CMI Management, Inc.

Over and Above Estimate

Region: 5

Location: MD002

CSS #: 15107

Maximo Work Order No.: 9572

Asset #: NA

Date: 6/10/2019

Original Description:
Phase II controls work at MD002, this is follow on to the Phase I project that was recently completed under WO 5993.

Repairs Needed:
BAS Survey & Report have been completed and show that the existing system has several deficiencies; propose required BAS repairs to programming and related hardware; specific inclusions and exclusions are noted inside proposed scope

RS Means Line Buildup and Labor Summary (Data Version 2017, Q4):

Quantity	Line Item Number	Description	Labor Hours	Labor Rate/Hr	Materials	Equipment	Total
1	NA	Materials (See details attached)	--	--	$18,130.00	--	$18,130.00
--	NA	Labor	230	$150.00	--	--	$34,590.00
--	NA	Sales Tax	--	--	--	--	$3,163.00
--	NA	CMI Coordination and Site/Task Oversight	16	$80.00	--	--	$1,280.00

Estimate Summary:

Labor Hours	Labor Cost	Material Cost	Sales Tax	Total Cost	CE Factor	Total Estimate
246	$35,870.00	$18,130.00	$3,163.00	$57,163.00	102%	**$58,306.26**

The Experience You Deserve

TUSTIN ENERGY SOLUTIONS

PROJECT PROPOSAL

Proposal Date:

June 7, 2019

Proposal Number:

TES19145

Prepared for:

Adam Colopy
Tidewater, Inc.
3761 Attucks Drive

Powell OH 43065

TOMORROW'S SOLUTIONS for TODAYS' BUILDINGS

Prepared by:

Dominic Bostardi
610.539.8200

CORPORATE HEADQUATERS:
2555 INDUSTRY LANE ~ NORRISTOWN, PA 19403 ~ 610.539.8200 ~ 610.539.2890 fax

Summary

We are providing a proposal for **USAFRC Baltimore Phase II BAS**. Our proposal is based upon the following documentation:

Site Visit:	**Complete**	**Date:**	**April - May 2019**
Mechanical Documents:	**NA**	**Date:**	
Addendum Received:	**NA**	**Date:**	

During our meeting(s), we discussed the following goals:
1. A BAS Survey & Report have been completed and show that the existing system has several deficiencies; propose required BAS repairs to programming and related hardware; specific inclusions and exclusions are noted inside proposed scope

Please see the following pages for clarification.

This proposal assumes that if granted, all parties will work together to develop a mutually agreeable construction schedule. This proposal is also based on information provided at time of bid proposal. Any revisions required at a later date is subject to price review at that time. We reserve the right to withdraw this proposal if not accepted within 60 days.

Thank you for this opportunity.

Dominic Bostardi, Sales
cell: 610.551.1563

USAFRC BALTIMORE PHASE II BAS

Tustin Energy Solutions will provide the following to accomplish the documented goals:

1. Temperature Control Modifications For The Following Existing HVAC Equipment:
- CHW plant
- HHW plant
- AHU-1, 2, 3
- HRU-1
- (10) CV/VAV boxes
- (6) Exhaust fans

2. Provide The Following New Software / Hardware:
- CHW plant
  a. Programming modifications as required for proper system operation
  b. Enable BACnet communication to chiller
  c. Provide hardwired chiller enable and status points
  d. Wire, calibrate & calibrate the existing CHW flow meter; replacement meter, if required, not included
- HHW plant
  a. Programming modifications as required for proper system operation
  b. Replace the existing HHW differential pressure transmitter
  c. Wire, calibrate & calibrate the existing HHW flow meter; replacement meter, if required, not included
- AHU-1
  a. Programming modifications as required for proper unit operation
  b. Add current sensing to existing supply fan for status
- AHU-2
  a. Programming modifications as required for proper unit operation
  b. Replace the existing CHW valve actuator; valve body replacement not included
  c. Add return air CO2 sensor, wiring, programming and graphic
- AHU-3
  a. Programming modifications as required for proper unit operation
  b. Replace the existing HHW valve actuator; valve body replacement not included
- HRU-1
  a. Programming modifications as required for proper unit operation
- CV/VAV boxes
  a. Programming modifications as required for proper unit operation
  b. Replace the existing reheat valve actuators for VAV1_02, VAV1_07, CAV4_03; valve body replacement not included
  c. Relace space CO2 sensors for VAV1_02, VAV1_08, VAV1_09, VAV1_10, CAV2_02, CAV4_01, VAV3_01
  d. Add space CO2 sensor to VAV3_04; configured in software, but does not physically exist
- Exhaust fans
  a. Programming modifications as required for proper unit operation

NOTES:
- The existing communication network wiring and end devices shall be repurposed under this proposal; any required hardware/software replacement in addition to the above items is not included; this proposal assumes the existing infrastructure to be sound and functional
- Currently, there is no indication that there are issues with the existing communication wiring
- The existing BAS points and sequence of operation shall be replicated under this proposal
- No mechanical, plumbing and/or piping work [if required] is included under this proposal
- Lead time for project start is approximately 6 weeks from approval

continued next page...

USAFRC BALTIMORE PHASE II BAS

...continued from previous page

3. Standard Programming
- Web-based access (based upon owner approval)
- Architectural floor plan with thermostat locations of each zone
- Trending reports (based upon owner's history requirements)
- Critical / Non-critical alarming (based upon owner's requirements)
- Provide setpoint screen listing zone temperatures

4. Miscellaneous
- Provide all necessary low voltage wiring in plenum rated wire for new devices

5. Owner Responsibilities
- Internal network connection to the world wide web utilizing a static IP address
- Signed proposal or purchase order
- Architectural backgrounds with most current layout
- Approval of design documents and schedule

6. Work Hours
- Monday through Friday 7am to 3:30pm non-holidays

7. Startup and commissioning
- Provide 2 hours onsite owner training

8. Warranty
- One year warranty on all new items furnished and installed by Tustin Energy Solutions

Exclusions - See the attached pages for additional exclusions

USAFRC BALTIMORE PHASE II BAS

Exclusions

1. Premium time
2. Sales tax
3. Bid and/or performance bonds
4. Building permit
5. Mechanical work of any kind
6. Water treatment
7. Flushing of systems by others
8. Rigging of equipment provided by others
9. Structural steel
10. No line voltage wiring other than described in scope of work; power to control panels and 120V devices by others; all electrical work included in this proposal is considered low voltage
11. Cutting, patching, painting of drywall, ceilings
12. Core drilling, with the exception of low voltage conduit where required
13. Relocation of piping systems
14. Abatement
15. Protection of walls, floors, ceilings
16. Coordination of owner supplied equipment
17. Start-up or shut-down of existing owner equipment
18. Demolition or salvage of existing material
19. Additional repairs not specifically noted
20. Temporary removal, relocation, etc. for installation of new equipment
21. Structural steel for catwalk, platforms, etc.
22. Seismic vibration control
23. Third party testing (vibration, welding, etc.)
24. No field pressure testing; field leak testing by others if required
25. Equipment quick ship options
26. No site acceptance testing
27. No fire alarm system work
28. Sprinkler work
29. Third party validation or commissioning
30. Temporary construction filters
31. Certified air/water balancing
32. New power for welding work; welding circuit by others
33. Starters or disconnects
34. Temporary utilities including cooling, power, heating
35. No foundation drains
36. Dumpster
37. Concrete cutting
38. Third party testing for medical, drug, security, etc.
39. Liquidated damages
40. Additional kW meters not specifically noted
41. Modification to existing automation logic outside of direct scope of work
42. Emergency power and/or temporary power
43. Prevailing wage rates included where applicable
44. Stamped or professionally engineered documents
45. Pipe insulation repair
46. Preventative maintenance; we recommend a preventative maintenance program for this site

TUSTIN ENERGY SOLUTIONS

The Experience You Deserve

PROJECT AGREEMENT
FOR BUILDING ENVIRONMENTAL SYSTEMS

Proposal Date	Proposal Number	Agreement No.
June 7, 2019	TES19145	

BY and BETWEEN:

Tustin Energy Solutions **2555 Industry Lane** **Norristown PA 19403**	**AND**	**Tidewater, Inc.** **3761 Attucks Drive** **Powell OH 43065**
hereinafter CONTRACTOR		hereinafter CUSTOMER

SERVICES WILL BE PROVIDED AT THE FOLLOWING LOCATION(S)

USAFRC

700 East Ordnance Road, Baltimore, MD 21226

As a condition of performance, payments are to made on a progress basis. Invoice payment must be made within (30) days of receipt. Any alteration or deviation from the above proposal involving extra cost of material or labor will become an extra charge over the sum stated above. This proposal will become a binding Agreement only after acceptance by Customer and approved by an officer of Contractor as evidenced by their signatures below. This agreement sets forth all of the terms and conditions binding upon the parties hereto; and no person has authority to make any claim, representation, promise or condition on behalf of Contractor which is not expressed herein.

Phase II Proposal Price:	**$55,883.00**	
Labor:	$34,590.00	[Hourly Rate $150/hr.]
Material:	$18,130.00	
Sales Tax:	$3,163.00	

RELEASE OF THIS CONFIDENTIAL INFORMATION TO OTHERS IS FORBIDDEN AND IS PUNISHABLE BY LAW

Purchase Order #:

CONTRACTOR

Signature (Sales Representative) Dominic Bostardi

Approved for Contractor:

Signature

Name & Title

Date

CUSTOMER

Signature (Authorized Representative)

Name (Print/Type)

Title

Date

PROJECT AGREEMENT TERMS AND CONDITIONS

1. Customer shall permit Contractor free and timely access to areas and equipment, and allow Contractor to start and stop the equipment as necessary to perform required services. All planned work under this Agreement will be performed during the Contractor's normal working hours.

2. Contractor warrants that the workmanship hereunder shall be free from defects for thirty (30) days from date of installation. If any replacement part or item of equipment proves defective, Contactor will extend to Customer the benefits of any warranty Contactor has received from the manufacturer. Removal and reinstallation of any equipment or materials repaired or replaced under a manufacturer's warranty will be at Customer's expense and at the rates in effect.

3. Customer will promptly pay invoices within thirty (30) days of receipt. Should a payment become thirty (30) days or more delinquent, Contractor may stop all work under this Agreement without notice and/or cancel this Agreement amount shall become due and payable immediately upon demand.

4. Customer shall be responsible for all taxes applicable to the services and/or materials hereunder.

5. Any alteration to, or deviation from, this Agreement involving extra work, cost of materials or labor will become an extra charge (fixed price amount to be negotiated of on a time-and-material basis at Contractor's rates then in effect) over the sum stated in this Agreement.

6. In the event Contractor must commence legal action in order to recover any amount payable or owed to Contractor under this Agreement, Customer shall pay Contractor all court costs and attorneys' fees incurred by Contactor.

7. Any legal action against the Contractor relating to this Agreement, or the breach thereof, shall be commenced within one (1) year from the date of the work.

8. Contractor shall not be liable for any delay, loss, damage, or detention caused by unavailability of machinery, equipment or materials, delay of carriers, strikes, including those by Contractor's employees, lockouts' civil or military authority, priority regulations, insurrection or riot, action of the elements, forces of nature, or by any cause beyond its control.

9. To the fullest extent permitted by law, Customer shall indemnify and hold harmless Contractor, its agent and employees from and against all claims, damages, losses, and expenses (including but not limited to attorneys' fees) arising out of or resulting from the performance of work hereunder, provided that such claim, damage, loss or expense is caused in whole or in part by an active or passive act or omission of Customer, anyone directly or indirectly employed by Customer, or anyone for whose acts Customer may be liable, regardless of whether it is caused in party by the negligence of Contractor.

10. Customer shall make available to Contractor's personal all pertinent Material Safety Data Sheets (MSDS) pursuant to OSHA's Hazard Communication Standard Regulations.

11. Contractor's obligation under this proposal and any subsequent contract does not include the identification, abatement or removal of asbestos or any other toxic or hazardous substances, hazardous wastes or hazardous materials. In the event such substances, wastes and materials are encountered, Contractor's sole obligation will be to notify the Owner of their existence. Contractor shall have the right thereafter to suspend its work until such substances, wastes or materials and the resultant hazards are removed. The time for completion of the work shall be extended to the extent caused by the suspension and the contract price equitably adjusted.

12. UNDER NO CIRCUMSTANCES, WHETHER ARISING IN CONTRACT, TORT (INCLUDING NEGIGENCE), EQUITY OR OTHERWISE, WILL CONTRACTOR BE RESPONSIBLE FOR LOSS OF USE, LOSS OF PROFIT, INCREASED OPERATING OR MAINTENANCE EXPENSES, CLAIMS OF CUSTOMER'S TENANTS OR CLIENTS, OR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES.

Tustin Energy Solutions, LLC Preventative Maintenance Report

Report Date: 4/17/2019
Site: USAFC Baltimore
Address: 450 Sentry Parkway
Techician: Dan Hainey **Date:** 4/17/2019
Reviewed By: **Date:**

HVAC Automation

- Good - System Operational
- Potential Issue - Additional Work Required
- Non-Functional - Immediate Repair Required

Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
1	x	Yes	A-19	Active	PM	USAFRC Baltimore	AHU-1		Mech 113	York XTI-033X045-EAGA046A VFD SAF	9		Yes	1. Unable to start/stop or schedule the unit from the graphic. 2. Hot water heating coil valve is not responding to commands and remains in open position. 3. Software has provisions for OA airflow station but no airflow station is installed. 4. Supply fan status not reading (remains off).	No

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Site: USAFC Baltimore
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Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
2	x	Yes	A-19	Active	PM	USAFRC Baltimore	AHU-2		Mech 113	York XTI-036X057-DAHA046A CV SAF	9		Yes	1. Unable to start/stop or schedule the unit from the graphic. 2. Occupany point not working (unit does not shut-down). 3. VFD points and duct static pressure sensor found in software but there is no VFD. 4. Temperature sensor readings are erratic. 5. Values on graphic do not match values in database (hot water valve, supply air temp). 6. Valves not operating as expected (heating when calling for cooling). 7. Software has provisions for OA airflow station but no airflow station is installed.	No

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3	x	Yes	A-19	Active	PM	USAFRC Baltimore	AHU-3		Mech 217	York XTI-042X066-EAKA046A VFD SAF	9		No	1. Unable to start/stop or schedule the unit from the graphic. 2. Software has provisions for OA airflow station but no airflow station is installed. 3. Heating coil valve unresponsive to commands and remains in current position.	No

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Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
4	x	Yes	A-19	Active	PM	USAFRC Baltimore	HRU-1		Mech 113	York XTI-042X072-HHJJ017A CV SAF CV EAF	9		Yes	1. Energy recovery wheel remains On when the unit is disabled (Unoccupied). 2. Valves not operating as expected (unit is heating when calling for cooling). 3. EAD, SAD, and Bypass modulating dampers not shown on graphic. 4. When the OA damper is set to automatic control it was found to be closed. The bypass damper also found to be closed. This starves the supply fan. One of these dampers should be full open at all times and both modulate in sequence. 5.ExhaustFilterS point reading fault/stale.	No
5	x	Yes	A-19	Active	PM	USAFRC Baltimore	Boiler 1	Building	Mech 113	Lochinvar KBN501	9		Yes	1. Boiler 1Alm point in fault, stale. 2. System differential pressure reading low. 3. System flow reading low.	No

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Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
6	x	Yes	A-19	Active	PM	USAFRC Baltimore	Boiler 2	Building	Mech 113	Lochinvar KBN501	9		Yes	1. System differential pressure reading low. 2. System flow reading low.	No
7	x	Yes	A-19	Active	PM	USAFRC Baltimore	Chiller	Building	Outside Mech 113	York YLAA0115SE46XCA	9		Yes	1. Appears that BACnet connection planned but never completed. 2. Chiller operating standalone only. 3. Chilled water pump status points not working. 4. Chilled water flow meter not reading. 5. Chiller graphic incomplete. 6. PumpDischPress not reading. 7. PumpSuctPress not reading. 8. Chiller is turned off at this time.	No

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8	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_02				9		Yes	1. Controller needs a download. 2. Airflow setpoints seem too low. 3. Unable to change setpoints on graphic. 4. Box is low on airflow. 5. CO2 sensor reading low (171 ppm). 6. Reheat valve override not working.	No
9	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_03				9		Yes	1. Unable to change setpoints on graphic. 2. Box is low on airflow.	No
10	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_04				9		Yes	1. Airflow setpoints seem too low. 2. Unable to change setpoints on graphic.	No
11	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_05				9		Yes	1. Airflow setpoints seem too low. 2. Unable to change setpoints on graphic.	No
12	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_06				9		Yes	1. Airflow setpoints seem too low. 2. Unable to change setpoints on graphic.	No

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13	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_07				9		Yes	1. Airflow setpoints seem too low. 2. Unable to change setpoints on graphic. 3. No rise in SAT with heating valve override to open.	No
14	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_08				9		Yes	1. Airflow setpoints all generally the same value. 2. Box is low on airflow. 3. Unable to change setpoints on graphic. 4. CO2 sensor reading too high.	No
15	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_09				9		Yes	1. Airflow setpoints do not appear correct. 2. Unable to change setpoints on graphic. 3. CO2 sensor reading too high.	No
16	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV1_10				9		Yes	1. Airflow setpoints are not correct. 2. Unable to change setpoints on graphic. 3. CO2 sensor reading too low.	No
17	x	Yes	A-19	Active	PM	USAFRC Baltimore	CAV2_01				9		Yes	1. Box is low on airflow. 2. Unable to change setpoints on graphic. 3. Box is occupied and graphic reads that the box is unoccupied.	No

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18	x	Yes	A-19	Active	PM	USAFRC Baltimore	CAV2_02	Kitchen	Receiving		9		Yes	1. Box is low on airflow. 2. Unable to change setpoints on graphic. 3. CO2 sensor reading too low.	No
19	x	Yes	A-19	Active	PM	USAFRC Baltimore	CAV4_01				9		Yes	1. Box is low on airflow. 2. Unable to change setpoints on graphic. 3. CO2 sensor reading too high (900 ppm).	No
20	x	Yes	A-19	Active	PM	USAFRC Baltimore	CAV4_02				9		Yes	1. Box is low on airflow. 2. Unable to change setpoints on graphic.	No
21	x	Yes	A-19	Active	PM	USAFRC Baltimore	CAV4_03				9		Yes	1. Box is low on airflow. 2. Unable to change setpoints on graphic. 3. No rise in DAT when heating coil valve commanded open.	No
22	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_01				9		Yes	1. Controller needs a download. 2. Unable to change setpoints on graphic. 3. CO2 sensor reading low (270 ppm).	No
23	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_02				9		Yes	1. Controller needs a download. 2. Unable to change setpoints on graphic.	No

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Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
24	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_03				9		Yes	1. Box a little low on airflow. 2. Unable to change setpoints on graphic.	No
25	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_04				9		Yes	1. Box low on airflow. 2. Unable to change setpoints on graphic. 3. CO2 setpoint in software but no CO2 sensor.	No
26	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_05				9		Yes	Unable to change setpoints on graphic.	No
27	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_06				9		Yes	Unable to change setpoints on graphic.	No
28	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_07				9		Yes	Unable to change setpoints on graphic.	No
29	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_08				9		Yes	Unable to change setpoints on graphic.	No
30	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_09				9		Yes	1. Box a little low on airflow. 2. Unable to change setpoints on graphic.	No
31	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_10				9		Yes	Unable to change setpoints on graphic.	No
32	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_11				9		Yes	Unable to change setpoints on graphic.	No
33	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_12				9		Yes	Unable to change setpoints on graphic.	No
34	x	Yes	A-19	Active	PM	USAFRC Baltimore	VAV3_13				9		Yes	Unable to change setpoints on graphic.	No
35	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_1A	112 Equip Storage	112 Equip Storage	Vulcan	9		No		
36	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_2A	112 Equip Storage	112 Equip Storage	Vulcan	9		No		
37	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_3A	Receiving	Receiving	Vulcan	9		No		

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HVAC Automation

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Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
38	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_4A	121 TA50 Storage	121 TA50 Storage	Vulcan	9		No		
39	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_5A	Mech 113	Mech 113	Vulcan HV-036	9		No		
40	x	Yes	A-19	Active	PM	USAFRC Baltimore	UH_6A	Mech 217	Mech 217	Vulcan	9		No		
41	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_1A			Wired to CAV4_02 controller	9		No		
42	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_2A			Wired to VAV1_10 controller	9		No		
43	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_3A			Wired to VAV3_02 controller	9		Yes	1. Controller needs a download. 2. Fan appears uncontrolled on / off except for HVAC Shutdown. 3. Fan not shown on graphics.	No
44	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_4A			Wired to VAV1_07 controller	9		Yes	Fan not shown on graphics.	No
45	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_5A	112 Equip Storage	112 Equip Storage	1. Inline Duct 2. Wired to CAV2_01 controller	9		Yes	1. Check software. Fan running constant and should start/stop based on room temperature.	No
46	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_6A			Wired to VAV1_09 controller	9		No		
47	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_7A	Mech 113	Mech 113	Inline Duct	9		Yes	1. Fan not running in Auto or Hand. 2. Fan start/stop to relay ok. 3. Motor operated intake air damper non-functional.	No
48	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF-8A			Wired to VAV3_07 controller	9		Yes	1. Fan appears uncontrolled on / off except for HVAC Shutdown. 2. Fan not shown on graphics.	No
49	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_9A	Mech 217			9		Yes	Fan noisy.	No

Tustin Energy Solutions, LLC Preventative Maintenance Report

Report Date: 4/17/2019
Site: USAFC Baltimore
Address: 450 Sentry Parkway
Techician: Dan Hainey **Date:** 4/17/2019
Reviewed By: **Date:**

HVAC Automation

- Good - System Operational
- Potential Issue - Additional Work Required
- Non-Functional - Immediate Repair Required

Item #	Add	Checked	Date	Contract Status	Type	Site Name	Device Name	Area Served	Location	Description	Age (Yrs)	System Health	Issue	Issues	Corrective Action Complete
50	x	Yes	A-19	Active	PM	USAFRC Baltimore	EF_10A		121 TA50 Storage	1. Inline Duct 2. Wired to VAV1_03 controller	9		Yes	1. Fan fails to start when commanded on. 2. Fan start/stop to relay ok.	No
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USAFRC Baltimore BAS Status Report REV1

May 2019

Log-in Credentials Provided By Owner

Username: CMI

Password: CMI_Md002#

In addition, there are some existing usernames that remain unchanged. These can be deleted, updated or changed as required.

Name	Full Name	Enabled	Expiration
guest		false	Never
admin		true	Never
BACnet		true	Never
99thRSC_Admin		true	Never
AFOS_MD002		true	Never
Tustin	Tustin Energy Solutions	true	Never
asable	Andrew Sable - TES	true	Never
CMI	CMI PM Contractor	true	Never
ClientConnection	ClientConnection	true	Never

Building Wide HVAC Shut-Down

The Building Automation System is equipped with a building wide HVAC shut-down. This might be intended for shelter-in-place or a variety of other reasons. Once this intent is clarified, the operation should be tested, and the initiation point clearly indicated on BAS graphics.

Honeywell WEBs AX and N4 Stations

<u>Completed Work</u>

1. The following stations are upgraded to version 3.8.401:

Database

Name	Exts	Address	Host Model	Version	Status	Health
CBA_Chiller		ip:192.168.2.129	NPM2	3.8.401	{ok}	Ok [03-May-19 10:00 AM EDT]
CBA_Ahu1		ip:192.168.2.123	NPM6	3.8.401	{ok}	Ok [03-May-19 9:56 AM EDT]
CBA_Boiler		ip:192.168.2.127	NPM2	3.8.401	{ok}	Ok [03-May-19 10:00 AM EDT]
CBA_Ahu2		ip:192.168.2.124	NPM2	3.8.401	{ok}	Ok [03-May-19 10:00 AM EDT]
CBA_HRU1		ip:192.168.2.121	NPM2	3.8.401	{ok}	Ok [03-May-19 9:56 AM EDT]

2. CBA_Ahu3 is upgraded to version 4.4.93.40. This station hosts the graphical interface for the building:

Database 5 objec

Name	Exts	Address	Host Model	Version	Status	Health
CBA_Chiller		ip:192.168.2.129	NPM2	3.8.401	{ok}	Ok [03-May-19 10:02 AM EDT]
CBA_Ahu1		ip:192.168.2.123	NPM6	3.8.401	{unackedAlarm}	Ok [03-May-19 10:02 AM EDT]
CBA_Ahu2		ip:192.168.2.124	NPM2	3.8.401	{unackedAlarm}	Ok [03-May-19 9:57 AM EDT]
CBA_Ahu3		ip:192.168.2.125	NPM6	4.4.93.40	{unackedAlarm}	Ok [03-May-19 10:01 AM EDT]
CBA_Boiler		ip:192.168.2.127	NPM2	3.8.401	{ok}	Ok [03-May-19 9:57 AM EDT]

3. Batteries replaced and are currently new for all the above WEBs controllers.

Deficiencies

There are no current deficiencies known.

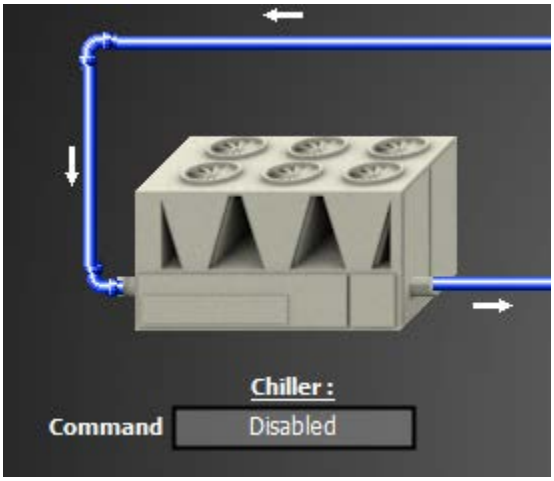
Chiller Plant

Completed Work

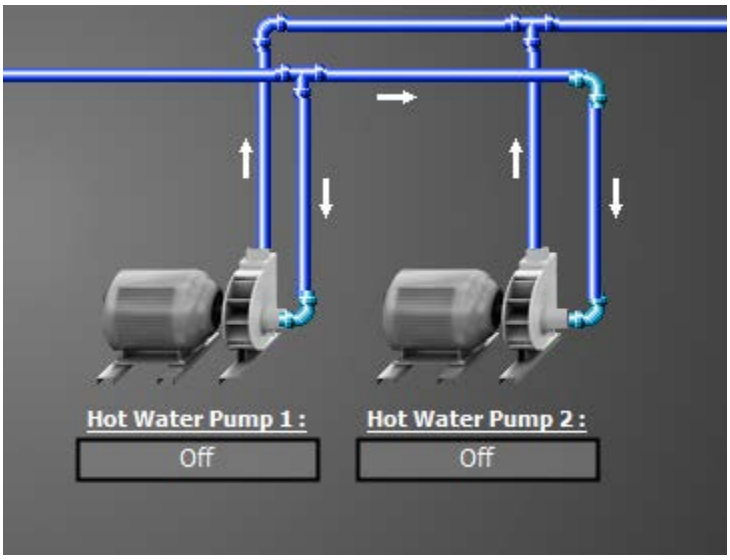
There is no work completed at this time. It is recommended at a minimum that the chiller enable point and pump status points are completed. This includes wiring, hardware, software and graphics. Control logic is already present to enable/disable the chiller based on chilled water valve demand. Chilled water supply temperature reset should be considered as an energy saving strategy.

Deficiencies

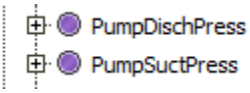
1. Chiller controls are incomplete. It appears that a BACnet connection to the chiller was planned but not connected. Wires are pulled from the chiller control panel out to the chiller but left unterminated.
2. Chiller package (including chilled water pumps) run standalone. The chiller is currently enabled/disabled by the switch at the chiller control panel and will run continuously if nobody attends to it. The BAS system shows a chiller command point which does not work:



3. The graphic also shows chilled water pump status which is also does not work.



4. Several chilled water flow meters are installed but none are reporting data at the BAS.
5. Pump Discharge Pressure and Pump Suction Pressure are unconnected points in the database that are not reading:



Boiler Plant (Boiler 1 and Boiler 2)

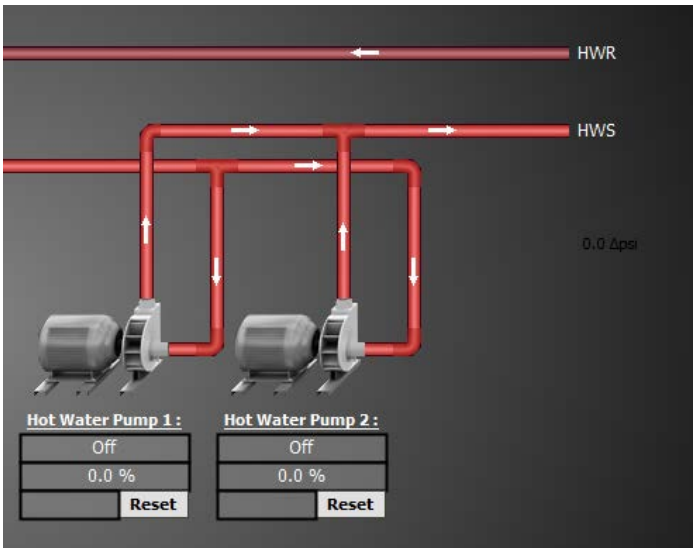
Completed Work

There is no work completed at this time. Boilers are currently enabled/disabled based on outside air temperature and work standalone once enabled. Pump rotation occurs every Monday just after 9AM. Boiler rotation occurs on the 1st of every month just after 9AM. Control logic is present to rotate the lead pump or boiler when a failure is detected.

Deficiencies

1. Boiler sequencing should be modified to extend boiler operation into the warmer months if high levels of indoor humidity are present.
2. The boilers are equipped to receive a supply water temperature reset signal from the BAS. This should be implemented as an energy saving strategy especially if the boilers are used during the summer months.
3. The domestic water pump has a start/stop schedule built in which is currently enabled for 24 hours a day operation. Consider changing the schedule to match actual building occupancy.
4. Boiler and pump rotation schedules are not shown on the graphics. This might be preferred depending on the experience level of the building operators.

5. Boiler hot water pumps are VFD controlled to maintain system differential pressure setpoint:



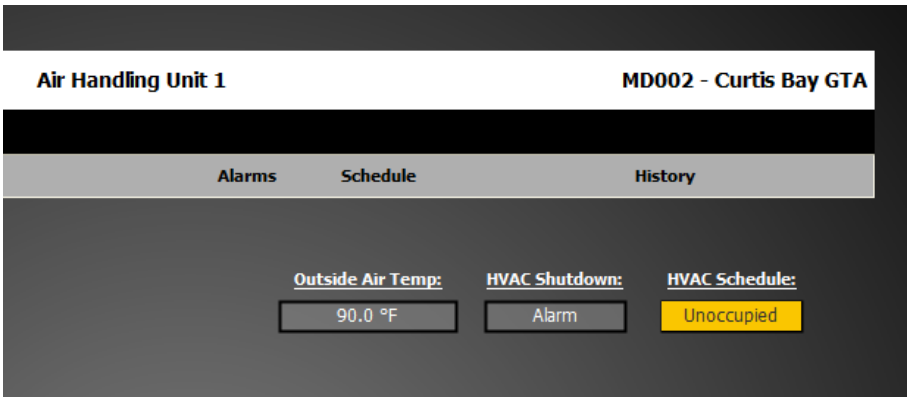
The system is also equipped with a hot water bypass valve which is not shown on the graphic. Differential pressure setpoint is also not shown on the graphic. Differential pressure reads very low and as a result pumps are continually ramped to 100 percent. System differential pressure control and hardware devices should be checked for proper operation.

6. The system is equipped with a hot water flow meter which is not shown on the graphics. System flow reads very low. Hot water flow meter should be checked for proper operation.
7. Boiler 1 Alarm point reading fault/stale and should be checked out.

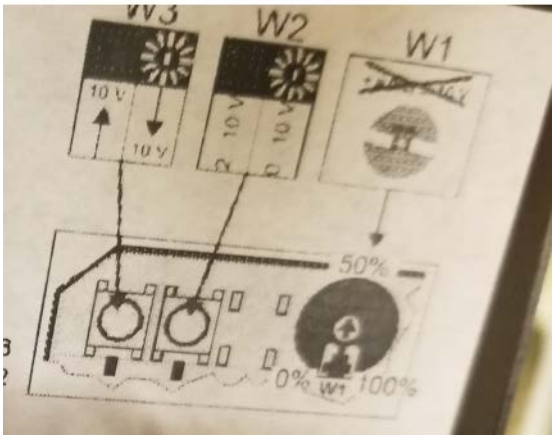
AHU-1

Completed Work

1. Unit is scheduled from the graphical interface:

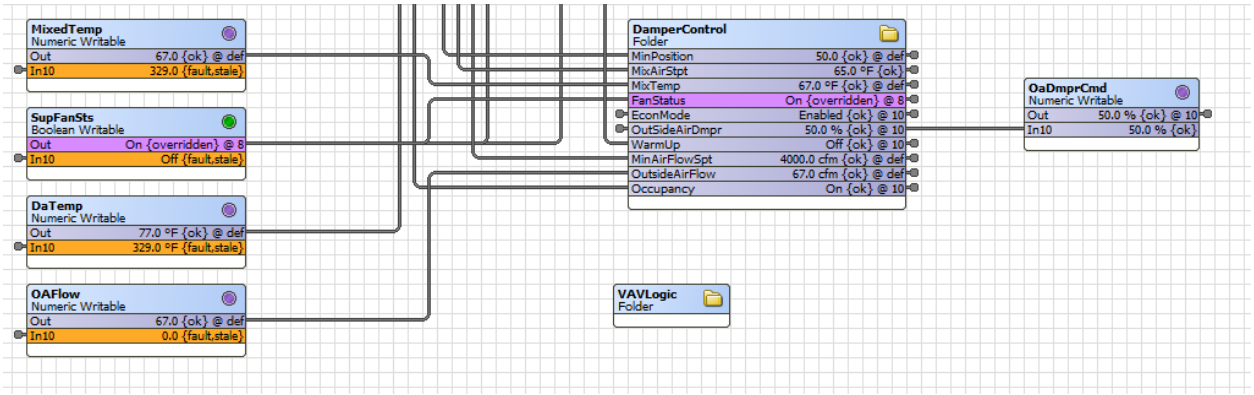


2. Control valves reconfigured to match the programming / software for AHU and HRU units. Note that each hot water and chilled water valve has a setting for 2-10VDC signal or 0-10VDC signal (W2). There is also a direct or reverse acting setting (W3). The correct setting is a 2-10VDC signal. The direct or reverse acting setting depends on whether the valve is used for chilled water or hot water. If the valve seems to be operating in reverse, then change this setting.



Deficiencies

1. Supply air fan status remains off when the fan is commanded to run. VFD will remain at minimum speed unless this point is overridden on. The fan proving device needs adjustment or replaced to correct this deficiency.
2. Existing AHU mixed air damper control takes outside air airflow into control logic. There is no airflow station installed. This portion of software and mixed air damper control should be corrected:

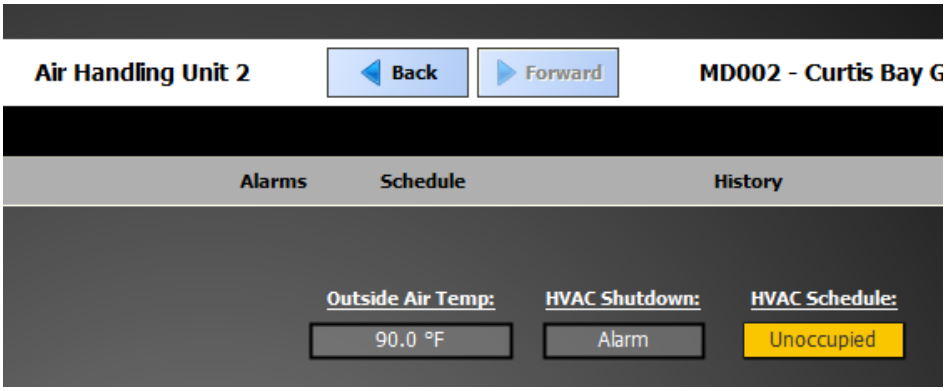


3. This building appears to have generally low occupancy. Proper utilization of CO2 detectors would be an added benefit to optimize mixed air damper control / minimum damper position when outside air conditions are not favorable to economizer.

AHU-2

Completed Work

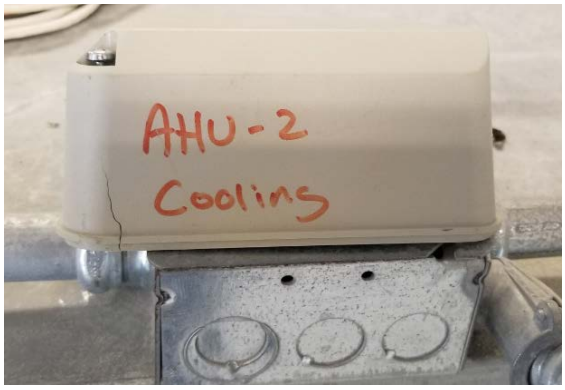
1. Unit is scheduled from the graphical interface:



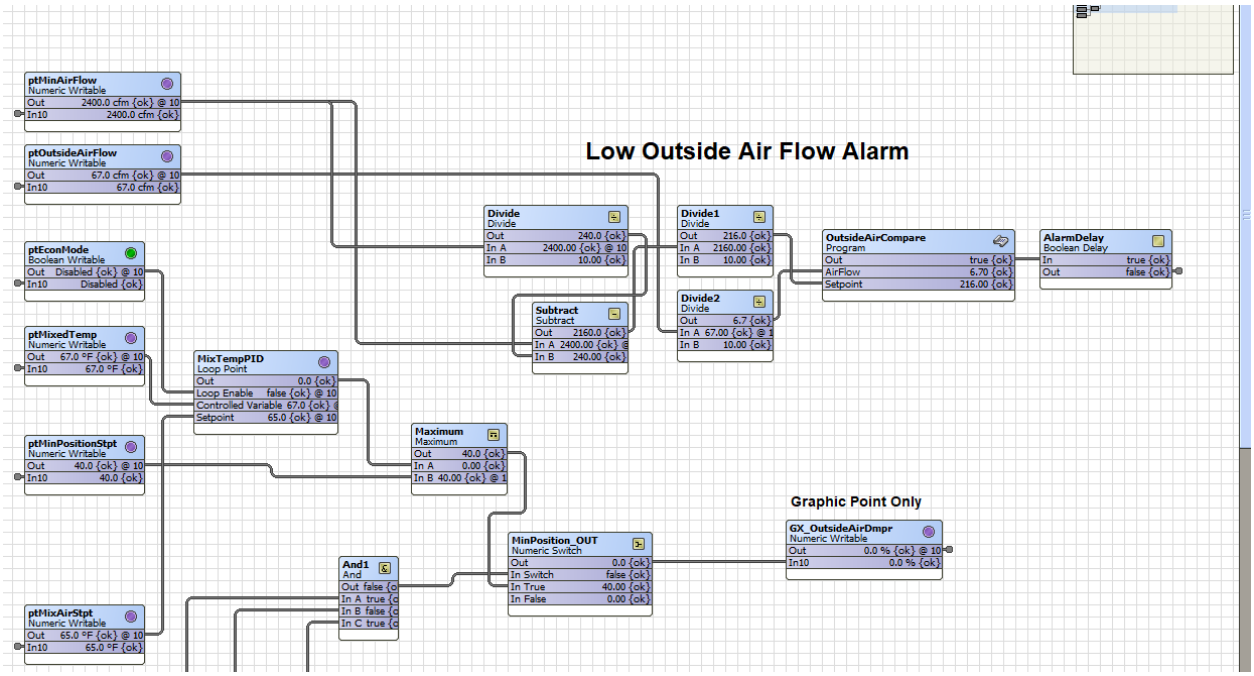
2. Refer to Note 2 under AHU-1 Completed Work.

Deficiencies

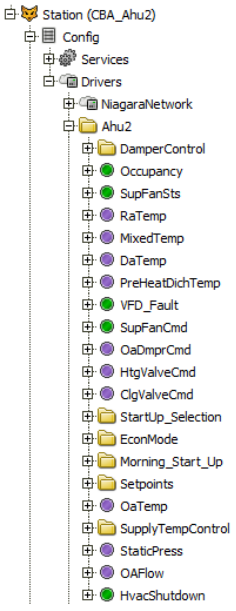
1. AHU-2 cooling valve actuator has failed and needs to be replaced:



2. There is no airflow station installed. This portion of software should be corrected:



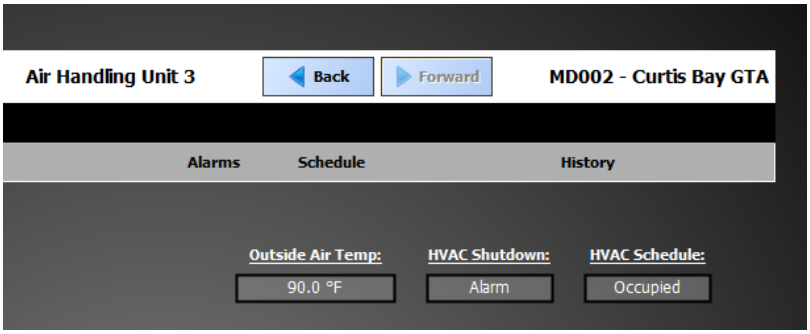
3. This building appears to have generally low occupancy. Proper utilization of CO2 detectors would be an added benefit to optimize mixed air damper control / minimum damper position when outside air conditions are not favorable to economizer. Existing mixed air damper sequencing should be verified.
4. The health of the Ndio hardware should be investigated. Point values are updating erratically.
5. Points for Static Pressure and VFD Fault are found in the point database. This is a constant volume AHU:



AHU-3

Completed Work

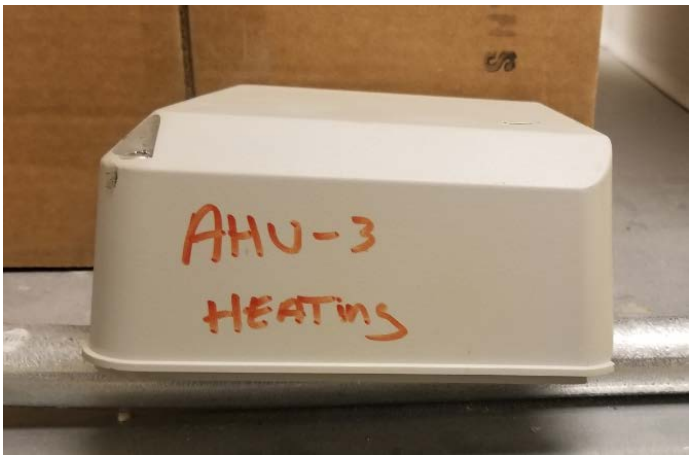
1. Unit is scheduled from the graphical interface:



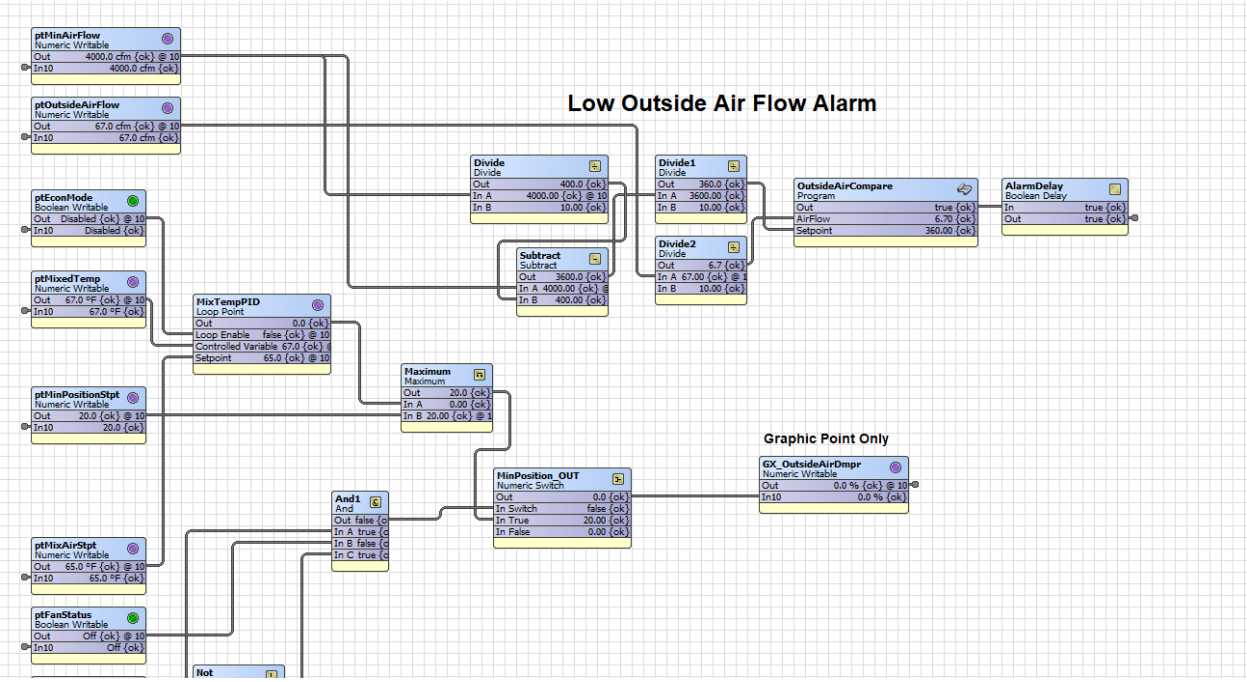
2. Refer to Note 2 under AHU-1 Completed Work.

Deficiencies

1. AHU-3 heating valve actuator has failed and needs to be replaced:



2. There is no airflow station installed. This portion of software should be corrected:

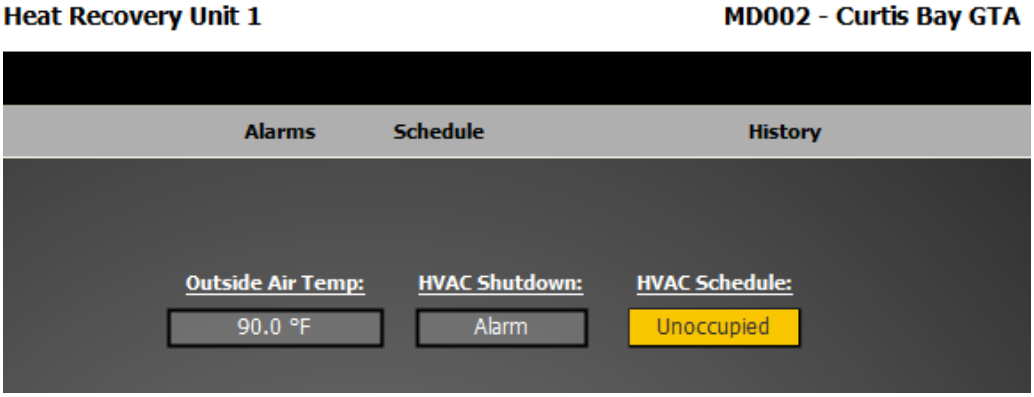


3. This building appears to have generally low occupancy. Proper utilization of CO2 detectors would be an added benefit to optimize mixed air damper control / minimum damper position when outside air conditions are not favorable to economizer. Existing mixed air damper sequencing should be verified.

HRU-1

Completed Work

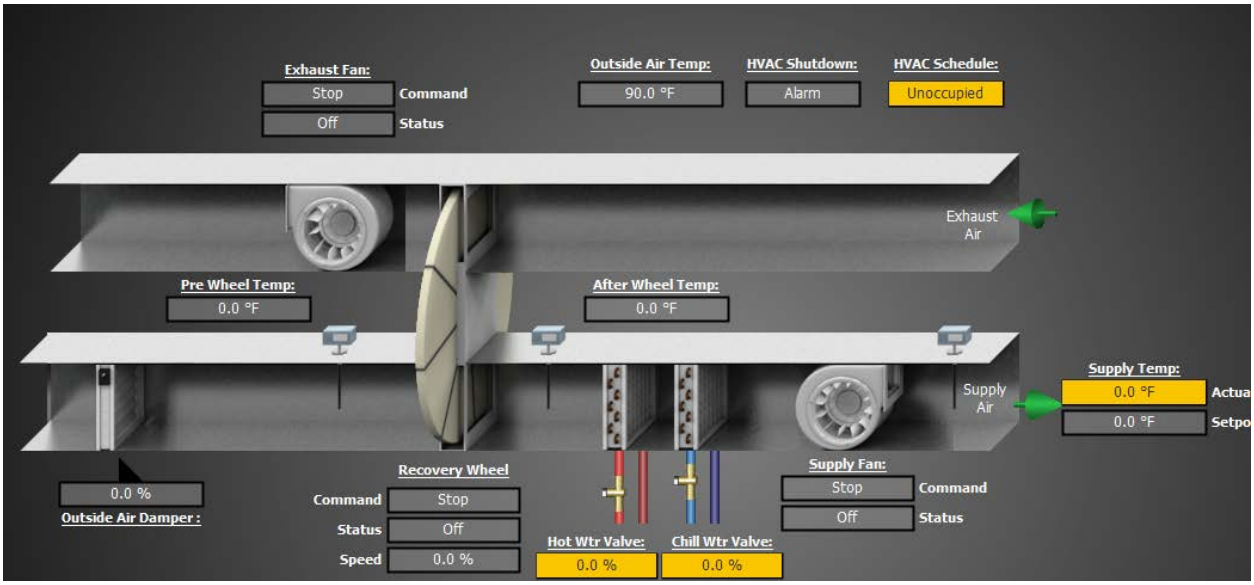
1. Unit is scheduled from the graphical interface:



2. Refer to Note 2 under AHU-1 Completed Work.

Deficiencies

1. The energy recovery wheel remains on when the unit shuts down.
2. Graphics do not show the supply air and exhaust air isolation dampers. These are modulating dampers but really should act as 2 position open/closed dampers only. End switches on damper actuators are recommended to prohibit fan operation unless dampers are proven open.
3. The bypass damper is not shown on the graphics.
4. The unit outside air damper was found to automatically modulate and starve the supply fan when closing. Either the outside air damper or bypass damper must be open to prevent supply fan starvation. During normal unit operation the outside air damper should be 100 percent open to make up for exhaust air exiting from the building:



5. ExhaustFilterS point is reading fault/stale.

VAV and CAV Boxes

Completed Work

1. Corrected communication and controller download issues on VAV and CAV Lon Networks:

Database

Name	Type	Exts	State	Subnet	Node	Fault Cause	Manufacturer	Program Id	Neuron Id	Enabled	Lon Xml File
Local Lon Device	Local Lon Device		Config Online	1	127		tridium	90 00 8e 01 03 80 00 03	04 14 21 c2 02 00	true	null
Vav1_02	LonSpyder		Config Online	1	2		honeywell	90 00 0c 52 00 03 04 3b	04 b7 60 ac 03 00	true	local:|module://honeywellLonS
Vav1_03	LonSpyder		Config Online	1	3		honeywell	90 00 0c 52 00 03 04 3b	04 91 8d 07 04 00	true	local:|module://honeywellLonS
Vav1_04	LonSpyder		Config Online	1	1		honeywell	90 00 0c 52 00 03 04 3b	04 cf 25 e9 03 00	true	local:|module://honeywellLonS
Vav1_05	LonSpyder		Config Online	1	4		honeywell	90 00 0c 52 00 03 04 3b	04 c1 2b e9 03 00	true	local:|module://honeywellLonS
Vav1_06	LonSpyder		Config Online	1	5		honeywell	90 00 0c 52 00 03 04 3b	04 c0 8d 07 04 00	true	local:|module://honeywellLonS
Vav1_07	LonSpyder		Config Online	1	15		honeywell	90 00 0c 52 00 03 04 3b	04 36 63 ac 03 00	true	local:|module://honeywellLonS
Vav1_08	LonSpyder		Config Online	1	7		honeywell	90 00 0c 52 00 03 04 3b	04 96 8e 07 04 00	true	local:|module://honeywellLonS
Vav1_09	LonSpyder		Config Online	1	8		honeywell	90 00 0c 52 00 03 04 3b	04 e3 8c 07 04 00	true	local:|module://honeywellLonS
Vav1_10	LonSpyder		Config Online	1	9		honeywell	90 00 0c 52 00 03 04 3b	04 97 8e 07 04 00	true	local:|module://honeywellLonS
Cav2_01	LonSpyder		Config Online	1	6		honeywell	90 00 0c 52 00 03 04 3b	04 30 8b 07 04 00	true	local:|module://honeywellLonS
Cav2_02	LonSpyder		Config Online	1	10		honeywell	90 00 0c 52 00 03 04 3b	04 31 8b 07 04 00	true	local:|module://honeywellLonS
Cav4_01	LonSpyder		Config Online	1	12		honeywell	90 00 0c 52 00 03 04 3b	04 c4 68 ac 03 00	true	local:|module://honeywellLonS
Cav4_02	LonSpyder		Config Online	1	13		honeywell	90 00 0c 52 00 03 04 3b	04 70 66 ac 03 00	true	local:|module://honeywellLonS
Cav4_03	LonSpyder		Config Online	1	14		honeywell	90 00 0c 52 00 03 04 3b	04 23 2f e9 03 00	true	local:|module://honeywellLonS

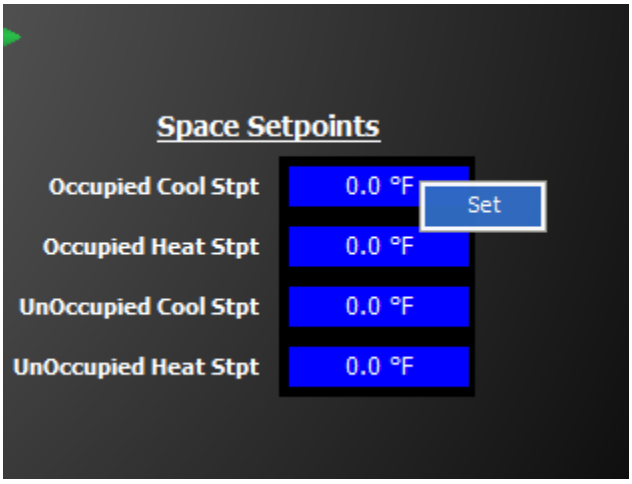
Note that this Lon Network and controllers are connected to CBA_Ahu1 station.

Database

Name	Type	Exts	State	Subnet	Node	Fault Cause	Manufacturer	Program Id	Neuron Id	Enabled	Lon Xml File
Local Lon Device	Local Lon Device		Config Online	1	127		tridium	90 00 8e 01 03 80 00 03	04 5b 56 6d 02 00	true	null
Vav3_01	LonSpyder		Config Online	1	1		honeywell	90 00 0c 52 00 03 04 3b	04 bf 2f e9 03 00	true	local:|module://honeywellLonSpy
Vav3_02	LonSpyder		Config Online	1	2		honeywell	90 00 0c 52 00 03 04 3b	04 72 29 e9 03 00	true	local:|module://honeywellLonSpy
Vav3_03	LonSpyder		Config Online	1	3		honeywell	90 00 0c 52 00 03 04 3b	04 33 8b 07 04 00	true	local:|module://honeywellLonSpy
Vav3_04	LonSpyder		Config Online	1	4		honeywell	90 00 0c 52 00 03 04 3b	04 0e 2b e9 03 00	true	local:|module://honeywellLonSpy
Vav3_05	LonSpyder		Config Online	1	5		honeywell	90 00 0c 52 00 03 04 3b	04 99 8e 07 04 00	true	local:|module://honeywellLonSpy
Vav3_06	LonSpyder		Config Online	1	6		honeywell	90 00 0c 52 00 03 04 3b	04 95 8e 07 04 00	true	local:|module://honeywellLonSpy
Vav3_07	LonSpyder		Config Online	1	7		honeywell	90 00 0c 52 00 03 04 3b	04 17 89 07 04 00	true	local:|module://honeywellLonSpy
Vav3_08	LonSpyder		Config Online	1	8		honeywell	90 00 0c 52 00 03 04 3b	04 d2 27 e9 03 00	true	local:|module://honeywellLonSpy
Vav3_09	LonSpyder		Config Online	1	9		honeywell	90 00 0c 52 00 03 04 3b	04 d3 27 e9 03 00	true	local:|module://honeywellLonSpy
Vav3_10	LonSpyder		Config Online	1	10		honeywell	90 00 0c 52 00 03 04 3b	04 37 64 ac 03 00	true	local:|module://honeywellLonSpy
Vav3_11	LonSpyder		Config Online	1	11		honeywell	90 00 0c 52 00 03 04 3b	04 71 66 ac 03 00	true	local:|module://honeywellLonSpy
Vav3_12	LonSpyder		Config Online	1	12		honeywell	90 00 0c 52 00 03 04 3b	04 3c 64 ac 03 00	true	local:|module://honeywellLonSpy
Vav3_13	LonSpyder		Config Online	1	13		honeywell	90 00 0c 52 00 03 04 3b	04 3a 64 ac 03 00	true	local:|module://honeywellLonSpy

Note that this Lon Network and controllers are connected to CBA_Ahu3 station.

2. Modified all VAV and CAV graphics to allow changeable space temperature and CO2 setpoints:



Change the setpoint by right clicking in the blue box.

Deficiencies

1. Airflow setpoints do not appear to be correct. It is recommended to input scheduled design airflow setpoints once mechanical drawings are sourced or located. This may alleviate occupant complaints and VAV / CAV boxes low on airflow.
2. VAV1_02: CO2 sensor reads low (171 ppm). Reheat valve override non-functional with a possibility that valve is also non-functional.
3. VAV1_07: There is no rise in supply air temperature with reheat valve override open. Reheat valve is non-functional, or hand isolation valves are closed.
4. VAV1_08: CO2 sensor reading very high.
5. VAV1_09: CO2 sensor reading very high.
6. VAV1_10: CO2 sensor reading too low.
7. CAV2_01: Control indicates Occupied and graphic displays Unoccupied (mismatch).
8. CAV2_02: CO2 sensor reading too low.

9. CAV4_01: CO2 sensor reading too high (900 ppm).
10. CAV4_03: There is no rise in supply air temperature with reheat valve override open. Reheat valve is non-functional, or hand isolation valves are closed.
11. VAV3_01: CO2 sensor reading low (270 ppm).
12. VAV3_04: CO2 setpoint in software but no apparent CO2 sensor.

Exhaust Fans

Completed Work

Exhaust fans functionally tested.

Deficiencies

1. EF_3A: Exhaust fan appears to be uncontrolled on or off except for HVAC Shut-Down, is also not shown on graphics.
2. EF_4A: Exhaust fan is not shown on graphics.
3. EF_5A (112 Equipment Storage): Exhaust fan running continuously. It should be controlled to maintain a space temperature cooling setpoint.
4. EF_7A (Mech 113): Exhaust fan not running in Auto or Hand, which appears to be a mechanical or electrical issue. Or maybe faulty damper end switches prohibiting start / stop. There is an associated motor operated intake air damper which fails to open. This fan should be controlled to maintain a space temperature cooling setpoint.
5. EF_8A: Exhaust fan appears to be uncontrolled on or off except for HVAC Shut-Down, is also not shown on graphics.
6. EF_9A (Mech 217): Exhaust fan is noisy.
7. EF_10A (121 TA50 Storage): Exhaust fan fails to start when commanded on. Control wiring to start / stop relay is ok.

Unit Heaters

Completed Work

Unit heaters functionally tested.

Deficiencies

No deficiencies are noted at this time.