**ENGINEERING DATA TRANSMITTAL**

2. To: (Receiving Organization) WRAP 1
3. From: (Originating Organization) WRAP 1
5. Proj./Prog./Dept./Div.: W026/Solid Waste Construction
8. Originator Remarks: For release

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(See Approval Designator for required signatures)

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Signature of EDT Orig. Date

19. **Cog. Eng.**

Authorized Representative Date for Receiving Organization

20. **Cog. Mgr.**

Design Authority/Date Cognizant Manager

21. **DOE APPROVAL** (if required)

Ctrl. No.

[ ] Approved

[ ] Approved w/comments

[ ] Disapproved w/comments

BD-74000-172-2 (05/96) GEF097
W-026, Acceptance Test Report
HVAC Control System
(Submittal # 1572.1)

TL Watson
Westinghouse Hanford, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: EDT-1611038 UC:
Org Code: 04E00 Charge Code: PIJF18
B&R Code: 39EW3130020 Total Pages: 10

Key Words: DCS, WRAP 1, ATR, Heating, Ventilation, Air Conditioning

Abstract: This report verified the HVAC-DSC performed to the criteria stated in this functional test.
# WRAP ACCEPTANCE TEST PROCEDURE

## EXCEPTION LOG

**ATP (Y/N)**  Y  ATP#: HVAC Control ATP  
**Test:** Table 1A  
**Step:** Equipment Tag #: 11-PDISL-622/623  
**Spec. Section:**  
**Test Operator:** Matt Harper  
**Test Witness/Author:** Keith Ealden  
**Date:** 26 September 1996  
**Time:** 1000hrs  

**Exception Description:** (Expected Result versus Actual Result)  
Actuation of 11-PDISL-623 and 11-PDISL-624 should have resulted in tripping Supply Fan SF-11-101 and Return Fan RF-11-101 respectively, and the annunciation of the associated fan fail indication. Neither fan tripped and it was approximately 30 minutes before the Return Fan fail indication was received.

**Exception Resolution:**  
11-PDISL-623 was actuated during Alarm Response ATP. Supply Fan SF-11-101 tripped with red fan fail indication, and Return Fan RF-11-101 stopped with yellow fan stop indication. Date tested 9 Oct '96. 
11-PDISL-624 successfully retested during HVAC ATP PCS to DES interface checks, 9 Oct '96

Exception Closed By:  

**APPROVAL OF RESOLUTION**

Contractor Representative:  
WHC Projects Representative:  
WHC NFS Representative: (NFS = New Facility Startup)  
ICF KEH Representative:  

Date: 10 Oct '96.

Date: 10 Oct '96.  
Date: 10 Oct '96.
WRAP ACCEPTANCE TEST PROCEDURE
EXCEPTION LOG

ATP (Y/N) Y
ATP#: HVAC Control ATP

Test: Table 1B
Step: / / / Equipment Tag #: AH-11-101/OC & UC
Spec. Section:

Test Operator: Matt Harper
Test Witness/Author: Keith Ealden

Date: 26 September 1996
Time: 1410hrs

Revision: 0
Execution:

Exception: 2

RESPONSIBLE CONTRACTOR: PCL
RESPONSIBLE SUBCONTRACTOR: Building Control Services
RESPONSIBLE INDIVIDUAL: Matt Harper

EXCEPTION DESCRIPTION: (Expected Result versus Actual Result)

"Manual over-ride to un-occupied cycle" command issued at the PCS RTAP screen. Command was received by the HVAC DCS system but no change in equipment status was noted.
Similar results were obtained when the "Manual over-ride to occupied cycle" command was issued at the PCS RTAP screen.

EXCEPTION RESOLUTION:

Exception Closed By: ___________________________ Date: __________

APPROVAL OF RESOLUTION

Contractor Representative: ___________________________ Date: __________
WHC Projects Representative: ___________________________ Date: __________
WHC NFS Representative: ___________________________ Date: __________
(NFS = New Facility Startup)
ICF KEH Representative: ___________________________ Date: __________
## WRAP ACCEPTANCE TEST PROCEDURE

### EXCEPTION LOG

**ATP (Y/N)** Y  
**ATP#:** HVAC Control ATP  
**Test:** Table 1C  
**Step:** 1.2.1  
**Equipment Tag #:** 11-XA-621  

**Spec. Section:**

**Test Operator:** Matt Harper  
**Test Witness/Author:** Keith Ealden  
**Date:** 26 September 1996  
**Time:** 1030hrs  

**Responsible Contractor:** PCL  
**Responsible Subcontractor:** Building Control Services  
**Responsible Individual:** Matt Harper  

### EXCEPTION DESCRIPTION: (Expected Result versus Actual Result)

Controller C-11-101 "Trouble" condition was simulated but alarm was not received at the PCS.

### EXCEPTION RESOLUTION:

Signed: [Signature]

**Date:**

---

### APPROVAL OF RESOLUTION

**Contractor Representative:**  
**Date:**

**WHC Projects Representative:**  
**Date:**

**WHC NFS Representative:**  
**Date:**  
(NFS = New Facility Startup)

**ICF KEH Representative:**  
**Date:**
## WRAP ACCEPTANCE TEST PROCEDURE

### EXCEPTION LOG

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<td></td>
<td>Date: 26 September 1996</td>
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<td>Matt Harper</td>
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### EXCEPTION DESCRIPTION: (Expected Result versus Actual Result)

"Manual over-ride to un-occupied cycle" command issued at the PCS RTAP screen. Command was received by the HVAC DCS system but no change in equipment status was noted. Similar results were obtained when the "Manual over-ride to occupied cycle" command was issued at the PCS RTAP screen.

### EXCEPTION RESOLUTION:

Exception Closed By: ___________________________ Date: ____________

### APPROVAL OF RESOLUTION

Contractor Representative: ___________________________ Date: ____________

WHC Projects Representative: ___________________________ Date: ____________

WHC NFS Representative: (NFS = New Facility Startup) ___________________________ Date: ____________

ICF KEH Representative: ___________________________ Date: ____________
WRAP ACCEPTANCE TEST PROCEDURE
EXCEPTION LOG

ATP (Y/N) Y
ATP#: HVAC Control ATP
Test: Table 9B
Step: Equipment Tag #: P-11-101A/B; 102A/B
Spec. Section:

Test Operator: Matt Harper
Test Witness/Author: Keith Ealden

Exception: 5
Revision: 0
Execution:

Date: 26 September 1996
Time: 1535hrs

Responsible Contractor: PCL
Responsible Subcontractor: Building Control Services
Responsible Individual: Matt Harper

EXCEPTION DESCRIPTION: (Expected Result versus Actual Result)
Stop and Start pulses for Chilled Glycol pumps P-11-101A/B and P-11-102A/B were issued at the PCS RTAP screen. The commands were received by the HVAC DCS system but the expected changes in equipment status were not observed.

EXCEPTION RESOLUTION:
BUILDING CONSTRUCTION SYSTEMS & SITE MEAC PROGRAM
CHANGES TO CORRECT PROBION, RE-TESTED 16 NOV '96

Exception Closed By: ___________________________ Date: 15/11/96

APPROVAL OF RESOLUTION
Contractor Representative: ___________________________ Date: 10/16/96
WHC Projects Representative: ___________________________ Date: 10/16/96
WHC NFS Representative: ___________________________ Date: 16/11/96
(NFS = New Facility Startup)
ICF KEH Representative: ___________________________ Date: 10/16/96
WRAP ACCEPTANCE TEST PROCEDURE
EXCEPTION LOG

ATP (Y/N)  Y  ATP#: HVAC CONTROL ATP
Test: TABLE 3.8
Step: 3.2.1  Equipment Tag #:
Spec. Section:

Test Operator: MATT HARPER
Test Witness/Author: KEITH EAGDEN

Exception: 6
Revision:
Execution:

Responsible Contractor:
Responsible Subcontractor:
Responsible Individual:

EXCEPTION DESCRIPTION: (Expected Result versus Actual Result)

OPERATOR OVERRIDE TO "UNOCCUPIED" AND "OCCUPIED"
CYCLES NOT TESTED.

EXCEPTION RESOLUTION:

Exception Closed By: ___________________________ Date: __________

APPROVAL OF RESOLUTION
Contractor Representative: ___________________________ Date: __________
WHC Projects Representative: ___________________________ Date: __________
WHC NFS Representative: ___________________________ Date: __________
(NFS = New Facility Startup)
ICF KEH Representative: ___________________________ Date: __________
PREREQUISITES AND EQUIPMENT REQUIRED

1. The Andover DDC system will have to be completely installed, wired and powered up.

2. All systems that are subject to testing will have to be completely installed, wired, powered up and checked out by the unit manufacturers representative.

3. All duct systems included in systems will have to be completely installed and sealed.

4. The following tools will be required:
   - Handheld digital multi-meter.
   - Laptop computer
   - Screwdrivers
   - Andover panel keys
APPENDIX A – GUIDE ATP

ACCEPTANCE TEST PROCEDURE * REV 0 DATE

TEST TITLE

LOCATION *

PROJECT NUMBER *

PROJECT TITLE *

Prepared By
(Company Name)

For _______________________

Contract ___________________

PROCEDURE APPROVAL

Originator Date

Checker Date

Project Manager Date

*NOTE TO ATP ORIGINATOR: Enter project specific
EXECUTION AND TEST APPROVAL

EXECUTED BY

Test Director/Organization Date Test Operator/Organization Date

Recorder/Organization Date

WITNESSES*

Witness/Organization Date Witness/Organization Date

Witness/Organization Date Witness/Organization Date

A-E Approval

Kaiser Engineers Hanford Company

Without exceptions _______ With exceptions resolved _______ With exceptions outstanding

Design Engineer Date

Project Manager Date

TEST APPROVAL AND ACCEPTANCE*

(Operating Contractor)

Without exceptions _______ With exceptions resolved _______ With exceptions outstanding

(Title or Department) Date (Title or Department) Date

* NOTE TO ATP ORIGINATOR: KEH will establish project specific signatory titles or organizations during approval review.

V-W-026-C1 01655-A-1 6/1993 Rev. 0
APPENDIX A - GUIDE ATP

ACCEPTANCE TEST PROCEDURE * REV 0 DATE

TEST TITLE

LOCATION *

PROJECT NUMBER *

PROJECT TITLE *

Prepared By
(Company Name)

For ______________________

Contract ________________

PROCEDURE APPROVAL

Originator ___________________ Date ________________

Checker ___________________ Date ________________

Project Manager ____________ Date ________________

*NOTE TO ATP ORIGINATOR: Enter project specific
HANFORD W.R.A.P.

Building Control Systems

Acceptance Test Procedure

Submittal

March 20, 1996
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PURPOSE

The purpose of the test and checkout is to witness and verify that the Andover HVAC system will perform the documented sequences as specified. This test will prove that all sensors, wire, hardware, controllers, and programming are working together properly.
HANFORD W.R.A.P.

**PREREQUISITES AND EQUIPMENT REQUIRED**

1. The Andover DDC system will have to be completely installed, wired and powered up.

2. All systems that are subject to testing will have to be completely installed, wired, powered up and checked out by the unit manufacturers representative.

3. All duct systems included in systems will have to be completely installed and sealed.

4. The following tools will be required:
   - Handheld digital multi-meter.
   - Laptop computer
   - Screwdrivers
   - Andover panel keys
SAFETY PRECAUTIONS

1. All standard safety guidelines will be followed at all times.

2. If there is any possibility that equipment will be damaged during testing, the testing will be stopped immediately.

3. If the differential pressure between the PROCESS AREA and the PROCESS HVAC AREA rises above 1"WC, the testing will be stopped immediately.
SECTION 1

SHIPPING-RECEIVING AND NDE/ANDA AREAS

1.0 AIR HANDLING SYSTEM 203-AH-11-101:

1.1 AH-11-101 will normally operate in accordance with the “OCCUPIED-UNOCCUPIED” schedule programmed into the Andover system.

1.2 Control points between HVAC DCS and the PCS for AH-11-101 will be verified on tables 1A, 1B and 1C. These points allow the Andover control system to enunciate alarm conditions and systems variables such as supply air temperature and fan failures to the PCS. These points also allow the PCS to send commands to the Andover control system such as system start/stop signals and temperature set points. The Hardwired control points to the PCS are to enunciate air handling unit controller failures such as loss of controller power or a controller hardware malfunction.

1.3 Supply air flow will be proven by PDISL-623.

1.3.1 Supply Fan 203-SF-11-101 will be manually turned off and an alarm will be sent to the Andover control system. The Return Fan 203-RF-11-101 will not operate if Supply Fan 203-SF-11-101 is not running.

Verifications and dates have been added to the document.
HANFORD W.R.A.P.

Supply Fan 203-SF-11-101 and the Supply Fan 203-SF-11-101 alarm points will be restored to normal operation. The test will continue with Supply Fan 203-SF-11-101 running and air flow proven by PDISL-623.

1.3.5 Return Fan 203-RF-11-101 will start.

Verified by: [Signature] Date: 4/19/96

1.3.6 Return air flow will be proven by PDISL-624. PDISL-624 not calibrated. Manometer employed to confirm 4-19-96 PERFORMED BY Mathewtt/HSS.

Verified by: [Signature] Date: 4/19/96

1.3.7 Return Fan 203-RF-11-101 will be manually turned off and an alarm will be sent to the Andover control system.

Verified by: [Signature] Date: 4-22-96

Return Fan 203-RF-11-101 and the Return Fan 203-RF-11-101 alarm points will be restored to normal operation. The test will continue with Return Fan 203-RF-11-101 running and air flow proven by PDISL-624.

1.3.8 Air solenoid valves TEV-628 and TEV-629 will energize enabling the economizer dampers.

Verified by: [Signature] Date: 4-22-96

1.3.9 The outside air damper and the return air damper will be positioned to the minimum outside air setting by TX-628.

Verified by: [Signature] Date: 4-22-96

1.3.10 The relief air damper, controlled by TX-629, will remain closed when the unit is operating on minimum outside air setting to provide a positive pressurization of the spaces served.

Verified by: [Signature] Date: 4-22-96

1.3.11 The NDE/NDA space temperature will be sensed by room temperature sensor TE-627 and will be maintained at a minimum of 72°F in winter and 78°F in summer.

Verified by: [Signature] Date: 4-22-96

1.3.12 If the space temperature TE-627 is above setpoint and the outside air temperature is below 70°F then the outside air damper and relief air damper will modulate open and the return air damper will modulate closed.

Verified by: [Signature] Date: 4-22-96

1.3.13 The temperature sensor TE-621 located in the mixed air plenum will limit the mixed air temperature from dropping below 67°F until the minimum outside air setting results in a lower mixed air temperature.

Verified by: [Signature] Date: 4-22-96
1.3.14 If the space temperature TE-627 is above setpoint and the outside air temperature is above 70°F the outside air damper and the return air damper will return to the minimum outside air setting and the relief air damper will close. The chilled water coil valve TV-630 controlled by TY-630 will modulate open to maintain the space temperature setpoint.

Verified by: [Name] Date: 4-22-96

1.3.15 If the space temperature TE-627 falls below setpoint the outside air damper and the return air damper will return to the minimum outside air setting and the relief air damper will close. The electric heating coils will be energized in six stages.

Verified by: [Name] Date: 4-22-96

1.3.16 Temperature sensor TE-626 located in the supply air duct will limit the supply air temperature from exceeding 80°F.

Verified by: [Name] Date: 4-22-96

1.3.17 If differential pressure switch PDISH-621 indicates a pressure differential greater than 0.6"WC across the pre-filter an alarm will be sent to the Andover control system.

Verified by: [Name] Date: 4-22-96

1.3.18 If differential pressure switch PDISH-622 indicates a pressure differential greater than 1.0"WC across the final-filter an alarm will be sent to the Andover control system.

Verified by: [Name] Date: 4-22-96

1.4.0 UNOCCUPIED CYCLE:

1.4.1 During unoccupied cycle the system will be shut down.

Verified by: [Name] Date: 4-22-96

1.4.2 If the space temperature sensor TE-627 falls to 60°F the system will start. The outside air damper and the relief air damper will close and the return air damper will open. The heating coils will energize.

Verified by: [Name] Date: 4-22-96

1.4.4 When the space temperature sensor TE-627 reaches 68°F the system will shut down.

Verified by: [Name] Date: 4-22-96

1.5.0 FIRE ALARM SHUT DOWN:

If the smoke detector (provided, Installed and wired by others) in the supply air duct is activated a signal will be sent to the central fire alarm panel (provided, Installed and wired by others) causing the supply and return air fans to shut down (interlock wiring by others).
HANFORD W.R.A.P.

1.6.0 ELECTRIC UNIT HEATERS:

Electric unit heaters are provided to offset heat losses at overhead doors in the shipping and receiving and truck loading areas. A separate thermostat for each heater will cycle the fan and energize the heating element on at 68°F.

1.6.1 101-EH-11-101A
Verified by: Matthew Date: 4/23/96

1.6.2 101-EH-11-101B
Verified by: Matthew Date: 4/23/96

1.6.3 100-EH-11-101C
Verified by: Matthew Date: 4/23/96

1.6.4 100-EH-11-101D
Verified by: Matthew Date: 4/23/96

1.7 EXHAUST FAN 100-EF-11-101:

A roof mounted exhaust fan above the truck loading area to clear truck exhaust fumes will be controlled by a wall mounted hand switch. Either of the two overhead doors in this area must be open before 100-EF-11-101 can run to prevent severe disruption of space pressure.

Verified by: Matthew Date: 4/23/96

Curtis Hooper 4/23/96

1.8 AIR HANDLING SYSTEM 203-AH-11-101

COMPLETE SYSTEM CHECKOUT

Verified by: Date: 6/6/96
HANFORD W.R.A.P.

SECTION 2

ADMINISTRATION AREA:

2.0 AIR HANDLING SYSTEM 203-AH-11-401:

2.1 Air handler 203-AH-11-401 will normally operate in accordance with the "OCCUPIED-UNOCCUPIED" schedule programmed into the Andover system. 203-AH-11-401 is a variable air volume system with heating coils in the terminal units for each zone.

2.2.0 Control points between HVAC DCS and the PCS for AH-11-401 will be verified on tables 2A, 2B and 2C. These points allow the Andover control system to enunciate alarm conditions and systems variables such as supply air temperature and fan failures to the PCS. These points also allow the PCS to send commands to the Andover control system such as system start/stop signals and temperature set points. The Hardwired control points to the PCS are to enunciate air handling unit controller failures such as loss of controller power or a controller hardware malfunction.

2.2.1 AH-11-401 HVAC DCS-PCS control points complete.

Exception: 
Verified by: [Signature] 
Date: 26 Sept. '96

2.3.0 OCCUPIED CYCLE:

2.3.1 Upon receiving a start signal the supply fan 203-SF-11-401 will start.

Verified by: [Signature] 
Date: 4-23-96

2.3.2 Upon receiving a stop signal the supply fan 203-SF-11-401 will stop.

Verified by: [Signature] 
Date: 4-23-96

The supply fan will be restarted.

2.3.3 The supply fan inlet vanes, controlled by TY-649, will open to the minimum CFM position of 5225 CFM as indicated by the flow monitoring station in the supply duct FE-643.

Verified by: [Signature] 
Date: 4-23-96

2.3.4 Supply air flow will be proven by PDISL-643.

Verified by: [Signature] 
Date: 4-23-96
2.3.5 Supply Fan 203-SF-11-401 will be manually turned off and an alarm will be sent to the Andover control system. The Return Fan 203-RF-11-401 will not operate if Supply Fan 203-SF-11-401 is not running.

Verified by: [Signature] Date: 4-23-96

Supply Fan 203-SF-11-401 and the Supply Fan 203-SF-11-401 alarm points will be restored to normal operation. The test will continue with Supply Fan 203-SF-11-401 running and airflow proven by PDISL-643.

2.3.6 The outside air damper and the return air damper will return to the minimum outside air setting and the relief air damper will remain closed.

Verified by: [Signature] Date: 4-23-96

2.3.7 When supply air flow is proven as indicated by the flow monitoring station FE-643, the return fan, 203-RF-11-401, will start.

Verified by: [Signature] Date: 4-23-96

2.3.8 The return fan inlet vanes, controlled by TY-640, will open to the minimum CFM position of 3305 CFM as indicated by the flow monitoring station FE-642.

Verified by: [Signature] Date: 4-23-96

2.3.9 Return air flow will be proven by PDISL-643.

Verified by: [Signature] Date: 4-23-96

2.3.10 Return Fan 203-RF-11-401 will be manually turned off and an alarm will be sent to the Andover control system.

Verified by: [Signature] Date: 4-23-96

Return Fan 203-RF-11-401 and the Return Fan 203-RF-11-401 alarm points will be restored to normal operation. The test will continue with Return Fan 203-RF-11-401 running and airflow proven by PDISL-643.

2.3.11 Supply air CFM measured by FE-643 and return air CFM measured by FE-642 will maintain a constant differential of 1920 CFM from a minimum supply air flow of 5225 CFM to a maximum supply air CFM of 11,735 CFM to offset exhaust and provide positive space pressurization.

Verified by: [Signature] Date: 4-23-96

2.3.12 If the outside air temperature as indicated by TE-641 is below 60°F then the temperature sensor TE-642 located in the mixed air plenum will maintain 55°F by modulating the mixed air dampers.

Verified by: [Signature] Date: 4-23-96

Emily Noone 4/23/96
2.3.13 If the outside air temperature is above 60°F the outside air damper and the return air damper will return to the minimum outside air setting and the relief damper will close. The supply air temperature sensor TE-645 will maintain 55°F supply air by modulating the cooling coil control valve TV-648, controlled by TY-648.

Verified by: [Signature] Date: 4-23-96

2.3.14 The supply air duct will be maintained at a constant Static pressure of 1.5”WC at the duct mounted differential pressure sensor PDT-645, the Andover system will reset the supply fan inlet vanes as the system CFM demand varies.

Verified by: [Signature] Date: 4-24-96

2.3.15 If differential pressure switch PDISH-641 indicates a pressure differential greater than 0.6”WC across the pre-filter an alarm will be sent to the Andover control system.

Verified by: [Signature] Date: 4-24-96

2.3.16 If differential pressure switch PDISH-642 indicates a pressure differential greater than 1.0”WC across the final-filter an alarm will be sent to the Andover control system.

Verified by: [Signature] Date: 4-24-96

[Signature] 9/29/96
HANFORD W.R.A.P.

2.4.0 VAV BOXES:

2.4.1 Individual zone temperatures will be monitored by zone sensors, and maintained at 78°F in summer and 72°F in winter.

2.4.1.0 151-VA-11-401: Sample Management and Corridor

2.4.1.1 If the room temperature rises above setpoint the volume of air supplied will increase.

   Verified by: [Signature] Date: 4-24-96

2.4.1.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

   Verified by: [Signature] Date: 4-24-96

2.4.1.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.

   Verified by: [Signature] Date: 4-24-96

2.4.1.4 151-VA-11-401 Complete.

   Verified by: [Signature] Date: 4-24-96

   Owner: Noon 9/29/96

2.4.2.0 139-VA-11-402: Equipment Maintenance

2.4.2.1 If the room temperature rises above setpoint the volume of air supplied will increase.

   Verified by: [Signature] Date: 4-24-96

2.4.2.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

   Verified by: [Signature] Date: 4-24-96

2.4.2.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 2 stages.

   Verified by: [Signature] Date: 4-24-96

2.4.2.4 139-VA-11-402 Complete.

   Verified by: [Signature] Date: 4-24-96

   Owner: Noon 9/29/96
2.4.3.0 119-VA-11-403: Telecom Room

2.4.3.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: Matthew Ho
Date: 4-24-96

2.4.3.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: Matthew Ho
Date: 4-23-96

2.4.3.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.

Verified by: Matthew Ho
Date: 4-23-96

2.4.3.4 119-VA-11-403 Complete.

Verified by: Matthew Ho
Date: 4-23-96

2.4.4.0 118-VA-11-404: Corridor

2.4.4.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: Matthew Ho
Date: 4-24-96

2.4.4.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: Matthew Ho
Date: 4-24-96

2.4.4.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 2 stages.

Verified by: Matthew Ho
Date: 4-24-96

2.4.4.4 118-VA-11-404 Complete.

Verified by: Matthew Ho
Date: 4-24-96
HANFORD W.R.A.P.

2.4.5.0 118-VA-11-405: Mechanical Equipment
2.4.5.1 If the room temperature rises above setpoint the volume of air supplied will increase.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.5.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.5.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.5.4 118-VA-11-405 Complete.
   Verified by: Matthew Harner  Date: 4-24-96

2.4.6.0 115-VA-11-406: UPS Room
2.4.6.1 If the room temperature rises above setpoint the volume of air supplied will increase.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.6.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.6.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 2 stages.
   Verified by: Matthew Harner  Date: 4-24-96
2.4.6.4 115-VA-11-406 Complete.
   Verified by: Matthew Harner  Date: 4-24-96
HANFORD W.R.A.P.

2.4.7.0 116-VA-11-407: Electrical Room

2.4.7.1 If the room temperature rises above setpoint the volume of air supplied will increase.
   Verified by: [Signature] Date: 4-24-76

2.4.7.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
   Verified by: [Signature] Date: 4-24-76

2.4.7.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 2 stages.
   Verified by: [Signature] Date: 4-24-76

2.4.7.4 116-VA-11-407 Complete.
   Verified by: [Signature] Date: 4-24-76

2.4.8.0 152-VA-11-408: Material Preparations Area

2.4.8.1 If the room temperature rises above setpoint the volume of air supplied will increase.
   Verified by: [Signature] Date: 4-24-76

2.4.8.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
   Verified by: [Signature] Date: 4-24-76

2.4.8.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.
   Verified by: [Signature] Date: 4-24-76

2.4.8.4 152-VA-11-408 Complete.
   Verified by: [Signature] Date: 4-24-76

[Signature] 4/24/76
HANFORD W.R.A.P.

2.4.9.0 102-VA-11-409: Shipping and Receiving Office

2.4.9.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: [Signature] Date: 4-24-96

2.4.9.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: [Signature] Date: 4-24-96

2.4.9.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.

Verified by: [Signature] Date: 4-24-96

2.4.9.4 102-VA-11-409 Complete.

Verified by: [Signature] Date: 4-24-96

912496

2.4.10.0 130-VA-11-410: Corridor

2.4.10.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: [Signature] Date: 4-24-96

2.4.10.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: [Signature] Date: 4-24-96

2.4.10.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 3 stages.

Verified by: [Signature] Date: 4-24-96

2.4.10.4 130-VA-11-410 Complete.

Verified by: [Signature] Date: 4-24-96

912496
HANFORD W.R.A.P.

2.4.11.0 129-VA-11-411: Lunch Room

2.4.11.1 If the room temperature rises above setpoint the volume of air supplied will increase.
Verified by: Matthew Thompson Date: 4-24-96

2.4.11.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
Verified by: Matthew Thompson Date: 4-24-96

2.4.11.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 3 stages.
Verified by: Matthew Thompson Date: 4-24-96

2.4.11.4 129-VA-11-411 Complete.
Verified by: Matthew Thompson Date: 4-24-96

2.4.12.0 128-VA-11-412: Conference Room

2.4.12.1 If the room temperature rises above setpoint the volume of air supplied will increase.
Verified by: Matthew Thompson Date: 4-24-96

2.4.12.2 If the room temperature drops below setpoint the volume of air supplied will decrease.
Verified by: Matthew Thompson Date: 4-24-96

2.4.12.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 3 stages.
Verified by: Matthew Thompson Date: 4-24-96

2.4.12.4 128-VA-11-412 Complete.
Verified by: Matthew Thompson Date: 4-24-96
HANFORD W.R.A.P.

2.4.13.0 126-VA-11-413: Operations Manager RCD, MGT and Storage

2.4.13.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by Matthew A. Harper Date: 4-24-96

2.4.13.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by Matthew A. Harper Date: 4-24-96

2.4.13.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 3 stages.

Verified by Matthew A. Harper Date: 4-24-96

2.4.13.4 126-VA-11-413 Complete.

Verified by Matthew A. Harper Date: 4-24-96

1/24/96

2.4.14.0 120-VA-11-414: RPT

2.4.14.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by Matthew A. Harper Date: 4-24-96

2.4.14.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by Matthew A. Harper Date: 4-24-96

2.4.14.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.

Verified by Matthew A. Harper Date: 4-24-96

2.4.14.4 120-VA-11-414 Complete.

Verified by Matthew A. Harper Date: 4-24-96

1/24/96
2.4.15.0 125-VA-11-415: Sec and Rec/Waiting Area

2.4.15.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: Matthew Harper Date: 4-24-96

2.4.15.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: Matthew Harper Date: 4-24-96

2.4.15.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 3 stages.

Verified by: Matthew Harper Date: 4-24-96

2.4.15.4 125-VA-11-415 Complete.

Verified by: Matthew Harper Date: 4-24-96

2.4.16.0 203-VA-11-416: HVAC Equipment Room

2.4.16.1 If the room temperature rises above setpoint the volume of air supplied will increase.

Verified by: Matthew Harper Date: 4-24-96

2.4.16.2 If the room temperature drops below setpoint the volume of air supplied will decrease.

Verified by: Matthew Harper Date: 4-24-96

2.4.16.3 If the room temperature continues to drop after the VAV supply air has reached minimum CFM, electric heating coil will energize in 1 stage.

Verified by: Matthew Harper Date: 4-24-96

2.4.16.4 203-VA-11-416 Complete.

Verified by: Matthew Harper Date: 4-24-96

Verified by: Curtis Koopen 4-29-96
HANFORD W.R.A.P.

2.5.0 UNOCCUPIED CYCLE:

2.5.1 During the unoccupied cycle the system will shut down

Verified by: [Signature] Date: 4-24-96

2.5.2 If the temperature sensor in the Operations Manager's office (TE-646K) falls to 60°F, the supply fan 203-SF-11-401 will start, then the return fan 203-RF-11-401 will start.

Verified by: [Signature] Date: 4-24-96

2.5.3 The outside air damper and relief air damper will remain closed and the return air damper will remain open.

Verified by: [Signature] Date: 4-24-96

2.5.4 The exhaust fans will remain off.

Verified by: [Signature] Date: 4-24-96

2.5.5 The return air CFM will equal the supply air CFM.

Verified by: [Signature] Date: 4-24-96

2.6.0 EXHAUST FANS:

2.6.1 Toilet exhaust fan, 203-EF-11-401 will be interlocked to run when 203-RF-11-401 is operating during the occupied cycle.

Verified by: [Signature] Date: 4-24-96

2.6.2 Material prep room exhaust fan, 152-EF-11-402 will operate from a manual wall switch only if 203-RF-11-401 is running.

Verified by: [Signature] Date: __________

2.7 FIRE ALARM SHUT DOWN:

If the smoke detector (provided, installed and wired by others) in the supply air duct is activated a signal will be sent to the central fire alarm panel (provided, installed and wired by others) causing the supply, return and exhaust air fans to shut down (interlock wiring by others).
2.8.0 ELECTRIC UNIT HEATERS:

Each electric unit heater will be cycled from a wall mounted thermostat.

2.8.1 152-EH-11-401

Verified by: Matthew Harper Date: 4-24-96

2.8.2 203-EH-11-402A

Verified by: Matthew Harper Date: 4-24-96

2.8.3 203-AH-11-402B

Verified by: Matthew Harper Date: 4-24-96

2.8.4 203-AH-11-402C

Verified by: Matthew Harper Date: 4-24-96

2.9 AIR HANDLING SYSTEM 203-AH-11-401

COMPLETE SYSTEM CHECKOUT

Verified by: Date: 10-26-96

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SECTION 3

ADMINISTRATION AREA (LOCKER ROOMS)

3.0 AIR HANDLING SYSTEM 203-AH-11-301 / EXHAUST FAN 203-RF-11-301:

3.1 This system will normally operate in accordance with the “OCCUPIED-UNOCCUPIED” schedule programmed into the Andover Control System. The system used 100% outside air to ventilate the locker room area.

3.2.0 Control points between HVAC DCS and the PCS for AH-11-301 will be verified on tables 3A, 3B and 3C. These points allow the Andover control system to enunciate alarm conditions and systems variables such as supply air temperature and fan failures to the PCS. These points also allow the PCS to send commands to the Andover control system such as system start/stop signals and temperature set points. The Hardwired control points to the PCS are to enunciate air handling unit controller failures such as loss of controller power or a controller hardware malfunction.

3.2.1 AH-11-401 HVAC DCS-PCS control points complete.  
Verified by: [Signature] Date: 4-23-96

3.3.0 OCCUPIED CYCLE.

3.3.1 Upon receiving a start signal, FEV-661 will enable the outside air damper and the exhaust air damper to open fully.
Verified by: [Signature] Date: 4-23-96

3.3.2 The supply fan 203-SF-11-301 will start and airflow will be proven by PDISL-663.
Verified by: [Signature] Date: 4-23-96

3.3.3 Upon receiving a stop signal, FEV-661 will disable and close fully the outside air damper and the exhaust air damper.
Verified by: [Signature] Date: 4-23-96

3.3.4 The supply fan 203-SF-11-301 will stop.
Verified by: [Signature] Date: 4-23-96
HANFORD W.R.A.P.

The supply fan will be restarted.

3.3.5 Supply Fan 203-SF-11-301 will be manually turned off and an alarm will be sent to the Andover control system. The Exhaust Fan 203-EF-11-301 will not operate if Supply Fan 203-SF-11-301 is not running.

Verified by: Date: 4-23-96

Supply Fan 203-SF-11-301 and the Supply Fan 203-SF-11-301 alarm points will be restored to normal operation. The test will continue with Supply Fan 203-SF-11-301 running and airflow proven by PDISL-663.

3.3.6 The exhaust fan 203-EF-11-301 will start.

Verified by: Date: 4-23-96

3.3.7 The locker room temperature sensor TE-668 will maintain a minimum of 72°F in winter and 78°F in summer.

Verified by: Date: 4-23-96

3.3.8 If the room temperature sensor TE-668 is above setpoint the chilled glycol coil control valve TV-666, controlled by TY-666, will modulate open to maintain the room setpoint.

Verified by: Date: 4-23-96

3.3.9 The supply air sensor TE-665 will limit the supply air temperature from dropping below 60°F.

Verified by: Date: 4-23-96

3.3.10 If the room temperature sensor TE-668 is below setpoint and the cooling control valve TV-666 is fully closed, the electric heating coil will be energized in eight stages.

Verified by: Date: 

3.3.11 The supply air sensor TE-665 will limit the supply air temperature from rising above 80°F.

Verified by: Date: 4-23-96

3.3.12 If differential pressure switch PDISH-661 indicates a pressure differential greater than 0.6"WC across the pre-filter an alarm will be sent to the Andover control system.

Verified by: Date: 4-23-96

3.3.13 If differential pressure switch PDISH-662 indicates a pressure differential greater than 1.0"WC across the final-filter an alarm will be sent to the Andover control system.

Verified by: Date: 4-23-96

* AUX DUCT HEATER (STAGES 7 & 8) WILL NOT FUNCTION.
HANFORD W.R.A.P.

3.4.0 UNOCCUPIED CYCLE:

3.4.1 During the unoccupied cycle the system will be shut down.
Verified by: [Signature] Date: 4/23/96

3.4.2 If the room temperature sensor TE-668 falls to 60°F the fans will start and the heating coil will be energized.
Verified by: [Signature] Date: 4/23/96

3.4.3 When the space temperature reaches 68°F the system will shut down.
Verified by: [Signature] Date: 4/23/96

3.5 FIRE ALARM SHUT DOWN:

If the smoke detector (provided, installed and wired by others) in the supply air duct is activated a signal will be sent to the central fire alarm panel (provided, installed and wired by others) causing the supply and exhaust air fans to shut down (interlock wiring by others).

3.6 AIR HANDLING SYSTEM 203-AH-11-301

COMPLETE SYSTEM CHECKOUT

Verified by: ________________ Date: __________
SECTION 4

COMPUTER AND CONTROL ROOMS

4.0 AIR HANDLING SYSTEM 203-AH-11-501A AND B:

4.1.0 Control points between HVAC DCS and the PCS for AH-11-501A & B will be verified on tables 4A, 4B and 4C. These points allow the Andover control system to enunciate alarm conditions and systems variables such as supply air temperature and fan failures to the PCS. These points also allow the PCS to send commands to the Andover control system such as system start/stop signals and temperature set points. The Hardwired control points to the PCS are to enunciate air handling unit controller failures such as loss of controller power or a controller hardware malfunction.

4.1.1 AH-11-501A & B HVAC DCS-PCS control points complete.

Verified by: ___________________________ Date: 14-06-96

4.2 Redundant air-handlers arranged for active/standby operation serve the computer and control rooms. The active unit will operate 24 hours per day. The Andover system will alternate the active/standby status of the units every seven days.

Verified by: ___________________________ Date: 4-24-96

4.3 AIR HANDLING SYSTEM 203-AH-11-501A: As the active unit, 203-AH-11-501B as the standby unit.

4.3.1 Upon receiving a start signal TEV-638A will enable and open fully the isolation dampers 203-DP-11-501A and 203-DP-11-502A.

Verified by: ___________________________ Date: 4-24-96

4.3.2 Supply fan 203-SF-11-501A will start will be proven by PDISL-633A

Verified by: ___________________________ Date: 4-24-96

4.3.3 Upon receiving a stop signal TEV-638A will disable and close fully the isolation dampers 203-DP-11-501A and 203-DP-11-502A.

Verified by: ___________________________ Date: 4-24-96
HANFORD W.R.A.P.

4.3.4 Supply fan 203-SF-11-501A will stop.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

The supply fan will be restarted.

4.3.5 Supply Fan 203-SF-11-501A will be manually turned off and an alarm will be sent to the Andover control system.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

Supply Fan 203-SF-11-501A and the Supply Fan 203-SF-11-501A alarm points will be restored to normal operation. The test will continue with Supply Fan 203-SF-11-501A running and air flow proven by PDISL-663A.

4.3.6 The outside air damper and the return air damper will travel to the minimum outside air setting and the relief damper will remain closed.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.7 The room temperature sensor TE-632A will maintain 72°F.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.8 If the outside air temperature is below 60°F, a rise in room temperature sensor TE-632A, above setpoint will cause the outside air damper and the relief air damper to modulate open and the return air damper to modulate closed. The outside air damper and return air damper are modulated by TY-633A and the relief air damper by TY-632A.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.9 If the outside air temperature is above 60°F the outside air and return air dampers will return to a minimum outside air setting and the relief damper will close, a rise in room temperature sensor TE-632A above setpoint will cause the chilled glycol cooling coil valve TV-638A, controlled by TY-638A, to modulate open to maintain room temperature setpoint.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.10 The supply air sensor TE-637A will limit the supply air from dropping below 55°F.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.11 If room temperature sensor TE-632A drops below room temperature setpoint, the outside air and return air dampers will return to a minimum outside air setting and the relief air damper will close. The electric heating coil will energize in three stages.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

4.3.12 The supply air sensor TE-637A will limit the supply air from rising above 80°F.

Verified by: Matthew T. Hooper  Date: 4-24-96  Entry Room  9/29/96

*IF THE OUTSIDE AIR TEMPERATURE IS BELOW 60°F, A RISE IN ROOM TEMPERATURE SENSOR TE-632A, ABOVE SETPOINT WILL CAUSE THE OUTSIDE AIR DAMPER AND RETURN AIR DAMPER TO MODULATE TO OUTSIDE AIR. THE RELIEF DAMPER WILL OPEN FULLY. THE OUTSIDE AIR DAMPER AND RETURN AIR DAMPER ARE CONTROLLED BY TY-633A. THE RELIEF AIR DAMPER IS CONTROLLED BY TY-632A AND TV-638A.
HANFORD W.R.A.P.

4.3.13 Room humidity sensor ME-632A will maintain a minimum of 30% RH by sequencing a two stage humidifier located in the supply air duct with a 4-20ma control signal.

Verified by: _________________ Date: ____________

4.3.14 If differential pressure switch PDISH-631A indicates a pressure differential greater than 0.6"WC across the pre-filter an alarm will be sent to the Andover control system.

Verified by: _________________ Date: ____________

4.3.15 If differential pressure switch PDISH-632A indicates a pressure differential greater than 1.0"WC across the final-filter an alarm will be sent to the Andover control system.

Verified by: _________________ Date: ____________

4.3.16 Upon a loss of airflow in 203-AH-11-501A or failure to maintain the room temperature setpoint the Andover system will shut down 203-AH-11-501A, set 203-AH-11-501B as the active unit and provide an alarm signal to the PCS.

Verified by: _________________ Date: ____________

4.3.17 FIRE ALARM SHUT DOWN:

If the smoke detector (provided, Installed and wired by others) in the supply air duct is activated a signal will be sent to the central fire alarm panel (provided, Installed and wired by others) causing the supply fan to shut down (interlock wiring by others).

4.3.18 AIR HANDLING SYSTEM 203-AH-11-501A

COMPLETE SYSTEM CHECKOUT

Verified by: _________________ Date: ____________

Upon receiving a start signal TEV-638B will enable and open fully the isolation dampers 203-DP-11-501B and 203-DP-11-502B.

Supply fan 203-SF-11-501B will start and will be proven by PDISL-633B

Upon receiving a stop signal TEV-638B will disable and close fully the isolation dampers 203-DP-11-501B and 203-DP-11-502B.

Supply fan 203-SF-11-501B will stop.

The supply fan will be restarted.

Supply Fan 203-SF-11-501B will be manually turned off and an alarm will be sent to the Andover control system.

The room temperature sensor TE-632B will maintain 72°F.

If the outside air temperature is below 60°F, a rise in room temperature sensor TE-632B above setpoint will cause the outside air damper and the relief air damper to modulate open and the return air damper to remain closed.
4.4.9 If the outside air temperature is above 60°F the outside air and return air dampers will return to a minimum outside air setting and the relief air damper will close. A rise in room temperature sensor TE-632B above setpoint will cause the chilled glycol cooling coil valve TV-638B, controlled by TY-638B, to modulate open to maintain room temperature setpoint.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/26/96

4.4.10 The supply air sensor TE-637B will limit the supply air from dropping below 55°F.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/25/96

4.4.11 If room temperature sensor TE-632B drops below room temperature setpoint, the outside air and return air dampers will return to a minimum outside air setting and the relief air damper will close. The electric heating coil will energize in three stages.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/25/96

4.4.12 The supply air sensor TE-637B will limit the supply air from rising above 80°F.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/25/96

4.4.13 Room humidity sensor ME-632B will maintain a minimum of 30% RH by sequencing a two stage humidifier located in the supply air duct with a 4-20ma control signal.

Verified by: ___________________ Date: __________

4.4.14 If differential pressure switch PDISH-631B indicates a pressure differential greater than 0.6"WC across the pre-filter an alarm will be sent to the Andover control system.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/25/96

4.4.15 If differential pressure switch PDISH-632B indicates a pressure differential greater than 1.0"WC across the final-filter an alarm will be sent to the Andover control system.

Verified by: Matthew J. Harper Date: 4-25-96 Initials: HRM 4/25/96

4.4.16 Upon a loss of airflow in 203-AH-11-501B or failure to maintain the room temperature setpoint the Andover system will shut down 203-AH-11-501B, set 203-AH-11-501A as the active unit and provide an alarm signal to the PCS.

Verified by: Matthew J. Harper Date: 4-24-96 Initials: HRM 4/25/96

4.4.17 FIRE ALARM SHUT DOWN:
If the smoke detector (provided, installed and wired by others) in the supply air duct is activated a signal will be sent to the central fire alarm panel (provided, installed and wired by others) causing the supply fan to shut down (interlock wiring by others).

4.4.18 AIR HANDLING SYSTEM 203-AH-11-501B

COMPLETE SYSTEM CHECKOUT

Verified by: ___________________ Date: __________
SECTION 5

PROCESS AREA HVAC SYSTEMS:

5.0 Redundant exhaust fans and air handling units arranged for active/standby operation are provided for the process area. In no case will redundant units be connected to the same HVAC controller. Changeover from the active/standby status will require operator input to the Plant Control System (PCS) or direct to the Andover Control System except in the case of a failure of the active unit which will result in an automatic switchover by the Andover Control System to the standby unit, shutdown of the failed unit and an alarm set by the Andover Control System shall be reported to the PCS.
SECTION 9

CHILLED GLYCOL SYSTEM:

9.0 The chilled glycol system consists of two air-cooled reciprocating chillers 118-CH-11-101A and 118-CH-11-101B piped in parallel with a dedicated circulation pumps 118-P-11-102A and 118-P-11-102B, respectively per chiller. The chiller circulation pumps are piped in a secondary circuit to the primary chilled glycol distribution circuit which has redundant pumps 118-P-11-101A and 118-P-11-101B in an active/standby arrangement.

9.1.0 Control points between HVAC DCS and the PCS for CH-11-101A & B will be verified on tables 9A, 9B and 9C. These points allow the Andover control system to enunciate alarm conditions and systems variables such as supply air temperature and fan failures to the PCS. These points also allow the PCS to send commands to the Andover control system such as system start/stop signals and temperature set points. The Hardwired control points to the PCS are to enunciate air handling unit controller failures such as loss of controller power or a controller hardware malfunction.

9.1.1 The Andover Control System will automatically alternate lead/lag status of the chillers and chiller circulation pumps every seven days.

Verified by Matthew Honein 4-26-96

9.2.0 CHILLER 118-CH-11-101A and PUMPS 118-P-11-101A and 118-P-11-102A as the active system.

9.2.1 When the outside air temperature reaches 58°F the Andover Control System will start 118-P-11-101A.

Verified by Matthew Honein 4-26-96

9.2.2 When the flow switch FS-654 in the primary distribution circuit proves circulation, circulation pump 118-P-11-102A will start.

Verified by Matthew Honein 4-26-96

9.2.3 The Andover Control System will enable chiller 118-CH-11-101A, when the chiller’s factory furnished operating and safety controls are enabled, the chiller will start.

Verified by Matthew Honein 4-26-96

9.2.4 Chiller 118-CH-11-101A will maintain 44°F leaving chilled glycol by loading/unloading cylinders and sequencing compressors on and off. This is not a Function of the Andover control System and is internal to chiller 118-CH-11-101A.
9.2.5 When the cooling load rises above the capacity of a single chiller and the flow switch FS-653 in the primary-secondary bridge leg detects a flow of approximately 30 GPM recirculation in the primary distribution circuit, the Andover Control System will activate the 118-CH-11-101B system.

Verified by: [Signature] Date: 4-26-96

9.2.6 The chilled glycol system will operate with both chillers on-line until the load decreases to approximately 80% of the capacity of a single chiller. This condition occurs when the venturi/pressure transducer FE-652 senses approximately 180 GPM recirculation in the secondary circuit. At this time the chiller 118-CH-11-101B will shut down.

Verified by: [Signature] Date: 4-26-96

9.2.7 The chiller 118-CH-11-101A system will continue to operate until the outside air temperature drops to 55°F.

Verified by: [Signature] Date: 4-26-96

9.2.8 Chiller 118-CH-11-101A system complete.

Verified by: [Signature] Date: 4-26-96
HANFORD W.R.A.P.

9.3.0 CHILLER 118-CH-11-101B and PUMPS 118-P-11-101B and 118-P-11-102B as the active system.

9.3.1 When the outside air temperature reaches 58°F the Andover Control System will start 118-P-11-101B.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.2 When the flow switch FS-654 in the primary distribution circuit proves circulation, circulation pump 118-P-11-102B will start.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.3 The Andover Control System will enable chiller 118-CH-11-101B, when the chiller’s factory furnished operating and safety controls are enabled, the chiller will start.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.4 Chiller 118-CH-11-101B will maintain 44°F leaving chilled glycol by loading/unloading cylinders and sequencing compressors on and off. This is not a Function of the Andover control System and is internal to chiller 118-CH-11-101B.

9.3.5 When the cooling load rises above the capacity of a single chiller and the flow switch FS-653 in the primary-secondary bridge leg detects a flow of approximately 30 GPM recirculation in the primary distribution circuit, the Andover Control System will activate the 118-CH-11-101A system.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.6 The chilled glycol system will operate with both chillers on-line until the load decreases to approximately 80% of the capacity of a single chiller. This condition occurs when the venturi/pressure transducer FE-652 senses approximately 180 GPM recirculation in the secondary circuit. At this time the chiller 118-CH-11-101A will shut down.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.7 The chiller 118-CH-11-101B system will continue to operate until the outside air temperature drops to 55°F.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

9.3.8 Chiller 118-CH-11-101B system complete.

Verified by Matthew Harper Date: 4-26-96 Smith Hooven 9/26/96

[Signature] 14 Oct '96
# TABLES

## HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

<table>
<thead>
<tr>
<th>Description</th>
<th>Pages</th>
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</thead>
<tbody>
<tr>
<td>Shipping/Receiving and NDE/NDA HVAC</td>
<td>1A,1B,1C</td>
</tr>
<tr>
<td>Administration Area</td>
<td>2A,2B,2C</td>
</tr>
<tr>
<td>Administration (Locker Rooms)</td>
<td>3A,3B,3C</td>
</tr>
<tr>
<td>Computer and Control Room HVAC</td>
<td>4A,4B,4C</td>
</tr>
<tr>
<td>Process Zone I (Glovebox)</td>
<td>6A,6B,6C</td>
</tr>
<tr>
<td>Process Zone II (Process Area)</td>
<td>7A,7B,7C</td>
</tr>
<tr>
<td>Process Area Supply Air</td>
<td>8A,8B,8C</td>
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<tr>
<td>Chilled Glycol</td>
<td>9A,9B,9C</td>
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## TABLE SYMBOL AND TYPE KEY:

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<th>SYMBOL</th>
<th>TYPE</th>
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<tbody>
<tr>
<td>A</td>
<td>Analog 4-20 MA Signal</td>
</tr>
<tr>
<td>B</td>
<td>Binary Bit</td>
</tr>
<tr>
<td>DI</td>
<td>Discrete 3 AMP, 120 VAC Dry Contact Input to PCS</td>
</tr>
<tr>
<td>V</td>
<td>Integer Value</td>
</tr>
</tbody>
</table>
### TABLE 1A

<table>
<thead>
<tr>
<th>TAG</th>
<th>HVAC DCS TO PCS VIA COMMUNICATION LINK</th>
<th>VERIFY</th>
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</thead>
<tbody>
<tr>
<td>11-PDISL-624</td>
<td>RETURN FAN NOT RUNNING OR FAILED, RF-11-101</td>
<td>B</td>
</tr>
<tr>
<td>11-TI-621</td>
<td>MIXED AIR TEMPERATURE, AH-11-101</td>
<td>V</td>
</tr>
<tr>
<td>11-PDISH-621</td>
<td>PRE-FILTER DIRTY, AH-11-101</td>
<td>B</td>
</tr>
<tr>
<td>11-PDISH-622</td>
<td>FINAL FILTER DIRTY, AH-11-101</td>
<td>B</td>
</tr>
<tr>
<td>11-PDISL-623</td>
<td>SUPPLY FAN NOT RUNNING OR FAILED, SF-11-101</td>
<td>B</td>
</tr>
<tr>
<td>11-TI-626</td>
<td>SUPPLY AIR TEMPERATURE, AH-11-101</td>
<td>V</td>
</tr>
<tr>
<td>11-TI-627</td>
<td>NDE/NDA AREA TEMPERATURE, AH-11-101</td>
<td>V</td>
</tr>
<tr>
<td>SF-11-101/S</td>
<td>SHIPPING/RECEIVING AND NDE/NDA SUPPLY FAN RUNNING, SF-11-101</td>
<td>B</td>
</tr>
<tr>
<td>RF-11-101/S</td>
<td>SHIPPING/RECEIVING AND NDE/NDA RETURN FAN RUNNING, RF-11-101</td>
<td>B</td>
</tr>
<tr>
<td>11-TI-627/SPS</td>
<td>NDE/NDA AREA CURRENT TEMPERATURE SET POINT, AH-11-101</td>
<td>V</td>
</tr>
</tbody>
</table>

**See Exception at Step 1.2.1.**

**HVAC DCS TO PCS POINTS (TABLE 1A) COMPLETE**

**VERIFIED BY** [Signature]  **DATE** 26 SEP 96
# SHIPPI NG/ RECEIVING AND NDE/NDA HVAC

## HVAC SYSTEM/ PLANT CONTROL SYSTEM INTERFACE SIGNALS

### TABLE 1B

<table>
<thead>
<tr>
<th>TAG</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
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</thead>
<tbody>
<tr>
<td>AH-11-101/ST</td>
<td>AHU START PULSE, AH-11-101</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-101/SP</td>
<td>AHU STOP PULSE, AH-11-101</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-101/OC</td>
<td>OPERATOR OVER-RIDE TO OCCUPIED CYCLE, AH-11-101</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-101/UC</td>
<td>OPERATOR OVER-RIDE TO UNOCCUPIED CYCLE, AH-11-101</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>11-TI-627/SP</td>
<td>NDE/NDA TEMPERATURE SET POINT, AH-11-101</td>
<td>V</td>
<td>YES</td>
</tr>
<tr>
<td>11-TI-627/EN</td>
<td>ENABLE TEMPERATURE SET POINT PULSE, AH-11-101</td>
<td>B</td>
<td>YES</td>
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*See Exception Report for Step 1.2.1.*

PCS TO HVAC DCS POINTS (TABLE 1B) COMPLETE

VERIFIED BY [Signature]  DATE 26 Sept '96
### TABLE 1C

<table>
<thead>
<tr>
<th>TAG</th>
<th>DESCRIPTION</th>
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<th>YES/NO</th>
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<tbody>
<tr>
<td>11-XA-621</td>
<td>SHIPPING/RECEIVING AND NDE/NDA AHU CONTROLLER, C-11-101 TROUBLE ALARM</td>
<td>DI</td>
<td>No</td>
</tr>
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See exception #3 report for step 1.2.1

POINTS HARDWIRED TO PCS (TABLE 1C) COMPLETE

VERIFIED BY [Signature]  DATE 26 Sept 96
### TABLE 2A

<table>
<thead>
<tr>
<th>TAG</th>
<th>HVAC DCS TO PCS VIA COMMUNICATION LINK</th>
<th>VERIFY</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-PDISL-644</td>
<td>RETURN FAN NOT RUNNING OR FAILED, RF-11-401</td>
<td>B YES</td>
</tr>
<tr>
<td>11-TI-641</td>
<td>OUTSIDE AIR TEMPERATURE, AH-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>11-TI-642</td>
<td>MIXED AIR TEMPERATURE, AH-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>11-PDISH-641</td>
<td>PRE-FILTER DIRTY, AH-11-401</td>
<td>B YES</td>
</tr>
<tr>
<td>11-PDISH-642</td>
<td>FINAL FILTER DIRTY, AH-11-401</td>
<td>B YES</td>
</tr>
<tr>
<td>11-PDISL-643</td>
<td>SUPPLY FAN NOT RUNNING OR FAILED, AH-11-401</td>
<td>B YES</td>
</tr>
<tr>
<td>11-TI-645</td>
<td>SUPPLY AIR TEMPERATURE, AH-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>11-FI-643</td>
<td>SUPPLY AIR FLOW, AH-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>11-FI-645</td>
<td>SUPPLY AIR PRESSURE, AH-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>11-PDI-642</td>
<td>RETURN AIR FLOW, RF-11-401</td>
<td>V YES</td>
</tr>
<tr>
<td>SF-11-401/S</td>
<td>ADMINISTRATION AREA SUPPLY FAN, SF-11-401 RUNNING</td>
<td>B YES</td>
</tr>
<tr>
<td>RF-11-401/S</td>
<td>ADMINISTRATION AREA RETURN FAN, RF-11-401 RUNNING</td>
<td>B YES</td>
</tr>
</tbody>
</table>

HVAC DCS TO PCS POINTS (TABLE 2A) COMPLETE

VERIFIED BY [Signature] DATE 20 Sept 96
## HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

### TABLE 2B

<table>
<thead>
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<th>TAG</th>
<th>DESCRIPTION</th>
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<th>YES/NO</th>
</tr>
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<tbody>
<tr>
<td>AH-11-401/ST</td>
<td>AHU START PULSE, AH-11-401</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-401/SP</td>
<td>AHU STOP PULSE, AH-11-401</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-401/OC</td>
<td>OPERATOR OVER-RIDE TO OCCUPIED CYCLE, AH-11-401</td>
<td>B</td>
<td>YES</td>
</tr>
<tr>
<td>AH-11-401/UC</td>
<td>OPERATOR OVER-RIDE TO UNOCCUPIED CYCLE, AH-11-401</td>
<td>B</td>
<td>YES</td>
</tr>
</tbody>
</table>

See Exception 

PCS TO HVAC DCS POINTS (TABLE 2B) COMPLETE

VERIFIED BY [Signature]  DATE 26 Sept 86
## TABLE 2C

<table>
<thead>
<tr>
<th>TAG</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>VERIFY</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-XA-641</td>
<td>ADMINISTRATION AREA CONTROLLER, C-11-401 TROUBLE ALARM</td>
<td>DI</td>
<td>YES</td>
</tr>
</tbody>
</table>

**POINTS HARDWIRED TO PCS (TABLE 2C) COMPLETE**

**VERIFIED BY** [Signature]  
**DATE** 30 Sept. '96
# LOCKER ROOMS

## ADMINISTRATION (LOCKER ROOMS)

### HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

<table>
<thead>
<tr>
<th>TABLE 3A</th>
<th>HVAC DCS TO PCS VIA COMMUNICATION LINK</th>
<th>VERIFY</th>
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<tbody>
<tr>
<td>TAG</td>
<td>DESCRIPTION</td>
<td>TYPE</td>
</tr>
<tr>
<td>11-TI-665</td>
<td>SUPPLY AIR TEMPERATURE, AH-11-301</td>
<td>V</td>
</tr>
<tr>
<td>11-PDISH-661</td>
<td>PRE-FILTER DIRTY, AH-11-301</td>
<td>B</td>
</tr>
<tr>
<td>11-PDISH-662</td>
<td>FINAL FILTER DIRTY, AH-11-301</td>
<td>B</td>
</tr>
<tr>
<td>11-PDISL-663</td>
<td>SUPPLY FAN NOT RUNNING OR FAILED, SF-11-301</td>
<td>B</td>
</tr>
<tr>
<td>11-TI-668</td>
<td>LOCKER ROOM AREA TEMPERATURE, AH-11-301</td>
<td>V</td>
</tr>
<tr>
<td>11-TI-668/SPS</td>
<td>CURRENT LOCKER ROOM AREA TEMPERATURE SET POINT, AH-11-301</td>
<td>V</td>
</tr>
<tr>
<td>EF-11-301/S</td>
<td>EXHAUST FAN RUNNING</td>
<td>B</td>
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<tr>
<td>AH-11-301/S</td>
<td>ADMINISTRATION LOCKER ROOM AREA AHU RUNNING</td>
<td>B</td>
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</table>

HVAC DCS TO PCS POINTS (TABLE 3A) COMPLETE

VERIFIED BY: [Signature]

DATE: 26 Sept '96
## LOCKER ROOMS

### ADMINISTRATION (LOCKER ROOMS)

**HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS**

<table>
<thead>
<tr>
<th>TABLE 3B</th>
<th>PCS TO HVAC DCS VIA COMMUNICATION LINK</th>
<th>VERIFY</th>
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</thead>
<tbody>
<tr>
<td>TAG</td>
<td>DESCRIPTION</td>
<td>TYPE</td>
</tr>
<tr>
<td>AH-11-301/ST</td>
<td>AHU START PULSE, AH-11-301</td>
<td>B</td>
</tr>
<tr>
<td>AH-11-301/SP</td>
<td>AHU STOP PULSE, AH-11-301</td>
<td>B</td>
</tr>
<tr>
<td>AH-11-301/OC</td>
<td>OPERATOR OVER-RIDE TO OCCUPIED CYCLE, AH-11-301</td>
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<tr>
<td>AH-11-301/UC</td>
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<td>11-TI-688/SP</td>
<td>LOCKER ROOM AREA TEMPERATURE SET POINT, AH-11-301</td>
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See Exception #6, Step 3.2.1.

PCS TO HVAC DCS POINTS (TABLE 3B) COMPLETE

VERIFIED BY [Signature]  
DATE 26 Sept 96
## ADMINISTRATION (LOCKER ROOMS)

### HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

**TABLE 3C**

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<tr>
<th>TAG</th>
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<tr>
<td>11-XA-661</td>
<td>ADMINISTRATION AREA LOCKER ROOMS AHU CONTROLLER, C-11-301 TROUBLE ALARM</td>
<td>DI</td>
<td>YES</td>
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</tbody>
</table>

**POINTS HARDWIRED TO PCS (TABLE 3C) COMPLETE**

VERIFIED BY: [Signature]  DATE: 28 Sept '96
### COMPUTER ROOM

**COMPUTER AND CONTROL ROOM HVAC**

**HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS**

<table>
<thead>
<tr>
<th>TABLE 4A</th>
<th>HVAC DCS TO PCS VIA COMMUNICATION LINK</th>
<th>VERIFY</th>
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</thead>
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<tr>
<td><strong>TAG</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>TYPE</strong></td>
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<td>11-PDISL-633A</td>
<td>SUPPLY FAN NOT RUNNING OR FAILED, SF-11-501A</td>
<td>B</td>
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<tr>
<td>11-TI-635A</td>
<td>MIXED AIR TEMPERATURE, AH-11-501A</td>
<td>V</td>
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<td>11-PDISH-631A</td>
<td>PRE-FILTER DIRTY, AH-11-501A</td>
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<td>11-MI-632A</td>
<td>CONTROL ROOM HUMIDITY, AH-11-501A</td>
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<td>11-MI-632A/SPS</td>
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<td>11-TI-632A</td>
<td>CONTROL ROOM TEMPERATURE, AH-11-501A</td>
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<td>CURRENT CONTROL ROOM TEMPERATURE SET POINT, AH-11-501A</td>
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<td>SF-11-501A/S</td>
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<td>11-TI-632B</td>
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**HVAC DCS TO PCS POINTS (TABLE 4A) COMPLETE**

**VERIFIED BY** [Signature]  **DATE** 2 Oct '96
# COMPUTER ROOM

## COMPUTER AND CONTROL ROOM HVAC

### HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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PCS TO HVAC DCS POINTS (TABLE 4B) COMPLETE

VERIFIED BY [Signature]

DATE 14 OCT 96
## COMPUTER ROOM

**COMPUTER AND CONTROL ROOM HVAC**

**HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS**

### TABLE 4C

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**POINTS HARDWIRED TO PCS (TABLE 4C) COMPLETE**

VERIFIED BY [Signature] DATE 14 Oct 96
## PROCESS ZONE I

### PROCESS ZONE I (GLOVEBOX)

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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HVAC DCS TO PCS POINTS (TABLE 6A) COMPLETE

VERIFIED BY ___________________________ DATE ___________
PROCESS ZONE I

PROCESS ZONE I (GLOVEBOX)

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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PCS TO HVAC DCS POINTS (TABLE 6B) COMPLETE

VERIFIED BY ___________________________ DATE ____________
### PROCESS ZONE I

### PROCESS ZONE I (GLOVEBOX)

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

#### TABLE 6C POINTS HARDWIRED TO PCS

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POINTS HARDWIRED TO PCS (TABLE 6C) COMPLETE

VERIFIED BY____________________ DATE________
## PROCESS ZONE II

**PROCESS ZONE II (PROCESS AREA)**

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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HVAC DCS TO PCS POINTS (TABLE 7A) COMPLETE

VERIFIED BY __________________________ DATE __________
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PCS TO HVAC DCS POINTS (TABLE 7B) COMPLETE

VERIFIED BY ___________________________ DATE ____________
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POINTS HARDWIRED TO PCS (TABLE 7C) COMPLETE

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HVAC DCS TO PCS POINTS (TABLE 8A) COMPLETE
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### PROCESS SUPPLY AIR

### PROCESS AREA SUPPLY AIR

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

#### TABLE 8B

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<th>TAG</th>
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<tr>
<td>AH-11-201A/ST</td>
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<td>AH-11-201A/SP</td>
<td>PROCESS AREA AHU STOP PULSE, AH-11-201A</td>
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<tr>
<td>11-FI-603A/SP</td>
<td>SUPPLY AIR FLOW SET POINT, AH-11-201A</td>
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<td>11-FI-603A/EN</td>
<td>ENABLE SUPPLY AIR FLOW SET POINT PULSE, AH-11-201A</td>
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<td>AH-11-201B/SP</td>
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<td>11-FI-603B/SP</td>
<td>SUPPLY AIR FLOW SET POINT, AH-11-201B</td>
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PCS TO HVAC DCS POINTS (TABLE 8B) COMPLETE

VERIFIED BY __________________________ DATE ________
## PROCESS SUPPLY AIR

### PROCESS AREA SUPPLY AIR

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

<table>
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<tr>
<td>11-XA-601A</td>
<td>PROCESS AREA AHU CONTROLLER, C-11-201A, TROUBLE ALARM</td>
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<tr>
<td>11-XA-601B</td>
<td>PROCESS AREA AHU CONTROLLER, C-11-201B, TROUBLE ALARM</td>
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<tr>
<td>11-ZSO-604</td>
<td>COMMON SUPPLY AIR DAMPER OPEN</td>
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<td>11-ZSC-604</td>
<td>COMMON SUPPLY AIR DAMPER CLOSED</td>
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**POINTS HARDWIRED TO PCS (TABLE 8C) COMPLETE**

VERIFIED BY __________________________ DATE ___________
# CHILLERS

## CHILLED GLYCOL

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

<table>
<thead>
<tr>
<th>TABLE 9A</th>
<th>HVAC DCS TO PCS VIA COMMUNICATION LINK</th>
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<td>CHILLED GLYCOL PRIMARY-SECONDARY BRIDGE FLOW</td>
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<td>P-11-101A/S</td>
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<td>P-11-101B/S</td>
<td>CHILLED GLYCOL DISTRIBUTION PUMP P-11-101B RUNNING</td>
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HVAC DCS TO PCS POINTS (TABLE 9A) COMPLETE

VERIFIED BY [Signature]  DATE 14 Oct '96
### CHILLERS

#### CHILLED GLYCOL

HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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<th>TABLE 9B</th>
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<td>TYPE</td>
</tr>
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<td>CHILLED GLYCOL DISTRIBUTION PUMP P-11-101A START PULSE</td>
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<tr>
<td>P-11-101A/SP</td>
<td>CHILLED GLYCOL DISTRIBUTION PUMP P-11-101A STOP PULSE</td>
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<td>P-11-101B/ST</td>
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See Exception 45, Step 9.1.0.

PCS TO HVAC DCS POINTS (TABLE 9B) COMPLETE

VERIFIED BY [Signature] DATE 14 OCT 96
### TABLE 9C

**CHILLED GLYCOL**  
HVAC SYSTEM/PLANT CONTROL SYSTEM INTERFACE SIGNALS

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<tr>
<td>11-XA-651</td>
<td>CHILLED GLYCOL SYSTEM CONTROLLER, C-11-101 TROUBLE ALARM</td>
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<td><strong>Yes</strong></td>
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<tr>
<td>11-TIT-652</td>
<td>CHILLED GLYCOL TEMPERATURE</td>
<td>A</td>
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**POINTS HARDWIRED TO PCS (TABLE 9C) COMPLETE**

VERIFIED BY [Signature]

DATE 14 Apr '96