

PROJECT DATA SHEETS FOR UNIT NO. CP-4143 REVISION 4

Customer

Name Southern Co. Services SCS Tag 01C-QC-AX-2001
Address: 24 Inverness Ctr Pkwy
City: Birmingham State: AL ZIP: 35242
Contact: Becky Stinson Email: rwstinso@southernco.com
Phone: 205-992-7868 Fax:

End User

Name Mississippi Power Co.
Address: Kemper County (IGCC Facility)
City: Liberty State: MS ZIP: 39645
Contact:
Phone: Email:
Fax:

Destination Rep.

Name ADCO Companies, Inc.
Address: 3657 Pine Lane
City: Bessemer State: AL ZIP: 35022
Contact: Taylor Adams Email: tadams@adcoboiler.com
Phone: 205-428-2326 Fax: 205-428-2395

Nebraska Boiler Co.

Project Manager Jason Grieser Email: jgrieser@cleaverbrooks.com
Project Engineer Muthu Veeramuthumoni Email: mveeramuthumoni@cleaverbrooks.com

Unit Definition

Boiler Model No.: CP-NB-501D-125-450-HC-RH-EZ-325-590-NAT-30-NG-00-3
Year Built: 2011
Unit Identification: Watertube Boiler Assembly Drawing No.: 643-1504
Boiler S/N: CP-4143 Boiler Unit No.: CP-4143 Boiler CRN No.: N/A
Economizer S/N: Econ. Unit No.: Econ. CRN No.: N/A
SH #1 Serial No.: N/A SH #2 Serial No.: N/A

Site Conditions

Site Elevation: 482 FASL 147 MASL

Boiler Location

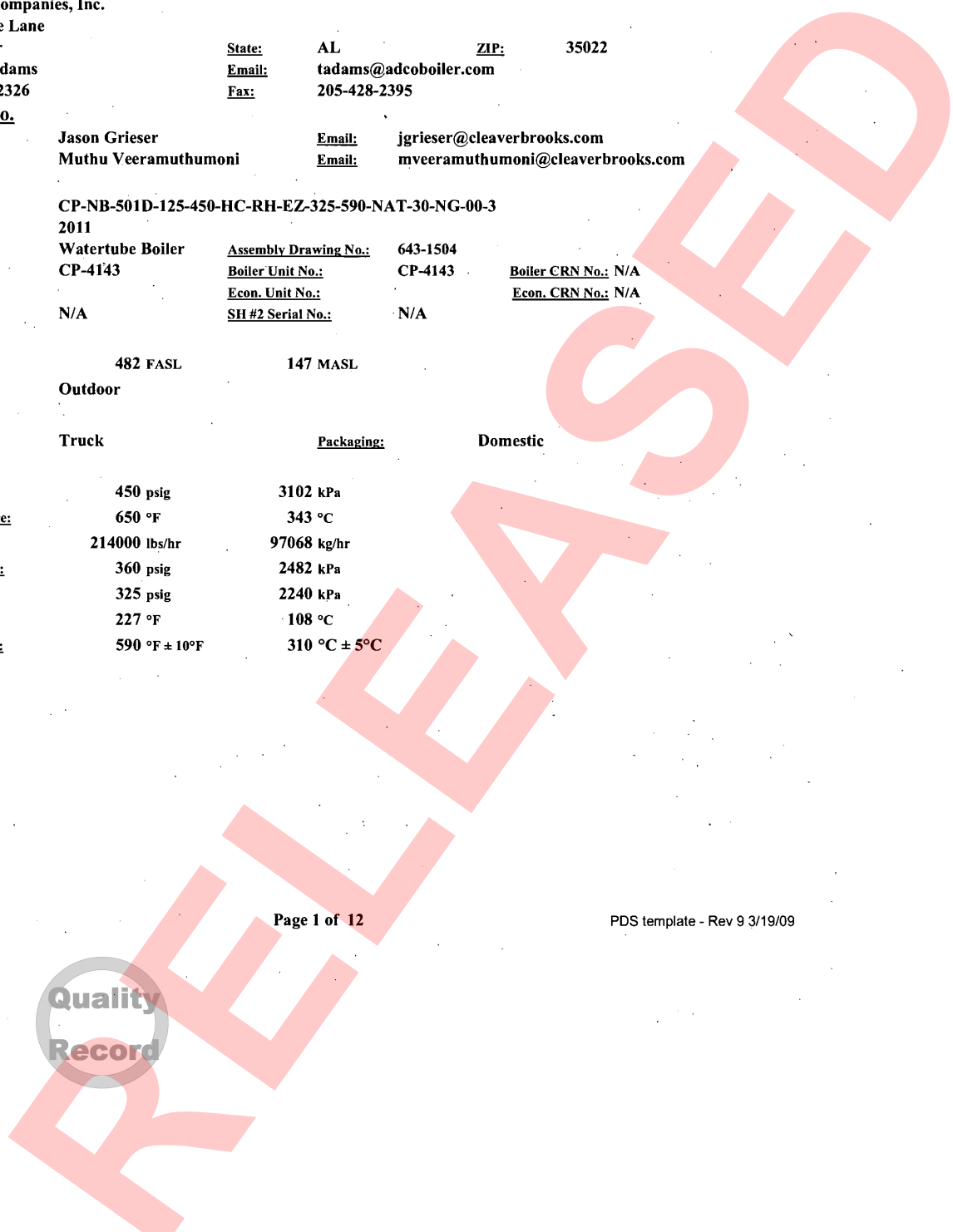
Outdoor

Shipping

Shipping Method: Truck Packaging: Domestic

Design Data

Boiler Design Pressure: 450 psig 3102 kPa
Boiler Design Temperature: 650 °F 343 °C
Boiler Capacity: 214000 lbs/hr 97068 kg/hr
Drum Operating Pressure: 360 psig 2482 kPa
Outlet Header Pressure: 325 psig 2240 kPa
Feedwater Temperature: 227 °F 108 °C
Main Steam Temperature: 590 °F ± 10°F 310 °C ± 5°C



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<u>Additional Equipment</u>	<u>Vendor</u>	<u>Model No.</u>	<u>Serial No.</u>
<u>Burner:</u>	Natcom	P-285-G-43-2329	20008-1
<u>Combustion Air Fan:</u>	Northern Blower	5740	
<u>Deaerator</u>	Cleaver-Brooks	TM225	

Codes

<u>ASME Section I Code Year:</u>	2007	<u>Addenda:</u> 2009	<u>Code Cases:</u>	N/A
<u>Burner Code:</u>	NFPA 85			
<u>Structural Code:</u>	ASCE 7-05, IBC 2006			
<u>Wind Speed</u>	100 mph		160 kph	
<u>Wind Importance Factor (Iw):</u>	1.15			
<u>Seismic Importance Factor (Is):</u>	1.25			
<u>Insurance:</u>	UL			
<u>Special:</u>				

Paint

1. Boiler Casing

<u>Prep:</u>	SSPC-SP3
<u>Prime:</u>	One (1) coat Sherwin Williams B50RW -3 Red, 2 mils DFT, P/N # 998-13120
<u>Finish:</u>	One (1) coat Sherwin Williams CB-04 blue finish @ 3 mils DFT

2. Boiler Drum Heads, Piping, Hot Duct, Hot Duct Flanges and Stub Stack

<u>Prep:</u>	SSPC-SP3
<u>Prime:</u>	N/A
<u>Finish:</u>	One (1) coat Sherwin Williams Flame Control 850 (Black) @ 3-4 mils DFT

3. Support Structure, Platforms and Ladders

<u>Prep:</u>	SSPC-SP3
<u>Prime:</u>	N/A
<u>Finish:</u>	Galvanized

4. Hand Rails and Posts

<u>Prep:</u>	SSPC-SP3
<u>Prime:</u>	One (1) coat Sherwin Williams B50RW -3 Red, 2 mils DFT, P/N # 998-13120
<u>Finish:</u>	One (1) coat Sherwin Williams Yellow Finish @ 3-4 mils DFT

<u>Deliverables</u>	<u>Customer</u>	<u>Destination Rep.</u>	<u>Document Control</u>
<u>Electronic Submittals:</u>	1	1	1
<u>O & M Manuals:</u>	6	1	1
<u>Weight</u> (Burner Included)			
<u>Boiler Weight Dry:</u>	142,423 lbs	64601 kg	
<u>Boiler Weight Operating:</u>	182,271 lbs	82676 kg	
<u>Boiler Weight Flooded:</u>	210,217 lbs	95352 kg	
<u>Economizer Weight Dry:</u>	36,500 lbs	16556 kg	
<u>Economizer Weight Wet:</u>	40,500 lbs	18370 kg	

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ASME Heating Surface

Boiler Convection:	7,584 ft ²	704 m ²
Boiler Radiant:	1,504 ft ²	139 m ²
Boiler Total:	9,088 ft ²	844 m ²
Furnace Volume:	2,797 ft ³	79 m ³
Economizer:	24,982 ft ²	2320 m ²
Superheater #1:	699 ft ²	64 m ²
Superheater #2:	N/A ft ²	N/A m ²

Boiler Data

Arrangement:	Right hand	
Gas Side Baffling:	N/A	
Turning Lane Tubes:	20	
Turning Lane Tube Spacing:	4 in	10 cm
Exit Lane Tubes:	28	
Steam Quality:	99.5 %	

Boiler Internals: Chevron Separators with Full Belly Pan

Belly Pan Height above Drum I.D.:	5 in
# Rows uncovered from the burner end:	25
Air Casing Test Pressure:	30 inH2O

Exterior Casing: Hard Casing

Fuel Data

Natural Gas:	30 psig	206 kPa
#2 Fuel Oil:	N/A psig	N/A kPa
#6 Fuel Oil:	N/A psig	N/A kPa
Other: Customer Gas	N/A psig	N/A kPa
Atomizing Saturated Steam:	N/A psig	N/A kPa
Atomizing Air:	N/A psig	N/A kPa

Utility Data

Instrument Air:	80 psig	551 kPa	SCFM
Service Air:	N/A psig	N/A kPa	SCFM
Electrical: Motors, LV	480 Volt	3 Phase	60 Hertz
Motors, MV	4160 Volt	3 Phase	60 Hertz
Controls	120 Volt	1 Phase	60 Hertz
Enclosures	NEMA4X		
Site Supplied Steam Pressure:	N/A psig	N/A kPa	
Site Supplied Steam Temp.:	N/A °F	N/A °C	



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Notes	
1	Name plate capacity 285 mmBtu/hr
2	Outlet stack 60ft above grade. EAP ports per 40 CFR 60 Appendix A, & CEMS port
3	All structural steel shall be galvanized
4	Upper drum shall have 3 drum level transmitting/displaying (1 local & 2 transmitting) devices.
5	Platforms will extend to full length of upper drum and provide access to both ends of the upper drum
6	Platforms and ladder galvanized (per NBC proposal)
7	8:1 turndown ratio for natural gas
8	Tandem blow-off valves
9	Piping between package boiler and DA
10	The fan shall be controlled with variable inlet vanes driven by a Beck Electric drive with limit switches
11	All transmitters shall be local indicating 4-20 ma/hart. Resemount 3051S Transmitters provided
12	The following set points are measured from CL of Steam Drum: 1) Normal Water Level (NWL) -8". 2) High Water Alarm (HWA) -3". 3) Low Water Alarm (LWA) -13". 4) Low Water Cut-Off -14 1/2". 5) Aux. Low Water Cut-Off -15".
13	Refer to Package Boiler Specification section 4.5 for use of Foreign manufactured material.
14	Chinese and North Korean manufactured components are not allowed for Pr >150psi and or Temp >300F
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Boiler Construction Data

Corrosion Allowance

<u>Boiler C.A. Drums</u>	N/A
<u>Boiler C.A. Piping</u>	N/A
<u>Boiler C.A. Tubes</u>	N/A

Drums	Diameter	Length	Thickness	Material	Part No.
<u>Steam Drum</u>	54 in ID	42'-4"	1.5000 in	SA-516 70	172-04227
<u>Water Drum</u>	24 in OD	42'-4"	0.6880 in	SA-106 C	172-04044

Drum Drilling	Hole Dia.	Tube Pitch	Angle
<u>Steam Drum</u>	2.0432 in	4.0000 in	10.00 °
<u>Water Drum</u>	2.0432 in	4.0000 in	16.00 °

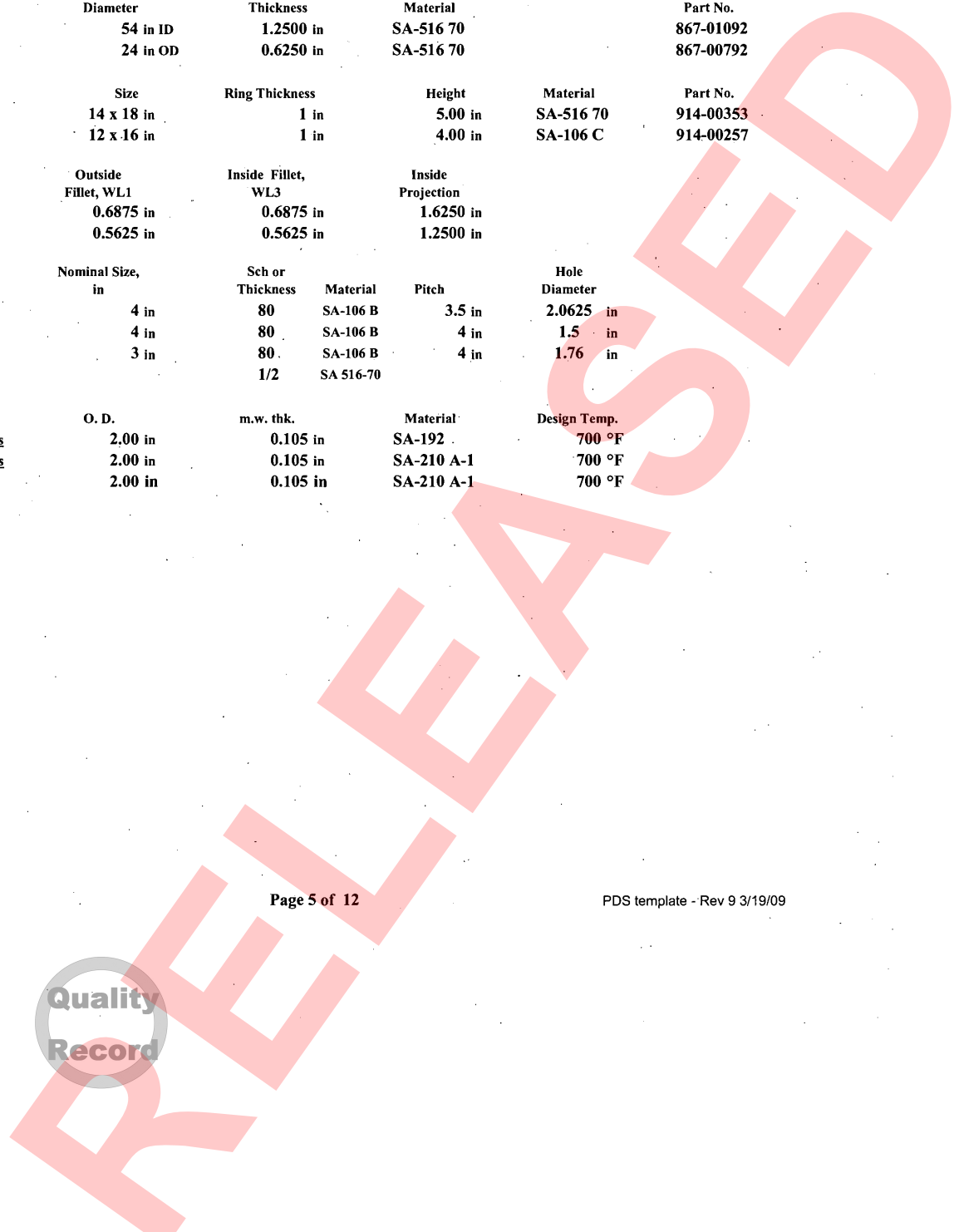
Heads - 2:1 Elliptical	Diameter	Thickness	Material	Part No.
<u>Steam Drum</u>	54 in ID	1.2500 in	SA-516 70	867-01092
<u>Water Drum</u>	24 in OD	0.6250 in	SA-516 70	867-00792

Manways	Size	Ring Thickness	Height	Material	Part No.
<u>Steam Drum</u>	14 x 18 in	1 in	5.00 in	SA-516 70	914-00353
<u>Water Drum</u>	12 x 16 in	1 in	4.00 in	SA-106 C	914-00257

	Outside Fillet, WL1	Inside Fillet, WL3	Inside Projection
<u>Steam Drum</u>	0.6875 in	0.6875 in	1.6250 in
<u>Water Drum</u>	0.5625 in	0.5625 in	1.2500 in

Headers	Nominal Size, in	Sch or Thickness	Material	Pitch	Hole Diameter
<u>Front/Rear Wall Header</u>	4 in	80	SA-106 B	3.5 in	2.0625 in
<u>Burner Ring Header</u>	4 in	80	SA-106 B	4 in	1.5 in
<u>Access Door Header</u>	3 in	80	SA-106 B	4 in	1.76 in
<u>Access Header End Plate</u>		1/2	SA 516-70		

Boiler Tubes	O. D.	m.w. thk.	Material	Design Temp.
<u>Furnace/Convection Tubes</u>	2.00 in	0.105 in	SA-192	700 °F
<u>Furnace/Convection Tubes</u>	2.00 in	0.105 in	SA-210 A-1	700 °F
<u>Finned (Fuzzy) Tubes</u>	2.00 in	0.105 in	SA-210 A-1	700 °F



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Boiler Nozzles

Steam Drum Shell Name

	Type	Nominal Size, in	Schedule	Outside Connection	Rating	Inside Proj.	Material	Inside Fillet	Outside Fillet
Steam Outlet	PIPE	12	80	BW		13/16	SA-106 B	5/8	5/8
Safety Valve #1	LWN	4	N/A	RFLWN Flg	600#	13/16	SA-105	11/16	11/16
Safety Valve #2	LWN	4	N/A	RFLWN Flg	600#	13/16	SA-105	11/16	11/16
Water Wall Header	Pipe	4	160	BW		13/16	SA-106 B	1/2	1/2
Vent	Pipe	1	80	RFSO Flg	300#	13/16	SA-106 B	3/8	3/8

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Boiler Nozzles

Water Drum Shell

Name

Type

Nominal
Size, in

Schedule

Outside
Connection

Rating

Inside
Proj.

Material

Inside
Fillet

Outside
Fillet

Water Wall Header

Pipe

4

160

BW

13/16

SA-106 B

1/2

1/2

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Boiler Nozzles

Steam Drum Heads

Name	Type	Coupling Size	Nominal Size, in	Schedule	Outside Connection	Rating	End	Material	Inside Fillet	Outside Fillet
Feed Water	Pipe	8" SCH 160 Pipe	6	80	RFWN Flg	600#	BE	SA-106 B	11/16	11/16
Upper Water Column	Pipe		1 1/2	80	RFSO Flg	300#	BE	SA-106 B	3/8	3/8
Lower Water Column	Pipe	3" SCH XXS Pipe	1 1/2	80	RFSO Flg	300#	BE	SA-106 B	9/16	9/16
Upper Drum Level	Pipe		1	80	RFSO Flg	300#	BE	SA-106 B	3/8	3/8
Lower Drum Level	Pipe		1	80	RFSO Flg	300#	BE	SA-106 B	3/8	3/8
Upper Aux. LWCO	Pipe		1	80	RFSO Flg	300#	BE	SA-106 B	3/8	3/8
Lower Aux. LWCO	Pipe	2 1/2" SCH XXS Pipe	1	80	RFSO Flg	300#	BE	SA-106 B	1/2	1/2
Cont. Blowdown	Pipe		1	80	RFWN Flg	600#	TE	SA-106 B	3/8	3/8
Chemical Feed	Pipe	2 1/2" SCH XXS Pipe	1	80	RFSO Flg	300#	TE	SA-106 B	1/2	1/2



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Boiler Nozzles

Water Drum Heads

Name	Type	Coupling Size	Nominal Size, in	Schedule	Outside Connection	Rating	End	Material	Inside Fillet	Outside Fillet
Blowoff	Pipe	2" SCH 160 Pipe	1 1/2	80	RFWN Flg	600#	TE	SA-106 B	3/8	3/8
Blowoff	Pipe	2" SCH 160 Pipe	1 1/2	80	RFWN Flg	600#	BE	SA-106 B	3/8	3/8
LDHC #1	Pipe		1	80	RFSO Flg	300#	TE	SA-106 B	3/8	3/8
LDHC #2	Pipe		1	80	RFSO Flg	300#	TE	SA-106 B	3/8	3/8



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Economizer Data

Design Data

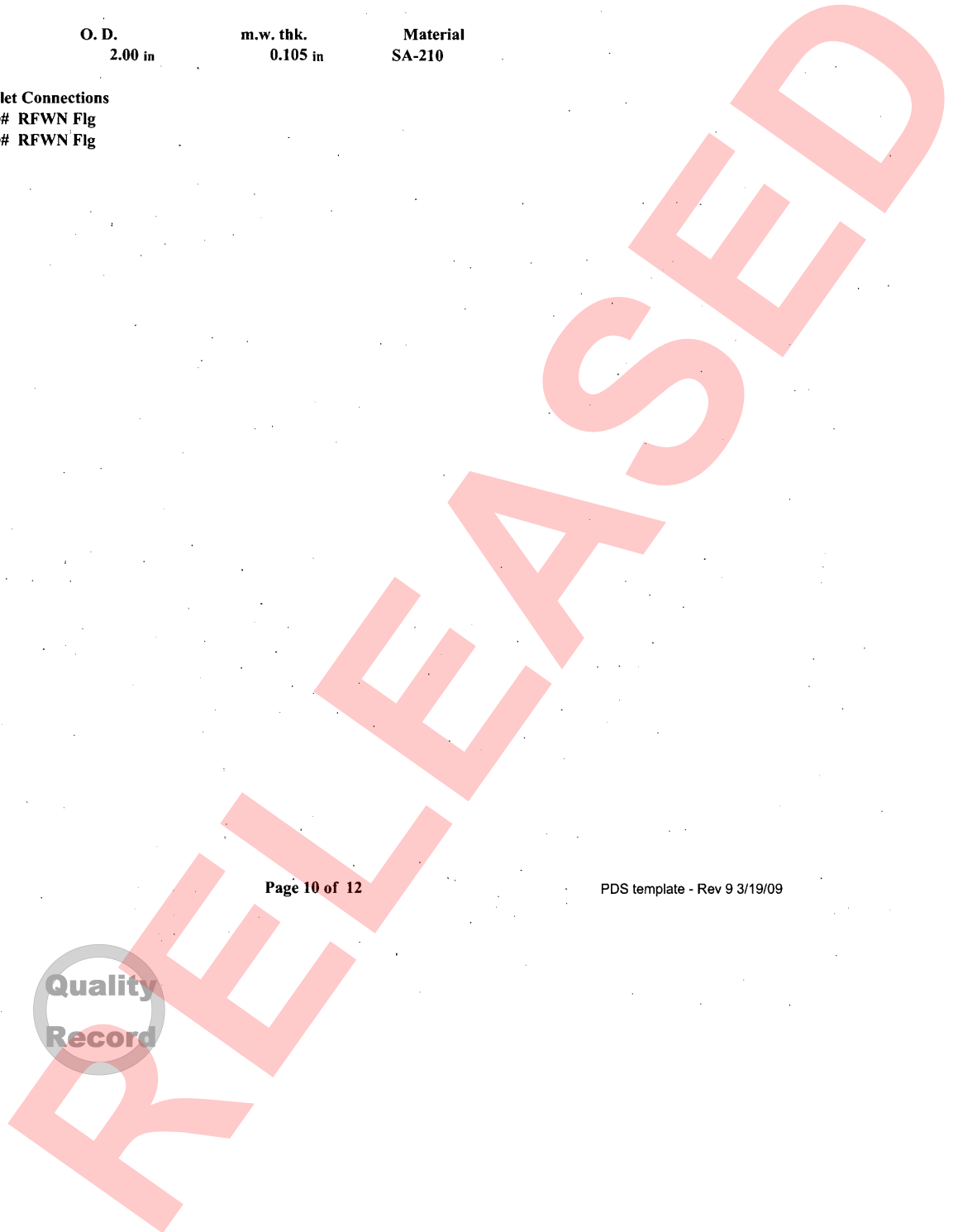
<u>Econ. Design Pressure:</u>	565 psig	3895 kPa
<u>Econ. Design Temperature:</u>	700 °F	371 °C
<u>Econ. Duty:</u>	37514192 Btu/hr	10984.54 kW
<u>Econ. Operating Pressure:</u>	380 psig	2620 kPa
<u>Econ. Inlet Water Temperature:</u>	227 °F	108 °C
<u>Econ. Outlet Water Temperature:</u>	391 °F ± 10°F	199 °C ± 5°C
<u>Corrosion Allowance Piping:</u>	N/A	
<u>Corrosion Allowance Tubing:</u>	N/A	

Headers	Size	Sch	Material	Pitch	Hole Diameter
<u>Inlet Header Details</u>	8 in	80	SA-106 B	4.50 in	1.9375 in
<u>Outlet Header Details</u>	8 in	80	SA-106 B	4.50 in	1.9375 in

Economizer Tubes	O. D.	m.w. thk.	Material
	2.00 in	0.105 in	SA-210

Economizer Inlet/Outlet Connections

<u>Inlet</u>	6 in - 600# RFWN Flg
<u>Outlet</u>	6 in - 600# RFWN Flg



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Superheater #1 Data

Design Data

<u>S.H. #1 Design Pressure:</u>	450 psig	3102 kPa
<u>S.H. #1 Header Design Temperature:</u>	740 °F	393 °C
<u>S.H. #1 Inlet Temperature:</u>	438 °F	225 °C
<u>S.H. #1 Outlet Temperature:</u>	590 °F ± 10°F	310 °C ± 5°C
<u>Corrosion Allowance Piping:</u>	N/A	
<u>Corrosion Allowance Tubing:</u>	N/A	

S.H. #1 Tube Design Temperature:

<u>Low Temp. Bundle</u>	850 °F	454 °C
<u>High Temp. Bundle</u>	N/A	N/A

Superheater #1 Headers

	Size	Sch	Material	Pitch	Hole Diameter
<u>Inlet Header Details</u>	10 in	120	SA-335 P22	4.50 in	* in
<u>Outlet Header Details</u>	10 in	120	SA-335 P22	4.50 in	* in

Superheater #1 Tubes

	O. D.	m.w. thk.	Material
<u>Low Temperature Bundle</u>	2.00 in	0.135 in	SA-213 T22
<u>High Temperature Bundle</u>	N/A in	N/A in	N/A

Superheater #1 Connections

<u>Inlet</u>	10 in - Sch 60 BW
<u>Outlet</u>	10 in - Sch 60 BW

Superheater #1 Inlet/Outlet Header Endplates

3/4 in thk. SA-387 Gr22 CL2

Superheater #2 Data

Design Data

<u>S.H. #2 Design Pressure:</u>	N/A psig	N/A kPa
<u>S.H. #2 Header Design Temperature:</u>	N/A °F	N/A °C
<u>S.H. #2 Inlet Temperature:</u>	N/A °F	N/A °C
<u>S.H. #2 Outlet Temperature:</u>	N/A °F ± 10°F	N/A °C ± 5°C
<u>Corrosion Allowance Piping:</u>	N/A	
<u>Corrosion Allowance Tubing:</u>	N/A	

S.H. #2 Tube Design Temperature:

<u>Low Temp. Bundle</u>	N/A	N/A
<u>High Temp. Bundle</u>	N/A	N/A

Superheater #2 Headers

	Size	Sch	Material	Pitch	Hole Diameter
<u>Inlet Header Details</u>	N/A in	N/A	N/A	N/A in	N/A in
<u>Outlet Header Details</u>	N/A in	N/A	N/A	N/A in	N/A in

Superheater #2 Tubes

	O. D.	m.w. thk.	Material
<u>Low Temperature Bundle</u>	N/A in	N/A in	N/A
<u>High Temperature Bundle</u>	N/A in	N/A in	N/A

Superheater #2 Connections

<u>Inlet</u>	N/A
<u>Outlet</u>	N/A

Superheater #2 Inlet/Outlet Header Endplates

N/A in thk.

* Holes are stepped drilled: 1st = 2.5" dia. x 1/4" deep; 2nd = 2.0156" dia. x 1/8" deep; 3rd = 1.625" dia. through hole



