1111 Burma Drive
Apex, North Carolina 27539
919-367-2000 Fax 919-367-2098

www.crowderusa.com

CROWDER CONSTRUCTION COMPANY
CIVIL & ENVIRONMENTAL DIVISION

September 16, 2020

NOTE: Pages have been redacted or intentionally excluded by the EPA. Contact SRF_AIS@epa.gov to request more detailed information if needed.

Mr. Ed Stempien, P.E
Construction Projects Administrator
Public Utilities Department
219 Fayetteville St, Suite 620
Raleigh, NC 27601

Ref: Neuse River Resource Recovery Facility (NRRRF) Bioenergy Recovery Project (BERP)
Project No. CS370419-20 Clean Water State Revolving Fund (CWSRF)
Submit to cwsrfwaiver@epa.gov

Subject: City of Raleigh Project Specific Waiver Request

Dear Mr. Stempien,

We are responding to Mr. Greg Gwaltney, Physical Scientist – AIS Team, from the Office of Wastewater Management, U.S. EPA, August 20, 2020 email listing manufacturers who stated that they can furnish AIS compliant six inch and smaller 316/304L schedule 10 and 40 stainless steel pipe, and fittings. The listed manufacturers in the table were contacted and not able to provide AIS compliant products or their delivery times would add a significant scheduling risk to the project. The Contractor's documented conversations along with their disposition is attached for review.

At this time, we are requesting that the project waiver request attached to this letter be reevaluated for consideration.

If you have any questions or require further information or clarifications, please feel free to contact me at 919.825.3653.

Sincerely,

CROWDER CONSTRUCTION COMPANY

Brian Boyle
Senior Project Manager

cc: Mr. Shannon Dorsey, Hazen
File

PROJECT WAIVER REQUEST

General

1. Description of the foreign and domestic construction materials.

Foreign Materials shall include six inch and smaller seamless and welded seam schedule 10 and 40 316L stainless steel pipe, fittings, and tubing.

Domestic Construction Materials are not readily available in sufficient quantity for domestically for six inch and smaller seamless and welded seam schedule 10 and 40 316L stainless steel pipe, fittings, and tubing. [redacted] stated AIS compliance for only two inch and smaller socket welded fittings, but their stock is limited, their pricing is at a premium, and for items out of stock the availability of raw materials is unknown. Procuring materials from Bonney Forge adds a significant scheduling risk to the project

Pipe Designation	Service	Material	Type of Joint	Class/Design	Restraint System/Design Pressure	Test Pressure
Air-S	Compressed Air Service	Stainless Steel	Socket Weld	SCH 40	N/A	200 PSI
DEOF	Digester Emergency Overflow	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	10 PSI
DEOF	Digester Emergency Overflow	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 PSI
DGL	Digester Gas Low Pressure	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	25 PSI
DGL	Digester Gas Low Pressure	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	25 PSI
DS	Digested Sludge	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI
OC	Odorization Chemical	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	1200 PSI
OS	Oxygen Scavanger	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI
NS	Nuetralizing Adjustment	< = 2 Stainless Steel Type	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI

		316L				
AA	Alkalinity Adjustment	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI
PD	Process Drain	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 PSI
PDS	Pre-Dewatering Sludge Cake	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	450 PSI
PG	Process Gas	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	100 PSI
PG	Process Gas	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI
PL-LUB	Pipeline Lubrication	Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	450 PSI
PW	Potable Water	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI
RW-PL	Reclaimed Water - Plant Low	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI
TW	Tempered Water	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI
RW-PH	Reclaimed Water - Plant High Pressure	< 3" Stainless Steel Type 316L	Socket Welded (Taped Wrapped Burried)	See Section 15012 Steel Pipe	300 PSI	250 PSI
SFW	Softened Water	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	100 PSI
SFW	Softened Water	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI
SW	Service Water	< 3" Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	250 PSI	150 PSI
THS	Thermal	< = 2	Socket Weld	See Section	N/A	100 PSI

	Hydroloyzed Sludge	Stainless Steel Type 316L	(Exposed)	15012 Steel Pipe		
THS	Thermal Hydroloyzed Sludge	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI
V	Vent	Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	N/A
Site	Sidestream	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 SI

2. Unit of Measure & Quantity

Price shown for foreign material, AIS compliant domestic materials not available.

Ulliman Schutte Construction					
SIZE (in.)	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL COST**
	Pipe				
0.75	316SS SCH40 SMLS PIPE	20	LF	$	$
1	316SS SCH40 SMLS PIPE	740	LF	$	$
1.25	316SS SCH40 SMLS PIPE	180	LF	$	$
1.5	316SS SCH40 SMLS PIPE	1180	LF	$	$
2	316SS SCH40 SMLS PIPE	600	LF	$	$
2.5	316SS SCH40 SMLS PIPE	40	LF	$	$
3	316SS SCH40 SMLS PIPE	100	LF	$	$
4	316SS SCH40 SMLS PIPE	80	LF	$	$
	Fittings				
0.75	316SS 3000# SW 90 ELBOW	3	EA	$	$
1	316SS 3000# SW 90 ELBOW	114	EA	$	$
1.25	316SS 3000# SW 90 ELBOW	28	EA	$	$
1.5	316SS 3000# SW 90 ELBOW	116	EA	$	$
2	316SS 3000# SW 90 ELBOW	57	EA	$	$
2.5	316SS 3000# BW 90 ELBOW	3	EA	$	$
3	316SS 3000# BW 90 ELBOW	40	EA	$	$
4	316SS 3000# BW 90 ELBOW	12	EA	$	$
1	316SS 3000# SW TEE	23	EA	$	$
1.25	316SS 3000# SW TEE	6	EA	$	$
1.5	316SS 3000# SW TEE	28	EA	$	$
2	316SS 3000# SW TEE	10	EA	$	$
2.5	316SS 3000# BW TEE	1	EA	$	$
3	316SS 3000# BW TEE	20	EA	$	$
4	316SS 3000# BW TEE	2	EA	$	$
1.5	316SS 3000# SW 45 ELBOW	14	EA	$	$
2	316SS 3000# SW 45 ELBOW	12	EA	$	$
2.5	316SS 3000# BW 45 ELBOW	4	EA	$	$
0.75	316SS 3000# SW UNION	1	EA	$	$
0.75	316SS 3000# SW CPLG	1	EA	$	$
1	316SS 3000# SW UNION	25	EA	$	$
1	316SS 3000# SW CPLG	25	EA	$	$
1.5	316SS 3000# SW UNION	41	EA	$	$
1.5	316SS 3000# SW CPLG	41	EA	$	$
2	316SS 3000# SW UNION	19	EA	$	$
2	316SS 3000# SW CPLG	19	EA	$	$
3	316SS 3000# SW UNION	14	EA	$	$
3	316SS 3000# SW CPLG	14	EA	$	$
4	316SS 3000# SW UNION	4	EA	$	$
4	316SS 3000# SW CPLG	4	EA	$	$
1X3/4	316SS 3000# SW RED CPLG	10	EA	$	$
1.5X1	316SS 3000# SW RED CPLG	5	EA	$	$
2X1.5	316SS 3000# SW RED CPLG	19	EA	$	$
2.5X2	316SS 3000# BW RED CPLG	2	EA	$	$
3X2	316SS 3000# BW RED CPLG	10	EA	$	$
4X3	316SS 3000# BW RED CPLG	8	EA	$	$

English Construction Co.					
Size (in.)	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNITCOST**	**TOTAL Cost**
	Pipe				
0.5	316L SEAMLESS A312 SS PIPE	20	LF	$	$
0.75	316L SEAMLESS A312 SS PIPE	80	LF	$	$
1	316L SEAMLESS A312 SS PIPE	140	LF	$	$
1.25	316L SEAMLESS A312 SS PIPE	120	LF	$	$
1.5	316L SEAMLESS A312 SS PIPE	160	LF	$	$
2	316L SEAMLESS A312 SS PIPE	720	LF	$	$
2.5	316L SEAMLESS A312 SS PIPE	183	LF	$	$
3	316L SEAMLESS A312 SS PIPE	80	LF	$	$
	Fittings				
1.25	SS T316 3000# SW UNION	10	EA	$	$
1	SS T316 3000# SW UNION	4	EA	$	$
1	SS T316 3000# SW 90	10	EA	$	$
2	SS T316 3000# SW 90	1	EA	$	$
1	SS T316L 3000# SW UNION	5	EA	$	$
1	SS T316L 3000# SW 90	35	EA	$	$
1	SS T316L 3000# SW TEE	1	EA	$	$
1.5	SS T316L 3000# SW UNION	15	EA	$	$
1.5	SS T316L 3000# SW 90	18	EA	$	$
1.5	SS T316L 3000# SW ST 90	10	EA	$	$
1.5	SS T316L 3000# SW TEE	13	EA	$	$
1.5X1	SS T316L 3000# SW BUSH	4	EA	$	$
2	SS T316L 3000# SW COUPLING	31	EA	$	$
2	SS T316L 3000# SWUNION	38	EA	$	$
2	SS T316L 3000# SW UNION SSxTHP EQ	4	EA	$	$
2	SS T316L 3000# SW 90	76	EA	$	$
2	SS T316L 3000# SW TEE	13	EA	$	$
2X.75	SS T316L 3000# SW BUSH	4	EA	$	$
2X1	SS T316L 3000# SW BUSH	4	EA	$	$
2X1.5	SS T316L 3000# SW BUSH	8	EA	$	$
2.5	SS T316L 3000# BW UNION	14	EA	$	$
2.5	SS T316L 3000# BW 90	64	EA	$	$
2.5	SS T316L 3000# BW TEE	5	EA	$	$
2.5	SS T316L 3000# BW 90	13	EA	$	$
2.5	SS T316L 3000# BW TEE	1	EA	$	$
2	SS T316L 3000# BW FLANGE	4	EA	$	$
3	SS T316L 3000# BW FLANGE	16	EA	$	$
1X.75	SS T316L 3000# SW BUSH	4	EA	$	$
0.75	SS T316L 3000# THD 90	4	EA	$	$
1X.75	SS T316L 3000# SW COUP	2	EA	$	$
2	SS T316 3000# SW 45	2	EA	$	$
3	SS T316L 3000# BW 90	13	EA	$	$
3	SS T316L 3000# BW 45	2	EA	$	$
3	SS T316L 3000# BW UNION	4	EA	$	$
3	SS T316L 3000# BW TEE	2	EA	$	$
3X1	SS T316L 3000# BW BUSH	1	EA	$	$
3	SS T316L 3000# BW 90	2	EA	$	$
3	SS T316L 3000# BW TEE	2	EA	$	$
3X2	SS T316L 3000# BW TEE	4	EA	$	$
3X2	SS T316L 3000# BW RED	1	EA	$	$

.5X2.5	SS T316L 3000# THD NIP/	48	EA	$ [redacted]	$ [redacted]
1X2.5	SS T316L 3000# THD NIP/	8	EA	$ [redacted]	$ [redacted]
1X3	SS T316L 3000# THD NIP/	24	EA	$ [redacted]	$ [redacted]
2X2	SS T316L 3000# THD NIP/	3	EA	$ [redacted]	$ [redacted]
2X2.5	SS T316L 3000# THD NIP/	30	EA	$ [redacted]	$ [redacted]
2 X 3	SS T316L 3000# THD NIP/	14	EA	$ [redacted]	$ [redacted]
.75X2	SS T316L 3000# THD NIP/	4	EA	$ [redacted]	$ [redacted]
.75X12	SS T316L 3000# THD NIP/	4	EA	$ [redacted]	$ [redacted]
2X2.5	SS T316L 3000# THD NIP/	4	EA	$ [redacted]	$ [redacted]

3. Quantity (See above table).

[redacted]

[redacted]

5. Location of the construction project.

Neuse River RRF Bioenergy Recovery Project
8500 Battle Bridge Road
Raleigh, NC 27610

6. Name and address of the proposed supplier.

[redacted]

[redacted]

[redacted]

3. Project Schedule.

Pipe Designation	Service	Material	Type of Joint	Class/Design	Restraint System/Design Pressure	Test Pressure	Start Date	Expected Installation Finish Date
Air-S	Compressed Air Service	Stainless Steel	Socket Weld	SCH 40	N/A	200 PSI	Upon Receiving Waiver	12/1/2020
DEOF	Digester Emergency Overflow	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	10 PSI	Upon Receiving Waiver	11/1/2020
DEOF	Digester Emergency Overflow	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 PSI	Upon Receiving Waiver	11/1/2020
DGL	Digester Gas Low Pressure	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	25 PSI	Upon Receiving Waiver	11/1/2020
DGL	Digester Gas Low Pressure	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	25 PSI	Upon Receiving Waiver	11/1/2020
DS	Digested Sludge	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI	Upon Receiving Waiver	11/1/2020
OC	Odorization Chemical	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	1200 PSI	1/1/2021	11/1/2021
OS	Oxygen Scavanger	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI	1/1/2021	11/1/2021
NS	Nuetralizing Adjustment	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI	1/1/2021	11/1/2021
AA	Alkalinity Adjustment	< = 2 Stainless Steel Type	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	250 PSI	1/1/2021	11/1/2021

		316L						
PD	Process Drain	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 PSI	Upon Receiving Waiver	11/1/2021
PDS	Pre-Dewatering Sludge Cake	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	450 PSI	1/1/2021	11/1/2021
PG	Process Gas	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	100 PSI	1/1/2021	11/1/2021
PG	Process Gas	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI	1/1/2021	11/1/2021
PL-LUB	Pipeline Lubrication	Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	450 PSI	Upon Receiving Waiver	11/1/2021
PW	Potable Water	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI	Upon Receiving Waiver	11/1/2021
RW-PL	Reclaimed Water - Plant Low	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI	Upon Receiving Waiver	11/1/2021
TW	Tempered Water	< 4" Stainless Steel Type 316L (Exposed)	Socket Weld	See Section 15012 Steel Pipe	250 PSI	250 PSI	Upon Receiving Waiver	11/1/2021
RW-PH	Reclaimed Water - Plant High Pressure	< 3" Stainless Steel Type 316L	Socket Welded (Taped Wrapped Burried)	See Section 15012 Steel Pipe	300 PSI	250 PSI	Upon Receiving Waiver	11/1/2021
SFW	Softened Water	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	100 PSI	1/1/2021	11/1/2021

SFW	Softened Water	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI	1/1/2021	11/1/2021
SW	Service Water	< 3" Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	250 PSI	150 PSI	1/1/2021	11/1/2021
THS	Thermal Hydroloyzed Sludge	< = 2 Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	100 PSI	Upon Receiving Waiver	11/1/2021
THS	Thermal Hydroloyzed Sludge	> 2 Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	100 PSI	Upon Receiving Waiver	11/1/2021
V	Vent	Stainless Steel Type 316L	Socket Weld (Exposed)	See Section 15012 Steel Pipe	N/A	N/A	Upon Receiving Waiver	11/1/2021
Site	Sidestream	Stainless Steel Type 316L	Welded/Flanged (Exposed	See Section 15012 Steel Pipe	N/A	10 PSI	Upon Receiving Waiver	11/1/2021

4. Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials.

Updated with Addendum #3 Changes

SECTION 15012

STEEL PIPE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Steel pipe and fittings shall conform to AWWA C200 or ASME standards as indicated herein. Steel pipe shall be new and shall meet or exceed the manufacturer and material requirements of ASTM A53, Grade B or ASTM A139, Grade B.

B. The AWWA Specifications referenced in this section are supplemented as follows:

1. An affidavit of compliance is required from the pipe manufacturer.

2. The steel manufacturer's certification that the material meets the ASTM Specification will be accepted in lieu of tests on specimens taken from the fabricated pipe.

3. The fabricator may purchase steel plates on the chemical basis only, and shall furnish to the Owner certified test reports.

4. Joints shall be flanged unless otherwise indicated on the Drawings.

C. All parts of the materials furnished shall be amply designed, manufactured and constructed for the maximum stresses occurring during fabrication and erection. All materials shall be new and both workmanship and materials shall be of the very best quality, entirely suitable for the service to which they will be subjected and shall conform to all applicable sections of these Specifications. Manufacturer's designs shall accommodate all the requirements of these Specifications.

D. The Contractor shall be responsible for the structural design of the steel pipe, fittings and couplers. The Contractor shall submit certification that the steel pipe, fittings and couplers have been designed to resist all loads implied and reasonably anticipated.

E. Reference Section 15000, Basic Mechanical Requirements.

PART 2 -- PRODUCTS

2.01 STAINLESS STEEL PIPE AND FITTINGS FOR DIGESTER GAS, PROCESS GAS, SOFTENED WATER, BOILER CHEMICAL, ODORIZATION CHEMICALS, DIGESTED SLUDGE, DIGESTER EMERGENCY OVERFLOW, THERMALLY HYDROLIZED SLUDGE, PRE-DEWATERED SLUDGE CAKE, PIPELINE LUBRICATION, AND PROCESS DRAIN SERVICES

A. Stainless steel piping shall be of nominal sizes ranging from one-half (1/2) inch to twenty-four (30) inches. Piping shall be manufactured from ASTM A312, Type 316L stainless steel. Stainless steel piping shall be in accordance with ASME B36.19. Stainless steel piping wall

Paragraph 2.01, B., 3.: Delete and replace with "Piping 2 inches and smaller shall be seamless and piping larger than 2 inches shall be seamless or welded seam piping in accordance with ASTM A312."

thickness for low pressure digester gas larger than 2 inches, shall be Schedule 10S. Unless otherwise indicated, all other stainless steel piping shall be schedule 40S. Stainless steel pipe, at a minimum, shall be service rated as indicated in the Piping Schedule. Unless otherwise specified, drain and vent piping for each service shall match the specified service piping. Stainless steel pipe shall be as manufactured by Douglas Brothers, Felker Bros. Corp., or equal.

B. The following information shall be provided:

1. An affidavit of compliance is required from the pipe manufacturers.

2. The steel manufacturer's certification that the material meets the ASTM specification will be accepted in lieu of tests on specimens taken from fabricated pipe.

3. ~~Only seamless shall be permitted unless otherwise required for fabrication of large diameter pipe in accordance with ASTM A312.~~

4. Joints in piping larger than 2-inches in diameter shall be butt welded or flanged, unless otherwise shown on the Drawings. Joints in piping 2-inches and smaller diameter shall be socket welded, unless otherwise shown on the Drawings.

C. Fittings larger than 2-inches shall be the buttwelded type, shall be fabricated from ASTM A403, Type 316L, and shall conform to ANSI/ASME B16.9. Fittings for Pre-Dewatered Sludge Cake piping shall be long radius smooth bore with a radius equal to five (5) pipe diameters as indicated on the Drawings. Fittings 2-inches and smaller shall be socket-welded type, shall be fabricated from ASTM A-182, Type 316L, and shall conform to ANSI/ASME B16.11, Class 3000.

D. Flanges, where shown on the Drawings for low pressure digester gas, shall be a lap joint flange assembly consisting of a 316L stainless steel slip-on rolled angle ring with a ASTM A182, Type 316L stainless steel drilled back up flange, and shall conform dimensionally to ANSI B16.5, Class 150, unless specified otherwise herein. Hardware shall be stainless steel per ASME B18.2, type and grade to prevent galling. The angle of leg shall not interfere with the flange bolt holes. The back-up flanges and plate flanges shall be supplied with the following nominal thicknesses:

Nom. Pipe Size (in.)	Flange Thickness (in.)
2-1/2 to 3	1/2
4	9/16
6 to 10	5/8
12 to 16	3/4
18 to 20	7/8
24	1

E. Flanges where shown on the Drawings for Pre-Dewatered Sludge Cake piping shall be ANSI/ASME B16.5, pressure Class 300, AISI Type 316L stainless steel weld neck type with the bore inside diameter of the weld neck flange matching the bore inside diameter of the pipe. The weld neck shall be butt welded to the pipe such that there is a smooth non-raised transition between the two.

F. Flanges, where shown on the Drawings for digested sludge, digester emergency overflow, thermally hydrolyzed sludge and process gas piping shall be ANSI/ASME B16.5, pressure Class 150, AISI Type 316L stainless steel weld neck type.

G. Grooved couplings where shown on the Drawings for Pre-Dewatered Sludge Cake piping shall conform to AWWA C606 with shoulder type joint on the exterior of the pipe wall. Cut or roll type grooved joints shall not be acceptable. Grooved couplings shall only be allowed where indicated on the Drawings. The coupling shall be Victaulic Style W89, galvanized steel with Vic-Rings and Grade T nitrile gasket and a minimum rated working pressure of 350 psi. Bolts and nuts shall be ASTM F593, Type 316 stainless steel. Joints shall be prepared such that there is a smooth non-raised transition between pipes. Shoulder ring shall be of the same material as the pipe.

H. Hexagonal head and bolts and nuts shall be provided. Size and length in accordance with the "American Standard" and comply with the requirements of the ANSI/AWWA Standards. Flange bolts shall be ASTM A193, Grade B8M, Class 1, ANSI B18.2.1, heavy hex head, length such that, after installation, the bolts will project 1/8 to 3/8 inch beyond outer face of the nut. Nuts shall be ASTM A194, Grade 8M, ANSI/ASME B18.2.2, heavy hex pattern. Washers shall be installed under the nuts.

I. Gaskets shall be "Ring Gasket" type, 1/8-inch minimum thickness, EPDM and shall be suited for the service intended. gaskets shall be 1/8-inch minimum thickness and shall be of a material suitable for the service conditions specified in the Piping Schedule. Dielectric gasket material service rated for the service conditions specified in the Piping Schedule, shall be provided at all transitions to material other than mild steel.

J. Branch connections 2-1/2 inches and smaller shall be made with welding fittings. Welded outlets shall be used. Where the exact outlet size desired is in doubt, but is known to be less than 1 inch, a 1 inch outlet shall be provided and reducing bushings used as needed. Branch connections sized 3 and larger shall be made with pipe nipples or with welding fittings with welded outlets. Pipe nipples and welding fittings shall be welded to the pipe shell and reinforced as needed to meet design and testing requirements. The pressure rating of branch and branch connections shall equal or exceed the pressure rating of the main pipe it is connected to. Small branch connections shall be so located that they will not interfere with joints, supports, or other details, and shall be provided with caps or plugs to protect the threads during shipping and handling.

K. Welding practices for joints shall conform to those specified for the manufacture of the pipe and fittings in ASTM, and the specifications contained herein. All welds shall be free from burrs, snags or rough projections.

L. Welding shall be performed by AWS certified welders in conformance with standard procedures. Piping with wall thickness up to 11 gauge (0.125") shall be welded with the TIG (GTAW) process. Heavier walls shall be properly beveled and have a root pass with the TIG (GTAW) process followed by subsequent passes with the TIG (GTAW), MIG (GMAW), or Metallic Arc (SMAW) process. Filler wire of ELC grades only shall be added to all welds to provide a cross section at the weld equal to or greater than the parent metal. Weld deposit shall be greater than the parent metal. Weld deposit shall be smooth and evenly distributed and have a crown of no more than 1/16 inch on the I.D. and 3/32 inch on the O.D. of the piping or fittings. Concavity, undercut, cracks or crevices shall not be allowed. All joints shall have true edges as to leave no shoulder on pipe interior. Butt-welds shall have full

penetration to the interior surface, and inert gas shielding shall be provided to the interior and exterior of the joint. Excessive weld deposits, slag, spatter and projections shall be removed by grinding. Angle face rings shall be continuously welded on both sides to the pipe or fitting. Welds on gasket surfaces shall be ground smooth.

M. All elbows through 24 inch size shall be long radius, die formed and shall be automatically butt welded and shall be of the same material and thickness as the pipe. All fittings shall be welded with 316L filler metal, using gas tungsten-arc procedures with inert gas backing. Fitting dimensions shall be in accordance with ANSI B16.9, and shall be terminated and dimensioned as indicated on the Drawings.

N. Pipe spools shall be manually welded with 316L filler metal, using gas tungsten-arc procedures with internal gas purge where internal weld seams are not accessible. Where they are accessible, seams shall be welded both inside and outside, using manual shielded metal-arc procedures. Weld seams shall have full penetration and be free of oxidation, crevices, pits, cracks and protrusions.

O. All pipe, fittings and spools shall be completely pickled and passivated by immersion in a nitric-hydrofluoric bath at the proper temperature and length of time to insure removal of all free iron, weld scale and other impurities and to insure the establishment of a passive surface. A clean water rinse shall follow the acid pickle.

P. The field testing procedure for low pressure digester gas piping shall use air pressure only. Hydrostatic testing shall be utilized on all other stainless steel piping unless approved otherwise by the Engineer.

Q. The inspection of all welds shall be required. This shall be a visual inspection for crevices, pits, cracks, protrusions and oxidation deposits. Presence of any of these items found in the weld seams shall be considered as grounds for rejection of the joint.

R. All fabricated piping shall have openings plugged and flanges secured for storage and/or transport after fabrication. All fabricated piping shall be piece marked with identifying numbers or codes which correspond to the Contractor's layout and installation drawings. The marks shall be located on the spools at opposite ends and 180 degrees apart.

S. The piping supplier during manufacturing, fabrication and handling stages, and the Contractor during handling and installation stages, shall use extreme care to avoid the contact of any ferrous materials with the stainless steel piping. Only manufacturer recommended saws, drills, files, wire brushes, etc. shall be used for stainless steel piping. Pipe storage and fabrication racks shall be non-ferrous or stainless steel or rubber lined. Nylon slings or straps shall be used for handling stainless steel piping. Contact with ferrous items may cause rusting of iron particles embedded in the piping walls. After installation, the Contractor shall wash and rinse all foreign matter from the piping surface. If rusting of embedded iron occurs, the Contractor shall pickle the affected surface with Oakite Deoxidizer SS or equal, scrub with stainless steel brushes and rinse clean.

T. All parts of the materials furnished shall be amply designed, manufactured and constructed for the maximum stresses occurring during fabrication and erection. All materials shall be new and both workmanship and materials shall be of the very best quality, entirely suitable for the service to which they will be subjected and shall conform to all applicable sections of these Specifications. Manufacturer's designs shall accommodate all the requirements of these Specifications.

Add the following after Paragraph 2.02.E: "F. All insulated carbon steel pipe surfaces, including steam and cooling fluid, shall be shop coated with an Alkyd primer, Tnemec Series 10 or equal. All other carbon steel pipe surfaces, including gas and air, shall be finished coated in accordance with Section 09900 – Painting."

U. The Contractor shall be responsible for the structural design of the stainless steel pipe, fittings and couplers. The Contractor shall submit certification that the stainless steel pipe, fittings and couplers have been designed to resist all loads implied and reasonably anticipated.

2.02 STEEL PIPE AND FITTINGS FOR STEAM, COOLING FLUID, GAS AND PROCESS AIR

A. Paragraph 2.02.A.: Delete and replace with "Steel pipe and fittings for boiler feed water, cooling fluid supply and return; natural gas and renewable natural gas (RNG); medium pressure digester gas (gas treatment), and process air service (membrane gas holder air) shall conform to ASTM A53 or A106, black, seamless, Grade B. Renewable natural gas piping shall be Schedule 80 wall thickness, all other piping shall have Schedule 40 wall thickness. Unless otherwise shown or required, all pipe and fittings shall be socket welded or butt welded. Unless otherwise specified, drain and vent piping for each service shall match the specified service piping. Steel pipe and fittings for exposed steam shall conform to A106, black, seamless, Grade B."

B. Fittings for 2 inch and smaller piping shall be conform to ASME B16.11, Class 3000 and shall be of the forged steel, socket welded type. Fittings for piping larger than 2 inch shall conform to ASME B16.9 and shall be the wrought steel, butt-welded type.

C. Where threaded connections are required for valves or instruments, threads shall conform to ASME B1.20.1, NPT with tapered threads at 3/4 inches per foot. Joints shall be made tight with an oil and graphite paste or Teflon thread tape applied to the male threads only. All pipe 1-1/2-inches and smaller shall be reamed to remove scale and dirt.

D. Flanges, where shown on the Drawings, shall be the weld neck type flange constructed of steel matching the piping, and shall conform to ASME B16.5, Class 150, unless otherwise indicated. Flanges for the steam piping shall conform to ASME B16.5, Class 300. Flanges for renewable natural gas (RNG) piping shall be ASME B16.5, Class 600.

E. Bolts and Nuts: Provide hexagonal head and bolts and nuts. Size and length in accordance with the "American Standard" and comply with the requirements of the ANSI/AWWA Standards. The bolts for flanged joints shall be per ASTM A307, Grade A, the bolts will project 1/8 to 3/8 inch beyond outer face of the nut. Nuts shall be per ASTM A563, Grade A hex nuts. Washers shall be installed under the nuts.

2.03 STEEL PIPE AND FITTINGS FOR BOILER BLOWDOWN

A. Steel pipe and fittings for exposed boiler blowdown shall conform to ASTM A106, black, seamless, Grade B with Chromium Equivalent (CREQ) >/= 0.16%, with chromium content 0.1% (resistant to flow accelerated corrosion FAC). Piping shall be Schedule 80 wall thickness. Piping downstream of the boiler blowdown valves shall conform to ASTM A335, Grade P22. Unless otherwise shown or required, all pipe and fittings shall be socket welded. Unless otherwise specified, drain and vent piping shall match the specified service piping.

B. Fittings for 2 inch and smaller piping shall be conform to ASME B16.11, Class 3000 and shall be of the socket welded type with materials matching the piping.

2.04 STAINLESS STEEL TUBING AND FITTINGS FOR BOILER CHEMICAL FEED.

A. Stainless steel pipe and fittings for boiler chemical feed systems shall be Schedule 40 seamless stainless steel tubing and shall conform to the requirements of ASTM A269, Type 316, annealed, max harness Rockwell B80, with a minimum wall thickness of 0.080 inches, with AISE Type 316 compression fittings.

2.5 MISCELLANEOUS STEEL PIPE AND FITTINGS

A. Other steel pipe and fittings not specified elsewhere shall conform to ASTM A120, black or galvanized, as directed by the Engineer, seamless, Schedule 40 or 80 as indicated in the appropriate Piping System Schedule in Section 15390, Schedules or as indicated on the Drawings.

B. Unless otherwise shown or required, all piping and fitting shall be threaded. Fittings shall conform to ANSI B16.3, 300 pound class and shall be of the black malleable iron screw type. All threaded joints shall be made tight with an oil and graphite paste or Teflon thread tape applied to the male threads only. All pipe 1-1/2 inches and smaller shall be reamed to removed scale and dirt. Pipe to be galvanized shall have a deep galvanized coating applied in full accordance with ASTM A123.

5. **Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availabiliy of the domestic construction materials for which the waiver is sought.**

Ulliman Schutte Construction, LLC:

I confirm that 6" diameter and smaller 316 stainless steel pipw, fittings, and tubing is not available AIS compliant. This includes schedule 10 and 40 and 3000# pipe in both seamless and welded seamed pipe, fittings, and tubing.

If you have any further questions, please let me know.

Thanks,

Matt Williams
Senior Project Engineer, Quality Control Manager
Ulliman Schutte Construction, LLC

[redacted]

I confirm that 6" diameter and smaller 316 stainless steel pipe, fittings, and tubing is not available AIS Compliant. This includes schedule 10 and 40 and 3000# pipe in both seamless and welded seamed pipe, fittings, and tubing.

If you have any further questions, please let me know.

Thanks,

[redacted]