stat

OCT 30 1997 ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 607818

2. To: (Receiving Organization) W-030 TEST REVIEW BOARD		3. From: (Originating Organization) DISPOSAL PROJECTS		4. Related EDT No.: <i>PC</i> 616329	
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 Primary Ventilation Cooling 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	
				13. Permit/Permit Application No.: NA	
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				14. Required Response Date: Sept. 5, 1997	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-SD-W030-TD-004	-	0	W030 AY/AZ TANK FARM PREOP. TEST, PRIMARY VENT CONDENSER COOLING	Q	2	1	

16. 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	5-13	10/1/97	2	1	GP Hopkins	10/2/97		
--	--	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		Jim Kurland	10-22-97	101-56	
2	1	QA	HM Chafin								
3	--	Safety	WP Nelson								

18. Signature of EDT Originator <i>[Signature]</i>		19. Authorized Representative Date for Receiving Organization <i>[Signature]</i> 9/3/97		20. Design Authority/ Cognizant Manager <i>[Signature]</i> 10/1/97		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
---	--	--	--	---	--	--	--

PREOPERATIONAL TEST REPORT, PRIMARY VENTILATION CONDENSER COOLING SYSTEM

FT CLIFTON

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

EDT/ECN: 607818	UC: 2030
Org Code: 8C473	Charge Code: NH107
B&R Code: EW3130010	Total Pages: 93

Key Words: TEST, CONDENSER, COOLING, VENTILATION, UPGRADE

Abstract: Preoperational test report for Primary Ventilation Condenser Cooling System, Project W-030. Project W-030 provides a ventilation upgrade for the four Aging Waste Facility tanks.

The system uses a closed chilled water piping loop to provide offgas effluent cooling for tanks AY101, AY102, AZ101, AZ102; the offgas is cooled from a nominal 100 degrees F to 40 F. Resulting condensation removes tritiated vapor from the exhaust stack stream. The piping system includes a package outdoor air-cooled water chiller with parallel redundant circulating pumps; the condenser coil is located inside a shielded ventilation equipment cell. The tests verify correct system operation and correct indications displayed by the central Monitor and Control System.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: Document Control Services, P.O. Box 950, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Kara J. Braz 10/29/97
Release Approval Date

Approved for Public Release

W030 AY/AZ TANK FARM PREOPERATIONAL TESTING,
PRIMARY VENT CONDENSER COOLING 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 - System Manual Valves Alignment
Appendix C - Electrical Alignment List
Appendix D - Operation Data Sheets
Appendix E - Signature/Initial Verification Table
- Attachment 3 - Miscellaneous Supporting Data, including:
Lab test report of chilled water glycol concentration
Test report of sanitary water chemistry
Chilled water pump curve (poor copy enlarged from vendor data)
Vendor test report of chiller startup service
Procedure validation checksheet
- Attachment 4 - Calibration, Grooming, and Alignment Plan with data

REFERENCES

1. WHC-SD-W030-POTP-004/0	<i>Preoperational Test Procedure, W-030 Primary Vent Condenser Cooling</i>
2. WHC-SD-W030-SUP-003/0	<i>Startup Test Plan, W-030</i>
3. H-2-131071, Rev. 1	<i>P&ID AZCW Vent Condenser Cooling System</i>
4. WHC-SD-W030-ATR-004	<i>W-030 Acceptance Test Report, Cooling and Miscellaneous Instrumentation</i>

INTRODUCTION

Preoperational Test WHC-SD-W030-POTP-004 was successfully performed in June 1996 in accordance with reference-1 with one exception and no deficiencies. The tested system includes one air-cooled water chiller (nominal 40 refrigerant tons), two centrifugal circulating water pumps with expansion tank, one 500-gallon thermal storage tank, piping connecting these components to the primary vent system condenser, and related instrumentation. All test actions were initiated and/or verified at the central control room graphic screens of the Monitor and Control System (MCS).

All system instrumentation was calibrated and all system instrument loop checks were completed prior to testing in accordance with a Project W030 internal Calibration, Grooming, and Alignment (CGA) Plan. Data is included in Attachment-4. The testing satisfactorily met the test objectives as outlined in reference-2 for the applicable system which is designed as shown on reference-3. Performance data was collected primarily for information only, with minimal acceptance criteria. One test exception was recorded and resolved. This test report includes a copy of the final approved test procedure, annotated with field test data and initialed by the Test Engineer.

SUMMARY OF ACCEPTANCE CRITERIA AND RESULTS

The following acceptance criteria were evaluated in the course of testing:

ITEM/FUNCTION	ACCEPTANCE CRITERIA	TEST RESULT
LOCAL/REMOTE PUMP CONTROL	CORRECT LOGIC INTERLOCKS	CRITERIA MET
PUMP ROTATION	CORRECT DIRECTION AS MARKED	CRITERIA MET
PUMP PERFORMANCE AT NO FLOW	REASONABLY CLOSE TO VENDOR CURVE	CRITERIA MET
PUMP PERFORMANCE AT DESIGN FLOW	REASONABLY CLOSE TO VENDOR CURVE	CRITERIA MET
EXPANSION TANK LEVEL ALARMS	ALARM ANNUNCIATES ON LOW TANK LEVEL	CRITERIA MET
LOW-FLOW PUMP SWITCHOVER	AUTOMATIC SWITCH TO STANDBY AT LOW FLOW	CRITERIA MET
PUMP VIBRATION	VIBRATION IS TYPICAL FOR PUMPS OF THIS TYPE	CRITERIA MET
LIQUID CHILLER OPERATION FROM MCS PANEL	CHILLER STARTS AND STOPS FROM CORRECT GRAPHIC SCREEN	CRITERIA MET (Note)
LIQUID CHILLER INTERLOCK	CHILLER STOPS ON LOW WATER FLOW (<70 GPM), RESTARTS AT NORMAL FLOW	CRITERIA MET
PERFORM VENDOR STARTUP SERVICE ON CHILLER	AUTHORIZED SERVICE REP. TO PERFORM STARTUP SERVICE PER MFG. INSTRUCTIONS	CRITERIA MET (note)

Note: Chiller was not tested for performance since insufficient system load was available.

Water System Filling. The Condenser cooling (chilled-water recirculation) system, AZCW, was turned over to W-030 Project Test Engineering Personnel prior to being filled with water and propylene glycol. Sanitary water was used for filling and flushing the AZCW system and was supplied by tanker truck; raw water which is piped to the W030 site is not sufficiently pure for this service.

Prior to filling operations, a vent valve was installed on the condenser inlet connection in the primary vent cell to ensure removal of all trapped air from the piping system. The AZCW system was filled using an engine-driven pump with a capacity of approximately 30 gallons per minute (gpm) and a discharge head of 40 psig. The system was flushed to remove discoloration of the water due to corrosion products in the piping. Upon obtaining water clarity, the thermal storage tank was isolated and drained in preparation for glycol addition. Estimated system volume is about 750 gallons; approximately 6 ½ drums (350 gallons) of propylene glycol (DOWFROST HEAT TRANSFER FLUID) were added to the AZCW system to achieve a concentration of 45%-50% by volume. A lab analysis (copy attached) shows the concentration to be 46% (using best available ASTM organic analysis). This concentration gives a desired freezing point of about -20 degrees F (see vendor table, attachment 3). The system was filled to expansion tank mid-level (by sight glass). As stated in attached vendor information, the DOWFROST dilution water chemistry requirements (to ensure effectiveness of corrosion inhibitors) is as follows: Chlorides ≤25ppm, Sulfates ≤25ppm, Calcium ≤50ppm and Magnesium ≤50ppm. It was determined before filling, that site sanitary water meets these requirements, according to routine laboratory analysis taken June 1995 (copy attached).

Alarm/Interlock & Pump Tests. All system alarms were verified during the preoperational test. Conditions were established locally to force occurrence of the system alarms (low system flow and low expansion tank level). The alarms were verified on the applicable computer graphics screen in the control room. Local pump controls were proven and then the controls were placed in "remote" mode to prove the Monitor/Control System (MCS) controls and interlocks. Pump operation was performed from the Monitor and Control System (MCS) in the central control room and from the Local Control Unit (LCU). The low-flow interlock and pump switchover functions were proven, as well as the capability to override this interlock. Sufficient operational data was gathered on pump operation to demonstrate that both pumps are operating within the acceptable range of the pump curve provided by the vendor (see below). The following table summarizes the data recorded during the test for each AZCW pump at shutoff head and at system design flow rates:

Pump ID	AZ-CW-P-1A		AZ-CW-P-1B	
Flow, gpm	0	115 ⁽¹⁾	0	115 ⁽¹⁾
Motor amps (volts=490)	4	5	4	5
Suct. pressure (psig)	9	4	5.5	4
Dis. pressure (psig)	37	26	33	27
Calculated values				
Diff. pressure (psid)	28	22	27.5	23
Total Head (calc., ft)	62	49	62 ⁽²⁾	49
Total Head (design)	55	50	55	50
<p>(1) System waterflow was throttled and set at the nominal design flow rate of 115 gpm (reference 4) using manual valve HV-AZCWS-1A2.</p> <p>(2) Pumps developed slightly higher pressure at no flow than vendor curve predicts, but this will have no consequence on normal system operation. Calculated TH=2.31(DP)/(SG) (DP=diff. press; SG=specific grav.=1.04). Motor amperage is very close to that which would be expected and is only recorded for information.</p> <p>(3) Baseline pump vibration data was collected and recorded on the data sheets; data is considered normal although no acceptance criteria exists.</p>				

Chiller Operation. Initial chiller operation was checked by a vendor service representative (called in by the startup team for assistance) using a general startup procedure given in CVI (copy included in attachment 3). A problem was found in the operation of the expansion valve for #2 compressor. Consequently, a new control circuit board and expansion valve were installed by the vendor representative. The chiller was then placed in operation and the refrigerant systems were trimmed out by the vendor representative. During this time, the chiller was observed to cycle on and off at the established temperature setpoint for the AZCW system. This cycling occurred several times as there was only minimal heat load available to maintain chiller operation (load was established using normal airflow through the system condenser as provided by operation of one primary vent fan handling outside ambient air).

Following completion of the vendor representative's initial checks and setup,

the chiller was placed in service to verify operation of the low recirculation flow trip. AZCW flow was throttled to initiate the chiller trip. The capability of overriding this trip was also verified. This completed the preoperational testing of the AZCW system and the chiller.

A brief user-training session was provided to three operations personnel by the vendor representative, however it was noted that operators will be restricted from access to the local video display terminal due to 120V connections inside the chiller cabinet panel. A copy of the vendor representative's field report is attached for record keeping.

Test Notes: The test procedure required a Test Engineer's signature (but not the date of the signature) on some of the test steps. Dates were provided along with signatures on calibrations verification sheets, valve alignment checklists, and valve cycling checklists (see Appendices A, B, and C), as well as the "prerequisite" steps in Section 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.

This test effectively satisfies previously-deferred test exception, TE#007, from construction acceptance testing, reference-4 (Section 10, chilled water pump testing).

CERTIFIED VENDOR INFORMATION (CVI)

Major equipment CVI is filed as follows:

o pumps	022525/29	Worthington
o chiller	022525/30	Dunham Bush

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	10/2/97
	d. Onsite vendor test procedures/reports	JTC	10/8/97
	e. Applicable/important vendor data	JTC	10/8/97
	f. CVI list, Major equipment	JTC	10/8/97
	g. Instrument and Loop calibration data	JTC	10/8/97
3	Test Exceptions (TEs) - Qty. <u>01</u>	JTC	10/8/97
	a. All listed in TE Log	JTC	10/8/97
	b. All TE reports closed/signed/dated	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: <u>WHC-SD-W030-ATR-004</u>	JTC	10/8/97
	b. TEs covered in this test: <u>007</u> ⁽⁴⁾	JTC	10/8/97
8	Filename, original test record <u>2E-96-00286</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

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

PAI

REVISION NO. 0

EFFECTIVE DATE

HNF-SD-W030-TD-004,
REV. 0, PAGE 7

Author

Thomas G. Howell

T.G. Howell

Print Name/Signature

APPROVAL DESIGNATOR SO

PROCEDURE APPROVAL BY TEST REVIEW BOARD (TRB)

<u><i>J. Clifton</i></u>	<u>4-1-96</u>	<u><i>M.D. Harding</i></u>	<u>4-12-96</u>
TRB Chair	Date	TWRS Operations	Date
<u><i>Scott R. Rags</i></u>	<u>4-12-96</u>	<u><i>W. P. Nelson</i></u>	<u>4-10-96</u>
TWRS Engineering	Date	TWRS Safety	Date
<u><i>B. Alder</i></u>	<u>10 April '96</u>	<u><i>Harold M. Chafin</i></u>	<u>4-2-96</u>
Construction Projects Startup	Date	Quality Assurance	Date
<u><i>K.D. Colon</i></u>	<u>4/16/96</u>	<u>N/A</u>	
Project Management	Date	ICF-KH Construction	Date

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

REVISION NO. 0

PAGE
EFFECTIVE DATE

TABLE OF CONTENTS PAGE

1.0 PURPOSE	3
2.0 INFORMATION	3
2.1 SCOPE	3
2.2 TERMS AND DEFINITIONS	3
2.3 RESPONSIBILITIES	3
2.4 CHANGE CONTROL	5
2.5 EXCEPTIONS	5
2.6 REFERENCES	5
2.7 ENVIRONMENTAL	5
2.8 SAFETY	6
2.9 RADIATION AND CONTAMINATION CONTROL	6
2.10 QUALITY ASSURANCE	6
2.11 GENERAL INFORMATION	6
2.12 LIMITS AND PRECAUTIONS	7
3.0 RECORDS	8
4.0 PREREQUISITES	8
5.0 PROCEDURE	9
ATTACHMENTS	
Attachment A	

WHC-SD-W030-TD-004,
REV. 0, PAGE 8

1.0 PURPOSE

- 1.1 This procedure has been prepared to verify the Primary Ventilation Condensate Cooling System 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 in the Primary Ventilation Condensate Cooling System:
- Glycol System Recirc Pumps
 - Air Cooled Chiller Package
- 2.1.2 This test will demonstrate the operation of system interlocks and controls both local and remote.

2.2 TERMS AND DEFINITIONS

- 2.2.1 OS - Operating Station
2.2.2 LOI - Local Operator Interface device
2.2.3 HS - Hand Switch
2.2.4 MCS - Monitoring and Control Station
2.2.5 HV - Hand Valve
2.2.6 PI - Pressure Indicator

2.3 RESPONSIBILITIES

- 2.3.1 The craft personnel (TWRS Maintenance and/or Construction Forces) are responsible for:
- Providing assistance during the test.

2.3.2 Test Director responsible:

- Provides the equipment found in Step 4.8 of this procedure.
- 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.
- 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 Engineering Personnel responsible for:

- 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 responsible for:

- Observing test activities for training purposes.

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 H, Test Exception log sheet. A test exception report, Appendix G, 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, WHC-SD-W030-SUP-003
 - H-2-131071, P&ID AZCW Vent Cond Cooling Sys
 - Tank Farm Ventilation Upgrade, W-030-C2
 - Tank Farm Ventilation Upgrade, W-030-C3
 - W-030-P13, Air-Cooled Liquid Chiller
 - W-030-P12, Vertical In-Line Centrifugal Pump
 - W-030-P14, Primary/Recirculation Off-Gas Heat Exchangers
 - W-030-P18, Gas/Liquid Separator

2.7 ENVIRONMENTAL

- 2.7.1 Spills of hazardous materials (including propylene glycol) should be reported to Environmental Reports group at 373-4942.

- 2.7.2 At no time during the testing should refrigerants, such as chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC), be discharged to the atmosphere.
- 2.7.3 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.

Warning - Exposure to Propylene Glycol can cause gastrointestinal disturbances, nausea, headache and vomiting and CNS depression. May be harmful by ingestion, inhalation or skin absorption. May cause skin and eye irritation.

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

- 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 or hold points 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 None

2.12 LIMITS AND PRECAUTIONS

- 2.12.1 If during performance of this procedure, any of the following conditions are found, immediately notify the Test Engineer:
- Any equipment malfunction which could prevent fulfillment of it's functional requirements.
 - Personnel error or procedural inadequacy which could prevent fulfillment of procedural requirements.

The Test Engineer may choose to stop work and place equipment in a safe condition based on the significance of the malfunction, error or inadequacy.

- 2.12.2 Contact Test Director for additional instructions if changing plant conditions affect work or delays in work extend past end of shift.
- 2.12.3 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 disposal.
- 2.12.4 Comply with WHC and plant/facility specific lock and tag or over-tagging requirements, as applicable.
- 2.12.5 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 desired range.
 - Have an accuracy (consistent with state-of-the-art limitations) equal to or greater than the accuracy specified in the procedure.
- 2.12.6 Timing measurements shall be made with commercially available time devices.

2.12.7 The Test Engineer has overall control of the testing process and change authorization for this procedure. They are responsible for running the test, data collection, and ensuring compliance with all requirements in this procedure.

2.12.8 All readings are to be taken and recorded for each location where the capability exists (i.e. local instrument, LOI, MCS).

3.0 RECORDS

3.1 This procedure as well as all completed attachments/appendices are kept as a permanent record.

4.0 PREREQUISITES

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 test.

Test Director *[Signature]* 5/2/96

4.2 Perform a walkdown inspection of the systems tested by this procedure.

Test Director *[Signature]* 5/3/96

4.3 The following equipment has been prepared for operation in accordance with vendor manuals:

4.3.1 Air-cooled Liquid Chiller AZ-CW-R-1.

Test Director *[Signature]* 6/21/96

4.4 Radio communication between the control room and field test personnel has been verified.

Test Director *[Signature]* 5/3/96

4.5 The official copy of this POTP and all other copies that will be used during the test have been verified to be the latest revision.

Test Director *[Signature]* 5/3/96

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WMC-SD-W030-POTP-004~~

PAGE

REVISION NO. 0

EFFECTIVE DATE

HMF-SD-W030-TD-004,
REV. 0, PAGE 15

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

Test Director [Signature] 5/13/96

- 4.7 Notify WMC Maintenance (373-9035) 24 hours prior to commencement of testing to facilitate obtaining baseline data on fans and motors by maintenance.

4.8 EQUIPMENT/INSTRUMENTS

Supplied by Test Operator unless otherwise noted.

- 4.8.1 Clamp-on Ammeter: 0-40 Ampere.

Manufacturer: N/ASerial No. N/ACalibration Due Date N/A

See Test Log, App. F

Model No. N/ACalibration Date N/A

10-2-97

- 4.8.2 Multi-meter 0-480V

Manufacturer: FLUKEModel No. 8060ASerial No. 814-44-03-068Calibration Date 5/14/96Calibration Due Date 5/14/97

- 4.8.3 Ohmmeter (OHM): Quantity of 2 required.

Manufacturer: N/AModel No. N/ASerial No. N/ACalibration Date N/ACalibration Due Date N/A

5.0 PROCEDURE

- 5.1 Preoperational testing shall be performed using Attachment A of this procedure.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

PAGE 1 OF 1

Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 16

1.0 INITIAL CONDITIONS

- 1.1 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: JS Howell

- 1.2 VERIFY the system is aligned for preoperational testing in accordance with Appendix B.

Test Engineer: JS Howell

- 1.3 VERIFY system electrical circuit breakers are aligned in accordance with Appendix C.

Test Engineer: JS Howell

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

Test Engineer: JS Howell

- 1.5 The test engineer has verified, by review of the tag log and a walkdown of the systems being tested, that all components within and including the test boundary have been "blue" tagged.

Test Engineer: JS Howell

2.0 Glycol Recirc System Testing

- 2.1 VERIFY Recirc Pump AZ-CW-P-1A local control switch HS-AZCWP-1A1 in the STOP position.

Test Engineer: JS Howell

- 2.2 CLOSE local breaker for Recirc Pump AZ-CW-P-1A.

- 2.3 RECORD the following data for Recirc Pump AZ-CW-P-1A:

Expansion Tank Level (Local) Y2

Suction Pressure(Local) 9 psi

Run Time (graphics screen 14Chillr.v) 11 hrs

Test Engineer: JS Howell

- 2.4 PLACE remote control switch HS-AZCWP-1A in START on graphics screen 14Chillr.v.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~PAGE ~~2~~ OF ~~1~~Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 17

- 2.5 VERIFY Recirc Pump AZ-CW-P-1A does not start.
Test Engineer: TD Howell
- 2.6 BUMP Recirc Pump AZ-CW-P-1A by placing local control switch HS-AZCWP-1A1 in START and then back to STOP.
- 2.7 VERIFY rotation of the Recirc Pump AZ-CW-P-1A is in the direction indicated by the arrow on the pump.
Test Engineer: TD Howell
- 2.8 PLACE Recirc Pump AZ-CW-P-1A local control switch HS-AZCWP-1A1 in the START position.
- 2.9 VERIFY Recirc Pump AZ-CW-P-1A starts.
Test Engineer: TD Howell
- 2.10 RECORD the following data for Recirc Pump AZ-CW-P-1A:
See Test Log, App. F. JTC 10/2/27
2.10.1	Motor Current (TEST INST.)	<u>4</u>	Amps
2.10.2	Motor Voltage (TEST INST.)	<u>490</u>	Volts
2.10.3	Suction Pressure (LOCAL)	<u>9</u>	psi
2.10.4	Discharge Pressure (LOCAL)	<u>37</u>	psi
- Test Engineer: TD Howell
- 2.11 SLOWLY OPEN Recirc pump AZ-CW-P-1A discharge valve HV-AZCWP-1A5 and establish a system flowrate of ≥ 115 gpm as indicated on FI-AZCWR-1.
- 2.12 VERIFY low flow alarm FAL-AZCWR-1 clears on graphics screen 14Chillr.v.
Test Engineer: TD Howell
- 2.13 RECORD the following data for Recirc Pump AZ-CW-P-1A:
See Test Log, App. F. JTC 10/2/27
2.13.1	Motor Current (Test Inst.)	<u>5</u>	Amps
2.13.2	Motor Voltage (Test Inst.)	<u>490</u>	Volts
2.13.3	Suction Pressure (Local)	<u>4</u>	psi
2.13.4	Discharge Pressure (Local)	<u>26</u>	psi
2.13.5	System Flow (graphics screen 14Chillr.v)	<u>115</u>	gpm
2.13.6	Expansion Tank Level (Local)	<u>Y2</u>	
- Test Engineer: TD Howell
- 2.14 THROTTLE CLOSED valve HV-AZCWP-1A2 until system flow starts to decrease as indicated on FI-AZCWR-1.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

PAGE 3 OF 11

Revision No. 0

ATTACHMENT A

Effective Date _____

2.15 FULLY OPEN Recirc Pump AZ-CW-P-1A discharge valve HV-AZCWP-1A5.

2.16 ADJUST system flow to ≥ 115 gpm using HV-AZCWP-1A2

2.17 VERIFY Recirc Pump AZ-CW-P-1B local control switch HS-AZCWP-1B1 in the STOP position.

Test Engineer: JA Howell

2.18 CLOSE local breaker for Recirc Pump AZ-CW-P-1B.

2.19 RECORD the following data for Recirc Pump AZ-CW-P-1B:

Suction Pressure(Local) 5.5 psi

Run Time (graphics screen 14Chillr.v) 9 hrs.

Test Engineer: JA Howell

2.20 PLACE remote control switch HS-AZCWP-1B in START on graphics screen 14Chillr.v.

2.21 VERIFY Recirc Pump AZ-CW-P-1B does not start.

Test Engineer: JA Howell

2.22 BUMP Recirc Pump AZ-CW-P-1B by placing local control switch HS-AZCWP-1B1 in START and then back to STOP.

2.23 VERIFY rotation of the Recirc Pump AZ-CW-P-1B is in the direction indicated by the arrow on the pump.

Test Engineer: JA Howell

2.24 PLACE Recirc Pump AZ-CW-P-1B local control switch HS-AZCWP-1B1 in the START position.

2.25 VERIFY Recirc Pump AZ-CW-P-1B starts.

Test Engineer: JA Howell

2.26 RECORD the following data for Recirc Pump AZ-CW-P-1B:

2.26.1 Motor Current (graphics screen 14Chillr.v) 4.1

Amps See Test Log, App. F. 3R 10/2/27

2.26.2 Motor Voltage (TEST INST.) 490 Volts

2.26.3 Suction Pressure (LOCAL) 5.5 psi

2.26.4 Discharge Pressure (LOCAL) 3.3 psi

Test Engineer: JA Howell

2.27 SLOWLY OPEN Recirc pump AZ-CW-P-1B discharge valve HV-AZCWP-1B5.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

PAGE 4 OF 1

Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 19

2.28 PLACE Recirc Pump AZ-CW-P-1A remote control switch HS-AZCWP-1A in the STOP position on graphics screen 14Chillr.v.

2.29 VERIFY that Recirc Pump AZ-CW-P-1A does not STOP.

Test Engineer: T.D. Howell

2.30 PLACE Recirc Pump AZ-CW-P-1A local control switch HS-AZCWP-1A1 in the STOP position.

2.31 VERIFY that Recirc Pump AZ-CW-P-1A STOPS.

Test Engineer: T.D. Howell

2.32 ADJUST system flow, if required, to ≥ 115 gpm using HV-AZCWP-1A2.

2.33 RECORD the following data for Recirc Pump AZ-CW-P-1B:

2.33.1 Motor Current (graphics screen 14Chillr.v) 5
Amps

2.33.2 Motor Voltage (TEST INST.) 490 Volts

2.33.3 Suction Pressure (LOCAL) 4 psi

2.33.4 Discharge Pressure (LOCAL) 27 psi

2.33.5 System Flow (TEST INST.) 115 gpm

2.33.6 Expansion Tank Level (Local) Y2

Test Engineer: T.D. Howell

2.34 VERIFY that Low Flow Shutdown Override control switch HS-AZCWP-1BB is selected to NORMAL on graphics screen 14Chillr.v.

Test Engineer: T.D. Howell

2.35 THROTTLE HV-AZCWP-1A2 to decrease flow to < 100 gpm.

2.36 VERIFY system low flow alarm, FAL-AZCWR-1 annunciates on graphics screen 14Chiller.v.

Test Engineer: T.D. Howell

2.37 THROTTLE HV-AZCWP-1A2 to increase flow to ≥ 115 gpm.

2.38 VERIFY system low flow alarm, FAL-AZCWR-1 clears on graphics screen 14Chiller.v.

Test Engineer: T.D. Howell

2.39 PLACE Recirc Pump AZ-CW-P-1A local control switch HS-AZCWP-1A1 in the REMOTE position.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

PAGE 5 OF 11

Revision No. 0

ATTACHMENT A

Effective Date _____

- 2.40 START Recirc Pump AZ-CW-P-1A from graphics screen 14Chiller.v.
- 2.41 VERIFY Recirc Pump AZ-CW-P-1A starts.
Test Engineer: 7.5 Howell
- 2.42 PLACE Recirc Pump AZ-CW-P-1B local control switch HS-AZCWP-1B1 in the STOP position.
- 2.43 VERIFY Pump AZ-CW-P-1B stops.
Test Engineer: 7.5 Howell
- 2.44 PLACE Recirc Pump AZ-CW-P-1B local control switch HS-AZCWP-1B1 in the REMOTE position.
- 2.45 PLACE Recirc Pump AZ-CW-P-1B in standby on graphics screen 14Chiller.v.
- 2.46 OPEN local breaker for Recirc Pump AZ-CW-P-1A.
- 2.47 VERIFY Recirc Pump AZ-CW-P-1B auto starts.
Test Engineer: 7.5 Howell
- 2.48 PLACE Recirc Pump AZ-CW-P-1A remote control switch HS-AZCWP-1A in STOP position on graphics screen 14Chiller.v.
- 2.49 CLOSE local breaker for Recirc Pump AZ-CW-P-1A.
- 2.50 PLACE Recirc Pump AZ-CW-P-1A in standby on graphics screen 14Chiller.v.
- 2.51 OPEN local breaker for Recirc Pump AZ-CW-P-1B.
- 2.52 VERIFY Recirc Pump AZ-CW-P-1A starts.
Test Engineer: 7.5 Howell
- 2.53 PLACE Recirc Pump AZ-CW-P-1B remote control switch HS-AZCWP-1B in STOP position on graphics 14Chiller.v.
- 2.54 CLOSE local breaker for Recirc Pump AZ-CW-P-1B.
- 2.55 ALLOW Recirc Pump AZ-CW-P-1A to operate for one hour for collection of vibration data and bearing data.

HNF-SD-W030-TD-004,
REV. 0, PAGE 20

Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 21

- 2.56 RECORD vibration data and bearing temperatures on Appendix D-1.

Test Engineer: J.A. Howell

- 2.57 START Recirc Pump AZ-CW-P-1B from LCU3-31.

- 2.58 STOP Recirc Pump AZ-CW-P-1A from LCU3-30.

- 2.59 ALLOW Recirc Pump AZ-CW-P-1B to operate for one hour for collection of vibration data and bearing data.

- 2.60 RECORD vibration data and bearing temperatures on Appendix D-2.

Test Engineer: J.B. Howell

- 2.61 SLOWLY CLOSE Expansion Tank Level Switch LSL-AZCWTk- 1 Low Side Isolation Valve HV-AZCWTk-1A1.

- 2.62 VERIFY Expansion Tank Low Level Alarm annunciates on graphics screen 14Chiller.v.

Test Engineer: J.B. Howell

- 2.63 OPEN Expansion Tank Level Switch LSL-AZCWTk- 1 Low Side Isolation Valve HV-AZCWTk-1A1.

- 2.64 VERIFY Expansion Tank Low Level Alarm clears on graphics screen 14Chiller.v.

Test Engineer: J.B. Howell

- 2.65 PLACE Low Flow Shutdown Override switches HS-AZCWP-1AB and HS-AZCWP-1BB in the OVERRIDE position on graphics screen 14Chiller.v.

- 2.66 PLACE Recirc Pump AZ-CW-P-1A in standby on graphics screen 14Chiller.v.

- 2.67 THROTTLE HV-AZCWP-1A2 to decrease flow to <80 gpm.

- 2.68 VERIFY the Recirc Pump AZ-CW-P-1B does not STOP on low flow.

Test Engineer: J.B. Howell

- 2.69 PLACE Low Flow Shutdown Override switch HS-AZCWP-1BB in the NORMAL position on graphics screen 14Chiller.v.

2.70 VERIFY the Recirc Pump AZ-CW-P-1B STOPS on low flow.

Test Engineer: 7.0 Howell

2.71 VERIFY Recirc Pump AZ-CW-P-1A auto starts.

Test Engineer: 7.0 Howell

2.72 PLACE Low Flow Shutdown Override switch HS-AZCWP-1AB in the NORMAL position on graphics screen 14Chiller.v.

2.73 VERIFY the Recirc Pump AZ-CW-P-1A STOPS on low flow.

Test Engineer: 7.0 Howell

2.74 PLACE Low Flow Shutdown Override switch HS-AZCWP-1AB in the OVERRIDE position on graphics screen 14Chiller.v.

2.75 PLACE Recirc Pump AZ-CW-P-1A remote control switch HS-AZCWP-1A in START position on graphics screen 14Chiller.v.

2.76 VERIFY that Recirc Pump AZ-CW-P-1A starts.

Test Engineer: 7.0 Howell

2.77 THROTTLE HV-AZCWP-1A2 to increase system flow to ≥ 115 gpm.

2.78 PLACE Low Flow Shutdown Override switch HS-AZCWP-1AB in the NORMAL position on graphics screen 14Chiller.v.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WMC-SD-W030-POTP-004~~

PAGE 8 OF 8

Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 23

3.0 Air-Cooled Liquid Chiller Testing

- 3.1 VERIFY chiller compressor crankcase heaters have been energized for a minimum 24 hours prior to testing of chiller.

Test Engineer: JA Howell

- 3.2 VERIFY oil level in both compressor sightglasses is between $\frac{1}{2}$ and $\frac{3}{4}$ of the complete sightglass.

Test Engineer: JA Howell

- 3.3 ASSIST vendor representative in performing required initial startup checks.

- 3.4 VERIFY chilled water flow of ≥ 115 gpm as indicated at FI-AZCWR-1 on graphics screen 14Chiller.v.

Test Engineer: JA Howell

- 3.5 RECORD chiller evaporator chilled water inlet and outlet temperatures from chiller CRT.

- Evaporator chilled water inlet temperature (RWT) 78 °F
- Evaporator chilled water outlet temperature (LWT) 78 °F

Test Engineer: JA Howell

- 3.6 IF chilled water temperature is below 38°F, THEN DECREASE the chilled water control point using the vendors manual, OTHERWISE continue at step 3.7, 3.15.

- 3.7 PLACE chiller control switch HS-AZCWR-1 in the ON position on graphics screen 14Chiller.v..

- 3.8 VERIFY chiller compressor No. 1 starts.

Test Engineer: JA Howell

- 3.9 OBSERVE compressor No. 1 load using indicators at the local control panel.

- 3.10 VERIFY that chiller maintains chilled water temperature (LWT) within 5°F of setpoint.

Test Engineer: JA Howell

- 3.11 PLACE Low Flow Shutdown Override switch HS-AZCWP-1AB and HS-AZCWP-1BB in the OVERRIDE position on graphics screen 14Chiller.v.

- 3.12 THROTTLE HV-AZCWP-1A2 to decrease flow to <70 gpm.

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

~~PAGE 9 OF 1~~

Revision No. 0

ATTACHMENT A

Effective Date _____

HNF-SD-W030-TD-004,
REV. 0, PAGE 24

3.13 VERIFY the Air Cooled Liquid Chiller stops .

Test Engineer: TS Howell

3.13 ADJUST HV-AZCWP-1A2 to increase flow to ≥ 115 .

3.14 VERIFY the Air Cooled Liquid Chiller starts .

Test Engineer: TS Howell

3.15 PLACE chiller control switch HS-AZCWR-1 in the OFF position on graphics screen, 14Chiller.v..

3.16 VERIFY the Air Cooled Liquid Chiller stops .

Test Engineer: TS Howell

3.17 PLACE Recirc Pump AZ-CW-P-1A remote control switch HS-AZCWP-1A in STOP position on graphics screen 14Chiller.v.

3.18 VERIFY Recirc Pump AZ-CW-P-1A stops.

Test Engineer: TS Howell

3.19 PLACE Low Flow Shutdown Override switch HS-AZCWP-1AB and HS-AZCWP-1BB in the NORMAL position on graphics screen 14Chiller.v.

4.0 Secure From Testing.

4.1 VERIFY all test equipment disconnected from system.

Test Engineer: TS Howell

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 25

APPENDIX A - Instrumentation Requiring Calibration Verification

Equipment Number	Functional Description	Signature	Date/Time
PI-AZCWP-1A1	Recirc Pump AZ-CW-P-1A Suction Pressure Indicator	<i>70 H</i>	<i>5/30/96</i>
PI-AZCWP-1A2	Recirc Pump AZ-CW-P-1A Discharge Pressure Indicator	<i>70 H</i>	<i>5/30/96</i>
IT-AZCWP-1A	Recirc Pump AZ-CW-P-1A Motor Current Transformer	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
PI-AZCWP-1B1	Recirc Pump AZ-CW-P-1B Suction Pressure Indicator	<i>70 H</i>	<i>5/30/96</i>
PI-AZCWP-1B2	Recirc Pump AZ-CW-P-1B Discharge Pressure Indicator	<i>70 H</i>	<i>5/30/96</i>
IT-AZCWP-1B	Recirc Pump AZ-CW-P-1B Motor Current Transformer	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
TE-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Temperature Element	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
TT-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Temperature Transmitter	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
TE-AZCWS-1	Primary Ventilation Condensate Cooling System Supply Header Temperature Element	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
TT-AZCWS-1	Primary Ventilation Condensate Cooling System Supply Header Temperature Transmitter	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>
FT-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Flow Transmitter.	<i>70 H</i>	<i>5/30/96</i>
LSL-AZCWTk-1	Expansion Tank AZ-CW-TK-1 Low Level Switch	<i>* TE-W030-007</i> <i>70 H</i>	<i>5/30/96</i>

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 26

APPENDIX B - Tank AY101 Recirc Condenser Cooling System Valve Alignment

VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS (1*)	IV (2)
HV-AZCWP-1A1	Recirc Pump AZ-CW-P-1A Suction Isolation Valve	OPEN	DA	7894
HV-AZCWP-1A3	Recirc Pump AZ-CW-P-1A Suction Pressure Gage Isolation	OPEN	DA	7894
HV-AZCWP-1A4	Recirc Pump AZ-CW-P-1A Discharge Pressure Gage Isolation	OPEN	DA	7894
HV-AZCWP-1A5	Recirc Pump AZ-CW-P-1A Discharge Isolation	CLOSED	DA	7894
HV-AZCWS-1A2	Recirc Pump Discharge Header Isolation Valve	OPEN	DA	7894
HV-AZCWP-1A2	Recirc Pump AZ-CW-P-1A Suction Strainer AZ-CW-F-1A Drain Isolation Valve	CLOSED	DA	7894
HV-AZCWP-1B1	Recirc Pump AZ-CW-P-1B Suction Isolation Valve	OPEN	DA	7894
HV-AZCWP-1B3	Recirc Pump AZ-CW-P-1B Suction Pressure Gage Isolation	OPEN	DA	7894
HV-AZCWP-1B4	Recirc Pump AZ-CW-P-1B Discharge Pressure Gage Isolation	OPEN	DA	7894
HV-AZCWP-1B5	Recirc Pump AZ-CW-P-1B Discharge Isolation	CLOSED	DA	7894
HV-AZCWP-1B2	Recirc Pump AZ-CW-P-1B Suction Strainer AZ-CW-F-1B Drain Isolation Valve	CLOSED	DA	7894
HV-AZCWS-1A1	Primary Ventilation Condensate Cooling System Supply Header Drain Valve	CLOSED	DA	7894
HV-AZCWR-1A1	Primary Ventilation Condensate Cooling System Return Header Drain Valve	CLOSED	DA	7894
HV-AZCWTk-1A1	Expansion Tank Level Switch LSL- AZCWTk-1 Low Side Isolation	OPEN	DA	7894
HV-AZCWTk-1A2	Expansion Tank Level Switch LSL- AZCWTk-1 High Side Isolation	OPEN	DA	7894

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~

Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 27

APPENDIX B - Tank AY101 Recirc Condenser Cooling System Valve Alignment

VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS (1*)	IV (2)
HV-AZCWT-2	Primary Ventilation Condensate Cooling System Thermal Storage Tank Drain Valve	CLOSED	<i>DA</i>	<i>DA</i>
HV-AZCWR-1	Air-Cooled Liquid Chiller Inlet Isolation Valve	OPEN	<i>DA</i>	<i>DA</i>
HV-AZCWS-1	Air-Cooled Liquid Chiller Outlet Isolation Valve	OPEN	<i>DA</i>	<i>DA</i>

Performed

By *D.R. Hodgins*
(1*) PRINT NAME

DA
INITIALS

5-30-96
DATE

Verified

BY *T.L. Howell*
(2) PRINT NAME

Z8A
INITIALS

5/30/96
DATE

~~WHC-SD-W030-POTP-004~~

ATTACHMENT A

APPENDIX C - Tank AY101 Recirc Condenser Cooling System Electrical Alignment

DATE _____

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

WMC-SD-W030-POTP-004

Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 29

APPENDIX D-1
OPERATION DATA SHEET

Equipment Name: ~~TANK AY101 RECIRC~~ ^{*} CONDENSER COOLING SYSTEM RECIRC PUMP

EQUIPMENT I.D. NO. : AZ-CW-P-1A

NAMEPLATE DATA: See Attachment A, APP. F

VIBRATION DATA (mil)

1ST READING <i>✓ 1745</i>	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
HORIZONTAL <i>I/s</i>	<i>0.160 sec 1/0.002 ex 1</i>	<i>0.130 sec 1/0.002 ex 1</i>	<i>NA</i>	<i>NA</i>
VERTICAL <i>Indy/sec</i>	<i>NA</i>	<i>NA</i>	<i>✓</i>	<i>✓</i>
AXIAL	<i>↓</i>	<i>↓</i>	<i>↓</i>	<i>↓</i>

2ND READING	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
HORIZONTAL	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
VERTICAL	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>
AXIAL	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>

PUMP BEARING TEMPERATURES	MOTOR OUTBOARD	MOTOR INBOARD	PUMP OUTBOARD	PUMP INBOARD
	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

REMARKS: ** PROCEDURE ERROR, CORRECTED IN TEST REPORT. JTC 10/27/97*

Performed by: *[Signature]* Date *6/13/96*

Verified by: *[Signature]* Date *6/13/96*

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WMC-SD-W030-POTP-004~~

Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE ~~30~~ 29A

APPENDIX D-2
OPERATION DATA SHEET

Equipment Name: ~~TANK AY101 RECIRC~~ ^{*}CONDENSER COOLING SYSTEM RECIRC PUMP

EQUIPMENT I.D. NO. : AZ-CW-P-1B

NAMEPLATE DATA: See Attachment A, App. F

VIBRATION DATA (mil)

1ST READING	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
^{x1=1745} HORIZONTAL <u>I/s</u>	<u>0.162 sec</u>	<u>0.162 sec</u>	<u>N/A</u>	<u>N/A</u>
VERTICAL <u>Inches/sec</u>	<u>N/A</u>	<u>N/A</u>	<u>↓</u>	<u>↓</u>
AXIAL	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>

2ND READING	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
HORIZONTAL	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
VERTICAL	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>
AXIAL	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>

PUMP BEARING TEMPERATURES	MOTOR OUTBOARD	MOTOR INBOARD	PUMP OUTBOARD	PUMP INBOARD
	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

REMARKS: * PROCEDURE ERROR. CORRECTED IN TEST REPORT. JTC 1/27/97

Performed by: [Signature] Date 6/23/96

Verified by: [Signature] Date 6/25/96

~~WHC-SD-W030-PTP-004~~

ATTACHMENT A

APPENDIX E

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 29C

APPENDIX F

TEST LOG		TEST NUMBER:	TEST LOG PAGE NUMBER: _____ of _____
TEST TITLE:			
TIME/DATE	EVENT DESCRIPTION/SIGNATURE		
6/25/96	Vibration Test Inst.: SKF Microlag CMVA10 Standard lab #: 552-8402-001 Data Due 11/11/96		
10/2/97	All motor current amperage read from graphics screen, Mes. * JTC		
EQUIPMENT NAMEPLATE DATA			
* PUMP Worthington Model D-1132 Size 3X2X8 DC Impeller dia. 7.25 (AZ-CW-P-1A); 7.4 (AZ-CW-P-1B) Design press. 275 @ 100F S/N 49621 (AZ-CW-P-1A) 49721 (AZ-CW-P-1B)			
MOTOR US Electric, Unimount 125 Model B032A RPM 1745 HP 5 VOLTS 208-230/460, 3-PH/60 FLA 15-13.6/6.8 (max 16.2 @ 208V) DUTY Continuous ID W10W237R090M ENC TE, SF=1.25, Code J Frame 184 JP, Type UT1			

* Added to Test Report.

JTC 10/22/97

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~Revision No. 0

ATTACHMENT A

HNF-SD-W030-TD-004,
REV. 0, PAGE 30

APPENDIX G

TEST EXCEPTION REPORT		
TEST PROCEDURE NO. & SECTION: WHC-SD-W030-POTP-004	TEST NAME: W030 AY/AZ TANK FARM PREOPERATIONAL TEST, VENTILATION CONDENSATE COOLING SYSTEM	T.E. NUMBER: W030-007
DESCRIPTION OF PROBLEM: Seven instruments were included on the calibration verification list, in Attachment A in error. These instruments are put through a functional check as they cannot be calibrated. The affected instruments are as follows: LSL-AZCWTk-1, IT-AZCWP-1A, IT-AZCWP-1B, TE-AZCWR-1, TT-AZCWR-1, TE AZCWS-1, TT-AZCWS-1.		
ORIGINATOR: TG Howell <u>TG Howell</u> <u>5/31/96</u> ORG: DATE:	IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION & ☒ CONTINUE <u>M.D. Standing</u> <u>6-6-96</u> PIC DATE	
DISPOSITION: Remove (lineout) these instruments from Appendix A of Attachment A as the above listed instruments cannot be calibrated.		
DISPOSITION AND RETEST REQUIREMENTS BY: No Retest is required. <u>TG Howell</u> <u>5/31/96</u> DATE	DISPOSITION ACTIONS COMPLETE: Verified <u>Frank Clifton</u> <u>6-5-96</u> By: DATE	
QAE CONCURRENCE WITH DISPOSITION (if required): <u>Frank M. Clifton</u> <u>6-6-96</u> DATE	RETEST COMPLETE: N/A _____ PIC DATE	

PREOPERATIONAL TESTING, PRIMARY VENTILATION CONDENSATE COOLING

~~WHC-SD-W030-POTP-004~~
ATTACHMENT A

Revision No. 0

HNF-SD-W030-TD-004,
REV. 0, PAGE 31

APPENDIX H

TEST EXCEPTION LOG

TE #	DATE	DESCRIPTION	DISPOSITIONED	DATE CLOSED
W030-007	5/31/96	Insts. in App. A Not Calibratable.	Removed instruments From APP. A.	6/6/96

ATTACHMENT 3

MISCELLANEOUS SUPPORTING DATA

VERIFICATION / VALIDATION CHECKSHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 33

PROCEDURE NUMBER: WHC-SD-W030-POTP-004 REVISION NUMBER: _____

PROCEDURE TITLE: Preoperational Testing, Primary Ventilation Condensate Cooling

VERIFICATION

PROCEDURE WRITER: Gary Howell DATE: 3/11/96

PEER REVIEWER: Keith Ealden DATE: 3/11/96

VALIDATION

OPERATOR: T.K. Nease DATE: 3/13/96

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 Review: DE R. Martinez DATE: 3-13-96

VERIFICATION

COGNIZANT ENGINEER: [Signature] DATE: 4/8/96

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.

W. R. Grace & Co. - Conn.
300 Genesee Street
Lake Zurich, IL 60047-2458

(38) 438-1800

Laboratory no. 95-08084 ID no. 69017002
Collected 06/30/95 Rec'd 07/17/95 Reported 07/31/95
Salesman SPINNER, MARC D. District BOISE DISTRICT
Client WESTINGHOUSE/KAISER RICHLAND WA
Sampling Point 200 EAST (sanitary)

GRACE Dearborn

Report of Water Analysis

Sample Description:

reg'd.
Dissolved Solids 77.4 ppm
Suspended Solids < 10 ppm
pH 7.00
Phenolphthalein Alk as CaCO₃ < 1.0 ppm
Methyl Orange Alk as CaCO₃ 56.0 ppm

SPECIAL ANALYSIS:

*Hardness as CaCO₃ < 100 58.65 ppm
*Calcium as Ca 17.00 ppm
*Magnesium as Mg 3.93 ppm
Specific Conductance 120 umho/cm

reg'd. ppm#

epm##

*Calcium as CaCO₃ < 50 42.50 0.85
*Magnesium as CaCO₃ < 50 16.15 0.32
*Sodium as Na - 2.10 0.09
*Potassium as K - 0.80 0.02
Bicarbonate as HCO₃ - 68.3 1.12
Chloride as Cl by IC < 25 11.00 0.03
Nitrate as NO₃ by IC - 0.40 0.01
Sulfate as SO₄ by IC < 25 8.00 0.17
Silica as SiO₂ - 7.70

REMARKS:

WSCF
ANALYTICAL LABORATORY REPORT

Attention:
Project Number

FRANK CLIFTON R3-25
MISC. : MISCELLANEOUS WHC PROJECTS

Group #: 96000778

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W960001944	AZ101	Miscellaneous Organic Analyses	WATER	Best Availab		42%		0.000	05/24/96	05/24/96
W960001945	AZCW	Miscellaneous Organic Analyses	WATER	Best Availab		46%		0.000	05/24/96	05/24/96

MDL=Minimum Detection Limit

RQ=Result Qualifier

B - The analyte was detected in the associated method blank.

N - Identification is based on a mass spectral library search.

J - Estimated value.

U - The analyte was analyzed for but not detected.

* - Indicates results that have NOT been validated.

Westinghouse Hanford Company

HNF-SD-M030-TD-004,
REV. 0, PAGE 35

WORTHINGTON PUMP PERFORMANCE DATA

FOR COMPLETE INFORMATION
SEE CVI # 22525-29

SELECTING THE PROPER CONCENTRATION OF DOWFROST FLUID

The concentration of glycol-based heat transfer fluid required in a system depends on the kind of protection needed in winter, or the operating temperature if the system involves refrigeration. There are two basic types of protection available: "burst protection" and "freeze protection."

Burst protection

Burst protection is sufficient if the system will remain dormant when the temperature is below the freezing point of the solution. In HVAC applications, burst protection is considered an appropriate safeguard in systems where there is adequate space to accommodate the expansion of an ice/slush mixture and the system is inactive during the winter.

Inhibited glycol-based fluids provide burst protection in the following manner: as the temperature drops below the solution's freezing point, ice crystals begin to form. Because water in the solution freezes first, the remaining glycol solution becomes further concentrated and remains fluid. The combination of ice crystals and fluid results in a flowable slush. Fluid volume increases as this slush forms, with the extra volume flowing into available expansion volume in the system. If the concentration of glycol is sufficient, system damage will not occur.

For burst protection, a 35 percent (volume) solution of propylene glycol (36.6 percent DOWFROST or 46.7 percent DOWFROST HD) is usually adequate. See Table 3 for typical propylene glycol concentrations required to achieve burst protection at various temperatures.

Freeze protection

Freeze protection is required in systems where fluid must be pumped at the lowest anticipated temperature. Freeze protection is essential in cases where no ice crystals can be permitted to form or where there is inadequate expansion volume available to accommodate ice/slush formation.

For freeze protection, the required concentration of inhibited glycol fluid in the system depends on the operating conditions of the system and the lowest expected ambient

temperature. HVAC systems that are subject to prolonged winter shut-down—but which must start-up again while the weather is still cold—may require freeze protection. Freeze protection is also appropriate for closed-loop systems that must be protected in the event of power or pump failure.

To obtain adequate freeze protection, the glycol solution must maintain a freezing point at least 5°F below the lowest anticipated ambient temperature. Table 3 lists typical concentrations of DOWFROST fluids required to provide freeze protection. Refer to Table 2 for a complete list of the concentrations of inhibited propylene glycol to be added for freeze protection.

**Table 3—Typical Concentrations of DOWFROST Fluids
Required to Provide Freeze and Burst Protection
at Various Temperatures**

Temperature °F	Percent (volume) Glycol Concentration Required	
	For Freeze Protection	For Burst Protection
	DOWFROST and DOWFROST HD	DOWFROST and DOWFROST HD
20	18%	12%
10	29	20
0	36	24
-10	42	28
-20	46	30
-30	50	33
-40	54	35
-50	57	35
-60	60	35

NOTE: These figures are examples only and may not be appropriate to your situation. Generally, for an extended margin of protection, you should select a temperature in this table that is at least 5°F lower than the expected lowest ambient temperature. Inhibitor levels should be adjusted for solutions of less than 25–30% glycol. Contact Dow for information on specific cases or further assistance.

ATTENTION: These are typical numbers only and are not to be regarded as specifications. As use conditions are not within its control, Dow does not guarantee results from use of the information or products herein; and gives no warranty, express or implied.

PREPARING SOLUTIONS OF DOWFROST FLUIDS

Dilution water quality

Water used to dilute DOWFROST fluids must meet certain minimum standards for purity. Impurities in dilution water can increase metal corrosion, aggravate pitting of cast iron and steel, reduce the effectiveness of corrosion inhibitors, increase inhibitor depletion rate, cause formation of scale and other deposits on heat transfer surfaces, and cause clogging of system components.

To assure inhibitor effectiveness, the levels of chlorides and sulfates in water used to dilute DOWFROST fluids should be less than 25 ppm each. Total hardness should be less than 100 ppm expressed as ppm calcium carbonate. (See Table 4.) Distilled or deionized water is recommended. If good quality water is unavailable, pre-diluted solutions of DOWFROST fluids are available from Dow.

To ensure maximum effectiveness for corrosion protection, the inhibitor package is designed for a minimum 25-30 volume percent concentration of glycol in water.

**Table 4—Dilution Water
Quality Requirements**

Impurity	Level
Chlorides	25 ppm, max
Sulfates	25 ppm, max
Calcium [†]	50 ppm, max
Magnesium [†]	50 ppm, max

[†]Calcium and magnesium expressed as ppm calcium carbonate. Total hardness as calcium carbonate should be less than 100 ppm.

Solution make-up

As indicated above, good quality water must be used for fluid make-up. In addition, any flush water remaining in the system should be taken into account when introducing and diluting DOWFROST fluids. In an industrial system, it is not unusual to have "hold-up" of up to 20 percent of the total system volume, although 10 percent is more common.

Introducing DOWFROST fluids into your system

In most cases, solutions containing glycol-based heat transfer fluid are mixed on a volume basis. If you wish to mix by weight percent, use Table 2 to obtain the volume-to-weight conversion. Following is the mixing procedure for installing these fluids:

1. Calculate the quantity of fluid needed to achieve the desired results. Table 5, which provides the number of gallons per 100 feet of pipe, may be helpful in the calculation.

2. Introduce a sufficient quantity of water to check the system for tightness. Pressure testing the system at this stage can be helpful. Often pressure testing can be accomplished during the initial cleaning or flushing of the system.

3. Drain enough water from the system to provide space for the inhibited glycol quantity as calculated in Step 1.

4. Add the correct amount of fluid and any water needed to completely refill the system, allowing for liquid expansion as needed due to the operating temperature.

5. Circulate for at least 24 hours to ensure complete mixing. Check the liquid concentration with a refractometer or other method to assure that the correct mixture is obtained.

Increasing or decreasing the concentration of inhibited glycol in the system

It is sometimes necessary to increase the concentration of the glycol solution in your system, either to protect against cold weather, or to replace fluid lost through leakage or moisture absorbed from the atmosphere. There are other conditions which may require the dilution of inhibited glycol already in the system. Either adjustment can be carried out in batch or continuous operation.

REGULATORY STATUS OF DOWFROST FLUID

DOWFROST inhibited propylene glycol-based fluid is listed as chemically acceptable by the U.S. Department of Agriculture (USDA) for both defrosting refrigeration coils and for immersion freezing of wrapped meats, poultry and meat products in food processing plants operated under federal inspection. The FDA clears only individual ingredients, not proprietary products (trademarks). The two ingredients in DOWFROST fluid are generally recognized by the FDA as safe food additives under parts 182 and 184 of the Food Additive Regulations. The regulation for propylene glycol is 21 CFR 184.1666; for dipotassium phosphate, 182.6285. The propylene glycol and dipotassium phosphate in DOWFROST fluid meet the requirements of these regulations. Grade A dairies and meat packing establishments sometimes require a letter certifying the appropriate use and quality of DOWFROST fluid. Such a letter, along with copies of the acceptance letter from the USDA and a statement of FDA compliance, will be provided to Dow customers on request.

For applications where there is no chance of accidental contact with food or beverage products, and where there is no possibility of incidental contact with drinking water, DOWTHERM ethylene glycol-based fluids are generally used because of their greater heat transfer efficiency and superior low temperature performance. (Request Form No. 180-1190, "Engineering and Operating Guide for DOWTHERM SR-1 and DOWTHERM 4000 Inhibited Ethylene Glycol-based Heat Transfer Fluids.")

PREPARING SYSTEMS FOR THE ADDITION OF DOWFROST OR DOWFROST HD HEAT TRANSFER FLUID

Existing systems

In existing systems, all lines and materials should be cleaned and flushed thoroughly before charging the system with DOWFROST fluid. This is especially important if fluid previously in the system is incompatible with the new inhibited glycol fluid. A Dow technical service representative can help you determine the compatibility of other fluids with DOWFROST and DOWFROST HD heat transfer fluids.

If a fluid containing silicates (such as automotive antifreeze) was previously used, it may be necessary to clean silicate residues from the system.

It is also important to remove all rust, scale, and sediment in the system. Traces of chloride should be removed—whether from old fluid or residue from acid cleaner—because chlorides can contribute to corrosion. For large systems, or systems where corrosion is already evident, consult

a professional industrial cleaning organization. For heavily fouled or corroded systems, an optimum cleaning procedure includes the use of an inhibited acid followed by neutralization and phosphatization. This procedure is quite involved and should be done by a company experienced in industrial cleaning. If chemical cleaning is used, it is important that all traces of the cleaning agent be removed, and the system be thoroughly flushed with water.

New systems

New systems are typically coated with oil, grease or a protective film during fabrication, storage, or construction. Dirt, solder flux, and welding and pipe scale can also cause problems. Therefore, thorough cleaning of new systems is recommended. A solution of 1 to 2 percent trisodium phosphate can be used with water for flushing the system. System volume can be calculated during this stage by metering in the initial fill of the system, or by chemical analysis of cleaning chemicals after known quantities are introduced into the system.

RECIPROCATING UNIT CHECK-OUT REPORT

IMPORTANT: THIS REPORT MUST BE COMPLETELY FILLED OUT, AND SIGNED ON PAGE FOUR (4) IN ORDER FOR THE WARRANTY TO BE VALID. SEND COPY OF REPORT TO: NORTH AMERICAN SERVICE, DUNHAM-BUSH, INC., 101 BURGESS ROAD, HARRISONBURG, VA 22801.

INSTRUCTIONS

The format of this report is such, that, it can be used for a wide range of equipment. Therefore, when filling out this report, complete only the applicable parts. If you have any questions when filling out this form or if you encounter any problems starting the equipment, contact the Service Manager at North American Service immediately for assistance.

1. Use one Check-out Report for each package or unit. Do not use one report for two or more units.
2. If equipment is not operational, complete to middle of page 3. If equipment is operational, complete all applicable parts of this report.
3. If there is not enough space available for special equipment, readings, etc., list these on the back of page 2. If there is not enough space on the back of this report for notes, use additional paper.
4. Do not rely on field installed gauges, thermometers or meters for your reading. Use only calibrated gauge manifolds, and meters for your readings. When checking temperatures, insure that the thermometers or thermocouples are insulated to insure accurate readings.
5. Final readings should be taken when unit is running at maximum capacity.
6. Explain operating conditions at time of test, i.e., compressors fully loaded, hot gas bypass operating, compressor unloaded, etc.
7. If possible, furnish photographs of installation or problem (i.e., control panel, leaking, etc.).
8. Abbreviations: CR - Compressor circuit

JOB NAME & ADDRESS AY/AZ VENTILATION CHILLER PAD
272 AW EAST TANK FARM SHIFT OFFICE
WESTINGHOUSE HANFORD COMPANY SS-04
RICHLAND, WASH

NAMEPLATE DATA

UNIT MODEL ACDR45B SERIAL # 2705601A94D
FACTORY ORDER # 27056-1 ENGINEERING FILE # _____
COMPRESSOR MODEL 14DK32520TSK211 24DH: 32520TSK211 4
SERIAL NUMBER 1CT94C0192752 CT94C005765 3 4
CONDENSER MODEL 1 2 3
CONDENSER SERIAL # 1 2 3
EVAPORATOR/CHILLER MODEL 1 2 3
EVAPORATOR/CHILLER SERIAL # 1 2 3
HEAD PRESSURE CONTROL Mfg _____ Model _____ #Used _____
TXV MANUFACTURER 1 SPORLAN 2 SPORLAN 3 4
TXV MODEL 1 5E020 2 5E020 3 4

AIR HANDLER OR FAN COIL INFORMATION

MANUFACTURER	MODEL #	# USED

INSTALLATION DATA

REFRIGERANT TYPE 22

APPLICATION: AIR CONDITIONING ☐ REFRIGERATION ☐ PROCESS COOLING ☐ OTHER ☒ PROCESS DEHUMIDIFIER FOR DEHUMIDIFICATION

LIQUID LINE/SUCTION LINE HEAT EXCHANGER INSTALLED? YES ☐ NO ☒

LIQUID LINE FILTER DRYER INSTALLED? YES ☒ NO ☐

LIQUID LINE SIGHT GLASS INSTALLED? YES ☒ NO ☐

LIQUID LINE SOLENOID INSTALLED? YES ☐ NO ☒

WATER THROUGH CHILLER BARREL PARALLEL FLOW ☐ COUNTERFLOW ☒

CHILLER FLOW #1 117 GPM #2 _____ GPM

COOLING MEDIUM IS: WATER _____ BRINE _____ %BY WGT. GLYCOL 45-55 % BY WGT.

☒ REFRIGERANT LEAKS: THOROUGHLY INSPECT UNIT FOR REFRIGERANT LEAKS. IF ANY ARE FOUND, CHECK THIS BLOCK AND EXPLAIN IN DETAIL ON BACK OF PAGE 1. (CONTACT NORTH AMERICAN SERVICE MANAGER FOR A PURCHASE ORDER PRIOR TO REPAIRING LEAKS AT DUNHAM-BUSH EXPENSE.)

SYSTEM LOAD

IS A FULL LOAD AVAILABLE DURING START-UP? YES ☒ NO ☐

IF FULL LOAD IS NOT AVAILABLE NOTE UNDER CUSTOMER DISCREPANCIES ON PAGE 4 AND ADVISE CUSTOMER THAT A RETURN TRIP AT THIS EXPENSE WILL BE REQUIRED.

ELECTRICAL NAMEPLATE DATA

UNIT VOLTAGE 460 SINGLE PHASE ☐ 3 PHASE ☒ UNIT FLA 94

CONTROL VOLTAGE 115

COMPRESSOR STARTERS: ACROSS-THE-LINE ☒ PART WIND ☐

COMPRESSOR STARTER/CONTRACTOR MODEL # 43DE35AF357 O.L. HEATER # _____

COMPRESSOR FAN CONTACTOR MODEL # 45CA20AF O.L. HEATER # _____

IS UNIT WIRED FOR PUMPDOWN? YES by processor

*IS FLOW SWITCH INSTALLED? YES IS SAIL SWITCH INSTALLED? NO

*IS CHILL WATER PUMP INTERLOCKED TO CONTROL CIRCUIT? YES

HAS ALL WIRING CONNECTIONS BEEN CHECKED FOR TIGHTNESS? YES

ACTUAL SUPPLY VOLTAGE (UNIT SHUT-DOWN) L1-L2 494 L2-L3 4894 L3-L1 494

CRANKCASE HEATER OPERATING? YES ☒ NO ☐

WIRING DIAGRAM # 270560101

*IMPORTANT NOTE: ON WATER/BRINE CHILLER APPLICATIONS, A FLOW SWITCH AND/OR CW PUMP INTERLOCK MUST BE INSTALLED OR WARRANTY WILL BE VOID. DO NOT LEAVE UNIT OPERATING WITHOUT EITHER OR BOTH OF THESE SAFETY FEATURES.

1. Water piping for the cooler is installed and tested.
2. Electrical connections are made and properly fused.
3. Unit has been leak tested, leaks corrected, and charge completed.
4. Compressor crankcase heater(s) has been energized for a minimum of 24 hours.
5. Calibrated refrigerant gages have been connected to the suction, discharge and oil pressure ports.
6. Turn on the chilled water pump, check direction of rotation and adjust the water flow through the cooler to the specified flow rate. Bleed off all entrained air.
7. Manually energize the fan starters and check the fan rotation. Fans should pull air through the condenser coil and discharge vertically upwards. Rotation can be changed on 3-phase motors by interchanging only two wires on the main terminal block.
8. Check all refrigerant valves to be sure they are open.
9. Proceed to System Start-up.

3.4 System Start-Up ACDR/AUDR

1. Request for Start-Up Representative ACDR/AUDR

Start-up service is an option for these units and is requested when the unit is ordered. If you purchased start-up service, then after the installation has been completed and checked, Form 9180 must be filled out and sent to the local Dunham-Bush representative who sold the unit. Following receipt of this signed form, a representative will be sent to the customer. The purchaser should have competent service and operating personnel in attendance to assist in the work involved, and also to be trained in the operation and maintenance of this unit.

The representative will inspect the installation to determine whether it meets Dunham-Bush, Inc. requirements, perform the initial start-up of the installation, determine whether it is in satisfactory operating condition, and instruct specified customer personnel in its operation and maintenance for the length of time specified in the purchase contract.

NOTE: Sump oil heaters should be energized a minimum of 24 hours and the oil sump

temperature must be at a minimum of 100°F (38°C) prior to arrival of start-up representative. This will ensure that the oil is warm enough to vaporize any dissolved refrigerant and that the oil is within the normal operating temperature range.

2. Before starting the compressor(s), check all three phases of supply voltage, of all legs of the motor. They must be within $\pm 10\%$ of the nameplate voltage.
3. Start compressor(s), check the gages and note if the pressures are within the prescribed limits.
4. Check the refrigerant sight glass at the TX Valve to be sure it is free of bubbles. If not, charge as specified per section 4.8 Charging.
5. Shut the compressor down and check the compressor crankcase sight glass for oil level. It should be between 1/2 to 3/4 of the complete sight glass. If not, see Section 3.7 Lubrication.
6. Restart the compressor. After an hour of operation the expansion valve superheat setting should be checked, it should be between 8° and 12°F at full load design conditions. In some instances, it will be necessary to lower the superheat setting to ensure proper distribution. Turn the TX valve adjustment stem clockwise to increase the superheat setting and counterclockwise to decrease the setting. Be sure and allow ample time between each adjustment for the system to rebalance.
7. The electrical control settings should be checked and, if necessary, reset to those settings indicated on the wiring diagram. Safety controls are factory set and must be maintained at settings indicated on the wiring diagram.
8. The temperatures of the chilled water both in and out, should be checked to insure the unit is operating within the desired temperatures.

*Excerpted from
Manufacturer's operation
and Maintenance manual
CVI File #22525-030
(Dunham-Bush Co.)*

PUGET SOUND REFRIGERATION
3132 N.E. 133rd
P.O. Box 27073, Lake City Station
Seattle, WA 98125
(206) 367-2500
CONT. LICENSE: PUGETSR 169CB

SERVICE REPORT

3132 N.E. 133rd
P.O. Box 27073, Lake City Station
Seattle, WA 98125
(206) 367-2500
CONT. LICENSE: PUGETSR 189CB

(309)
376-755
-7554

COVERAGE CODE: 1585-3-7
CUSTOMER CONTRACT: FRANK CLIFTON

SUPV. JOB ACCT # 54303
EMPLOYEE # 1054

SERVICE PERIOD		PAY PERIOD ENDING	
MONTH	DAY	MONTH	DAY
9	4	9	6
9	6	9	6

SERVICE COMPLETE
Y ☒ HENDRICKSON

UNIC SERVICE REPRESENTATIVE SIGNATURE
TED

JOB NAME AND LOCATION
AY/AZ VENTILATION CHILDER. RAO
2124W EST JUNK FARM SHFT OFFIC
WESTINGHOUSE HANFORD COMPANY 55

Your LINC Service® Contractor for Total Living Comfort.

LABOR AND MILEAGE			EXPENSES	
AGREEMENT	EXTRA	EXTRA	AGREEMENT	EXTRA
REGULAR TIME	5			
OVERTIME	5			
MILES/NO	670			

SPOT AND EXTRA ONLY

CUSTOMER AUTHORIZATION OR P.O. NUMBER

ATTENTION TO

BEASON FOR CALL: ☐ COOLING OUT ☐ HEATING OUT ☐ WATER LEAK ☐ NOISE ☐ WARRANTY

NAME: DUNHAM BUSH MODEL: ACORASB SERIAL: 8705601A94D HP: VOLTS: 460 PH: 3

DESCRIPTION OF WORK: PERFORM PRELIMINARY CHECKOUT OF UNIT FOR STARTUP & START UP #1 CIRCUIT & FOUND LOW ON CHARGE - RECHARGE & CORRECT LEAK AT SUCTION STOP VALVE PACKING - COULD NOT GET #2 CIRCUIT EXPANSION VALVE TO OPEN ACCORDING TO COMPUTER COMMAND - HAD TO PULL OFF AT THIS TIME OF DAY BUT WILL RETURN THIS PROBLEM W/ DUNHAM BUSH AND SEE WHAT OUR NEXT COURSE OF ACTION WILL BE FOR STARTUP NOT COMPLETE

CUSTOMER AUTHORIZATION TO PERFORM WORK/
CUSTOMER SIGNATURE

REFRIGERANT DATA											
1	EQUIPMENT DESCRIPTION	2	ID NUMBER	3	REFRIGERANT TYPE	4	QUANTITY POUNDS	5	QUANTITY POUNDS	6	PO #
	DONAHUE BUS		270567		R22		45				

[illegible]

¹ X = Extra Work, A = Agreement Work ² A = Reclaimed Refrigerant, D = Recycled Refrigerant, C = Recovered Refrigerant ³ Source: I = Inventory, P = PO, R = Reclaimed, Recycled, Recovered Refrigerant ⁴ Source: I = Inventory, P = PO, C = Cash

RECOMMENDED ADDITIONAL WORK:

ACKNOWLEDGEMENT OF SERVICE
CUSTOMER SIGNATURE: *NO SIGNATURE AVAILABLE*
X AT THIS TIME

206-387-2500
CONT. LICENSE: PUGETSR 169CB

COVERAGE CODE	TRACER #	ASSIGNMENT ACCT #	EMPLOYEE #
		54303	7054
CUSTOMER CONTACT	SERVICE PERFORMED	PAY PERIOD ENDING	
FRANK CUFON	MONTH DAY YEAR	MONTH DAY YEAR	
	6 27 96	7 2 96	
SERVICE COMPLETE?	LICENSED REPRESENTATIVE SIGNATURE		
	780		
Living Comfort:	*HENORCKSON		
	(U) 11		

	LABOR AND MILEAGE				EXPENSES	
	AGREEMENT		EXTRA	AGREEMENT	EXTRA	
	P.M./SPOT	DAILY				
REGULAR TIME	8	1	1			
OVERTIME	8	1	1			
MILES/KM	20	1	1			

LINC[®]
SERVICE

AY/AZ VENTILATION CHILLER, PA
372AW 6TST. TANK, FARM, SHIF OFF
WESTINGHOUSE HANFORD COMPANY & S

CUSTOMER AUTHORIZATION TO PERFORM WORK
CUSTOMER SIGNATURE

REASON FOR CALL: ☐ COOLING OUT ☐ HEATING OUT ☐ WATER LEAK ☐ NOISE ☒ WARRANTY ☐ START UP ☐ PREVENTIVE MAINTENANCE
NAME: DURHAM BKH MODEL: ACDR458 SERIAL #: 27056-01A94D HP: _____ VOLTS: 460 PH: 3
MAKE: _____ MODEL: FACDR458DSE# SERIAL #: 27056-1 HP: _____ VOLTS: _____ PH: _____

DESCRIPTION OF WORK: REPLACE #2 CIRCUIT EXPANSION VALVE & 1VC VOLTAGE CARD (RECOVERED AS# FROM INVERTER PREVIOUS TO OPENING UP CIRCUIT); RESTORE THE SAME AS# TO CIRCUIT AFTER AUTOMATICALLY RESTART & CHECK OPERATION - TRIM CHARGE & SET SUGGEST SUPERHEAT & SUBCOOL & NUCLE UNIT & CHECK OPERAND, COMPLETE STATUS PAPERWORK & PROCESS AS REQUIRED.

1	2	3	4	5	6	7	8
EQUIPMENT DESCRIPTION	ID NUMBER	REFRIGERANT TYPE	QUANTITY	POUNDS	OUNCES	PO #	
DUNHAM BUSH		R22	R	25			

[illegible]

**THANK YOU
FOR YOUR
BUSINESS.**

¹ X = Extra Work; A = Additional Work; ² R = Reclaimed Refrigerant; B = Recycled Refrigerant; C = Recovered Refrigerant; ³ Source: I = Inventory; P = PO; R = Reclaimed, Recycled, Recovered Refrigerant; ⁴ Source: I = Inventory; P = PO; C = Cash

ACKNOWLEDGEMENT OF SERVICE
CUSTOMER SIGNATURE: *ROSANNE AVILA*
DATE: *04/11/05*

O-017A © 1993 The Linc Corporation (Rev. 2-20-95)

THIS AGREEMENT IS SUBJECT TO THE TERMS, CONDITIONS AND LIMITATIONS ON THE REVERSE HEREOF

UNIT SPECIFICATIONS

(THIS INFORMATION AVAILABLE FROM SALES REPRESENTATIVES OR NORTH AMERICAN SERVICE MANAGERS)

REFRIGERANT SUCTION TEMPERATURE _____ CONDENSING TEMPERATURE _____ TONS 22.2
CHILLER: GPM 117 INLET TEMPERATURE 33 OUTLET TEMPERATURE 38

PRESSURE SETTINGS

	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT
HP		360						
LP		33						
PUMPDOWN LP	48	83						
FAN #1+2	190	140						
FAN #2	210	160						
FAN #3								
OIL FAILURE								
HGBP								
CPV/EPR								

TEMPERATURE SETTINGS

	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT
OP STAT		9						
FREEZESTAT		0						

OPERATING INFORMATION

ELECTRICAL DATA

COMPRESSORS	VOLTAGE			AMPERAGE*		
	T1-T2	T2-T3	T1-T3	PHASE1	PHASE 2	PHASE 3
#1	489	488	489	27'	27'	28'
#2	489	489	489	26'	26'	27'
#3				1	1	1
#4				1	1	1

CONDENSER, FANS _____ HP FLA _____

	VOLTAGE			AMPERAGE*		
#1	489	490	489	2	2	2'
#2	489	489	490	2	2	2'
#3	489	490	489	2	2	2'
	489	489	489	2	2	2

*IF TWO STARTERS ARE USED (PART WIND), GIVE AMPERAGE ON ALL LEGS.

COMPRESSOR DISCHARGE	PRESS <u>257</u>	SAT. TEMP <u>119</u>	TEMP <u>157</u>	DSH <u>38</u>
LIQUID LINE FROM COND.	PRESS <u>245</u>	SAT. TEMP <u>115</u>	TEMP <u>90</u>	S/C <u>25°</u>
LIQUID FROM H.X.	PRESS <u>0</u>	SAT. TEMP <u>0</u>	TEMP <u>0</u>	S/C <u>0</u>
EVAPORATOR OUTLET	PRESS <u>57</u>	SAT. TEMP <u>31.7</u>	TEMP <u>45</u>	SSH <u>13°</u>
SUCTION LINE @ COMP.	PRESS <u>57</u>	SAT. TEMP <u>31.7</u>	TEMP <u>45</u>	SSH <u>13°</u>
CHILL WATER TEMP/PRESS	IN T <u>38</u>	OUT T <u>3.2</u>	IN P <u></u>	OUT P <u></u>
COND. WATER TEMP/PRESS	IN T <u>0</u>	OUT T <u>0</u>	IN P <u>0</u>	OUT P <u>0</u>
AIR COOL COND.	PRESS <u>257</u>	SAT. TEMP <u>119</u>	AIR IN <u>84</u>	
APPROACH	EVAP <u>3</u>	COND <u>35</u>		
COMP. AMPS	11 <u>27</u>	12 <u>27</u>	13 <u>27</u>	
VOLTAGE	11-12 <u>489</u>	11-13 <u>489</u>	12-13 <u>489</u>	
OIL LEVEL	#1 <u>0</u>	#2 <u>0</u>		

NOTES: DSH-DISCHARGE SUPER HEAT. (TEMP - SAT TEMP-DSH), S/C-SUB COOLING. (SAT TEMP-TEMP-S/C), SSH SUCTION SUPER HEAT. (TEMP - SAT TEMP-SSH)

APPROACH: CONDENSER-(SAT. DISH. TEMP - LEAVING COND WATER), EVAPORATOR-(LEAVING WATER TEMP - SAT TEMP), AIR COOL-SAT DIS (TEMP-AMBIENT TEMP OF THE AIR IN)

TIME EXPENDED FOR START-UP AND TEST:

- (A) TRAVEL TIME (Travel time is not to be included in the scheduled working days required to start and test units). 8 HRS - each trip, 2 trips
- (B) (a) START & TEST 8 HRS (b) FACTORY ERRORS 5 HRS
- (C) EVAP/AIR COOLER CONDENSER (a) START & TEST 0 HRS (b) FACTORY ERRORS 0 HRS
- (D) CUSTOMER PROBLEMS 3 HRS

TIME EXPENDED NOT COVERED ABOVE 0 HRS

OURS OWNER AND/OR CONTRACTOR PERSONNEL IN TRAINING 1.5 HRS

ABOVE:

(Tim)

TK Neering

Vincent M Merkt

Gary Howell

PURCHASER ACCEPTANCE OF DUNHAM-BUSH START-UP

WE UNDERSIGNED, AGREE THAT THIS START-UP MEETS WITH OUR APPROVAL PERTAINING TO THE PERFORMANCE OF THE EQUIPMENT, AND TO THE TRAINING RECEIVED BY OUR OPERATING AND SERVICE PERSONNEL

SITE DISCREPANCIES - OWNER/CONTRACTOR
POSSIBILITY:

James D. Howell
SIGNATURE

Test Engineer
TITLE

6/22/96
DATE

PARTS REQUIRED

NS100
Page 5 of 5

QUALITY ASSURANCE - SUPPLEMENT FIELD SERVICE REPORT

NORTH AMERICAN SERVICE FILE NUMBER: _____ FIELD REPORT NUMBER _____

LEAKS - REFRIGERANT & OIL

LOCATION AND/OR FITTING TYPES: LIQUID LINE ACCESS VALVE

CAUSES: LEAKS @ THREADS

CORRECTIVE ACTIONS: TIGHTENED

TOTAL TIME EXPENDED TO RESTORE NORMAL CHARGE DUE TO LEAKS: Ø

AMOUNT OF REFRIGERANT ADDED DUE TO LEAKS: Ø

AMOUNT OF OIL ADDED DUE TO LEAKS: Ø

DEFECTIVE PARTS

PART NUMBERS/DESCRIPTIONS: #2 CIRCUIT EXPANSION VALVE DOESN'T OPERATE

CAUSES: UNKNOWN - APPARENT MECHANICAL FAILURE / POSSIBLE BINDING OF VALVE

CORRECTIVE ACTIONS: REPLACED

TIME EXPENDED TO FIND/CORRECT DEFECT: 1.5/5.0 RETURN NUMBER: _____

WIRING - EXPLAIN IN FIELD REPORT

_____Ø ERRORS IN WIRING

_____Ø QUANTITY OF WIRES

_____Ø LOGIC CHANGE

MARKED PRINT SENT TO FACTORY _____ YES _____ NO

DIRT AND/OR CONTAMINATION IN SYSTEM

LOCATIONS: Ø

CORRECTIVE ACTIONS: _____

TIME EXPENDED IN CLEAN-UP: _____

INCORRECT/MISSING PARTS

PART NUMBERS/DESCRIPTIONS: Ø

CORRECTIVE ACTIONS: _____

TIME EXPENDED CORRECTING: _____ RETURN NUMBER: _____

PARTS SHIPMENT

WAS START-UP DELAYED DUE TO WAITING FOR PARTS SHIPMENT ✓ YES _____ NO

TIME DELAYED 2 days - special freight @ customer's expense

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 (if any).

IMPORTANT NOTES:

The attached data is presented as field-recorded by plant instrument technicians and initialed off by test engineers; it represents work done over many months according to current site work practices and best available information and techniques. Only necessary information was recorded for each calibration sheet, and thus many data fields are not applicable and are left blank. Some vendor-provided data is included and may be missing non-critical information. Test exception reports were created only where necessary.

Generally, "loops" refers to those instruments related to the central Monitor and Control System (MCS), although some non-MCS "local loops" are 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.

FOR PROJECT W-030

TANK FARM VENTILATION UPGRADE

PLAN APPROVAL

<u>Frank Clifton</u>	<u>3/6/96</u>	<u>M.D. Harding</u>	<u>3-7-96</u>
Startup Manager	Date	TWRS Operations	Date
<u>Scott R. Ral</u>	<u>3/6/96</u>	<u>W.H. Brule</u>	<u>3-7-96</u>
TWRS Engineering	Date	TWRS Maintenance	Date
<u>Thomas G. Howell</u>	<u>3-6-96</u>	<u>Frank M. Chapin</u>	<u>3-7-96</u>
Construction Projects Startup	Date	Quality Assurance	Date
<u>John A. Cole</u>	<u>3/7/96</u>	<u>L. L. Hill</u>	<u>3/6/96</u>
Project Management	Date	Lowell Hill	Date

The original signatures are on file.

TABLE OF CONTENTS

HNF-SD-W030-TD-004,
REV. 0, PAGE 51

<u>SECTION NO.</u>	<u>PAGE</u>
1.0 Purpose and Scope	3
2.0 References	3
3.0 Personnel Requirements	3
4.0 Change Control	3
5.0 Exceptions	3
6.0 Precautions and Limitations	4
7.0 Special Tools, Equipment, and Materials	4
8.0 Prerequisites	5
9.0 Procedure	5
10.0 Restoration	7
11.0 Records	8
12.0 Attachments	8
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

1.0 PURPOSE AND SCOPE

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.

- 11.1 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 SHEETS

and

INSTRUMENT LOOP CALIBRATION SHEETS

FOR THE PRIMARY VENTILATION CONDENSER COOLING SYSTEM

NOTES ON LOOP CAL DATA SHEETS:

A. Loop Cal Sheets -

Data fields left blank are not applicable, i.e.:
Location field was not generally used and is left blank because the information was not helpful or needed;
"Screen" (applicable "screen" fields have a screen name given); "Trip point" (applicable fields have annunciator priority greater than zero); M&TE is noted only where required, eg, "M&TE" is generally not required for these loops- Analog Output (AO), Digital Output (DO) or Input (DI); also, very little calibration data is needed for DO/DI loops.

B. Instrument Cal Sheets -

Sheets marked "VOID" have been superseded by more recent calibration and are included only to show that the instrument had been calibrated at time of POTP test. If the term "broken" is noted, then the instrument was later found defective and was replaced at time of later calibration.

LOOP TESTS

CGA PACKAGE #5 INSTRUMENT LIST PRIMARY VENTILATION CONDENSATE COOLING SYSTEM

TAG	Complete
YS_AZ_CWR-1	<i>L.H.</i>
AZ_CWP_1AA	<i>D.J.</i>
AZ_CWP_1AB	<i>D.J.</i>
AZ_CWP_1BA	<i>D.J.</i>
AZ_CWP_1BB	<i>D.J.</i>
AZ_CWR_1A	<i>D.J.</i>
AZ_CWR_1B	<i>D.J.</i>
FSL_AZ_CWR_1	<i>m.e.</i>

CGA PACKAGE #5 INSTRUMENT LIST PRIMARY VENTILATION CONDENSATE COOLING SYSTEM

Tag	Complete
FI-AZCWR-1	<i>D.J.</i>
II-AZCWP-1A	<i>L.H.</i>
II-AZCWP-1B	<i>L.H.</i>
LAL-AZCWTk-1	<i>D.J.</i>
TI-AZCWR-1	<i>L.H.</i>
TI-AZCWS-1	<i>L.H.</i>
XA-AZCWR-1	<i>L.H.</i>
YS-AZCWP-1A1	<i>D.J.</i>
YS-AZCWP-1B1	<i>D.J.</i>

TEST EXCEPTION REPORT

TEST PROCEDURE NO. & SECTION: CGA-5		TEST NAME: Calibration Grooming and Alignment	T.E. NUMBER: 001
DESCRIPTION OF PROBLEM: Loops TI AZ CWS 1 and TI AZ CWR 1. The transmitters actually installed are for a 4-wire sensor, whereas the actual sensors are 3-wire. The transmitter output is therefore in a failed high state. The drawings seem to specify a 3-wire system.			
ORIGINATOR: LF Hill <i>LF Hill</i> ORG: DATE:		IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION x CONTINUE <i>R. Gutierrez</i> PIC DATE 4/1/96	
DISPOSITION: Lifted lead at TB-LCU-3S, TB01-52 & 55 to allow testing to proceed. Wiring corrected and retested per ECN-120.			
DISPOSITION AND RETEST REQUIREMENTS BY: <i>Darryl Clark</i> DATE 7/1/96		DISPOSITION ACTIONS COMPLETE: Verified <i>R. Gutierrez</i> By: DATE 7/1/96	
OAE CONCURRENCE WITH DISPOSITION (if required): <i>Harold M. Chapin</i> DATE 7/1/96		RETEST COMPLETE: <i>R. Gutierrez</i> PIC DATE 7/1/96	

TEST EXCEPTION REPORT

TEST PROCEDURE NO. & SECTION: CGA Package 3,4,5,7		TEST NAME: Evap Towers, etc	T.E. NUMBER: 005
DESCRIPTION OF PROBLEM: Current transformers are all 0-5A, whereas each should be matched to the motor current (and MCS expected range). <ul style="list-style-type: none"> - IT AZ-CWP 1A/1B (chiller pumps) should be 0-10A (2 total) - IT-702-K305-1A/1B (bldg vent) should be 0-10A (2 total) - IT AZ101 EWP-1A/1B should be 0-50A (2 total) - IT AY101-EWP-1A/1B (typ AY1, AY2, AZ2) should be 0-20A(6 total) - IT AY1-K405-1 (typ 4 plcs) should be 0-10A (4 total) 			
ORIGINATOR: LF Hill 4/17/96 <i>[Signature]</i> ORG: DATE:		IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION x CONTINUE Continue testing on other loops. <i>R. Martinez</i> 4/17/96 PIC DATE	
DISPOSITION: Current transformers were replaced and retested in the applicable CGA package.			
DISPOSITION AND RETEST REQUIREMENTS BY: <i>Doug Lusk</i> 8/12/96 DATE		DISPOSITION ACTIONS COMPLETE: Verified <i>R. Martinez</i> 8/12/96 By: DATE	
OAE CONCURRENCE WITH DISPOSITION (if required): <i>Harold M. Chapin</i> 8/12/96 DATE		RETEST COMPLETE: <i>R. Martinez</i> 8/12/96 PIC DATE	

3/28/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 62

Tag: YS_AZ_CWR_1 I/O Type: DI Description: PVChillrStatus

Cntlr: 28 Chan No: 16 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: lifted chiller valve - activated starter

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): OFF	4	<u>OFF</u>	<u>empty</u>	<u>empty</u>	<u>empty</u>
Hi (1): ON	7	<u>ON</u>	<u>full</u>	<u>full</u>	<u>full</u>

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other:

04 Totaliz - empty/full

MTE Instr. No: _____ Due Date: _____

(signoff)

Loop Complete: PLHDate: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 63

Tag: AZ CWP_1AA I/O Type: DO Description: CwPump1A Start

Cntlr: 31 Chan No: 10 P&ID: H-2-131071, 3H.1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor lead - activate start

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4	_____	_____	_____	_____
Hi (1): TRUE	7	_____	_____	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other: _____

MTE Instr. No: _____ Due Date: _____

(signoff)

Loop Complete: LBHDate: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 64

Tag: AZ CWP_1AB I/O Type: DO Description: CwPump1A Stop

Cntlr: 31 Chan No: 1 P&ID: H-2-131071, SH.1 Logic:

Remarks:

Location:

Actuation Method: lift motor leads - activate status & display

Sensor Calibration:

☐ per procedure N/A (data attached) (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4				
Hi (1): TRUE	7				

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	0	
Lo:	0	

Other:

MTE Instr. No: Due Date:

(signoff) Loop Complete: L. J. H. Date: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 65

Tag: AZ CWP_1BA I/O Type: DO Description: CwPump1B Start

Cntlr: 31 Chan No: 12 P&ID: H-2-131071, 6H.1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor leads - ~~pull~~ remote station

Sensor Calibration:

☐ _____ per procedure 11/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4	_____	_____	_____	_____
Hi (1): TRUE	7	_____	_____	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other:

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: L2760 Date: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 66

Tag: AZ CWP_1BB I/O Type: DO Description: CwPump1B Stop

Cntlr: 31 Chan No: 13 P&ID: H-2-131071, SH.1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor leads - operate starter

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4	_____	_____	_____	_____
Hi (1): TRUE	7	_____	_____	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other:

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: 294 Date: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 67

Tag: AZ CWR_1A I/O Type: DO Description: Chiller On

Cntlr: 31 Chan No: 14 P&ID: H-2-13 1071, SH. 1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor bldg - operate starter

Sensor Calibration:

☐ _____ per procedure _____ (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4	_____	_____	_____	_____
Hi (1): TRUE	7	_____	_____	_____	_____

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	0	_____
Lo:	0	_____

Other:

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: SPHDate: 4/18/06

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 68

Tag: AZ_____CWR_1B . I/O Type: DO Description: Chiller Off

Cntlr: 31 Chan No: 15 P&ID: H-2-131071, SH.1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor cable - operate starter

Sensor Calibration:

☐ _____ per procedure _____ (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): FALSE	4	_____	_____	_____	_____
Hi (1): TRUE	7	_____	_____	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other: _____

MTE Instr. No: _____ Due Date: _____

(signoff)

Loop Complete: LTHDate: 4/18/96

3/1/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004
REV. 0, PAGE 69

Tag: FSL_AZ_CWR_1 I/O Type: DO Description: Chiller Flow

Cntlr: 31 Chan No: 1 P&ID: H-Z-131071, SH.1 Logic:

Remarks: _____

Location: _____

Actuation Method: measure contact in chiller cabinetSensor Calibration: N/A☐ _____ per procedure _____ (data attached) _____ (signoff)

Setpoint:

Loop Tolerance: Cutoff chiller flow < 78 gpm

Process State	Color	LOI	Screen1	Screen2	Screen3
Lo (0): LOW	4	_____	_____	_____	_____
Hi (1): NORMAL	7	_____	_____	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 0 _____

Other:

contact @ chiller opens below 78 gpmLJH

MTE Instr. No:

817-23-01-005

Due Date:

6/2/97

(signoff)

Loop Complete:

LJH

Date:

5/30/96

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 70

Tag: FI_AZ_CWR_1 I/O Type: AI Description: Chiller Flow

Cntlr: 24 Chan No: 15 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: _____

Sensor Calibration:

☐ 5 pt cal☐ _____ per procedure _____ (data attached) _____ (signoff)

Loop Tolerance: 2.0 % = $\sqrt{\begin{matrix} \text{(sensor)}^2 & + & \text{(xmitter)}^2 & + & 2.0 \%^2 & + & 0.2 \%^2 \\ & & & & \text{(other)} & & \text{(DCS)} \end{matrix}}$

Units: GPM

Process Input Readout Tolerance

LOI
LCU3-30Screen1
14Chillr

Screen2

Screen3

Lo: 0.00 -3.01 - 3.01

0.050.01

Hi: 150.00 146.99 - 153.01

149.74150

Annunciator(s): Priority Setpoint

Tolerance

Trip Point

Max: 0 99999.99

-

HiHi: 0 99999.99

-

Hi: 0 99999.99

-

Lo: 2 100.00

96.99 - 103.01

99.9 yellow

LoLo: 0 -9999.99

-

Min: 0 -9999.99

-

Other: _____

MTE Instr. No: 817-23-01-005Due Date: 6/2/97

(signoff)

Loop Complete: Dary LalDate: 5/30/96

4/29/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 71

Tag: FT-AZCWR-1

P&ID: W-030-P6 P5

LOOP: H-2-131311, SH 5

Manufacturer: Foxboro Model No.: EB3WA/02515TAA Serial No: 2A9436
 MTE Instr. No: 817-23-01-006 817-95-08-040 Due Date: 06-10-97 02-28-98

Input Range 0-150 (0-85.37 Hz)			Tolerance 1%			
Units: GPM						
Input (Hz)	Output (ma)	Micon	Lo:	Hi:	As Found	In/Out As Left
0	4.00	0	3.84 (-1.5)	4.16 (1.5)	4.01 (0)	4.01 (0)
21.34	8.00	37.5	7.84 (3.6)	8.16 (3.9)	8.01 (38) *	8.01 (38) *
42.69	12.00	75	11.84 (7.3.5)	12.16 (7.6.5)	12.02 (75)	12.02 (75)
64.03	16.00	112.5	15.84 (11.1)	16.16 (11.4)	16.02 (113) *	16.02 (113) *
85.37	20.00	150	19.84 (14.8.5)	20.16 (15.1.5)	20.01 (150)	20.01 (150)

(signoff) Calibrated By: Paul M. ZylinskiDate: 5-8-97Location: Chill Water Pad

Install voltmeter across MICON leads TB01-100 and TB01-101 in LCU-3-3C (I:E Rm A).
 Does contact open when flow drops below 78 gpm. (44.39 Hz) Y/N

Comments 150 gpm = 85.37 Hz / 252.69 Pulses/ft³

CALIBRATE PER PSCP-6-275

* Resistor in gpm (whole # - rounded)

Course span K - off
 L - on
 M - off

Medium span (70.74%)
 N - on
 P - off
 R - on

4 - 20 ma

J - off

A	B	C	D	E	F	G	H
ON	OFF	ON	OFF	OFF	OFF	OFF	ON

5/29/96

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 72

Tag: FT-AZCWR-1

P&ID: W-030-P6

LOOP: H-2-131311, SH 5

Manufacturer: Foxboro Model No.: E83WA/0251STFAA-K Serial No.: 2A9436MTE Instr. No: 817-28-01-005
817-45-08-040Due Date: 06-02-97 (BETACAL)
02-05-97 (FLUEE DMM)Input Range 0-150 gpm
Units: GPM (0-85.37 Hz)

Tolerance 1%

Input(Hz)	Output(^{ma} Vdc)	Lo:	Hi:	As Found	In/Out	As Left
0 Hz	4.00	3.84	4.16	N/A	N/A	4.00
21.34	8.00	7.84	8.16			8.01
42.69	12.00	11.84	12.16			12.01
64.03	16.00	15.84	16.16			16.01
85.37 Hz	20.00	19.84	20.16	✓	✓	20.00

(signoff) Calibrated By: P. M. ZylinskiDate: 5-30-96Location: Chill water Pad.Comments 150 gpm = 85.37 Hz / 252.69 Pulses/ft³

CALIBRATE PER PSCP-6-275

COARSE SPAN

K - off

L - on

M - off

4-20 ma

J - off

Medium span (70.74%)

N = ON

P = OFF

R = ON

A B C
ON OFF OND E F
OFF OFF OFFG H
OFF ON5-8-97
Pry

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 73

Tag: II_AZ_CWP_1A I/O Type: AI Description: CwPump1ACurrent
 Cntl'r: 24 Chan No: 16 P&ID: H-2-131071 Logic: Y200

Remarks: _____

Location: _____

Actuation Method: CURRENT SOURCE INTO CT PRIMARY ZERO AND 50% CT PRIMARY
PRIMARY CURRENT MEASURED WITH CALIBRATED AMMETER

Sensor Calibration:

☐ 5 pt cal
☒ WITH LOOP per procedure _____ (data attached) _____ (signoff)

Loop Tolerance: $2.0\% = \sqrt{(\text{sensor})^2 + (\text{xmitter})^2 + 2.0\%^2 + 0.2\%^2}$

Units: AMP

Process Input	Readout Tolerance	LOI LCU3-30	Screen1 14Chillr	Screen2 02Main.v	Screen3 04Totdy
Lo: 0.00	-.20 - .20	<u>0</u>	<u>0</u>	<u>OFF</u>	<u>OFF</u>
Hi: 10.00	9.80 - 10.20	<u>10.13</u>	<u>10.0</u> (filled)	<u>ON</u>	<u>ON</u>

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: 817-95-02-010 Due Date: 1/29/97

(signoff) Loop Complete: [Signature]Date: 1/29/97

5/13/96

5/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 74

Tag: IT-AZCWP-1A

P&ID: W-030-C2

LOOP: H-2-131311, SH 4

Manufacturer: KATV INSTRS.

Model No.: 420

Serial No: N/A

MTE Instr. No: 817.45.02.004

Due Date: 5.16.97 2.28.98

Input Range 0-10

10% - Screen
Tolerance 2% - output

Units: A

Input (A)	Output (Mg) (MICON)	Lo:	Hi:	As Found	In/Out	As Left	
0	4.00	0	3.68 (-1)	4.32 (1)	4.00 (0)	IN	4.00 (0)
10	20.00	10	19.68 (9)	20.32 (11)	20.10 (10)	IN	20.10 (10)

(signoff)Calibrated By:

Date: 5/4/97

Location:

Comments

Comments: Factory calibrated, check zero; SPAN. Use current generator w/ calibrated MTE clamp on meter.
functional

* TE-005 JTC 10/27/97

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 75

Tag: II_AZ_CWP_1B I/O Type: AI Description: CwPump1BCurrent
 Cntl'r: 24 Chan No: 17 P&ID: H-2-131071 Logic: Y202

Remarks: _____

Location: _____

Actuation Method: CURRENT SOURCE INTO CT PRIMARY. PRIMARY~~CURRENT MEASURED WITH CALIBRATED AMMETER~~

clamp on ammeter to measure actual running current.
 Sensor Calibration: N/A - ct is factory calibratable only.

☐ 5 pt cal☒ WITH LOOP per procedure _____ (data attached) _____ (signoff)

Loop Tolerance: $2.0\% = \sqrt{\begin{matrix} 2 & 2 & 2.0\% & 0.2\% \\ \text{(sensor)} & \text{(xmmitter)} & \text{(other)} & \text{(DCS)} \end{matrix}}$

Units: AMP

Process Input	Readout Tolerance	LOI LCU3-31	Screen1 14Chillr	Screen2 02Main.v	Screen3 04Totdy
Lo: 0.00	- .20 - .20	<u>0</u>	<u>0</u>	<u>OFF</u>	<u>OFF</u>
Hi: 10.00 4.7	9.80-10.20 4.5-4.9	<u>4.7</u>	<u>4.7</u> (ENGL)	<u>ON</u>	<u>ON</u>

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: 812-45-02-070Due Date: 4/22/97 4/29/97

(signoff)

Loop Complete: SPHILLDate: 5/20/96

5/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 76

Tag: IT-AZCWP-1B

P&ID: W-030-C2

LOOP: H-2-131311, SH 4

Manufacturer: KATY INSTRS. Model No.: 420 Serial No: N/AMTE Instr. No: 817.45.08.040 Due Date: 2-28-98
817.45.02.004 5-16-97Input Range 0-10 *10% - screen
Tolerance 2% - outputUnits: A

Input	Output (ua) (Mican)	Lo:	Hi:	As Found	In/Out	As Left
0	4.00 0	3.68(-1)	4.32(1)	4.00 (0)	IN	4.00 (0)
10	20.00 10	19.68(9)	20.32(11)	20.08(10)	IN	20.08 (10)

(signoff) Calibrated By: P. Zylinski / S. FitzsimmonsDate: 5-14-97Location: CW Pad (Pump 1B)

Comments

Factory calibrated; check zero; SPAN. Use current generator w/ calibrated MTE clamp on meter functional.

* TE-005

JFC
10/27/97

3/28/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 77

Tag: LAL_AZ_CWTK_1 I/O Type: DI Description: CWExpnTkLvlLo

Cntlr: 28 Chan No: 20 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: operate switch w/ screwdriver in slot provided

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____
(signoff)

Setpoint:

Loop Tolerance:

	Process State	Color	LOI LCU3-32	Screen1 14Chillr	Screen2 9 trays 94	Screen3
Lo (0):	NORMAL LOW	23	<u>OFF</u>	<u>yellow</u>	<u>yellow</u>	_____
Hi (1):	LOW NORMAL	22	<u>ON</u>	<u>blue</u>	<u>green</u>	_____

Annunciator(s): Priority Alarm Color (actual)

Hi:	20	<u>_____</u>
Lo:	22	<u>yellow</u>

Other: _____

MTE Instr. No: _____ Due Date: _____

(signoff)

Loop Complete: L. J. L. J.Date: 4/19/96

2/19/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 78

Tag: LAL-AZCWTk-1

P&ID: H-2-131311, SH 5

LOOP: H-2-131311, SH 5

Manufacturer: ITT McDonnell Model No.: 63 Serial No: 2E-000-735MTE Instr. No: N/A Due Date: N/A

Input Range <u>Functional</u>		Tolerance <u>N/A</u>				
Units: <u>Switch</u>						
Input	Output	Lo:	Hi:	As Found	In/Out	As Left
<u>Mech trip.</u>	<u>SWITCH</u>	<u>" SEE INSTRUCTIONS IN COMMENTS</u>				

(signoff) Calibrated By:

Ryzhinski/StitzingerDate: 4-18-97

Location:

Chill Water Pad

Comments

INSTRUCTIONS: Actuate level switch with screwdriver through access port provided. Verify LAL (YELLOW) received on MICON screen.

Is Alarm received at MICON? Y/N

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 79

Tag: TI_AZ_CWR_1 I/O Type: AI Description: CwrHdr Temp

Cntlr: 24 Chan No: 18 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: verify ambient & freeze for response

Sensor Calibration: N/A - not calibratable - device was checked for 4-20mA output 0-100°F.

☐ 5 pt cal per procedure _____ (data attached) _____ (signoff)

☐ _____

Loop Tolerance: 2.0 % = $\sqrt{\begin{matrix} 2^2 & + & 2^2 & + & 2.0\% ^2 & + & 0.2\% ^2 \\ \text{(sensor)} & & \text{(xmitter)} & & \text{(other)} & & \text{(DCS)} \end{matrix}}$

Units: F	Process Input	Readout Tolerance	LOI LCU3-6	Screen1 16PriCoo	Screen2	Screen3
Lo: 0.00	-2.01 - 2.01	<u>57.17</u>	<u>57</u>	_____	_____	_____
Hi: 100.00	97.99 - 102.01	<u>-1.26</u>	<u>-1</u>	_____	_____	_____

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: _____ Due Date: _____

(signoff) Loop Complete: [Signature]Date: 5/2/96

7/17/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 80

Tag: TT-AZCWR-1

P&ID: W-030-P6

LOOP: H-2-131311, SH3

Manufacturer: Roesmount Model No.: 244P Serial No: ZE-000772
812-45-08-088
 MTE Instr. No: 701-63-02-601 Due Date: 4-98
777-13-20-010 10-8-97

Input Range 0 TO 100

Tolerance 2%

Units: DEG F

Input	Output (µA)	MICON (°F)	Lo:	Hi:	As Found	In/Out	As Left
93.09	4.00	(0)	3.68 (-2)	4.32 (2)	4.00 (0°F)	IN	4.00 (0°F)
98.48	8.00	(25)	7.68 (23)	8.32 (27)	8.01 (25)	IN	8.01 (25)
103.90	12.00	(50)	11.68 (48)	12.32 (52)	12.04 (50)	IN	12.04 (50)
109.30	16.00	(75)	15.68 (73)	16.32 (77)	16.02 (75)	IN	16.03 (75)
114.68	20.00	(100)	19.68 (98)	20.32 (102)	20.03 (100)	IN	20.03 (100)

(signoff) Calibrated By: R. T. T. Roesmount / J. T. T. T. Date: 7-18-97Location: STACK MONITOR ROOM

Comments

SEE TE-001 JC 10/17/97

FUNCTIONAL TEST ONLY-VERIFY AMBIENT TEMP AT MICON, FREEZE AND
VERIFY NEW TEMPERATURE AT MICON WITHIN 2%.AMBIENT 93 MICON READING 93FREEZE BATH 33 MICON READING 33ARE LOCAL READINGS AND MICON READINGS WITHIN $\pm 2^\circ\text{F}$? (Y/N)

IF LOCAL AND MICON READINGS ^{ARE NOT} WITHIN $\pm 2^\circ\text{F}$ CONTACT OPERATIONS
 M. SE. AND MAINTENANCE ENG. TROUBLESHOOT/REPLACE/REPAIR DEFECTIVE
 COMPONENT(S)

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 81

Tag: TI_AZ_CWS_1 I/O Type: AI Description: CwsHdr Temp

Cntlr: 24 Chan No: 19 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: VERIFY AMBIENT TEMPERATURE & freeze for
responseSensor Calibration: N/A - not calibratable → device was checked for
4-20mA out @ 0-100°F
☐ 5 pt cal per procedure (data attached) (signoff)
☐ _____Loop Tolerance: $2.0\% = \sqrt{\begin{matrix} 2^2 & + & 2^2 & + & 2.0\%^2 & + & 0.2\%^2 \\ \text{(sensor)} & & \text{(xmitter)} & & \text{(other)} & & \text{(DCS)} \end{matrix}}$

Units: F

Process Input	Readout Tolerance	LOI	Screen1	Screen2	Screen3
Lo: 0.00	2.01 2.01 ambient	LCU3-6	16PriCoo		
Hi: 100.00	97.99 102.01 freeze				

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: _____ Due Date: _____

(signoff) Loop Complete: L. J. LeeDate: 5/2/96

7/17/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 82

Tag: TT-AZCWS-1

P&ID: W-030-P6

LOOP: H-2-131311, SH 3

Manufacturer: Rosemount Model No.: 244 P Serial No: 2E-000771
812-45-08-088 9-97
 MTE Instr. No: 702-63-02-001 Due Date: 4-98
777-13-20-010 10-8-97

Input Range 0 TO 100

Tolerance 2%

Units: DEG F

Input	Output (m)	MICON (°F)	Lo: °F	Hi: °F	As Found	In/Out	As Left
93.04	4.00	(0)	3.68 (-2)	4.32 (2)	4.04 (0) °F	IN	4.04 (0) °F
98.48	8.00	(25)	7.68 (23)	8.32 (27)	8.09 (25)	IN	8.09 (25)
103.90	12.00	(50)	11.68 (48)	12.32 (52)	12.05 (50)	IN	12.05 (50)
109.30	16.00	(75)	15.68 (73)	16.32 (77)	16.05 (75)	IN	16.05 (75)
114.68	20.00	(100)	19.68 (98)	20.32 (102)	20.04 (100)	IN	20.04 (100)

(signoff) Calibrated By: R. Ballantyne / R. Wilkerson / J. Taylor Date: 7-18-97
P. Zylinski
 Location: STACK monitor room

Comments

FUNCTIONAL TEST ONLY-VERIFY AMBIENT TEMP AT MICON, FREEZE AND
 VERIFY NEW TEMPERATURE AT MICON

AMBIENT 90 MICON READING 91
 FREEZE BATH 33 MICON READING 33

ARE LOCAL READINGS AND MICON READINGS WITHIN $\pm 2^\circ\text{F}$? (Y/N)

IF LOCAL AND MICON READINGS ARE NOT WITHIN $\pm 2^\circ\text{F}$, NOTIFY OPERATIONS
 MANAGEMENT AND MAINTENANCE ENG. TROUBLESHOOT, REPAIR/REPLACE DEFECTIVE
 COMPONENT(S).

3/28/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 83

Tag: XA_AZ_CWR_1 I/O Type: DI Description: PVChillrFaultAlm

Cntlr: 28 Chan No: 17 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: ? couldn't activate via starter only -
jumpered contact on CR4 in UIC controller.

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI LCU3-29	Screen1 14Chillr	Screen2 02Main.v	Screen3 03LeakDt
Lo (0): NORMAL	2	_____	_____	<u>N/A</u>	<u>N/A</u>
Hi (1): FAULT	3	<u>ON</u>	<u>yellow</u>	<u>N/A</u>	<u>N/A</u>

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	2	<u>yellow</u>
Lo:	0	<u>-</u>

does not
show on
these screens.
RFA

Other: _____

MTE Instr. No: _____ Due Date: _____

(signoff)

Loop Complete: RFADate: 4/18/96

3/28/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 84-----
Tag: YS_AZ_CWP_1A1 I/O Type: DI Description: CWPump1ARemLoc

Cntlr: 28 Chan No: 18 P&ID: H-2-131071 Logic:

Remarks: -----

Location: -----

Actuation Method: Local
use a switch

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____
(signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI LCU3-30	Screen1 14Chillr	Screen2	Screen3
Lo (0): LOCAL	7	<u>state 1</u>	<u>white</u>	_____	_____
Hi (1): REMOTE	2	<u>state 9</u>	<u>(off)</u>	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi:	0	_____
Lo:	3	<u>white</u>

Other:

_____MTE Instr. No: _____ Due Date: _____
-----(signoff) Loop Complete: 2/21Date: 4/18/96

3/28/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 85

Tag: YS_AZ_CWP_1B1 I/O Type: DI Description: CWPump1BRemLoc

Cntlr: 28 Chan No: 19 P&ID: H-2-131071 Logic:

Remarks: _____

Location: _____

Actuation Method: operate local switch

Sensor Calibration:

☐ _____ per procedure N/A (data attached) _____ (signoff)

Setpoint:

Loop Tolerance:

Process State	Color	LOI LCU3-31	Screen1 14Chillr	Screen2	Screen3
Lo (0): LOCAL	7	<u>State 1</u>	<u>white</u>	_____	_____
Hi (1): REMOTE	2	<u>State 9</u>	<u>(off)</u>	_____	_____

Annunciator(s): Priority Alarm Color (actual)

Hi: 0 _____

Lo: 3 white

Other:

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: 24210Date: 4/18/96

2/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 86

Tag: PI-AZCWP-1A1

P&ID: H-2-131071

LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-670MTE Instr. No: 817-35-40-615 Due Date: 3-19-97

Input Range 0-15

Tolerance 3%

Units: PSI

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	-4.5	4.5	0	IN	0
7.5 PSI	7.5	7.05	7.95	7.8	IN	7.8
15 PSI	15	14.55	15.45	15.0	IN	15.0
-10 In Hg	-10	-9.1	-10.9	-9.9	IN	-9.9
-20 In Hg	-20	-19.1	-20.9	-20.0	IN	-20.0

(signoff) Calibrated By: Fitzsimmons Date: 2-14-97Location: CW Pad (CWP 1A1 - Pump Suction)Comments Compound Gauge

2/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 87

Tag: PI-AZCWP-1A2

P&ID: 4-2-131071

LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No.: 2E-000-671MTE Instr. No: 817-35-40-013Due Date: 5-30-97

Input Range 0-60

Tolerance 3%

Units: PSI

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	-1.8	1.8	0	IN	0
30	30	28.2	31.8	30	IN	30
60	60	58.2	61.8	59.2	IN	59.2

(signoff) Calibrated By: FitzsimmonsDate: 2-14-97Location: CW Pad (CWP 1A - Pump Discharge)

Comments

2/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 88

Tag: PI-AZCWP-1B1

P&ID: H-2-13/071

LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-672MTE Instr. No: 817-35-40-015 Due Date: 3-19-97

Input Range 0-15

Tolerance 3%

Units: PSI

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	<u>-.45</u>	<u>.45</u>	<u>0</u>	<u>IN</u>	<u>0</u>
7.5 PSI	7.5	<u>7.05</u>	<u>7.95</u>	<u>7.4</u>	<u>IN</u>	<u>7.4</u>
15 PSI	15	<u>14.55</u>	<u>15.45</u>	<u>14.9</u>	<u>IN</u>	<u>14.9</u>
-10 in Hg	-10	<u>-9.1</u>	<u>-10.9</u>	<u>-10.0</u>	<u>IN</u>	<u>-10.0</u>
-20 in Hg	-20	<u>-19.1</u>	<u>-20.9</u>	<u>-19.7</u>	<u>IN</u>	<u>-19.7</u>

(signoff) Calibrated By: Fitzsimmons Date: 2.14.97Location: CW Pad (CWP-1B - Pump Suction)Comments Compound Gauge.

2/14/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-004,
REV. 0, PAGE 89

Tag: PI-AZCWP-1B2

P&ID: 4-2-131071

LOOP:

Manufacturer: McDaniel Contro Model No.: Safety Gauge Serial No: 2E-000-673MTE Instr. No: 817-35-40-013 Due Date: 5-30-97

Input Range 0-60

Tolerance 3%

Units: PSI

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	-1.8	1.8	0	IN	0
30	30	28.2	31.8	30	IN	30
60	60	58.2	61.8	60	IN	60

(signoff) Calibrated By: FitzsimmonsDate: 2-14-97Location: CW Pad (CWP-1B - Pump Discharge)

Comments

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Disposal Projects	Date
Project Title/Work Order		EDT No. 607818
TD-004 - TANK FARM VENTILATION UPGRADE W-030 - 8C473		ECN No. ---

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
------	------	-----------------------------	-----------	------------------------------	-----------------

US Department of Energy
Richland Operations Office

C. R. Pacheco S7-54 X

Fluor Daniel Northwest Company

D. P. Devine G3-12 X
H. M. Chafin R3-25 X

Lockheed Martin Hanford Company

G. P. Hopkins S5-03 X
S. U. Zaman S5-12 X
~~S. R. Pierce S5-05 X~~
W. D. Winkelman R3-12 X
W. M. Harty S5-13 X
J. R. Kriskovich R1-56 X

Numatec Hanford Company

K. A. Colosi (2 copies) R3-25 X
D. B. Cole R3-25 X
T. Choho R3-47 X
M. D. Gerken R3-38 X

B&W Hanford Company

L. F. Hill N2-54 X

Others

DPC/TFIC A3-94 X
W-030 Project Files R1-29 X