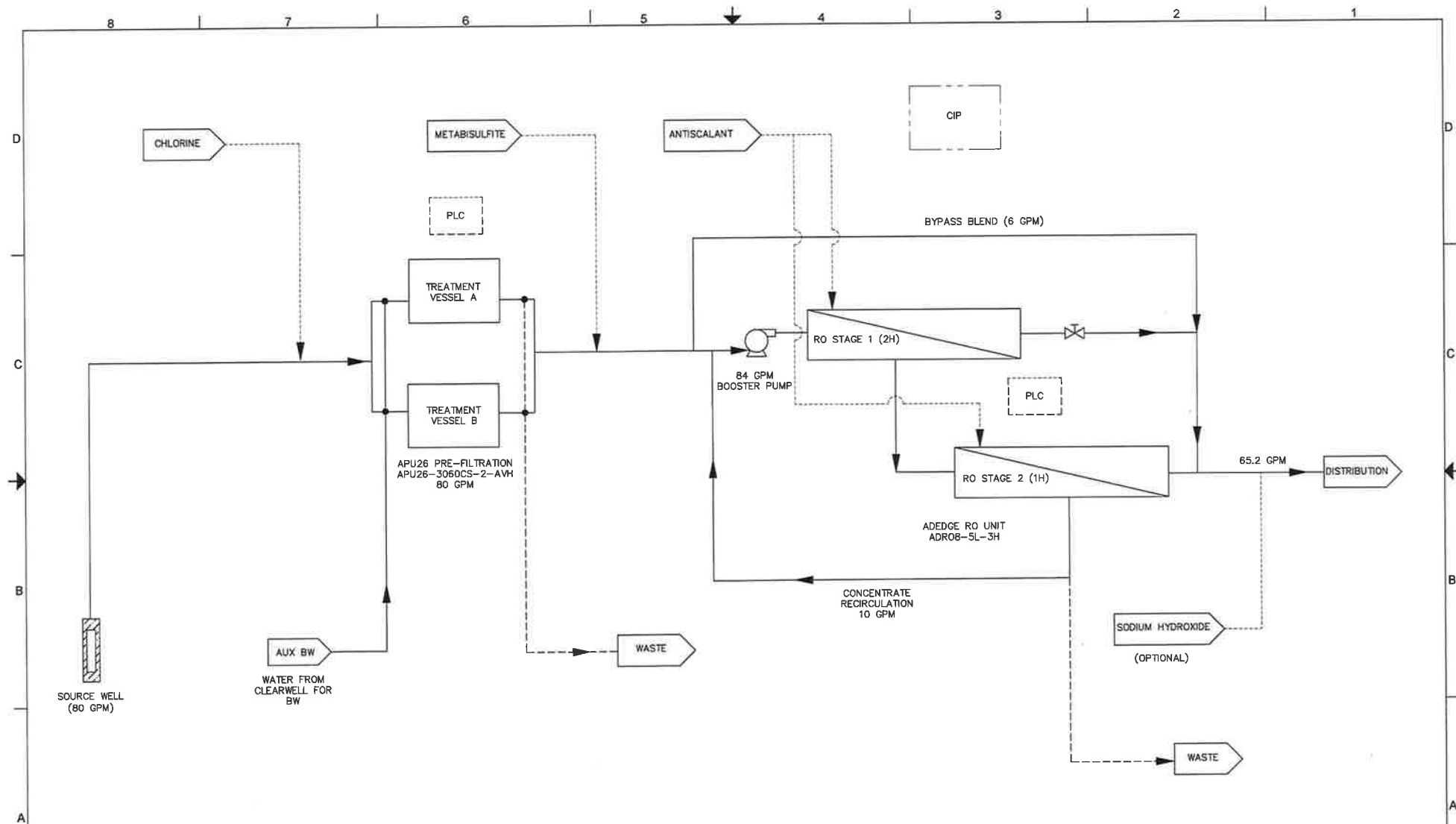




REV #	DATE	REVISIONS
1		
2		
3		
4		
5		
6		
7		
8		

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TYPE	SERVICE CONNECTIONS	TYPE / MATERIAL
A		
B		
C		

PROCESS FLOW DIAGRAM
MANGANESE, TOTAL DISSOLVED SOLIDS
REDUCTION
ADEGE TREATMENT SYSTEM
PRELIMINARY DRAWING

Drawn by DJ	Checked by CH	Approved by GG	Project -	Date 02/17/17	Scale NTS
Customer HALCHITA NTUA NAVAJO NATION, UTAH					
Dwg. File	Rev. Date	Rev. No.	Sheet		
			1 OF 1		

A detailed technical line drawing of a two-tank water filtration system. Two large, cylindrical tanks are mounted on a metal frame. Each tank has a control box on top. A complex network of pipes with various valves and fittings connects the tanks and the control boxes. The drawing is a perspective view, showing the top and side of the tanks.

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CONTRACTOR/CONTRASTA:		SHEET INDEX			REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:	DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
-----		ORIGINATING NO.	TITLE	SHEET NO.	---	---	---	---	---	SM	---	---	HWAZ-0317	5/3/17	NTS
		G-001	GENERAL NOTES	1 OF 7						MODEL:	CUSTOMER: HALCHITA, NTUA, UTAH FOR APPROVAL				
		P-001	APU TREATMENT SYSTEM	2 OF 7						ADEEDGE TREATMENT SYSTEM					
		P-002	RO TREATMENT SYSTEM	3 OF 7						MODEL: APU26-3072C0-2-315					
		M-001	APU GENERAL ARRANGEMENT	4 OF 7						MODEL: ADR08-5L-3H (2x1 ARRAY)					
		M-002	APU ISO GENERAL ARRANGEMENT	5 OF 7											
		M-003	RO GENERAL ARRANGEMENT	6 OF 7						TITLE: COVER					
		M-004	RO ISO GENERAL ARRANGEMENT	7 OF 7											

LOCATION / ACCESSIBILITY	DISCRETE SYMBOL	SHARED DISPLAY & CONTROL (DCS)	PROGRAM-ABLE LOGIC CONTROLLER	DISCRETE HARDWARE INTERLOCK	TYPICAL NOMENCLATURE
FIELD MOUNTED					
1) FIELD OR LOCALLY MOUNTED					
2) ACCESSIBLE TO AN OPERATOR AT THE DEVICE					
PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR					
1) CENTRAL OR MAIN CONTROL ROOM					
2) FRONT OF MAIN PANEL OR CONSOLE MOUNTED					
3) VISIBLE ON VIDEO DISPLAY					
4) ACCESSIBLE TO AN OPERATOR AT DEVICE OR CONSOLE					
PRIMARY LOCATION NORMALLY INACCESSIBLE TO OPERATOR					
1) CENTRAL OR MAIN CONTROL ROOM					
2) REAR OF PANEL OR CABINET MOUNTED					
3) NOT VISIBLE ON VIDEO DISPLAY					
4) INACCESSIBLE TO AN OPERATOR AT DEVICE OR CONSOLE					
AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR					
1) SECONDARY OR LOCAL CONTROL ROOM					
2) FIELD OR LOCAL CONTROL PANEL					
3) FRONT OF SECONDARY OR LOCAL PANEL MOUNTED					
4) VISIBLE ON VIDEO DISPLAY					
5) ACCESSIBLE TO OPERATOR AT DEVICE OR CONSOLE					
AUXILIARY LOCATION NORMALLY INACCESSIBLE TO OPERATOR					
1) SECONDARY OR LOCAL CONTROL ROOM					
2) FIELD OR LOCAL CONTROL PANEL					
3) REAR OF SECONDARY/LOCAL OR CABINET PANEL MOUNTED					
4) NOT VISIBLE ON VIDEO DISPLAY					
5) NOT ACCESSIBLE TO OPERATOR AT DEVICE OR CONSOLE					

TYPICAL TRANSMITTER NOMENCLATURE AND TRANSMITTER LOCATION ARE AS FOLLOWS:

IF THE TRANSMITTER IS CONTROL PANEL MOUNTED THE PANEL TAG NUMBER WILL BE PROVIDED (E.G. MCP-191). IF THE TRANSMITTER IS LOCALLY MOUNTED ON THE SENSOR, THE DESIGNATION "LOCAL" WILL BE PROVIDED. IF THE TRANSMITTER IS MOUNTED ON A LOW FLOW PANEL THEN THE TAG WILL BE PROVIDED (E.G. LFP-175).

TYPICAL PANEL I/O NOMENCLATURE

AI ANALOG INPUT (E.G. mA OR mV)
AO ANALOG OUTPUT (E.G. mA OR mV)
DI DIGITAL INPUT (E.G. NS OR HSI)
NS NORMAL SPEED; SINGLE CONTACT CLOSURE
HSI HIGH SPEED INPUT; MULTIPLE CONTACT CLOSURES
DO DIGITAL OUTPUT
1) RELAY FOR VALVE OR PUMP ON/OFF CONTROL
2) PULSE FOR DOSING PUMP AND FLOW CONTROL
SI DATA OR SCADA INPUT (E.G. MODBUS OR IIP)
SO DATA OR SCADA OUTPUT (E.G. MODBUS OR IIP)

MCP-191
Panel where the device input is received
Type of I/O

MCP-191
Transmitter location
Type of transmitter

AE	ANALYTICAL SENSOR
AIT	ANALYTICAL INDICATING TRANSMITTER
BFV	BUTTERFLY VALVE
BLO	BLOWER
BLV	BALL VALVE
CBT	CONE BOTTOM TANK
CCL	CO ₂ CYLINDER
CP	CHEMICAL FEED PUMP
CKV	CHECK VALVE
CST	CORPORATION STOP
CTK	CHEMICAL STORAGE TANK
DMV	DIAPHRAGM VALVE
DTK	CHEMICAL DAY TANK
EDC	EDUCATOR/EJECTOR (CHEMICAL DRAW)
FBT	FLAT BOTTOM TANK
FCP	FILTER CONTROL PANEL
FCV	FLOW CONTROL VALVE
FG	SIGHT GLASS (PVC/STAINLESS)
FKV	FLECK VALVE
FIT	FLOW INDICATING TRANSMITTER
FLT	BAG OR CARTRIDGE FILTER HOUSING
FME	FLOW METER
FOT	FLOW TOTALIZING TRANSMITTER
FT	FLOW TRANSMITTER
HET	HEATING ELEMENT
HP	HYDRAULIC PANEL
INJ	INJECTION ASSEMBLY
JB	JUNCTION BOX
LCP	LOCAL CONTROL PANEL
LG	LEVEL VIEWING
LIT	LEVEL INDICATION TRANSMITTER
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LT	LEVEL TRANSMITTER
MCP	MASTER CONTROL PANEL
MEL	MEMBRANE ELEMENT
MFO	MEDIA FILTER COMPOSITE VESSEL
MFS	MEDIA FILTER CARBON STEEL VESSEL
MIX	STATIC MIXER
MPP	MAIN POWER PANEL
PCP	PERISTALTIC CHEMICAL PUMP
PDIC	PRESSURE DIFFERENTIAL INDICATING SWITCH
PI	PRESSURE INDICATION (LOCAL READING)
PIT	PRESSURE INDICATING TRANSMITTER
P	PUMP
PSL	PRESSURE SWITCH LOW
PSH	PRESSURE SWITCH HIGH
RMH	RO MEMBRANE HOUSING
PSE	PRESSURE REDUCING VALVE
PSV	PRESSURE RELIEF VALVE
PT	PRESSURE TRANSDUCER
PVL	PRESSURE VESSEL
RP	RELAY PANEL
SPV	SAMPLE VALVE
TI	TEMPERATURE INDICATION
YIC	EVENT INDICATING CONTROLLER

TYPICAL SYMBOLS

AIR RELEASE VALVE

BALL VALVE (MANUAL / NORMALLY OPEN)

BALL VALVE (MANUAL / NORMALLY CLOSED)

BALL VALVE (ELECTRIC ACTUATED)

BUTTERFLY VALVE (MANUAL)

BUTTERFLY VALVE (ELECTRIC ACTIVATED)

BUTTERFLY VALVE (PNEUMATIC ACTIVATED)

CHECK VALVE

CIRCUIT BALANCING VALVE (MANUAL)

CROSSOVER VALVE

DIAPHRAGM VALVE (MANUAL)

GATE VALVE

GLOBE VALVE

NEEDLE OR TOGGLE VALVE (NORMALLY CLOSED)

PILOT OPERATED DIAPHRAGM VALVE

PRESSURE REDUCING VALVE

PRESSURE RELIEF VALVE

SOLENOID CONTROL VALVE

THREE-WAY VALVE (MANUAL)

VACUUM RELIEF VALVE

V-PORT BALL VALVE

LT FLOAT LEVEL INDICATOR

FE MAGNETIC FLOW METER

FE TURBINE/IMPELLER FLOW METER

FI VARIABLE AREA FLOW INDICATOR

CORPORATION STOP

STATIC MIXER

PIPE REDUCER

UNION

DRAIN

FLEXIBLE TUBING/HOSE

CAMLOCK

MAIN PROCESS LINE

SECONDARY PROCESS LINE

PIPING BY OTHER

HYDRAULIC SIGNAL

DISCRETE CONTROL SIGNAL

PNEUMATIC SIGNAL

POWER SUPPLY SIGNAL

ANALOG CONTROL SIGNAL

INSTRUMENT SUPPLY/CONNECTION TO PROCESS

ELECTRIC SIGNAL

CAPILLARY TUBE

SOFTWARE / DATA LINK

MECHANICAL LINK

SKID BOUNDARIES

CP DIAPHRAGM CHEMICAL PUMP

PCP PERISTALTIC CHEMICAL PUMP

P RECYCLE OR SUPPLY PUMP

BLO BLOWER

WPP WELL PUMP

CCL CO₂ CYLINDER

FLT BAG FILTER OR CARTRIDGE FILTER

CTK CHEMICAL TANK

PVL PRESSURE VESSEL

MFC MEDIA FILTER CO

MFS MEDIA FILTER CS

FBT FLAT BOTTOM

CBT CONE BOTTOM W/STAND

RMH RO MEMBRANE HOUSING

FOR APPROVAL

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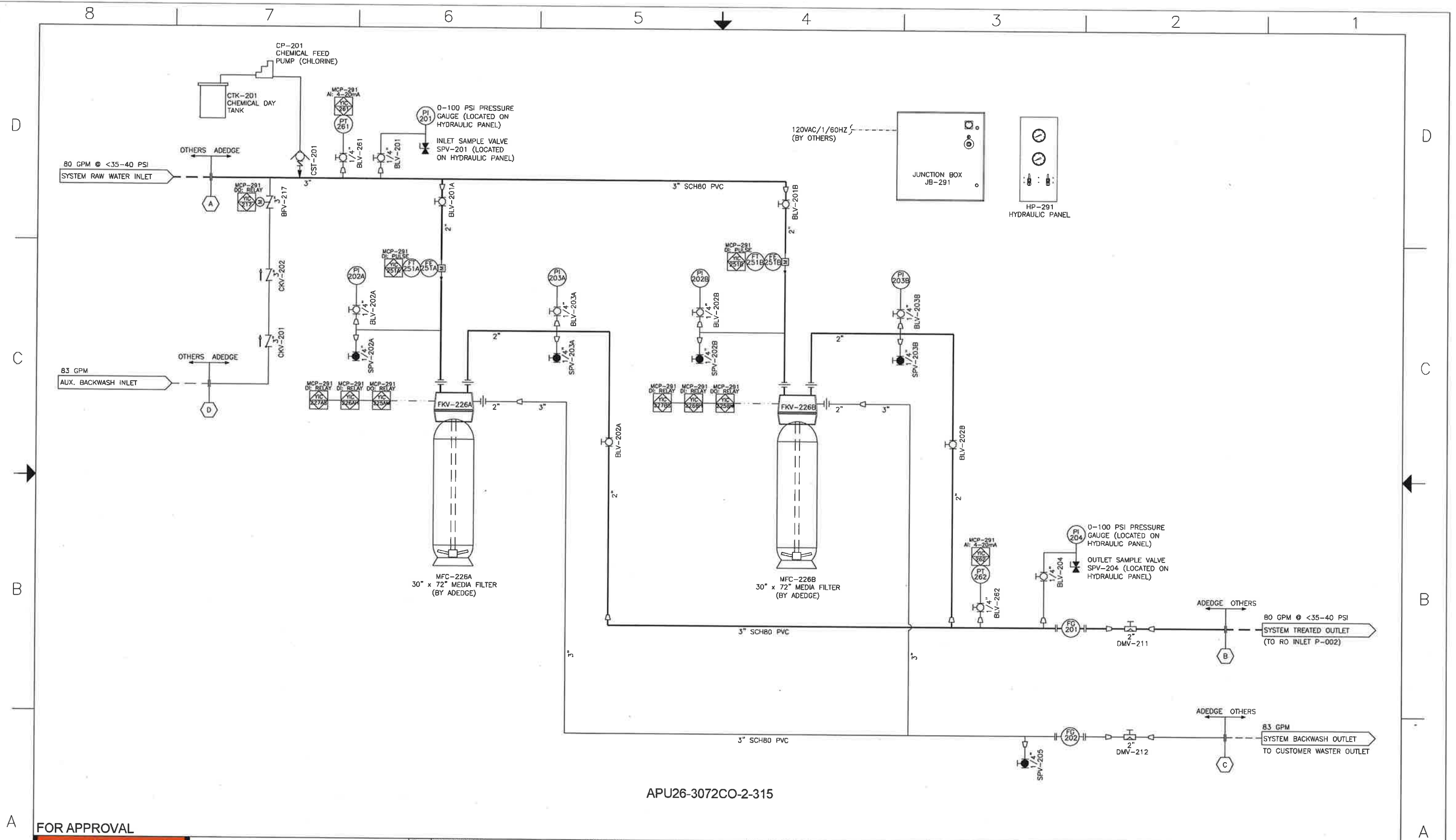
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TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:	TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:	DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
A	---	---				SM	---		HWAZ-0317	5/3/17	NTS
B	---	---									
C	---	---									
D	---	---									
E	---	---									
F	---	---									
G	---	---									

REV. #	DATE	BY	APPROVED BY:	REVISION DESCRIPTION:

MODEL:	ADEDGE TREATMENT SYSTEM	CUSTOMER:	HALCHITA NTUA, UTAH
MODEL:	APU26-3072CO-2-315		
MODEL:	ADRO8-5L-3H (2x1 ARRAY)		
TITLE:	GENERAL NOTES	DRAWING NUMBER:	G-001
		SHEET:	1 OF 7



APU26-3072CO-2-315

A FOR APPROVAL



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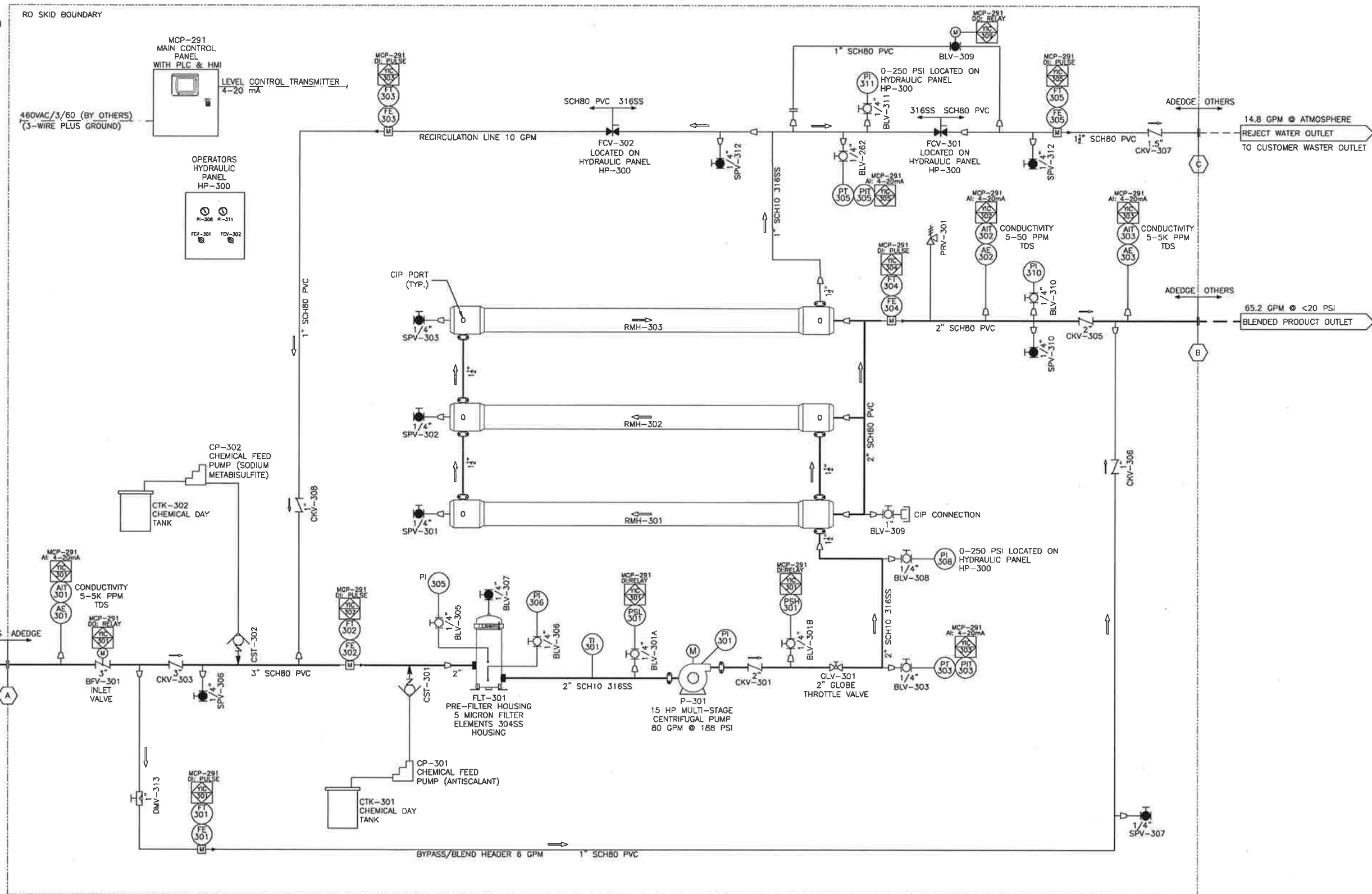
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TR.	SOURCE CONNECTIONS:	TYPE/MATERIAL:
A	SYSTEM RAW WATER INLET	3" SCH80 PVC 150# FLANGE
B	SYSTEM TREATED WATER OUTLET	3" SCH80 PVC 150# FLANGE
C	SYSTEM BACKWASH OUTLET	3" SCH80 PVC 150# FLANGE
C	AUX. BACKWASH INLET	3" SCH80 PVC 150# FLANGE

TP:	SERVICE CONNECTIONS:	TYPE/MATERIAL:		
REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:

DRAWN BY: SM	CHECKED BY: —	APPROVED BY:	PROJECT #: HWAZ-0317	DATE: 5/3/17	SCALE: NTS
MODEL: A0EDGE TREATMENT SYSTEM MODEL: APU26-3072C0-2-315 MODEL: ADRO8-5L-3H (2x1 ARRAY)			CUSTOMER: HALCHITA NTUA, UTAH		
TITLE: TREATMENT SYSTEM			DRAWING NUMBER:		SHEET:

1. HIGH PRESSURE PIPING" S10 316SS
2. LOW PRESSURE PIPING: SCH80 PVC
3. (15)-8" x 40" LANXESS LOW ENERGY MEMBRANE ELEMENTS
4. (3)-8" x 5"-LONG x 300PSI FRP MEMBRANE HOUSING



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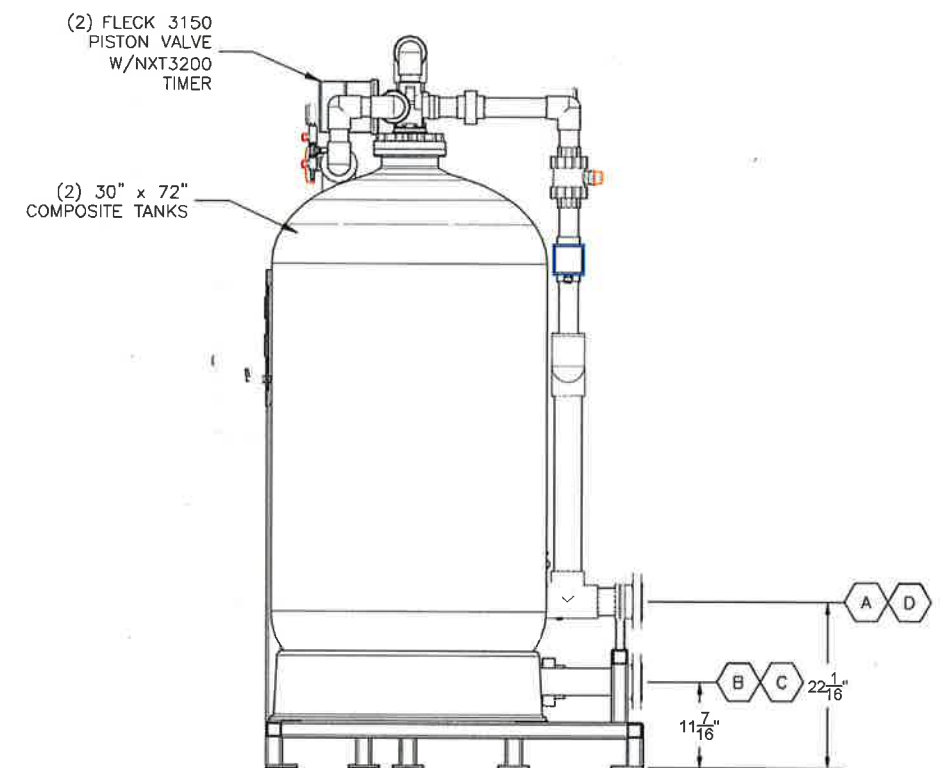
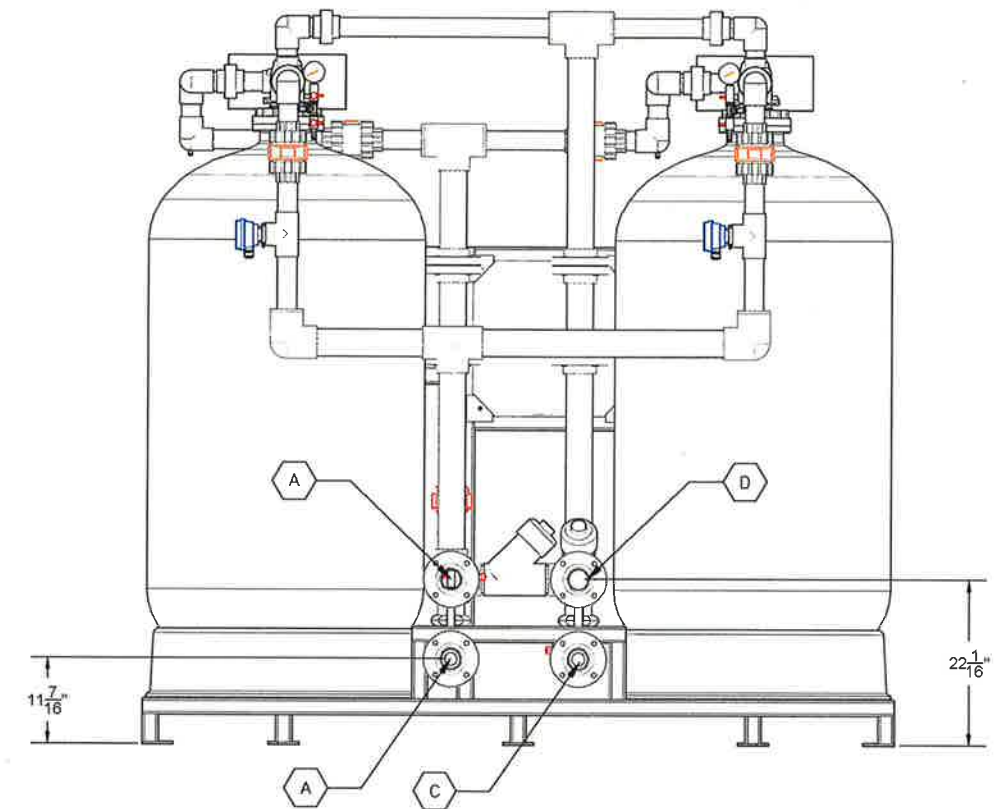
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TP.	STORAGE CONNECTIONS:	TYPE/MATERIAL:
A	RAW WATER INLET	3" SCH80 PVC 150# FLANGE
B	BLENDED PRODUCT OUTLET	2" SCH80 PVC 150# FLANGE
B	REJECT WASTE OUTLET	1.5" SCH80 PVC 150# FLANGE

TP:	SERVICE CONNECTIONS:	TYPE/MATERIAL:		
REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:

DRAWN BY: SM	CHECKED BY: —	APPROVED BY:	PROJECT #: HWAZ-0317	DATE: 5/3/17	SCALE: NTS
MODEL: AODEGE TREATMENT SYSTEM MODEL: APU26-3072CO-2-315 MODEL: ADRO8-5L-3H (2x1 ARRAY)			CUSTOMER: HALCHITA NTUA, UTAH		
TITLE: RO TREATMENT SYSTEM			DRAWING NUMBER: R-002	SHEET: 3 OF 3	



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DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
SM	—		HWAZ-0317	5/3/17	NTS
MODEL:			CUSTOMER:		
ADEGGE TREATMENT SYSTEM			HALCHITA NTUA,		
MODEL: APU26-3072C0-2-315			UTAH		
MODEL: ADRO8-5L-3H (2x1 ARRAY)					
TITLE:		DRAWING NUMBER:		SHEET:	
ADL GENERAL ASSEMBLY		M-001		1 OF 3	

D

C

B

A

D

C

B

A

DESCRIPTION:

1. SYSTEM MODEL: APU26-3072CO-2-315
2. MEDIA: AEDGE AD26L MEDIA
3. CONTROL VALVES: FLECK 3150S FILTER VALVES, NHWP PISTONS, 115V/1/60
4. VESSELS: (2) 30" DIAMETER X 72" HEIGHT COMPOSITE VESSELS
5. SYSTEM PIPING: SCH80 PVC
6. SYSTEM MAXIMUM PRESSURE: 100PSI

DIMENSIONAL NOTES:

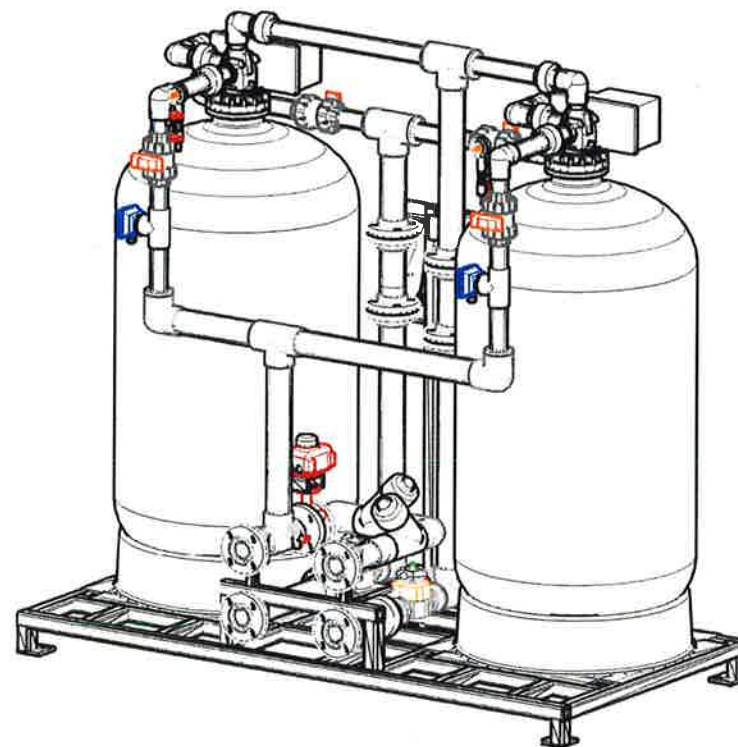
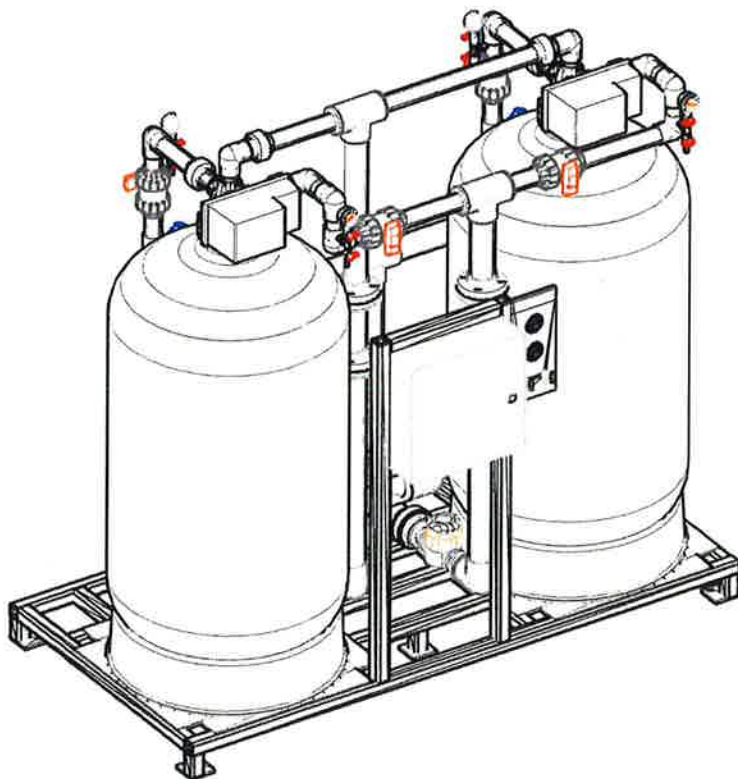
1. ALL DIMENSIONS ARE +/- 2".
2. DO NOT SCALE DRAWING. REFER TO AEDGE ENGINEERING DEPT FOR ALL DIMENSIONS.
3. (##): REFERENCE DIMENSION

GENERAL SYSTEM SPECIFICATIONS:

1. 3" SCH80 PVC INLET AND OUTLET HEADERS WITH FLANGED TIE POINTS
2. 3" SCH80 PVC BACKWASH OUTLET AND AUX BACKWASH INLET FLANGED TIE POINT
3. 2" SCH80 PVC VESSEL PIPING
4. 2" 3150 TOP-MOUNTED AUTOMATIC CONTROL VALVES WITH NHWP PISTON
5. 2" MANUAL ISOLATION VALVES ON EACH VESSEL'S RAW WATER INLET
6. 2" GF DIAPHRAGM VALVE ON SYSTEM BACKWASH OUTLET AND TREATED OUTLET
7. 304SS HYDRAULIC PANEL WITH SYSTEM INLET/OUTLET PRESSURE GAUGES, SAMPLE PORTS MONITORING PANEL AND HYDRAULIC PANEL
8. 0-100 PSI PRESSURE GAUGE AND ASAHI LABCOCK SAMPLE VALVES ON EACH VESSEL'S INLET AND OUTLET
9. LABCOCK SAMPLE VALVE ON SYSTEM BACKWASH OUTLET
10. INSERTION MAGNETIC FLOWMETER ON RAW WATER INLET TO EACH VESSEL
11. CLEAR PVC SIGHT WINDOW ON SYSTEM TREATED OUTLET AND ON SYSTEM BACKWASH OUTLET

VESSEL SPECIFICATIONS:

1. FLOW CONFIGURATION: PARALLEL
2. SERVICE FLOW RATE: 80 GPM TOTAL
3. BACKWASH FLOW RATE: 8.3 GPM PER VESSEL
4. BACKWASH WATER SOURCE: PRESSURIZED DISTRIBUTION VIA AUX. BACKWASH SUPPLY TIE-POINT
5. SYSTEM OPERATING PRESSURE: ≤ 100 PSI



FOR APPROVAL



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TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:
A	RAW WATER INLET	3" SCH80 PVC 150# FLANGE
B	TREATED WATER OUTLET	3" SCH80 PVC 150# FLANGE
C	WASTE OUTLET	3" SCH80 PVC 150# FLANGE
D	AUXILIARY BACKWASH INLET	3" SCH80 PVC 150# FLANGE

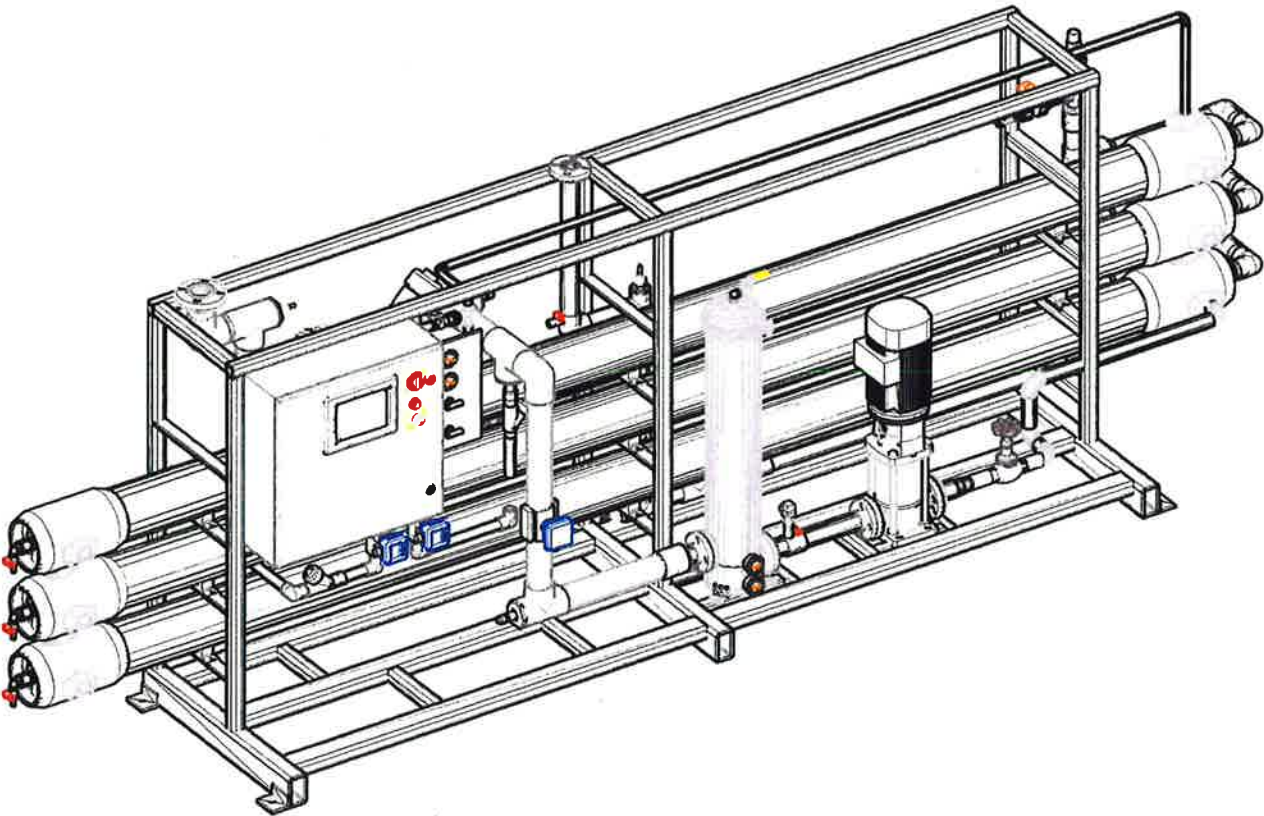
TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:

REV. # DATE BY: APPROVED BY: REVISION DESCRIPTION:

DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
SM			HWAZ-0317	5/3/17	NTS
MODEL:			CUSTOMER:		
ADEGE TREATMENT SYSTEM			HALCHITA NTUA,		
MODEL: APU26-3072CO-2-315			UTAH		
MODEL: ADRO8-5L-3H (2x1 ARRAY)					
TITLE:			DRAWING NUMBER:		SHEET:
APU GENERAL ARRANGEMENT			M-002		5 OF 7

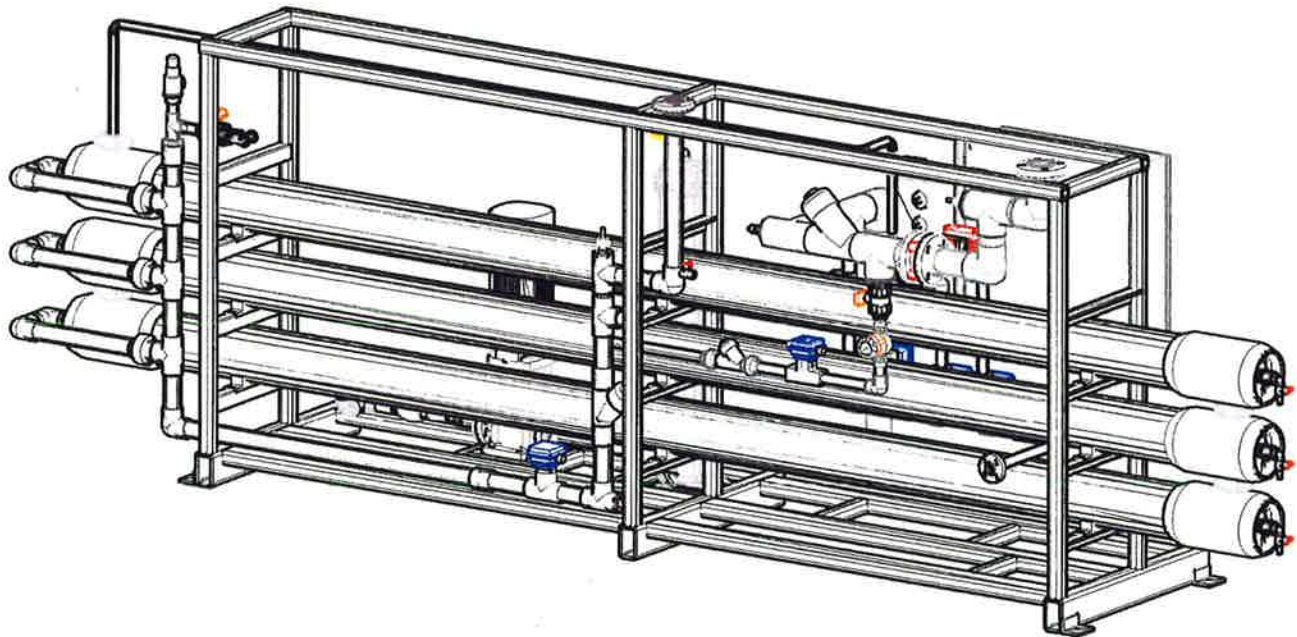
NOTES:

1. MODEL: ADRO8-5L-3H
2. PUMP MOTOR: 460VAC/3/60
3. RO FRAME MUST BE ANCHORED PROPERLY TO FLOOR BEFORE OPERATION
4. HMI: C-MORE COLOR-TOUCH SCREEN
5. DO NOT SCALE DRAWING, REFER TO ADEGE ENGINEERING DEPARTMENT FOR ALL DIMENSIONS
6. SHIPPING WEIGHT: APPROX. 4200 LBS
7. PLC CONTROL PANEL: NEMA 4XSS
8. HIGH PRESSURE PIPING: 316SS
LOW PRESSURE PIPING: SCH80 PVC
9. BOLTING HARDWARE: 304SS
10. INLET VALVE: ACTUATED BALL VALVE, PVC



NOTES:

1. RAW WATER FROM FLOW TO RO: 80 GPM
2. PUMP FLOW TO STAGE #1: 84 GPM
3. REJECT WASTE FLOW: 14.8 GPM
4. RECIRCULATION FLOW: 10 GPM
5. BYPASS/BLEND FLOW: 6 GPM
6. PERMEATE FLOW: 59.2 GPM
7. SYSTEM PERMEATE FLOW: 65.2 GPM
8. RO RECOVERY: 75%
9. SYSTEM RECOVERY: 83.3%



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TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:
A	RAW WATER INLET	3" SCH80 PVC 150# FLANGE
B	BLEND PRODUCT OUTLET	2" SCH80 PVC 150# FLANGE
C	WASTE OUTLET	1.5" SCH80 PVC 150# FLANGE

TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:

REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:

DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
SM	-		HWAZ-0317	5/3/17	NTS
MODEL:			CUSTOMER:		
ADEGE TREATMENT SYSTEM			HALCHITA NTUA,		
MODEL: APU26-3072CO-2-315			UTAH		
MODEL: ADRO8-5L-3H (2x1 ARRAY)					
TITLE:			DRAWING NUMBER:		SHEET:
RO GENERAL ARRANGEMENT			M-004		7 OF 7