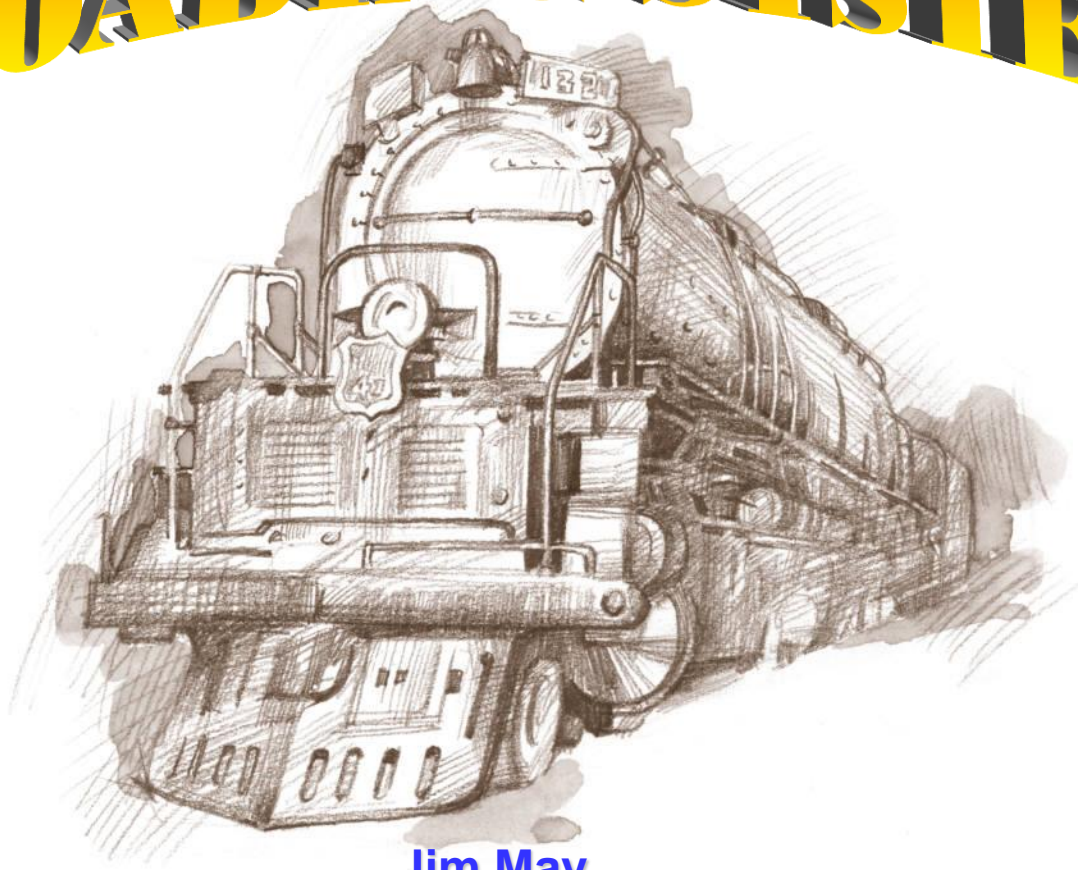


MULTIPLE TANK CAR UNLOADING SYSTEMS



Jim May

J. May Equipment/ ATA, Inc.

Arlington, TX

Fluid Fertilizer Foundation

Council Bluffs, IA, Dec 6 - 7, 2016

MULTIPLE TANK CAR UNLOADING SYSTEMS



PUMP FROM WHERE TO WHERE



THROUGH WHAT



START WITH WHAT WILL
WORK

WWW.FREECALC.COM/FRICFRAM.HTM

ON Line Friction Piping Loss-FreeCalc

“SIZE MATTERS!”

Based on FreeCalc.com

	<i>PRESSURE DROP</i>	<i>HEAD LOSS</i>
3" Pipe per 100' @ 500 GPM	22.5 PSI	52'
4" Pipe per 100' @ 500 GPM	5.59 PSI	12.9'
6" Pipe per 100' @ 500 GPM	0.71 PSI	1.6'
8" Pipe per 100' @ 500 GPM	0.18 PSI	0.4'

3" Pipe per 100' @ 1000 GPM	87.99 PSI	203.3'
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Basically Impossible

4" Pipe per 100' @ 1000 GPM	21.62 PSI	49.5'
6" Pipe per 100' @ 1000 GPM	2.66 PSI	6.1'
8" Pipe per 100' @ 1000 GPM	0.67 PSI	1.5'

COMPARE PIPE BY DIAMETER

3" PIPE INTERNAL IS 7.0686 SQUARE INCHES

4" PIPE INTERNAL IS 12.5664 SQUARE INCHES

4" IS 5.4978" LARGER, 78% LARGER THAN 3"

6" PIPE INTERNAL IS 28.2744 SQUARE INCHES

6" IS 15.708" LARGER, 2.25 TIMES LARGER THAN 4"

8" PIPE INTERNAL IS 50.2656 SQUARE INCHES

8" IS 21.991" LARGER, 78% LARGER THAN 6"

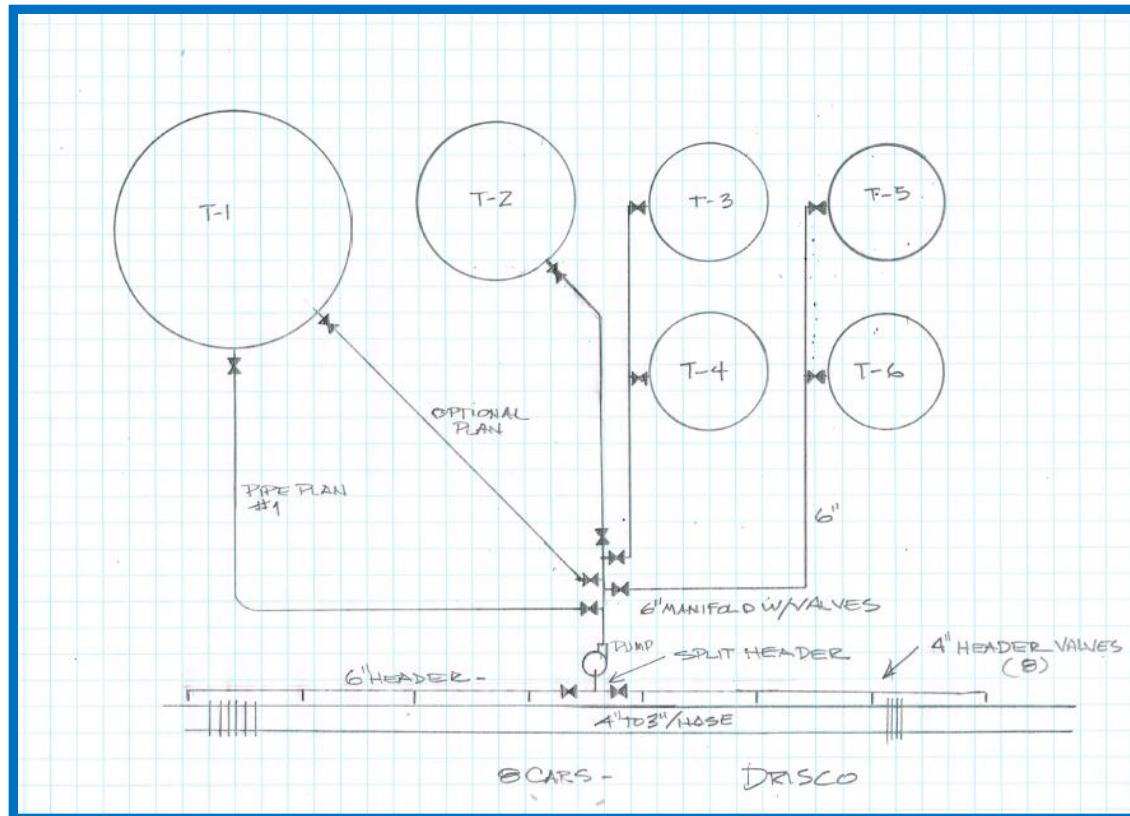
**IT'S NOT GUESSING,
IT'S ENGINEERING**

DESIGNS BASED ON FLOW CALCULATIONS



ALWAYS START WITH BASIS FOR DESIGN

- Flow Diagram, no dimensions from where to where with all valves indicated



Flow Capacity desired.

Maximum cars on spur

Volume divided by the elapsed time desired

Flow capacity multiplied by design factor.

Such as 110% or 125%

Marginal Systems work at marginal capacity.

BASIS FOR DESIGN

- HOW MANY CARS
- CAR SPACING, CENTER TO CENTER
- RAILROAD REGULATIONS FOR SET BACK OF EQUIPMENT. NOZZLE HEIGHT USUALLY NOT AN ISSUE. KEEP LOW.
- SELECT MATERIALS OF CONSTRUCTION, TYPE PIPE
- PIPE SIZE (From *FreeCalc.Com*)

DESIGN SOMETHING

- BASED ON DESIRED FLOW AND DISTANCE
- SELECT A PUMP
- SELECT A PIPE SIZE
- CALCULATE OVERALL DISTANCE INCLUDING TANK HEIGHT
- COUNT AND ADD FITTINGS, 90° ELBOWS, VALVES AND T's.. Add to length
- CONFIRM WITH FreeCalc.com



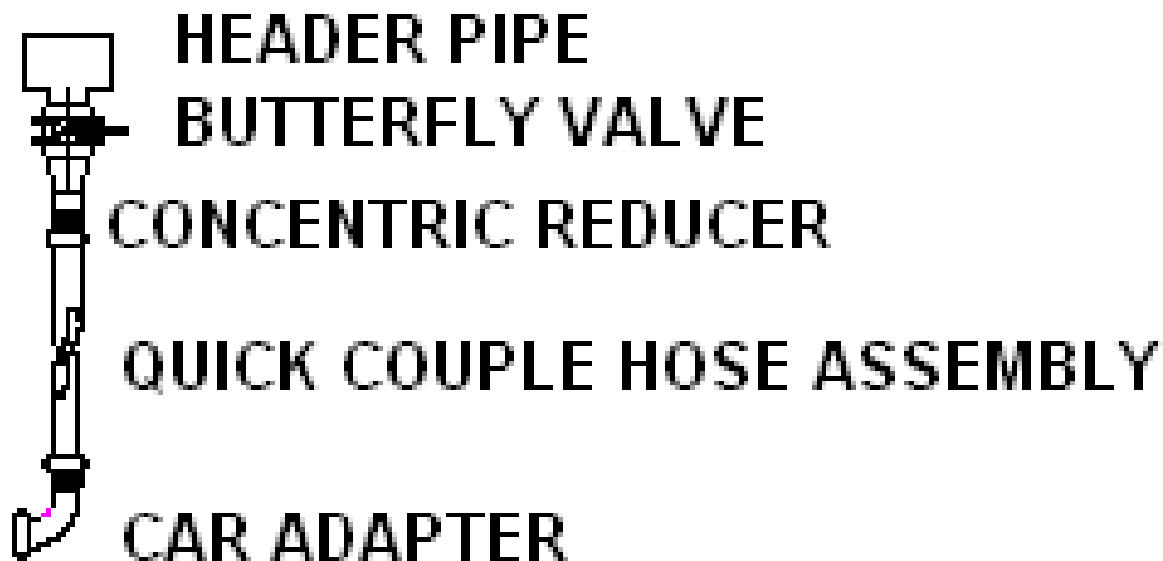
The less Feet The Less Friction

Item	3"	4"	6"	8"
90 Elbow	7.9	11.4	16.7	21.0'
45 Elbow	4.0	5.1	8.0	10.6'
T - Branch	16.4	22.0	32.7	49.0'
T - Run	6.1	7.9	12.3	14.0'

Fittings add to the overall length.
They must be calculated in the
flow capacity.

DESIGN SOMETHING

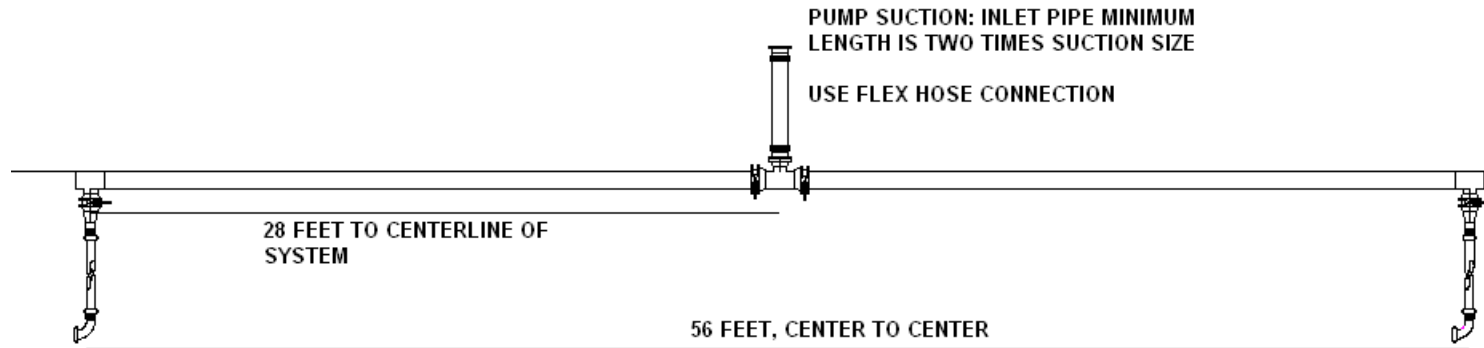
- INDIVIDUAL CAR CONNECTIONS
- SELECT VALVE SIZE



Wrong & Right



CENTER TO CENTER

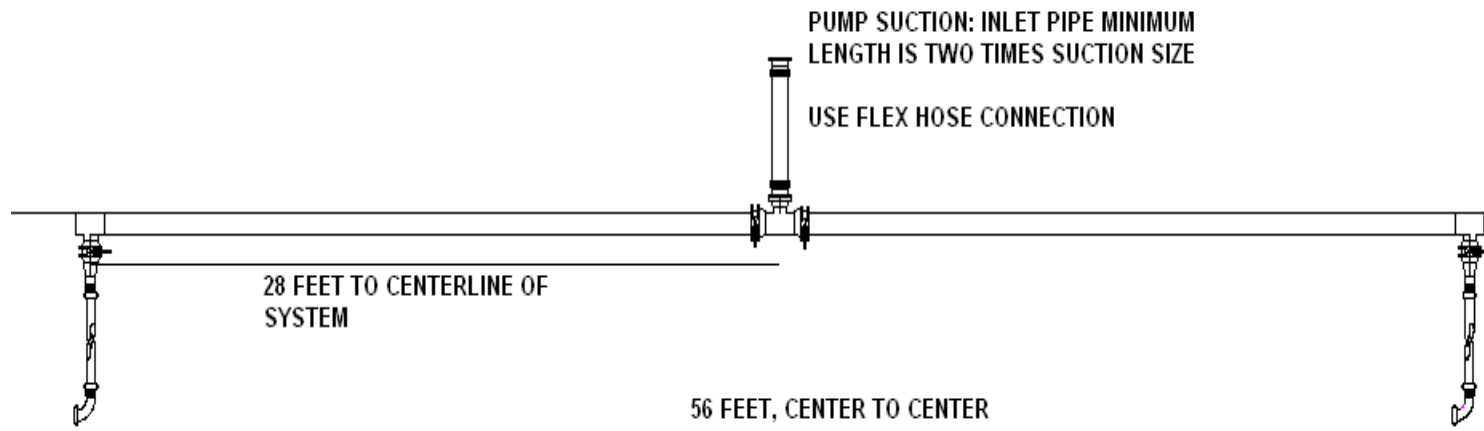


- Confirm Car Sizes with Local RR representative



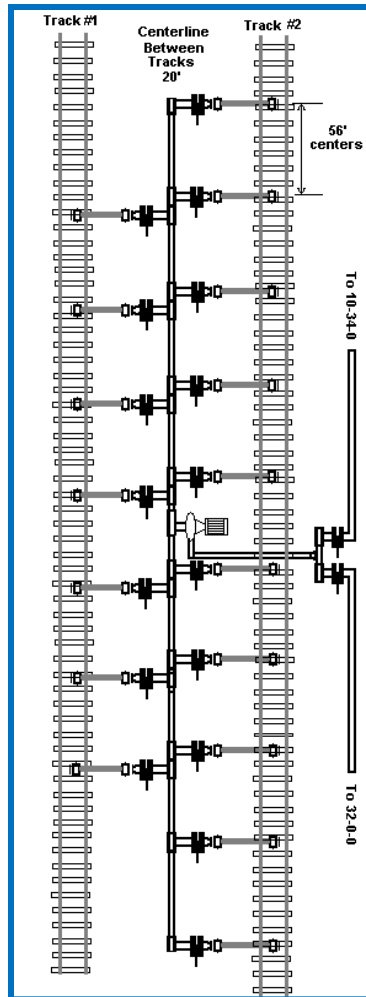
OTHER LITTLE THINGS

- *Separate the header at the pump,
Allows isolation of less than full number of cars
- *Add an air elimination valve at the pump suction
- *Add hose racks to minimize spill from hoses
- *Drip Pans under cars

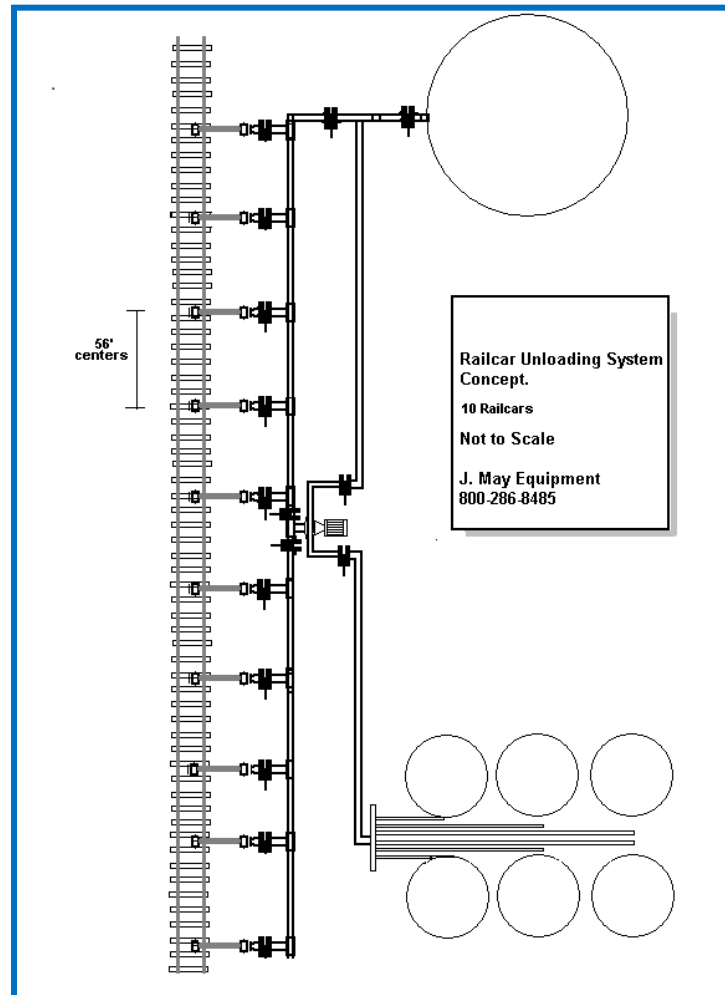


More Things

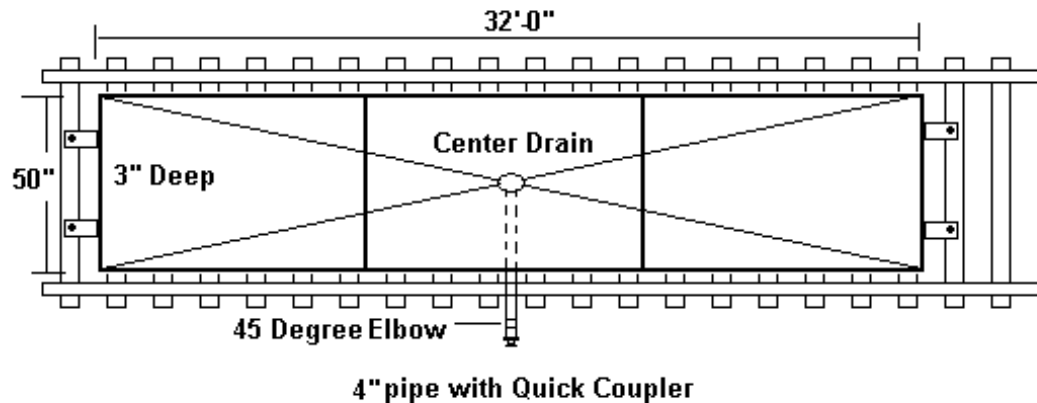
- Two Rail System



- Move Big Tank to Small Tanks

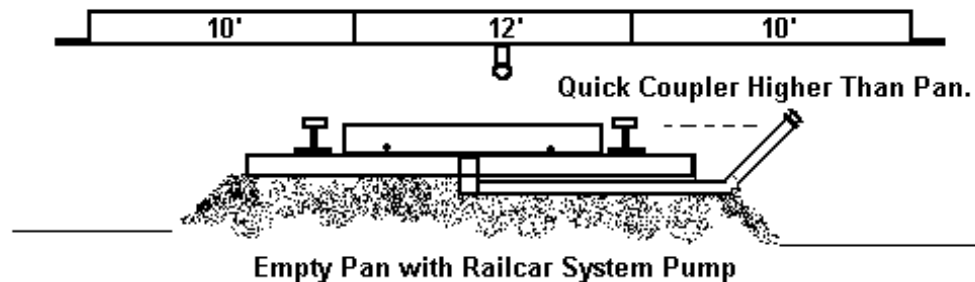


One More



304 Stainless Steel Construction

built in 3 sections, bolt together with gasket. Lag bolt to the cross-tie at each end.

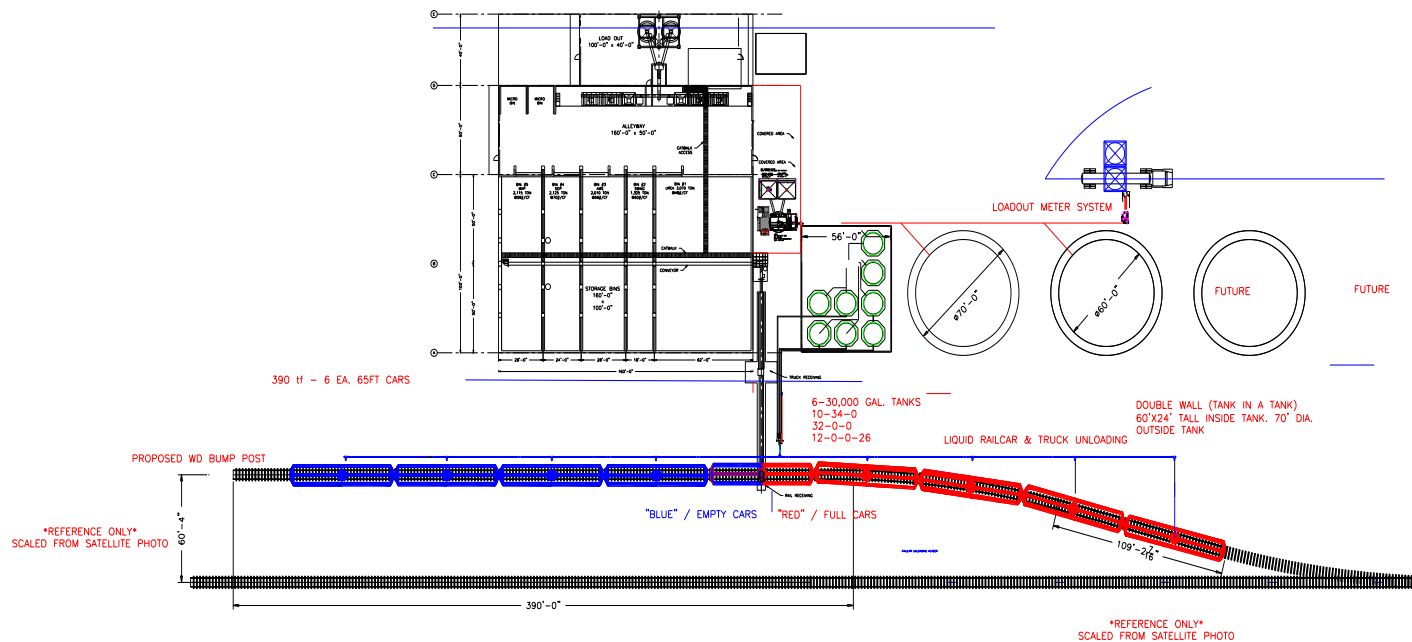


J. May Equipment Group
800-286-8485

250 Gallon Railcar Drip Pan

SPUR MANAGEMENT

- Car Position, Full & Empty, Liquid or Dry



DRISCO, It Grows

- Drisco Pipe, Polyethylene
- www.performancepipe.com
- Approximately 1" per 10°F per 100 feet
- 600' Pipe and a 30°F Temp Rise = 18" Increase in Length
- It has to go Somewhere. Stress on Pipe, Pump and Fittings





OTHER OPTIONS

- Add suction valves to unload trucks
- Add discharge valves to load trucks direct from the railcar
- **Air Blowout will clear lines.... And blow up the system. Use Extreme Caution with air blowout, anywhere, anytime**
- **Place air blowout where air cannot be trapped**



RUBBER LINED TANKS INLET STRAINER



Top Load or Bottom



Alternate System

Meter Railcars or Trucks , In or Out



ONE SYSTEM, UNLOAD EVERYTHING



Discharge manifolds should be compact and expandable



THINGS TO REMEMBER

- Center to Center of cars
- Your design factors
- How fast you want to go is highly determined by your pocket book
- Check with tank Manufacturer for tank vent calculations. Don't blow or collapse a tank
- Labor Costs more than good equipment

MULTIPLE TANK CAR UNLOADING SYSTEMS

- NOT JUST A PUMP & PIPE
- REQUIRES DESIGN AND PLANNING
- WORK WITH A COMPETENT COMPANY AND EQUIPMENT SUPPLIER
- ***“Don’t plan vast projects with half vast equipment”***

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