Stat

OCT 3 0 1997 ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 607818

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
W-030 TEST REVIEW BOARD	DISPOSAL PROJECTS	616329
5. Proj./Prog./Dept./Div.:	**6. Design Authority/ Design Agent/Cog. Engr.:**	**7. Purchase Order No.:**
PROJECT W-030	D.B. Cole/S.R. Pierce	NA
8. Originator Remarks:		**9. Equip./Component No.:**
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.		NA
		10. System/Bldg./Facility:
		AY/AZ Tank Farms
11. Receiver Remarks: 11A. Design Baseline Document? [ ] Yes [X] No		**12. Major Assm. Dwg. No.:**
		NA
		13. Permit/Permit Application No.:
		NA
		14. Required Response Date:
		Sept. 5, 1997

15. DATA TRANSMITTED

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

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved 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	10/24/97	S5-13	2	1	GP Hopkins		10/31/97	
-	--	Design Agent	NA			3	--	LF Hill	-----		
2	1	Cog.Eng.	DB Cole	9/3/97		3	--	MD Gerken	-----		
2	1	Cog. Mgr.	KA Colosi	9/3/97		1	1			10-22-97	R1-56
2	1	QA	HM Chaffin	9-3-97							
3	--	Safety	WP Nelson	-----							

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
Signature of EDT Originator / Date: 9-3-97	Authorized Representative for Receiving Organization / Date: 9/3/97	Design Authority/ Cognizant Manager / Date: 10/24/97	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

PREOPERATIONAL TEST REPORT, PRIMARY VENTILATION CONDENSER COOLING SYSTEM

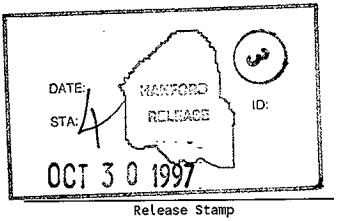
FT CLIFTON
NUMATEC HANFORD COMPANY, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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.



Release Stamp

Release Approval

10/29/97
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	*Preoperational Test Procedure, W-030 Primary Vent Condenser Cooling*
2. WHC-SD-W030-SUP-003/0	*Startup Test Plan, W-030*
3. H-2-131071, Rev. 1	*P&ID AZCW Vent Condenser Cooling System*
4. WHC-SD-W030-ATR-004	*W-030 Acceptance Test Report, Cooling and Miscellaneous Instrumentation*

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

(1) System waterflow was throttled and set at the nominal design flow rate of 115 gpm (reference 4) using manual valve HV-AZCWS-1A2.

(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.

(3) Baseline pump vibration data was collected and recorded on the data sheets; data is considered normal although no acceptance criteria exists.

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	10/8/97
	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. 01	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: WHC-SD-W030-ATR-004	JTC	10/8/97
	b. TEs covered in this test: 007 (4)	JTC	10/8/97
8	Filename, original test record 2E-96-00286	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

Author
Thomas G. Howell
T.G. Howell
Print Name/Signature

APPROVAL DESIGNATOR SQ

PROCEDURE APPROVAL BY TEST REVIEW BOARD (TRB)

TRB Chair	4-1-96 Date	M.D. Hardy TWRS Operations	4-12-96 Date
TWRS Engineering	4-12-96 Date	W. P. Nelson TWRS Safety	4-10-96 Date
Construction Projects Startup	10 April '96 Date	Hank M. Chaffin Quality Assurance	4-2-96 Date
Project Management	4/16/96 Date	N/A ICF-KH Construction	Date

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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 5/3/96

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

Test Director 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 6/24/96

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

Test Director 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 5/3/96

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 WHC 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. See Test Log, App. F
Manufacturer: N/A Model No. N/A
Serial No. N/A Calibration Date N/A
Calibration Due Date N/A
[signature] 10-2-97

4.8.2 Multi-meter 0-480V
Manufacturer: FLUKE Model No. 8060A
Serial No. ~~814-45-09-005~~ Calibration Date 5/14/96
Calibration Due Date 5/14/97

4.8.3 Ohmmeter (OHM): Quantity of 2 required.
Manufacturer: N/A Model No. N/A
Serial No. N/A Calibration Date N/A
Calibration Due Date N/A

5.0 PROCEDURE

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

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: ZD Howell

1.2 VERIFY the system is aligned for preoperational testing in accordance with Appendix B.
Test Engineer: ZD Howell

1.3 VERIFY system electrical circuit breakers are aligned in accordance with Appendix C.
Test Engineer: ZD Howell

1.4 All personnel who will be involved with this procedure have provided the required signature verification information in Appendix E .
Test Engineer: ZD 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: ZD 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: ZD 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) Yz
Suction Pressure(Local) 9 psi
Run Time (graphics screen 14Chillr.v) 11 hrs
Test Engineer: ZD Howell

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

2.5 VERIFY Recirc Pump AZ-CW-P-1A does not start.
Test Engineer: TA 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: TA 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: TA Howell

2.10 RECORD the following data for Recirc Pump AZ-CW-P-1A:
See Test Log, App. F. JRC 10/2/97

2.10.1	Motor Current ~~(TEST INST.)~~	4	Amps
2.10.2	Motor Voltage ~~(TEST INST.)~~	490	Volts
2.10.3	Suction Pressure (LOCAL)	9	psi
2.10.4	Discharge Pressure (LOCAL)	37	psi

Test Engineer: TA 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: TA Howell

2.13 RECORD the following data for Recirc Pump AZ-CW-P-1A:
See Test Log, App. F. JRC 10/2/97

2.13.1	Motor Current (~~Test Inst.~~)	5	Amps
2.13.2	Motor Voltage (~~Test Inst.~~)	490	Volts
2.13.3	Suction Pressure (Local)	4	psi
2.13.4	Discharge Pressure (Local)	36	psi
2.13.5	System Flow (graphics screen 14Chillr.v)	115	gpm
2.13.6	Expansion Tank Level (Local)	Yz	

Test Engineer: TA Howell

2.14 THROTTLE CLOSED valve HV-AZCWP-1A2 untill system flow starts to decrease as indicated on FI-AZCWR-1.

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: TA 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: TA 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: TA 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: TA 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: TA 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. JK 10/2/97
2.26.2 Motor Voltage ~~(TEST INST.)~~ 490 Volts
2.26.3 Suction Pressure (LOCAL) 5.5 psi
2.26.4 Discharge Pressure (LOCAL) 33 psi
Test Engineer: TA Howell

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

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) ½
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.

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: TD 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: TD 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: TD Howell

2.48 PLACE Recirc Pump AZ-CW-P-1A remote control switch HS-AZCWP-1A in STOP position on graphics screen 14Chillr.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: TD Howell

2.53 PLACE Recirc Pump AZ-CW-P-1B remote control switch HS-AZCWP-1B in STOP position on graphics 14Chillr.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.

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

Test Engineer: J D 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 D 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 D 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 D 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 D 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: T S Howell

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

Test Engineer: T S 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: T S 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: T S 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.

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: ZA Howell

3.2 VERIFY oil level in both compressor sightglasses is between ½ and 3/4 of the complete sightglass.
Test Engineer: ZA 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: ZA 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: ZA 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: ZA 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: ZA 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.

3.13 VERIFY the Air Cooled Liquid Chiller stops .
Test Engineer: ZS Howell

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

3.14 VERIFY the Air Cooled Liquid Chiller starts .
Test Engineer: ZS 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: ZS 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: ZS 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: ZS Howell

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	[signature]	5/30/96
PI-AZCWP-1A2	Recirc Pump AZ-CW-P-1A Discharge Pressure Indicator	[signature]	5/30/96
IT-AZCWP-1A	Recirc Pump AZ-CW-P-1A Motor Current Transformer	* TE-W030-007 [signature]	5/30/96
PI-AZCWP-1B1	Recirc Pump AZ-CW-P-1B Suction Pressure Indicator	[signature]	5/30/96
PI-AZCWP-1B2	Recirc Pump AZ-CW-P-1B Discharge Pressure Indicator	[signature]	5/30/96
IT-AZCWP-1B	Recirc Pump AZ-CW-P-1B Motor Current Transformer	* TE-W030-007 [signature]	5/30/96
TE-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Temperature Element	* TE-W030-007 [signature]	5/30/96
TT-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Temperature Transmitter	* TE-W030-007 [signature]	5/30/96
TE-AZCWS-1	Primary Ventilation Condensate Cooling System Supply Header Temperature Element	* TE-W030-007 [signature]	5/30/96
TT-AZCWS-1	Primary Ventilation Condensate Cooling System Supply Header Temperature Transmitter	* TE-W030-007 [signature]	5/30/96
FT-AZCWR-1	Primary Ventilation Condensate Cooling System Return Header Flow Transmitter.	[signature]	5/30/96
LSL-AZCWTK-1	Expansion Tank AZ-CW-TK-1 Low Level Switch	* TE-W030-007 [signature]	5/30/96

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	DH	7/9/94
HV-AZCWP-1A3	Recirc Pump AZ-CW-P-1A Suction Pressure Gage Isolation	OPEN	DH	7/9/94
HV-AZCWP-1A4	Recirc Pump AZ-CW-P-1A Discharge Pressure Gage Isolation	OPEN	DH	7/9/94
HV-AZCWP-1A5	Recirc Pump AZ-CW-P-1A Discharge Isolation	CLOSED	DH	7/9/94
HV-AZCWS-1A2	Recirc Pump Discharge Header Isolation Valve	OPEN	DH	7/9/94
HV-AZCWP-1A2	Recirc Pump AZ-CW-P-1A Suction Strainer AZ-CW-F-1A Drain Isolation Valve	CLOSED	DH	7/9/94
HV-AZCWP-1B1	Recirc Pump AZ-CW-P-1B Suction Isolation Valve	OPEN	DH	7/9/94
HV-AZCWP-1B3	Recirc Pump AZ-CW-P-1B Suction Pressure Gage Isolation	OPEN	DH	7/9/94
HV-AZCWP-1B4	Recirc Pump AZ-CW-P-1B Discharge Pressure Gage Isolation	OPEN	DH	7/9/94
HV-AZCWP-1B5	Recirc Pump AZ-CW-P-1B Discharge Isolation	CLOSED	DH	7/9/94
HV-AZCWP-1B2	Recirc Pump AZ-CW-P-1B Suction Strainer AZ-CW-F-1B Drain Isolation Valve	CLOSED	DH	7/9/94
HV-AZCWS-1A1	Primary Ventilation Condensate Cooling System Supply Header Drain Valve	CLOSED	DH	7/9/94
HV-AZCWR-1A1	Primary Ventilation Condensate Cooling System Return Header Drain Valve	CLOSED	DH	7/9/94
HV-AZCWTK-1A1	Expansion Tank Level Switch LSL-AZCWTK-1 Low Side Isolation	OPEN	DH	7/9/94
HV-AZCWTK-1A2	Expansion Tank Level Switch LSL-AZCWTK-1 High Side Isolation	OPEN	DH	7/9/94

APPENDIX B - Tank AY101 Recirc Condenser Cooling System Valve Alignment				
VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS (1*)	IV (2)
HV-AZCWTK-2	Primary Ventilation Condensate Cooling System Thermal Storage Tank Drain Valve	CLOSED	DH	DH
HV-AZCWR-1	Air-Cooled Liquid Chiller Inlet Isolation Valve	OPEN	DH	DH
HV-AZCWS-1	Air-Cooled Liquid Chiller Outlet Isolation Valve	OPEN	DH	DH

Performed By (1*) D.R. Hodgin (PRINT NAME) DH (INITIALS) 5-30-96 (DATE)

Verified BY (2) T.V. Howell (PRINT NAME) DH (INITIALS) 5/30/96 (DATE)

APPENDIX C - Tank AY101 Recirc Condenser Cooling System Electrical Alignment				
BREAKER NUMBER	BREAKER NAME AND LOCATION	REQUIRED POSITION	INITIALS (1*)	IV (2)
SPARE	SPARE	OFF	MTS	~~IV~~
CHILLER AZ-CW-R-1	Air-Cooled Liquid Chiller power supply breaker in Local Panel.	ON	MTS	~~IV~~
RECIRC PUMP AZ-CW-P-1A	Primary Ventilation Condensate Cooling System Recirc Pump AZ-CW-P-1A in Local Panel	OFF	MTS	~~IV~~
RECIRC PUMP AZ-CW-P-1B	Primary Ventilation Condensate Cooling System Recirc Pump AZ-CW-P-1B in Local Panel	OFF	MTS	~~IV~~
PANEL PP-6	Mini-Power Center Panelboard PP-6	ON	MTS	~~IV~~

Performed By M.T. Stein (PRINT NAME) MTS (INITIALS) 5-30-96 (DATE)

Verified BY T.G. Howell (PRINT NAME) ~~IV~~ (INITIALS) 5/30/96 (DATE)

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 V1=1745	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
HORIZONTAL I/S	.16 overall/.002@x1	.13 overall/.052@x1	N/A	N/A
VERTICAL Indicator	N/A	N/A	↓	↓
AXIAL	↓	↓	↓	↓

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

PUMP BEARING TEMPERATURES	MOTOR OUTBOARD	MOTOR INBOARD	PUMP OUTBOARD	PUMP INBOARD
	N/A	N/A	N/A	N/A

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

Performed by : [signature] Date 6/25/96

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

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 λ=1745	MOTOR OUTBOARD	MOTOR INBOARD	PUMP INBOARD	PUMP OUTBOARD
HORIZONTAL I/S	.162 overall / .002@X	.158 overall / .002@X	NA	NA
VERTICAL Inches/Second	NA	NA	↓	↓
AXIAL	↓	↓	↓	↓

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

PUMP BEARING TEMPERATURES	MOTOR OUTBOARD	MOTOR INBOARD	PUMP OUTBOARD	PUMP INBOARD
	N/A	N/A	N/A	N/A

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

Performed by : [signature] Date 6/25/96

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

APPENDIX E

(EXAMPLE) SIGNATURE/INITIAL VERIFICATION

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

NAME (PRINT)	TITLE	SIGNATURE	INITIAL
G P Hopkins	Test Director		GPH
T.G. Howell	Test Engineer	T.G. Howell	TGH
M.T. Stein	Electrician	Michael J. Stein	MTS
D.R. Hodgin	Fitter		
M.M. Jennings	Vibration Engr.		

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 Microlog CMVA10
	Standard Lab #: 752-84-02-0001
	Data Due 11/11/96
10/2/97	All motor current amperage read from graphics screen, Mcs.* 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

APPENDIX G

TEST EXCEPTION REPORT

TEST PROCEDURE NO. & SECTION:	TEST NAME:	T.E. NUMBER:
WHC-SD-W030-POTP-004	W030 AY/AZ TANK FARM PREOPERATIONAL TEST, VENTILATION CONDENSATE COOLING SYSTEM	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
TG Howell 5/31/96
ORG: DATE:

IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION ☑ CONTINUE
M.D. Harding 6-6-96
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.
TG Howell 5/31/96
DATE

DISPOSITION ACTIONS COMPLETE:
Verified By: Frank Cliffe 6-5-96
DATE

QAE CONCURRENCE WITH DISPOSITION (if required):
Hank M. Chaffin 6-6-96
DATE

RETEST COMPLETE:
N/A
PIC DATE

APPENDIX H

TEST EXCEPTION LOG

TE #	DATE	DESCRIPTION	DISPOSITIONED	DATE CLOSED
W030-007	5/31/96	Instr. in App. A not calibratible.	Removed instruments From App. A.	6/6/96

ATTACHMENT 3

MISCELLANEOUS SUPPORTING DATA

VERIFICATION / VALIDATION CHECKSHEET

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. Neagle 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/OE Review R. Gutierrez DATE: 3-13-96

VERIFICATION

COGNIZANT ENGINEER: [signature] DATE: 4/2/96

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.

DOCUMENT VVCHK.FRM

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

(708) 438-1800

Laboratory no.	95-08084	*I D 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: Req'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

	Req'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	1.00	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:

Parts per million x .0583 = gr./U.S. Gallon
Grains per U.S. Gallon x 17.12 = ppm

Parts per million (ppm) = milligrams per liter (mg/l)

WSCF
ANALYTICAL LABORATORY REPORT

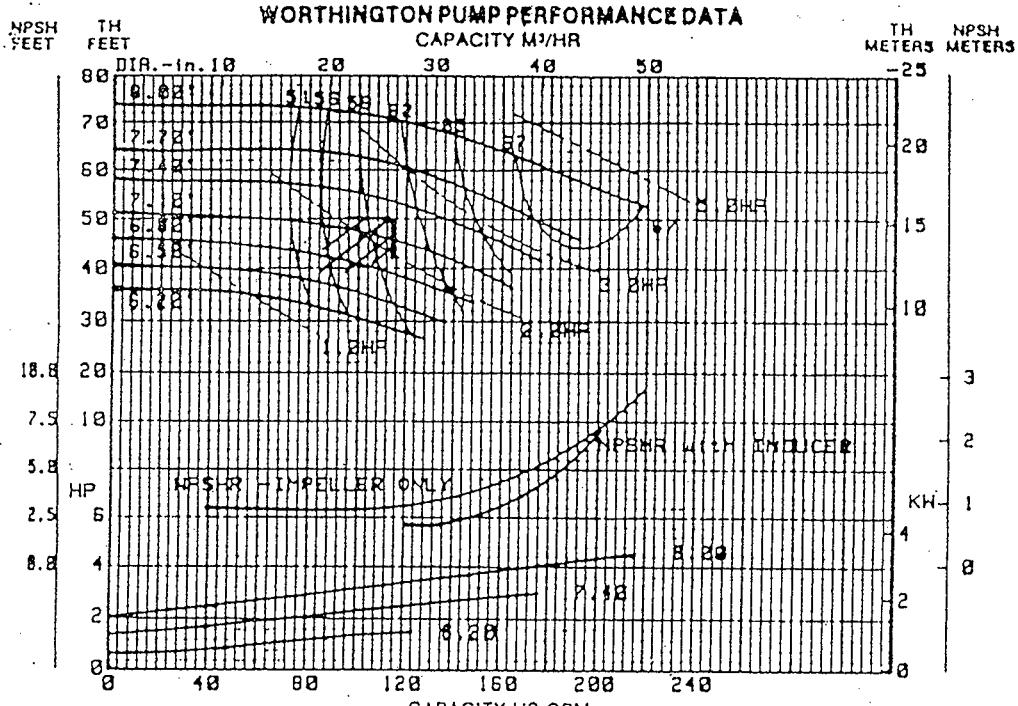
Attention: FRANK CLIFTON R3-25 Group #: 96000778
Project Number MISC. :MISCELLANEOUS WHC PROJECTS

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W9600001944	AZ101	Miscellaneous Organic Analyses	WATER	Best Availab		42%		0.000	05/24/96	05/24/96
W9600001945	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. J - Estimated value.
N - Identification is based on a mass spectral library search. U - The analyte was analyzed for but not detected.

* - Indicates results that have NOT been validated.

Westinghouse Hanford Company



MODEL	SIZE A60	RPM	CURVE NO.	MAX SOLIDS
D-1000	3x2x8	1740	A-18654	.50 dia

5 HP

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 shutdown—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.

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.

FORM NAS1001G

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 55-04
RICHLAND, WASH

NAMEPLATE DATA

UNIT MODEL ACDR45B SERIAL # 2705601A94D

FACTORY ORDER # 27056-1 ENGINEERING FILE #

COMPRESSOR MODEL	1 4DK3250OTSK211	2 4DH-3250TSK211	3	4
SERIAL NUMBER	1 CT94C019275	2 CT94C005165	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 SE020	2 SE020	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 35-50% % 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# ADE35AF357 O.L. HEATER # _____

COMPRESSOR FAN CONTACTOR MODEL # 450A20AF 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 494 L3-L1 494

CRANKCASE HEATER OPERATING? YES ☒ NO ☐

WIRING DIAGRAM # 27056010I

*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 ± 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

COVERAGE CODE	TRACER #	AGR. JOB ACCT #	EMPLOYEE #
	1585-3-1	54303	7054

CUSTOMER CONTACT: FRANK CLIFTON (509) 376-7554

SERVICE PERFORMED	MONTH	DAY	YEAR	PAY PERIOD ENDING MONTH	DAY	YEAR
	4	4	96	6	4	96

SERVICE COMPLETE? Y (N) — LINC SERVICE REPRESENTATIVE SIGNATURE: TED HENDRICKSON

Your LINC Service® Contractor for Total Living Comfort.

LINC® SERVICE

	LABOR AND MILEAGE AGREEMENT P.M./SPOT	LABOR AND MILEAGE AGREEMENT EMERGENCY	LABOR AND MILEAGE EXTRA	EXPENSES AGREEMENT	EXPENSES EXTRA
REGULAR TIME	8				
OVERTIME	6				
MILES/KM	670				

JOB NAME AND LOCATION: AY/AZ VENTILATION, CHILLER, RAD 272 AW EAST TANK FARM SHIFT OFFICE WESTINGHOUSE HANFORD COMPANY 55

SPOT AND EXTRA ONLY — CUSTOMER AUTHORIZATION OR P.O. NUMBER: ATTENTION TO

CUSTOMER AUTHORIZATION TO PERFORM WORK/ CUSTOMER SIGNATURE: X

REASON FOR CALL: ☐ COOLING OUT ☐ HEATING OUT ☐ WATER LEAK ☐ NOISE ☐ WARRANTY ☐ START UP ☐ PREVENTIVE MAINTENANCE

MAKE DUNHAM BUSH MODEL: ACORA5 B SERIAL # A705L01A94D HP: ____ VOLTS 460 PH 3

MAKE ____ MODEL: FACTORY ORDER SERIAL #: 27056-1 HP: ____ VOLTS ____ PH ____

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 REVIEW THIS PROBLEM W/ DUNHAM BUSH AND SEE WHAT OUR NEXT COURSE OF ACTION WILL BE STARTUP NOT COMPLETE

REFRIGERANT DATA

1 EQUIPMENT DESCRIPTION	2 ID NUMBER	REFRIGERANT TYPE	3 QUANTITY POUNDS	QUANTITY OUNCES	PO #
DUNHAM BUSH	27056-1	R22	45		

EQUIPMENT AND MATERIALS

1 DESCRIPTION	4 QUANTITY	PO #

THANK YOU FOR YOUR BUSINESS.

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

RECOMMENDED ADDITIONAL WORK:

ACKNOWLEDGEMENT OF SERVICE/ CUSTOMER SIGNATURE: X MY SIGNATURE ON FRANK CLIFTON'S BEHALF

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

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

COVERAGE CODE	TRACER #	ASTOGIL ACCT #	EMPLOYEE #
		54303	7054

CUSTOMER CONTACT	SERVICE PERFORMED			PAY PERIOD ENDING		
	MONTH	DAY	YEAR	MONTH	DAY	YEAR
FRANK CLIFTON	6	27	96	7	2	96

SERVICE COMPLETE? Y ☑ N ☐ — LINC SERVICE REPRESENTATIVE SIGNATURE: TED HONORKSON

JOB NAME AND LOCATION: AY/AZ VENTILATION CHILLER PAC 372 AW EAST STACK FARM, SHIFT OFFI WESTINGHOUSE HANFORD COMPANY

Your LINC Service® Contractor for Total Living Comfort.

LINC® SERVICE

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

SPOT AND EXTRA ONLY — CUSTOMER AUTHORIZATION OR P.O. NUMBER: ATTENTION TO:

CUSTOMER AUTHORIZATION TO PERFORM WORK/ CUSTOMER SIGNATURE: X [illegible]

REASON FOR CALL: ☐ COOLING OUT ☐ HEATING OUT ☐ WATER LEAK ☐ NOISE ☐ WARRANTY ☐ START UP ☐ PREVENTIVE MAINTENANCE

MAKE DUNHAM BUSH MODEL: ACDR45B SERIAL # 27056 01 A94D HP: ____ VOLTS 460 PH 3

MAKE ____ MODEL: FACTORY ORDER# SERIAL # 27056-1 HP: ____ VOLTS ____ PH ____

DESCRIPTION OF WORK:

REPLACE #2 CIRCUIT EXPANSION VALVE & TVC VOLTAGE CARD (RECOVERED 25# FROM ISOLATED CIRCUIT PREVIOUS TO OPENING UP CIRCUIT) & RETURNED THE SAME 25# TO CIRCUIT AFTER EVACUATION. RESTART & CHECK OPERATION - TRIM CHARGE & SET SUCTION SUPERHEAT & SUBCOOL & CYCLE UNIT & CHECK OPERATION. COMPLETE STATUS PAPERWORK & PROCESS AS REQUIRED.

REFRIGERANT DATA

1 EQUIPMENT DESCRIPTION	2 ID NUMBER	REFRIGERANT TYPE	3 QUANTITY POUNDS	QUANTITY OUNCES	PO #
DUNHAM BUSH		R22	R 25		

EQUIPMENT AND MATERIALS

1 DESCRIPTION	4 QUANTITY	PO #

THANK YOU FOR YOUR BUSINESS.

1 X = Extra Work, A = Agreement Work 2 A = 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

RECOMMENDED ADDITIONAL WORK:

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

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

DESIGN OUTDOOR AMBIENT = 115°F

(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	23						
FAN #1&2	190	140						
FAN #2	210	160						
FAN #3								
OIL FAILURE								
HGBP								
CPR/EPR								

TEMPERATURE SETTINGS

	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT	CUT-IN	CUT-OUT
OP STAT		4						
FREEZESTAT		0						

OPERATING INFORMATION

ELECTRICAL DATA

COMPRESSORS FLA 28

	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				/	/	/
#4				/	/	/

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 257	SAT. TEMP 119	TEMP 157	DSH 38
LIQUID LINE FROM COND.	PRESS 245	SAT. TEMP 115	TEMP 90	S/C 25°
LIQUID FROM H.X.	PRESS Ø	SAT. TEMP Ø	TEMP Ø	S/C Ø
EVAPORATOR OUTLET	PRESS 57	SAT. TEMP 31.7	TEMP 45	SSH 13°
SUCTION LINE @ COMP.	PRESS 57	SAT. TEMP 31.7	TEMP 45	SSH 13°
CHILL WATTER TEMP/PRESS	IN T 38	OUT T 32	IN P	OUT P
COND.WATER TEMP/PRESS	IN T Ø	OUT T Ø	IN P Ø	OUT P Ø
AIR COOL COND.	PRESS 257	SAT. TEMP 119	AIR IN 84	
APPROACH	EVAP 3	COND 35		
COMP. AMPS	11 27	12 27	13 27	
VOLTAGE	11-12 489	11-13 489	12-13 489	
OIL LEVEL	#1	#2		

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 Ø HRS (b) FACTORY ERRORS Ø HRS

D) CUSTOMER PROBLEMS 3 HRS

TIME EXPENDED NOT COVERED ABOVE Ø HRS

OURS OWNER AND/OR CONTRACTOR PERSONNEL IN TRAINING 1.5 HRS

BOVE: (TIM) T.K. Nearing
Vincent M Merkt
Gary Howell

PURCHASER ACCEPTANCE OF DUNHAM-BUSH START-UP

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

SITE DISCREPANCIES - OWNER/CONTRACTOR SPONSIBILITY:

Steven D Howell
SIGNATURE
Test Engineer
TITLE
6/27/96
DATE

X# 27056-1

FACTORY AND OWNER PROBLEMS	SOLUTION/S	HRS
① multiple loose female spade connectors @ 1V ⅀ terminals	① tightened - OK	½
② FOUND #2 CIRCUIT EXPANSION VALVE WOULD NOT OPERATE	② REPLACED BOTH #2 CIRCUIT EXPANSION VALVE & VOLTAGE CARD JOB ALREADY COMPLETED ON 6/27/96	5

PARTS REQUIRED

WAS
~~TO BE~~ INSTALLED BY ____D/B ✓ CONTRACTOR ____OWNER

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/DORRECT DEFECT: 1.5/5.0. RETURN NUMBER: _____

WIRING - EXPLAIN IN FIELD REPORT

_____ERRORS IN WIRING (OK) _____ QUANTITY OF WIRES

_____LOGIC CHANGE MARKED PRINT SENT TO FACTORY _____YES _____NO

DIRT AND/OR CONTAMINATION IN SYSTEM

LOCATIONS: (OK)

CORRECTIVE ACTIONS: _____

TIME EXPENDED IN CLEAN-UP: _____

INCORRECT/MISSING PARTS

PART NUMBERS/DESCRIPTIONS: (OK)

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:

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.

CALIBRATION, GROOMING, AND ALIGNMENT PLAN

FOR PROJECT W-030

TANK FARM VENTILATION UPGRADE

PLAN APPROVAL

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

The original signatures are on file.

TABLE OF CONTENTS

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 Pacakge attachment. A test exception report will be filled out to record and disposition each test exception.

5.0 PERSONNEL REQUIREMENTS

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

6.0 PRECAUTIONS AND LIMITATIONS

6.1 During the performance of this procedure, if any of the following conditions are found, immediately stop work, place equipment in a safe condition, and notify the Test Engineer and take appropriate action to resolve the problem quickly:

6.1.1 Stop work if any condition could jeopardize personnel safety or jeopardize damage to equipment/components.

6.1.2 Stop work if personnel error or procedural error/inadequacy could prevent fulfillment of this procedure.

6.1.3 Stop work if any un-safe condition exists.

6.2 Review hazards in the work area (if any), prior to start of this test.

6.3 Sections or steps within sections of this procedure (except for prerequisites, Section 6.0) may be performed out of sequence under direction and authority of the Test Engineer.

6.4 Performance of this procedure requires stationing of an Operator in the Control Room.

7.0 Special Tools, Equipment, and Materials

7.1 The following is a general list of test equipment that may be required to perform the testing under this procedure:

7.1.1 Digital Multimeter (DMM).

7.1.2 Decade Box.

7.1.3 Calibrated Pressure Source.

7.1.4 Calibrated Pressure Gauge.

7.1.5 Calibrated Power Supply.

7.1.6 Two-Way Radios or Sound Powered Phones to communicate between field devices and Control Room.

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

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

7.2.2 It shall be capable of providing the desired range.

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

8.0 PREREQUISITES

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

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

8.3 Establish communications between field devices and Control Room.

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

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

9.0 PROCEDURE

9.1 Test Boundaries

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

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

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

9.1.3 Test personnel shall have the freedom to change the order in which the testing is being performed.

9.1.4 Test personnel shall have the authority to change the system configuration to match the drawing configuration if wiring is found not to be in accordance with the construction drawings and applicable ECN's on systems that have been turned over to WHC. The change must be noted/logged in the daily test log located in the Control Room. The contractor should be notified in cases where the system has not been turned over to WHC.

9.1.5 If the system configuration does not work as designed and is installed according to the contract drawings, the problem shall be noted in the daily test log and the design engineer shall be notified immediately to begin processing an ECN to correct the problem.

9.1.6 Test personnel, when completing a loop test, shall document it in the daily test log and initial for completion on the package instrument list. Also items found that are not installed per construction drawings, and any other problems/fixes shall be documented in the daily test log.

9.2 Test Execution

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

9.2.1 The Test Engineer shall identify and initiate any system alignments that may be required for the loops to be tested.

9.2.2 Identify on Loop Test Data Sheet, the sensor actuation method to be used. Record the test instrument type (ie: pressure source, etc.), instrument number, model, and calibration due date at the bottom of the Data Sheet (M&TE Inst. No.).

9.2.3 Identify if instrument calibration has been performed or will be performed as part of the loop test. This information will be provided on the calibration data sheet attached to the Loop Test Data Sheet.

9.2.4 Connect the sensor actuation device to the loop to be tested.

9.2.5 Loop tolerances are determined using the "Square Root of the Sum of the Squares (SRSS)" method as noted in ANSI/ASME PTC 19.1-1985, Part 1, "Measurement Uncertainties," and ANSI/ISA-S67.04-1988, Section 4.4.1. Loop tolerances will be pre-calculated and shown on the Loop Calibration Data Sheet.

9.2.6 Initiate the process input as shown on the Loop Calibration Data Sheet and then record the results in the spaces provided (LOI and MCS Screens) as applicable.

9.2.7 Verify annunciator setpoints and record the actual setpoint in the space provided on the Loop Test Data Sheet.

9.2.8 Additional remarks or comments may be recorded in the space provided on the Loop Test Data Sheet.

9.2.9 If there are any problems with the test that cannot be resolved quickly, then initiate a Test Exception on the form provided as part of each test package.

9.2.10 When all loop tests for a system have been completed, then the Test Engineer shall review the test data and sign in the space titled "Loop Complete" on Loop Test Data Sheets.

9.2.11 The associated P&ID shall be highlighted as loops are completed as a method of tracking test completion.

9.3 DOCUMENT CONFIGURATION CONTROL

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

10.0 RESTORATION

10.1 Upon completion of loop testing, restore the loop to it's design configuration.

10.2 Remove/disconnect all test equipment used to perform the loop test.

10.3 Verify loop restoration by observing that loop indications, alarms and/or computer points are consistent with expected conditions.

11.0 RECORDS

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	L&H
AZ_CWP_1AA	D.Y.
AZ_CWP_1AB	D.Y.
AZ_CWP_1BA	D.Y.
AZ_CWP_1BB	D.Y.
AZ_CWR_1A	D.Y.
AZ_CWR_1B	D.Y.
FSL_AZ_CWR_1	M. E.

CGA PACKAGE #5 INSTRUMENT LIST
PRIMARY VENTILATION CONDENSATE COOLING SYSTEM

Tag	Complete
FI-AZCWR-1	D.Y.
II-AZCWP-1A	L&H
II-AZCWP-1B	L&H
LAL-AZCWTK-1	D.Y.
TI-AZCWR-1	L&H
TI-AZCWS-1	L&H
XA-AZCWR-1	L&H
YS-AZCWP-1A1	D.Y.
YS-AZCWP-1B1	D.Y.

TEST EXCEPTION REPORT

TEST PROCEDURE NO. & SECTION:	TEST NAME:	T.E. NUMBER:
CGA-5	Calibration Grooming and Alignment	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 4/1/96

L F Hill

ORG: DATE:

IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION x CONTINUE

R. Gutierrez

PIC DATE 4/1/96

DISPOSITION:

_ifted 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:

Doug Lisk

DATE 7/1/96

DISPOSITION ACTIONS COMPLETE:

Verified By: R. Gutierrez DATE 7/1/96

QAE CONCURRENCE WITH DISPOSITION (if required):

Hank M. Chaffin

DATE 7/1/96

RETEST COMPLETE:

R. Gutierrez

PIC DATE 7/1/96

TEST EXCEPTION REPORT

TEST PROCEDURE NO. & SECTION:	TEST NAME:	T.E. NUMBER:
CGA Package 3,4,5,7	Evap Towers, etc	005

DESCRIPTION OF PROBLEM:

Current transformers are all 0-5A, whereas each should be matched to the motor current (and MCS expected range).

- 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
ORG: DATE:

IMPACT ON TESTING: ☐ HOLD FOR RESOLUTION x CONTINUE
Continue testing on other loops.
R. Gutierrez 4/17/96
PIC DATE

DISPOSITION:

Current transformers were replaced and retested in the applicable CGA package.

DISPOSITION AND RETEST REQUIREMENTS BY:
Doug Hugh 8/12/96
DATE

DISPOSITION ACTIONS COMPLETE:
Verified By: R. Gutierrez 8/12/96
DATE

QAE CONCURRENCE WITH DISPOSITION (if required):
Hank M. Chaplin 8/12/96
DATE

RETEST COMPLETE:
R. Gutierrez 8/12/96
PIC DATE

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: Tilted Chiller Leads — actuated Starter

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):	OFF	4	OFF	empty	empty	empty
Hi (1):	ON	7	ON	fill	fill	fill

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

Other: 04 Totalizer — empty/fill

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: [signature] Date: 4/18/96

Tag: AZ_____CWP_1AA I/O Type: DO Description: CwPump1A Start

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

Remarks: _____

Location: _____

Actuation Method: lift motor leads - actuate 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: [signature] Date: 4/18/96

Tag: AZ_____CWP_1AB I/O Type: DO Description: CwPump1A Stop

Cntlr: 31 Chan No: 11 P&ID: H-2-131071, SH.1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor breaker actuate starter & report

_____

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: _____ Date: 4/18/96

Tag: AZ_____CWP_1BA I/O Type: DO Description: CwPump1B Start

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

Remarks: _____

Location: _____

Actuation Method: Pitt motor feedback ~~panel~~ remote status

_____

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.F. Hall Date: 4/18/96

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: [signature] Date: 4/18/96

Tag: AZ_____CWR_1A I/O Type: DO Description: Chiller On

Cntlr: 31 Chan No: 14 P&ID: H-2-131071, SH. 1 Logic:

Remarks: _____

Location: _____

Actuation Method: lift motor brake + 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: FH Date: 4/18/96

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 leads — 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: LJH Date: 4/18/96

Tag: FSL_AZ__CWR_1 I/O Type: DO Description: Chiller Flow

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

Remarks: _____

Location: _____

Actuation Method: measure contact in Chiller Cabinet

Sensor Calibration: N/A

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

Setpoint:

Loop Tolerance: Cutoff chiller if 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 gpm LHH

MTE Instr. No: 617-23-01-005 Due Date: 6/2/97

(signoff) Loop Complete: L F Stiles Date: 5/30/96

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

Units: GPM

Process Input	Readout Tolerance	LOI LCU3-30	Screen1 14Chillr	Screen2	Screen3
Lo: 0.00	-3.01 - 3.01	0.05	0.01		
Hi: 150.00	146.99 - 153.01	149.74	150		

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: 817-23-01-005 Due Date: 6/2/97

(signoff) Loop Complete: Doug Lee Date: 5/30/96

Tag: FT-AZCWR-1 P&ID: W-030 ~~P6~~ P5 LOOP: H-2-131311, SH 5

Manufacturer: Foxboro Model No.: E83WA/025I5TFAA-K1 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 (36)	8.16 (39)	8.01 (38)	*	8.01 (38) *
42.69	12.00	75	11.84 (73.5)	12.16 (76.5)	12.02 (75)		12.02 (75)
64.03	16.00	112.5	15.84 (111)	16.16 (114)	16.02 (113)	*	16.02 (113) *
85.37	20.00	150	19.84 (148.5)	20.16 (151.5)	20.01 (150)		20.01 (150)

(signoff) Calibrated By: Paul M. Zyliniski Date: 5-8-97

Location: C-Hill 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 * Readout in gpm (whole # - rounded)

Coarse 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

Tag: FT-AZCWR-1 P&ID: W-030-P6 LOOP: H-2-131311, SH 5

Manufacturer: Foxboro Model No.: E83WA/D2S1S7FAA-KL Serial No: 2A9436

MTE Instr. No: 817-23-01-005 Due Date: 06-02-97 (BETA CAL)
817-45-08-040 02-05-97 (FLUKE DMM)

Input Range 0-150 gpm (0-85.37 Hz) Tolerance 1%

Units: GPM

Input (Hz)	output (~~vdc~~ ma)	Lo:	Hi:	As Found	In/Out	As Left
0 Hz	~~4 ma~~ 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 Zyblewski Date: 5-30-96

Location: Chill waters Pad.

Comments 150 gpm = 85.37 Hz / 252.69 Pulses/ft³

CALIBRATE PER PSCP-6-275

VOID 5-8-97 PMZ

COARSE 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

W-030 LOOP TEST DATA SHEET

Tag: II_AZ___CWP_1A I/O Type: AI Description: CwPump1ACurrent

Cntlr: 24 Chan No: 16 P&ID: H-2-131071 Logic: Y200

Remarks: _____

Location: _____

Actuation Method: CURRENT SOURCE INTO CT PRIMARY. LEAD AND SPARE CT PRIMARY
PRIMARY CURRENT MEASURED WITH CALIBRATED AMMETER.

Sensor Calibration:

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

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

Units: AMP Process Input	Readout Tolerance	LOI LCU3-30	Screen1 14Chillr	Screen2 02Main.v	Screen3 04Totdg
Lo: 0.00	-.20 - .20	0	0	OFF	OFF
Hi: 10.00	9.80 - 10.20	10.13	10.0 (Fixed)	ON	ON

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: ~~05sec Del = 0.0~~

MTE Instr. No: 817-95-02-010 Due Date: 1/24/97

(signoff) Loop Complete: J F Hill Date: ~~1/24/97~~ 5/13/96

W-030 CALIBRATION DATA SHEET

Tag: IT-AZCWP-1A P&ID: W-030-C2 LOOP: H-2-131311, SH 4

Manufacturer: KATY INSTRS. Model No.: 420 Serial No: N/A

MTE Instr. No: 817.45.08.040 / 817.45.02.004 Due Date: 2.28.98 / 5.16.97

Input Range 0-10 * Tolerance 10% - screen, 2% - output

Units: A

Input(A)	Output(ma)(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: Szyluriski / Stutzsimmons Date: 5.14.97

Location: CW PAD (Pump 1A)

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

* TE-005 JC 10/27/97

Tag: II_AZ___CWP_1B I/O Type: AI Description: CwPump1BCurrent

Cntlr: 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~~ ZERO AND SPAN CT PRIMARY. 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: $2.0\% = \sqrt{(\text{sensor})^2 + (\text{xmitter})^2 + (2.0\%)^2 + (0.2\%)^2}$ (other) (DCS)

Units: AMP Process Input	Readout Tolerance	LOI LCU3-31	Screen1 14Chillr	Screen2 02Main.v	Screen3 04Totdy
Lo: 0.00	-.20 - .20	0	0	OFF	OFF
Hi: ~~10.00~~ 4.7	~~9.80 - 10.20~~ 4.5 - 4.9	4.7	4.7 (linked)	ON	ON

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: _____

clamp on ammeter 0822
MTE Instr. No: ~~G12-45-07-000~~ Due Date: ~~4/29/97~~ 9/29/97

(signoff) Loop Complete: D J Hill Date: 5/20/96

Tag: IT-AZCWP-1B P&ID: W-030-C2 LOOP: H-2-131311, SH 4

Manufacturer: KATY INSTRS. Model No.: 420 Serial No: N/A

MTE Instr. No: 817-45-08-040 / 817-45-02-004 Due Date: 2-28-98 / 5-16-97

Input Range 0 - 10 * Tolerance 10% - screen, 2% - output

Units: A

Input	Output (ma)	(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)	20.08 (10)	IN	20.08 (10)

(signoff)Calibrated By: R Zyduch / S Stutzsimmons Date: 5-14-97

Location: CW Pad (Pump 1B)

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

* TE-005

RC 10/27/97

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 group 94	Screen3
Lo (0):	~~NORMAL~~ LOW	23	OFF	yellow	yellow	_____
Hi (1):	~~LOW~~ NORMAL	22	ON	blue	green	_____

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	20	—
Lo:	02	yellow

Other:

_____ _____

_____ _____

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: L F Hill Date: 4/19/96

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-000-735

MTE Instr. No: N/A Due Date: N/A

Input Range Functional Tolerance N/A

Units: Switch

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
Mech trip.	Switch	" SEE INSTRUCTIONS IN COMMENTS				

(signoff) Calibrated By: Bzglinski/Stitzsimmons Date: 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

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 0-100°F.
☐ 5 pt cal
☐ _____ per procedure _____ (data attached) _____ (signoff)

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

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

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 A Hill Date: 5/2/96

Tag: TT-AZCWR-1 P&ID: W-030-P6 LOOP: H-2-131311, SH 3

Manufacturer: Roesmount Model No.: 244P Serial No: 2E-000772

MTE Instr. No: 812-45-08-688 / 701-63-02-601 / 777-13-20-010 Due Date: 9-97 / 4-98 / 10-8-97

Input Range 0 TO 100 Tolerance 2%

Units: DEG F

Input	Output(ma)	MICON (°F)	Lo:	Hi:	As Found	In/Out	As Left
93.64	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)	16.03	(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 Talbot, R Wilmoth / a Frazier, Pzglewicz Date: 7.18.97

Location: STACK MONITOR ROOM

Comments See TE-001 TC 10/27/97

FUNCTIONAL TEST ONLY-VERIFY AMBIENT TEMP AT MICON, FREEZE AND VERIFY NEW TEMPERATURE AT MICON WITHIN 2%

AMBIENT 93 MICON READING 93

FREEZE BATH 33 MICON READING 33

ARE LOCAL READINGS AND MICON READINGS WITHIN ±2°F? (Y)/N

IF LOCAL AND MICON READINGS ARE NOT WITHIN ±2°F Contact Operations M1 SE. AND MAINTENACE ENG. TROUBLESHOOT/REPLACE/REPAIR DEFECTIVE COMPONENT(S)

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 response

Sensor 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: $2.0\% = \sqrt{(\text{sensor})^2 + (\text{xmitter})^2 + (2.0\%)^2 + (0.2\%)^2}$ (other) (DCS)

Units: F		LOI	Screen1	Screen2	Screen3
Process Input	Readout Tolerance	LCU3-6	16PriCoo		
~~Lo: 0.00~~	~~-2.01 2.01~~ ambient	62.76	63		
~~Hi: 100.00~~	~~97.99 - 102.01~~ freeze	-1.34	-1		

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 F Hill Date: 5/2/96

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

MTE Instr. No: 812-45-08-068 702-63-02-001 777-13-20-010 Due Date: 4-98 9-97 10-8-97

Input Range 0 TO 100 Tolerance 2%

Units: DEG F

Input	Output(ma)	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 Talbot/R Wilmoth/A Fuzyes 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 ±2°F? (Y/N

IF LOCAL AND MICON READINGS ARE NOT WITHIN ±2°F, NOTIFY OPERATIONS MANAGEMENT AND MAINTENANCE ENG. TROUBLESHOOT, REPAIR/REPLACE DEFECTIVE COMPONENT(S).

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 actuate 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	_____	_____	N/A	N/A
Hi (1):	FAULT	3	ON	yellow	N/A	N/A

does not show on these screens RFH

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	2	yellow
Lo:	0	—

Other:

_____ _____

_____ _____

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: L F Hill Date: 4/18/96

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: use a LOCAL 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	state 1	white		
Hi (1):	REMOTE	2	state 9	(off)		

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	0	/
Lo:	3	white

Other:

_____

_____

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: [signature] Date: 4/18/96

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	State 1	white		
Hi (1):	REMOTE	2	state 9	(off)		

Annunciator(s):	Priority	Alarm Color (actual)
Hi:	0	—
Lo:	3	white

Other:

_____ _____

_____ _____

MTE Instr. No: _____ Due Date: _____

(signoff) Loop Complete: [signature] Date: 4/18/96

Tag: PI-AZCWP-1A1 P&ID: H-2-131071 LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-670

MTE 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	-.45	.45	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: 2.14.97

Location: CW Pad (CWP 1A1 - Pump Suction)

Comments Compound Gauge

2/14/97

W-030 CALIBRATION DATA SHEET

Tag: PI-AZCWP-1A2 P&ID: H-2-13107 LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-671

MTE Instr. No: 817-35-40-013 Due Date: 5-30-97

Input Range 0-60

Units: PSI

Tolerance 3%

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: Fitzsimmons Date: 2-14-97

Location: CW Pad (CWP 1A - Pump Discharge)

Comments

Tag: PI-AZCWP-1B1 P&ID: H-2-131071 LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-672

MTE 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	-.45	.45	0	IN	0
7.5 PSI	7.5	7.05	7.95	7.4	IN	7.4
15 PSI	15	14.55	15.45	14.9	IN	14.9
-10 in Hg	-10	-9.1	-10.9	-10.0	IN	-10.0
-20 in Hg	-20	-19.1	-20.9	-19.7	IN	-19.7

(signoff)Calibrated By: Fitzsimmons Date: 2.14.97

Location: CW Pad (CWP-1B - Pump Suction)

Comments Compound Gauge.

Tag: PI-AZCWP-1B2 P&ID: H-2-131071 LOOP:

Manufacturer: McDaniel Controls Model No.: Safety Gauge Serial No: 2E-000-673

MTE Instr. No: 817-35-40-013 Due Date: 5-30-97

Input Range 0-60

Units: PSI

Tolerance 3%

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: Fitzsimmons Date: 2-14-97

Location: CW Pad (CWP-1B - Pump Discharge)

Comments

DISTRIBUTION SHEET

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TD-004 - TANK FARM VENTILATION UPGRADE W-030 - 8C473		ECN No. ---

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