

Q&A

RFQ 2592-GREC UNIT 3 SURFACE CONDENSER TUBE CLEANING AND EDDY CURRENT TESTING SERVICES

Q: What type of cleaner does the plant want to use? Or what type of deposit do you see?

A: In the past we have used projectile cleaning, but we are open to other options.

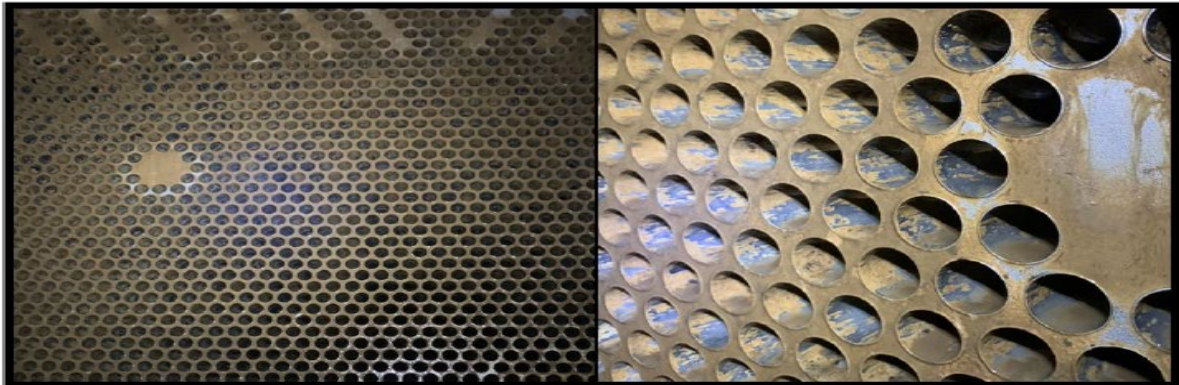


Image (left) showing tubes/tube sheet center of water box, image (right) up close view of tubes/tube sheet

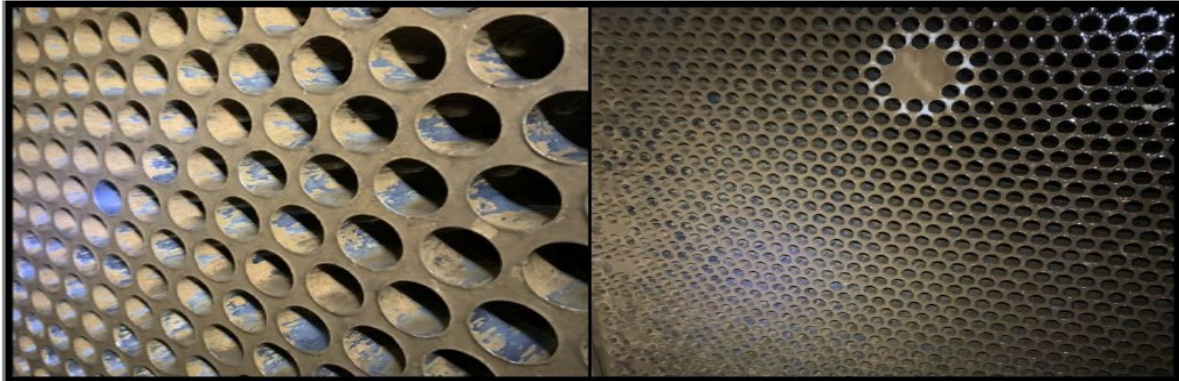


Image (left) close up view of tubes/tube sheet, image (right) center of tubes/tube sheet facing downward

Q: Would the plant consider pricing for tube cleaning only or do we want to provide the contract for tube cleaning and eddy current services together?

A: We would rather group the services together

Q: What percentage of tubes does the plant want eddy current? Usually the industry says 10%, 20%, 25%, 50%, 100%?

A: We are requesting 50%

Q: Is a hole watch required for the tube cleaning?

A: For a non-permit confined space a hole watch is not required, but one can be provided.

Q: Does the plant have any tube plugs for the condenser or should that be included in the bid?
Will the plant accept a price of Time and Materials since it is unknown the number of tubes needed plugged?

A: Tube plugs can be included in the bid on a T&M basis since this is an unknown. We do have plugs in stock (60)

Q: Is the 15,964 the total amount of tubes in condenser?

A: Yes

Q: Are there 4 water boxes? 2 inlets and 2 outlets? With approximately 4,000 tubes each?

A: Yes

Q: Do you have cathodic probes in the boxes closer than 4' from the tube sheets?

A: See attachment

Q: Will the plant provide scaffolding as needed in the boxes?

A: Any scaffolding needed will be provided by onsite scaffolding contractor

Q: Will the plant provide wood decking and/or scaffolding over the inlet and outlet valves for fall protection?

A: These are horizontal entries and valves will be closed

Q: Will the plant provide an electrician for hooking up electricity to electric pump for shooting brushes? 240V?

A: Provided

Q: Will there be a water supply of at least 1.5" service water within 100' of each box?

A: Available

Q: Will there be an air supply within 100'?

A: Available

Q: Can you provide a drawing of the water boxes inlet and outlet?

A: See attachments

Q: Do you have any pictures from within the water boxes further back so you can see all four sides?

A: See attached

Q: Contractor provides 50% inspection pattern or will client provide the pattern based on previous testing?

A: Contractor provide inspection pattern

Q: 8 Day schedule window to include cleaning and testing or what is the maximum window client will provide to complete both services?

A: 8 days would be max window.

Q: Does the client want round the clock or day shift only?

A: 24 hour shift would be allowed to complete the services in the available window.

Q: Are the Dummy Tubes visible from inside the water box and their only purpose is to protect the top of the condenser tubes from damage?

A: The tubes are not visible from the water boxes and are to protect the bundles from steam impingement. They are visible from the LP turbine access but they will not be opened.

SPX Heat Transfer Inc.

SPX HEAT TRANSFER CONDENSER DATA SHEET

1) Design basis

a) Calculation Code:	HEI Standards for Steam Surface Condensers
b) Nature and source of circulating water:	<u>Tower</u>
c) Steam Flow:	<u>830,470 lbs/hr</u>
d) Steam Temperature:	<u>90.74°F</u>
e) Duty (net heat rejected to circulating water):	<u>800.6 x 10⁶ BTU/hr</u>
f) Heat Transfer Rate (75% Clean):	<u>695.6 BTU/hr/°F/Ft²</u>
g) Effective Tube Length:	<u>43.917 ft</u>
h) Effective Condenser Surface:	<u>118,292 ft²</u>
i) Number of Water Passes:	<u>2</u>
j) Circulating water quantity:	<u>118,292 GPM</u>
k) Circulating water inlet design temperature:	<u>72.2°F</u>
l) Circulating water outlet design temperature:	85.74F
m) Circulating water temperature rise:	13.54°F
n) Circulating water operating temperature range:	TBA°F to TBA°F 49 F to 119 F
o) Circulating water density:	62.38 lb/Ft ³
p) Circulating water specific heat:	1.0 BTU/lb/°F
water specific gravity	1.0
q) Cleanliness factor:	<u>75 %</u>
r) Design circulating water velocity in tubes:	<u>7.00 ft/sec</u>
s) Absolute pressure:	<u>1.458" of HgA</u>
t) Deaeration - maximum free oxygen in condensate:	7 PPB
u) Maximum Circulating water friction loss through clean tubes and water boxes at 118,292 GPM:	<u>22.65 ft of water</u>

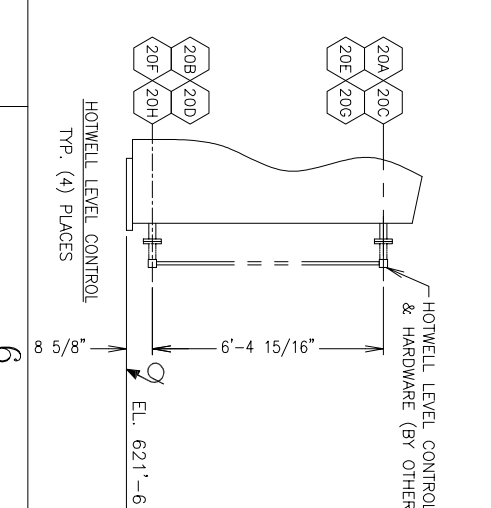
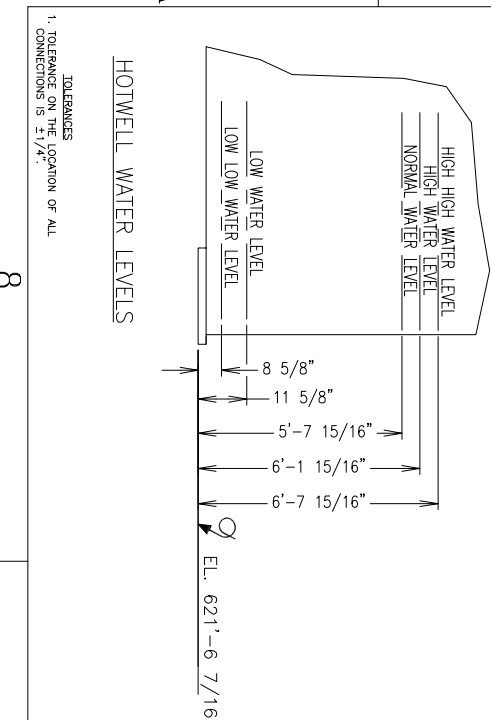
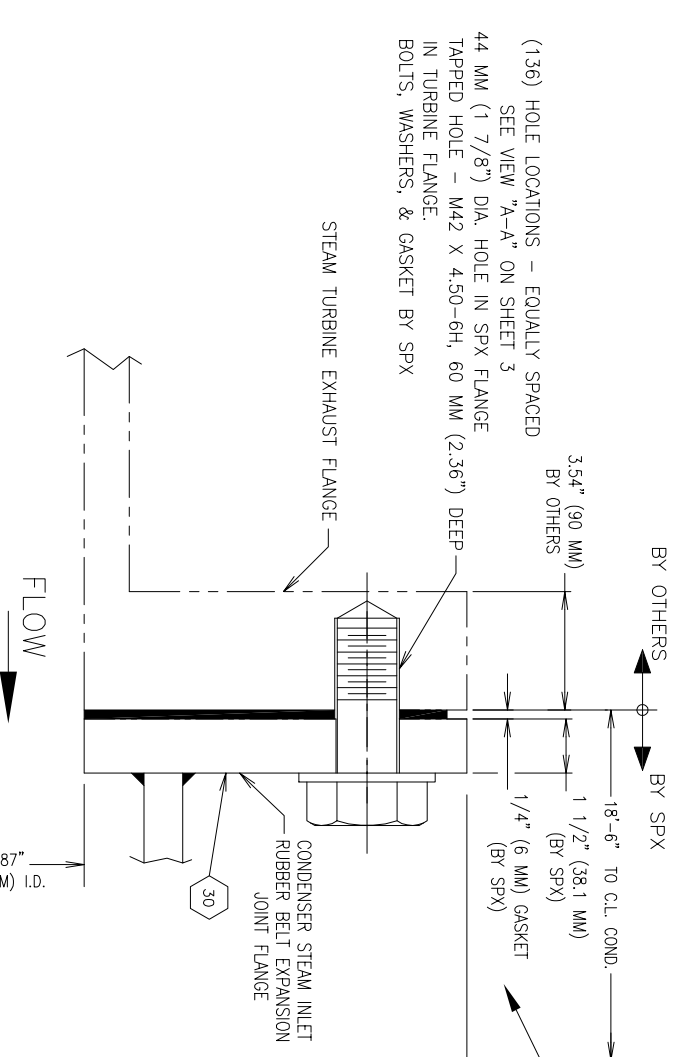
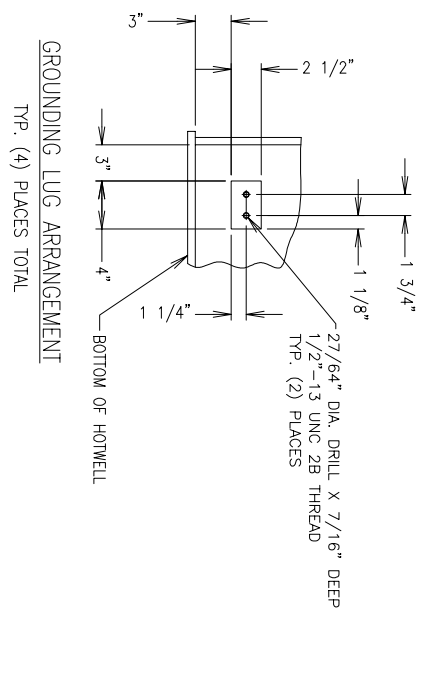
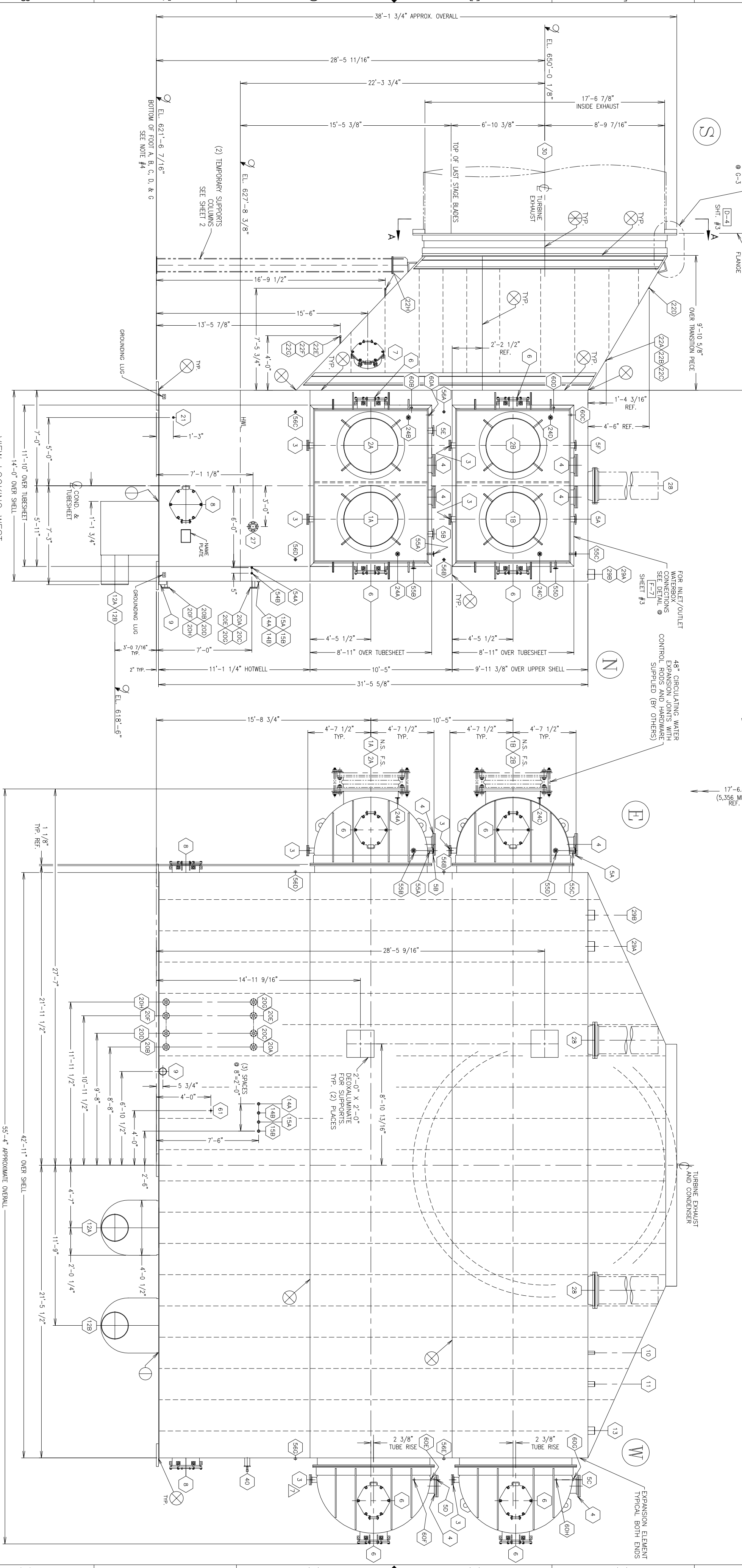
2) Tubes

a) Size:	<u>(1") O.D.</u>
b) Length and Tolerance for Ordering:	<u>44' 1-1/4" +1/4", -0)</u>
c) Main Condensing Sections:	
(1) No.:	<u>15,964</u>
(2) Gauge:	<u>22 BWG</u>
(3) Material:	<u>ASTM SA249 / 304L (Dual Certified)</u>
d) Dummy Tube Section:	
(1) No.:	<u>300</u>
(2) Gauge:	<u>16</u>
(3) Material:	<u>Carbon Steel</u>
e) Furnished by:	<u>SPX Heat Transfer</u>
f) Shop Installed:	<u>Yes (Partial -Balance installed in field)</u>

SPX Heat Transfer Inc.

- 3) Tubesheets
- a) Number and size: (4) 11' - 10" x 8' - 11"
 - b) Base Thickness: 1 1/4"
 - c) Material: SA240/304L SS Dual Certified
- 4) Shell
- a) Material: SA516 Gr.70 Carbon Steel
 - b) Thickness: 5/8" (includes 1/32" corrosion allowance)
 - c) Provision for tube contraction/shell expansion: Diaphragm
- 5) Tube support plates
- a) Number: 9 Upper 9 Lower
 - b) Thickness: 1/2")
 - c) Material: SA285C
- 6) Hotwell
- a) Storage Capacity: 5 Minutes (Low Water Level to Normal Water Level)
 - b) Material: SA516 Gr.70
 - c) Thickness: 5/8" (includes 1/32" corrosion allowance)
- 7) Water Boxes
- a) Material: SA516 Gr.70
 - b) Divided or non-divided: Divided - Pass Partition Plate
 - c) Design pressure: 80 psig
 - d) Number and size: Inlet nozzles: 2 at 48" Dia.
Outlet nozzles: 2 at 48" Dia.
 - e) Internal Protection: Coal Tar Epoxy
- 8) Connecting Piece
- a) Material: SA516 Gr.70
 - b) Thickness: 5/8" (includes 1/32" corrosion allowance)
 - c) Connection to EJ: Bolted to Turbine Welded to Condenser
- 9) Approximate weights, condenser with tubes
- a) Dry: 653,700 lbs
 - b) Operating: 1,092,000 lbs
 - c) Water Test: 1,575,000 lbs

1. FIELD WELD SYMBOLS: INTERNAL WELD, EXTERNAL WELD.
2. FOR SERVICE CONNECTIONS SEE DRAWING: WH-740-15-3080-SCL.
3. MAXIMUM ALLOWABLE WATERBOX PRESSURE: 80 PSIG & F.V.
4. FOR FOOT LOADS AND ARRANGEMENTS. SEE DRAWING: WH-740-15-3080-FL.
5. WATERBOX TO TUBE SHEET JOINTS ARE MADE WITH GASKETS.
6. APPROX WEIGHTS:
OPERATING: 1,155,000 LBS.
MATERIAL: 1,375,000 LBS.
MATER TEST: 653,000 LBS.
7. IN ORDER TO MEET THE PROJECT SCHEDULE, WE REQUIRE THAT ENGINEERING DESIGN INFORMATION AND/OR CHANGES TO BE FINALIZED BY 4/22/15, WHICH IS THE DESIGN CUT-OFF DATE FOR THIS PROJECT.
8. SERVICE CONNECTIONS SHOULD BE LOCATED BETWEEN SUPPORT PLATES & STIFFENING RIBS, INDICATED BY DASHED LINES IN MAIN VIEWS OF THIS DRAWING. SEE DOCUMENT SC-25561 FOR ADDITIONAL INFORMATION ON CONNECTION LOCATION.
9. DO NOT SCALE. ADDITIONAL DIMENSIONS WILL BE FURNISHED UPON REQUEST.
10. SPX DOES NOT FURNISH PARTS SHOWN IN PHANTOM LINE.
11. ALL BOLTS STRADDLE HORIZONTAL AND VERTICAL CENTER LINES OF FLANGES.
12. UNLESS OTHERWISE NOTED, ALL CONNECTIONS ARE LOCATED TO $\pm 1/4"$.
13. F.S. = FAR SIDE; N.S. = NEAR SIDE; F.E. = FAR END; N.E. = NEAR END.



REV	DESCRIPTION	DATE
1	AS SHOWN	03/01/16
2	REMOVED CONN. #55 & #56, ADDED CONN. #57 & #58	03/17/15
3	REMOVED CONN. #59 & #60, ADDED CONN. #61 & #62	03/17/15
4	REMOVED CONN. #63 & #64, ADDED CONN. #65 & #66	03/17/15
5	REMOVED CONN. #67 & #68, ADDED CONN. #69 & #70	03/17/15

REV	DESCRIPTION	DATE
6	REMOVED CONN. #71 & #72, ADDED CONN. #73 & #74	03/17/15
7	REMOVED CONN. #75 & #76, ADDED CONN. #77 & #78	03/17/15
8	REMOVED CONN. #79 & #80, ADDED CONN. #81 & #82	03/17/15
9	REMOVED CONN. #83 & #84, ADDED CONN. #85 & #86	03/17/15

REV	DESCRIPTION	DATE
10	REMOVED CONN. #87 & #88, ADDED CONN. #89 & #90	03/17/15
11	REMOVED CONN. #91 & #92, ADDED CONN. #93 & #94	03/17/15
12	REMOVED CONN. #95 & #96, ADDED CONN. #97 & #98	03/17/15
13	REMOVED CONN. #99 & #100, ADDED CONN. #101 & #102	03/17/15

REV	DESCRIPTION	DATE
14	REMOVED CONN. #103 & #104, ADDED CONN. #105 & #106	03/17/15
15	REMOVED CONN. #107 & #108, ADDED CONN. #109 & #110	03/17/15
16	REMOVED CONN. #111 & #112, ADDED CONN. #113 & #114	03/17/15
17	REMOVED CONN. #115 & #116, ADDED CONN. #117 & #118	03/17/15

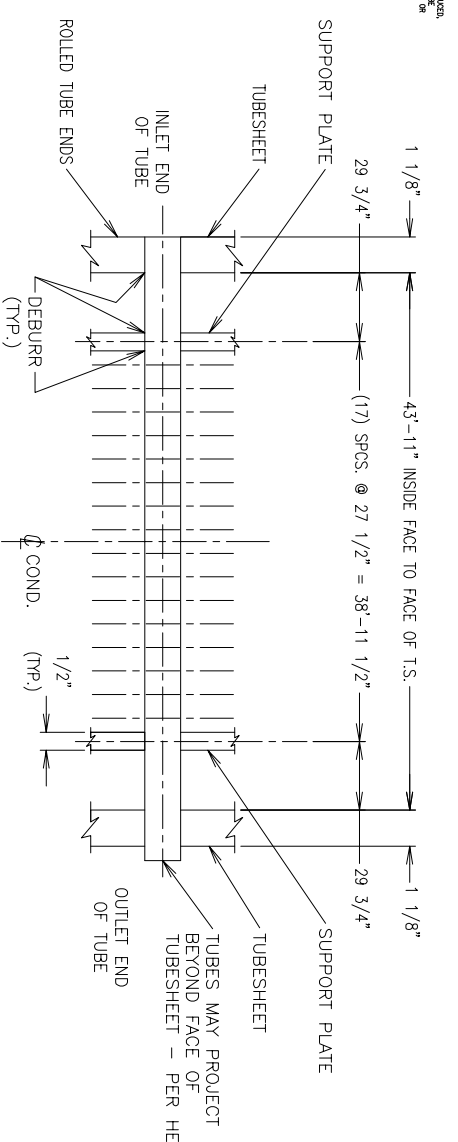
SPX **ECORRE** Condensers
BREITENBERG, PA 18017

KED TAG: 03-CND-CND-01

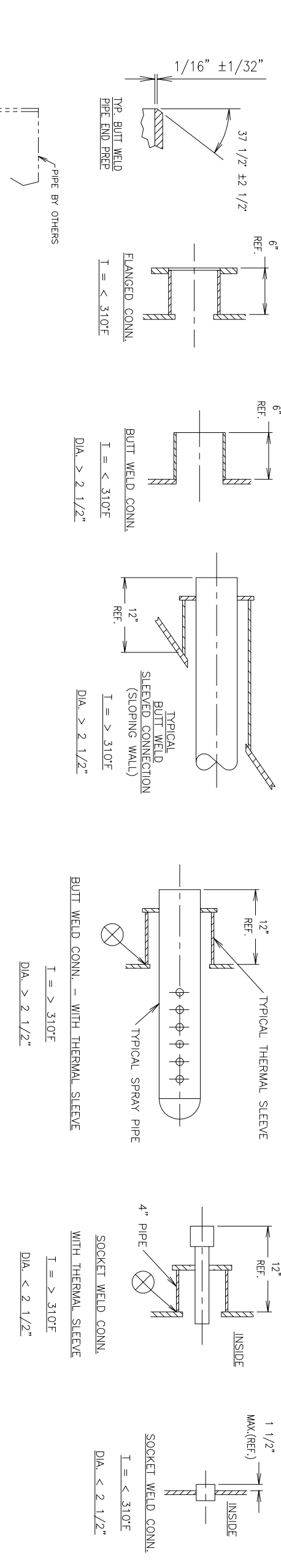
GRAND RIVER ENERGY CENTER UNIT 3
CHOUTEAU, OKLAHOMA
STEAM SURFACE CONDENSER

DATE: 03/19/16
SHEET: 1/3

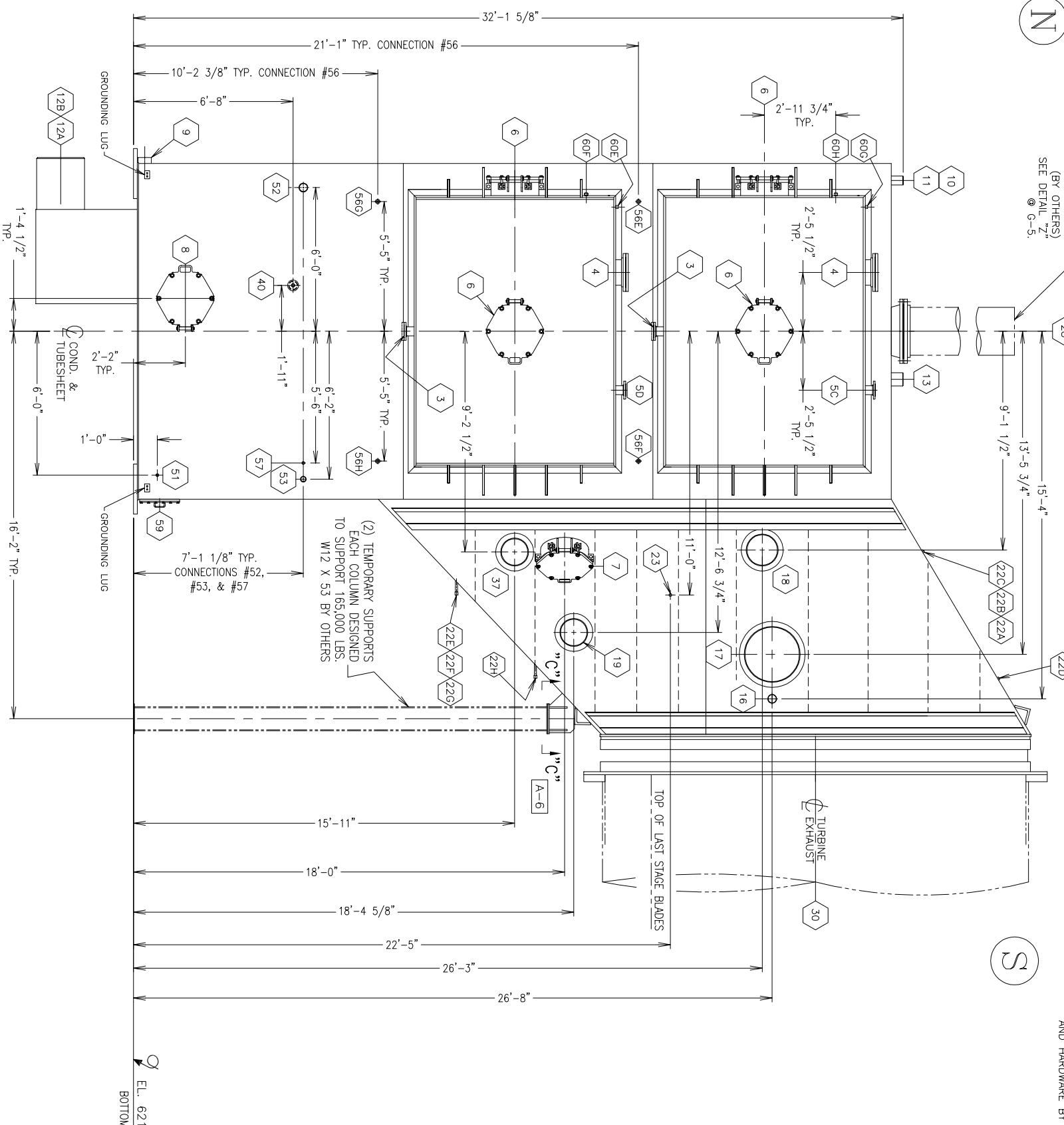
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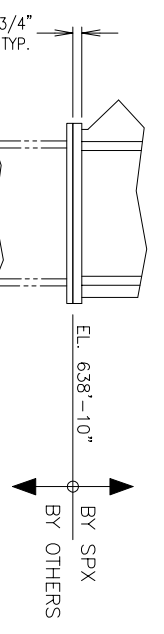
TUBE ARRANGEMENT
 (15,964) - 1" O.D. 22 BWG A249-304/304L DUAL CERTIFIED S.S. TUBES, MAIN BUNDLE
 LENGTH FOR ORDERING: 44'-1 1/4" (+1 1/4"/-0")
 TUBESHEET MATERIAL: SA240 TP 304/304L DUAL CERTIFIED STAINLESS STEEL



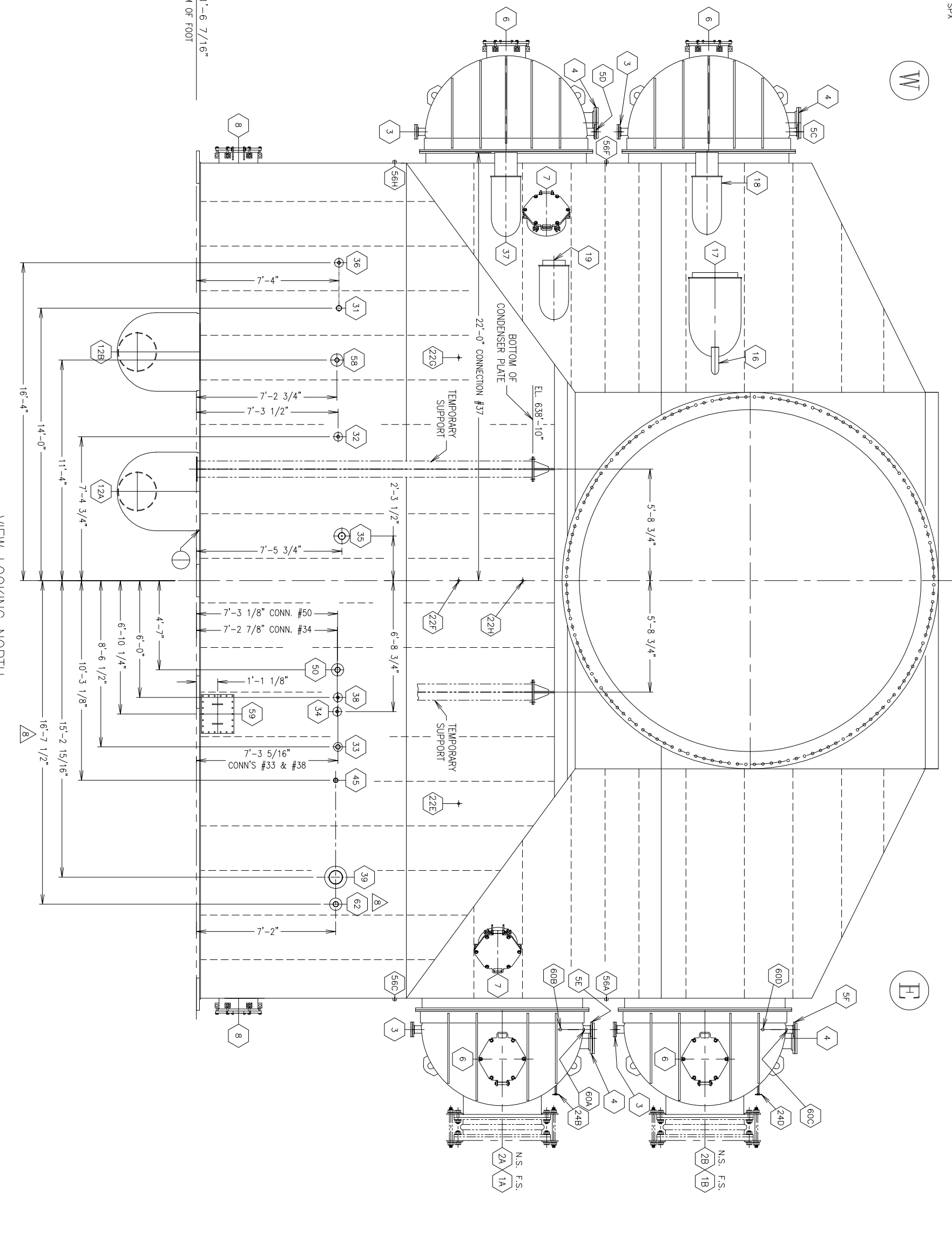
DETAIL "D"
 RUPTURE DISC ASSEMBLY
 WELD NECK SLIP ON FLANGE
 AND HARDWARE BY SPX
 RUPTURE DISC TUBES
 GASKET VACUUM SUPPORT
 SEAL AND TOP SECTION
 1" DRAIN TRP.
 PIPE BY OTHERS



VIEW LOOKING EAST



SECTION "C-C"
 TYPICAL (2) LOCATIONS
 COLUMN AND MOUNTING PLATE
 (A) 7/8" DIA. HOLES (MOUNTING HARDWARE BY OTHERS)
 COLUMN AND MOUNTING PLATE
 W12 X 53
 BY SPX
 EL. 638'-10"
 BY OTHERS



VIEW LOOKING NORTH

NO.	DATE	BY	CHECKED	DESCRIPTION
1	09/10/18	SPX	SPX	ISSUE FOR PERMIT
2	09/17/18	SPX	SPX	REVISIONS
3	09/14/18	SPX	SPX	REVISIONS
4	09/25/18	SPX	SPX	REVISIONS
5	12/11/18	SPX	SPX	REVISIONS
6	01/17/19	SPX	SPX	REVISIONS
7	02/19/19	SPX	SPX	REVISIONS
8	03/15/19	SPX	SPX	REVISIONS

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5	12/11/18	SPX	SPX	REVISIONS
6	01/17/19	SPX	SPX	REVISIONS
7	02/19/19	SPX	SPX	REVISIONS
8	03/15/19	SPX	SPX	REVISIONS

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4	09/25/18	SPX	SPX	REVISIONS
5	12/11/18	SPX	SPX	REVISIONS
6	01/17/19	SPX	SPX	REVISIONS
7	02/19/19	SPX	SPX	REVISIONS
8	03/15/19	SPX	SPX	REVISIONS

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2	09/17/18	SPX	SPX	REVISIONS
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4	09/25/18	SPX	SPX	REVISIONS
5	12/11/18	SPX	SPX	REVISIONS
6	01/17/19	SPX	SPX	REVISIONS
7	02/19/19	SPX	SPX	REVISIONS
8	03/15/19	SPX	SPX	REVISIONS

KED TAG : 03-CND-CND-01

GRAND RIVER ENERGY CENTER UNIT 3

CHOUTEAU, OKLAHOMA

STEAM SURFACE CONDENSER

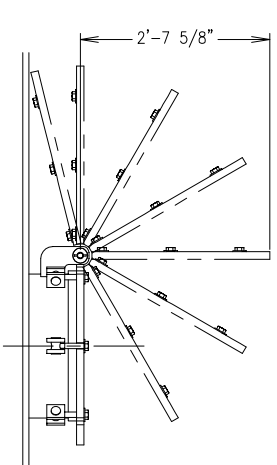
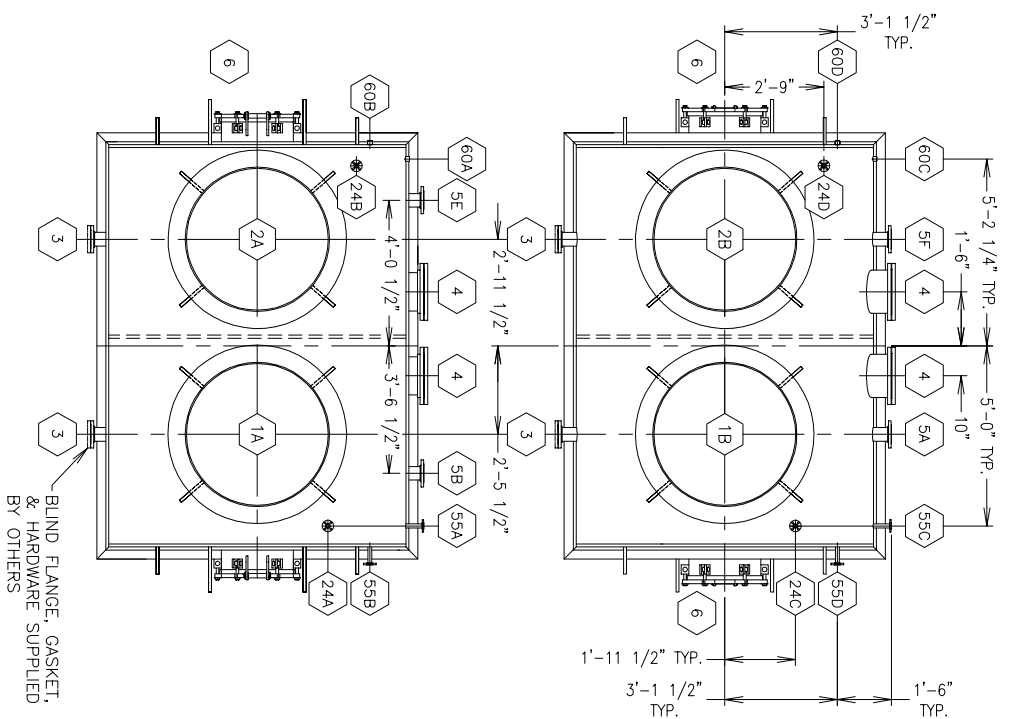
CONDENSER ARRANGEMENT

SPX

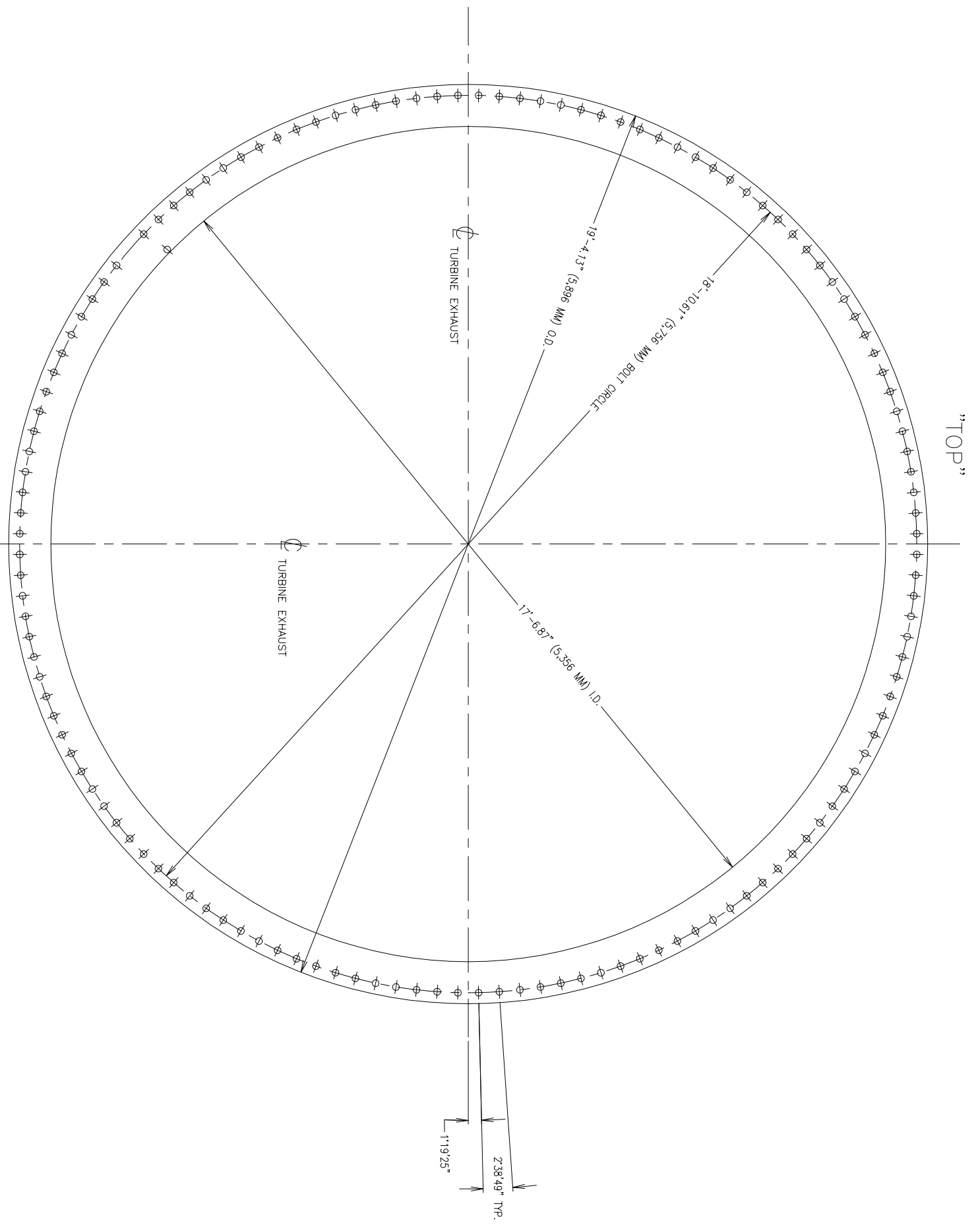
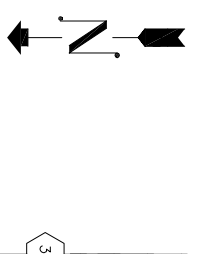
ECOLINE Condensers

DATE: 03/15/19
 BY: SPX
 CHECKED: SPX
 TITLE: GENERAL ARRANGEMENT
 SHEET NO: WUH-740-15-3080-GA
 REV: 2/3

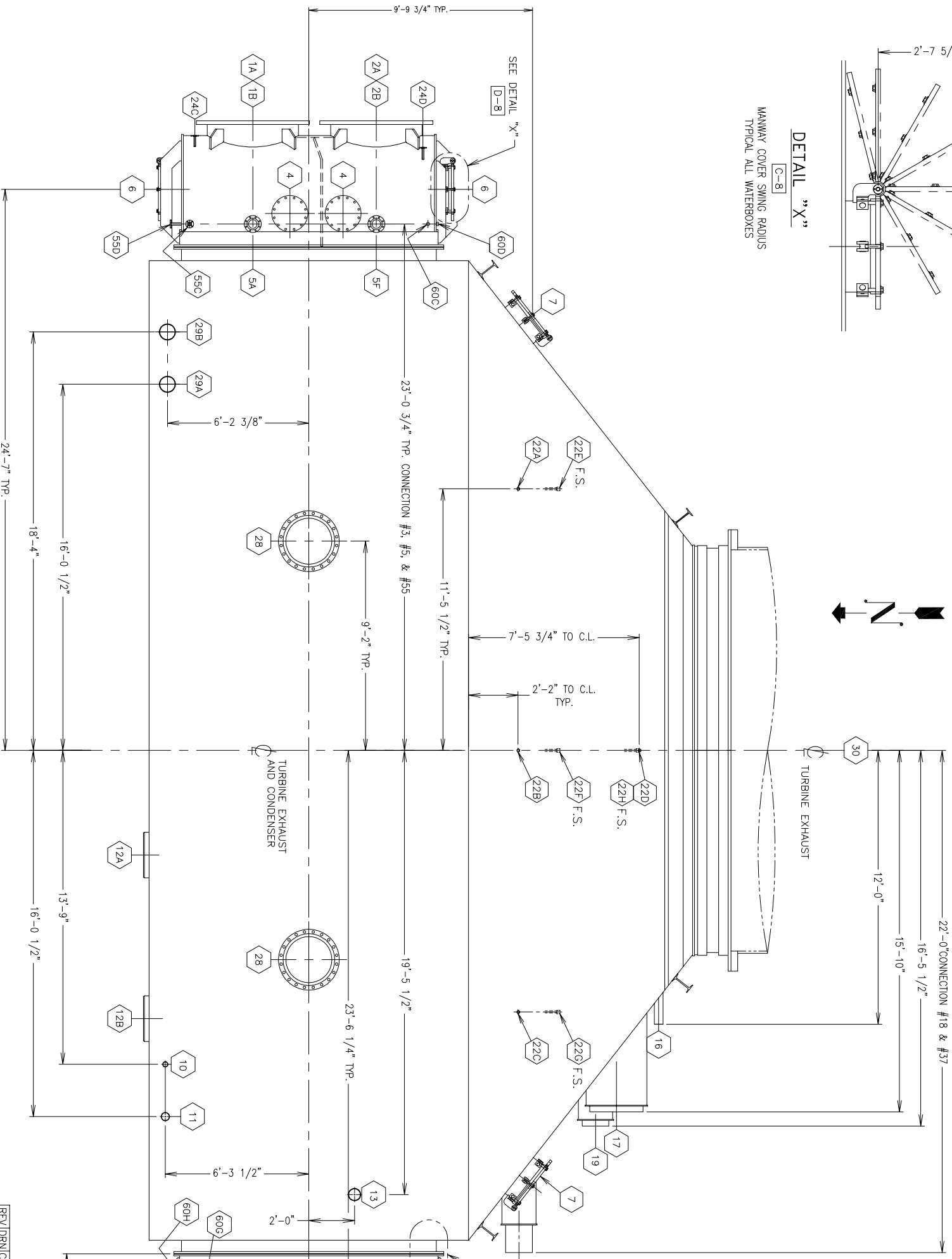
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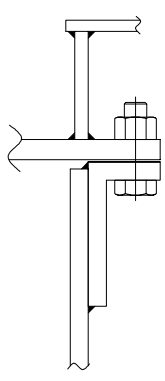
DETAIL "X"
 MANIFOLD COVER STRING RADIUS
 TYPICAL ALL WATERBOXES



VIEW "A-A"
 TURBINE FLANGE
 SHT. #1



PLAN VIEW



DETAIL "Y"
 WATERBOX TO TUBESHEET CONNECTION
 TYP. ALL WATERBOXES

REV	DESCRIPTION	DATE	BY	CHECKED
1	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
2	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
3	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
4	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
5	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
6	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
7	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
8	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.

REV	DESCRIPTION	DATE	BY	CHECKED
1	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
2	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
3	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
4	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
5	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
6	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
7	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.
8	MANIFOLD CONNECTION #18 & #37	03/16/16	J. S. T.	J. S. T.

SPX
 Ecolaire Condensers
 BREITENBERG, PA 18017

KED TAG : 03-CND-CND-01
 GRAND RIVER ENERGY CENTER UNIT 3
 KIEWIT
 CHOUTEAU, OKLAHOMA
 STEAM SURFACE CONDENSER

1. DIMENSIONS ON THIS LOCATION OF ALL TOLERANCES DIMENSION IS ± 1/4"

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NOTES: 1. INDICATES INFORMATION TO BE SUPPLIED BY CUSTOMER.

2. SURFACE CONDENSER CONNECTION DESIGN CONDITIONS OTHER THAN THOSE MUTUALLY AGREED UPON BETWEEN SPX HEAT TRANSFER & THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE ARE NOT TRANSFERRED. CHANGES IN CONNECTION CONDITIONS, DURING DESIGN, AFTER INSTALLATION, OR BEFORE A NEW SERVICE IS ADDED TO THE CONDENSER SHOULD BE REVIEWED BY SPX HEAT TRANSFER TO PREVENT DAMAGE OR MISAPPLICATION OF EXISTING CONNECTIONS.

3. SPX HEAT TRANSFER WILL PROVIDE A DESIGN BACK PRESSURE WHEN DISTRIBUTION PERFORATED PIPES ARE USED. LEAK ASSESSMENT OF THE PRESSURE IS ASSUMED TO BE VACUUM.

4. AN 'X' UNDER 'TEMPERATURE' SERVES AS INSTRUCTIONS TO OUR CUSTOMER TO REDUCE ENTHALPY TO VALUES AS SPECIFIED BY THE HEAT EXCHANGE INSTITUTE. THE CUSTOMER SHOULD THEN DESIGN AN OPERATION SYSTEM & CHANGE FLOW CONDITIONS (INCLUDING INCREASED FLOW RATE) TO ACCURATE FOR ATTEMPERATION.

5. UNLESS SPECIFICALLY SHOWN, ON THE DRAWING OR IN THE NOTES, INSULATION IS NOT FURNISHED FOR EITHER HEAT CONSERVATION OR PROTECTIVE PURPOSES. IT IS UNDERSTOOD THAT ANY SUCH INSULATION SHALL BE FURNISHED BY THE CUSTOMER.

6. THERMAL SLEEVES FOR SERVICE >310° F. DO NOT INSULATE THERMAL SLEEVES. 7. ALL FLANGE BOLT HOLES STRADDLE CENTERLINES. 8. IF BYPASS STEAM DUMPS ARE PROVIDED FOR THIS PROJECT, DO NOT OPERATE THE BYPASS STEAM DISCHARGE TO THE CONDENSER UNLESS THE CONDENSER HOOD SPRAY SYSTEM IS OPERATING AT THE FULL CONDENSATE FLOW AS STATED ON THIS DRAWING. 9. AIR VAPOR PIPING BETWEEN CONDENSER AND AIR REMOVAL EQUIPMENT SHALL BE 0.065" HD AT THE DESIGN SUCTION CONDITIONS FOR THE AIR REMOVAL EQUIPMENT. 10. BYPASS CONNECTIONS #17, #18, & #19 HAVE CARBON STEEL STUBS FOR CUSTOMER CONNECTION AND 304/304L STAINLESS STEEL FOR SPRAY TUBE PORTION. 11. FLOW LISTED IN TABLE IS FOR EACH CONNECTION WHEN OPERATING UNDER DESIGN CIRCULATING WATER FLOW TO EACH OPERATING WATERBOX CONNECTION IS 67.981 GPM. 12. MATERIAL LISTED IN 'MATERIAL' COLUMN IS FOR PIPE CONNECTIONS, PERFORATED PIPE, BAFFLE, BASKET TIP, AND OTHER INTERNAL PROVISIONS ARE TO BE 304 SS PER THE CONTRACT. 13. BLIND FLANGE, GASKET & HARDWARE FOR ALL CONNECTIONS #24 & #28 ARE SUPPLIED BY OTHERS.

Main data table with columns: CONNECTION NO., QUANTITY, NOMINAL SIZE IN., FLANGE, SERVICE DESCRIPTION, FITTING RATING OR PIPE SCHEDULE, MATERIAL, DESIGN FLOW EACH CONNECTION LBS./HR., DESIGN PRESSURE PSIA, DESIGN TEMPERATURE °F, ENTHALPY BTU/LB, FREQ. OF OPER., LOCATION, CONNECTION NO.

Summary table with columns: NUMBER, SIZE, TYPE, THK., O.D., B.C., NO. HOLES DIA., PIPE SCHEDULE.

Project information including: GRAND RIVER ENERGY CENTER UNIT 3, KIEWIT, CHOUTEAU, OKLAHOMA, SERVICE CONNECTION LIST, SPX Condensers logo, and revision table.

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CONNECTION NO.	QUANTITY	NOMINAL SIZE IN.	FLANGE						SERVICE DESCRIPTION	FITTING RATING OR PIPE SCHEDULE	MATERIAL	DESIGN FLOW LBS./HR.	PRESSURE PSIA		TEMPERATURE °F	ENTHALPY BTU/LB	FREQ. OF OPER.				INTERNAL PROVISION	LOCATION	CONNECTION NO.	
			BUTT WELD END	SOCKET WELD	NPT - FEMALE	SLEEVED SEE NOTE 6	HOLE ONLY	PLUG / CAP / BLIND FLG.					AT ENTRANCE TO CONDENSER	PERFORATED PIPE BACK PRESSURE SEE NOTE 3			CONTINUOUS	INTERMITTENT	START-UP ONLY	EMERGENCY				COMMISSIONING
41	1	3							HOTWELL SPARGING STEAM	SCH 40	3,150	30	30	680	1,373									41
42	1	3/4							HOTWELL SAMPLE	3000#														42
43	1	4							STEAM BLOW CONNECTION	SCH 40	LATER	LATER	LATER	64										43
44	1	2							STEAM TURBINE PIPING DRIP LEGS	SCH 40		5	NEGL.	370	1,225									44
45	1	2							GLAND STEAM CONDENSER DRAIN	3000#	3,520	5	NEGL.	212	1,154									45
46	1	1																						46
47	1	1																						47
48	1	1																						48
49	1	1																						49
50	1	3							HOTWELL SPARGING STEAM	SCH 40	3,150	30	30	680	1,373									50
51	1	3/4							HOTWELL SAMPLE	3000#														51
52	1	4							STEAM BLOW CONNECTION	SCH 40	LATER	LATER	LATER	64										52
53	1	2							STEAM TURBINE PIPING DRIP LEGS	SCH 40		5	NEGL.	370	1,225									53
54A/54B	2	1							SPARE	3000#														54A/54B
55A/55D	4	1							IN/OUT & RETURN WATERBOX LEVEL TRANSMITTERS	SEE CHART		94		105	73									55A/55D
56A/56H	8	1 1/4							CONDUCTIVITY TROUGH & CONN. TUBE END LEAKAGE	3000#				250										56A/56H
57	1	3/4							SHELL PRESSURE TRANSMITTER	3000#				250										57
58	1	2 1/2							TCA COOLER BYPASS	SCH 40	240 GPM	250	250	390	364									58
59	1	16" X 20"							HOTWELL CLEAN OUT DOOR	-----														59
60A/60H	8	1							SPARE	3000#														60A/60H
61	1	3/4							SPARE	3000#														61
62	1	3							N2 PACKING LEAK TEST	SCH 40	20,000	75		620	1,341									62
63																								63
64																								64
65																								65
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77																								77
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79																								79
80																								80

SEE NOTE #13

REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP REV: DRN (CKD) ENG APP
 DATE: 05/19/16 DATE: 03/01/16 DATE: 11/23/15 DATE: 10/07/15 DATE: 08/14/15 DATE: 06/17/15 DATE: 05/12/15
 RAS S.T. EMR/GMM 6 AMB/RJK ER GMM 5 AMB/S.T. TW/CMM 4 AMB/RJK TW/CMM 3 AMB/RJK TW/CMM 2 AMB/RJK TW/CMM 1 AMB CT TW/CMM
 DATE: 05/19/16 DATE: 03/01/16 DATE: 11/23/15 DATE: 10/07/15 DATE: 08/14/15 DATE: 06/17/15 DATE: 05/12/15
 ADDED CONN. #62 ADDED PLUG TO CONNECTION #54A/B & PRESURE. TEMP. & REF. "SEE NOTE #13" ADDED #61.
 AND "COMMISSIONING" TO HEADER @ D-2.

SERIAL: 15-3080 SCALE NONE
 DATE 4/3/15
 DRN S.T. CKM RJK
 ENG TWC APP GMM
 FRAME SIZE 106P-RB184-TPHD
 DWG. NO. WUH-740-15-3080-SCL 2/2 REV 2/7

SPX **ECOLARE** **Condensers**
 BETHLEHEM, PA 18017
 TITLE: SERVICE CONNECTION LIST

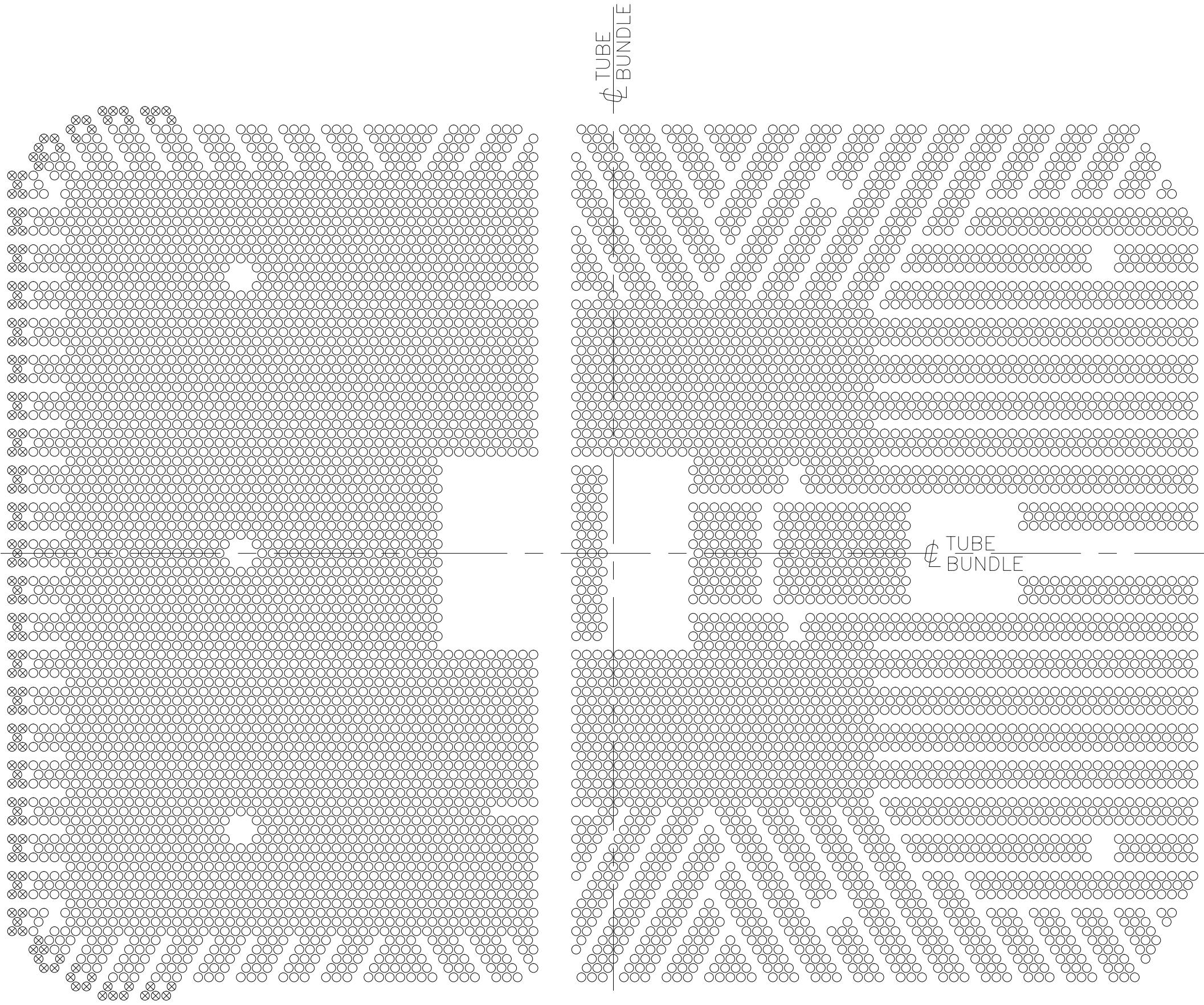
KED TAG : 03-CND-CND-01
 GRAND RIVER ENERGY CENTER UNIT 3
 KIEWIT
 CHOUTEAU, OKLAHOMA
 STEAM SURFACE CONDENSER

8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

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STEAM

○ = (7,982) 1" O.D. 22 BWG (.028 WALL) SA249 304/304L STAINLESS STEEL TUBES PER BUNDLE
 X 2 BUNDLES
 (15,964) TUBES PER CONDENSER

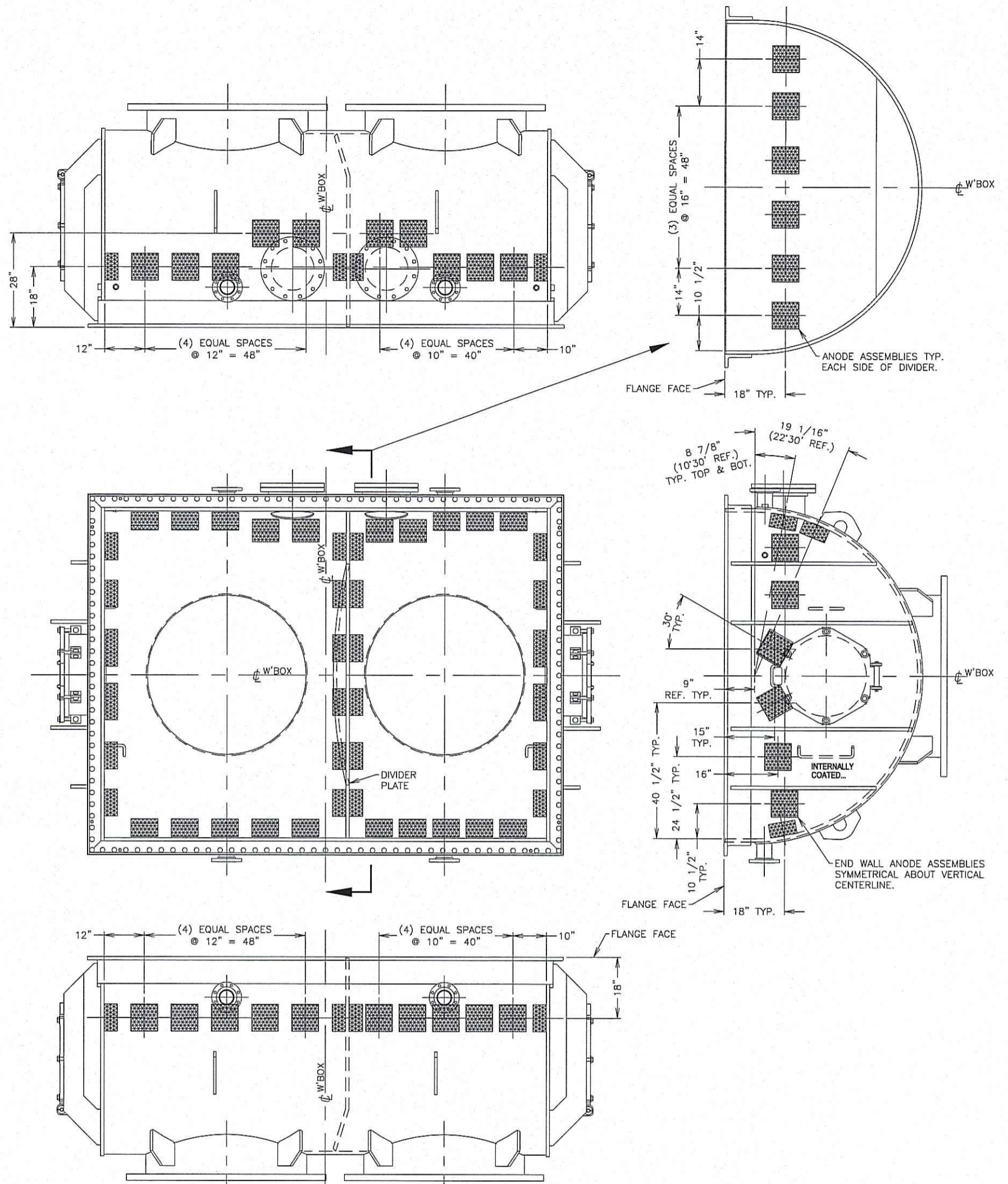
⊗ = (149) 1" O.D. (.060" MIN. WALL) SA214 CARBON STEEL IMPINGEMENT TUBES PER BUNDLE.
 (LOCATED INSIDE CONDENSER SHELLS—NOT ON TUBESHEET)
 X 2 BUNDLES
 (298) IMPINGEMENT TUBES PER CONDENSER

GRAND RIVER ENERGY CENTER UNIT 3
 KIEWIT
 CHOUTEAU, OKLAHOMA
 STEAM SURFACE CONDENSER

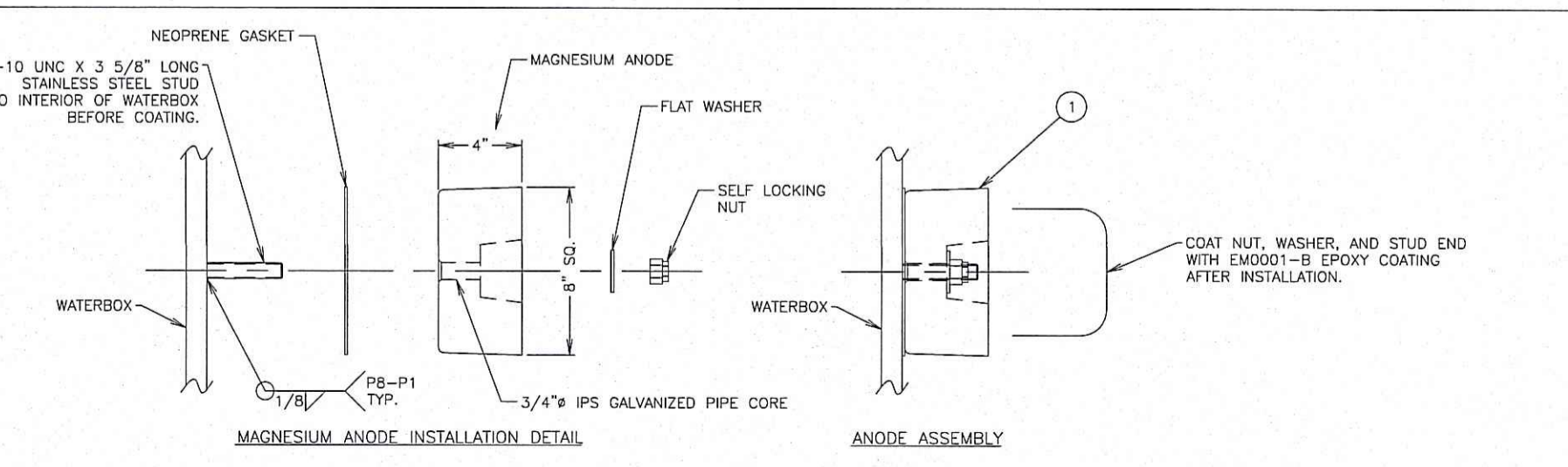
REV	DRN	CKD	ENG	APP	SERIAL:	15-3080		 
DATE:	DATE:	SCALE:			04/28/15	1 1/2"=1'-0"		
	DRN	CHK	APP	ENG	TWC	RJK	GMM	TITLE:
	AMB							TUBESHEET DIAGRAMMATIC
					FRAME SIZE	DWG. NO.	REV	
					106P-RB184-TPHD	WUH-740-15-3080-TSD	1/1	0

8 7 6 5 4 3 2 1

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UPPER INLET WATERBOX— (1) PER SERIAL NO. 3080-WB1A
 (44) ANODE ASSEMBLIES REQUIRED

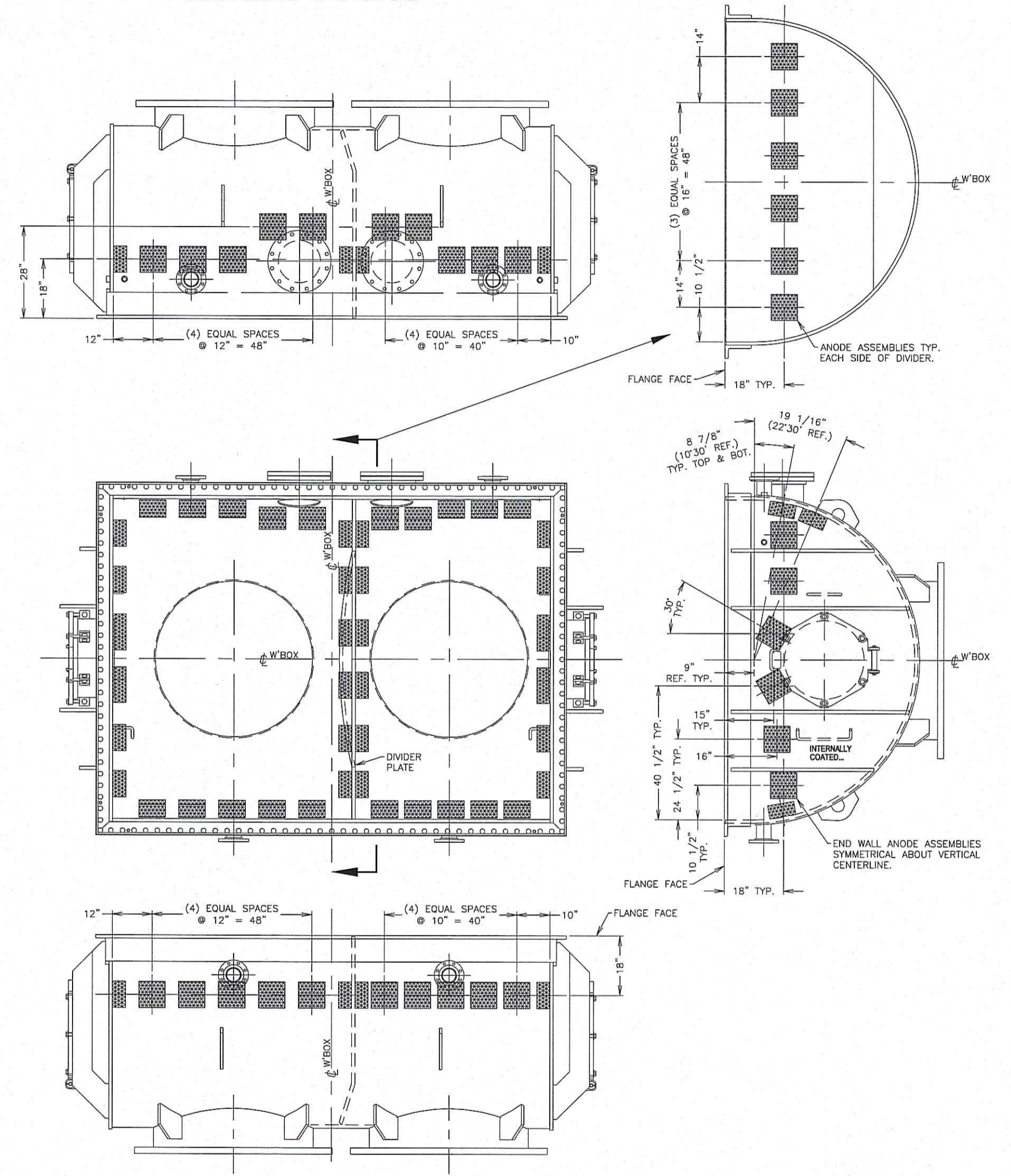


MAGNESIUM ANODE INSTALLATION DETAIL

TOLERANCES
 1. TOLERANCE ON THE LOCATION OF ALL CONNECTIONS IS ±1/4".

NOTES:

1. GENERAL ARRANGEMENT DWG: WUH-740-15-3080-GA
2. FOR WATERBOX IDENTIFICATION, REFER TO THE FOLLOWING DRAWINGS:
 UPPER INLET/OUTLET: WUH-740-15-3080-WB1A
 LOWER INLET/OUTLET: WUH-740-15-3080-WB1A
 UPPER RETURN: WUH-740-15-3080-WB1B
 LOWER RETURN: WUH-740-15-3080-WB1B
3. NORTON REF. DWG: B-21795-01
 -- ANODES DESIGNED FOR 5 YEAR LIFE. --
4. WATERBOX MANUFACTURER TO ADD ANODE MOUNTING STUDS PRIOR TO EPOXY COATING APPLICATION. ANODE ASSEMBLIES TO BE MOUNTED AFTER COATING APPLICATION BY THE COATING SUPPLIER.
5. MOUNTING STUDS ARE TO BE INSTALLED PERPENDICULAR TO THE PLATE ON WHICH THEY ARE ATTACHED.

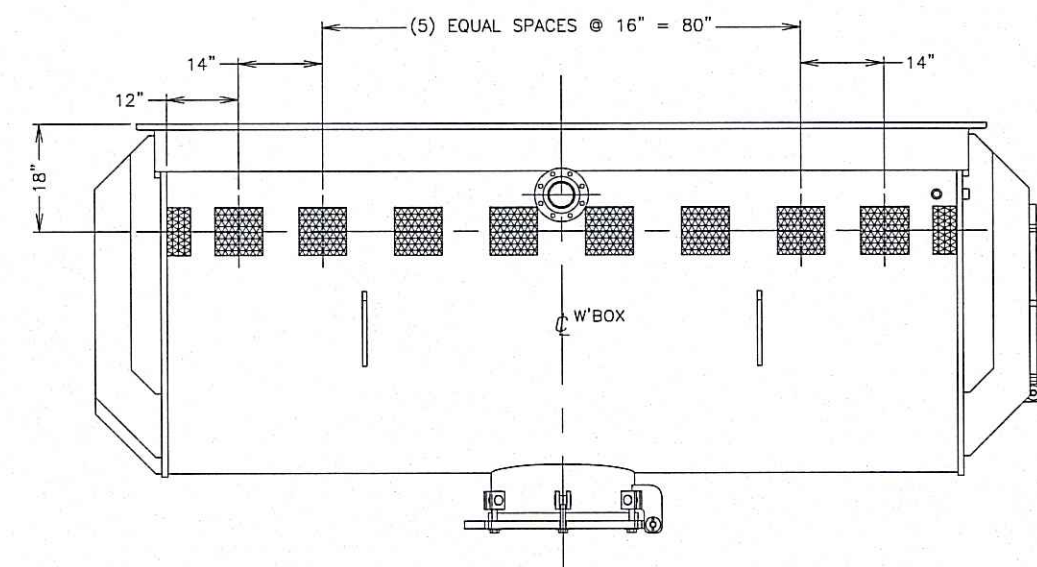
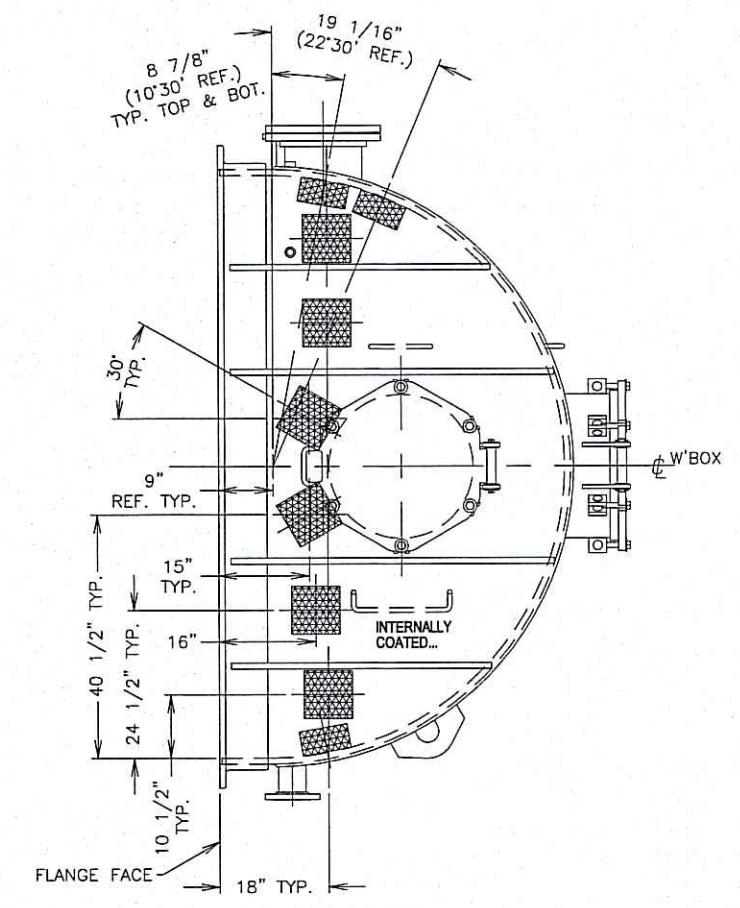
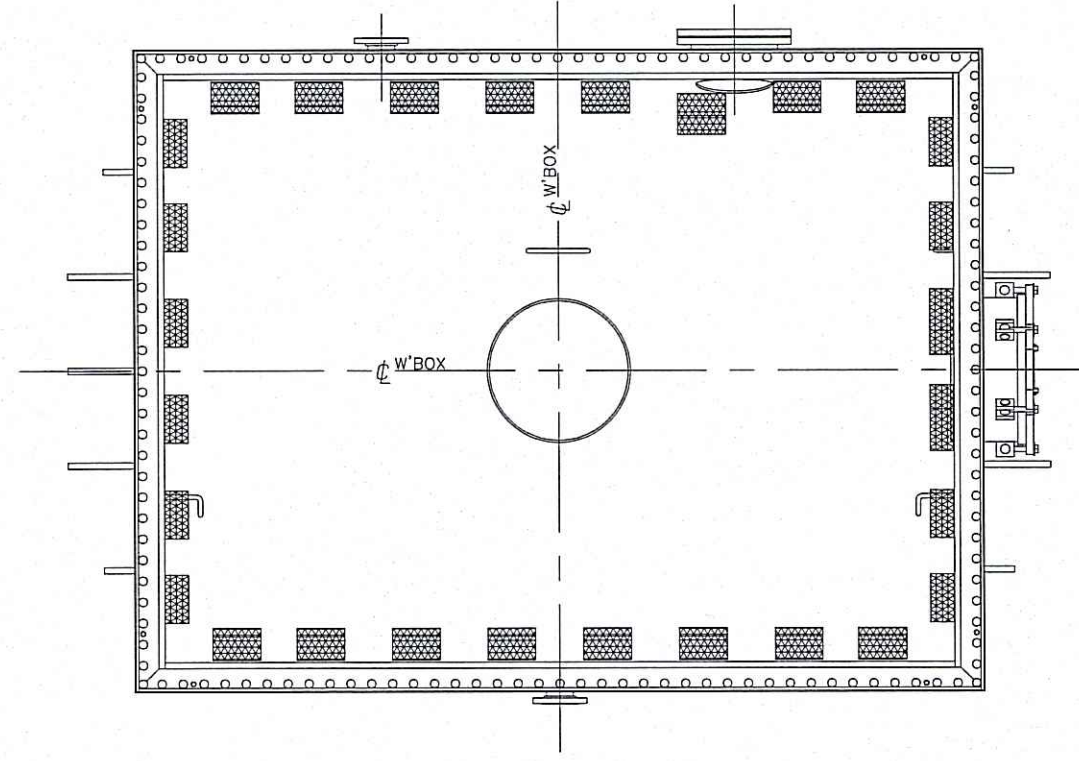
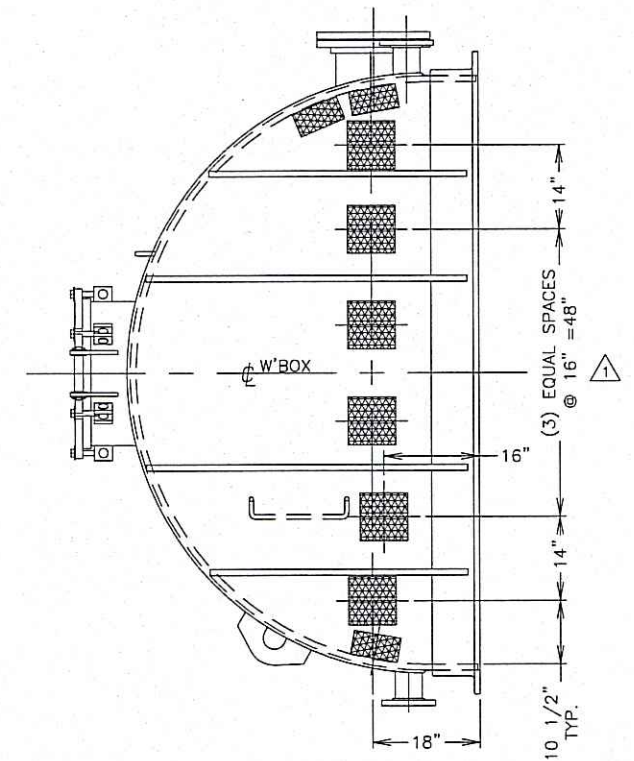
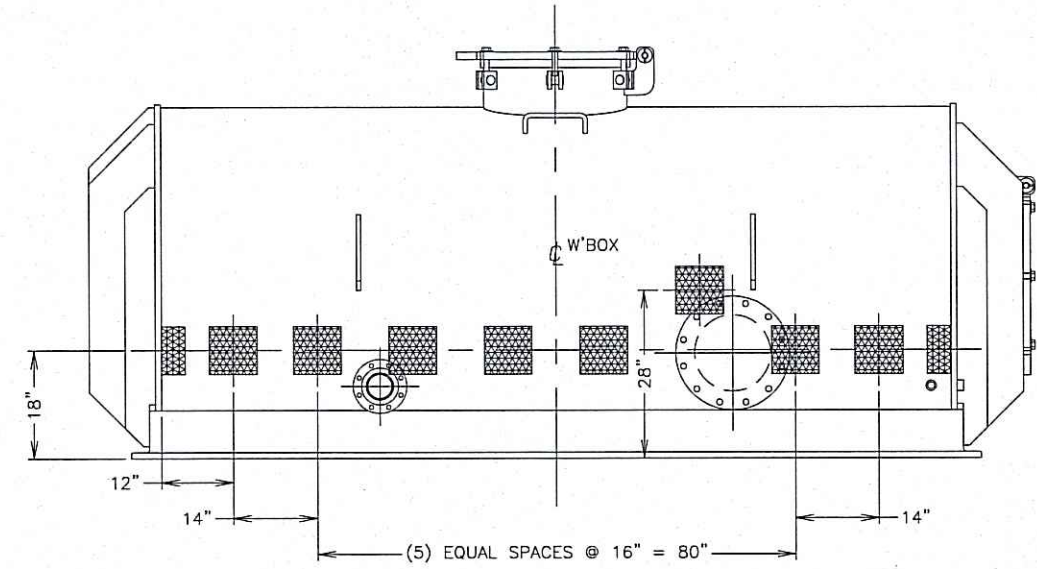


LOWER INLET WATERBOX— (1) PER SERIAL NO. 3080-WB2A
 (44) ANODE ASSEMBLIES REQUIRED

△ KED TAG: 03-CND-CND-01

REV	DRN	CHK	ENG	APP	DATE	SCALE	Description	Material	Total Wt	Rev
1	RJK	RJK	TWC	GMM	9/23/15	3/4"=1'-0"	MAGNESIUM ANODE ASSEMBLY PER PO #3080-007			
DATE: 11-23-15 ADD'D KED TAG NO. B-2.							SPX ECOLAIRE Condensers BETHLEHEM, PA 18017 TITLE: ANODE LOCATION & ARRANGEMENT IN/OUT & RETURN WATERBOXES DWG. NO. WUH-740-15-3080-WBA			

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UPPER & LOWER RETURN WATERBOXES-- (1) EACH PER SERIAL NO.
 3080-WB1B AND 3080-WB2B
 (28) ANODE ASSEMBLIES REQUIRED PER WATERBOX

△ KED TAG: 03-CND-CND-01

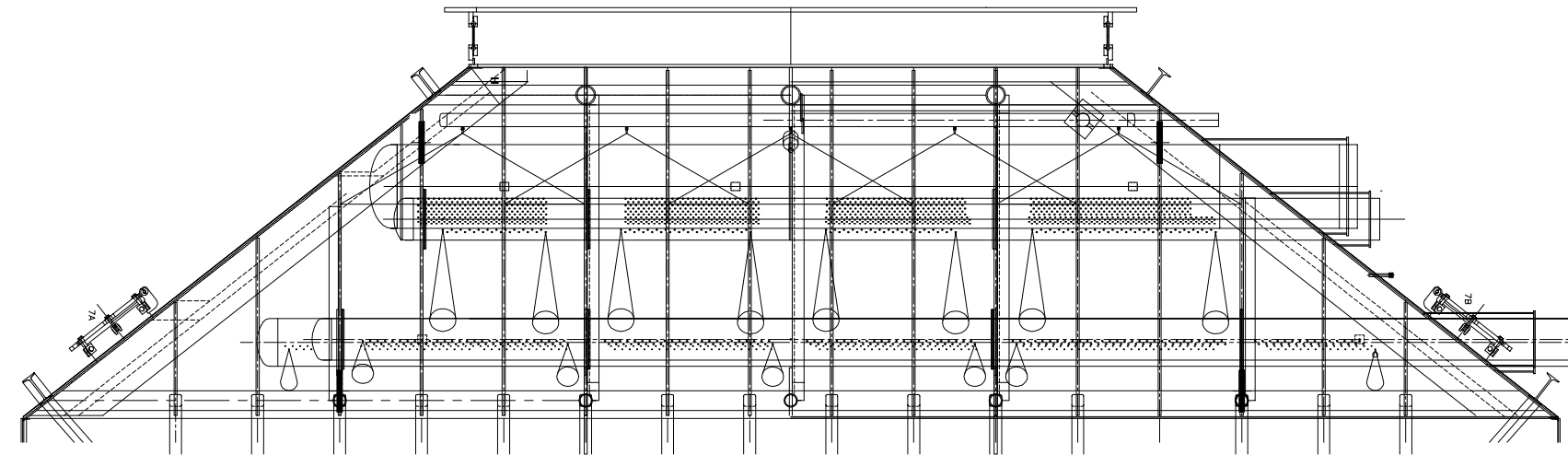
TOLERANCES
 1. TOLERANCE ON THE LOCATION OF ALL CONNECTING IS ±1/4"

REV	DRN	CKD	ENG	APP	SERIAL	15-3080
1	RJK	RJK	TWC	GM	DATE	SCALE
					9/23/15	3/4"-1'-0"
ADDED RED TAG NO					9/23/15	3/4"-1'-0"
S-2 MODIFIED					DATE	SCALE
ANODE SPACING @ D-6.					9/23/15	3/4"-1'-0"
DRN	RJK	CHK	RJK	APP	GM	GM
ENG	TWC	APP	RJK	APP	GM	GM
FRAME SIZE					106P-RB184	TPHD
TITLE:					ANODE LOCATION & ARRANGEMENT	
DWG. NO.					WUH-740-15-3080-WBA	
REV					2	1

SPX **ECOLINE** Condensers
 BETHLEHEM, PA 18017

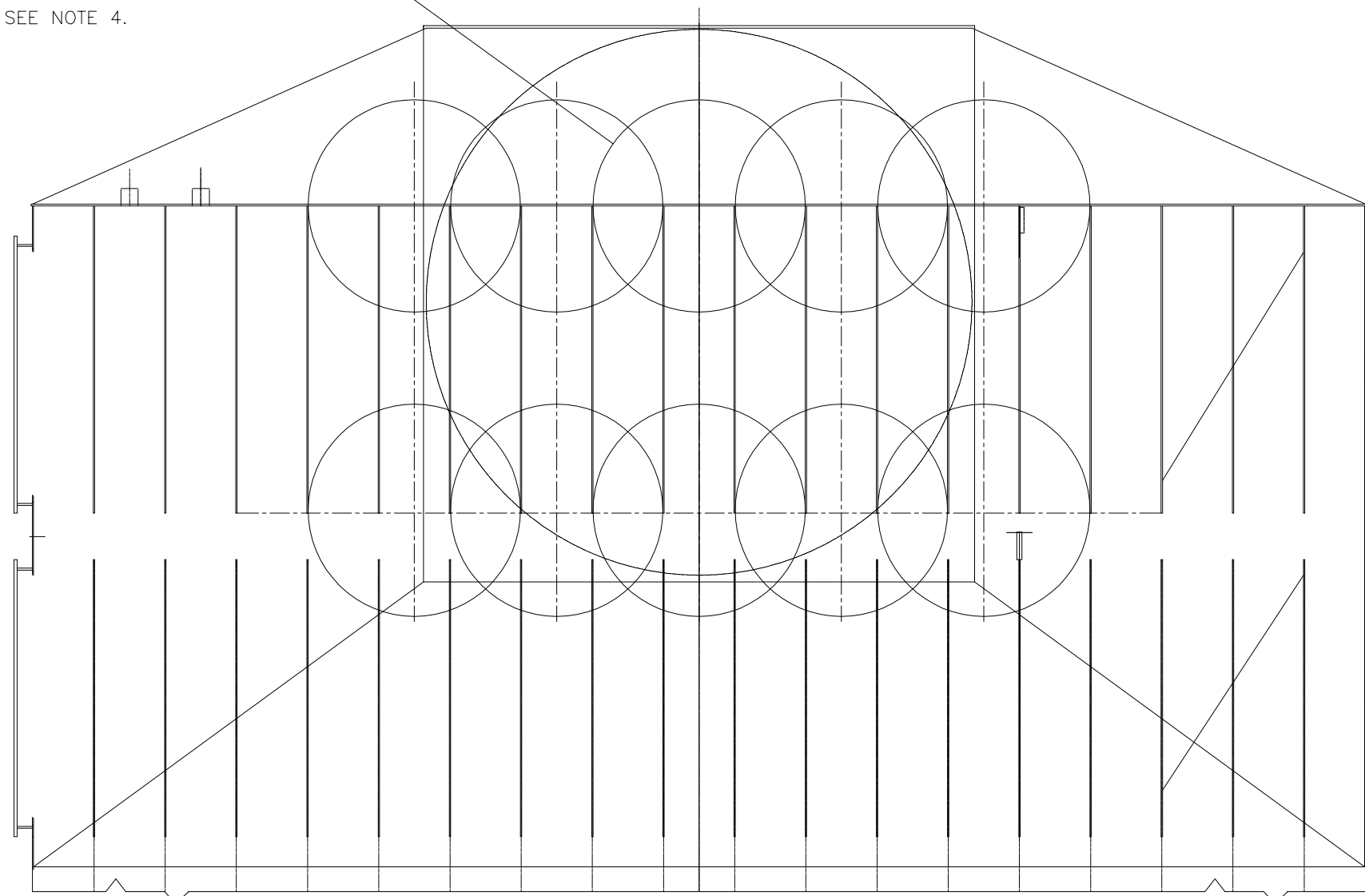
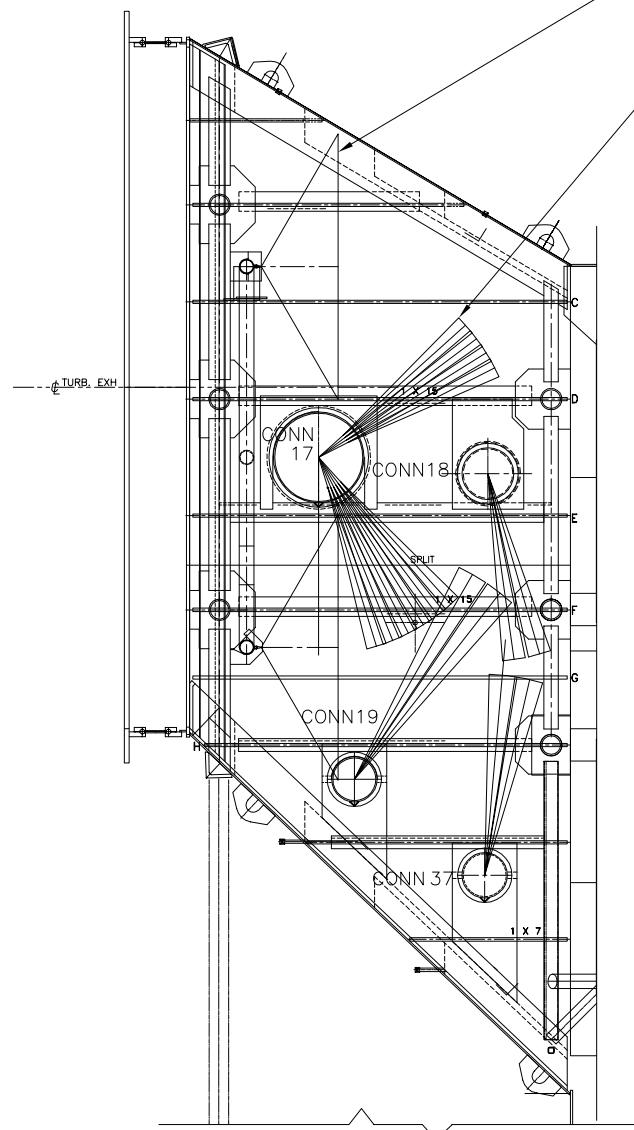
NOTES:

1. FOR GENERAL ARRANGEMENT DRAWING SEE WUH-740-15-3080-GA
2. FOR SERVICE CONNECTION LIST DRAWING SEE WUH-740-15-3080-SCL
3. DO NOT SCALE THIS DRAWING DIMENSIONS WILL BE PROVIDED UPON REQUEST
4. BYPASS DISTRIBUTION PIPES IN ACCORDANCE WITH HEI AND EPRI REPORT CS2251.
THE SPRAY PATTERN REPRESENTS THE MINIMUM SAFE DISTANCE.



CURTAIN SPRAYS 120 DEGREE FULL CONE

SPRAY PATTERN SEE NOTE 4.

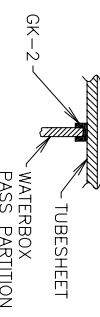


KED TAG NUMBER: 03-CND-CND-01

REV	DATE	BY	CHKD	APPD	DESCRIPTION
1	11/18/15	SPX	SPX		15-3080
Added Tag #					
					
1000 BIRCHWOOD DRIVE BETHLEHEM, PA 18017					
TITLE: BYPASS ARRANGEMENT					
SHEET NO: WUH-740-15-3080-001					
REV: 1					

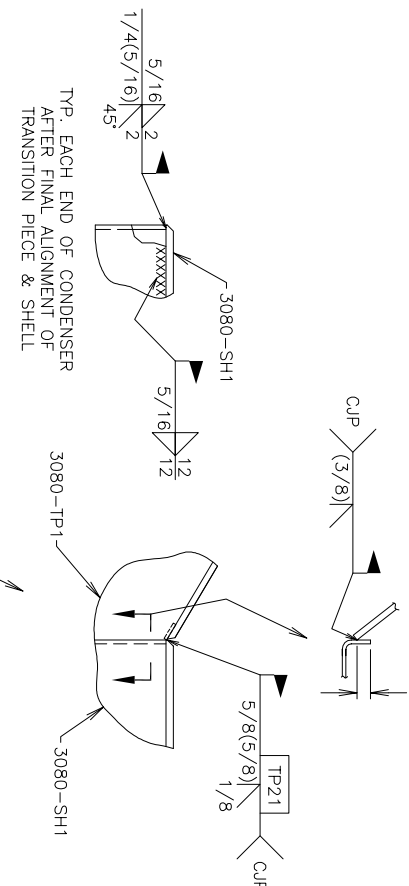
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NOTE: INSTALL PASS PARTITION GROMMET GK-2 PRIOR TO INSTALLING WATERBOXES. (THIS END ONLY)



SECTION V-V

TP (2) PLACES



TYPICAL EACH END

FINAL ALIGNMENT

TP AFTER

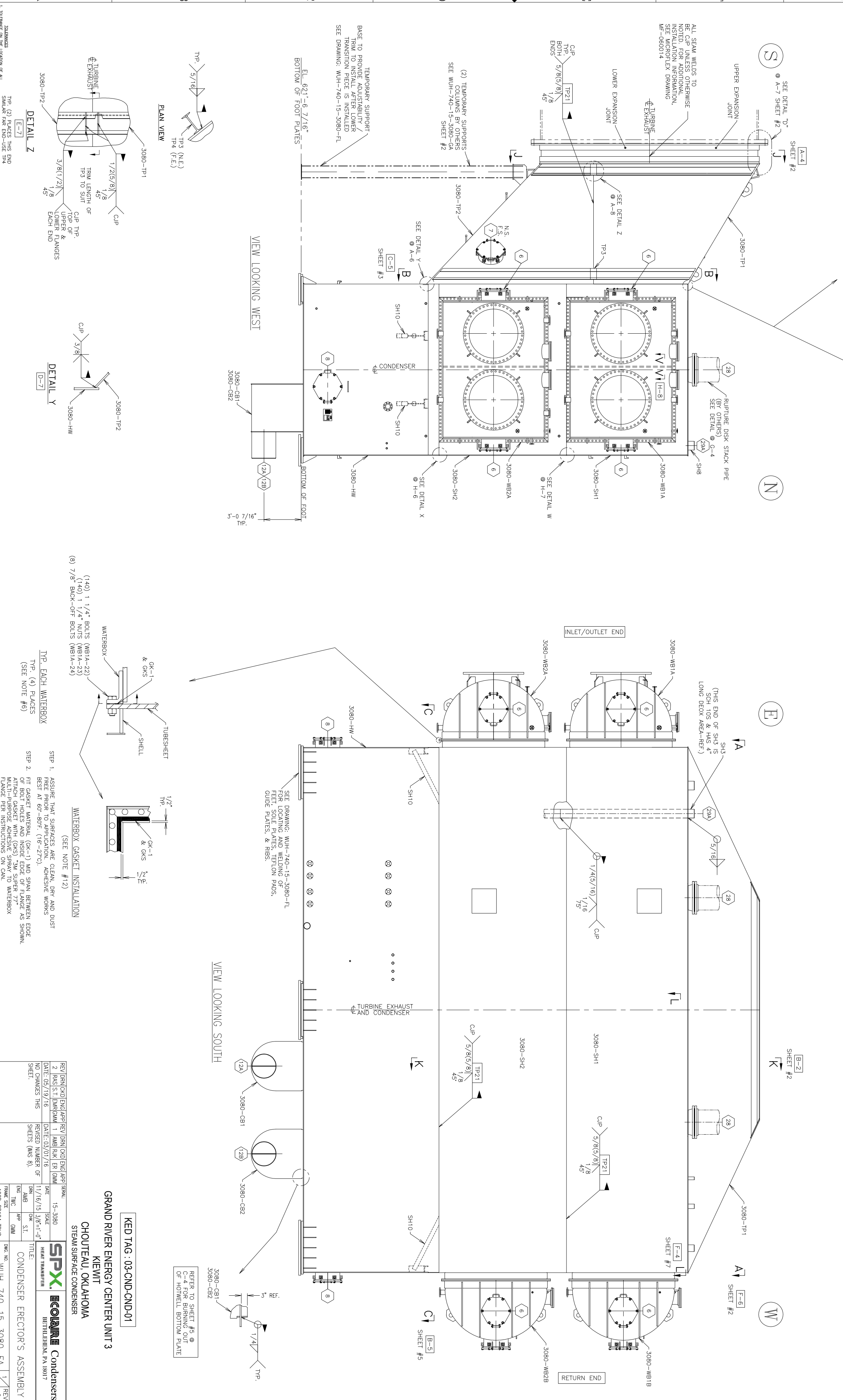
TP AFTER

TP AFTER

DETAIL W

DETAIL X

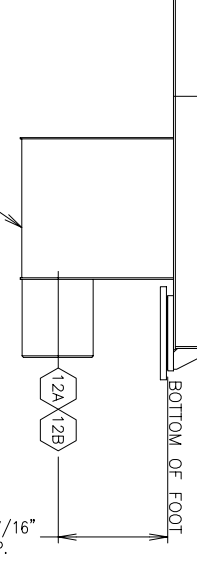
- NOTES:
- ALL WELDS SHOWN ARE FIELD WELDS.
 - TEMPORARY SHIPPING OR ERECTION BRACES (MARKED YELLOW) ARE NOT TO BE REMOVED PRIOR TO FIELD ASSEMBLY, BUT AFTER ERECTION IS COMPLETE.
 - ANY COMPONENT OR WELD JOINT (WHETHER NOTED OR NOT) MAY REQUIRE FIT, TRIM AND/OR COSSING BARS TO OBTAIN ALIGNMENT AND/OR ASSURE SATISFACTORY ASSEMBLY.
 - EACH FIELD ITEM HAS BEEN MARKED WITH THE FIELD IDENTIFICATION (EX. SH3, TP3, HW1 ETC.) AND IS CROSS-REFERENCED ON THE COMPONENTS LIST.
 - IF A FIELD WELD IS ACCESSIBLE FROM ONE SIDE ONLY, A BACKING STRIP OF COMPATIBLE MATERIAL FOR WELDING SHALL BE PROPERLY FITTED AND USED. (1/4" X 1 1/2" STRIPS (ITEM TP21) ARE SUPPLIED BY SPX HEAT TRANSFER FOR USE AT ALL MAIN CONDENSER SHELLS).
 - ALL BOLTED JOINTS MUST BE CHECKED FOR TIGHTNESS AT FIELD ASSEMBLY. THE BOLT TIGHTENING PROCEDURE AND TORQUE REQUIREMENTS FOR THE WATER BOX TO TUBE SHEET BOLTS, QUICK OPENING MANWAY AND BOLTED MANWAY COVER BOLTS ARE SPECIFIED ON SHEET #7.
 - REMOVE SHIPPING BARS FROM STEAM INLET EXPANSION JOINT AFTER INSTALLATION.
 - TO ASSURE AN ON-SCHEDULE ERECTION PROGRAM A PHYSICAL INVENTORY AND LOCATION SURVEY IS TO BE MADE OF ALL CONDENSER COMPONENTS BEFORE COMMENCING THE CONDENSER ERECTION.
 - NUMBERS APPEARING IN TAIL OF WELD SYMBOLS ARE ASSEMBLY IDENTIFICATION; "H" AND "P" NUMBER IS SHOWN, BOTH PIECES ARE CARBON STEEL.
 - C/P IN TAIL OF WELD SYMBOL DENOTES COMPLETE JOINT PENETRATION.
 - FOR ADDITIONAL FIELD WELDS AND INFORMATION, SEE:
 - GENERAL ARRANGEMENT DWG: WUH-740-15-3080-GA
 - EXPANSION JOINT FIELD ASSEMBLY DWG: WF-060014
 - FOOT LOAD AND ARRANGEMENT DWG: WUH-740-15-3080-FL
 - COMPONENT LIST: WUH-740-15-3080-CL
 - SUGGESTED CONDENSER ASSEMBLY SEQUENCE: WUH-740-15-3080-CAS
 - IT IS THE RESPONSIBILITY OF THE CONDENSER ERECTION ASSEMBLER TO PROTECT THE TUBES AT ALL TIMES FROM MECHANICAL DAMAGE AND/OR WELD SPATTER.
 - TUBE SHEET TO WATER BOX JOINTS ARE MADE WITH GASKETS. SEE DETAIL AT ZONE A-4 SHEET #1.



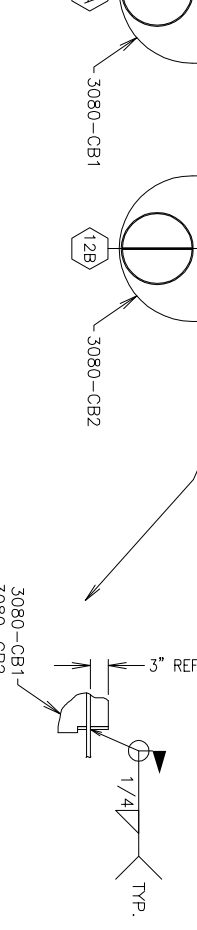
PLAN VIEW



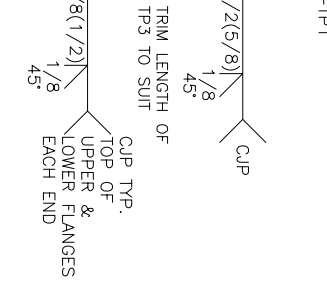
VIEW LOOKING WEST



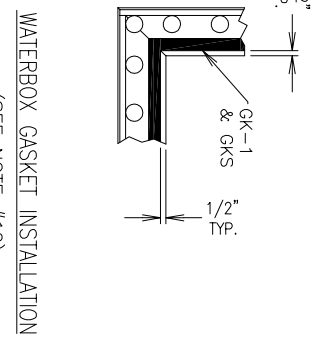
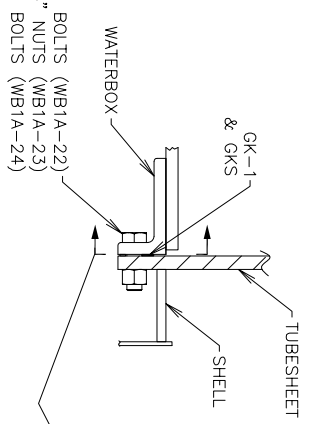
VIEW LOOKING SOUTH



DETAIL Z



DETAIL Y



- TP, EACH WATERBOX
- TP (4) PLACES (SEE NOTE #6)
- STEP 1. ASSURE THAT SURFACES ARE CLEAN, DRY AND DUST FREE. BEST AT 60°-80°F. (15°-27°C).
- STEP 2. FIT GASKET MATERIAL (GK-1) AND SPAN BETWEEN EDGE ATTACH GASKET WITH (GK2) TM SUPER 777 AS SHOWN. MULTI-PURPOSE ADHESIVE SPRAY TO WATERBOX FLANGE PER INSTRUCTIONS ON CAN.
- WATERBOX GASKET INSTALLATION (SEE NOTE #12)

REV	DATE	BY	APP	CHK	DESCRIPTION
1	11/16/15	JR	ST		CONDENSER ERECTOR'S ASSEMBLY
2	10/29/14	WUH	APP	OMW	CONDENSER ERECTOR'S ASSEMBLY

KED TAG : 03-CND-CND-01
 GRAND RIVER ENERGY CENTER UNIT 3
 KIEWIT
 CHOUTEAU, OKLAHOMA
 STEAM SURFACE CONDENSER

TOLERANCES
 UNLESS OTHERWISE SPECIFIED
 1. DIMENSIONS ON THE LOCATION OF ALL SIMILAR PARTS END-USE TYP







← DRAIN ←

← DRAIN ←





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