Material Handling in Power Plants
Focusing on Truck Unloading

McIlVaine Hot Topic

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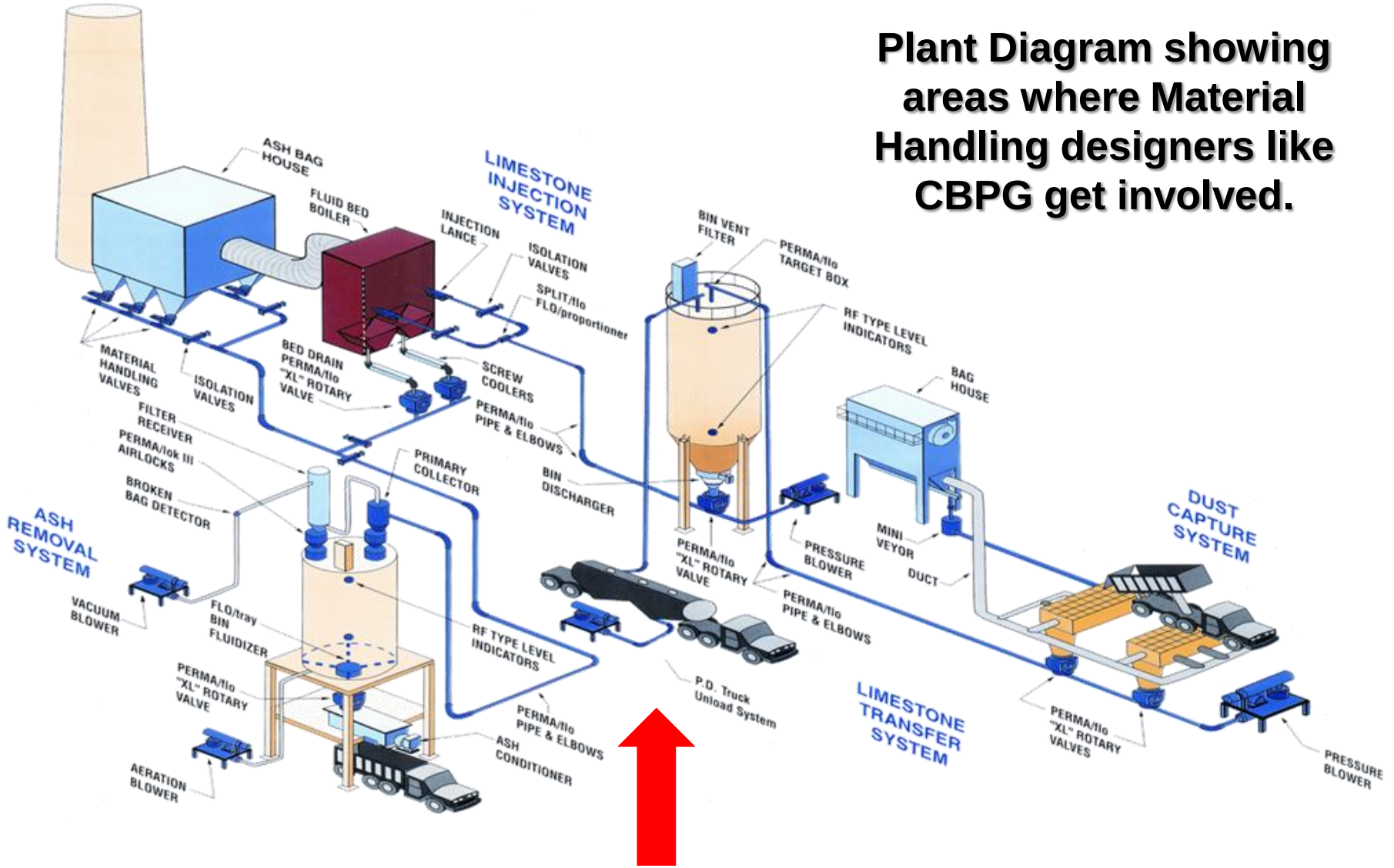
Material Handling

Plant Diagram showing areas where Material Handling designers like CBPG get involved.



Railcar and Truck Unloading

The art of bulk material transport has come a long way!

PD TRUCK

Understanding the PD Truck:

Typical Bulk Truck Unloading:

Typical bulk truck unloading would consist of a PD truck connecting to a 4” truck unload line. Using the on-board truck blower the truck was pneumatically unloaded to the storage silo.

PD trucks are typically limited to operate under 14.5 psig.

This technique works best when the truck unload station is close to the silo.

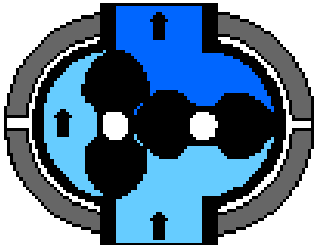
With short distances “dual phase” conveying is possible for optimum performance.

Understanding the PD Truck:

Air Feed Hose

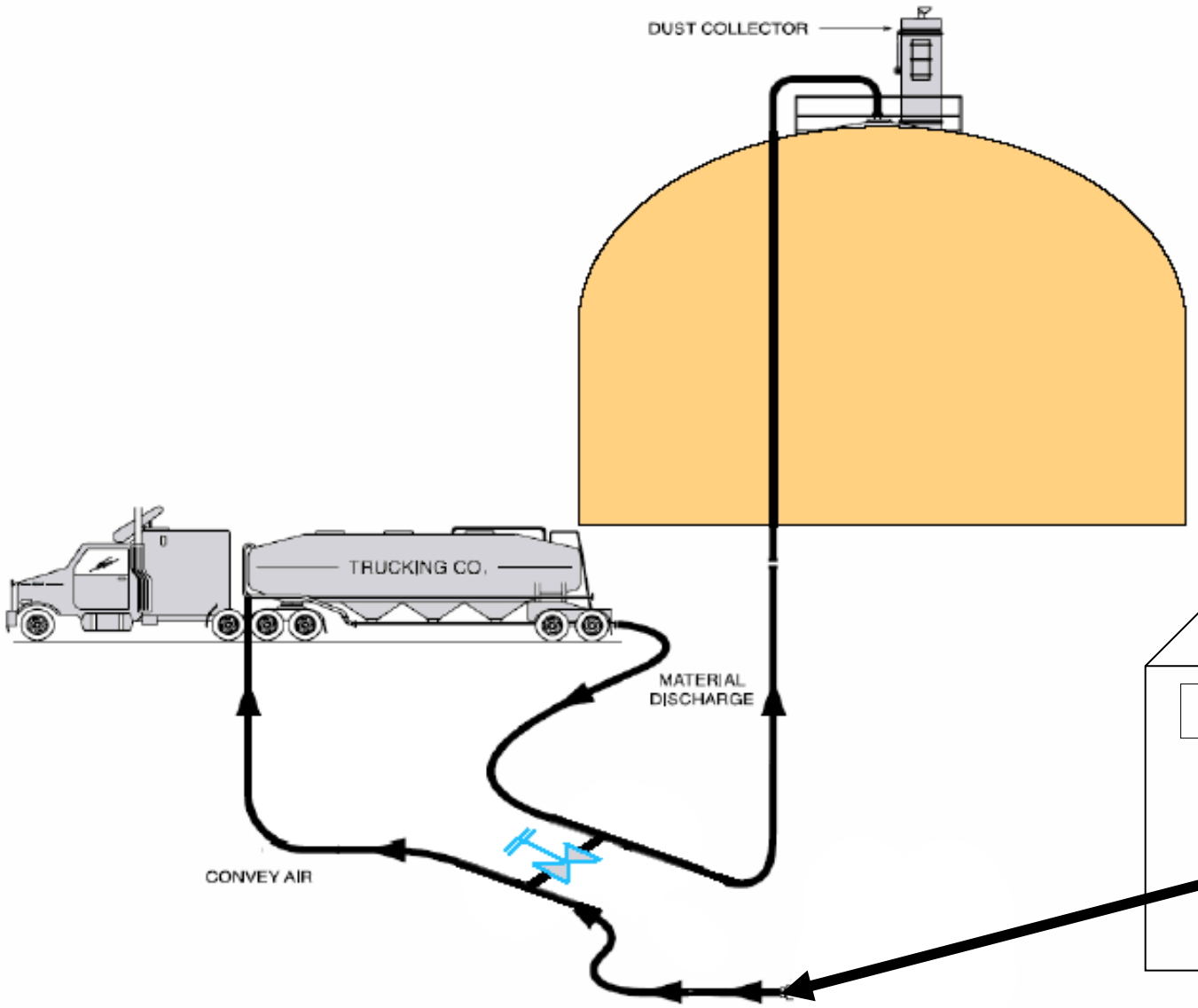
Air Balance Valve

Air Header

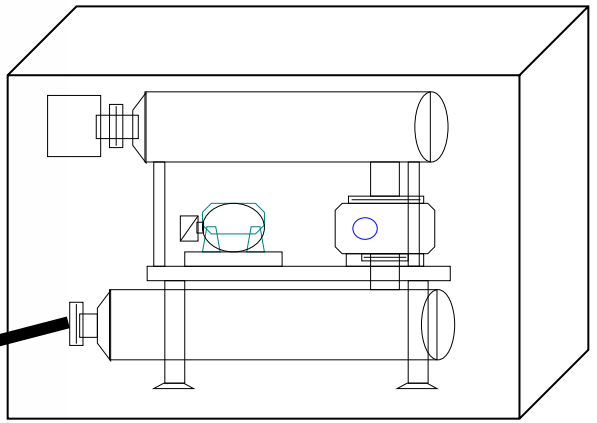


Truck mounted blower

Truck Unloading w/ Separate Blower



Blower



Blower Packages

Blower Packages are comprised of state-of-the-art components along with high quality PD (Positive Displacement) blowers.

Typical Blower Packages include:

- PD Blower
- TEFC Motor
- Double Adjustment Slide Base
- Flat or Raised Base Blower & Motor
- Inlet Filter (Replacement Cartridge)
- Inlet Silencer (Double Chamber Type)
- Discharge Silencer (Double Chamber Type)
- V-Belt Drive
- OSHA Drive Guard
- Inlet & Discharge Flexible Connection
- Check Valve
- Interconnecting Piping
- Painting & Testing
- Pressure Gauge

Packages provide acoustical sound enclosures around package or partial enclosures around blower with special treatment for guard & piping if required.

Blowers on raised base packages are pre-assembled.

Flat base blowers may require accessories to be partially assembled for shipping purposes.

Understanding the PD Truck:

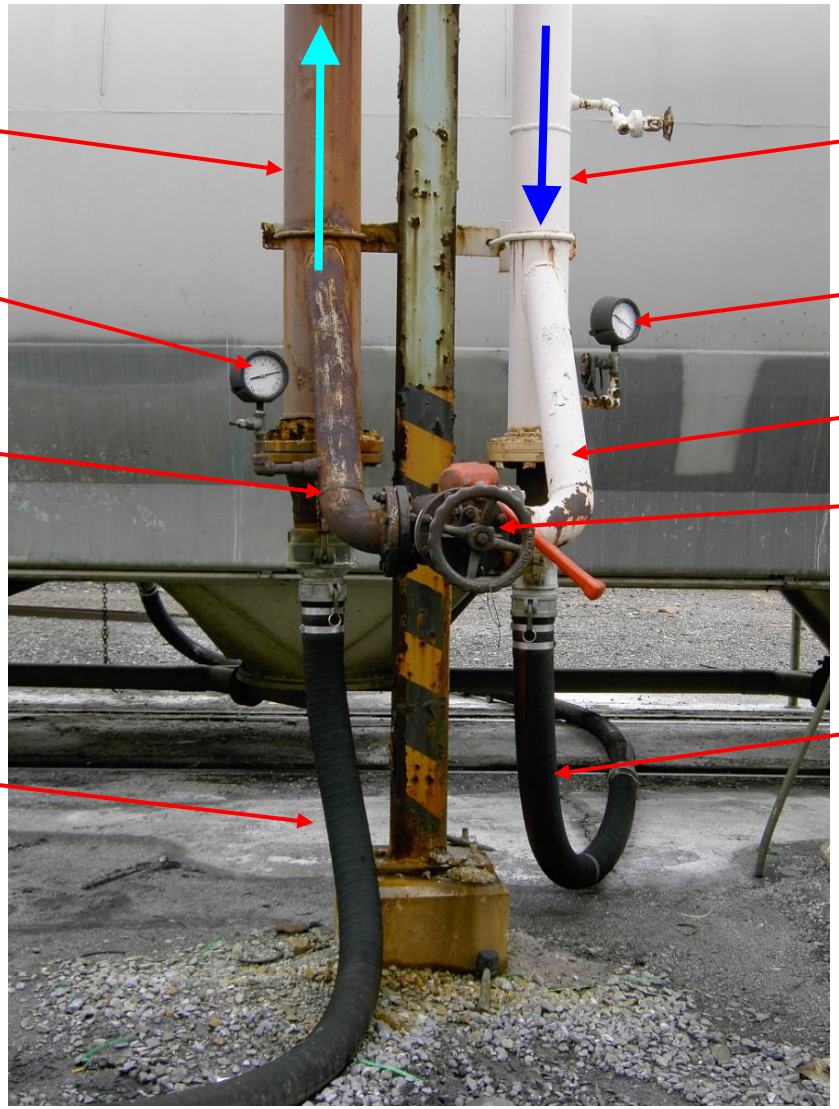
Air Header

Air Balance Valves

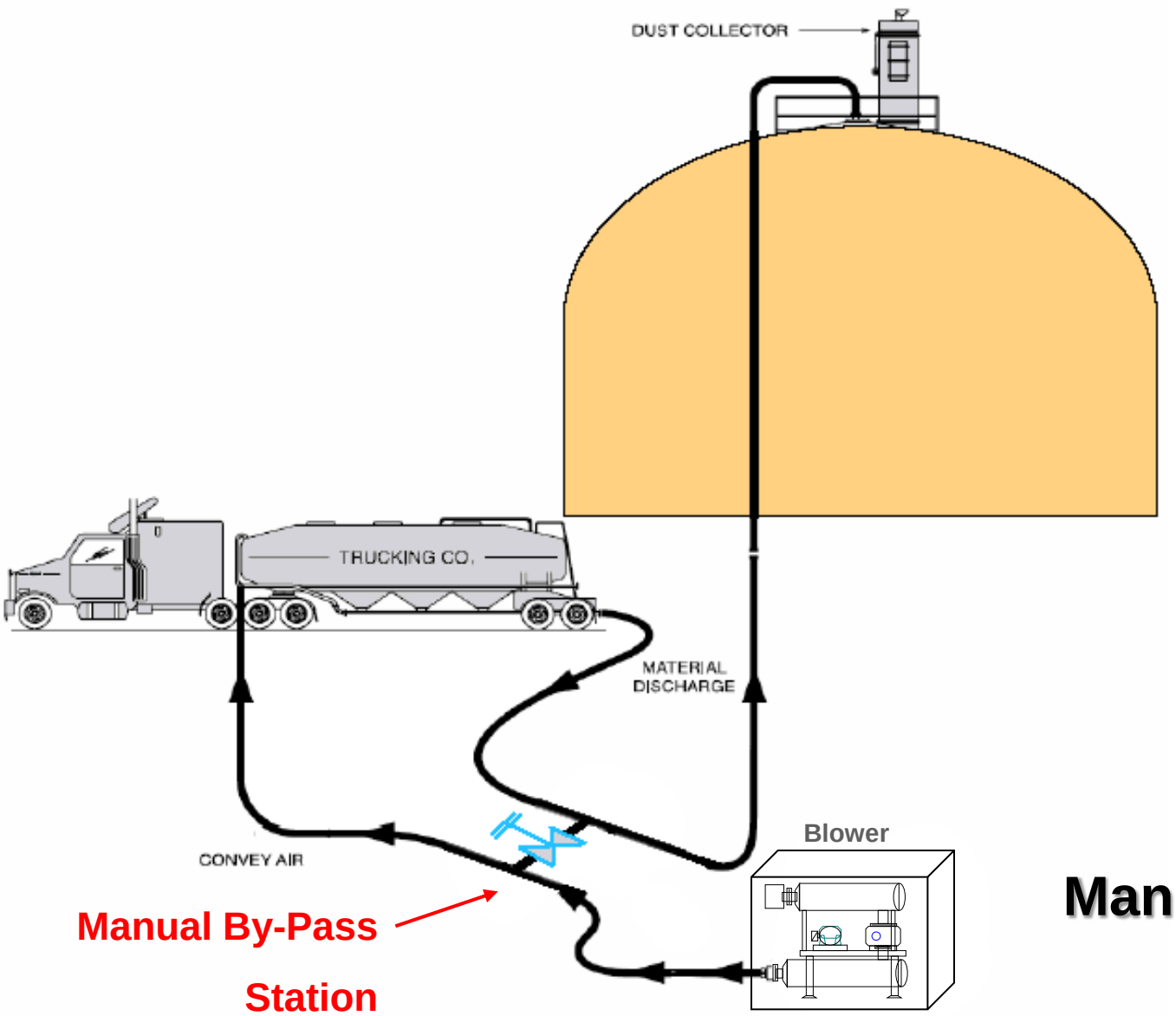
Hopper Gate Valves

Product Feed Header

Manual By-Pass Station

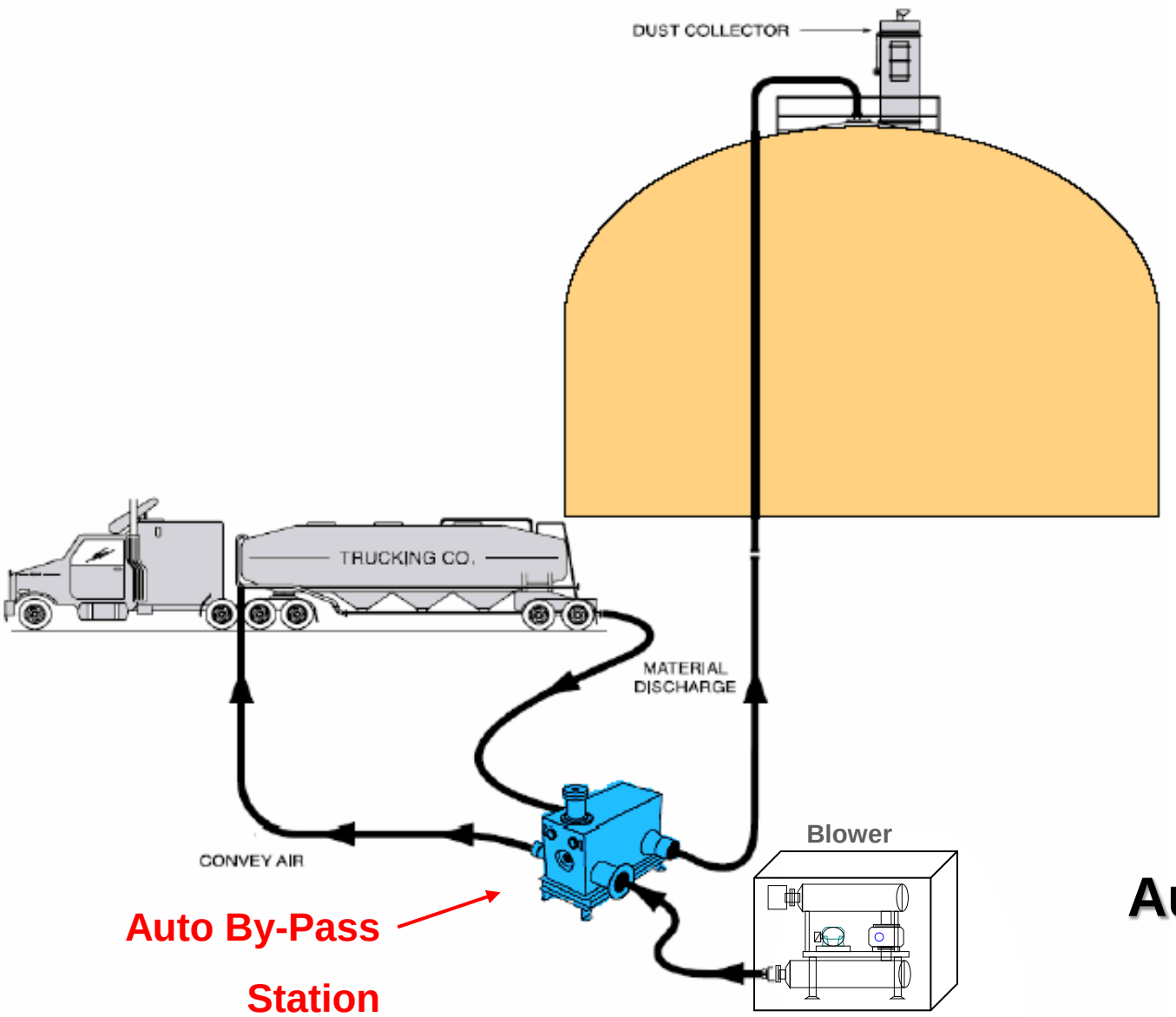


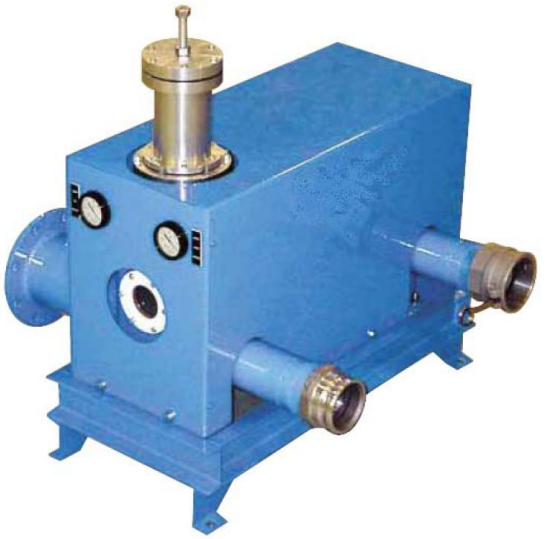
Truck Unloading



Manual By-Pass Station

Truck Unloading

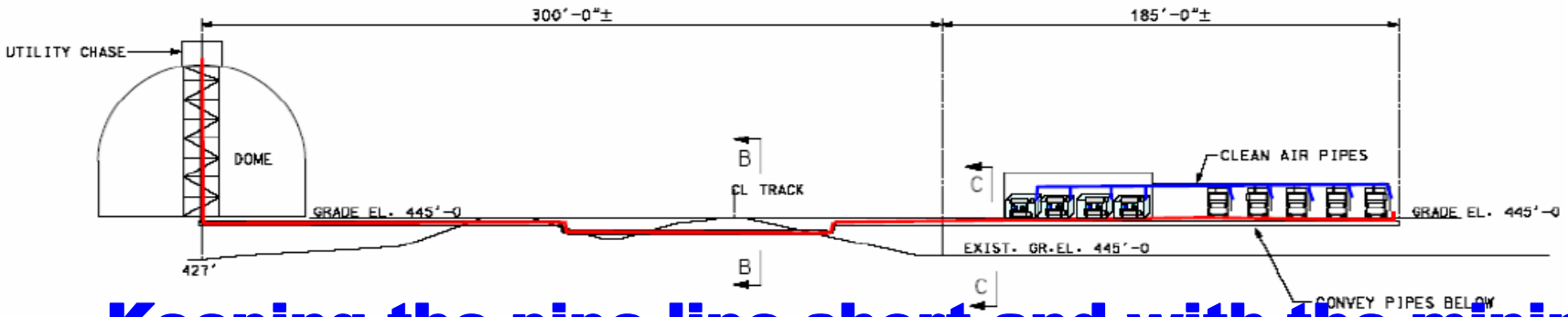




Auto By-Pass Station

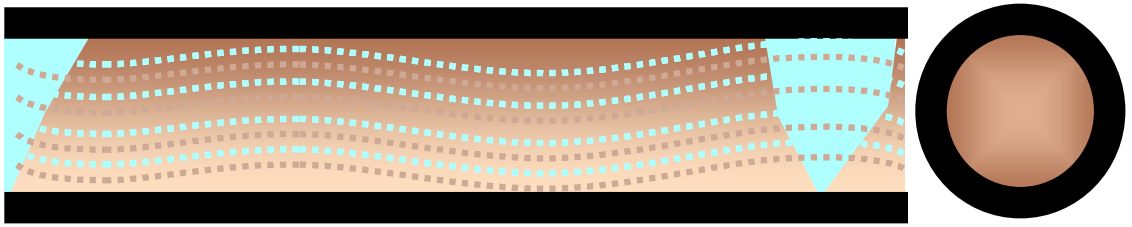
Design Considerations

Pipe Routing:



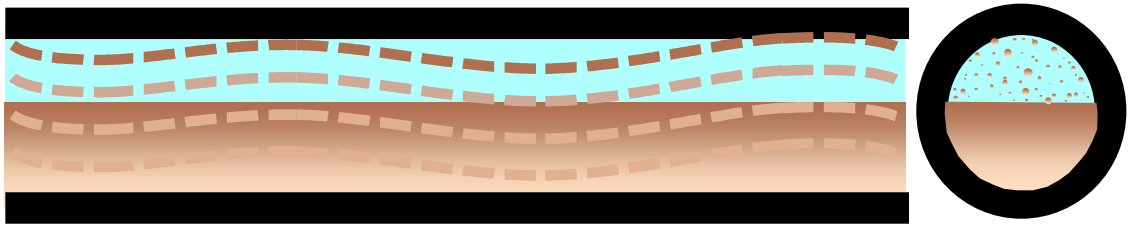
Keeping the pipe line short and with the minimum amount of elbows reduces HP and increases conveying rate!

Dense Phase



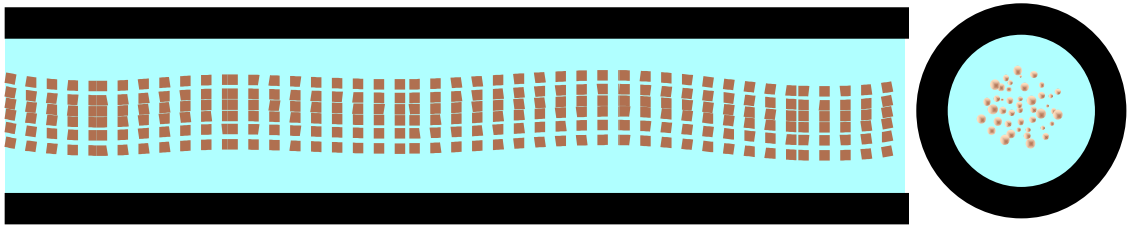
- 600-1800 fpm
- 25:1 Mat:Air
- 30-100 psig

Dual Phase



- 1800-2800 fpm
- 15:1 Mat:Air
- 15-30 psig

Dilute Phase

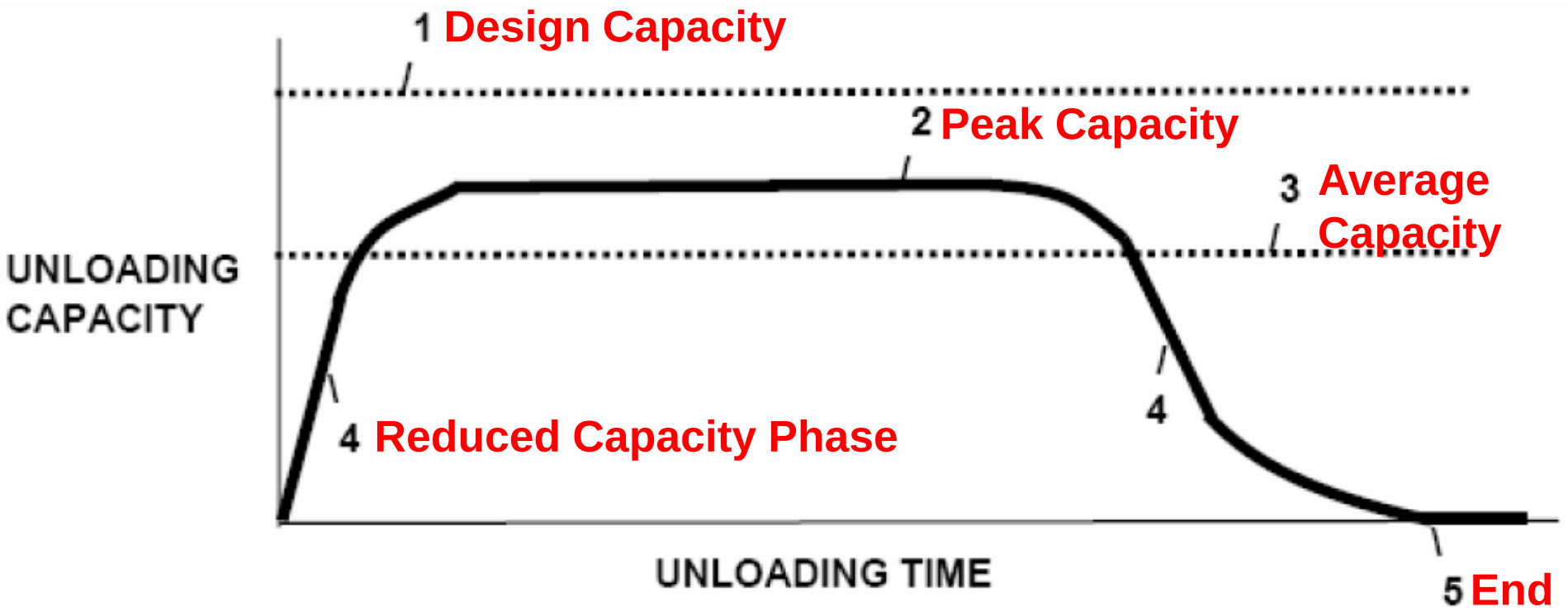


- 2800+ fpm
- 10:1 Mat:Air
- 3-15 psig

Real World Considerations

CAPACITY GRAPH

(PNEUMATIC CONVEYING)



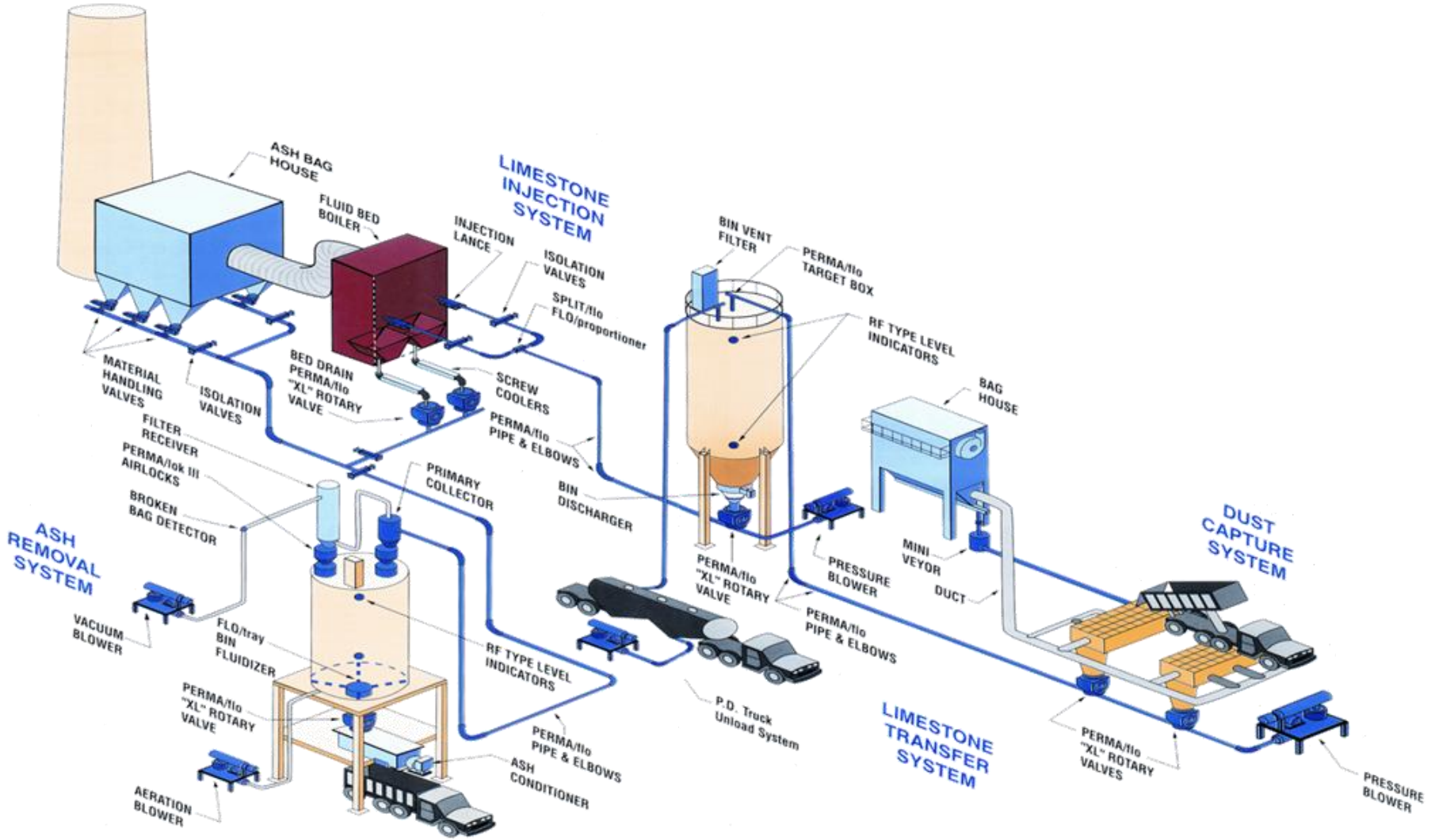
Efficiency Chart

25	TPH Peak Unload rate
Min	**Event:**
5.0	Driver Hook-UP
3.0	System Start (ramp up to max cap.)
60.0	Convey Time To Unload 25 Ton Truck @ Peak Rate
5.0	Stop / Purge
3.0	Driver Un Hook
76.0	**Total Truck Unload Time**
19.7	**TPH Average Truck Unload Rate**

78.9% Efficiency

Cost of Material Versus Unload Rate

Material Handling



Truck Unloading Example

www.cbpg.com