

SPT SCRUBBER

Model No.: SPT 30-60 S.O. No.: 81455

Drawing No.: D-81455-04 P.O. No.: 8123

DESIGN SPECIFICATIONS

Pressure: -2.5 to 50 PSIG Test: Per ASME Code

Temperature: 535 °F Material: Alloy C-276, SB-575 UNS N10276

Color: ----- Construction: Welded

Specification: ASME BPV 2001, 2003 ADD. Sect VII, Div 1

Contaminant	Inlet Conc. (1)	Outlet Conc. (2)	Removal Efficiency	Particle Size Removed
1. HCl	2.13 lb/Hr	0.06 lb/Hr	97%	(Overall System Removal)
2.				
3.				
4.				

OPERATING CONDITIONS

Capacity: 2343 ACFM (lbs/hr) Water Vapor: lbs/hr

Gas Inlet Temp.: 535 F Pressure: 50 PSIG

Pressure Drop: "WC Recirculation Temp: F

Scrubbing Liquid: NaOH/Water Recirculation Rate: GPM

Make-up Rate: As Req'd GPM Overflow Rate: As Req'd GPM

SPRAY NOZZLE

Type: BETE SCM 24W Capacity: GPM at psig

SCRUBBER WEIGHT

Shipping (Dry): 2,500 lbs Operating (Wet): lbs

(1) - Inlet Concentration is assumed when not given.

(2) - Outlet concentration is based on maximum inlet concentration.

EVS SCRUBBER

Model No.: EVS-12 S.O. No.: 81455
Drawing No.: D-81455-005 P.O. No.: 8/23

DESIGN SPECIFICATIONS

Pressure: -2.5 to 50 PSIG Test: Per ASME Code
Temperature: 535°F Material: Alloy C-276, SB-575 UNS N10276
Color: ----- Construction: Welded
Specification: -----

Contaminant	Inlet Conc. (1)	Outlet Conc. (2)	Removal Efficiency	Particle Size Removed
1. HCl	2.13 lb/Hr	0.06 lb/Hr	97%	(Overall System Removal)
2.				
3.				
4.				

OPERATING CONDITIONS

Capacity: 2343 ACFM ----- lbs/hr
Water Vapor: ----- lbs/hr Gas Inlet Temp.: ----- F
Pressure Drop: ----- "WC Recirculation Temp: ----- F
Scrubbing Liquid: NaOH/Water Recirculation Rate: ----- GPM
Make-up Rate: As Req'd GPM Overflow Rate: As Req'd GPM

SPRAY NOZZLE

Type: BETE NCF 2048K-15 Capacity: ----- GPM at ----- psig

SCRUBBER WEIGHT

Shipping (Dry): 650 lbs Operating (Wet): ----- lbs

- (1) - Inlet Concentration is assumed when not given.
(2) - Outlet concentration is based on maximum inlet concentration.

CAUSTIC SCRUBBER PACKED TOWER

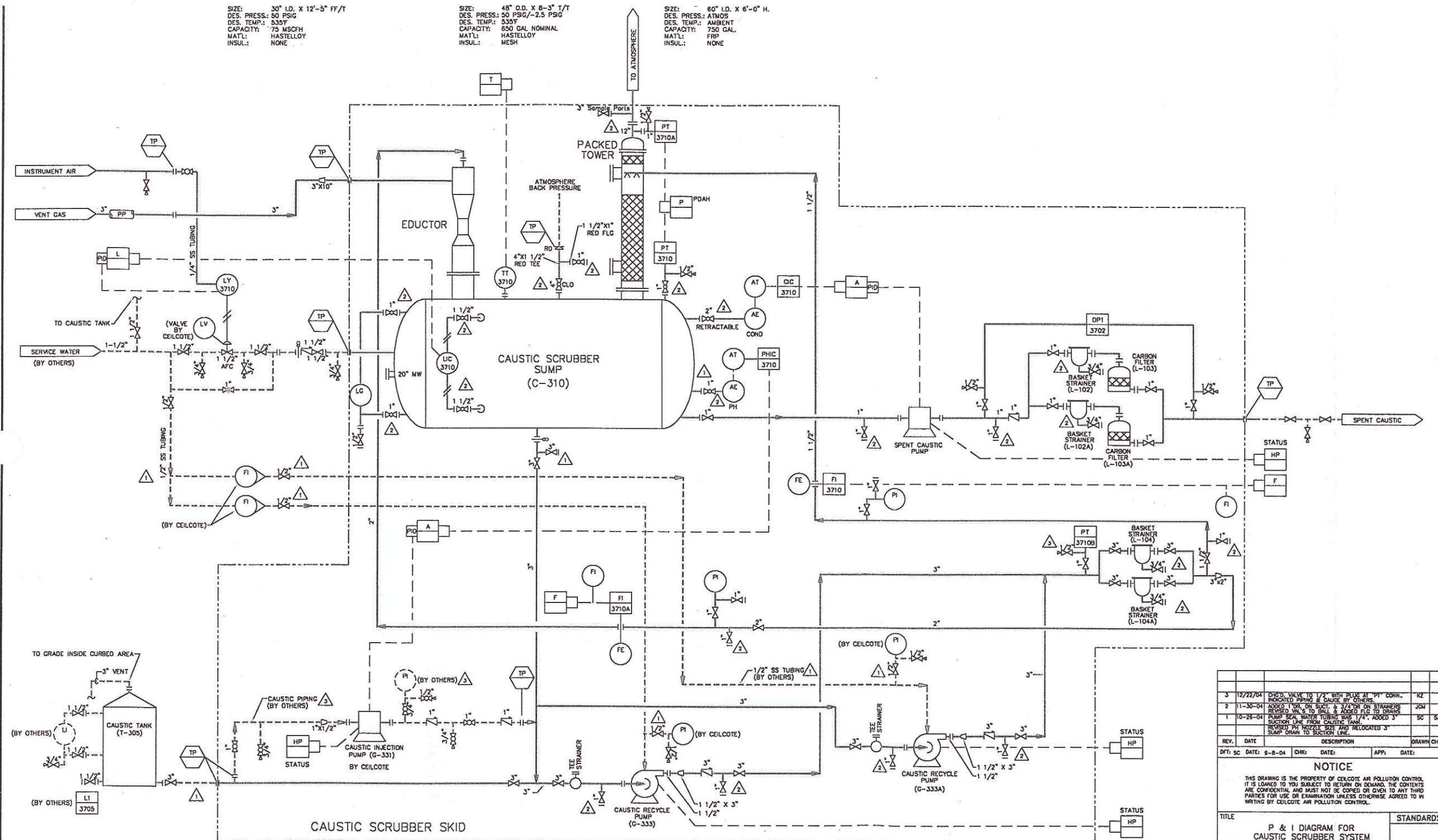
SIZE: 30" I.D. X 12'-3" FF/T
DES. PRESS.: 50 PSIG
DES. TEMP.: 530°F
CAPACITY: 75 MSCFH
MAT'L: HASTELLOY
INSUL.: NONE

CAUSTIC SCRUBBER SUMP (C-310)

SIZE: 48" O.D. X 8'-3" T/T
DES. PRESS.: 50 PSIG/-2.5 PSIG
DES. TEMP.: 530°F
CAPACITY: 650 GAL NOMINAL
MAT'L: HASTELLOY
INSUL.: MESH

CAUSTIC TANK (T-305)

SIZE: 60" I.D. X 6'-0" H.
DES. PRESS.: ATMOS
DES. TEMP.: AMBIENT
CAPACITY: 750 GAL.
MAT'L: FRP
INSUL.: NONE



CAUSTIC SCRUBBER SKID

EDUCTOR

CAUSTIC RECYCLE PUMPS (G-333 & G-333A)

SPENT CAUSTIC PUMP (G-332)

CAUSTIC INJECTION PUMP (G-331)

SIZE: EVS-12
DES. PRESS.: 50 PSIG
DES. TEMP.: 535°F
CAPACITY: 75,000 SCFH
MAT'L: HASTELLOY
INSUL.: NONE

RATED FLOW: 105 GPM
MOTOR HP: 7.5 HP
DES. PRESS.: 150 PSIG
DES. TEMP.: 180°F
DISCH. PRESS.: 43 PSIG

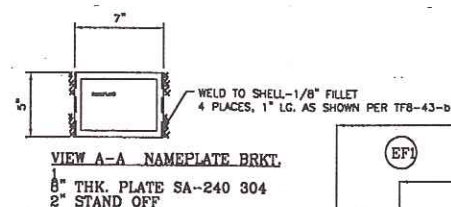
RATED FLOW: 240 GPH
MOTOR HP: 1 HP
DES. PRESS.: 150 PSIG
DES. TEMP.: 180°F
DISCH. PRESS.: 120 PSIG

RATED FLOW: 12.3 GPH
MOTOR HP: 1/3 HP
DES. PRESS.: 150 PSIG
DES. TEMP.: 180°F
DISCH. PRESS.: 50 PSIG

3	12/22/04	CHG. VALVE TO 1/2" WITH PLUG AT "PT" CORN. INDICATED PIPING & CAUSE BY OTHERS.	KZ	
2	11-30-04	ADDED 1" ON SUCT. & 3/4" ON STRAINERS REVISD VALVE TO BALL & ADDED F.L.G. TO DRAINS	JGM	
1	10-28-04	PUMP SEAL WATER TUBING WAS 1/4". ADDED 3" SUCT. LINE FROM CAUSTIC TANK. REVISD PUMP NOZZLE SIZE AND RELOCATED 3" SUMP DRAIN TO SUCT. LINE.	SC	SAC
REV.	DATE	DESCRIPTION	DRAWN	CHK'D
DFT: SC	DATE: 9-8-04	CHK: DATE:	APP: DATE:	
NOTICE				
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TITLE			STANDARD	
P & I DIAGRAM FOR CAUSTIC SCRUBBER SYSTEM				
CUSTOMER				
GIANT YORTOWN REFINERY GRAFTON, VA				
CEILCOTE AIR POLLUTION CONTROL				
14955 Sprogue Rd. Suite 250 Strongsville, Ohio 44136-1758				
QUOTE: W-24422-3		SCALE: FULL		D-81455-01
S.O.: 81455		SHT: 1 OF		
CAD FILE: 81455-01.DWG				
			☒ CUST.	☐ SUB.

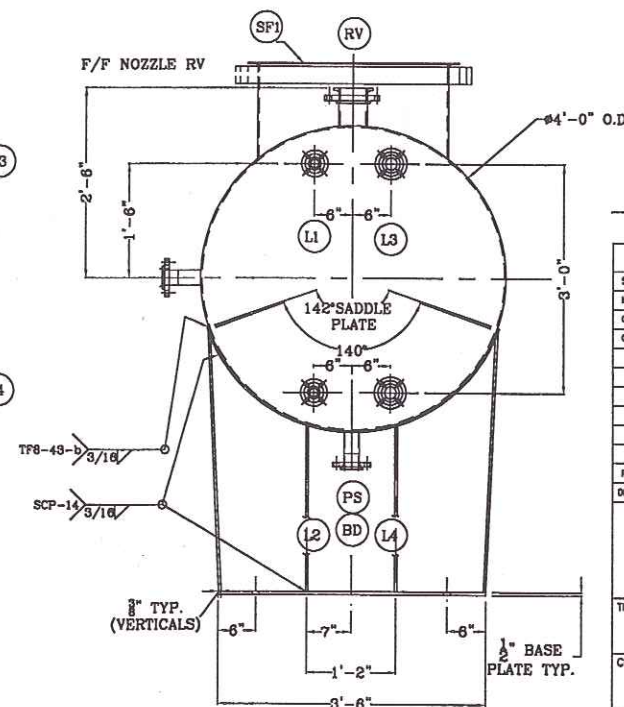
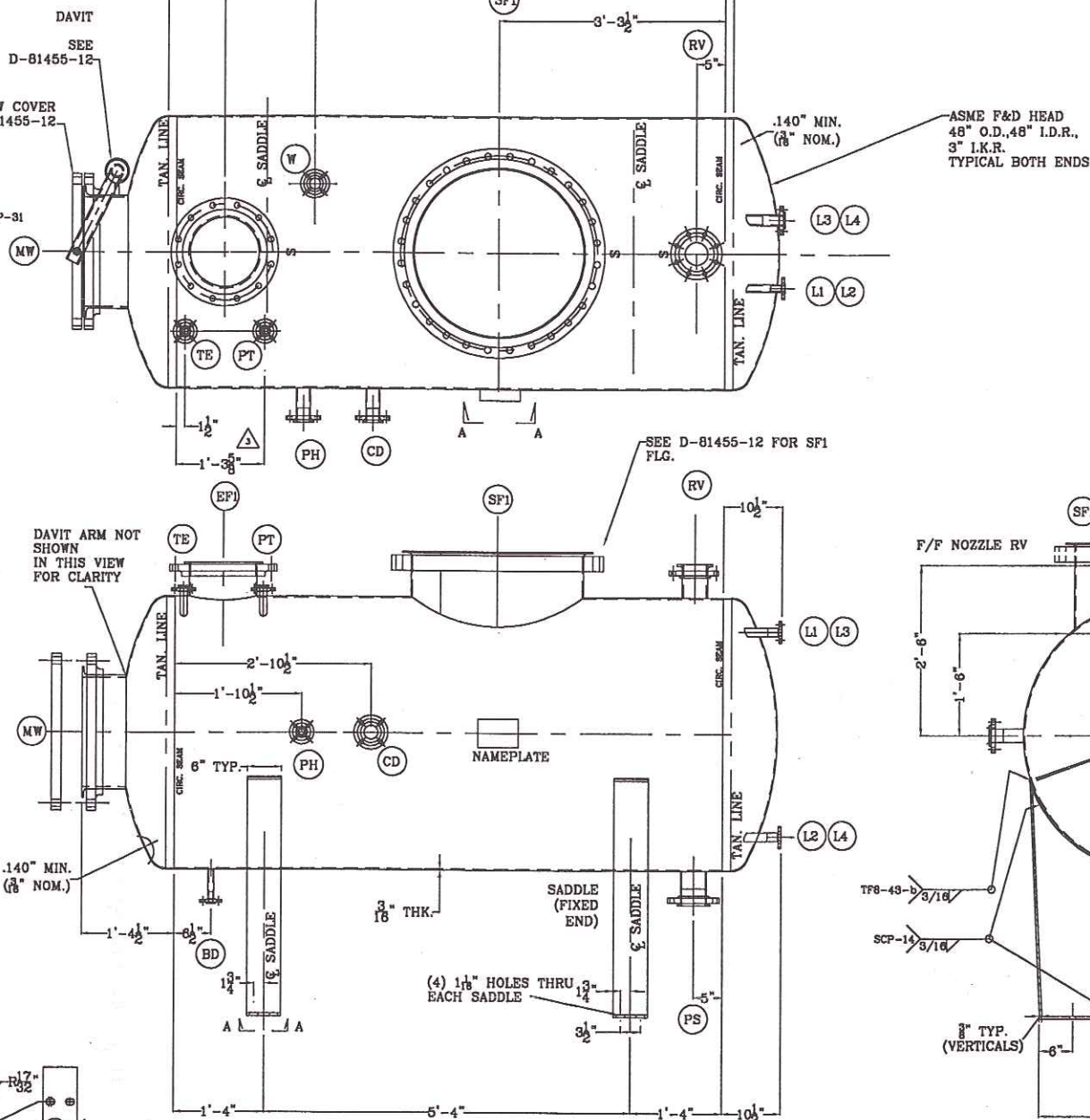
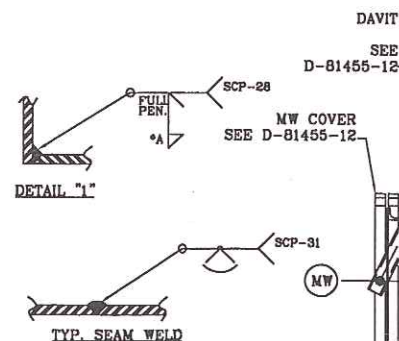
#102974

* TO BE ASSIGNED ● HYDRO
** TO BE ASSIGNED BY CUSTOMER



MARK	WELD DETAIL	SIZE (in.)
BD	1	A3/16
CD	1	A3/16
L1,2	1	A1/8
MW	1	A3/16
PH	1	A3/16
W	1	A3/16
PS	1	A3/16
PT	1	A1/8
L3,4	1	A3/16
TE	1	A3/16
SF1	1	A3/16
EF1	1	A3/16
RV	1	A3/16

WELD DETAILS



SERVICE	MARK	NPS	O.D.	B.C.	NO. OF HOLES	HOLE BACK-UP THICK.	FLANGE TYPE	BOLT SIZE	WALL THICK.	MAT'L. MODEL	
BLOWDOWN CONNECTION	BD	1"	4 1/4"	3 1/8"	4	3/8"	9/16"	LAP JT.	1/2"	405	SB-618JWS N102
CONDUCTIVITY	CD	2"	6"	4 3/4"	4	3/4"	3/4"	LAP JT.	5/8"	405	SB-618JWS N102
SIGHT GLASS CONNECTION	L1.1.2	1"	4 1/4"	3 1/8"	4	3/8"	9/16"	LAP JT.	1/2"	405	SB-618JWS N102
LEVEL TRANSMITTER CONN.	L3.1.4	1 1/2"	5"	3 7/8"	4	5/8"	11/16"	LAP JT.	1/2"	405	SB-618JWS N102
MANWAY WITH GWT	MW	20"	27 1/2"	25"	20	1 1/4"	1 11/16"	LAP JT.	1 3/8"	3/16"	SB-575JWS N102
PH CONNECTION	PH	1"	4 1/4"	3 1/8"	4	3/8"	9/16"	LAP JT.	1/2"	405	SB-618JWS N102
PUMP SUCTION	PS	3"	7 1/2"	6"	4	3/4"	15/16"	LAP JT.	5/8"	405	SB-618JWS N102
PRESSURE TRANSMITTER	PT	1"	4 1/4"	3 1/8"	4	3/8"	9/16"	LAP JT.	1/2"	405	SB-618JWS N102
RELIEF VALVE	RV	4"	9"	7 1/2"	8	3/4"	15/16"	LAP JT.	3/8"	405	SB-618JWS N102
WATER	W	1 1/2"	5"	3 7/8"	4	3/8"	11/16"	LAP JT.	1/2"	405	SB-618JWS N102
TEMPERATURE ELEMENT	TE	1"	4 1/4"	3 1/8"	4	3/8"	9/16"	LAP JT.	1/2"	405	SB-618JWS N102
SCR. MTL. FLANGE	SP1	30"	33"	34 3/8"	28	1 1/8"	2 3/4"	LAP JT.	1"	3/16"	SB-575JWS N102
EVS MTL. FLANGE	EF1	12"	18"	17"	12	1 1/4"	LAP JT.	7/8"	3/16"	SB-575JWS N102	

NOTES:

1. CUSTOMER P.O. NO. P08123
2. BACK-UP RINGS TO BE GALVANIZED PER SPECIFICATION.
3. MANWAYS WILL BE FURNISHED WITH DAVITS.SEE D-81455-12
4. MATERIALS OF CONSTRUCTION:
TANK SHELL - ALLOY C-276, SB-575 UNS N10276
LAP JOINT FLANGES --(LAPS) ALLOY C-276 SB-575 UNS N10276
SADDLES - SA-240 304
HEADS-SB575,UNS N10276
BOLTING: A193 GR. B7 BOLTS WITH A-194 GR. 2H NUTS U.O.N.,
BACK-UP RINGS-SA-105
BLIND FLANGES-SA-182 F304
5. GASKETS: 1/8" THK.,SPIRAL WOUND 347SS W/ FLEX GRAPHITE FILLER.
6. CAPACITY = 700 GALLONS APPROX. TO THE OVERFLOW.
7. WEIGHT: EMPTY = 2500 LBS. APPROX.
FULL W/S.G. 1.0. = 9500 LBS. APPROX.
- 8.UNLESS NOTED OTHERWISE ALL BACK-UP RINGS TO BE CLASS 150 LAP JOINT FLANGES PER ASME B16.5-1996
- 9.UNLESS NOTED OTHERWISE ALL NOZZLE NECK ENDS (4"-6")WILL BE STUB ENDS PER ASME B16.9-2001,ASME SB366 WPHC276.
- 10.BLIND FLANGES SHALL BE CLASS 150 ASME B16.5-1996
- 11.SEISMIC: UBC ZONE 1
- 12.HYDRO. PRESSURE: 66 PSIG
- 13.CORROSION ALL-NONE
- 14.RADIOGRAPHY: SPOT PER UW52
- 15.ALL WELDS TO ALLOY C276 TO BE EXAMINED BY LIQUID PENETRANT.
- 16.ADD 1" NPT TELLTALE HOLES IN ALL SADDLE PLATES.
- 17.P.W.H.T.: NONE REQ'D
- 18.WIND-ASCE-7 110 M.P.H.
- 19.TOLERANCES PER PIP STD. VEFV 1102.
20. PAINTING: NONE

(1) REQUIRED

DESIGN PARAMETERS				
SPEC:	ASHI, BAY 2001, 2003 ADD. SECTION VII DIV.1		TEMPERATURE:	335° F.
MATERIAL:	AS NOTED		PRESSURE:	-2.5 PSIG TO 50 PSIG
COLOR:	-----		TEST:	PER ASME CODE
CONSTRUCTION:	WELDED			
3	1/28/05	RELOCATED CONN. FT TO MATCH AS BUILT		GB
1	11/6/04	CONN. PH WAS 2" DIA. & L1 & L2 WERE 3/4" DIA.		JaPe
2	10/27/04	CONN. L3 & L4 CH'D TO 1 1/2" DIA. PER CUST.		JaPe
REV.	DATE	DESCRIPTION		DRAWN
DFT-L PROJECT DATE: 6/28/04 CHK: DATE: APPR: DATE:				

NOTICE

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TITLE	48" DIA. HORZ. CAUSTIC TANK	STANDARDS
CUSTOMER	GIANT YORKTOWN REFINERY GRAFTON,VA	

CEILCOTE AIR POLLUTION CONTROL
14955 Sproque Rd. Suite 250 Strongsville, Ohio 44136-175

QUOTE: IPG-24422-3	SCALE: 1" = 1'-0"	D-81455-03	RE: 3
S.O.: 81455	SHR: 3 OF		

CAD File: 81453-03.DWG

☒ CUST ☐ SUP

SHOP NOTE:

- 1) BREAK ALL SHARP EDGES AND DEBURR.
- 2) ALL BOLTS HOLES SHALL STRADDLE NORMAL CENTERLINE U.N.O. TOLERANCE ON BOAT HOLE ORIENTATION $\pm 1/16$
- 3) ALL FLANGE FACES SHALL BE FINISHED TO 125MA-250AA WITH CONCENTRIC OR 1RA GROOVES

NAMEPLATE

18" NAT'L BD. @HYDRO

CERTIFIED & MFG. BY
PALMER TOOL CO.
CAMDEN, TN.

MA.W.P. AT TEMP. 500 °F

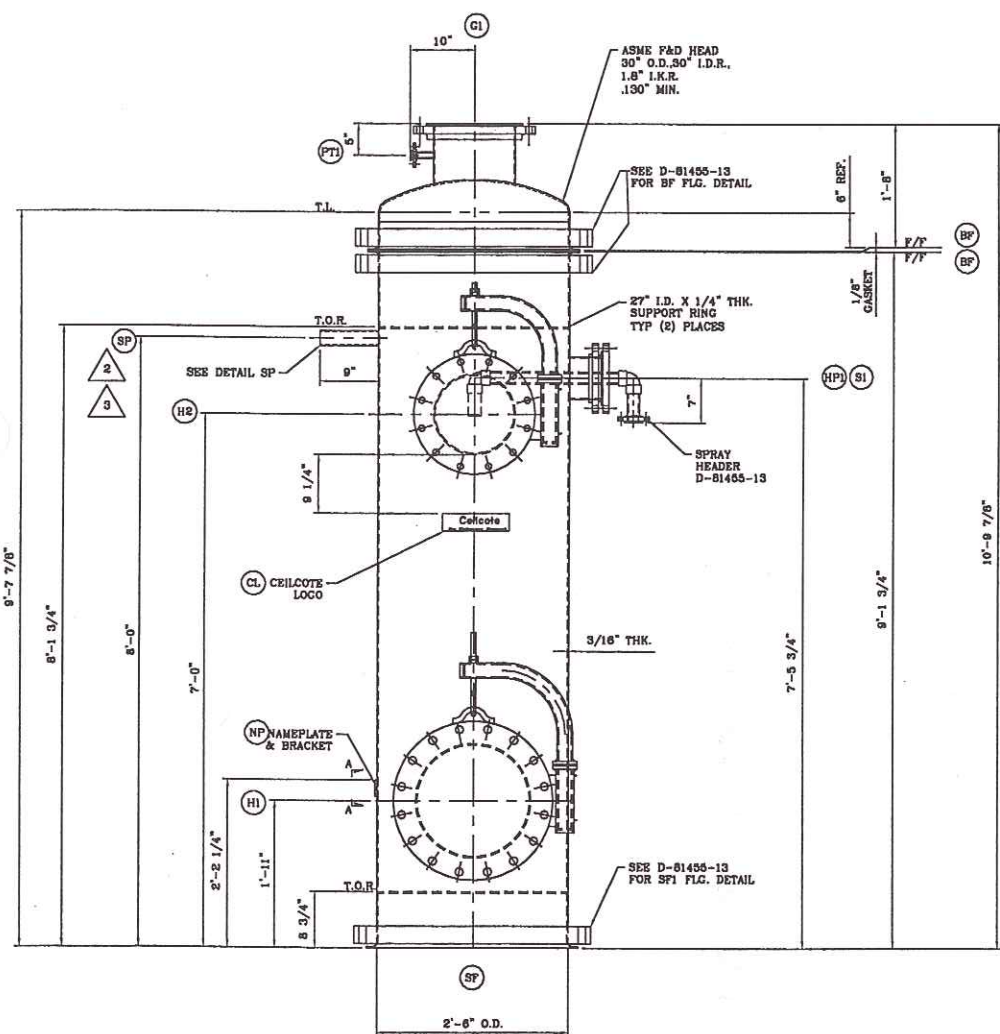
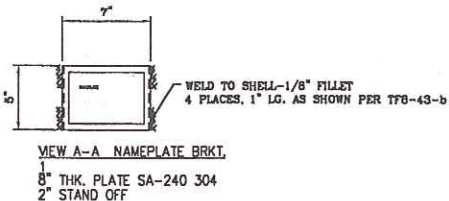
M.D.M.T. -20 °F AT 50 PSI

MFG. SERIAL NO. 104-0726-*

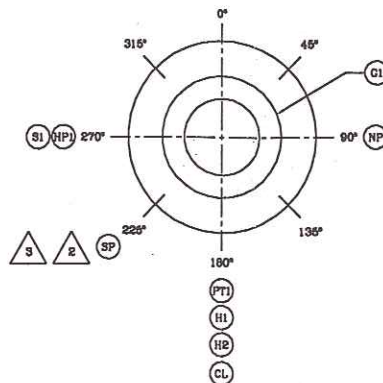
P.O. B1455/920hnb E.N.**

YEAR BUILT 2004

* TO BE ASSIGNED @ HYDRO
** TO BE ASSIGNED BY CUSTOMER



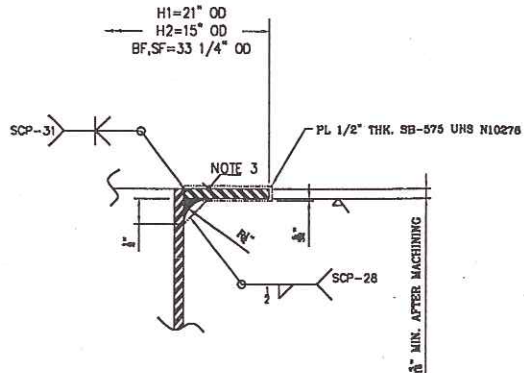
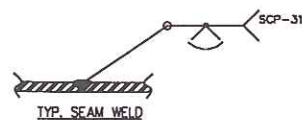
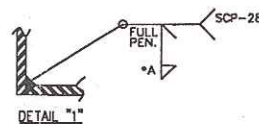
ELEVATION VIEW
SEE PLAN VIEW FOR TRUE ORIENTATION



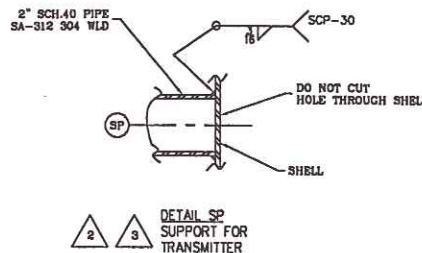
PLAN VIEW
TRUE ORIENTATION

MARK	WELD DETAIL	SIZE (in.)
G1	1	A:3/16
H1	1	A:3/16
H2	1	A:3/16
HP1	1	A:3/16
PT1	1	A:1/8

WELD DETAILS



STUB END DETAILS
FOR NOZZLES (H1, H2, G)



DETAIL SP
SUPPORT FOR
TRANSMITTER

SHOP NOTE:

- 1) BREAK ALL SHARP EDGES AND DEBURR.
- 2) ALL BOLTS HOLES SHALL STRADDLE NORMAL CENTERLINE U.N.O.
- 3) ALL FLANGE FACES SHALL BE FINISHED TO 125RA-250RA WITH CONCENTRIC OR SPIRAL GROOVES.

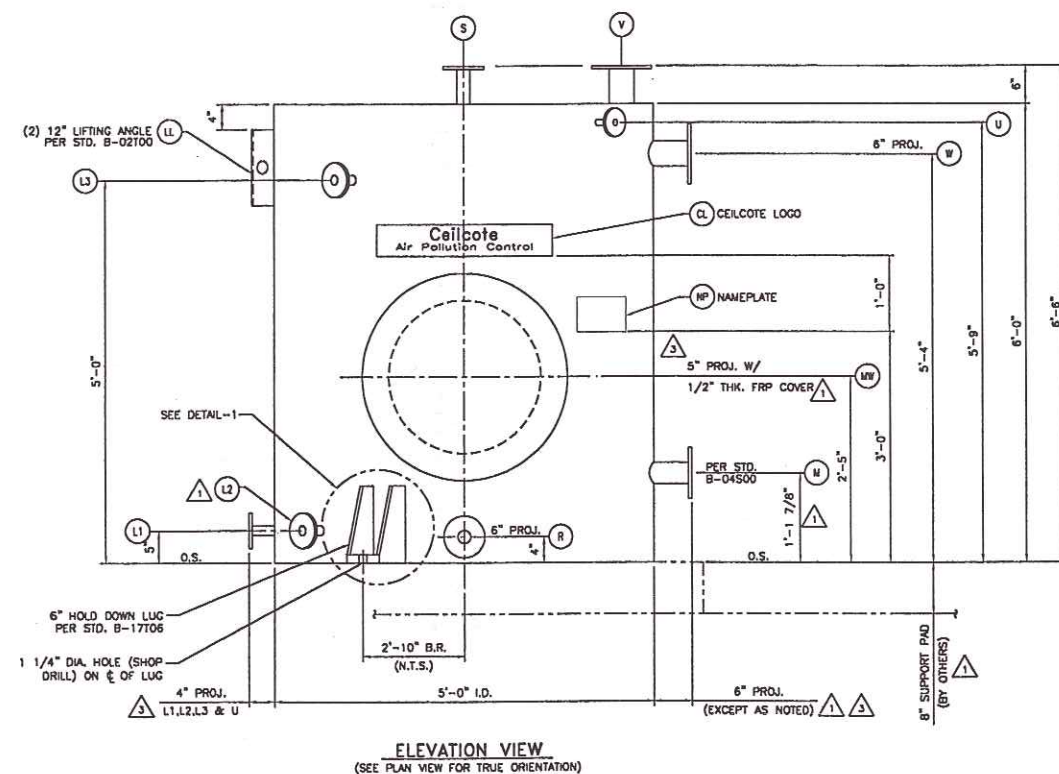
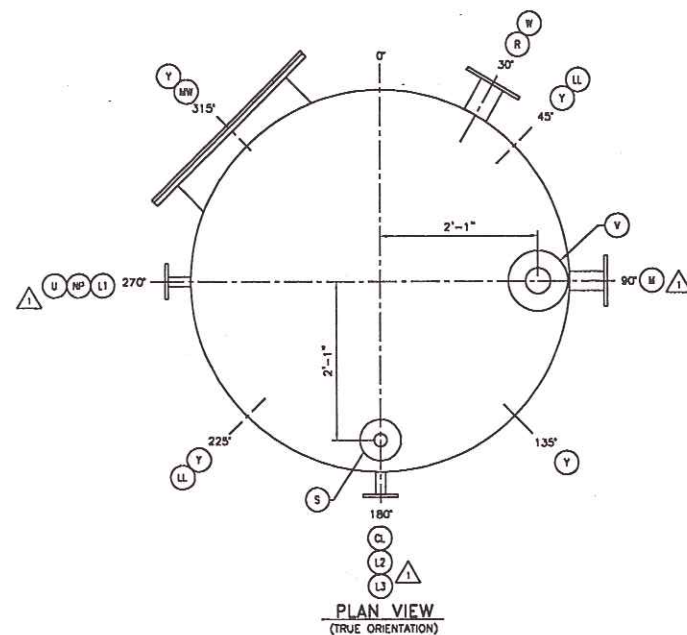
SERVICE	MARK	NPS	O.D.	S.C.	NO. OF HOLES	HOLE DIA.	BACK-UP RING THICKNESS	FLANGE TYPE	BOLT SIZE	WALL THICK.	MAT'L	NOZZ. PROJECTION
GAS OUTLET	G1	12"	10"	17"	12	1"	1 1/4"	LAP JT.	7/8"	3/16	SB-575 UNS N10276	SEE DWG.
MANWAY WITH DAVIT	H1	18"	20"	22 3/4"	10	1 1/4"	1 9/16"	LAP JT.	1 1/8"	3/16	SB-575 UNS N10276	7"
HANDHOLE WITH DAVIT	H2	18"	19"	17"	10	1"	1 1/4"	LAP JT.	7/8"	3/16	SB-575 UNS N10276	7"
SPRAY HEADER	SI	1 1/2"	6"	3 7/8"	4	5/8"	11/16"	LAP JT.	1/2"	408	SB-575 UNS N10276	SEE DWG.
HEADER MOUNTING PORT	HP1	6"	11"	9 1/2"	8	7/8"	1"	LAP JT.	3/4"	108	SB-575 UNS N10276	5"
PRESSURE TRANSMITTER	PT1	1"	4 1/4"	3 1/8"	4	5/8"	9/16"	LAP JT.	1/2"	408	SB-575 UNS N10276	SEE DWG.
SCRUBBER BODY FLANGE	BF	30"	37"	34 9/8"	28	1 1/8"	2 3/4"	LAP JT.	1"	3/16	SB-575 UNS N10276	N/A
SCR. INLET FLANGE	SI	30"	37"	34 9/8"	28	1 1/8"	2 3/4"	LAP JT.	1"	3/16	SB-575 UNS N10276	N/A

NOTES:

1. CUSTOMER P.O. NO. P08123
2. BACK-UP RINGS TO BE GALVANIZED PER SPECIFICATION.
3. MANWAYS WILL BE FURNISHED WITH DAVITS. SEE D-81455-13
4. MATERIALS OF CONSTRUCTION:
SHELL - ALLOY C-276, SB-575 UNS N10276
LAP JOINT FLANGES - (LAPS) ALLOY C-276 SB-575 UNS N10276
HEADS- SB575, UNS N10276, ALLOY C-276
BOLTING: A193 GR. B7 BOLTS WITH A-194 GR. 2H NUTS U.O.N..
BLIND FLANGES -SA-182 F304
5. GASKETS: 1/8" THK. SPIRAL WOUND 347SS W/ FLEX GRAPHITE FILLER.
6. WEIGHT: EMPTY = 2500 LBS. APPROX.
7. UNLESS NOTED OTHERWISE ALL BACK-UP RINGS TO BE CLASS 150 LAP JOINT FLANGES PER ASME B16.5-1996
8. UNLESS NOTED OTHERWISE ALL NOZZLE NECK ENDS (1/2"-8") WILL BE STUB ENDS PER ASME B16.9-2001, ASME SB366 WPHC276.
9. BLIND FLANGES SHALL BE CLASS 150 ASME B16.5-1996
10. WIND: ASCE-7 110 MPH
11. SEISMIC: UBC ZONE 1
12. HYDRO. PRESSURE: 66 PSIG
13. CORROSION ALL: NONE
14. RADIOGRAPHY: SPOT
15. ALL WELDS TO ALLOY C276 TO BE EXAMINED BY LIQUID PENETRANT.
16. PWHT: NONE REQ'D
17. TOLERANCES PER PIP STD. VEFV 1102.
18. NO PAINTING REQ'D.

(1) REQUIRED

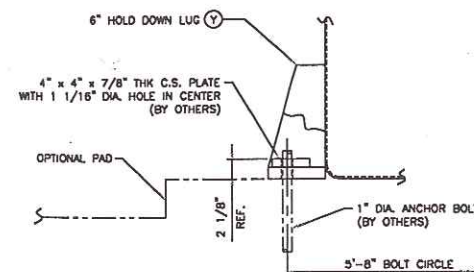
DESIGN PARAMETERS			
SPEC:	ASCE 7-05, UBC 2003, AND	TEMPERATURE:	650° F
MATERIAL:	AS NOTED	PRESSURE:	-2.5 PSIG TO 60 PSIG
COLOR:	AS NOTED	TEST:	PER ASME CODE
CONSTRUCTION: WELDED			
REV.	DATE	DESCRIPTION	DRAWN CHK'D
3	1/28/05	"SP" WAS AT 5'-0" EL. & 180° ORIENTATION	GB
2	1/10/05	ADDED TRANSMITTER SUPPORT "SP"	GB
1	11/24/04	CHANGED STUB END WELD DETAIL	JP
DFT: JF DATE: 8/28/04 CHK: DATE: APP: DATE:			
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TITLE		STANDARDS	
SPT-30-00-SCRUBBER			
CUSTOMER			
GIANT YORKTOWN REFINERY GRAFTON, VA			
CELSCOTE AIR POLLUTION CONTROL 14955 Sprague Rd. Suite 250 Strongsville, Ohio 44136-1768			
SAG	NOT APPROVED FOR FABRICATION	DATE	REV.
DISP.	APPROVED FOR FABRICATION	DATE	3
D-81455-04		SCALE: 1" = 1'-0"	
S.D.: B1455		SHT: 4 OF 4	
CAD FILE: B1455-04.DWG		CUST. ☐ SUB. ☒	



	SERVICE	MARK	L.D.	O.D.	B.C.	NO. OF HOLES	HOLE THICK.	FLANGE THICK.	FLANGE TYPE	BOLT SIZE	WALL THICK.
2	MANWAY W/ COVER	MM	24"	32 1/2"	29 1/2"	20	3/4"	3/4"	C.M.	5/8" X 2 1/2"	1/4"
1	VENT	V	4"	9 1/2"	7 1/2"	8	3/4"	1/2"	C.M.	-----	3/16"
1	PUMP SUCTION	M	3"	8"	6"	4	3/4"	1/2"	C.M.	-----	3/16"
	OVERFLOW	W	4"	9 1/2"	7 1/2"	8	3/4"	1/2"	C.M.	-----	3/16"
	CAUSTIC ADDITION	S	2"	6 1/2"	4 3/4"	4	3/4"	1/2"	C.M.	-----	3/16"
	LEVEL CORR.	1,1,2,1,3	1 1/2"	5 1/2"	3 7/8"	4	5/8"	1/2"	C.M.	-----	3/16"
	DRAIN	R	2"	6 1/2"	4 3/4"	4	3/4"	1/2"	C.M.	-----	3/16"
1	FILL & MAKE-UP	U	1 1/2"	5 1/2"	3 7/8"	4	5/8"	1/2"	C.M.	-----	3/16"

NOTES:

1. CUSTOMER P.O. NO. PO8123
2. TANK MUST HAVE FULL BOTTOM SUPPORT.
3. FLANGED NOZZLES ARE DRILLED TO 150 LB. STANDARD.
4. MANHOLE FLANGES WILL BE DRILLED IN ACCORDANCE WITH CEILCOTE AIR POLLUTION CONTROL STANDARDS.
5. BOLT HOLES IN DRILLED FLANGES WILL STRADDLE NATURAL CENTERLINES.
6. MATERIALS OF CONSTRUCTION:
TANK SHELL - HETRON 922 W/ NEXUS
150 LB. FLANGES - FRP
COUPLINGS - CPVC
7. COLOR:
100 MIL CORROSION BARRIER - NATURAL
STRUCTURAL LAYERS - NATURAL
EXTERIOR TOP COAT - GRAY W/ U.V. INHIBITOR
8. EPDM GASKETS AND 316 SS BOLTING WILL BE FURNISHED FOR ALL FLANGES WITH MATING COVERS.
9. CAPACITY = 750 GALLONS
10. WEIGHT: EMPTY = 500 LBS. APPROX
FULL W/S.G. 1.28 = 8,500 LBS. APPROX.
11. NOZZLE PROJECTIONS FROM THE CENTERLINE OF THE TANK TO THE FACE OF FLANGES MAY VARY DUE TO THE USE OF TAPERED MANIFOLDS AS ALLOWED BY PRODUCT STD. PS13-69.
12. ALL INTERNAL JOINTS MUST BE SEALED WITH A 2M.V OVERLAY; EXCEPT IN THE CASE OF NEXUS UNDER EQUIPMENT WHERE A 2M.N OVERLAY IS REQUIRED. WHERE THE SPECIFIED OVERLAYS ARE NOT PRACTICAL, OR FOR CONNECTION SIZES LESS THAN 3" DIAMETER, A HEAVY PARAFFINATED RESIN COATING MUST BE APPLIED.
13. GENERAL DIMENSIONAL TOLERANCES SHALL BE +/- 1/8" FOR ALL DIMENSIONS EXCEPT FLANGE THICKNESS WHICH SHALL BE +/- 1/8" - 0". THESE MINIMUM TOLERANCES MUST BE ADHERED TO UNLESS THEY ARE SUPERCEDED BY A MORE STRINGENT SPECIFICATION.
14. ALL CONTACT MOLDED (C.M.) FLANGES SHALL HAVE A FLAT FACE.



DETAIL-1
ANCHOR BOLT ARRANGEMENT
(SCALE: 1 1/2"=1'-0")

(1) REQUIRED

CONSTRUCTION SCHEDULE			
SHELLS:	1/4"	(N2M2M,MRV)	
BOTTOM:	1/4"	(N2M2M,MRV)	
TOP COVER:	1/4"	(N2M2M,MRV)	
NOTE - CHOP SPRAY MAY BE SUBSTITUTED FOR MAT			
DESIGN PARAMETERS			
SPEC:	PS 15-88	TEMPERATURE:	70° F
MATERIALS:	SEE NOTES	PRESSURE:	+12" W.C. - 6" W.C.
COLOR:	SEE NOTES	TEST:	-----
CONSTRUCTION: SEE CONSTRUCTION SCHEDULE			
3	1/27/05	ADDED TOP COAT TO NOTE 7; REVERSED NOZZLE & MANWAY PROJECTIONS TO AS BUILT	GR
2	11-1-04	REVERSED MANWAY FLANGE SIZES & DELTA T.C.	SC
1	10-28-04	REVERSED ORIENTATION OF NOZZLES L3, L3.5, M & U; REVERSED ELEV. OF NOZZLE L2 & M; REVERSED SIZE OF NOZZLES M & U; REVERSED PUMP SECTION STD. AND MANWAY FLANGE & COVER SIZE ADDED TANK PAD & NORTH ARROW	SC
REV.	DATE	DESCRIPTION	DRAWN CHK
BET: SC	DATE: 9-30-04	CHK: DATE:	APP: DATE:
NOTICE			
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TITLE	5'-0" DIA. X 6'-0" HIGH CAUSTIC FUEL STORAGE TANK DETAIL		STANDARDS
CUSTOMER	GIANT YORKTOWN REFINERY GRAFTON, VA		B-02700 B-04590 B-17706
CEILOTEC AIR POLLUTION CONTROL			
14955 Sprogue Rd. Suite 250 Strongsville, OH 44136-1758			
Y/24	QUOTE: PG-24422-3	SCALE: 1" = 1'-0"	D-81455-06
DATE	8/1: 84455	SH: 6 OF	
CAD FILE: 84455-06.DWG		☒ CUST.	☒ SUB.

MATERIAL LEGEND
M-1-1/2 OZ./SQ. FT. MAT
R-24 OZ./SQ. YD. ROVING
V-10 MIL C-VEIL
N-NEXUS VEIL
C-CHOP SPRAY

	NOT APPROVE FOR FABRICATION
SAG	APPROVED FOR FABRICATION
DISP.	DRAWING STATUS

TITLE	5'-0" DIA. X 6'-0" HIGH CAUSTIC FEED STORAGE TANK DETAIL	STANDARDS
CUSTOMER	GIANT YORKTOWN REFINERY GRAFTON, VA	B-02T00 B-04S00 B-17T06

CEILCOTE AIR POLLUTION CONTROL 14955 Sprogue Rd. Suite 230 Strongsville, Ohio 44136-1758			
QUOTE: IPC-24422-3 S.O.: 81455	SCALE: 1" = 1'-0" SHT: 6 OF	D-81455-06	RE: 3

NAMEPLATE

NAT'L BD. HYDRO

CERTIFIED & MFG. BY
PALMER TOOL CO.
CAMDEN, TN.

-2.5/50 PSI 535 °F

M.A.W.P. AT TEMP.

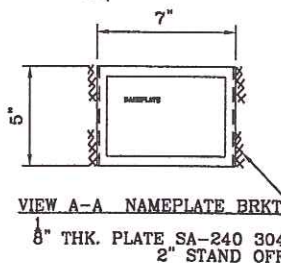
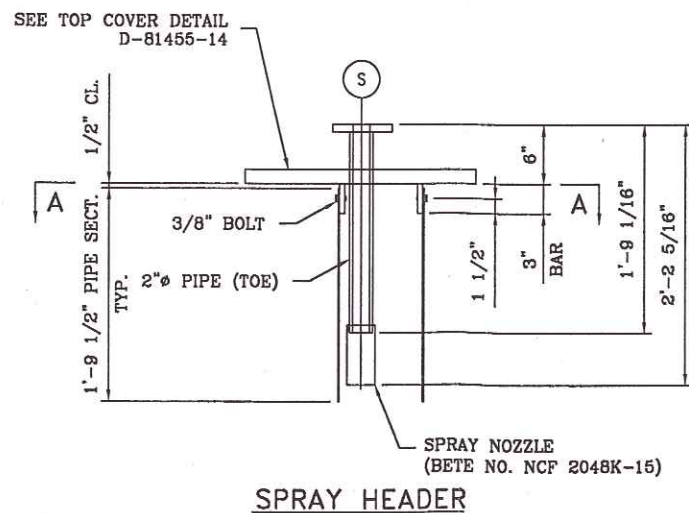
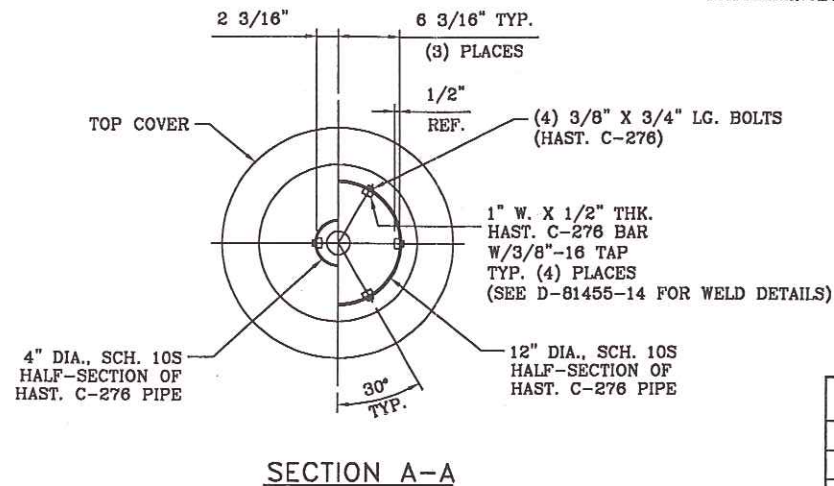
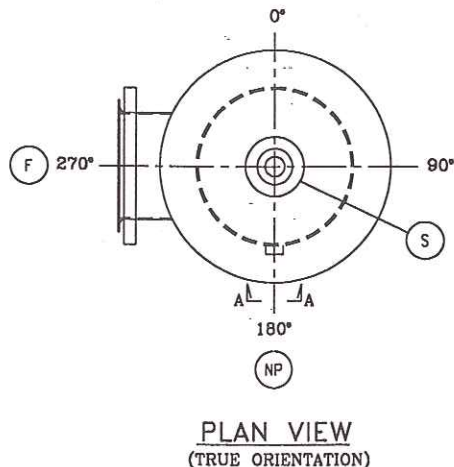
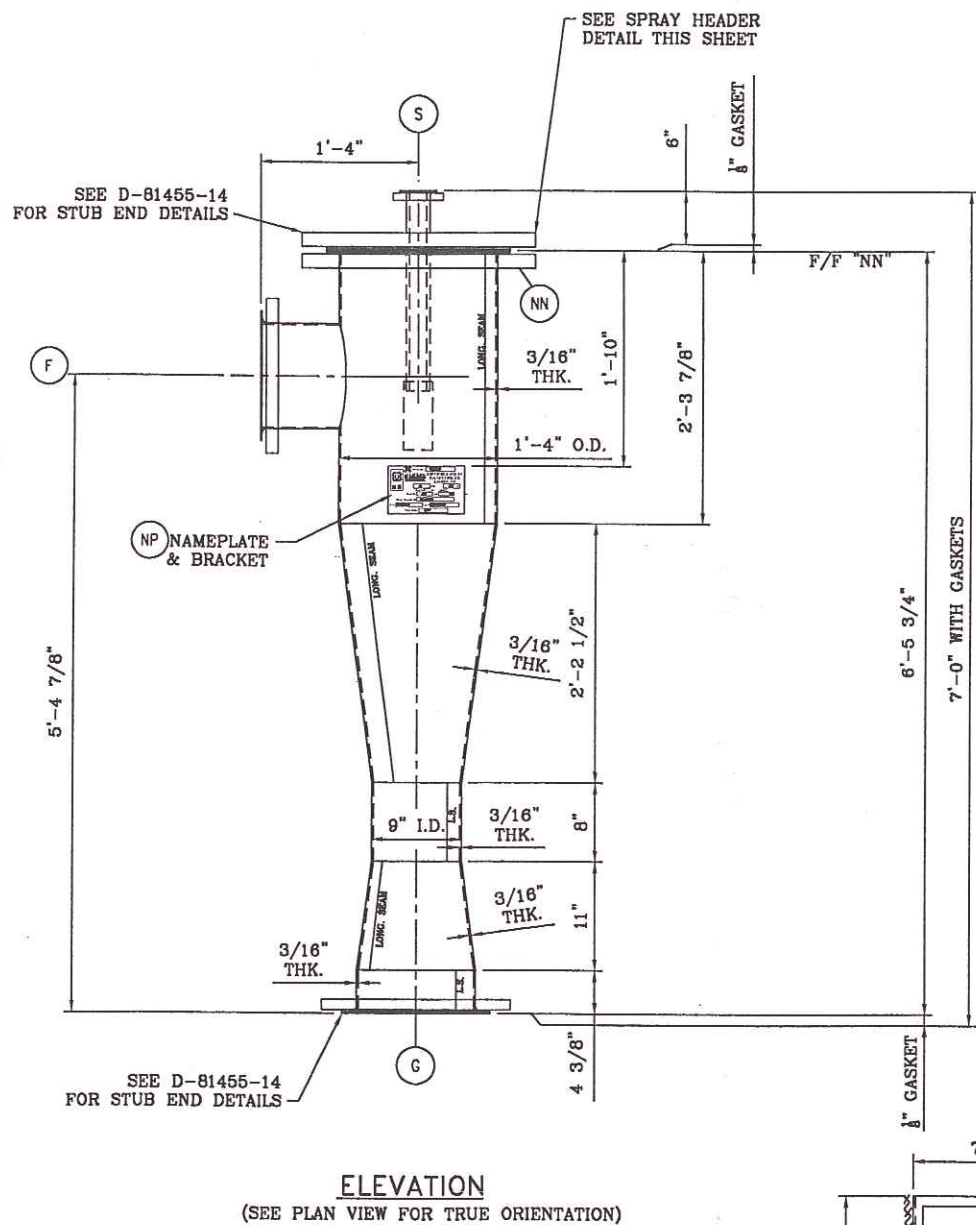
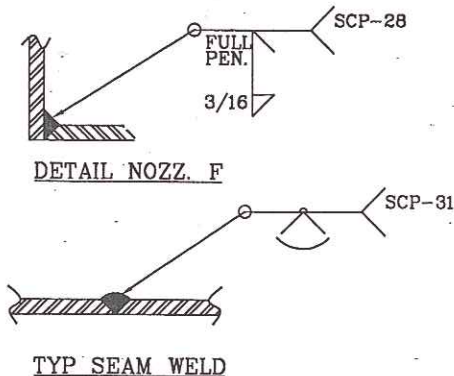
M.D.M.T. -20 °F AT 50 PSI

MFG. SERIAL NO. T04-0726-*

P.O. 81455/920ehb E.N. 00

YEAR BUILT 2004

*TO BE ASSIGNED @ HYDRO
**TO BE ASSIGNED BY CUSTOMER



WELD TO SHELL-1/8" FILLET
4 PLACES, 1" LG. AS SHOWN PER TFS-43-5

SERVICE	MARK	NPS SIZE	BACK UP RING O.D.	B.C.	NO. OF HOLES	HOLE DIA.	BACK UP RING THICK.	FLANGE TYPE	BOLT SIZE	WALL THICK.	MAT'L NOZZLE
GAS INLET	F	10"	16"	14 1/4"	12	1"	1 3/16"	LAP JT.	7/8	3/16	SB-575,UNS N10276
EVS OUTLET FLANGE	G	12"	19"	17"	12	1"	1 1/4"	LAP JT.	7/8	3/16	SB-575,UNS N10276
SPRAY HEADER	S	2"	6"	4 3/4"	4	3/4"	3/4"	LAP JT.	5/8	40S	SB-619,UNS N10276
TOP COVER FLANGE	NN	16"	23 1/2"	21 1/4"	16	1 1/8"	1 7/16"	LAP JT.	1	3/16	SB-575,UNS N10276

NOTES:

- CUSTOMER P.O. NO. P08123
- BACK-UP RINGS TO BE GALVANIZED PER SPECIFICATION.
- MATERIALS OF CONSTRUCTION:
SHELL - ALLOY C-276 SB-575 UNS N10276
LAP JOINT LAPS - ALLOY C-276, SB575 UNS N10276
BOLTING: SA193 GR. B7 BOLTS W/SA-194 GR. 2H NUTS U.O.N..
- GASKETS 1/8" THK., SPIRAL WOUND 347SS W/ FLEX GRAPHITE FILLER.
- WEIGHT: EMPTY = 650 LBS. APPROX.
- UNLESS NOTED OTHERWISE ALL BACK-UP RINGS TO BE CLASS 150 LAP JOINT TYPE FLANGES PER ASME B16.5-1998; MAT'L SA-105.
- UNLESS NOTED OTHERWISE ALL NOZZLE NECK ENDS (2"-6") WILL BE STUB ENDS PER ASME B16.9-2001; ASME SB366 WPHC276.
- BLIND FLANGES TO BE CLASS 150 ASME B16.5-1998; SA-182 F304
- WIND: ASCE-7 110 MPH
- SEISMIC: UBC ZONE 1
- HYDRO. PRESSURE: 66 PSIG
- CORROSION ALL:NONE
- RADIOGRAPHY: SPOT PER UW-52
- ALL WELDS TO ALLOY C276 TO BE EXAMINED BY LIQUID PENETRANT.
- P.W.H.T.-NONE REQ'D
- TOLERANCES PER PIP STD. VEFV 1102.

(1) REQ'D

DESIGN PARAMETERS

SPEC: 2003 ADD. SECTION VIII, DIV 1	TEMPERATURE: 535° F.
MATERIAL: AS NOTED	PRESSURE: -2.5 PSIG TO 50 PSIG
COLOR: -----	TEST: PER ASME CODE
CONSTRUCTION: WELDED	
REV.	DATE
DFT: J.P.	DATE: 9/28/04
CHK: DATE:	APP: DATE:

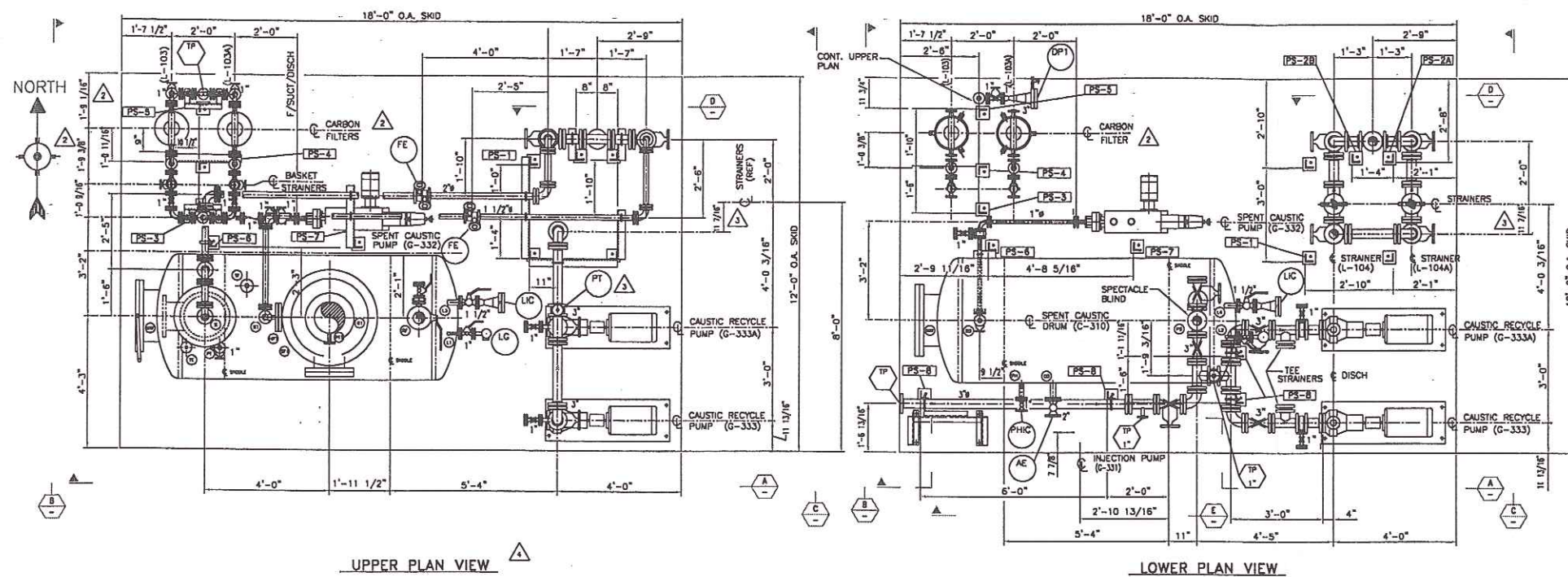
NOTICE

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TITLE	STANDARDS
EVS-12 EDUCATOR	
CUSTOMER	
GIANT YORKTOWN REFINERY GRAFTON, VA	

CEILCOTE AIR POLLUTION CONTROL
14955 Sprague Rd. Suite 250 Strongsville, Ohio 44136-1758

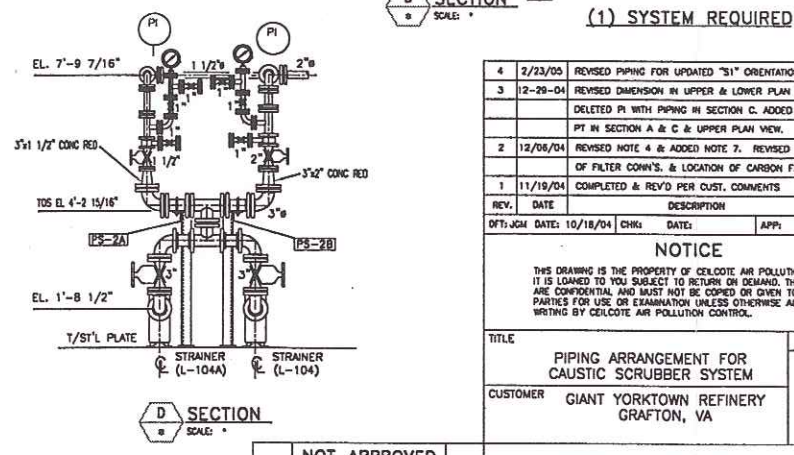
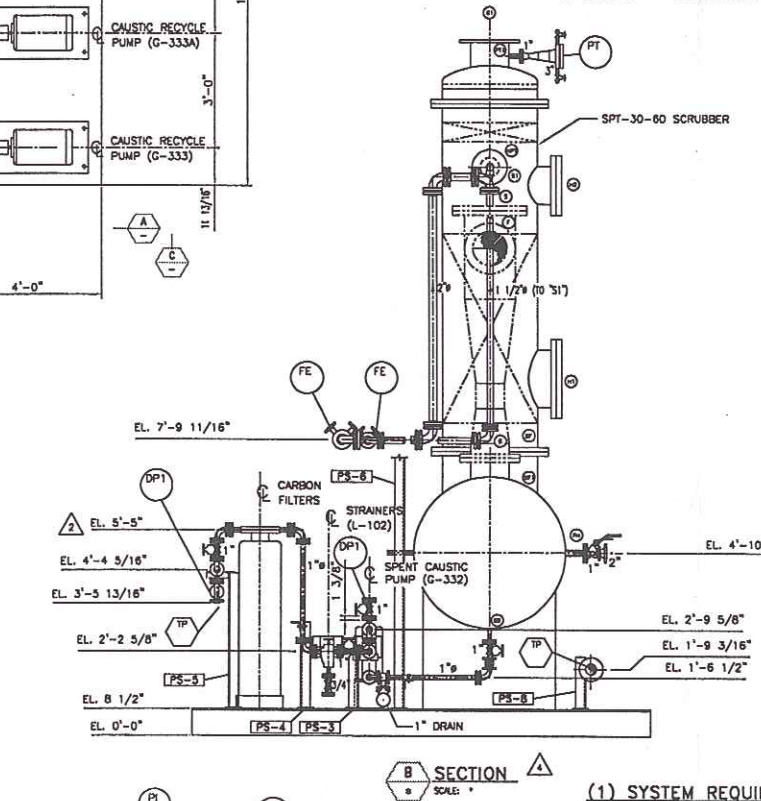
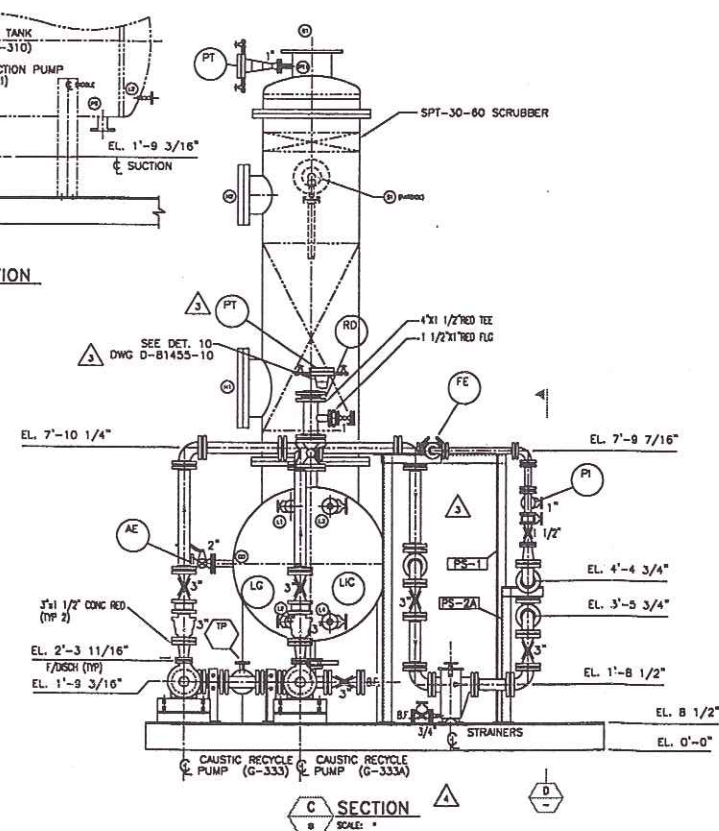
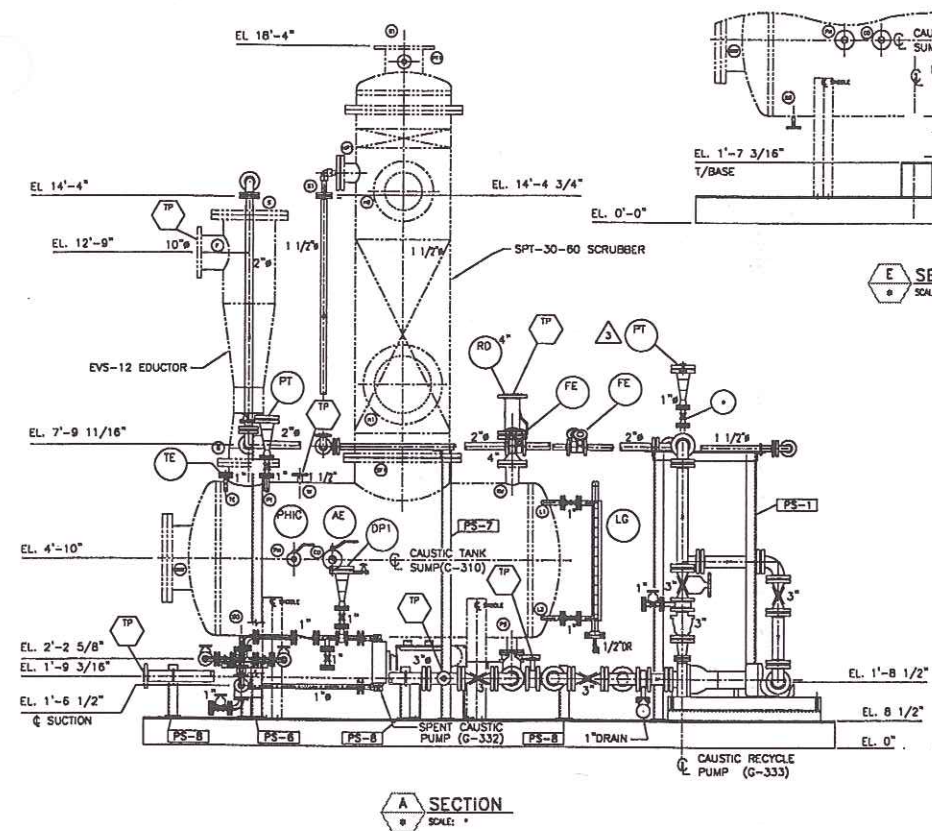
NOT APPROVED FOR FABRICATION	11/10/04
APPROVED FOR FABRICATION	
DISP.	DRAWING STATUS
DATE	DATE
S.O.: 81455	SHT: 5 OF
QUOTE: IFC-24422-3	SCALE: 1" = 1'-0"
C-81455-05	REV. 0



- NOTES:
1. CUSTOMER P.O. NO. POB123
 2. ALL PIPING ATTACHED TO THE EQUIPMENT BY THE CUSTOMER IN THE FIELD MUST BE INDEPENDENTLY SUPPORTED.
 3. BOLT HOLES IN DRILLED FLANGES WILL STRADDLE NATURAL CENTERLINES.
 4. USE TEFLON ENVELOPE GASKETS WHEN CONNECTING PIPE TO THE EDUCTOR, SCRUBBER, TANK, CARBON FILTERS & PUMPS. USE 316 SS STUD BOLTS WITH (2) NUTS AT ALL PIPING CONNECTIONS.
 5. PIPE SUPPORTS FOR CEILCOTE SUPPLIED PIPING WILL BE FURNISHED BY CEILCOTE WHERE REQUIRED.
 6. THE SKIDDED SYSTEM WILL BE SHOP ASSEMBLED & PRE-WIRED IN THE SHOP. AFTER ASSEMBLY THE SCRUBBER & EDUCTOR FEED PIPING ALONG WITH THE SCRUBBER & THE EDUCTOR WILL BE REMOVED PRIOR TO SHIPMENT.
 7. ALL PIPE & FITTINGS WILL BE CAST STEEL WITH A POLYPROPYLENE LINER.

REFERENCE DRAWINGS:

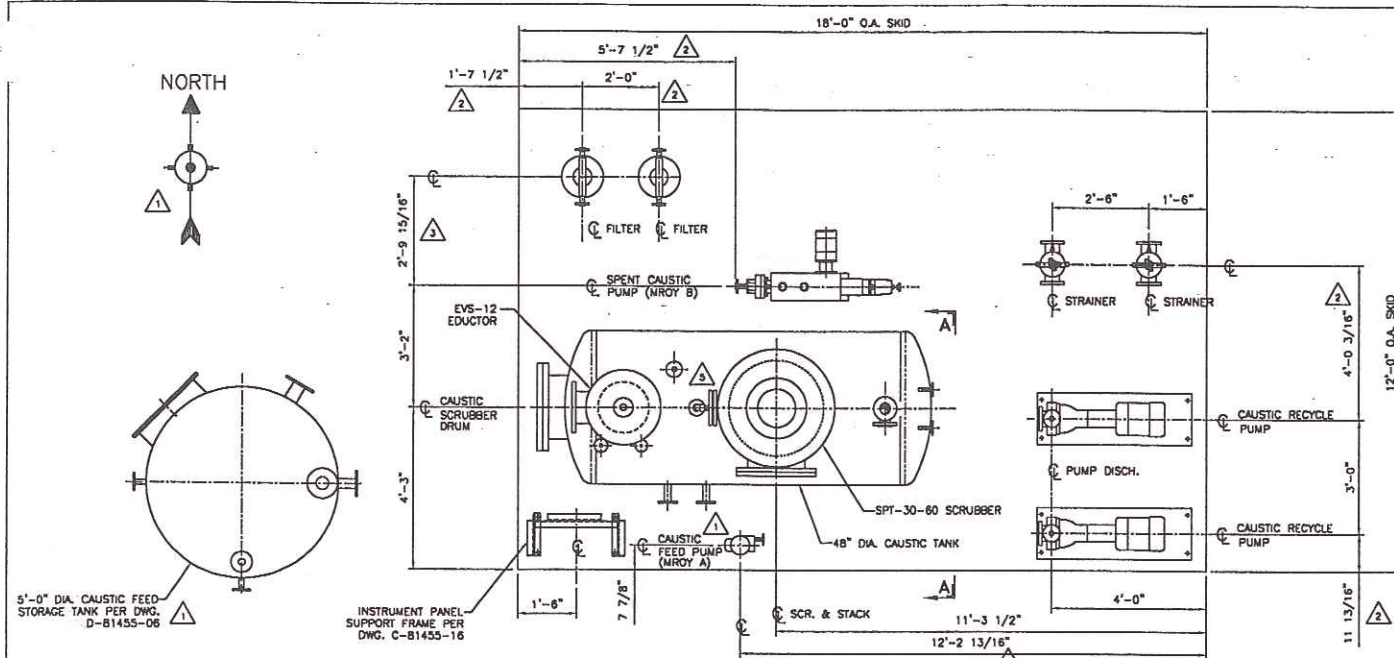
D-81455-02	GEN. ARRANG. CAUSTIC SCRUBBER
D-81455-08	CAUSTIC RECYCLE PIPING
C-81455-09	SPENT CAUSTIC PIPING
D-81455-10	MISC. PIPING DETAILS
D-81455-17	PIPE SUPPORT DETAILS



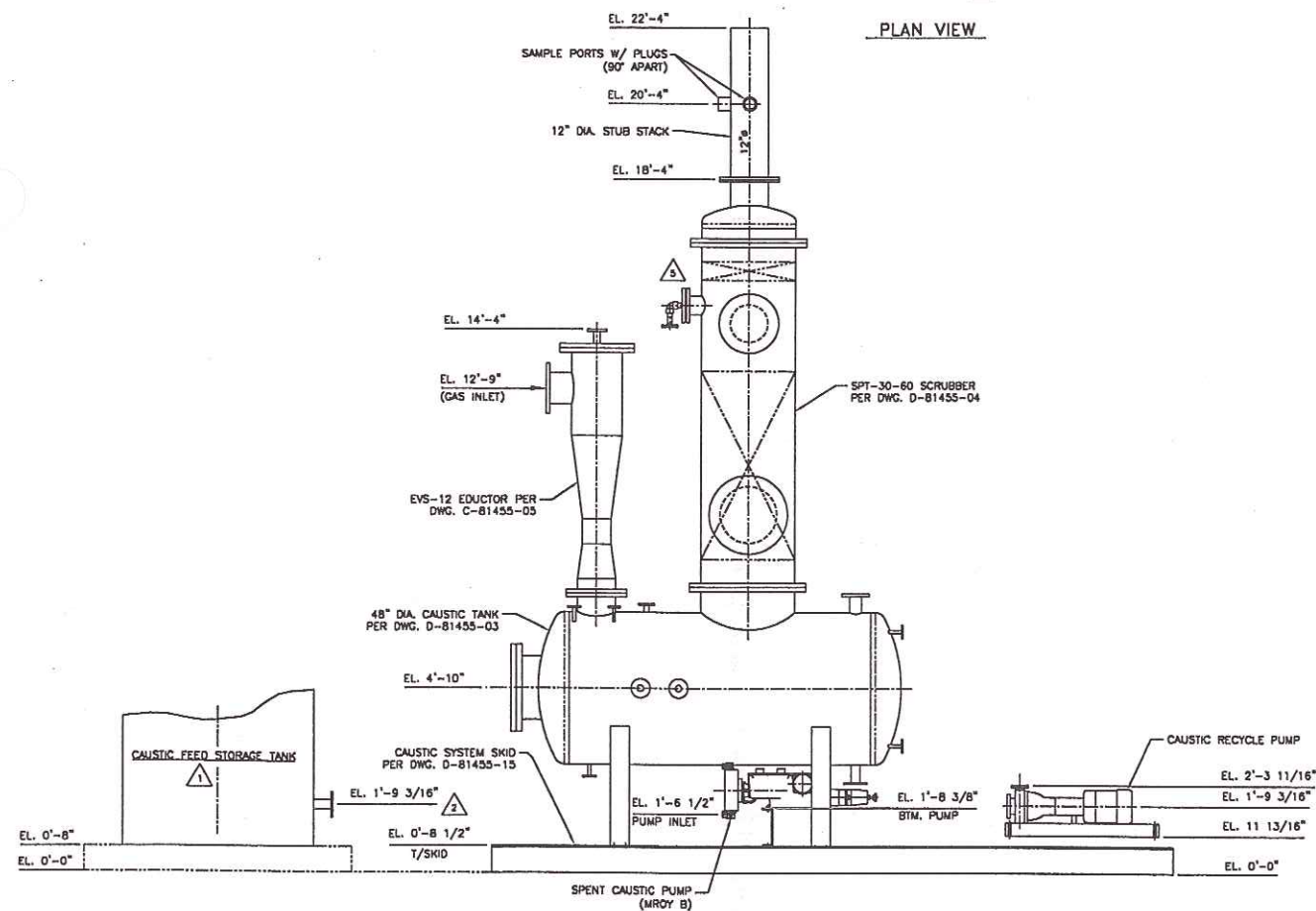
REV.	DATE	DESCRIPTION	DRAWN	CHECK'D
4	2/23/05	REVISED PIPING FOR UPDATED "S1" ORIENTATION	GB	
3	12-29-04	REVISED DIMENSION IN UPPER & LOWER PLAN VIEW.	SC	
		DELETED PI WITH PIPING IN SECTION C. ADDED		
		PT IN SECTION A & C & UPPER PLAN VIEW.		
2	12/06/04	REVISED NOTE 4 & ADDED NOTE 2. REVISED HT. OF FILTER CONN'S. & LOCATION OF CARBON FILTERS	KZ	
1	11/19/04	COMPLETED & REV'D PER CUST. COMMENTS	JCM	
REV.	DATE	DESCRIPTION	DRAWN	CHECK'D
DFT:JCM	DATE: 10/18/04	CHK: DATE:	APP: DATE:	

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TITLE	STANDARDS
PIPING ARRANGEMENT FOR CAUSTIC SCRUBBER SYSTEM	
CUSTOMER	
GIANT YORKTOWN REFINERY	
GRAFTON, VA	

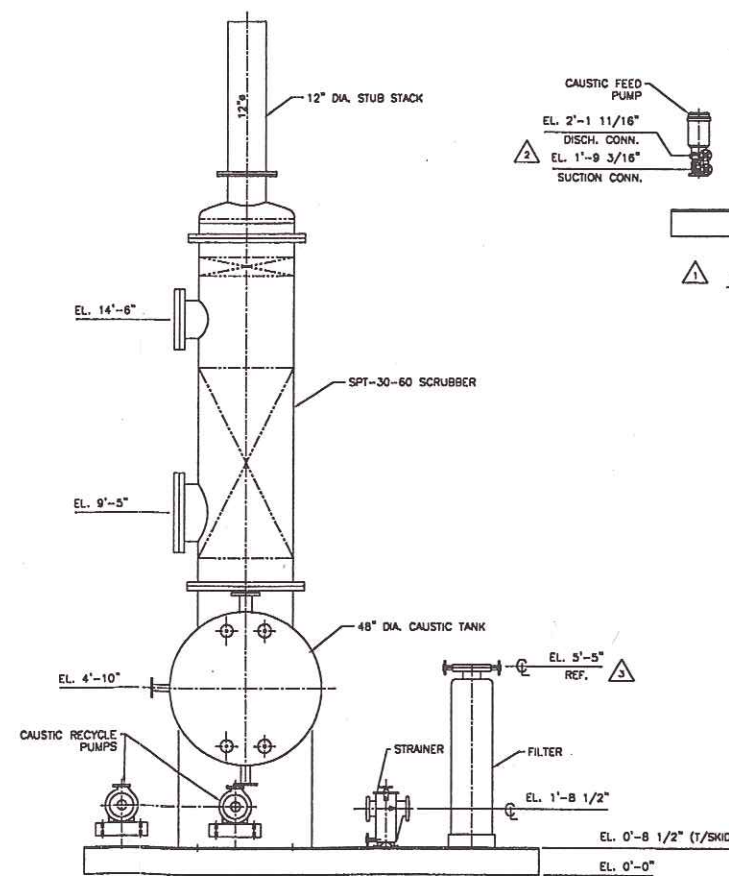
NOT APPROVED FOR FABRICATION		APPROVED FOR FABRICATION	
KZ		12/14/04	
DISP.	DRAWING STATUS	DATE	REV.
		S.O.: 81455	SH: 7 OF
CAD FILE: 81455-07.DWG		D-81455-07 4	



PLAN VIEW



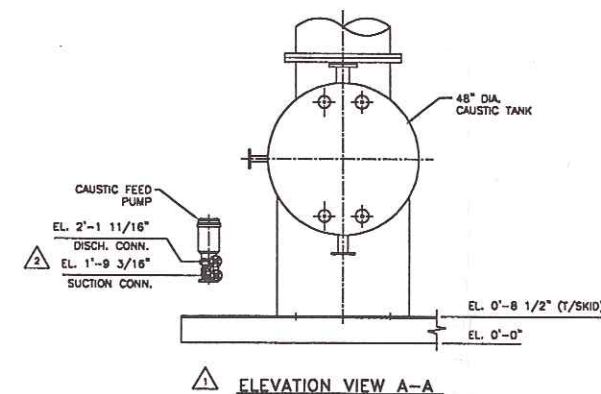
ELEVATION VIEW
(INSTRUMENT PANEL & CAUSTIC FEED PUMP NOT SHOWN)



END VIEW
(SPENT CAUSTIC & CAUSTIC FEED PUMPS ARE NOT SHOWN)

NOTES:

1. CUSTOMER P.O. NO. P08123
2. ALL PIPING ATTACHED TO THE EQUIPMENT BY THE CUSTOMER IN THE FIELD MUST BE INDEPENDENTLY SUPPORTED.
3. BOLT HOLES IN DRILLED FLANGES WILL STRADDLE NATURAL CENTERLINES.
4. USE 1/8" THICK 347SS GASKETS WITH FLEX GRAPHITE FILLER & A193 GR. B7 CALV. BOLTS & A194 GR. 2H GALV. NUTS FOR ASSEMBLING THE EQUIPMENT. USE 1/8" THICK TEFLON ENVELOPE GASKETS & 316 SS STUD BOLTS & NUTS FOR ASSEMBLING ALL PIPING.
5. EQUIPMENT WILL BE SECURED TO THE SKID USING A-325 GALVANIZED BOLTING MATERIALS.
6. PIPE SUPPORTS FOR CEILCOTE SUPPLIED PIPING WILL BE FURNISHED BY CEILCOTE WHERE REQUIRED.
7. THE SKIDDED SYSTEM WILL BE SHOP ASSEMBLED & PRE-WIRED IN THE SHOP. AFTER ASSEMBLY THE SCRUBBER & EDUCTOR FEED PIPING ALONG WITH THE SCRUBBER & THE EDUCTOR WILL BE REMOVED PRIOR TO SHIPMENT.
8. SYSTEM WEIGHT = 22,000 LBS. APPROX.
9. SHOP SHALL APPLY ANTI-SKID STRIPS TO THE TOP SURFACE OF THE SKID IN ALL OPEN WALKING AREAS, TO PREVENT PERSONNEL FROM FALLING, AFTER THE EQUIPMENT & PIPING IS FULLY ASSEMBLED ONTO THE SKID.



(1) SYSTEM REQUIRED

5	2/23/05	ROTATED SCRUBBER SPRAY HEADER 90° CCW	GB
4	2/22/05	ADDED NOTE 9	KZ
3	12/14/04	REV'D. ELEV. OF FILTER OUTLETS & LOC. OF FILTERS	KZ
2	11-22-04	REV'D. FILTER, CAUSTIC REC. PUMP, SPENT CAUSTIC PUMP, CAUSTIC FEED PUMP, DMS & NOTE 4	JSM
1	10-27-04	ADDED CAUSTIC FEED STORAGE TANK TO PLAN VIEW AND ELEVATION VIEW. ADDED ELEV. VIEW A-A, NORTH ARROW & SYSTEM WEIGHT. RELOCATED CAUSTIC FEED PUMPS.	SC

REV.	DATE	DESCRIPTION	DRAWN	CHK'D
01	9/20/04			

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TITLE	STANDARDS
GENERAL ARRANGEMENT OF CAUSTIC SCRUBBER SYSTEM	
CUSTOMER	GIANT YORKTOWN REFINERY GRAFTON, VA

NOT APPROVED FOR FABRICATION					
KZ	APPROVED FOR FABRICATION	12/14/04			
DISP.	DRAWING STATUS	DATE	QUOTE: PG-24422-3	SCALE: 1/2" = 1'-0"	REV. 5
			S.O.: 81455	SH: 2 OF	
			DATE		

CEILCOTE AIR POLLUTION CONTROL
14955 Sprogue Rd. Suite 250 Strongsville, Ohio 44136-1758

D-81455-02

CAD FILE: 81455-02.DWG

REV. 5