





	DRAWING INDEX				
SHEET	DESCRIPTION				
147-GI001	COVER SHEET				
147-M001	INDEX, LEGEND, AND GENERAL NOTES				
147-M501	SCHEDULES AND DETAILS				
147-M502	DETAILS				
147-MD101	FIRST FLOOR - REMOVALS				
147-MD102	SECOND FLOOR - REMOVALS				
147-MP101	FIRST FLOOR - NEW WORK				
147-MP102	SECOND FLOOR - NEW WORK				
147-MP103	ROOF AND SITE - NEW WORK				
147-E001	SYMBOLS AND INDEX				
147-E501	SCHEDULES AND DETAILS				
147-EP101	FIRST FLOOR - NEW WORK				
147-EP102	SECOND FLOOR - POWER				



12/6/2012 11:37:02 AM

2

5

PIPING SYMBOLS

GENERAL _____ W _____ ——____FOS —_____ _____FOR _____ ______BF _____ _____ G _____

HEATING

—— HPS (100) ——

—— LPS (5) —— ----- LPR -----——— PC ——— _____ D _____

GENERAL

<u> </u>	
Ĭ	
0	
-2	
—⊗—	
\oslash	
————— M	
— ET ———	
Ţ	
VES	
-×	
->->->->	
>>C	
-Ň	
₽	
б	
-0	
-@	
·	
· _5_	

_	-Ğ—
-\$-	
冬	
\wedge	للہ ل
\top	Ϋ́

3

DOMESTIC COLD WATER FUEL OIL SUPPLY FUEL OIL RETURN BOILER FEED NATURAL GAS SUPPLY

HIGH PRESSURE STEAM (60 PSIG AND ABOVE) NUMBER INDICATES STEAM PRESSURE HIGH PRESSURE STEAM CONDENSATE RETURN MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG) NUMBER INDICATES STEAM PRESSURE

MEDIUM PRESSURE STEAM CONDENSATE RETURN LOW PRESSURE STEAM (15 PSIG & BELOW) NUMBER INDICATES STEAM PRESSURE LOW PRESSURE STEAM CONDENSATE RETURN PUMPED CONDENSATE RETURN DRAIN LINE VENT LINE

FLOW METER DIRECTION OF PIPE PITCH (DOWN) DIRECTION OF FLOW

PIPE ANCHOR
PIPE GUIDE
REDUCER OR INCREASER
ECCENTRIC REDUCER
TOP CONNECTION, 45 DEG. OR 90 DEG.
BOTTOM CONNECTION, 45 DEG. OR 90 DEG.
SIDE CONNECTION
CAPPED OUTLET
RISE OR DROP IN PIPE
UNION
ORIFICE UNION
PIPE UP
PIPE DOWN
POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK.
INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES (SEE STANDARD DETAIL)
FLOAT AND THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES (SEE STANDARD DETAIL)
THERMOSTATIC TRAP
STRAINER
THERMOMETER
PRESSURE GAGE
EXISTING PIPE TO BE REMOVED
TEST PLUG (PRESSURE/TEMPERATURE)
EXPANSION TANK PIPE
PIPE MOUNTED DDC TEMPERATURE SENSOR
GATE VALVE
UHEUK VALVE

ANGLE GLOBE VALVE BUTTERFLY VALVE BALL VALVE COMBINATION BALANCING/SHUT-OFF VALVE CIRCUIT SETTER STRAIGHT-THRU MODULATING CONTROL VALVE STRAIGHT-THRU TWO-POSITION CONTROL VALVE THREE-WAY MODULATING CONTROL VALVE AUTOMATIC FLOW CONTROL VALVE SAFETY VALVE OR PRESSURE RELIEF PRESSURE REDUCING VALVE

MANUAL AIR VENT

CONTROLS

T H	ROOM CONTROL: THERMOSTAT, HUMIDISTAT
	REMOTE BULB THERMOSTAT
	DUCT OR PIPE THERMOSTAT (NOTE 1: PROVIDE 12" MIN. LENGTH IN DUCT WHEN SPACE PERMITS)
T)	DUCT THERMOSTAT WITH AVERAGING ELEMENT
ТН	ROOM SENSOR: TEMPERATURE, HUMIDITY
Т	DUCT OR PIPE TEMP. SENSOR (SEE NOTE 1 ABOVE)
н	DUCT HUMIDITY SENSOR
SP	DUCT STATIC PRESSURE SENSOR
T	DUCT TEMPERATURE SENSOR WITH AVERAGING ELEMENT
H1 N	CONTROL CIRCUIT CONN.
dP	DIFFERENTIAL PRESSURE SWITCH
DP SP	DIFFERENTIAL OR STATIC PRESSURE TRANSMITTER
<u></u> CS	CURRENT SENSING RELAY

ABBREVIATIONS

A/BCW	COMBINATION AXIAL/BACKWARD CURVED WHEEL
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFM	AIR FLOW MEASURING DEVICE
AFW	AIR FOIL WHEEL (FAN)
AI	ANALOG INPUT
AO	ANALOG OUTPUT
APD	AIR PRESSURE DROP
ATC	AUTOMATIC TEMPERATURE CONTROLS
BG	BOTTOM GRILLE (WALL TYPE)
BHP	BRAKE HORSEPOWER
BIW	BACKWARD INCLINED WHEEL (FAN)
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CONVERTOR
CF	CENTRIFUGAL FAN
CFM	CUBIC FEET PER MINUTE
CO	
CONV	CONVECTOR
C.O.R.	CONTRACTING OFFICERS TECHNICAL REPRESENTATIVE
CP	CONDENSATE PUMP
CW	COLD WATER (POTABLE)
D	AUTOMATIC CONTROL DAMPER
Db	DRY BULB TEMPERATURE, DEG. F
DB	DECIBELS
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DI	DIGITAL INPUT
DIA	DIAMETER
DO	DIGITAL OUTPUT
DPS	DIFFERENTIAL PRESSURE SENSOR
DWDI	DOUBLE WIDTH DOUBLE INLET (FAN)
E.A.	EXHAUST AIR
ECC	ENGINEERING CONTROL CENTER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
ENT	ENTERING
EX.	EXISTING
F	FAHRENHEIT
FACP	FIRE ALARM CONTROL PANEL
FC	FLEXIBLE CONNECTION
FCW	FOWARD CURVED WHEEL
FD	
F&T	
FLR.	FLOOR
FPM	FEET PER MINUTE
FT	FEET
GH	GRAVITY HOOD



4



5

ABBREVIATIONS

7

GPM	GALLONS PER MINUTE
HD	HEAD
HP	HORSEPOWER
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN
HPS	HIGH PRESSURE STEAM SUPPLY (60 PSIG & ABOVE)
ICF	IN-LINE CENTRIFUGAL FAN
IN	INCHES
IN WC	INCHES WATER COLUMN
IN WG	INCHES WATER GAUGE
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUNDS PER HOUR
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
LPS	LOW PRESSURE STEAM SUPPLY (15 PSIG & BELOW)
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVG	LEAVING
MAX	MAXIMUM
MB	MIXING BOX
MBH	1000 BTUH
MIN	MINIMUM
MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM SUPPLY (16 PSIG THRU 59 PSIG)
MV	MANUAL AIR VENT
NC	NOISE CRITERIA
NOM	NOMINAL
O.A.	OUTSIDE AIR
Р	PUMP
PC	PUMPED CONDENSATE
PD	PRESSURE DROP (FEET OF WATER)
PEF	PROPELLER TYPE EXHAUST FAN
POD	POWER OPERATED, OPPOSED BLADE DAMPER
PPD	POWER OPERATED, PARALLEL BLADE DAMPER
PRV	PRESSURE REDUCING VALVE
PUH	PROPELLER UNIT HEATER
Rh	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
RV	POWER TYPE ROOF VENTILATOR
S.P.	STATIC PRESSURE (INCHES OF WATER)
SP. GR.	SPECIFIC GRAVITY
SPRV	STEAM PRESSURE REDUCING VALVE
SPS SWSI	STATIC PRESSURE SENSOR SINGLE WIDTH SINGLE INLET
U/C	DOOR UNDERCUT BY GENERAL CONTRACTOR
UH	UNIT HEATER
USF	UTILITY SET FAN
V	VALVE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
Wb	WET BULB TEMPERATURE, DEG. F
WF	WATER FILTER
WV	POWER TYPE WALL VENTILATOR

8

<u>Ge</u>	ENERAL NOTES
1	WHERE ROOFING WORK IS REQUIRED, COORDINATE ALL WORK WITH EXISTING MANUFACTURER'S WARRANTY REQUIREMENTS.
2	THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.
3	TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, DUCT ACCESSORIES, ETC.
4	FOR TYPICAL STEAM, WATER AND REFRIGERANT PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD DETAILS AND PIPING SCHEMATICS.
5	WATER PIPE CONNECTIONS TO HEAT EXCHANGER DEVICES SHALL BE MADE TO PROVIDE COUNTER FLOW BETWEEN WATER AND AIR.
6	WHERE DUCTS OR PIPES ARE REMOVED THRU WALL/FLOOR/ROOF THAT IS TO REMAIN, PATCH WALL/FLOOR/ROOF OPENING TO MATCH EXISTING WHERE OPENING IS NOT RE-USED.
7	ALL PRESSURES LISTED ARE GAGE PRESSURE UNLESS OTHERWISE NOTED.
8	ALL CUTTING AND PATCHING REQUIRED FOR THE HVAC WORK SHALL BE INCLUDED. REFINISH ANY SURFACE DISTURBED UNDER THIS WORK TO MATCH EXISTING.
9	IN GENERAL, KEEP DUCT AND PIPING MAINS NEXT TO UNDERSIDE OF STRUCTURE.
10	ANNULAR SPACE OF ALL PIPE, CONDUIT, DUCT & OTHER SIMILAR PENETRATIONS OF FIRE RATED ASSEMBLIES SHALL BE FIRESTOPPED. IN ADDITION, PENETRATIONS THROUGH 0-HOUR RATED WALLS & FLOORS SHALL BE FIRESTOPPED TO RETARD PASSAGE OF FIRE & SMOKE.
11	UPON THE DISCOVERY OF ANY ASBESTOS MATERIAL, STOP WORK IMMEDIATELY AND REPORT IT TO THE C.O.R. THE C.O.R. WILL NOTIFY CONTRACTOR WHEN WORK IS SAFE TO PROCEED.
12	ANY REMOVED EQUIPMENT SHALL BE TURNED OVER TO THE VA. ITEMS NOT DESIRED BY THE VA SHALL BE REMOVED FROM THE PREMISES AND DISPOSED OF PROPERLY BY THE CONTRACTOR.
13	REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
14	THE CONTRACT DRAWINGS ARE NOT INTENDED TO SHOW EVERY VERTICAL OR HORIZONTAL OFFSET WHICH MAY BE NECESSARY TO COMPLETE THE SYSTEMS. COORDINATE WORK IN ADVANCE WITH ALL OTHER TRADES AND REPORT IMMEDIATELY AND DIFFICULTIES WHICH CAN BE ANTICIPATED.
15	FIELD VERIFY EXISTING CONDITIONS, INCLUDING DUCT, PIPE AND EQUIPMENT SIZES, SERVICES AND LOCATIONS PRIOR TO PERFORMING WORK.
16	ALL ABANDONED EXTRANEOUS PIPING, DUCTWORK, SUPPORTS, CONTROLS, ETC. SHALL BE REMOVED.
17	WHERE CONTROL DEVICES ARE REMOVED, PNEUMATIC LINES, ELECTRICAL WIRING, CONDUIT, ETC. SHALL BE REMOVED BACK TO MAIN OR POINT OF ORIGIN AND CAPPED.
18	ALL ITEMS THAT REQUIRE ACCESS, SUCH AS FOR OPERATING, CLEANING, SERVICING, MAINTENANCE, AND CALIBRATION, SHALL BE EASILY AND SAFELY ACCESSIBLE BY PERSONS STANDING AT FLOOR LEVEL, OR STANDING ON PERMANENT PLATFORMS, WITHOUT THE USE OF PORTABLE LADDERS. EXAMPLES OF THESE ITEMS INCLUDE, BUT ARE NOT LIMITED TO: ALL TYPES OF VALVES, FILTERS AND STRAINER, TRANSMITTERS, CONTROL DEVICES.
19	ALL EXISTING DUCTWORK, PIPING, EQUIPMENT, CONTROLS, ETC. SHOWN DASHED SHALL BE REMOVED. THE MAJORITY OF WORK TO BE REMOVED IS SHOWN. REMOVE ALL INCIDENTAL ABANDONED DUCTWORK, PIPING, ETC., THAT MAY NOT BE SHOWN BUT IS ASSOCIATED WITH THE REMOVAL WORK.
20	PROVIDE ONE WEEK (SEVEN CALENDAR DAYS) NOTICE TO THE VA FOR ANY ANTICIPATED OUTAGES NECESSITATED BY THE PROJECT WORK. ALL OUTAGES SHALL BE CLOSELY COORDINATED WITH THE C.O.R. AN OUTAGE SHALL BE DEFINED AS TAKING ANY SINGLE BOILER OUT OF SERVICE.
21	SCHEDULE ANY COMPLETE PLANT OUTAGES DURING THE ANNUAL THREE DAY SUMMER BOILER PLANT SHUT DOWN.

- ALL WORK INDICATED AND DESCRIBED IN THE CONTRACT DOCUMENTS SHALL BE INCLUDED IN THE BASE BID. DEDUCT ALTERNATE #1 SHALL INCLUDE THE DELETION OF WORK ASSOCIATED WITH PROVIDING THE AUTOMATED BOILER FEEDWATER MANAGEMENT SYSTEM.
- 23 ALL WORK AND COMPONENTS SUPPLIED TO COMPLY WITH BEI STANDARDS AND NATIONAL BOARD OF PRESSURE VESSELS STANDARDS.

100% SUBMITTAL

	Drawing Title	Project Title Modernize	Project No. VA Project No. 54 Heapy Project No. 2 Building Number 147		
ng	NOTES	Location Dayton, Ohio			
ED					Drawing Number
1310 /.com	Approved: CHIEF ENGINEER	Date 12/06/2012	Checked DLE	Drawn PCW	Dwg. of
6	7	8			

A

В

C

Δ

ш

ш.







PIPE

rubing

- HANGER ROD -

4

5



SUPPORT/ANCHOR FOR PIPE RISERS



6	7	8

FLUE GAS/FEEDWATER ECONOMIZER SCHEDULE									
MARK	LOCATION	SYSTEM	QUANTITY	MIN. HEAT EXCHANGED (MBTUH)	WATER FLOW (GPM)	EXHAUST FLOW RATE (SCFM)	MAX PRESSURE DROP WATER SIDE (PSIG)	MIN PRESSURE DROP GAS SIDE WC (IN)	NOTES
147-FHX1	SECOND FLOOR	MAIN BOILER PLANT	1	1,586	180	14,000	0.32	2.3	1,2,3

1 FEEDWATER INLET TEMPERATURE SHALL BE 218 °F.

2 MINIMUM HEAT EXCHANGED AT 100% BOILER LOAD.

3 PROVIDE TEMPORARY BREECHING AND TEMPORARY INSULATED BAFFLE INSIDE OF BREECHING TO ALLOW BOILER OPERATION DURING EQUIPMENT REPLACEMENT.

FAN SCHEDULE														
FAN NO.	LOCATION	FAN CFM	FAN E.S.P.	FAN TYPE	DESCRIPTION	WH TYPE	EEL MIN. DIA.(5)	DRIVE	MAX. BHP	NOM. HP (2)	MOTOR VOLT- PHASE	VFD	RPM	SEE NOTE
147-FD1	ON BURNER, FIRST FLOOR	EXISTING	EXISTING	EXISTING	FORCED DRAFT BURNER FAN	EXISTING		DIRECT	34	40	460-3	YES	-	1,2,3
147-IDF1	SECOND FLOOR	EXISTING	EXISTING	EXISTING	INDUCED DRAFT BOILER FAN	EXISTING		DIRECT	21.3	25	460-3	YES	900	1,2,3
147-FD2	ON BURNER, FIRST FLOOR	EXISTING	EXISTING	EXISTING	FORCED DRAFT BURNER FAN	EXISTING		DIRECT	34	40	460-3	YES	-	1,2,3
147-IDF2	SECOND FLOOR	EXISTING	EXISTING	EXISTING	INDUCED DRAFT BOILER FAN	EXISTING		DIRECT	21.3	25	460-3	YES	900	1,2,3
147-FD3	ON BURNER, FIRST FLOOR	EXISTING	EXISTING	EXISTING	FORCED DRAFT BURNER FAN	EXISTING		DIRECT	17	20	460-3	YES	-	1,2,3
147-IDF3	SECOND FLOOR	EXISTING	EXISTING	EXISTING	INDUCED DRAFT BOILER FAN	EXISTING		DIRECT	12.8	15	460-3	YES	900	1,2,3
147-FD4	ON BURNER, FIRST FLOOR	EXISTING	EXISTING	EXISTING	FORCED DRAFT BURNER FAN	EXISTING		DIRECT	17	20	460-3	YES	-	1,2,3
147-IDF4	SECOND FLOOR	EXISTING	EXISTING	EXISTING	INDUCED DRAFT BOILER FAN	EXISTING		DIRECT	12.8	15	460-3	YES	900	1,2,3

NOTES 1 DRAFT FAN IS EXISTING TO REMAIN. PROVIDE A NEW INVERTER DUTY MOTOR, RATED FOR USE WITH WITH A VFD. 2 MOTORS SHALL BE PREMIUM EFFICIENCY TYPE.

3 FIELD VERIFY ALL MOTOR REQUIREMENTS (HP/VOLT/PH/RPM) PRIOR TO ORDERING. PROVIDE COUPLING TO MATCH FAN AND NEW MOTOR SHAFT.

100% SUBMITTAL

	Drawing Title	Project Title Modernize	Project Title Modernize Boiler Plant B-147					
logy	SCHEDULES AND DETAILS							
ĒD		Location Dayt	Drawing Number					
310 com	Approved: CHIEF ENGINEER	Date 12/06/2012	Checked	Drawn PCW	147-M			
6	7	8						

 \triangleleft

ш

S

Δ

ш

LL







6









GASKET

SECTION "B-B"

-HANDLE INSIDE

∽ FLEXIBLE WASHER

LATCH

FACTORY FABRICATED

4

5







NOTES:

2

3

1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.

ACCESS DOOR

2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.

3. SEE SMACNA 2005, FIGURE 9-15

ACCESS PANEL AND DOOR DETAIL

INSULATION /







	Drawing Title	Project Title	Project No. VA Project No. Heapy Project No.							
Ig ology		DETAILS				Location Dayton, Ohio				
ED										
1310 /.com	Approved: CHIEF ENGINEER			Date 1	2/06/2012	Checked	Drawn PCW	Dwg. of		
6		7			8					



TERMINAL UNITS

DUCTWORK RADIUS ELBOWS





7



8





¥

В

S
