

PRELIMINARY DESIGN

HUSKY OIL OPERATIONS LTD.

POLY-ACID INJECTION SYSTEM INSTALLATION PROJECT

CONSTRUCTION PACKAGE

APRIL 14, 2005

LOCATION: LLOYDMINSTER REFINERY

**EWR NUMBER:
AFE NUMBER:**

**OF. 04-58
RP-00398**

PROJECT MANAGER:	TOM JOHNSTON	PHONE #: 780-871-6607
PROCESS ENGINEER:	TRAVIS WILSON	PHONE #: 780-871-6627
CONSTRUCTION SUPERVISOR:	PHIL WEIGHILL	PHONE #: 780-871-6573
OPS./MAINT. COORDINATOR:	LLOYD MARENGER	PHONE #: 780-872-3255
OPERATIONS CONTACT:	LLOYD GEE	PHONE #: 780-871-6583
INTEGRA PROJECT MANAGER:	RUSSEL BOOTH	PHONE #: 780-875-8847

POLYPHOSPHORIC ACID INJECTION SYSTEM INSTALLATION PROJECT

Objective:

Install a vendor supplied polyphosphoric acid injection skid, process piping, measurement and control equipment, and other ancilliary equipment to incorporate polyphosphoric acid into the Lloydminster Refinery asphalt manufacturing process.

Project Background:

Husky Asphalt Marketing has successfully acquired a contract to supply performance grade asphalt this summer. To meet the asphalt performance specifications set out in the contract the Lloydminster Refinery must upgrade it's product quality.

Polyphosphoric acid will be incorporated into the asphalt manufacturing process to meet the required performance specifications.

Integra Energy Consulting Ltd has been retained by Husky to help design and construct the polyphosphoric acid injection system.

Project Summary:

The Poly-Acid Injection System Installation Project includes the following work.

1. Dismantle existing metal storage shed to make room for new acid injection skid and building.
2. Extend existing concrete slab to support new poly-acid injection skid. Fabricate and install new structural steel skid to support new safety shower unit.
3. Install and tie-in safety shower unit adjacent to poly-acid skid.
4. Remove section of 6" blowdrum charge line. Fabricate, test and install replacement pipe spool section complete with stainless steel static mixer assembly.
5. Erect prefabricated insulated metal building to house poly-acid skid. Install "Ruffneck" heat exchanger unit heater and run steam supply lines. Install lighting and exhaust fan.
6. Set acid injection skid. Fabricate, test and install 2" stainless steel acid injection process piping and truck unload station piping. Install acid skid steam trace lines.
7. Install micro-motion acid flow meter and air actuated process control equipment and miscellaneous control instruments.
8. Install ½" stainless steel lines to supply instrument air to air actuated valves.
9. Upgrade existing 4" asphalt turbine flow meter in asphalt blowdrum charge line with new local readout c/w 4-20 mA output linked to Delta-V.

10. Replace 4" valve on 6" asphalt blowdrum charge line with new 4" air actuated shut-down valve.
11. Install new Delta-V HMI workstation in MCC-7. Link process equipment to Delta-V panel.
12. Re-locate existing blowdrum charge/rail car loading pump control station to MCC-7.
13. Install new 3 Hp. variable frequency drive in MCC-7 for acid injection pump motor.
14. Install mineral insulated heat trace cable and metal clad calcium silicate insulation on process piping and safety shower water lines. Heat trace and insulate steam trace piping and safety shower water lines to prevent freezing when not in service.
15. Install thermocouples on the blowdrum burner exhaust stacks and link to Delta-V control system. Program Delta -V system to shut-off fuel gas supply to burners when exhaust stack temperatures reach critical levels (safety feature designed to shut blowdrum burners off when asphalt is drained from blowdrums).

Project Schedule:

Husky will expedite construction to the extent possible to meet an in-service target date of June 1, 2005.

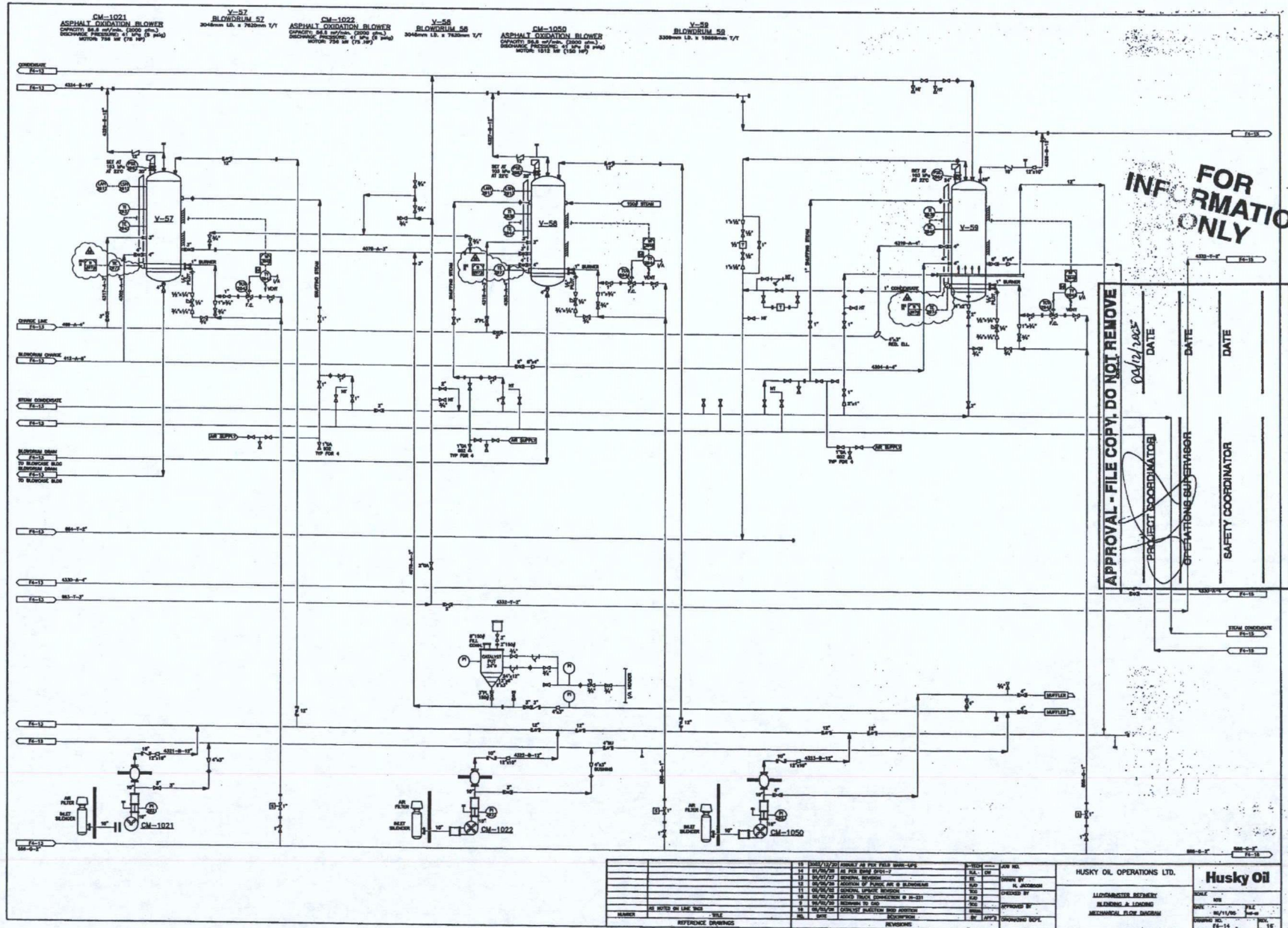
Husky may attempt to expedite this project by performing critical piping installation work during the scheduled April plant turnaround.

After the plant turnaround, work requiring process shutdown will be scheduled around critical processes to maximize productivity. Work that can be accomplished without shutting down process equipment will be performed as time and resources permit.

Husky expects to take delivery of the poly-acid skid during the last week of May. As a consequence, poly-acid skid placement and skid tie-in work scheduling will remain tentative until the skid is delivered.

Attachments:

Drawing Package
Equipment Order Summary
Husky Piping Specifications ("A", "M", "T")



PAUL MUELLER COMPANY

▲ 11. M. D. M. T. IS 0 DEG F. 0 28 PSIG.
 ▲ 12. ALL WELDING TO BE DONE BY ASME CERTIFIED WELDERS.
 ▲ 13. TEMP-PLATE SURFACES TO BE POLISHED IN SHEET
 POLISHER TO REMOVE HEAT TINT.

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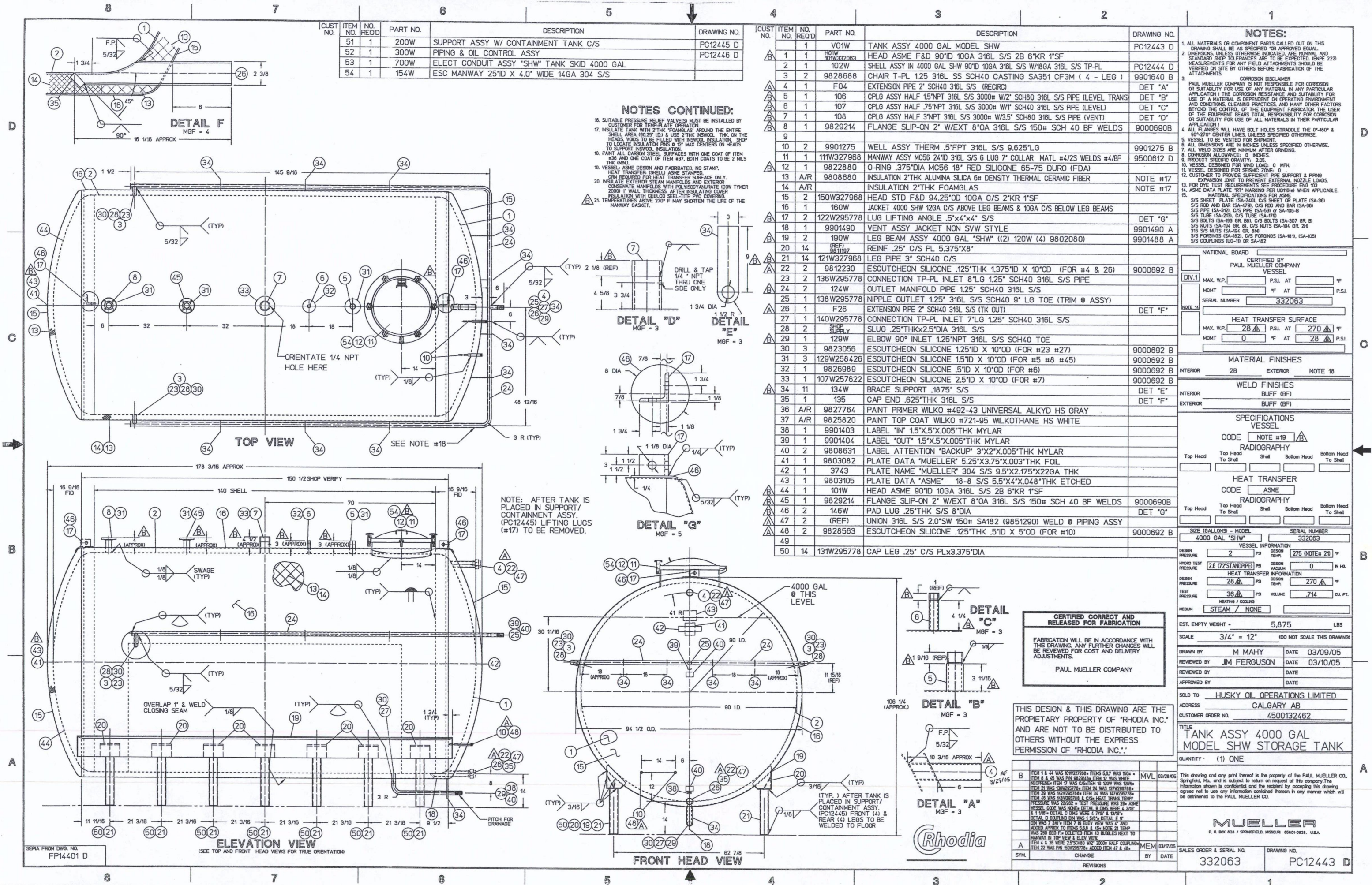
HUSKY OIL OPERATIONS LIMITED
LLOYDMINSTER, AB
CUSTOMER ORDER #4500132462

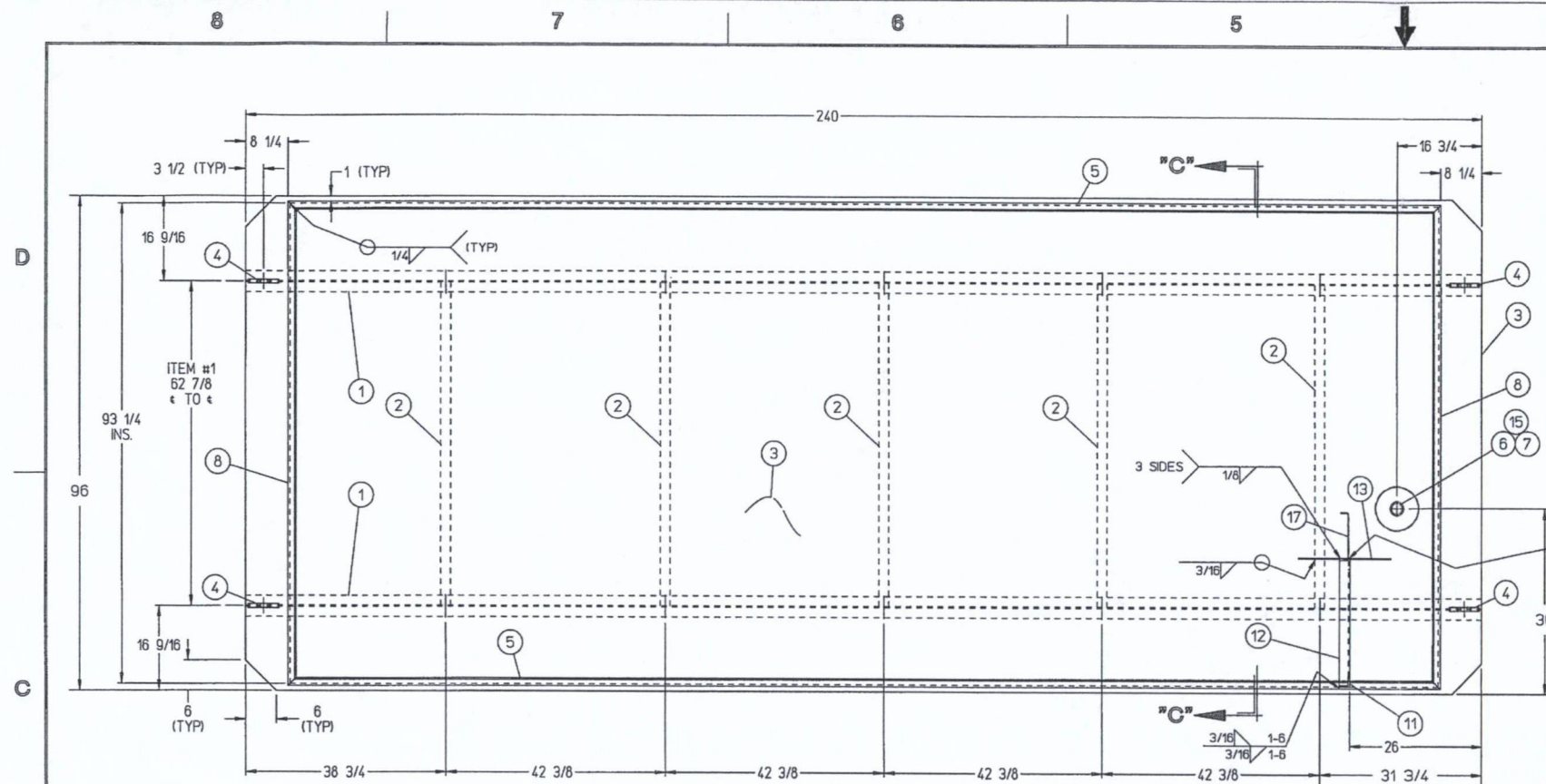
TEST PLATE NO.:		MA-384A (SEE NOTE #10)	
TEMP-PLATE TYPE: <input checked="" type="checkbox"/> INFL. <input type="checkbox"/> DIMPLED <input type="checkbox"/> DIEFORMED			
ROW AND SPOT SPACINGS ON INFLATED TYPE CANNOT EXCEED 1/16" MORE THAN DIMENSIONS SHOWN ON THIS DRAWING FOR ASME EQUIPMENT. (REF. SECT. VIII, DIV. 1, APX. 17J)			
MACHINE NO's: SPOT WELDS _____		SEAM WELDS _____	
PROTECTIVE PAINT: _____			
SURFACES TO BE PAINTED: _____			
TRIM EDGES: <input type="checkbox"/> ENDS ONLY <input type="checkbox"/> ALL EDGES			
MATERIAL FINISHES		WELD FINISHES	
INTERIOR	<u>2B</u>	<u>BUFF (BF)</u>	
EXTERIOR	<u>2B</u>	<u>AS IS (AI)</u>	
<input checked="" type="checkbox"/> ASME 'U' STAMPED <input type="checkbox"/> ASME DESIGNED (No Stamp) <input type="checkbox"/> NON ASME <input type="checkbox"/> ASME MATERIAL & WELDING (No Stamp)			
SPECIFICATIONS	TOP HEAD	SHELL	BTM HEAD
DESIGN PRESSURE PSI		28 <input checked="" type="checkbox"/>	
DESIGN TEMP. ° F		270 <input checked="" type="checkbox"/>	
MAX. HYDROSTATIC INFLATION PSI	NOTE #9	800	
HYDROSTATIC TEST PSI		36 <input checked="" type="checkbox"/>	
MAX. PNEUMATIC INFLATION PSI			
PNEUMATIC TEST PSI			
PILLOW DEPTH INCHES		.100	
HEATING MEDIUM		STEAM	
COOLING MEDIUM		NONE	
DEHYDRATION (per S.O.P. 23-6)		NO	
TEMP-PLATE CONTACT AREA (S.F.)		121.56	
TEMP-PLATE VOLUME CU.FT.		.714	
QUANTITY: ONE (1) PER ASSY			

APPROVED BY : STEVE MACKEY 03/28/05

				ALL MATERIALS OR COMPONENT PARTS CALLED OUT ON THIS DRAWING SHALL BE AS SPECIFIED OR APPROVED EQUAL				DRAWING NO. 177 PER ASSY	
				This drawing and any print thereof is the property of the PAUL MUELLER CO., Springfield, Mo., and is subject to return on request of this company. The information shown is confidential and the recipient by accepting this drawing agrees not to use any information contained therein in any manner which will be detrimental to the PAUL MUELLER CO.		DRAWN BY M MAHY DATE 3-08-05		SALES ORDER (MODEL/S) 332063 SHW	
	A	ADDED NOTES 11, 12 & 13 * DESIGN PRESSURE WAS 22 PSI * DESIGN TEMPERATURE WAS 262 DEGREE F * HYDRO TEST WAS 28 PSI.	MVL	03/28/05			REVIEWED BY JIM FERGUSON DATE 03/10/05	SCALE 9/16" = 12"	SIZE 4000 GAL
							MUELLER P. O. BOX 828 / SPRINGFIELD, MISSOURI 65801-0828, U.S.A.		
SYM.	CHANGE		BY	DATE			TITLE SHELL ASSY INNER W/TEMP-PLATE		DRAWING NO. PC12444 C
REVISIONS									

SEPIA FROM DWG. NO.
FP13813





NOTES:

1. ALL WELD SPATTER, RUST AND MILL SCALE MUST BE REMOVED FROM CARBON STEEL SURFACES. THOROUGHLY CLEAN ALL SURFACES INCLUDING WELDS, ABRADED OR OTHERWISE DEFECTIVE AREAS PER STEEL STRUCTURES PAINTING COUNCIL (SSPC) SP-9-63 POWER TOOL CLEANING.
2. PAINT ALL CARBON STEEL SURFACES WITH ONE COAT OF PRIMER AND A FINISH COAT, BOTH COATS TO BE 2 MILS THICK (MIN).
3. ESTIMATED WEIGHT OF SUPPORT ASSEMBLY = 7,000 LBS.
4. DYE TEST CONTAINMENT TANK WELDS PER PROCEDURE EN9103.
5. TANK CONTAINMENT VOLUME IS 4,102 GALLONS.

CUSTOMER APPROVAL

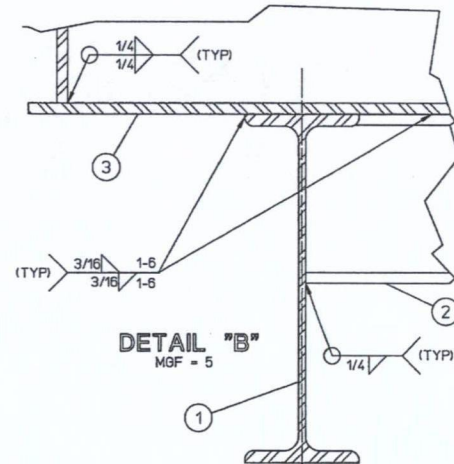
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☐ Proceed with fabrication according to this print.
☐ Proceed with fabrication making revisions marked on this print. Changes will be reviewed for cost and delivery adjustments.

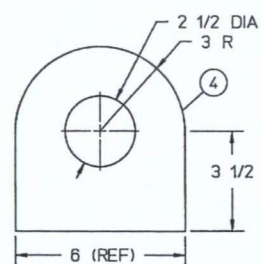
Signed _____ Dated _____
 Company _____

CUST NO.	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	DRAWING NO.
	1	1	200W	SUPPORT ASSY 4000 GAL MODEL "SHW" W/CONTAINMENT TANK C/S	FP14403 D
	1	2	201W298788	SUPPORT BEAM W12x22 HRCS	
	2	5	202W298788	SUPPORT CHANNEL C6x8.2 HRCS	
	3	1	203W298788	FLOOR .375" HRCS 96"x240"	
	4	4	204W298788	LUG LIFTING .75"THKx8"WIDE HRCS	DET A
	5	2	205W298788	TANK CONTAINMENT SIDE .375" C/S	
	6	1	006W298788	COUPLING HALF 2"NPT C/S 3000#	
	7	1	9801178	PLUG PIPE 2"NPT CS SQ HD OR HEX HD	
	8	2	208W298788	TANK CONTAINMENT END .375" C/S	
	9	A/R	9827764	PAINT PRIMER WILKO #492-43 UNIVERSAL ALKYD HS GRAY	NOTE #2
	10	A/R	9825820	PAINT TOP COAT WILKO #721-95 WILKOTHANE HS WHITE	NOTE #2
	11	2	211W/218W	SUPPORT CONTROL BOX 2"x2"x.25"ANGLE C/S 72.75"LG (1 RH 1 LH)	
	12	1	212W298788	BRACE SUPPORT CONTROL BOX 2"x2"x.25"ANGLE C/S 21"LG	
	13	1	213W298788	GUSSET .1875"THK C/S	
	14				
	15	1	004W298788	SUMP 8"SCH 40 C/S PIPE CAP WELDED	
	16				
	17	1	217W298788	MTG BRACKET FREQ DRIVE .1875"C/S FORMED 9"x1.5"x12.5"LG W/ 1" NOTCHED CORNERS	

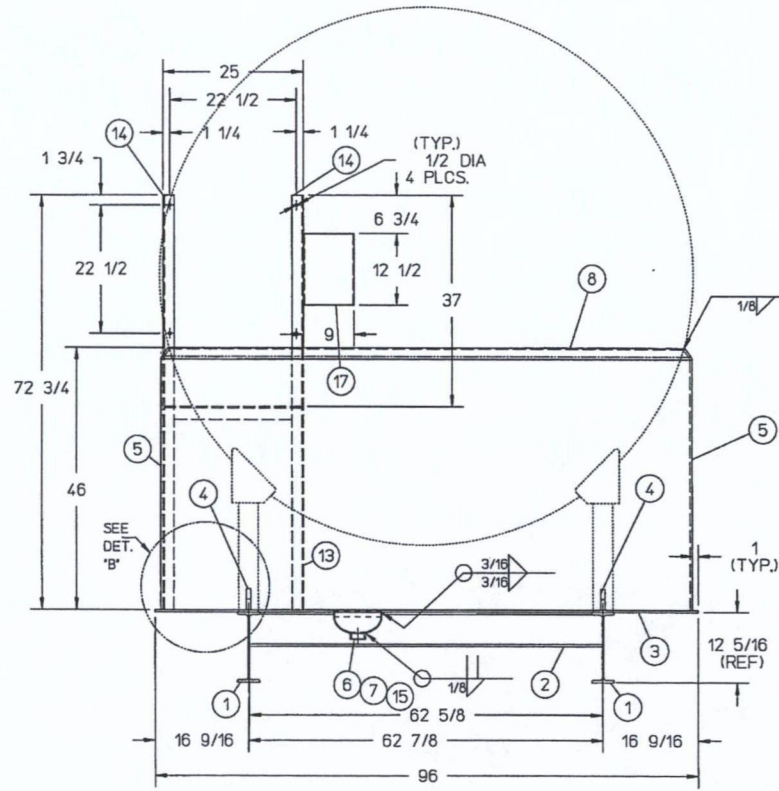
SECTION "C-C"
M.G.F. = 6



DETAIL "B"
M.G.F. = 5



DETAIL "A"
M.G.F. = 5

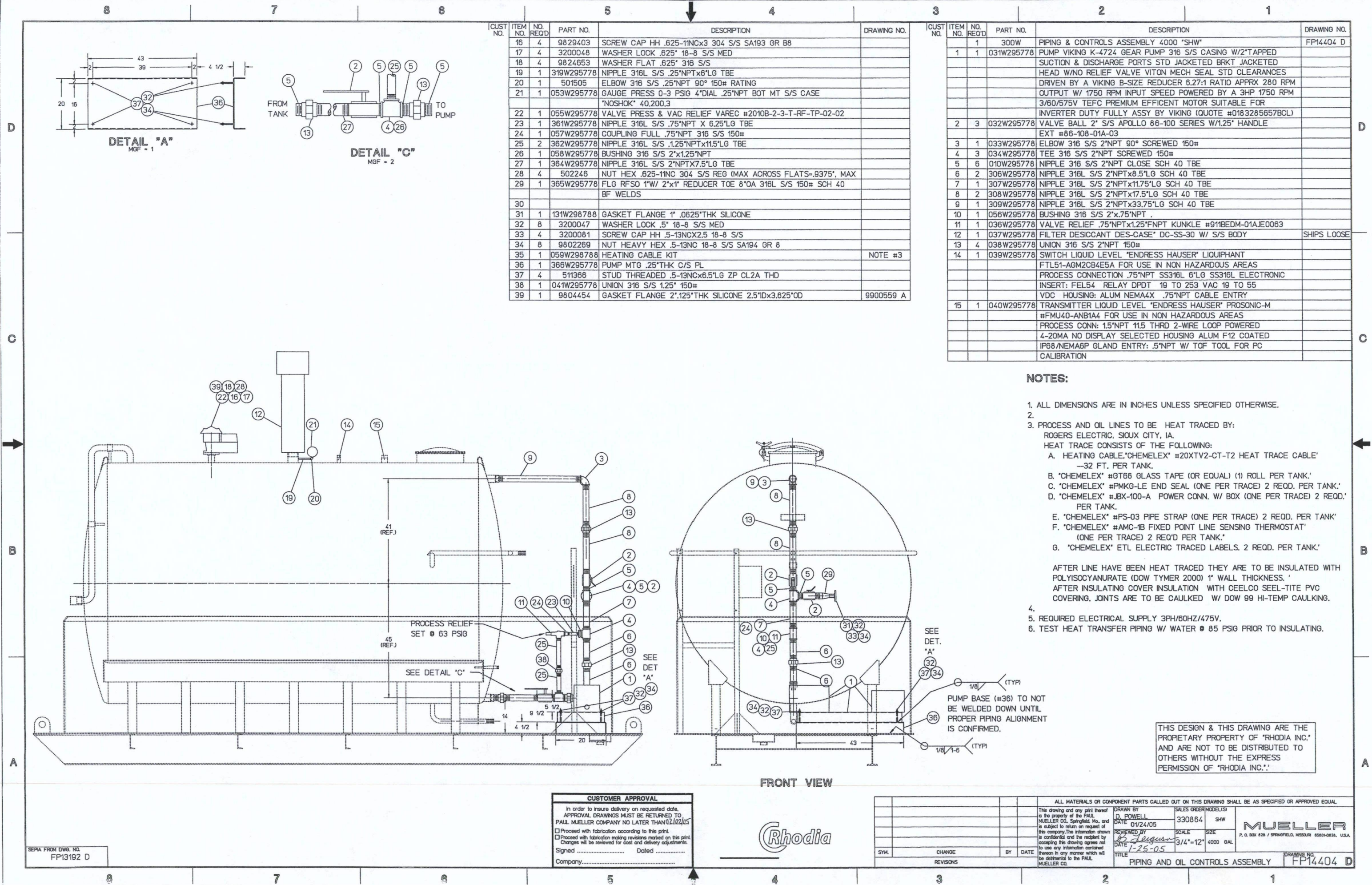


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SERIAL FROM DWG. NO.
FP13097 D

ALL MATERIALS OR COMPONENT PARTS CALLED OUT ON THIS DRAWING SHALL BE AS SPECIFIED OR APPROVED EQUAL.			
DRAWN BY D. POWELL DATE 01/24/05 REVIEWED BY [Signature] DATE 1-25-05 TITLE SUPPORT ASSEMBLY W/CONTAINMENT TANK	SALES ORDER/MODEL/IS 330864 S-W	MUELLER P. O. BOX 828 / SPRINGFIELD, MASSACHUSETTS 01101-0828, U.S.A.	
	SCALE 7.5"=12"	SIZE 4000 GAL	DRAWING NO. FP14403 D
	SYM. CHANGE BY DATE REVISIONS		
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CUST NO.	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	DRAWING NO.
	16	4	9829403	SCREW CAP HH .625-11NCx3 304 S/S SA193 GR B8	
	17	4	3200048	WASHER LOCK .625" 18-8 S/S MED	
	18	4	9824653	WASHER FLAT .625" 316 S/S	
	19	1	319W295778	NIPPLE 316L S/S .25"NPTx6"L TBE	
	20	1	501505	ELBOW 316 S/S .25"NPT 90° 150# RATING	
	21	1	053W295778	GAUGE PRESS 0-3 PSIG 4"DIAL .25"NPT BOT MT S/S CASE "NOSHOK" 40,200.3	
	22	1	055W295778	VALVE PRESS & VAC RELIEF VAREC #2010B-2-3-T-RF-TP-02-02	
	23	1	361W295778	NIPPLE 316L S/S .75"NPT X 6.25"L TBE	
	24	1	057W295778	COUPLING FULL .75"NPT 316 S/S 150#	
	25	2	362W295778	NIPPLE 316L S/S .125"NPTx11.5"L TBE	
	26	1	058W295778	BUSHING 316 S/S 2"x1.25"NPT	
	27	1	364W295778	NIPPLE 316L S/S 2"NPTx7.5"L TBE	
	28	4	502246	NUT HEX .625-11NC 304 S/S REG (MAX ACROSS FLATS=.9375", MAX	
	29	1	365W295778	FLG RFSO 1"W/ 2"x1" REDUCER TOE 8"OA 316L S/S 150# SCH 40 BF WELDS	
	30				
	31	1	131W298788	GASKET FLANGE 1" .0625"THK SILICONE	
	32	8	3200047	WASHER LOCK .5" 18-8 S/S MED	
	33	4	3200081	SCREW CAP HH .5-13NCx2.5 18-8 S/S	
	34	8	9802269	NUT HEAVY HEX .5-13NC 18-8 S/S SA194 GR 8	
	35	1	059W298788	HEATING CABLE KIT	NOTE #3
	36	1	366W295778	PUMP MTG .25"THK C/S PL	
	37	4	511366	STUD THREADED .5-13NCx6.5"L ZP CL2A THD	
	38	1	041W295778	UNION 316 S/S 1.25" 150#	
	39	1	9804454	GASKET FLANGE 2".125"THK SILICONE 2.5"IDx3.625"OD	9900559 A

CUST NO.	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	DRAWING NO.
		1	300W	PIPING & CONTROLS ASSEMBLY 4000 "SHW"	FP14404 D
1	1	1	031W295778	PUMP VIKING K-4724 GEAR PUMP 316 S/S CASING W/2"APPED SUCTION & DISCHARGE PORTS STD JACKETED BRKT JACKETED HEAD W/NO RELIEF VALVE VITON MECH SEAL STD CLEARANCES DRIVEN BY A VIKING B-SIZE REDUCER 6.27:1 RATIO APPRX 280 RPM OUTPUT W/ 1750 RPM INPUT SPEED POWERED BY A 3HP 1750 RPM 3/60/575V TEFC PREMIUM EFFICIENT MOTOR SUITABLE FOR INVERTER DUTY FULLY ASSY BY VIKING (QUOTE #0183285657BCL)	
2	3	1	032W295778	VALVE BALL 2" S/S APOLLO 86-100 SERIES W/1.25" HANDLE EXT #86-108-01A-03	
3	1	1	033W295778	ELBOW 316 S/S 2"NPT 90° SCREWED 150#	
4	3	1	034W295778	TEE 316 S/S 2"NPT SCREWED 150#	
5	6	1	010W295778	NIPPLE 316 S/S 2"NPT CLOSE SCH 40 TBE	
6	2	1	036W295778	NIPPLE 316L S/S 2"NPTx8.5"L SCH 40 TBE	
7	1	1	037W295778	NIPPLE 316L S/S 2"NPTx11.75"L SCH 40 TBE	
8	2	1	038W295778	NIPPLE 316L S/S 2"NPTx17.5"L SCH 40 TBE	
9	1	1	039W295778	NIPPLE 316L S/S 2"NPTx33.75"L SCH 40 TBE	
10	1	1	056W295778	BUSHING 316 S/S 2"x.75"NPT	
11	1	1	036W295778	VALVE RELIEF .75"NPTx1.25"NPT KUNKLE #911BEDM-01AJE0063	
12	1	1	037W295778	FILTER DESICCANT DES-CASE* DC-SS-30 W/ S/S BODY	SHIPS LOOSE
13	4	1	038W295778	UNION 316 S/S 2"NPT 150#	
14	1	1	039W295778	SWITCH LIQUID LEVEL "ENDRESS HAUSER" LIQUIPHANT FTL51-AGM2CB4E5A FOR USE IN NON HAZARDOUS AREAS PROCESS CONNECTION .75"NPT SS316L 6"L SS316L ELECTRONIC INSERT: FEL54 RELAY DPDT 19 TO 253 VAC 19 TO 55 VDC HOUSING: ALUM NEMA4X .75"NPT CABLE ENTRY TRANSMITTER LIQUID LEVEL "ENDRESS HAUSER" PROSONIC-M #FMU40-ANB1A4 FOR USE IN NON HAZARDOUS AREAS PROCESS CONN: 1.5"NPT 11.5 THRD 2-WIRE LOOP POWERED 4-20MA NO DISPLAY SELECTED HOUSING ALUM F12 COATED IP68/NEMA6P GLAND ENTRY: .5"NPT W/ TOF TOOL FOR PC CALIBRATION	
15	1	1	040W295778		

- NOTES:**
- ALL DIMENSIONS ARE IN INCHES UNLESS SPECIFIED OTHERWISE.
 -
 - PROCESS AND OIL LINES TO BE HEAT TRACED BY: ROGERS ELECTRIC, SIOUX CITY, IA.
HEAT TRACE CONSISTS OF THE FOLLOWING:
A. HEATING CABLE, "CHEMELEX" #20XTV2-CT-T2 HEAT TRACE CABLE -32 FT. PER TANK.
B. "CHEMELEX" #GT66 GLASS TAPE (OR EQUAL) (1) ROLL PER TANK.
C. "CHEMELEX" #PMKG-LE END SEAL (ONE PER TRACE) 2 REQD. PER TANK.
D. "CHEMELEX" #JBX-100-A POWER CONN. W/ BOX (ONE PER TRACE) 2 REQD. PER TANK.
E. "CHEMELEX" #PS-03 PIPE STRAP (ONE PER TRACE) 2 REQD. PER TANK.
F. "CHEMELEX" #AMC-1B FIXED POINT LINE SENSING THERMOSTAT (ONE PER TRACE) 2 REQD PER TANK.
G. "CHEMELEX" ETL ELECTRIC TRACED LABELS. 2 REQD. PER TANK.
 - AFTER LINE HAVE BEEN HEAT TRACED THEY ARE TO BE INSULATED WITH POLYISOCYANURATE (DOW TYMER 2000) 1" WALL THICKNESS.
AFTER INSULATING COVER INSULATION WITH CEELCO SEAL-TITE PVC COVERING. JOINTS ARE TO BE CAULKED W/ DOW 99 HI-TEMP CAULKING.
 -
 - REQUIRED ELECTRICAL SUPPLY 3PH/60HZ/475V.
 - TEST HEAT TRANSFER PIPING W/ WATER @ 85 PSIG PRIOR TO INSULATING.

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Signed _____ Dated _____
Company _____

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					DRAWN BY D. POWELL		SALES ORDER(MODEL(S)) 330864 SHW	
					DATE 01/24/05		SCALE SIZE 3/4"=12" 4000 GAL	
					REVIEWED BY <i>D. Leggett</i>		DATE 1-25-05	
REVISIONS				TITLE PIPING AND OIL CONTROLS ASSEMBLY		DRAWING NO. FP14404 D		

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Polyphosphoric Acid Skid

June 8, 2005

Outline

- Project Objective
- Acid properties
- General Safety (from Supplier)
- MSDS Review
- Equipment Review
- Operation philosophy
- Truck Off-loading
- Skid/ Blowdrum controls
- Questions

Objective

- Polyphosphoric Acid improves the PG grading of the blown asphalt project
- Test Runs performed last year showed that 300/400 could be blown to PG 64-37 that can be blended to make PG 58-37, ect.
- Project implemented Poly-Acid while adding safeguards to existing system.

What is Poly Acid?

- Highly Viscous -difficult to pump below 70 °C
- Very Low pH acid – careful
- Corrosive to carbon steel, aluminum and other metals. Stainless steel corrosiveness is low, but increases with prolonged exposure above 130 C
- Must be kept dry to prevent breakdown of long acid chains –becomes more corrosive to SS, effectiveness decreases

[datasheet.pdf](#)

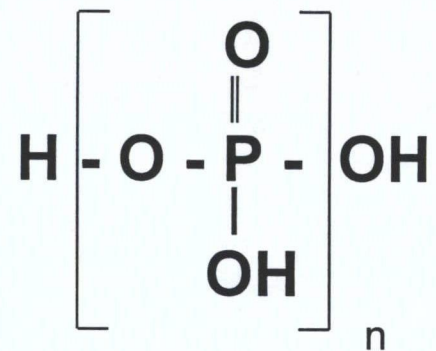
Innophos

INNOVALT™ Safety and Handling

INNOVALT™ Nomenclature

- Orthophosphoric Acid - Ranges from 1% to 95% by weight of H_3PO_4 . Grades include Technical, FCC, NF, ACS, and High Purity.
- INNOVALT™ - 105% to 118+% by weight of H_3PO_4 . Technical grade only.

INNOVALT™ Chemistry



1 to 95% Orthophosphoric Acid - $n = 1$

105 to 118% INNOVALT™ - n ranges from 4 to 15
ortho, pyro, tri, tetra, high poly constituents

INNOVALT™ Chemistry,

continued

Physical State : Colorless to amber, viscous, hygroscopic liquid

Specific Gravity: 2.05 @ 20 Deg C

Density: 17.1 lbs./gallon @ 20 Deg C

Viscosity: 2600 @ 60 Deg C

(centipoise) 380 @ 100 Deg C (300/400 is around 950)

Flash point: None (theoretically boils at over 500 C)

**Freeze point: Very viscous at ambient temperature, freezing is
difficult to attain; glassy consistency @ 52Deg C**

Solubility: Completely miscible in asphalt

Hazards

- Can Burn Eyes and Skin (Thermal Burns)
- Corrosive and Irritating
- Mist may Damage Throat and Lungs
- Can React with Some Metals / Corrosive to Mild Steel, Cast Iron, Copper, Brass, Bronze
- Keep away from Sulfides / Sulfites, Strong Oxidizing / Reducing Agents

Recommended Personal Protective Equipment

- Chemical Safety Glasses / Goggles
- Face Shield
- Chemical Resistant Gloves / Boots and Apron
- Good Work Practices/ Personal Hygiene
- Safety Shower and Eye Wash Station

First Aid

■ Eye Contact

- Flush Eyes with Water for 15 minutes
- Do not neutralize
- Seek Medical Attention

■ Skin Contact

- Flush with Water
- Remove Contaminated Clothing
- Do Not Neutralize
- Seek Medical Attention

First Aid, continued

■ Ingestion

- Dilute with Large Quantities of Water
- Do Not Induce Vomiting
- Seek Medical Attention

■ Inhalation

- Remove to Fresh Air
- If Breathing Stops-- Administer Artificial Respiration / CPR

INNOVALT™ Spills

- Dike or Contain Material
- Reclaim Material to Suitable Container(s)
- Neutralize Spill with Soda Ash or Sodium Bicarbonate (dilute)
- Exercise Caution during Neutralization
- Emergency Response Numbers
 - Canutec - 613-996-6666
 - Innophos ECT-615-386-7816

Additional Product Information

- More information on INNOVALT™ can be found at our website at:
<http://www.innophos.com>

REMEMBER: SAFETY IS FIRST

MSDS

msds-115percent.pdf

Poly-Acid Skid

- Skid consists of the following:
 - a Viking gear pump controlled by a VFD,
 - an insulated, steam traced 4000 gallon tank with an LIT and a high level switch
 - electrical tracing on the piping and the pump
 - A desiccant /filtration system keeps the air coming in dry to prevent making orthophosphoric acid
 - Block valves for the pump and tank
 - Installed Micromotion flow meter and actuated block valve on acid line.
 - Secondary containment that holds contents of tank

Skid Heating

- Low pressure steam will keep the skid at 100°C for acid pumpability
 - High pressure steam is reduced to 190 kpa to keep the temperature near 130 C.
 - The low pressure condensate ties into the 100 kpa steam to the lime pond from the steamers. A new Pressure Transmitter, PIT-2562 and a new positioner at the valve at the Lime Pond to allow accurate control.
 - TI in acid sends signal to DeltaV, which opens and closes valve on steam line to control at setpoint

Operating Philosophy

- Blowdrum charge valve and the charge pumps will be operated from MCC7 Work Station
- Operator will indicate it is a polyacid blow and specify the batch size (depending on blowdrum)
- Open asphalt charge valve (now in DeltaV)
- Turn on required pump (start/stop station now in MCC7)

Operating Philosophy, continued

- DeltaV will control the poly acid start up and shut down.
 - After a preset amount of asphalt enters the drum, the acid will begin injecting (5 usgpm) before a stainless steel inline mixer overhead. After mixing, the mixture is no longer corrosive
 - Once the required amount of acid is injected, the acid pump shuts off and the valve closes.

Operating philosophy

- Operator will shut-down the charge pump and charge valve (DeltaV) from MCC 7 when the charge is complete.
- Blow will likely utilize an existing recipe

Operation Checks

- The air filter/dryer has a sight glass to see if the silica gel is spent.
- Check the tank and pump routinely for leaks.
- The flow rate and RPM should be checked occasionally to see if they balance.
(expected relationship to be developed)

Truck off-loading

- Truck unloading station at the south east corner of blower building
- Trucks carry about 2500 USGal
- Bond-rite clamp shows proper bonding
- 2 inch camlock connection to truck
- Trucks can be off-loaded with air or with pump.
We've requested a pump
- May need to hook steam hose to truck coils

Truck Off-loading continued

- Shower is near Poly Acid skid building
- Have catch tray and solution of lime at unloading site
- Wear chemical resistant clothing, gloves and face shield
- Controls are in place to prevent overfilling of tank

Control Safegaurds

■ PolyAcid Off-loading

- LIT-2551 has high and low level alarms.
When loading tank, an alarm horn and red light will go on at the loading station. One minute later, the valve will automatically close
- Back-up high level switch shuts down the pump if alarm fails

Control Safegaurds

■ PolyAcid Injection

- PIT-2557 measures acid pressure line. If cool acid is in the line, it will slow the VFD-equipped pump down (stop if required) to keep the pressure below the PSV setting.
- If pump speed is less than 50% of normal, there will be an alarm in DeltaV.

Control Safegaurds

■ Blowdrums

- Thermocouples will be installed in the blowdrum stacks. These will shut-down the heaters when the stack temperature raises sharply, as would happen if the heaters were still on when the level went below the fire tubes.

Control Safegaurds

- Steam System

High pressure alarm on condensate line

High and Low temperature alarms on
the acid

Additional Safegaurds

- Discussion of additional requirements

Questions & Comments