DUKE ENERGY.

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ONS-2015-037

May 4, 2015

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

10 CFR 50.55a

Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station, Units 1, 2 and 3
Docket Numbers 50-269, 50-270, 50-287
Renewed License Numbers DPR-38, DPR-47, and DPR-55

Subject: Fifth Ten Year Inservice Inspection Interval, Relief Request No. 14-ON-002; Alternative Requirements for Specific Residual Heat Removal System Welds

References:

1. Duke Energy Letter, Oconee, Units 1, 2 and 3 - *Fifth Interval Inservice Inspection Plan*, dated July 15, 2014, (ADAMS Accession No. ML14202A008)

Pursuant to 10 CFR 50.55a(z)(1), Duke Energy requests the NRC to grant relief regarding specific Residual Heat Removal heat exchanger welds over the duration of the fifth (ten-year) inservice inspection (ISI) interval. Relief Request 14-ON-002 prescribes an examination with an acceptable level of quality and safety as an alternative to the edition of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) applicable to the fifth ISI Interval.

This relief is needed prior to the Oconee Unit 1, 2016 Fall refueling outage (1EOC29) projected to start November 5, 2016. Duke Energy requests approval by May 1, 2016 in support of planning for 1EOC29. The relief request details are provided as an enclosure to this letter.

If there are any questions or further information is needed you may contact David Haile at (864) 873-4742,

Sincerely,

Scott L. Batson
Vice President
Oconee Nuclear Station

Enclosure

Relief Request Serial #14-ON-002:
Request for Alternative in Accordance with 10 CFR 50.55a(z)(1) for Specific Welds on Residual Heat Removal Heat Exchangers, Fifth Inservice Inspection Interval

A047
NRR

cc (with enclosure):

Mr. Victor McCree, Regional Administrator
U.S. Nuclear Regulatory Commission – Region II
Marquis One Tower
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Atlanta, Georgia 30303-1257

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Rockville, MD 20852

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Mr. Eddy Crowe
NRC Senior Resident Inspector
Oconee Nuclear Station

Enclosure to ONS-2015-037

Duke Energy Carolinas, LLC

Oconee Nuclear Station, Units 1, 2, and 3

Relief Request Serial #14-ON-002

Request for Alternative in Accordance with 10 CFR 50.55a(z)(1) for Specific Welds on Residual Heat Removal Heat Exchangers

Fifth Inservice Inspection Interval

1. ASME Code Component(s) Affected

Low Pressure Injection (LPI) Residual Heat Removal Heat Exchangers (Decay Heat Coolers). This request is limited to the following Class 2 tube side inlet and outlet "Nozzle-to-Shell Welds".

These welds are subject to the examination requirements of IWC-2500, Table IWC-2500-1, Category C-B, Item No. C2.32.

Unit 1

Cooler 1A (Tag No. 1LP-C1A, National Board No. 734) Nozzles Mk. "M" and "N".

Cooler 1B (Tag No. 1LP-C1B, National Board No. 735) Nozzles Mk. "M" and "N".

Summary Numbers: 01.C2.32.001, 002, 003, and 004.

Unit 2

Cooler 2A (Tag No. 2LP-C1A, National Board No. 736) Nozzles Mk. "M" and "N.

Cooler 2B (Tag No. 2LP-C1B, National Board No. 737) Nozzles Mk. "M" and "N".

Summary Numbers: 02.C2.32.001, 002, 003, and 004.

Unit 3

Cooler 3A (Tag No. 3LP-C1A, National Board No. 738) Nozzles Mk. "M" and "N" .

Cooler 3B (Tag No. 3LP-C1B, National Board No. 739) Nozzles Mk. "M" and "N".

Summary Numbers: 03.C2.32.001, 002, 003, and 004.

Details of these components can be found on drawings referenced in Section 8 of this request.

Note that Duke Energy Corporation is unable to apply Code Case N-706-1 to these welds as they have not previously been volumetrically examined per Code Case N-706-1, Table 1, Note (2), as detailed in Section 5.2.5(d), below.

2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 2007 Edition with the 2008 Addenda.

3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-B, Item No. C2.32 requires a volumetric examination of the nozzle-to-shell welds when the inside of the vessel is accessible.

4. Reason for Request

Duke Energy plans to remove the Channel Cover from each of the Residual Heat Removal (RHR) Heat Exchangers to permit Eddy Current Examination of the heat exchanger tubes during the current inservice inspection interval at each unit. Because these activities will enable access to the interior of the heat exchangers, a volumetric examination of accessible nozzle-to-shell welds would be required in order to satisfy the requirement of IWC-2500, Table IWC-2500-1, Examination Category C-B, Item No.C2.32.

Eddy Current Examinations on the RHR Heat Exchangers are scheduled during plant operation (just prior to refueling outages) in order to minimize radiological dose, which is considerably higher during plant shutdown.

Dose estimates for performing the required volumetric examinations for all three Oconee Units are 600 to 900 mrem (during plant operation) compared to 4.2 to 6.6 rem (during refueling outages).

Duke Energy believes that performing the volumetric examination of these nozzle-to-shell welds is unnecessary because the proposed alternative provides an acceptable level of safety and quality. The proposed alternative will also eliminate all radiation dose associated with performing these volumetric examinations.

5. Proposed Alternative and Basis for Use

Pursuant to 10 CFR 50.55a(z)(1), the following alternative is proposed in lieu of the volumetric examinations required by IWC-2500, Table IWC-2500-1, Category C-B, Item C.2.32 for the tube side inlet and outlet nozzles of the Residual Heat Removal Heat Exchangers (Decay Heat Coolers).

5.1. Proposed Alternative:

(a) A VT-2 visual examination shall be performed in accordance with Code Case N-706-1 for Examination Category C-B, Item No. C2.31 welds, and

(b) A VT-2 visual examination shall be performed in accordance with IWC-2500, Table IWC-2500-1, Examination Category C-B, Item No. C2.33, and

(c) A VT-2 visual examination shall be performed on the RHR Heat Exchangers in accordance with IWC-2500, Table IWC-2500-1, Examination Category C-H, Item No. C7.10 during each inspection period.

5.2. Basis for Use of the Proposed Alternative:

5.2.1. Westinghouse Owner's group (WOG) performed a study (see Reference 8.1.) as part of the ASME approval process for Code Case N-706. This report provided technical justification for eliminating the volumetric examination of the residual heat removal heat exchangers. The components at Oconee are typical of the heat exchangers described in the WOG report in fabrication, design, inspection requirements and geometric restrictions.

The WOG report also addresses flaw tolerance and risk assessment for these components. Fracture evaluations were performed for the components using finite element models and fracture calculations. It was concluded that the heat exchangers have a large flaw tolerance and that significant leakage would be expected long before any failure occurred. Fatigue crack growth was determined to be extremely slow even in the most highly stressed region. These heat exchangers do not have a severe duty cycle, and there are no known degradation mechanisms applicable to the tube side nozzle-to-shell welds. Therefore, detailed examinations are not required to ensure their integrity.

A risk evaluation was performed using the accepted methodology applied for Risk Informed ISI piping inspection programs. The following conclusions were made:

- Safety equipment required to respond to a potential event is unaffected. Potential for loss of pressure boundary integrity is negligible.
- No safety analysis margins are changed.
- Leakage before full break is expected (i.e., there are no core damage consequences associated with leakage).

Thus, elimination of the volumetric examinations required by Table IWC-2500-1, Examination Category C-B, Item C2.32 is expected to result in an insignificant increase in risk. The WOG report indicated that there have been no through-wall leaks on these components or components of similar design reported in the industry. The WOG report indicated that one US plant (San Onofre Unit 3) had experienced a small leak from the letdown line exiting the Regenerative Heat exchanger, but this was caused by excessive vibration on the piping line and is not an indication of a defect in the heat exchanger.

Duke Energy performed a review of industry operating experience reports and did not identify any through-wall leaks in RHR heat exchangers subsequent to the publication date of the WOG report.

5.2.2. Oconee Selected Licensee Commitment (SLC) 16.6.4 currently limits Low Pressure Injection (LPI) system leakage to 2 gph, and LPI system leakage is periodically monitored. Any system leakage through the tube side inlet and outlet nozzle-to-vessel welds would likely be detected by Operations personnel which during plant rounds performed each week include the LPI Cooler (RHR Heat Exchanger) rooms. Any identified leakage from these welds would be noted and entered into the site corrective action program.

5.2.3. The examinations required by IWC-2500, Table IWC-2500-1, Category C-B, Item C.2.32 are conditional (required only if the interior of the heat exchanger is accessible). Therefore, the level of quality and safety afforded by the proposed alternative is equivalent to that provided by other types of RHR heat exchangers where the interior of the heat exchangers are not considered to be accessible.

5.2.4. The proposed alternative and operator rounds will identify defects resulting in through-wall leakage prior to propagation that results in failure of the component structural integrity.

5.2.5. Previous inservice inspections of the RHR Heat Exchangers have not detected any signs of leakage or age-related degradation in the subject RHR Heat Exchanger welds at Oconee Nuclear Station, Units 1, 2, and 3. Specific inspection results are as follows:

a. VT-2 visual examinations performed on the RHR Heat Exchangers at Oconee Nuclear Station, Units 1, 2, and 3 during the 4th Inservice Inspection Interval have not detected any evidence of leakage from these RHR Heat exchangers, including the welds for which relief has been requested.

b. Surface examinations performed on the nozzle Mk. "M" and "N" reinforcing pad-to-shell welds and reinforcing pad-to-nozzle welds on the RHR Heat Exchangers at Oconee Nuclear Station, Units 1, 2, and 3 during the 4th Inservice Inspection Interval have not detected any unacceptable indications.

c. Volumetric examinations performed on the shell-to-head flange welds and shell-to-tubesheet flange welds (adjacent to Nozzles Mk. "M" and "N") on the RHR Heat Exchangers at Oconee Nuclear Station, Units 1, 2, and 3 during the 4th Inservice Inspection Interval have not detected any unacceptable indications. These results provide additional evidence that there has been no service-induced degradation on the ID of the LPI Coolers in the vicinity of the Nozzle Mk. "M" and "N" nozzle-to-shell welds for which relief has been requested.

d. The nozzle-to-shell welds for which relief has been requested have not received any inservice volumetric examinations. However, the inservice volumetric examinations performed on the adjacent shell-to-head flange and shell-to-tubesheet flange welds during the 4th Inservice Inspection Intervals provide reasonable assurance that the service conditions within the RHR Heat Exchangers have not resulted in any age-related degradation in the nozzle-to-shell welds for which relief has been requested.

For the reasons stated above, the proposed alternative provides an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the 5th inservice inspection intervals for Oconee Units 1, 2 and 3, beginning July 15, 2014, currently scheduled to end July 15, 2024.

7. Related Industry Relief Requests

7.1. Virginia Electric and Power Company (Dominion), North Anna Power Station Unit 1 Relief Request No. NDE-006, submitted October 7, 2008 (ML082880160), approved August 13, 2009 (ML092230647).

7.2. Duke Energy Carolinas, LLC, Oconee Nuclear Station Units 1, 2, and 3, Relief Request No. 10-ON-001 submitted June 9, 2010 (ML101660473) and supplemented March 2, 2011 (ML11144A078), approved June 21, 2011.

8. References

8.1. Westinghouse Owner's group (WOG) project MUHP 5093, Working Group Inservice Inspection Optimization Action 97-01 (Boiler Code Item BC03-338), "Technical Basis for Revision of Inspection Requirements for Regenerative and Residual Heat Exchangers," August, 2004.

8.2. Duke Energy Drawings (copies provided as Attachments):

a) OM-201.00-0286.001, Decay Heat Coolers (1A and 2A)
b) OM-201.00-3131.002, Channels for Decay Heat Coolers (1B and 2B)
c) OM-2201.00-0277.001, Decay Heat Coolers (3A and 3B)

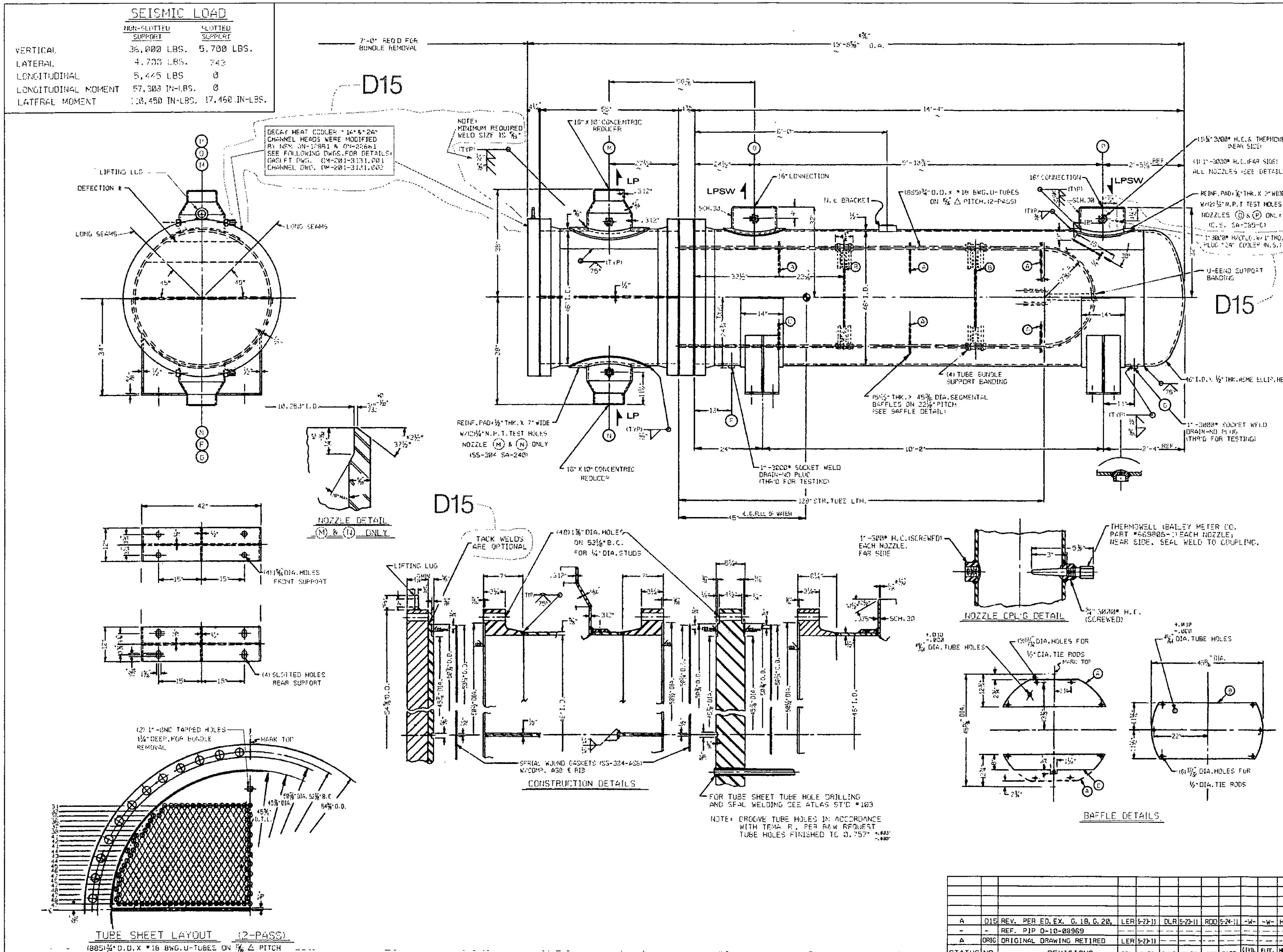
Attachments to 14-ON-002

Drawings of Decay Heat Exchanger

- OM-201.00-0286.001, *Decay Heat Coolers*
- OM-201.00-3131.002, *Channels for Decay Heat Coolers*
- OM-2201.00-0277.001, *Decay Heat Coolers*

SEISMIC LOAD

	NON-SLOTTED SUPPORT	SLOTTED SUPPORT
VERTICAL	36,000 LBS.	5,700 LBS.
LATERAL	4,700 LBS.	743
LONGITUDINAL	5,445 LBS	0
LONGITUDINAL MOMENT	57,300 IN-LBS.	0
LATERAL MOMENT	110,450 IN-LBS.	17,460 IN-LBS.



NOTES

1. CONSTRUCTION TO COMPLY WITH ASME CODE SECTION III CLASS "C" & SEC. VIII PARA. UW-2(a) FOR TUBE SIDE; SEC. VIII FOR SHELL SIDE. ALSO TEMA "R". ALL PER LATEST EDITION AT CONTRACT DATE.
2. NAME PLATE STAMPING: SEE NOTE 17.

ATLAS INDUSTRIAL MFG. CO. CLIFTON, N.J.
NAT'L BD. SEE NOTE 17 | SERIAL SEE NOTE 17 | YEAR DEL. YEAR
SHELL 150 PSI AT 300 °F
TUBES 370 PSI AT 300 °F
JACKET PSI AT °F
B&W P.O. NO: SEE BELOW (NOTE 17)
CONTRACT NO: SEE BELOW (NOTE 17)
B&W TAG NO. SEE BELOW (NOTE 17)

3. TEST TEMP. 60°F — SHELL SIDE / TUBE SIDE
   TEST PRESSURE: 225 PSI / 675 PSI
   CORROSION ALLOWANCE: 1/16" / 0"
4. WEIGHTS:
   EMPTY------------------ 24,400 LBS.
   FULL OF WATER---------- 36,300 LBS.
5. SANDBLAST: ALL EXT. C.S. SURFACES PER SSPC-SP6-63T
   PAINT: ALL C.S., PRIME COAT CARBO ZINC 11-3 MILS DRY FILM, FINISH COAT, PHENOLINE 305-4 MILS DRY FILM.
6. TUBE HOLE DRILLING AND SEAL WELDING TO BE IN ACCORDANCE WITH ATLAS STD #103 (SEE TUBE SHEET DET.) (OMIT HALOGEN TEST).
7. STRESS RELIEVE: NO
8. RADIOGRAPHY: TUBE SIDE 100% - ALL BUTT.
9. PRIOR TO HYDRO-TEST THE SHELL SIDE IS TO BE AIR TESTED TO 25 PSIG. THE TUBE SEAL WELDS ARE TO RECEIVE SOAP BUBBLE TEST. WATER FOR HYDRO TEST TO HAVE CHLORIDE CONTENT NOT EXCEEDING 0.1 P.P.M.
10. CUSTOMER'S INSPECTION: REQ'D.
11. TUBES TO BE EDDY CURRENT TESTED PER ASTM SA-450.
12. ONE DESICCANT (NON-CHLORIDE) ATTACHED TO PROTECTIVE SHIPPING COVERS ON "INLET" & "OUTLET" NOZZLES ONLY AND SEALED PRIOR TO SHIPPING. TAG UNIT NOTING EACH NOZZLE COVER THAT CONTAINS DESICCANT BAGS: "CAUTION-REMOVE DESICCANT BAGS BEFORE USE".
13. PERFORMANCE: HEAT LOAD 60 X 10^6 BTU/HR. SURFACE: 3940 SQ. FT.
14. SEE SEISMIC CALCULATIONS FOR SUPPORT LOADS.
15. CLEANING TO BE IN ACCORDANCE WITH ATLAS STANDARD #102 REVISED 9-27-68.
16. PRIOR TO TUBE HOLE DRILLING THE FACE OF THE TUBE-SHEET IS TO BE EXAMINED IN ACCORDANCE WITH ATLAS STD #101 LIQUID PENETRANT METHOD. INSPECTION & ACCEPTANCE BY INTERNAL QUALITY CONTROL.
17. NAME PLATE STAMPING:

JOB NO.	CONTRACT NO.	SER. NO.	NAT'L BD.	TAG NO.
1416-1	620-0003.4	884	734	1LP-C1A
1416-2	620-0003.4	885	735	1LP-C1B
1416-3	620-0003.4	886	736	2LP-C1A
1416-4	620-0003.4	887	737	2LP-C1B

18. TUBE SEAL WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE WITH ATLAS STD #101.
19. INTERNAL SURFACE OF CHANNEL TO BE SANDBLASTED TO CLEAN WHITE METAL AFTER FABRICATION.
20. WEIGHT OF SHELL 5,477 LBS.
    WEIGHT OF TUBE BUNDLE 12,313 LBS.
    WEIGHT OF CHANNEL 3,410 LBS.
    WEIGHT OF CHANNEL COVER 3,200 LBS.

CUSTOMER: BABCOCK & WILCOX COMPANY
P.O. NO. 604712 CONTRACT NO.: 620-0003.4
UNITS REQUIRED: FOUR
ATLAS JOB NO. 1416-1,2,3,4

OM 201.-0286.001

QA CONDITION 1

REV.		BY	DATE
8	REVERSED SHELL SIDE FLOW ARROWS	F.D.L.	8-23-71
7	ADDED BUNDLE SUPPORT BANDING REV. BAFFLE "A" CUTS	A.J.M.	6-23-71
6	REV. HYDRO-TEST PRESSURES	A.J.M.	10-9-69
5	REV. PAINT SPEC. PER B&W CHANGE ORDERS 11&13	A.J.M.	7-27-69
4	ADDED THERMOWELLS	A.J.M.	2-13-69
3	REV. TUBE SIDE DESIGN PRESS. AND AFFECTED PARTS. (PER B&W REQUEST)	A.J.M.	1-28-69
2	PER B&W RETURNED MARKED DWG. 11-12-68	A.J.M.	12-12-68
1	PER B&W RETURNED MARKED DWG. & MISC.	A.J.M.	10-1-68

STATUS	NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE	CIVIL	ELEC.	MECH.	OTHER
A	D15	REV. PER ED. EX. G. 18, G. 20,	LER	5-23-11	DLR	5-23-11	ROD	5-24-11	-W-	-W-	HEH.	---
-	-	REF. PIP 0-10-08969										
A	ORIG	ORIGINAL DRAWING RETIRED	LER	5-23-11								

INSPECTED

ASME MATERIAL SPECIFICATIONS

SHELLS			FACINGS			BONNETS CHANNELS			NOZZLE NECKS	SS-304	SA-240
PIPE			EXPANSION JOINT			WELD CAPS			FITTINGS	SS-304	SA-182
ROLLED PLATE	C.S.	SA-285-C	END PLATE			FORMED HEADS			COVERS FACED	C.S. SS-304	SA-515-70 SA-240
BAFFLES	C.S.	SA-7	WELD CAPS			PIPE			TUBE SHEETS	SS-304	SA-240
TIE RODS	C.S.	SA-7	FORMED HEADS	C.S.	SA-515-60	PLATE	SS-304	SA-240	TUBES SEAMLESS	SS-304	SA-249
SPACERS	C.S.	SA-214	UNIT FLANGES	F.S.	SA-105 II	UNIT FLANGES	SS-304	SA-210	REINF. PADS	SS-304	SA-240
NOZZLE FLGS			FITTINGS, SCREWED	F.S.	SA-105-II	NOZZLE FLGS			THERMOWELL	SS-316	
NOZZLE NECKS	C.S.	SA-53-B	SUPPORTS	C.S.	SA-7						

STUDS
- [x] SA-193 GR. B7
- [ ] SA-193 GR.

NUTS
- [x] SA-194 GR. 2H
- [ ] SA-182 CL. 2

GASKETS
- [ ] COMPRESSED ASBESTOS
- [ ] DOUBLE JACKETED
- [x] SPIRAL WOUND (FLEXITALLIC) SS-304-ASB W/ASB. & RIB. SEALING STRIPS
- [ ] SAE SS-18-8

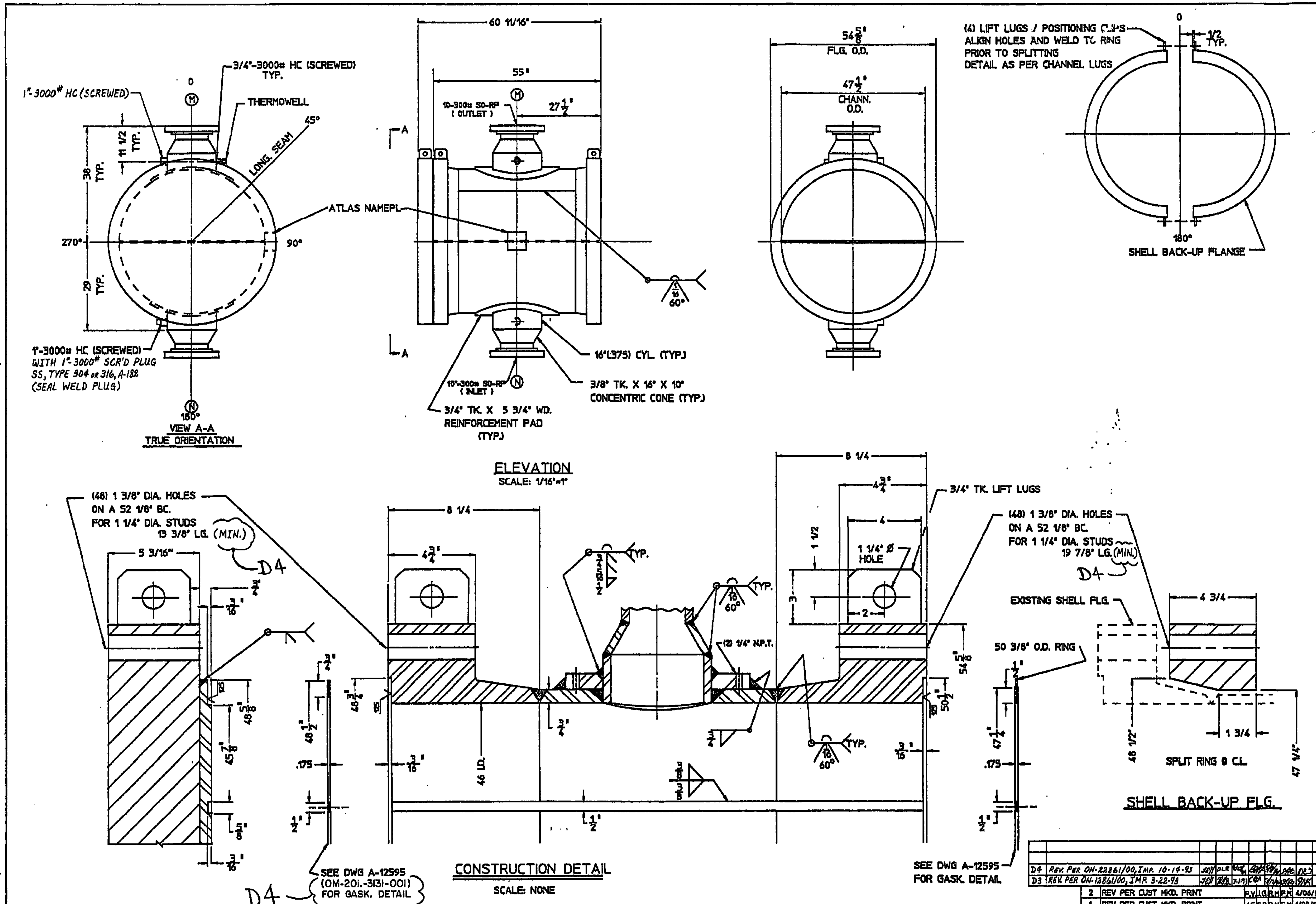
BABCOCK & WILCOX DRAWING NUMBER 620-0003 36-13-002

ATLAS INDUSTRIAL MANUFACTURING CO.
81 SOMERSET PLACE
CLIFTON, N.J.

#46-128 3940 DECAY HEAT COOLERS

SCALE	MADE	DATE	CKD.	APPD.	DRAWING NO.
3/4", 1 1/2"=1'-0"	A.J.M.	4-22-68			D-1738-8

ERN: 0X000R0D



NAME PLATE STAMPING

NAT'L BD. *
CERTIFIED BY
ATLAS INDUSTRIAL MFG. CO. CLIFTON, N.J.
U W N RT
MAX. ALLOW. WORKING PRESSURE
SHELL — PSI AT — °F
TUBES 515 PSI AT 250 °F
MIN. DES. METAL TEMPERATURE
SHELL — °F AT — PSI
TUBES -20 °F AT 515 PSI
SERIAL (SEE NOTE 13) YEAR
DUKE POWER P.O. NO. A31930-73
ITEM NO.:(SEE NOTE 13)

* NAT'L BD. NO. ISSUED AT TIME OF SHIPMENT

NOTES

1. LOCATION OF INSTALLATION : SENECA, S.C.
2. CUSTOMER'S INSPECTION REQUIRED.
3. TEST PRESSURE (psi) 644
   CORROSION ALL. (in.) 0
4. WEIGHTS (lb) CHANNEL 3890, CHANNEL COVER 3400, BACK-UP FLG 800
5. ALL BOLT HOLES TO STRADDLE UNIT/NOZZLE CENTERLINES.
6. ALL TOLERANCES ARE PER TEMA.
7. RADIOGRAPHY : 100% ALL BUTT WELDS
8. SANDBLAST : ALL C.S. PER SSPC-SP6-63T
8.a SANDBLAST INTERNAL SURFACES OF CHANNEL TO CLEAN WHITE METAL AFTER FABRICATION
9. PAINT : ALL C.S., PRIME COAT CARBOZINC 11 (3 MILS DFT) FINISH COAT, PHENOLINE 305 (4 MILS DFT)
10. WATER FOR HYDRO-TEST TO HAVE CHLORIDE CONTENT NOT EXCEEDING 0.1 PPM
11. PROVIDE SHIPPING COVERS ON NOZZLES WITH ONE DESIC--CANT (NON CHLORIDE) ATTACHED. TAG EA. NOZZLE AS FOLLOWS "CAUTION-REMOVE DESICCANT BAGS BEFORE USE"
12. CLEANING TO BE IN ACCORDANCE WITH ATLAS STD. 102
13.

JOB NO.	ITEM NO.	SERIAL
8216-1	1LP-C1A	7998
8216-2	2LP-C1A	8096

14. CUSTOMER TO SUPPLY THE FOLLOWING:
    A. STUDS & NUTS
    B. GASKETS
    C. THERMOWELLS
15. SEE SEISMIC CALCULATIONS FOR 3IP-C1A & B SUPPT. LOADS
16. THE TORQUE VALUES FOR THE STUDS ARE 1100 FT-LBF NOM AND 1600 FT-LBF MAX.
17. QUALITY ASSURANCE IN ACCORDANCE WITH 10CFR50, APP. B
18. THIS DWG. IS APPLICABLE TO DECAY HEAT COOLERS "1A" & "2A" ONLY.

D4

Q A CONDITION 1

OM 0201. -3131 002

REV.		BY	CK.	APP.	QA	DATE
D4	Rev. Per ON-22861/00, Imp. 10-14-93					
D3	REV. PER ON-12861/00, IMP. 3-22-93					
2	REV PER CUST MKD. PRINT	F.V.	J.G.	R.M.	F.M.	4/06/92
1	REV PER CUST MKD. PRINT	J.G.	C.B.	R.M.	F.M.	1/29/92

CUSTOMER : DUKE POWER COMPANY
STATION: OCONEE
D.E. FILE #8344-020100-00-0001-00
P.O. NO. : A31930-73
UNITS REQ'D. : TWO (2)
ATLAS JOB NO. : 8216

ERN: 0X002I66

SHELLSIDE MATERIAL SPECIFICATIONS			
PIPE		NOZZLE NECKS	
ROLLED PLATE		NOZZLE FACINGS	
HEAD		NOZZLE FLANGES	
END PLATE		REINF. PADS	
BACK-UP FLANGE	FS SA-105	COVER CYLINDER	
UNIT FLANGES		COVER HEAD	
EXP. JT. (STUBS)		COVER FLANGE	
EXP. JT. (BELLOWS)			
COUPLINGS			

TUBESIDE MATERIAL SPECIFICATIONS			
PIPE		NOZZLE NECKS	SS-304 SA-240
ROLLED PLATE	SS-304 SA-240	NOZZLE FACINGS	
HEADS		NOZZLE FLANGES	SS-304 SA-182
END PLATES		REINF. PADS	SS-304 SA-240
COVER FACING	SS-304 SA-240	FLOATING HD. CYL	
UNIT FLANGES	SS-304 SA-182	FLOATING HEAD	
COVER	CS SA-516-70	FLOATING HD. FLG	
PASS PARTITION	SS-304 SA-240	SPLIT RING	
COUPLINGS	SS-304 SA-182		

TUBE BUNDLE MATERIAL SPECIFICATIONS	
TUBES	
TUBESHEETS	
BAFFLES	
TIE RODS	
SPACERS	
DEFL./IMP. PLATE	
LONG BAFFLE	
SEALING BARS	
SEALING STRIPS	

MISCELLANEOUS MATERIAL SPECIFICATIONS			
SUPPORTS		STUDS	HA SA-193-B7
SUPPORT PADS		NUTS	CS SA-194-2H
CHANNEL LUGS	SS-304 SA-240		
COVER LUG	CS SA-516-70		
B-U FLG. LUGS	CS SA-516-70	SHELLSIDE GASKET	SPIRAL WD. (SS304) (ASB)
NAME PL. BRACKET	SS 304 SA-240		
NAME PLATE	SS-302	TUBESIDE GASKET	SPIRAL WD. (SS304) (ASB)
		T.S. GASKET RIBS	COMP. ASB.

CODE OF CONSTRUCTION :
A.S.M.E. SECTION III, CLASS C
A.S.M.E. SECTION VIII, DIVISION 1, PARA. UW-2(c) EX. NOZZ. MAN FLGS.
EDITION : 1968
ADDENDA : WIN-1969
CODE CASES : N/A
TEMA CLASS "C"
EDITION : 1968

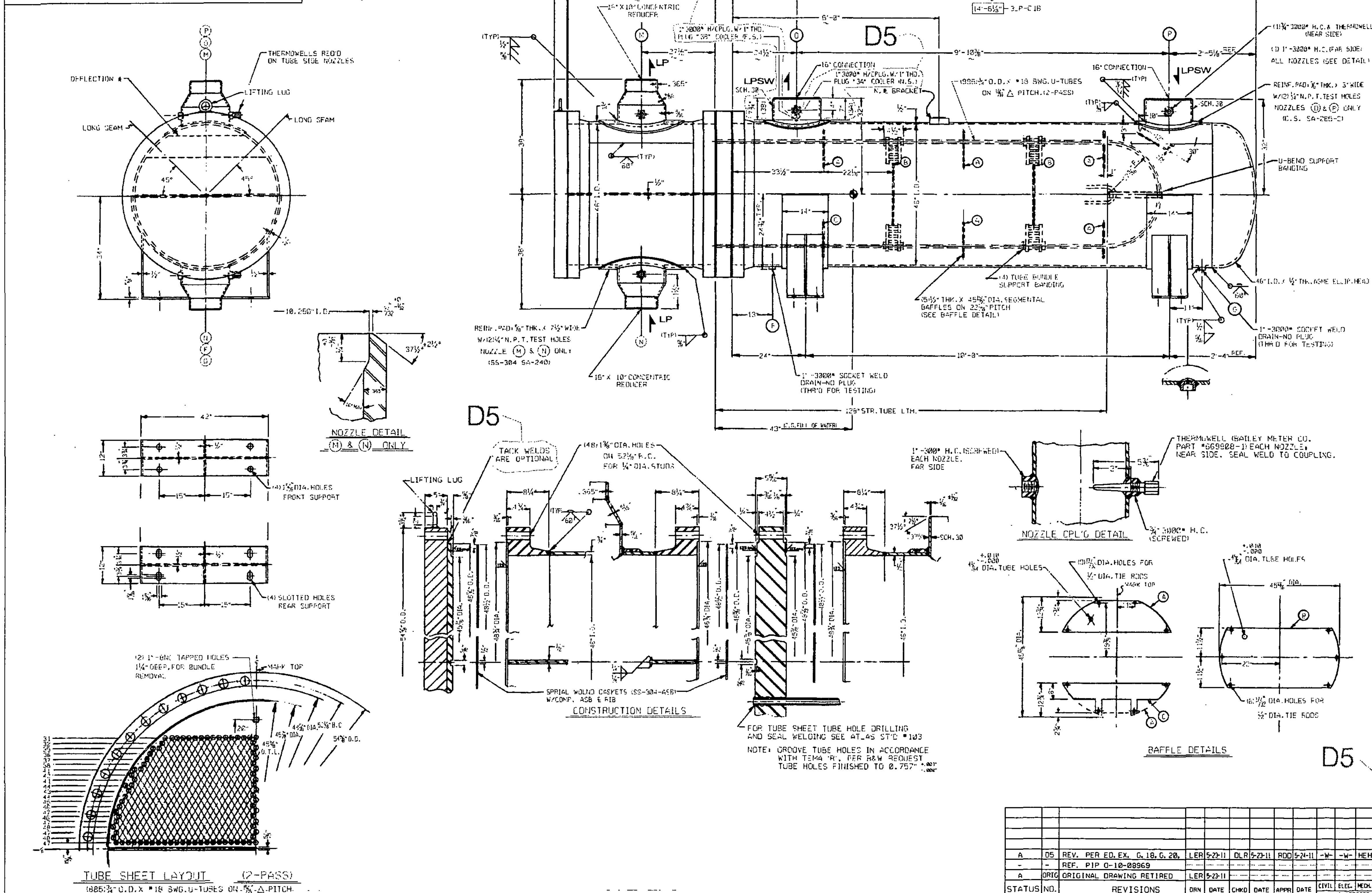
ATLAS INDUSTRIAL MANUFACTURING CO.
81 SOMERSET PLACE
CLIFTON, N.J.

CHANNELS FOR DECAY HEAT COOLERS

SCALE	MADE	CK.	APP.	QA	DATE	DRAWING NO.	REV.
AS NOTED	J.G.	C.B.	F.M.	R.M.	10/7/91	D-12592	D4

SEISMIC LOAD

	NON-SLOTTED SUPPORT	SLOTTED SUPPORT
VERTICAL	37,782 LBS.	5142 LBS.
LATERAL	4,928 LBS.	670
LONGITUDINAL	5,599 LBS	0
LONGITUDINAL MOMENT	58,790 IN-LBS.	0
LATERAL MOMENT	115,806 IN LBS.	15,745 IN-LBS.



NOTES

1. CONSTRUCTION TO COMPLY WITH ASME CODE SECTION III CLASS "C" & SEC.VIII PARA.UW-2(a) FOR TUBE SIDE; SEC.VIII FOR SHELL SIDE. ALSO, TEMA "R", ALL PER LATEST EDITION AT CONTRACT DATE.
2. NAME PLATE STAMPING: SEE NOTE 17.

ATLAS	INDUSTRIAL MFG. CO. CLIFTON, N.J.		
U / W / RT	NAT'L BD.	SEE NOTE 17	
	SERIAL	SEE NOTE 17	
	YEAR	DEL. YEAR	
SHELL	150 PSI AT	300	°F
TUBES	505 PSI AT	250	°F
JACKET	PSI AT		°F
B&W P.O. NO: SEE BELOW (NOTE 17)			
CONTRACT NO: SEE BELOW (NOTE 17)			
B&W TAG NO. SEE BELOW (NOTE 17)			

3. TEST TEMP. 60°F — SHELL SIDE / TUBE SIDE
   TEST PRESSURE: 225 PSI / 827 PSI
   CORROSION ALLOWANCE: ⅛" / 0"
4. WEIGHTS:
   EMPTY------------------ 25,500 LBS.
   FULL OF WATER---------- 37,325 LBS.
5. SANDBLAST: ALL EXT.C.S.SURFACES PER SSPC-SPC-63T
   PAINT: ALL C.S.,PRIME COAT CARBO ZINC 11-3 MILS DRY FILM. FINISH COAT, PHENOLINE 305-4 MILS DRY FILM.
6. TUBE HOLE DRILLING AND SEAL WELDING TO BE IN ACCORDANCE WITH ATLAS STD #103 (SEE TUBE SHEET DET.) (OMIT HALOGEN TEST).
7. STRESS RELIEVE: NO
8. RADIOGRAPHY: TUBE SIDE 100% - ALL BUTT.
9. PRIOR TO HYDRO-TEST THE SHELL SIDE IS TO BE AIR TESTED TO 25 PSIG. THE TUBE SEAL WELDS ARE TO RECEIVE SOAP BUBBLE TEST. WATER FOR HYDRO TEST TO HAVE CHLORIDE CONTENT NOT EXCEEDING 0.1 P.P.M.
10. CUSTOMER'S INSPECTION: REQ'D.
11. TUBES TO BE EDDY CURRENT TESTED PER ASTM SA-450.
12. ONE DESICCANT (NON-CHLORIDE) ATTACHED TO PROTECTIVE SHIPPING COVERS ON "INLET"&"OUTLET" NOZZLES ONLY AND SEALED PRIOR TO SHIPPING. TAG UNIT NOTING EACH NOZZLE COVER THAT CONTAINS DESICCANT BAGS: "CAUTION-REMOVE DESICCANT BAGS BEFORE USE".
13. PERFORMANCE: HEAT LOAD 60 X 10^6 BTU/HR. SURFACE: 3940 SQ. FT.
14. SEE SEISMIC CALCULATIONS FOR SUPPORT LOADS.
15. CLEANING TO BE IN ACCORDANCE WITH ATLAS STANDARD #102 REVISED 9-27-68.
16. PRIOR TO TUBE HOLE DRILLING THE FACE OF THE TUBE-SHEET IS TO BE EXAMINED IN ACCORDANCE WITH ATLAS STD #101 LIQUID PENETRANT METHOD. INSPECTION & ACCEPTANCE BY INTERNAL QUALITY CONTROL.
17. NAME PLATE STAMPING:

JOB NO.	CONTRACT NO.	SER. NO.	NAT'L BD.	TAG NO.
1420-1	620-0029	808	738	3LP-C1A
1420-2		809	739	3LP-C1B

18. TUBE SEAL WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE WITH ATLAS STD #101.
19. INTERNAL SURFACE OF CHANNEL TO BE SANDBLASTED TO CLEAN WHITE METAL AFTER FABRICATION.
20. WEIGHT OF SHELL 5,673 LBS.
    WEIGHT OF TUBE BUNDLE 12,313 LBS.
    WEIGHT OF CHANNEL 3,890 LBS.
    WEIGHT OF CHANNEL COVER 3,603 LBS.

CUSTOMER: BABCOCK & WILCOX COMPANY
P.O. NO. 804722 CONTRACT NO. 620-0029
UNITS REQUIRED: TWO
ATLAS JOB NO. 1420-1&2

D5 OM 2201.-0277.001

QA CONDITION 1

REV.		BY	DATE
4	"AS BUILT" ADDED BUNDLE SUPPORT BANDING	R.J.M.	3-14-[illegible]
3	"AS BUILT DIM.-TAG# 3LP-C1B ONLY	F.D.L.	12-30-72
2	"AS BUILT DIM.-TAG# 3LP-C1A ONLY	F.D.L.	12-1-71
1	REVISED TUBE SIDE PRESS.& TEMP.,AND AFFECTED PARTS. WAS DWG. #D-1739-6	R.J.M.	4-27-71

STATUS	NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE	CIVIL (INSPECTED)	ELEC. (INSPECTED)	MECH. (INSPECTED)	OTHER (INSPECTED)
A	D5	REV. PER ED. EX. G.18, G.20.	LER	5-23-11	DLR	5-23-11	RDD	5-24-11	-W-	-W-	HEH	---
-	-	REF. PIP 0-10-08969										
A	ORIG	ORIGINAL DRAWING RETIRED	LER	5-23-11								

ATLAS INDUSTRIAL MANUFACTURING CO.
81 SOMERSET PLACE
CLIFTON, N.J.

#46-128; 3940 DECAY HEAT COOLERS

SCALE	MADE	DATE	CKD.	APPD.	DRAWING NO.
¾"-1'-0"	A.J.M.	4-27-71		J.D.L.	D-2672-4

BABCOCK & WILCOX DRAWING NUMBER

ASME MATERIAL SPECIFICATIONS

SHELLS			FACINGS			BONNETS CHANNELS			NOZZLE NECKS	SS-304	SA-240/312 SMLS
PIPE			EXPANSION JOINT			WELD CAPS			FITTINGS	SS-304	SA-182
ROLLED PLATE	C.S.	SA-285-C	REINF.PADS (C.S.)	C.S.	SA-285-C	FORMED HEADS			COVERS FACED	C.S. SS-304	SA-515-70 SA-240
BAFFLES	C.S.	SA-36	WELD CAPS			PIPE			TUBE SHEETS	SS-304	SA-240
TIE RODS	C.S.	SA-36	FORMED HEADS	C.S.	SA-516-62	PLATE	SS-304	SA-240	TUBES SEAMLESS WELDED	SS-304	SA-249 AW
SPACERS	C.S.	SA-214	UNIT FLANGES	F.S.	SA-105-II	UNIT FLANGES	SS-304	SA-240	REINF.PADS (T.S.)	SS-304	SA-240
NOZZLE FLG'S			FITTINGS,SCREWED	F.S.	SA-181-I	NOZZLE FLG'S			THERMOWELL	SS-316	
NOZZLE NECKS	C.S.	SA-53-B	SUPPORTS	C.S.	SA-36						

STUDS
☒ SA-193 GR.B7
☐ SA-193 GR.

NUTS
☒ SA-194 GR.2H
☐ SA-192 CL.2

GASKETS
☐ COMPRESSED ASBESTOS
☐ DOUBLE JACKETED
☒ SPIRAL WOUND (FLEXITALLIC) SS-304-ASB W/ASB. & RIB.
SEALING STRIPS
☐ 302 SS-16-9

ERN:UX001EBC