## CONTROL POINT LIST - TYPICAL TARGET BUILDING MAKEUP AIR HANDLER

| BUILDING: TARGET MAKE UP AIR HANLDER | | OUTPUT FROM DDC | | | | | INPUT TO DDC | | | | | | | | | | | SOFTWARE | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DIGITAL | | | ANALOG | | DIGITAL | | | | | | ANALOG | | | | | ALARMS | | | | | | APPLICATIONS | | | | | | |
| | | | | | | | | | | | | | | | | | | DIGITAL | | | ANALOG | | | | | | | | | |
| POINT DESCRIPTION | GRAPHIC DISPLAY(WINDOWS BASED SOFTWARE) | CONTROL RELAY | HAND/OFF/AUTO | OPEN/CLOSE | CONTROL POINT ADJUSTMENT | PROPORTIONAL CONTROL | CONTACT CLOSURE | PULSE | DIFFERENTIAL PIPE'S SWITCH | PRESSURE SWITCH | AUXILLARY CONTACT | GENERAL ALARM | TEMPERATURE (F) / (DWB) | % RELATIVE HUMIDITY | PSIG, PSIA, PSID | SPEED (RPM) | FLOW | CONTACT CLOSURE--DRY FILTER | CONTACT CLOSURE--EQUIPMENT FAILURE | | HIGH LIMIT | LOW LIMIT | RUN TIME | | DUTY CYCLING | START/STOP | ECONOMIZER OFF/AUTO | REHEAT COIL RESET | LEAD/LAG | CHILLED WATER RESET | FAILURE MODE |
| MUA-TA-01, 02, 03, 04 | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WET BULB TEMPERATURE DOWNSTREAM OF PREHEAT COIL | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | |
| COOLING COIL WATER FLOW CONTROL VALVE | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| PREHEAT COIL WATER FLOW CONTROL VALVE | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| ZONE-REHEAT COIL WATER FLOW CONTROL VALVE | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| HUMIDIFIER | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| SUPPLY AIR FLOW | | | | | | | | | | | | | | | | | X | | X | | | X | X | | | | | | | |
| FAN START/STOP | | X | | | | | | | | | | | | | | | | | | | | | | | | X | | | | |
| FAN SPEED-VFD | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | |
| VFD FAULT | | | | | | | | | | | X | | | | | | | | X | | | | | | | | | | | |
| VFD SPEED FEEDBACK | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | |
| SUPPLY AIR TEMPERATURE | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | |
| ZONE-SPACE TEMPERATURE | | | | | | | | | | | | | X | | | | | | | | X | X | | | | | | | | |
| OUTSIDE AIR TEMPERATURE | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | |
| OUTSIDE AIR RELATIVE HUMIDITY | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | |
| SPACE RELATIVE HUMIDITY | | | | | | | | | | | | | | X | | | | | | | X | X | | | | | | | | |
| AIR TEMP DOWNSTREAM OF PREHEAT COIL | | | | | | | | | | | | | X | | | | | | | | | X | | | | | | | | X |
| OUTSIDE AIR DAMPER | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUPPLY AIR DISCHARGE DAMPER | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | |

## SEQUENCE OF OPERATION

1. GENERAL:

   THE MAKE UP AIR HANDLING UNIT SHALL BE ENERGIZED, WHEN DIRECTED BY THE CONTROL SYSTEM AND SHALL RUN CONTINUOUSLY. THE MAKE-UP AIR UNITS SHALL BE INTERLOCKED WITH SECONDARY CONFINEMENT EXHAUST (SEE) FANS (SEE CENTRAL EXHAUST FACILITY) SUCH THAT THE MAKE-UP AIR UNITS WILL BE DENERGIZED UPON FAILURE OF BOTH SEC FANS. DAMPERS IN THE OUTSIDE AIR INTAKE AND SUPPLY AIR DISCHARGE (SMOKE) SHALL BE CLOSED WHEN THE UNIT IS DEENERGIZED AND SHALL BE COMMANDED OPEN WHEN THE UNIT IS ENERGIZED. A DUCT SMOKE DETECTOR (DSD) IN THE SUPPLY AIR DISCHARGE SHALL BE CONNECTED TO THE FIRE ALARM CONTROL PANEL (FACP). SHOULD SMOKE BE DETECTED, THE FACP, SHALL INDICATE AN ALARM CONDITION AS THE CENTRAL CONTROL STATION. AN AIRFLOW MEASURING STATION (AFMS) IN THE SUPPLY AIR DUCTWORK SHALL REPORT UNIT AIRFLOW, AND THIS OPERATING STATUS TO THE CENTRAL CONTROL STATION. SHOULD THE TEMPERATURE OF THE AIR DOWNSTREAM OF THE PREHEAT COIL DROP TO 45°F, AN ALARM CONDITION SHALL BE INDICATED AT THE CENTRAL CONTROL STATION. MUA FANS SHALL BE ON DIESEL BACKUP POWER.

2. TEMPERATURE:

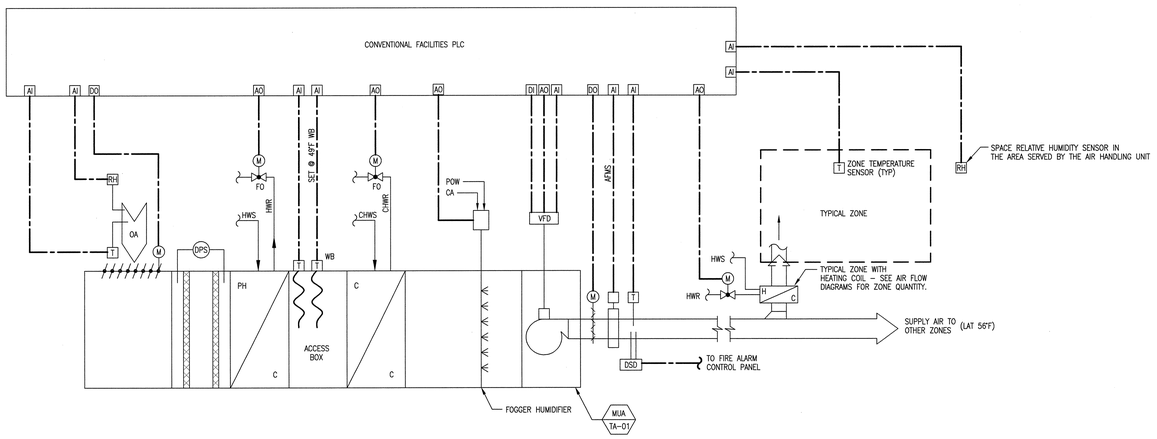
   A TEMPERATURE SENSOR IN THE OUTSIDE AIR INTAKE SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. A WET BULB TEMPERATURE SENSOR DOWNSTREAM OF THE HEATING COIL SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. SHOULD THE CONTROL SYSTEM SENSE A REQUIREMENT FOR HUMIDIFICATION, THE CONTROL SYSTEM SHALL MODULATE THE PREHEAT COIL CONTROL VALVE TO MAINTAIN A COIL DISCHARGE WET BULB TEMPERATURE OF 49°F. A TEMPERATURE SENSOR DOWNSTREAM OF THE HEATING COIL SHALL PROVIDE INPUT TO THE CONTROL SYATEM. SHOULD THE CONTROL SYSTEM SENSE THAT SPACE HUMIDIFICATION IS SATIFIED, THE CONTROL SYSTEM SHALL MODULATE THE PREHEAT COIL CONTROL VALVE TO MAINTAIN A COIL DISCHARGE TEMPERATURE OF 53°F. A TEMPERATURE SENSOR IN THE SUPPLY AIR DISCHARGE DUCT SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL MODULATE THE COOLING COIL CONTROL VALVE TO MAINTAIN A SUPPLY AIR DISCHARGE TEMPERATURE OF 55°F. HIGH AND LOW LIMIT TEMPERATURE ALARMS (5°F ABOVE AND BELOW SET POINT) SHALL BE REPORTED AT THE CONTROL SYSTEM. A ZONE TEMPERATURE SENSOR SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL MODULATE THE ZONE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN DESIRED SPACE TEMPERATURE.

3. HUMIDIFICATION:

   A SPACE RELATIVE HUMIDITY SENSOR SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL SEND A SIGNAL TO MODULATE HUMIDIFIER OUTPUT, THRU THE HUMIDIFIER UNIT CONTROL PANEL.

4. AIR FLOW CONTROL:

   AN AIR FLOW MEASURING STATION SHALL PROVIDE OPERATOR INPUT AT THE CENTRAL CONTROL STATION. SYSTEM OPERATOR SHALL HAVE THE ABILITY TO MANUALLY ADJUST FAN SPEED THROUGH THE CONTROL SYSTEM TO MAINTAIN DESIRED AIR FLOW AND ACCOUNT FOR FILTER LOADING. LOW AIR FLOW ALARM SHALL BE INDICATED SHOULD TOTAL SUPPLY AIR FLOW DROP BY 5% OR MORE.




MAKE-UP AIR HANDLING UNIT CONTROL DIAGRAM - TYPICAL FOR MUA-TA-01, 02, 03 & 04

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NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN OR TAKEN
SECTION AND DETAIL KEY

THIS DOCUMENT CONTROLLED BY
CHANGE CONTROL SYSTEM 3
ENGINEERING PROCEDURE SNS-ENG-G001

| REV | CHANGE TYPE | CHANGE CONTROL SYSTEM | CHANGE REQUEST NUMBER | DESCRIPTION | DSN | CHK | DEPT |
|---|---|---|---|---|---|---|---|
| A | | | | ISSUED FOR REFERENCE – 11/13/01 | MMK | BWJ | |

REVISION OR ISSUE PURPOSE

| DATE | PE | DATE | PJ | DATE | REQ | DATE | UTB | DATE | RPE | RPE NO | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | RPD | 11/14/01 | RPD | 11/14/01 | | | | | BWJ | 105869 | 11/13/01 |

REVISION APPROVALS

| REW | – | WRS | AK | WRS | BWJ | – | MP | – | ED |
|---|---|---|---|---|---|---|---|---|---|
| ST | CV | EC | EE | EM | IE | M | PD | SE | AR |

SQUAD CHECK

| RPE | | | |
|---|---|---|---|
| FOR REFERENCE ONLY | DSN | M.KEHOE | 11/13/01 |
| | DRW | J.STEIN | 11/13/01 |
| | CHK | B.JOHNSON | 11/13/01 |
| | DEPT | | |
| | PE | | |
| | PJ | R.D. Dean | 11/14/01 |
| | REQ | | |
| REV. DATE | UTB | | 11/14/01 |

DRAWING APPROVALS

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Oak Ridge National Laboratory
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC05-00OR22725
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PROJECT NAME:
SPALLATION NEUTRON SOURCE
TARGET BUILDING
TARGET MUA CONTROL DIAGRAM

| 1 | 48 | 49 | 50 | PLANT | BLDG | FL | SH. | OF | TYPE | CLASS |
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| 3 | H | X | X | 8 | 8700 | | 1 | 1 | D | U |

| 51 | 52 | 53 | | REV |
|---|---|---|---|---|
| NC | NA | | H8.40.01 | A |

WBS 1.8.3.7

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