

## Over and Above Estimate

**Region:** 5

**Location:** DE001

**CSS #:** 17832

**Maximo Work Order No.:** 9007

**Asset #:** 1690

**Date:** 6/10/2019

### Original Description:

Need to have Tustin provide solution to accessing the controls system.

### Repairs Needed:

A BAS Survey & Report have been completed (see attached) and show that the existing ASIC system should be replaced with an open protocol BAS for user access and control; propose a Tridium front end with new BACnet unitary controllers to replicate the existing sequence of operation.

### 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	Software/Hardware Materials (See details attached)	--	--	\$13,529.00	--	\$13,529.00
1	NA	Operator Workstation	--	--	\$1,762.00	--	\$1,762.00
--	NA	Labor	243	\$150.00	--	--	\$36,395.00
--	NA	Sales Tax	--	--	--	--	\$2,995.00
--	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
259	\$37,675.00	\$15,291.00	\$2,995.00	\$55,961.00	102%	<b>\$57,080.22</b>



The Experience You Deserve

# ***TUSTIN ENERGY SOLUTIONS***

## **PROJECT PROPOSAL**

***Proposal Date:***

June 7, 2019

***Proposal Number:***

TES19144

***Prepared for:***

Adam Colopy  
Tidewater, Inc.  
3761 Attucks Drive

Powell OH 43065

**TOMORROW'S SOLUTIONS for TODAY'S BUILDINGS**

***Prepared by:***

Dominic Bostardi  
610.539.8200

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

## The Experience You Deserve

### Summary

We are providing a proposal for **Fleming-Godwin USARC BAS**. Our proposal is based upon the following documentation:

<b>Site Visit:</b>	<b>Complete</b>	<b>Date:</b>	<b>04-02-19</b>
<b>Mechanical Documents:</b>	<b>NA</b>	<b>Date:</b>	
<b>Addendum Received:</b>	<b>NA</b>	<b>Date:</b>	

During our meeting(s), we discussed the following goals:

1. A BAS Survey & Report have been completed and show that the existing ASIC system should be replaced with an open protocol BAS for user access and control; propose a Tridium front end with new BACnet unitary controllers to replicate the existing sequence of operation

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

## The Experience You Deserve

### FLEMING-GODWIN USARC BAS

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

**1. Temperature Control For The Following Existing HVAC Equipment:**

- Equipment as currently controlled via the ASIC system

**2. Provide The Following New Software / Hardware:**

- (1) Tridium JACE Web-server in new enclosure
- (7) BACnet unitary controllers to replace existing ASIC/2-8540 controllers
- (25) Space/immersion temperature sensors to replace existing
- Furnish TES installation, wiring, programming, commissioning and graphics

**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
- The existing BAS points and sequence of operation shall be replicated under this proposal
- The existing operator workstation [desktop computer] requires replacement for new system access; new workstation may be Owner-furnished per TES requirements, or added per Option #1
- Lead time for project start is approximately 6 weeks from approval

**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**

## The Experience You Deserve

### FLEMING-GODWIN USARC BAS

#### Exclusions

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

## PROJECT AGREEMENT FOR BUILDING ENVIRONMENTAL SYSTEMS

Proposal Date	Proposal Number	Agreement No.
June 7, 2019	TES19144	

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)

Fleming-Godwin USARC
344 North New Street, Dover, DE 19904

As a condition of performance, payments are to be 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.

<b>Proposal Price:</b>	<b>\$52,919.00</b>	<b>[Building Automation System]</b>
Labor:	\$36,395.00	[Hourly Rate \$150/hr.]
Material:	\$13,529.00	
Sales Tax:	\$2,995.00	
<b>Add Option #1:</b>	<b>\$1,762.00</b>	<b>[Operator Workstation]</b>

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

## The Experience You Deserve

### 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, Contractor will extend to Customer the benefits of any warranty Contractor 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 Contractor.
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 part 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 NEGLIGENCE), 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.

## Fleming-Godwin US Air Force Reserve Center

### Summary

The existing control system is an ASIC/2-8540 (circa 2008). There are 7 of these controllers throughout the building.



Figure 1 ASIC controller

Controller devices 32100 through 32106 are reading ok. Device 32107 and 32108 are showing Communications Fault. Device 32107 appears to have been removed during a renovation. Device 32108 is in the Work Bay.



<input type="button" value="Send"/>	Device Address: 32100 Description: Fleming-Godwim Armory	Firmware: 300b v3.1	Tue 4/02/19 08:50:55
-------------------------------------	---	---------------------	----------------------

Messages | Alarm History | **Site Summary** | Clock Setup | Dial Out |

Controller Address	Alarm Status	Communications Ok/Fault	Controller Address	Alarm Status	Communications Ok/Fault
Active Alarm in 32101	<input type="button" value="OK"/>	<input type="button" value="OK"/>	Active Alarm in 32107	<input type="button" value="OK"/>	<input type="button" value="Fault"/>
OverRide Alarm in 32101	<input type="button" value="OK"/>	<input type="button" value="OK"/>	OverRide Alarm in 32107	<input type="button" value="OK"/>	<input type="button" value="Fault"/>
Active Alarm in 32102	<input type="button" value="OK"/>	<input type="button" value="OK"/>	Active Alarm in 32108	<input type="button" value="OK"/>	<input type="button" value="Fault"/>
OverRide Alarm in 32102	<input type="button" value="OK"/>	<input type="button" value="OK"/>	OverRide Alarm in 32108	<input type="button" value="OK"/>	<input type="button" value="Fault"/>
Active Alarm in 32103	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
OverRide Alarm in 32103	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
Active Alarm in 32104	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
OverRide Alarm in 32104	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
Active Alarm in 32105	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
OverRide Alarm in 32105	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
Active Alarm in 32106	<input type="button" value="OK"/>	<input type="button" value="OK"/>			
OverRide Alarm in 32106	<input type="button" value="OK"/>	<input type="button" value="OK"/>			

Figure 2 Existing BAS system communications

Operator interface to BAS is through a PC COM port and ASI Visual Expert Terminal. Outside access is achieved via service modem and is not currently utilized. I did not see any sort of graphical interface or floorplan.



Figure 3 Existing service modem

Maintenance and facilities personnel found unable to access the system for a long time. I gained access by selecting Local Connection (Serial) on COM 1. Devices and parameters are currently read-only. Password is needed to make setpoint and scheduling adjustments.

The control system in general only functions to monitor and disable / enable equipment. More details follow.

### **Hot Water Boiler Plant**

Boiler Room equipment consists of 3 Buderus Logano Plus GB312 Boilers and 2 hot water circulation pumps with Armstrong IVS series VFDs. Boilers operate stand-alone with factory Buderus controls including a Weather Dependent Module and MCM (multi-cascade) control. The MCM control provides

boiler (lead/lag) or cascading and load/unload them as necessary. I was informed that this system needs servicing or programming as boilers are in constant need of a reset.

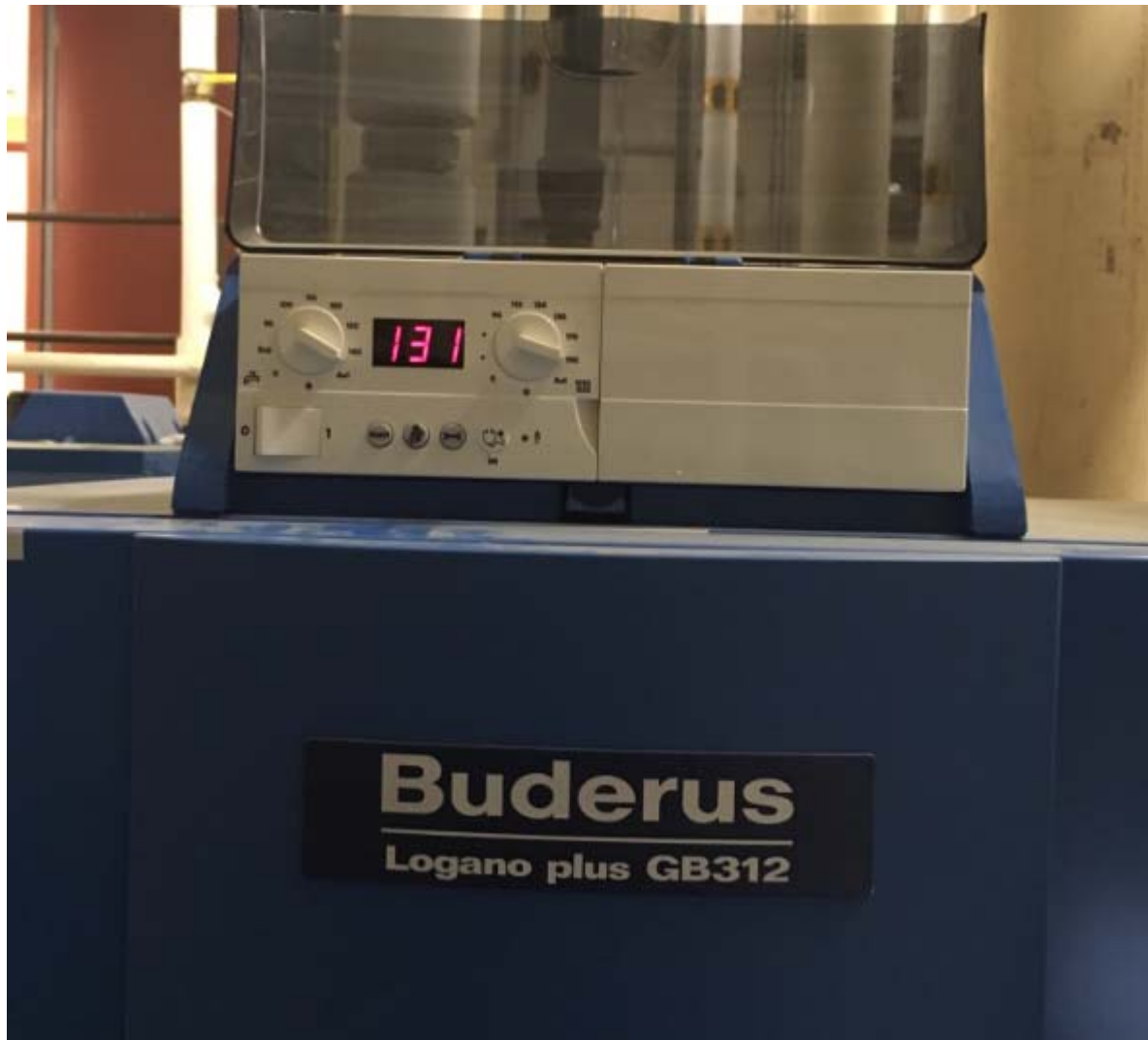


Figure 4 Buderus Boiler (1 of 3 boilers onsite)

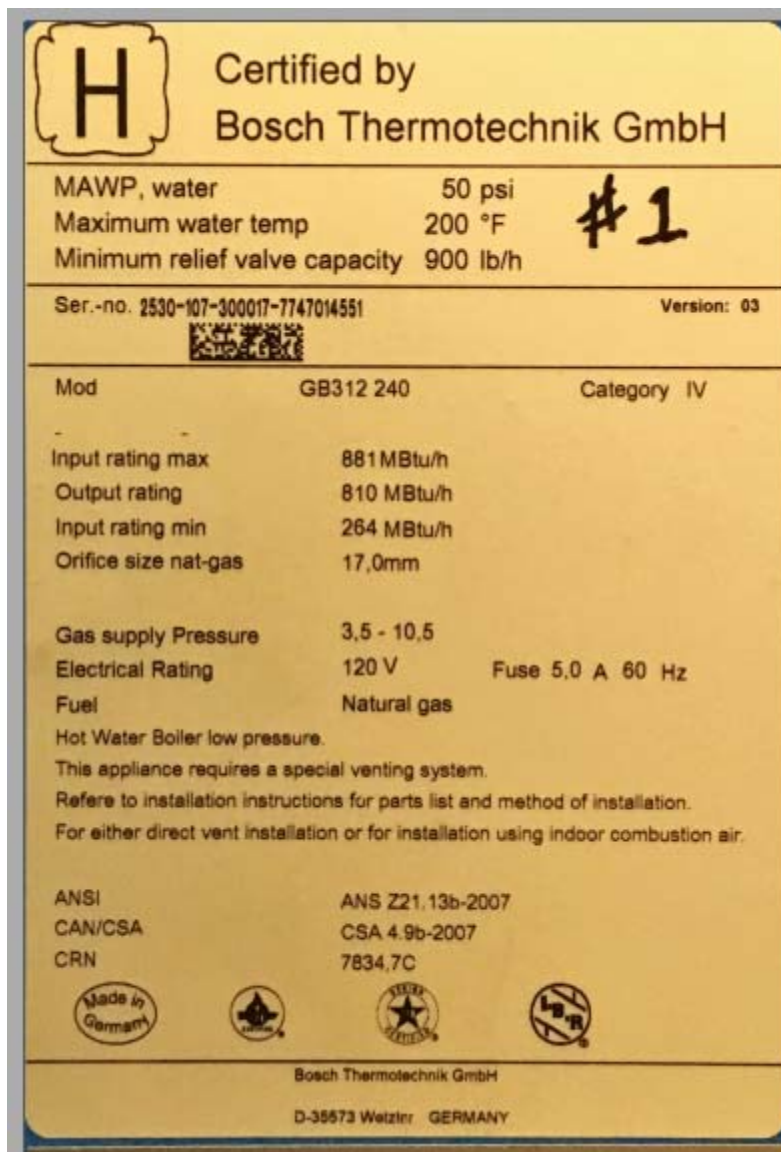


Figure 5 Boiler Nameplate (1 of 3 onsite)



Figure 6 Buderus Boiler MCM Control



Figure 7 Buderus Boiler AM10 Weather Module



Pump VFDs are controlled by the ASI system.



Figure 8 Pump VFD (1 of 2 onsite)

## Domestic Hot Water

The Buderus Boilers provide hot water to Bosch Indirect hot water storage heater. This system is supported by a Heat-Timer ETV (electronic tempering) control module.



Figure 9 Bosch Domestic Hot Water Heat Exchanger / Storage Tank



Figure 10 Heat-Timer ETV Control Module

## Government Energy Management

This unit is sealed closed and I did not open it up. Investigation is needed to understand intent and function.



Figure 11 Government Energy Management

## E-Mon Meter

The building is equipped with an electric meter, which supports LONWORKS TP or MODBUS TCP/IP communication protocols. Neither port is being utilized at this time.



Figure 12 E-Mon Electric Meter



## PTAC Units

PTAC units serve perimeter offices and meeting rooms. Units are equipped with DX cooling and hot water heating. Units found to have a two-position hot water control valve (open/close by unit controls). It appears that the ASI control system uses relays to disable and enable units simply by cutting power. This is probably not the best solution considering these units have compressors and is probably not supported by the unit manufacturers. Once enabled the units operate based on their local controls. It's a likely scenario that the ASI controls have a unit enabled for heating but the local unit controls are set for cooling. Several units have been replaced and not operating as expected. A thorough check of each unit is recommended and implementation of a more sophisticated control system to eliminate the local controls.



Figure 13 Older model PTAC (TPI Corporation RM135A-W)



Figure 14 Older model PTAC local controls

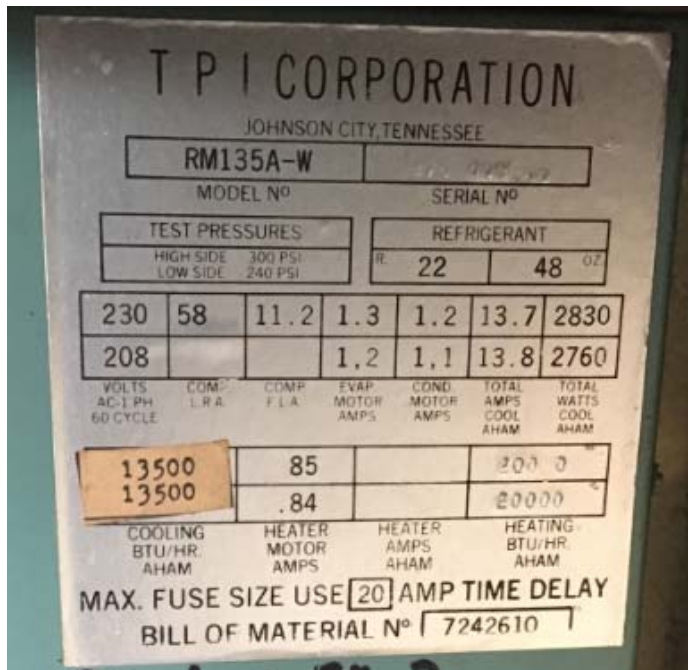


Figure 15 Older model PTAC nameplate



Figure 16 Newer model PTAC



Figure 17 Newer model PTAC controls



Figure 18 Newer model PTAC nameplate



Figure 19 PTAC 2 position (non-modulating) control valve



Figure 20 PTAC enable / disable and occupancy override relays

### **Hot Water Fin Tube Radiation**

Fin tube radiation is located throughout the building and controlled manually on or off by hand valve only.



Figure 21 Hot Water Fin Tube Radiation

### **Hot Water Cabinet Unit Heater**

A hot water cabinet unit is controlled locally in the Vestibule. The unit is turned off. Fan is operational on high speed, but hot water coil remained cold at the time of test. The unit has an integral thermostat.



Figure 22 Hot Water Cabinet Unit Heater





Figure 23 Hot Water Cabinet Unit Heater controls

### **Electric Unit Heater**

An electric unit heater serves the Boiler Room.

### **Ductless Mini-Splits**

Several ductless mini-split units are located throughout the building. It is assumed that these units operate stand-alone integral controls.



Figure 24 Ductless mini-split units

## **Pneumatic Controls**

Remnants of decommissioned pneumatic controls found in the building.



Figure 25 Pneumatic Controls

## **AHU-1 / Exhaust Fans**

This unit is a gas-fired 100% outside air unit. It appears that this unit replaces AHU-1 and evidence suggests that the old unit had a hot water heating coil. More investigation is necessary to determine if the ASI control system was properly updated when the new gas-fired unit was installed. There are concerns of lack of heating in this area. Four exhaust fans also serve this area. Each fan is equipped with a line-voltage thermostat. It doesn't appear that the ASI control system provides any sort of exhaust fan enable or disable.



Figure 26 AHU-1 (Rupp Model R2-IBT-300-G15)



Figure 27 AHU-1 Controls



Figure 28 Exterior view of Exhaust Fans (2 of 4 shown)





Figure 29 Interior view of Exhaust Fans and line voltage thermostat (1 of 4 shown)



Figure 30 Exhaust fan controls



Figure 31 Kitchen exhaust fan out of service

**Lobby RTU**

Unit was functional in cooling mode.

## Points Lists

ASI 8540 Points List			
Building: Fleming-Godwin		REV 1	Date: June 11, 2008
Comments: Room # 11, Boiler Room		Address: 32105	
Universal Inputs (0-5 Vdc) Type (AI or BI)			
Point #	Type	Name	Notes
IN-01	AI	Space Temp Room	
IN-02	AI	CO Sensor	
IN-03	AI	Domestic Hot Water	
IN-04	AI	Hot Water Supply Temp	
IN-05	BI	Hot Water Return Temp	
IN-06	AI	Space Humidity Sensor	
IN-07	BI	Combustible Gas Sensor	
IN-08	MUX	Pump proof #1, #2, Boiler Alarm 1&2	
Binary Outputs (Pilot Duty 24VAC-2A)			
Point #	Type	Name	Notes
BO-01		Boiler #1 Start/Stop	
BO-02		Boiler #2 Start/Stop	
BO-03		Pump #1 Start/Stop	
BO-04		Pump #2 Start/Stop	
BO-05		Domestic Hot Water Pump	
BO-06			
BO-07			
BO-08			
Analog Outputs (0-10VDC, 5mA)			
Point #	Type	Name	Notes
AO-01		Hot Water 3 way valve	
AO-02			
AO-03			
AO-04			Note Power meter on this controller

Figure 32 Boiler Room

ASI 8540 Points List			
Building: Fleming-Godwin		REV 1	Date: June 11, 2008
Comments: Classroom #1 & #2		Address: 32101	
Universal Inputs (0-5 Vdc) Type (AI or BI)			
Point #	Type	Name	Notes
IN-01	AI	Space Temp Room 1	Classroom 1
IN-02	AI	Space Temp Room 2	Classroom 2
IN-03	AI	Outside Air Temperature	
IN-04			
IN-05			
IN-06			
IN-07	BI	Override Button Room 1	
IN-08	BI	Override Button Room 2	
Binary Outputs (Pilot Duty 24VAC-2A)			
Point #	Type	Name	Notes
BO-01	PTAC #1 Start/Stop		Classroom 1
BO-02	PTAC #2 Start/Stop		Classroom 1
BO-03	PTAC #3 Start/Stop		Classroom 2
BO-04	PTAC #4 Start/Stop		Classroom 2
BO-05			
BO-06			
BO-07			
BO-08			
Analog Outputs (0-10VDC, 5mA)			
Point #	Type	Name	Notes
AO-01			
AO-02			
AO-03			
AO-04			

Figure 33 PTAC

Universal Inputs (0-5 Vdc) Type (AI or BI)			
Point #	Type	Name	Notes
IN-01	AI	Space Temp Room	
IN-02	AI	Discharge Air Sensor	
IN-03	AI	Freeze Stat	20' Freeze Stat per SOW
IN-04	AI	Space Sensor Kitchen	Alarm Only
IN-05	BI		
IN-06	BI		
IN-07	BI	Override Button	
IN-08	BI	Fan Proof	
Binary Outputs (Pilot Duty 24VAC-2A)			
Point #	Type	Name	Notes
BO-01	AHU #1 Start/Stop		
BO-02			
BO-03			
BO-04			
BO-05			
BO-06			
BO-07			
BO-08			
Analog Outputs (0-10VDC, 5mA)			
Point #	Type	Name	Notes
AO-01	Hot Water 3 way valve		NOTE-Wireless Device Needed
AO-02	Outdoor Air Damper		
AO-03	Return Air Damper		Two Dampers
AO-04			

Figure 34 AHU-1



ASJ 2540 Points List			
Building: Fleming-Godwin		REV 1	Date: June 11, 2008
Comments: Rooms #16, 17, #18, #19 & Lobby		Address: 32104	
Universal Inputs (0-5 Vdc) Type (AI or BI)			
Point #	Type	Name	Notes
IN-01	AI	Space Temp Room 16	
IN-02	AI	Space Temp Room 17	
IN-03	AI	Space Temp Room 18	
IN-04	AI	Space Temp Room 19	
IN-05	BI	Space Temp Lobby	
IN-06	BI	Space Humidity Lobby	Monitor Only
IN-07	MUX	Override Button Room 16, 18, 19, Lby	
IN-08	MUX	Override Button Room 17, RTU CT	
<b>Binary Outputs (Pilot Duty 24VAC-2A)</b>			
Point #	Point Name (16 Characters)		Notes
BO-01	PTAC #17 Start/Stop	Room 16	
BO-02	PTAC #18 Start/Stop	Room 17	
BO-03	PTAC #19 Start/Stop	Room 18	
BO-04	PTAC #20 Start/Stop	Room 19	
BO-05	RTU #1 Start/Stop	Lobby	
BO-06	RTU #1 Cool		
BO-07			
BO-08			
<b>Analog Outputs (0-10VDC, 5mA)</b>			
Point #	Point Name (16 Characters)		Notes
AO-01			
AO-02			
AO-03			
AO-04			

Figure 35 Lobby RTU and PTAC

### General



Figure 36 Low ceilings and fiberglass insulation will make for difficult wiring install