



Scott L. Batson
Vice President
Oconee Nuclear Station

Duke Energy
ON01VP | 7800 Rochester Hwy
Seneca, SC 29672

o: 864.873.3274
f: 864.873.4208

Scott.Batson@duke-energy.com

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
NRC

ONS-2015-037

May 4, 2015

Page 2

cc (with enclosure):

Mr. Victor McCree, Regional Administrator
U.S. Nuclear Regulatory Commission – Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

Mr. James R. Hall, Project Manager (ONS)
(by electronic mail only)
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-8B1
Rockville, MD 20852

Jeffery Whited
(by electronic mail only)
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-8B1A
Rockville, MD 20852

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

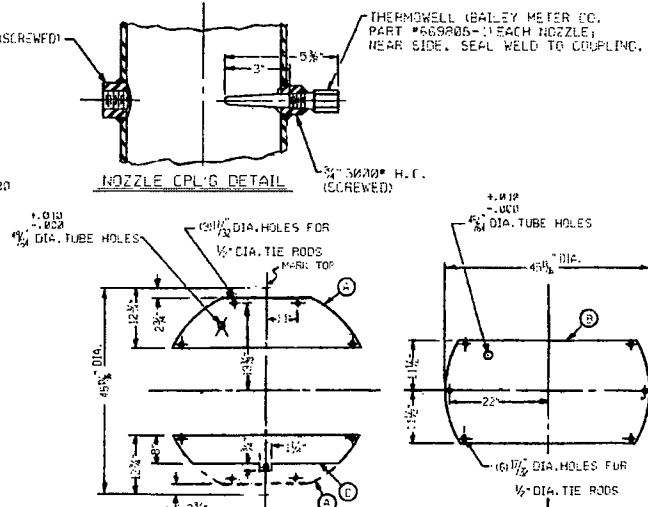
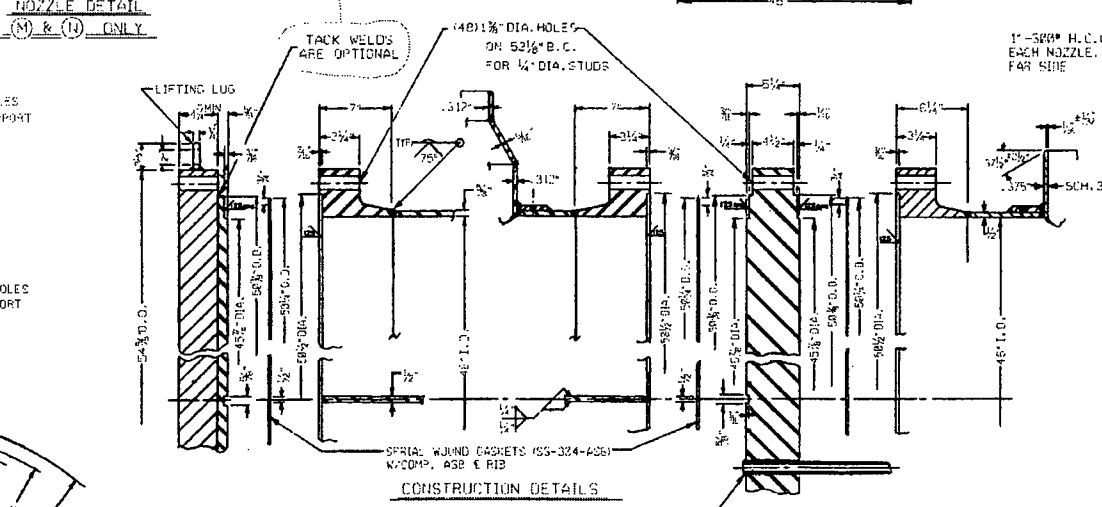
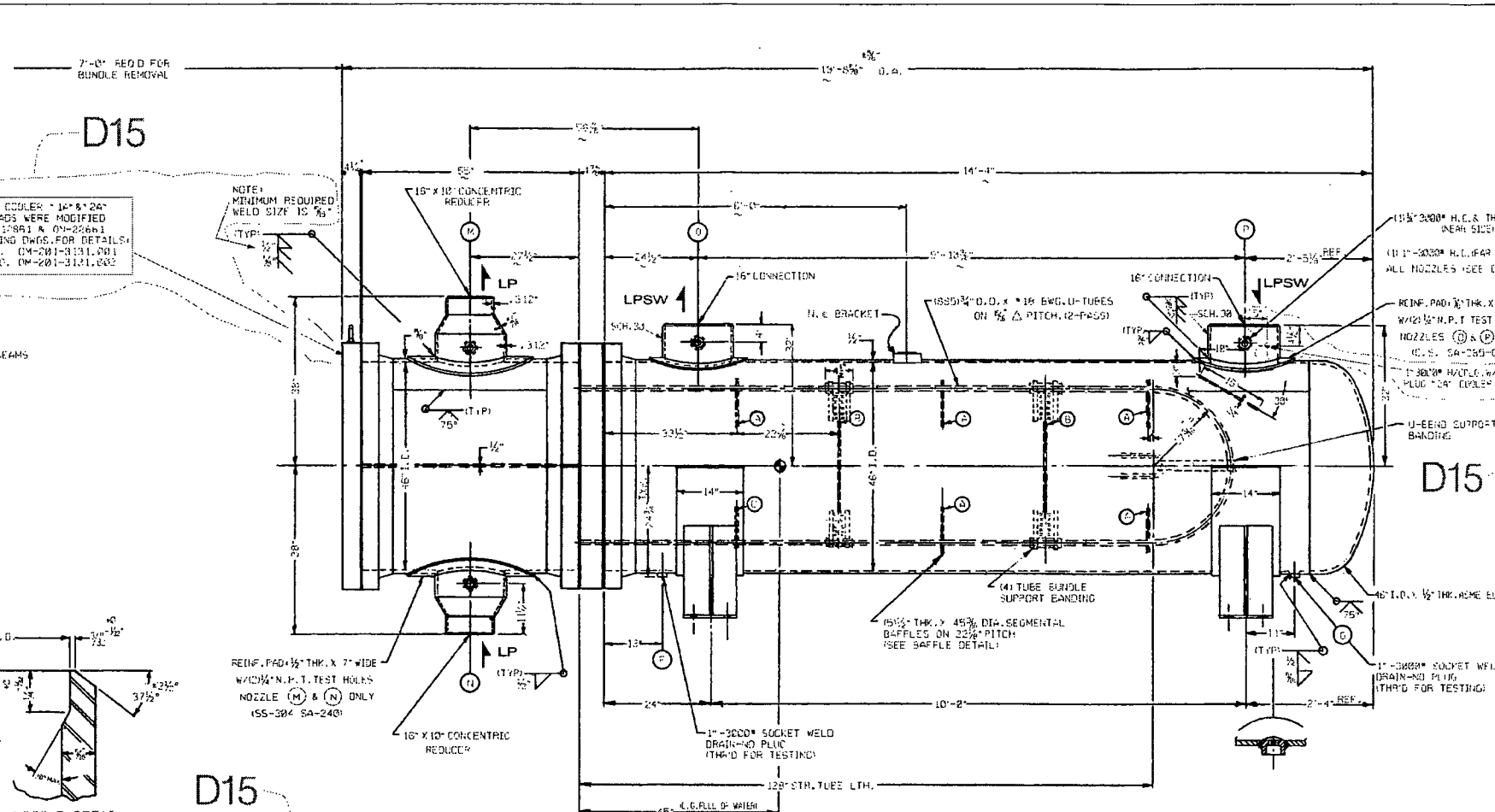
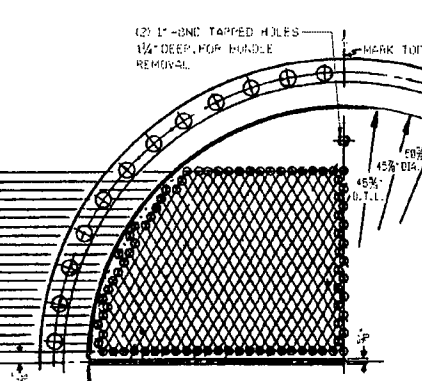
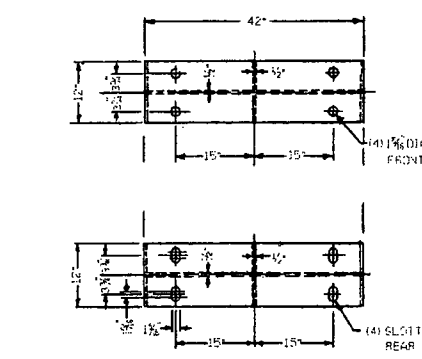
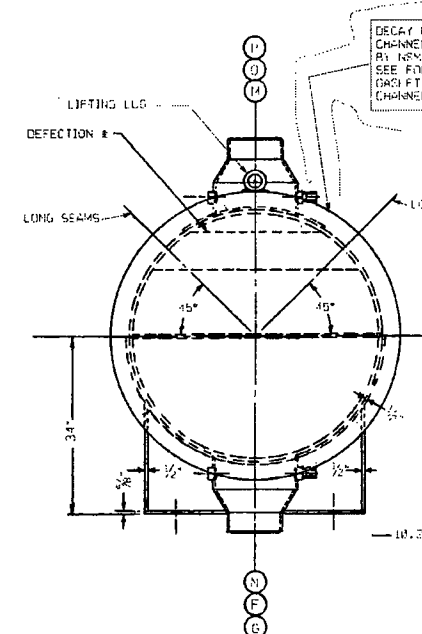
- 8.1. Westinghouse Owner's group (WOG) project MUHP 5093, Working Group Inservice Inspection Optimization Action 97-01 (Boiler Code Item BC03-338), "Technical Basis for Revision of Inspection Requirements for Regenerative and Residual Heat Exchangers," August, 2004.
- 8.2. Duke Energy Drawings (copies 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.	740
LONGITUDINAL	5,445 LBS.	0
LONGITUDINAL MOMENT	57,300 IN.-LBS.	0
LATERAL MOMENT	10,450 IN.-LBS.	17,450 IN.-LBS.



- NOTES**
- CONSTRUCTION TO COMPLY WITH ASME CODE SECTION III CLASS 'C' & SEC. VIII PARA. UG-21(a) FOR TUBE SHEET & SEC. VIII FOR SHELL SIDE. AS PER PARA. UG-21, ALL PER LATEST EDITION AT CONTRACT DATE.
 - NAME PLATE STAMPING: SEE NOTE 17.
 - TEST TEMP. 60°F. SHELL SIDE. TUBE SIDE. TEST PRESSURE 100 PSI. 670 PSI. COMPRESSION ALLOWANCE 1/8\".
 - WEIGHTS: EMPTY 24,400 LBS. FULL OF WATER 36,300 LBS.
 - SAW-BLAST: ALL EXT. SURFACES PER SSPC-SP6-B3T PAINT: ALL INT. SURFACES PER SSPC-SP6-B3T FINISH COAT, PNEUMATIC 805-4 MILS DRY FILM.
 - TUBE HOLE DRILLING AND SEAL WELDING TO BE IN ACCORDANCE WITH ATLAS STD #103 (SEE TUBE SHEET DET.). (OMIT HALOGEN TEST).
 - STRESS RELIEVE: NO.
 - RADIOGRAPHY: TUBE SIDE 100% - ALL BUTT.
 - PROVIDE HYDRO-TEST THE SHELL SIDE IS TO BE AIR TESTED TO 25 PSI. 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.
 - CUSTOMER'S INSPECTION: REQ'D.
 - TUBES TO BE 100% CURRENT TESTED PER ASTM SA-192. ONE DESICCANT INDICATOR ATTACHED TO PROTECTIVE SHIPPING COVERS ON INLET & OUTLET NOZZLES ONLY AND SEALED PAIR TO SHIPPING. TAG UNIT HOLDING EACH NOZZLE COVER THAT CONTAINS DESICCANT BASS. CAUTION - REMOVE DESICCANT BAGS BEFORE USE.
 - PERFORMANCE: HEAT LOAD 60 X 10⁶ BTU/HR. SURFACE 3940 SQ. FT.
 - SEE SEISMIC CALCULATIONS FOR SUPPORT LOADS.
 - CLEANING TO BE IN ACCORDANCE WITH ATLAS STANDARD #102 REVISED 9-27-68.
 - 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.
 - NAME PLATE STAMPING:

JOB NO.	CONTRACT NO.	SER. NO.	NAT'L. BD. TAG NO.
1416-1	620-0003.4	604	734 1P-C-1A
1416-2	620-0003.4	605	735 1P-C-1B
1416-3	620-0003.4	606	736 1P-C-1C
1416-4	620-0003.4	607	737 1P-C-1E
 - TUBE SEAL WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE WITH ATLAS STD #101.
 - INTERNAL SURFACE OF CHANNEL TO BE SAND-BLASTED TO CLEAN WHITE METAL AFTER FABRICATION.
 - WEIGHT OF SHELL 5,477 LBS. WEIGHT OF TUBE BUNDLE 12,313 LBS. WEIGHT OF CHANNEL 2,410 LBS. WEIGHT OF CHANNEL COVER 2,200 LBS.
- CUSTOMER: BABCOCK & WILCOX COMPANY
P.O. NO. 24712 CONTRACT NO. 620-0003.4
UNITS REQUIRED: FOUR
ATLAS JOB NO. 1416-1,2,3,4

OM 201.-0286.001

QA CONDITION 1

NO.	DESCRIPTION	DATE
6	REVIEWED SHELL SIDE FLOW ARROWS	6.11.68
7	ADDED BUNDLE SUPPORT BANDING	6.11.68
8	REV. HYDRO-TEST PRESSURES	6.11.68
9	REV. POINT CAPS PER BAW DRAWING	6.11.68
10	ADDED THERMOWELL	6.11.68
11	REV. TUBE SIDE DESICCANT BAGS AND AFFECTED PARTS - PER BAW REQUEST	6.11.68
12	PER BAW RETURNED MARKED DWG. 11-12-68	6.11.68
13	PER BAW RETURNED MARKED DWG. & MISC.	6.11.68

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

#46-128-3940 DECAY HEAT COOLERS

REV.	BY	DATE	APP.	DESCRIPTION
1	A.J.M.	4-22-68		

ERN:UX000RQD

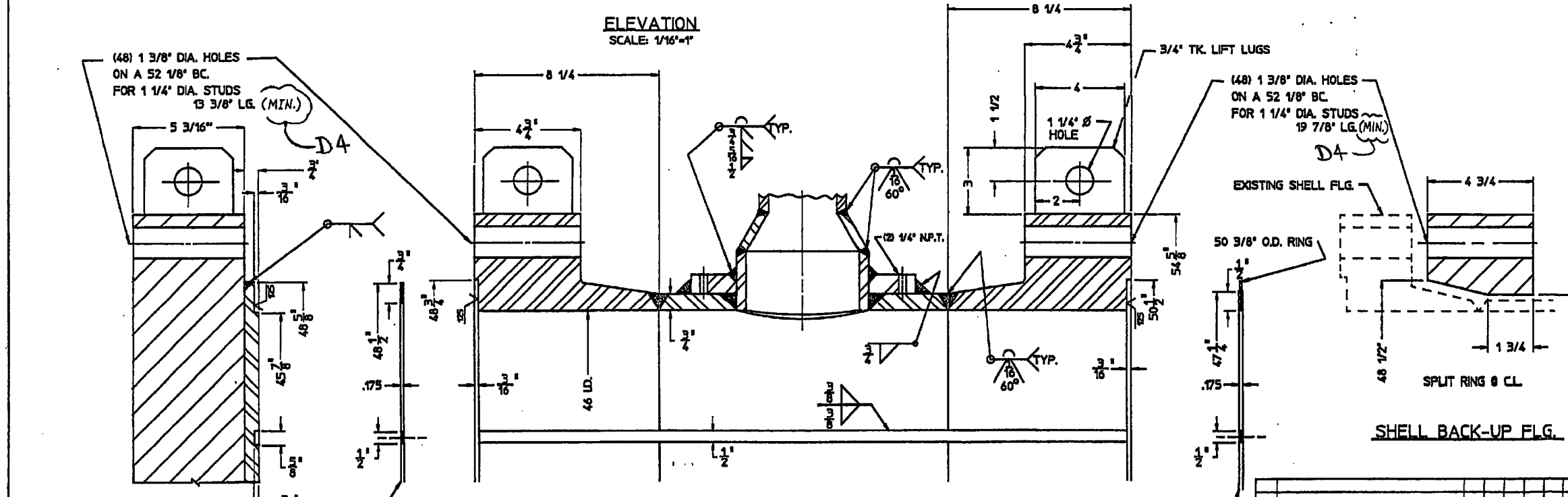
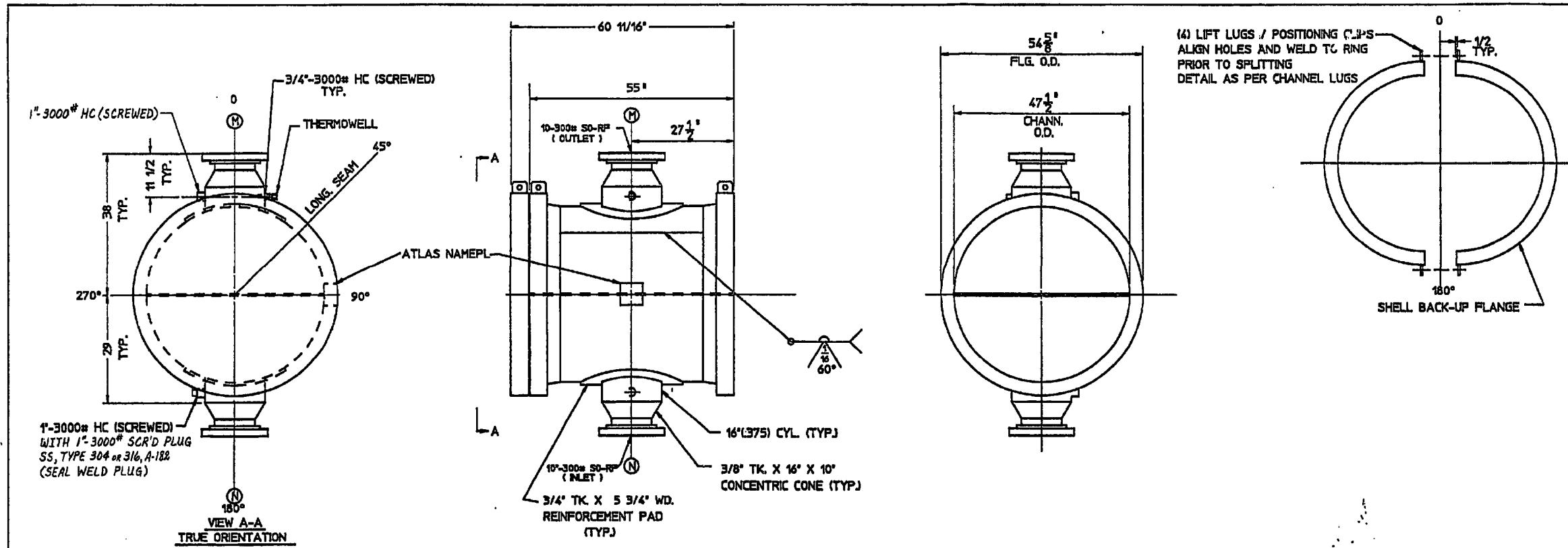
BABCOCK & WILCOX
DRAWING NUMBER
620-0003
36-13-802

ASME MATERIAL SPECIFICATIONS										
SHELLS										
PIPE										
PIPE FITTINGS										
WELD CAPS										
FORMED HEADS										
FLANGES										
PLATE										
UNIT FLANGES										
UNIT FLANGES										
NOZZLE FLANGES										
NOZZLE NECKS										

STATUS NO.	REVISIONS	DRN.	DATE	CHKD.	DATE	APPR.	DATE	CIVIL	ELEC.	MECH.	OTHER	INSPECTED
A	D15 REV. PER ED. EX. G. 10, G. 20.	LER	5-27-11	DLR	5-27-11	ROD	5-24-11	-W-	-W-	HEM	---	
-	REF. P.I.P. O-10-08969											
A	ORIG. ORIGINAL DRAWING RETIRED	LER	5-27-11									

ITEM	DESCRIPTION	QTY.	UNIT	STATUS
1	AS-100 CR. B7			
2	AS-103 CR.			
3	AS-104 CR. D			
4	AS-102 CR. 2			

ITEM	DESCRIPTION	QTY.	UNIT	STATUS
1	COMPRESSED ASBESTOS			
2	INSULATION JACKETS			
3	SEALING WAX			
4	SEALING STAPLES			



SHELLSIDE MATERIAL SPECIFICATIONS		TUBESIDE MATERIAL SPECIFICATIONS		TUBE BUNDLE MATERIAL SPECIFICATIONS		MISCELLANEOUS MATERIAL SPECIFICATIONS	
PIPE	NOZZLE NECKS	PIPE	NOZZLE NECKS	TUBES	STUDS	HA SA-193-B7	
ROLLED PLATE	NOZZLE FLANGES	ROLLED PLATE	NOZZLE FLANGES	TUBESHEETS	NUTS	CS SA-194-2H	
HEAD	NOZZLE FLANGES	SS-304 SA-240	NOZZLE FLANGES	BAFFLES			
END PLATE	REINFC. PADS		REINFC. PADS	TIE RODS			
BACK-UP FLANGE	COVER CYLINDER	SS-304 SA-240	COVERING HD. CYL.	SPACERS			
UNIT FLANGES	COVER HEAD	SS-304 SA-182	COVERING HEAD	DEFL./IMP. PLATE			
EXP. JT. (STUBS)	COVER FLANGE	CS SA-316-70	COVERING HD. FLG.	LONG BAFFLE			
EXP. JT. (BELLOW)		SS-304 SA-240	SPLIT RING	SEALING BARS			
COUPLINGS		SS-304 SA-182		SEALING STRIPS			

NAME PLATE STAMPING

NAT'L BD. CERTIFIED BY **ATLAS** INDUSTRIAL MFG. CO. CLIFTON, N.J.

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**
- LOCATION OF INSTALLATION: SENECA, S.C.
 - CUSTOMER'S INSPECTION REQUIRED.
 - TEST PRESSURE (psi) 844
CORROSION ALL. (In.) 0
 - WEIGHTS (lb) 3890 3400 800
CHANNEL CHANNEL COVER BACK-UP FLG
 - ALL BOLT HOLES TO STRADDLE UNIT/NOZZLE CENTERLINES.
 - ALL TOLERANCES ARE PER TEMA.
 - RADIOGRAPHY: 100% ALL BUTT WELDS
 - SANDBLAST: ALL C.S. PER SSPC-SP6-63T
8.0 SANDBLAST INTERNAL SURFACES OF CHANNEL TO CLEAN WHITE METAL AFTER FABRICATION
 - PAINT: ALL C.S., PRIME COAT CARBOZINC 11 (3 MILS DFT) FINISH COAT, PHENOLINE 303 (4 MILS DFT)
 - WATER FOR HYDRO-TEST TO HAVE CHLORIDE CONTENT NOT EXCEEDING 0.1 PPM
 - PROVIDE SHIPPING COVERS ON NOZZLES WITH ONE DESICCANT (NON CHLORIDE) ATTACHED. TAG EA. NOZZLE AS FOLLOWS 'CAUTION-REMOVE DESICCANT BAGS BEFORE USE'
 - CLEANING TO BE IN ACCORDANCE WITH ATLAS STD. 102
 - JOB NO. 8216-1 ITEM NO. 1LP-C1A SERIAL 8216-2 2LP-C1A 8096
 - CUSTOMER TO SUPPLY THE FOLLOWING:
A. STUDS & NUTS
B. GASKETS
C. THERMOWELLS
 - SEE SEISMIC CALCULATIONS FOR 31P-C1A & B SUPPLY LOADS
 - THE TORQUE VALUES FOR THE STUDS ARE 100 FT-LBF NOM AND 1600 FT-LBF MAX.
 - QUALITY ASSURANCE IN ACCORDANCE WITH 10CFR50, APP. B
 - THIS DWG. IS APPLICABLE TO DECAY HEAT COOLERS "1A" & "2A" ONLY.
- Q A CONDITION 1**
- OM 0201. -3131 002

ERN: 01002166

REV.	DESCRIPTION	DATE	BY	CHECKED	DATE
D4	REV PER ON-22861/00, IMP. 10-19-93				
D3	REV PER ON-12861/00, IMP. 3-23-93				
2	REV PER CUST MKD. PRINT	4/04/92			
1	REV PER CUST MKD. PRINT	1/23/92			

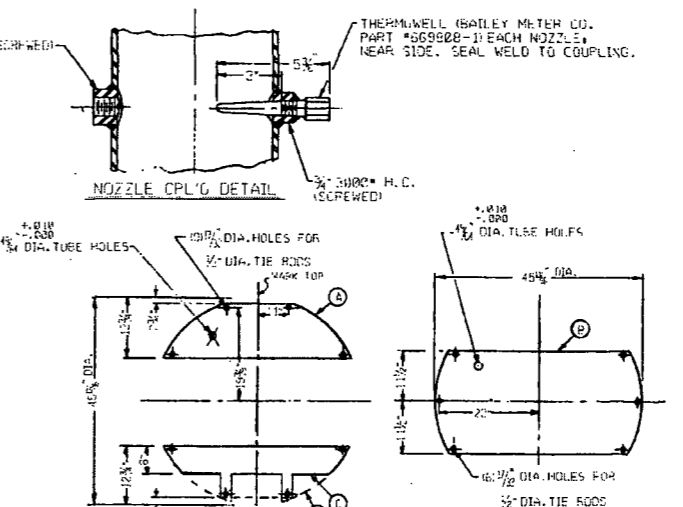
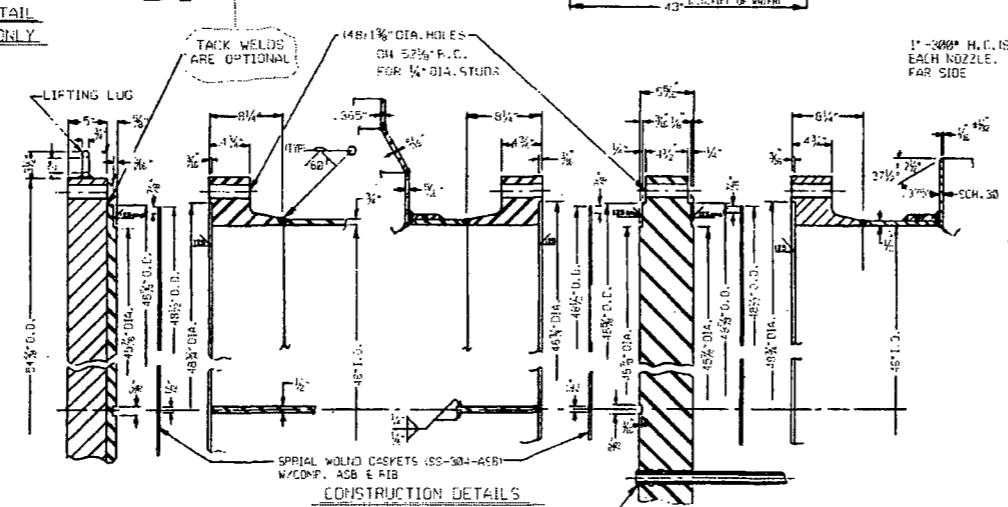
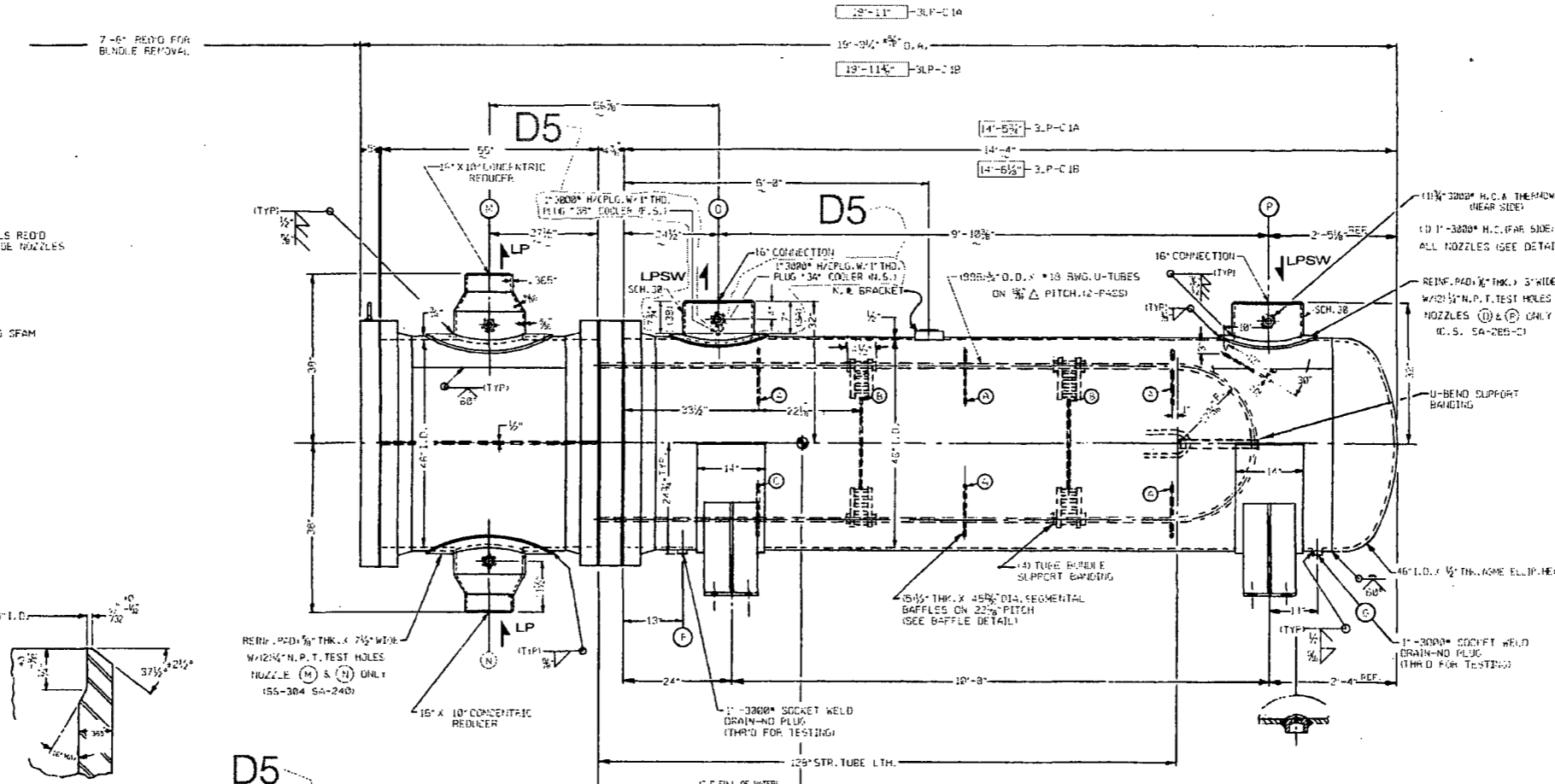
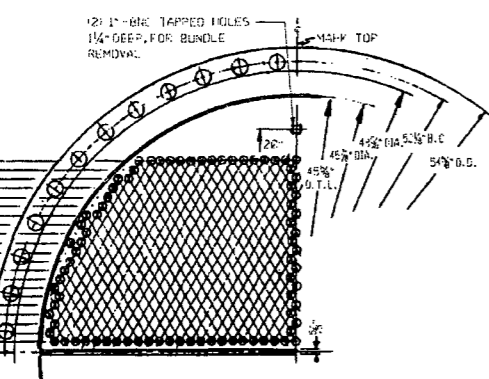
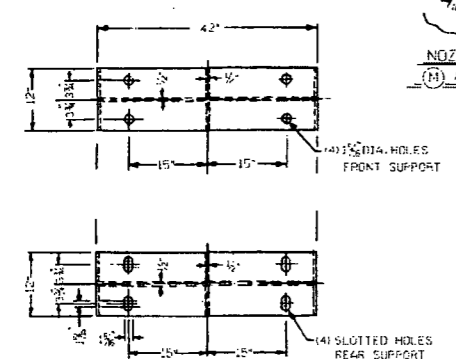
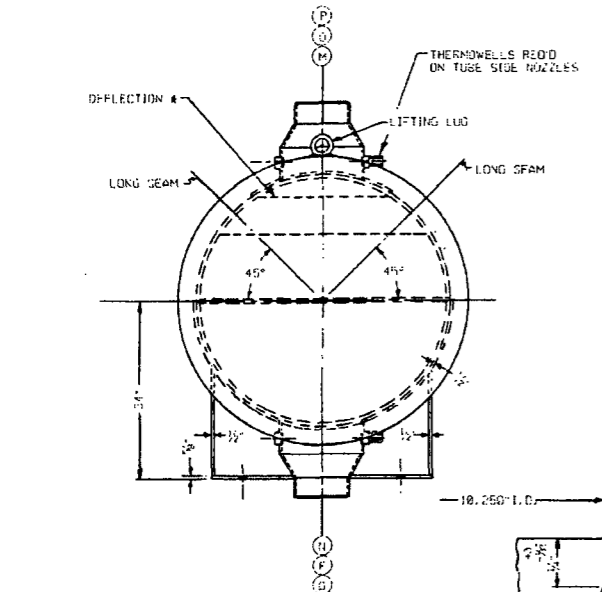
CODE OF CONSTRUCTION: ASME SECTION 8 CLASS C ASME SECTION VIII DIVISION 1 PARAJIN-201 EX. NOZZ. MAN FLGS. EDITION: 1980 ADDENDA: MN-890 CODE CASES: N/A TEMA CLASS C. EDITION: 1988

INDUSTRIAL MANUFACTURING CO. 81 GOMERSET PLACE CLIFTON, N.J.

CHANNLES FOR DECAY HEAT COOLERS

SCALE: 1/16"=1" MADE: JG. C.B. APP. F.M. R.M. DATE: 10/7/91 DRAWING NO. D-12592 REV. 04

SEISMIC LOAD		
	NON-SUPPORTED	SUPPORTED
VERTICAL	37,792 LBS.	5142 LBS.
LATERAL	4,928 LBS.	679
LONGITUDINAL	5,599 LBS.	0
LONGITUDINAL MOMENT	58,790 IN.-LBS.	0
LATERAL MOMENT	115,886 IN.-LBS.	15,746 IN.-LBS.



- NOTES
- CONSTRUCTION TO COMPLY WITH ASME CODE SECTION III CLASS II & SECTION VIII PARALLEL-TO-TUBE SHEET SIDE SHELLS. ALSO, TEMA 'R', 2011 PER LATEST EDITION AT CONTRACT DATE.
 - NAME PLATE STAMPING: SEE NOTE 17.

ATLAS INDUSTRIAL MFG. CO. CLIFTON, N.J.	
NAT'L. BD. REG. NO.	SEE NOTE 17
CERTAL. NO.	SEE NOTE 17
YEAR	SEE NOTE 17
SHELL	150 PSI AT 300 °F
TUBES	500 PSI AT 250 °F
JACKET	150 PSI AT 300 °F
B&W P.C. NO. SEE BELOW NOTE 17	
CONTRACT NO. SEE BELOW NOTE 17	
B&W TAG NO. SEE BELOW NOTE 17	

- TEST TEMP. 601° SHELL SIDE TUBE SIDE
TEST PRESSURE 225 PSI 627 PSI
CORROSION ALLOWANCE 1/8"
- WEIGHTS:
EMPTY 25,503 LBS.
FULL OF WATER 37,325 LBS.
- SANDBLAST ALL EXT. U.S. SURFACES PER SSPC-SPC-03T PAINT ALL U.S. PRIME COAT CARBON ZINC 11-3 MILS DRY FILM. FINISH COAT, FRENCHLINE 205-4 MILS DRY FILM.
- TIRE WIRE GRINDING AND SEAL WELDING TO BE IN ACCORDANCE WITH ATLAS STD #105 (SEE TUBE SHEET DET.) UNIT HOLDEN TEST).
- STRESS RELIEVE (NO)
- RADIOGRAPHY: TUBE SIDE 100% - ALL BUTT.
- 100% TO HYDRO-TEST THE SHELL SIDE IS TO BE AIR TESTED TO 24 PSI. 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.
- CUSTOMER'S INSPECTION: REQ'D.
- TUBES TO BE EDDY CURRENT TESTED PER ASTM C4-450.
- ONE DESICCANT (MOH-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. CAUTION-REMOVE DESICCANT BAGS BEFORE USE.
- PERFORMANCE: HEAT LOAD 50 X 10⁶ BTU/HR. SURFACE 3540 SQ. FT.
- SEE SEISMIC CALCULATIONS FOR SUPPORT LOADS.
- CLEANING TO BE IN ACCORDANCE WITH ATLAS STANDARD #105 REVISED 9-27-08.
- 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.
- NAME PLATE STAMPING:
JOB NO. CONTRACT NO. SER. NO. NAT'L. BD. TAG NO.
1420-1 620-0289 889 736 3-P-C-1A
1420-2 620-0289 889 739 3-P-C-1B
- TUBE SEAL WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE WITH ATLAS STD #101.
- INTERNAL SURFACE OF CHANNEL TO BE SANDBLASTED TO CLEAN WHITE METAL AFTER FABRICATION.
- WEIGHT OF SHELL 5,673 LBS.
WEIGHT OF TUBE BUNDLE 12,313 LBS.
WEIGHT OF CHANNEL 3,600 LBS.
WEIGHT OF CHANNEL COVER 3,603 LBS.

CUSTOMER: BARCOCK & WILCOX COMPANY
P.O. NO. 064772 CONTRACT NO. 620-0289
UNITS REQUIRED: TWO
ATLAS JOB NO. 1420-1&2

OM 2201-0277.001

QA CONDITION 1

STATUS NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE	CIVIL	ELEC	MED	OTHER	INSPECTED
A	D5 REV. PER ED. EX. G. 18. G. 20.	LER	5-22-11	DLR	5-22-11	ROD	5-24-11	W	W	MEH		
-	REF. PIP O-10-08969											
A	ORIG ORIGINAL DRAWING RETIRED	LER	5-23-11									

ASME MATERIAL SPECIFICATIONS											
SHELLS	SA-265-C	EXPANSION JOINT	SA-265-C	ROFETS (CHANNELS)	SA-265-C	NOZZLE NECKS	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
PIPE	SA-265-C	WELD CAPS	SA-265-C	WELD CAPS	SA-265-C	FITTINGS	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
ROLLED PLATE	SA-265-C	REF. PIP. (C.S.)	SA-265-C	REF. PIP. HEADS	SA-265-C	COVERS (FACTORY)	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
BAFFLES	SA-265-C	WELD CAPS	SA-265-C	PIPE	SA-265-C	TUBE SHEETS	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
FRAMES	SA-265-C	UNIT HEADS	SA-265-C	PLATE	SA-265-C	TUBES	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
FRAMES	SA-265-C	UNIT HEADS	SA-265-C	UNIT HEADS	SA-265-C	REF. PIP. (T.S.)	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
NOZZLE FLANGES	SA-265-C	FITTINGS (C.S.)	SA-265-C	NOZZLE FLANGES	SA-265-C	THEMOWELL	SA-265-C	SA-265-C	SA-265-C	SA-265-C	SA-265-C
NOZZLE FLANGES	SA-265-C	NOZZLE FLANGES	SA-265-C	NOZZLE FLANGES	SA-265-C						
NOZZLE HEADS	SA-265-C		SA-265-C		SA-265-C						

BARCOCK & WILCOX
DRAWING NUMBER

ATLAS INDUSTRIAL MANUFACTURING CO. 81 SOMERSET PLACE CLIFTON, N.J.	
#46-128; 3940 DECAY HEAT COOLERS	
DATE	BY
4-27-71	A.J.M.
DATE	BY
4-27-71	J.D.L.

ERN:UX001EBG