

**POWER PLANTS – FGD
LIMESTONE SLURRY PROCESSES
w/ PULVERIZED LIMESTONE**

**&
CHEMICAL HANDLING, SLURRYING & DELIVERY
PROCESSES FOR SO₂ & HG TREATMENT**

Presented by: Charles S. Alack

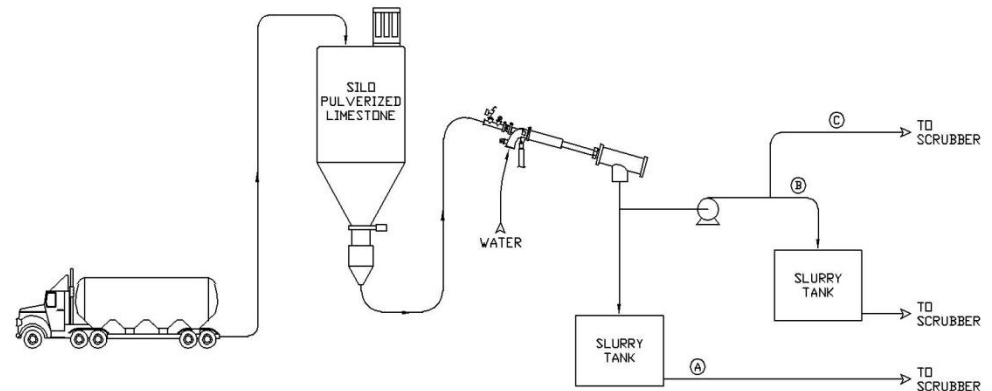
Semi-Bulk Systems, Inc

**HOT TOPIC HOUR
SEPT. 2012**

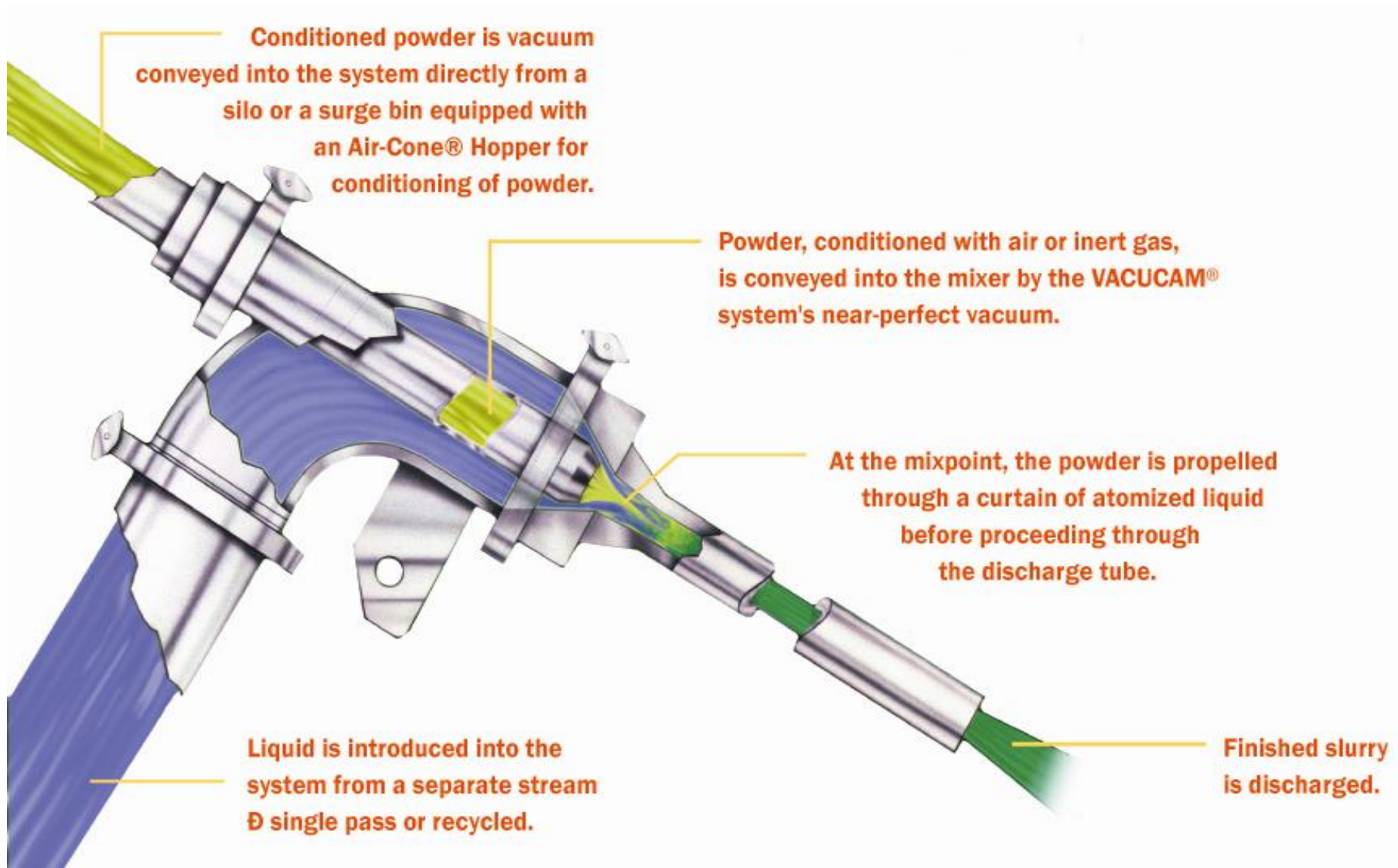


21st CENTURY PROCESSES [Pulverized Limestone] for LIMESTONE UNLOADING, HANDLING, STORAGE & SLURRY PREP [Vacucam® Ejector Mixer]

- Limestone Supplier:
 - Produces pulverized limestone w/ roller mills.
 - Provide logistics for supplier storage and regional distribution
 - Deliver and unload pulverized limestone to Power Plant silo.
- Power Plant
 - Supervision monitors automated slurry making process



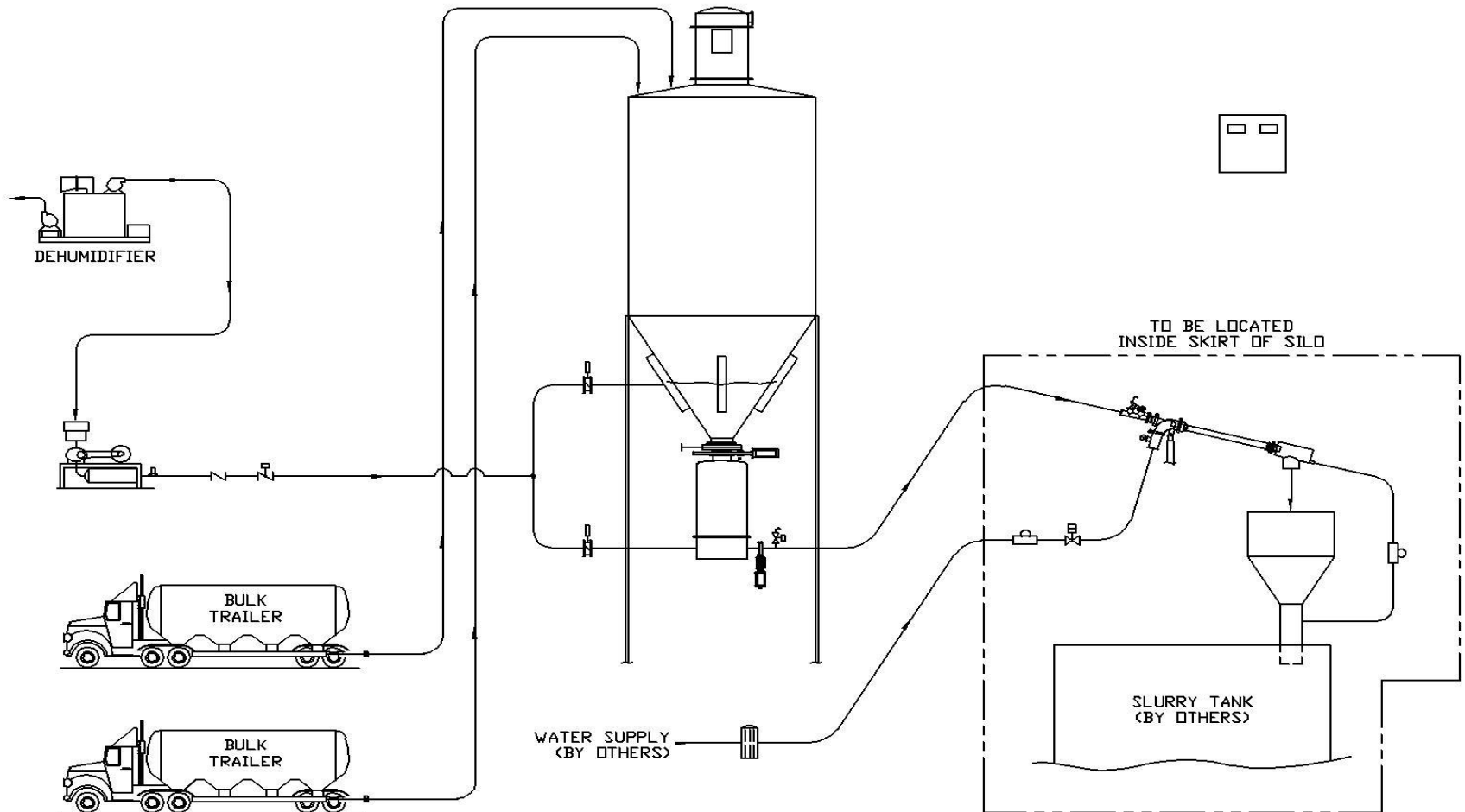
VACUCAM® EJECTOR MIXER



POWER PLANT Process Options

1. Single Pass Process Direct Into Slurry Storage Tank
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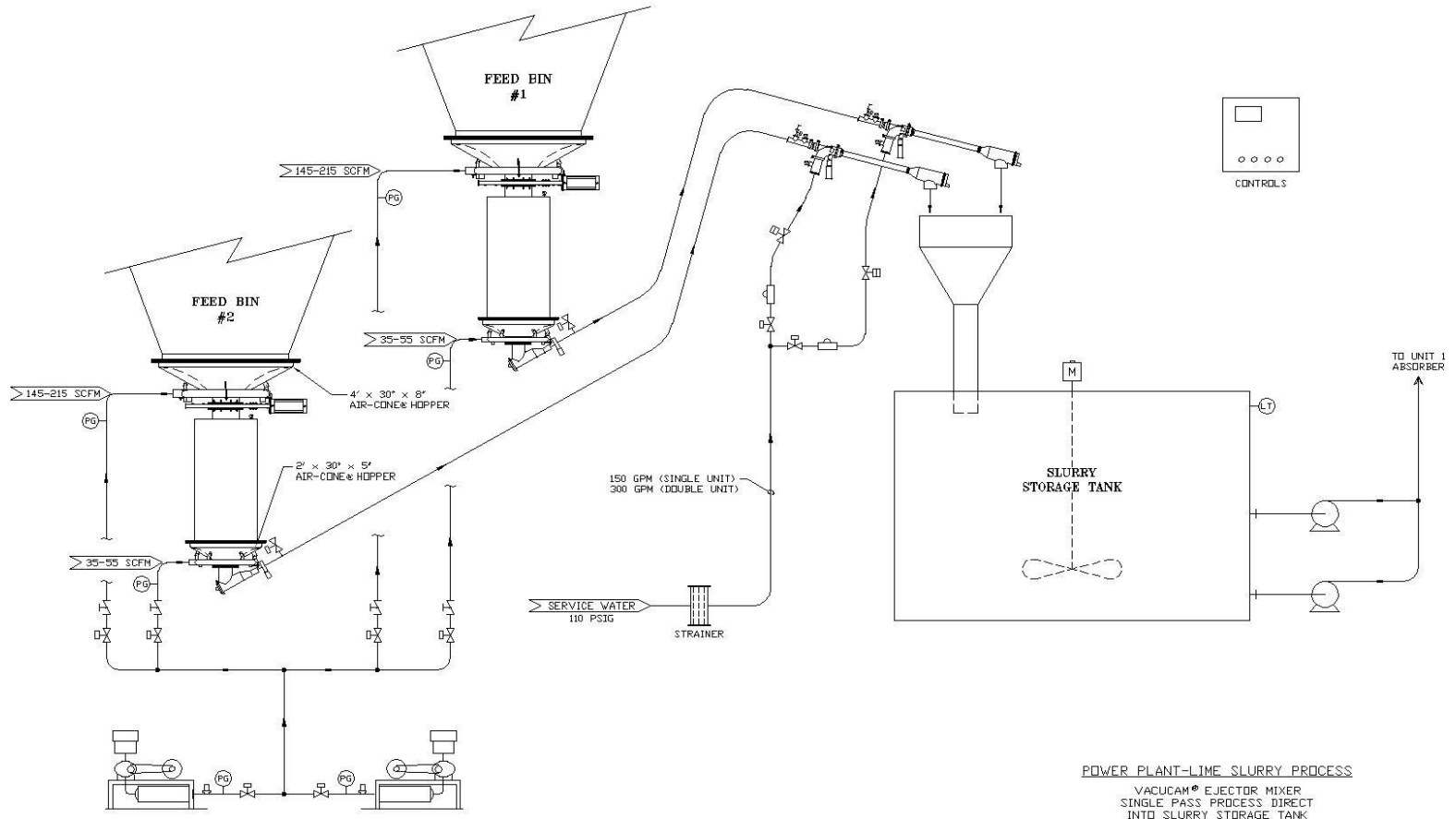
POWER PLANT-LIMESTONE SLURRY PROCESS SINGLE PASS PROCESS DIRECT INTO SLURRY STORAGE



POWER PLANT-LIMESTONE SLURRY PROCESS

SINGLE PASS PROCESS DIRECT INTO SLURRY STORAGE

Dual Silo Feed to Dual Mixer System

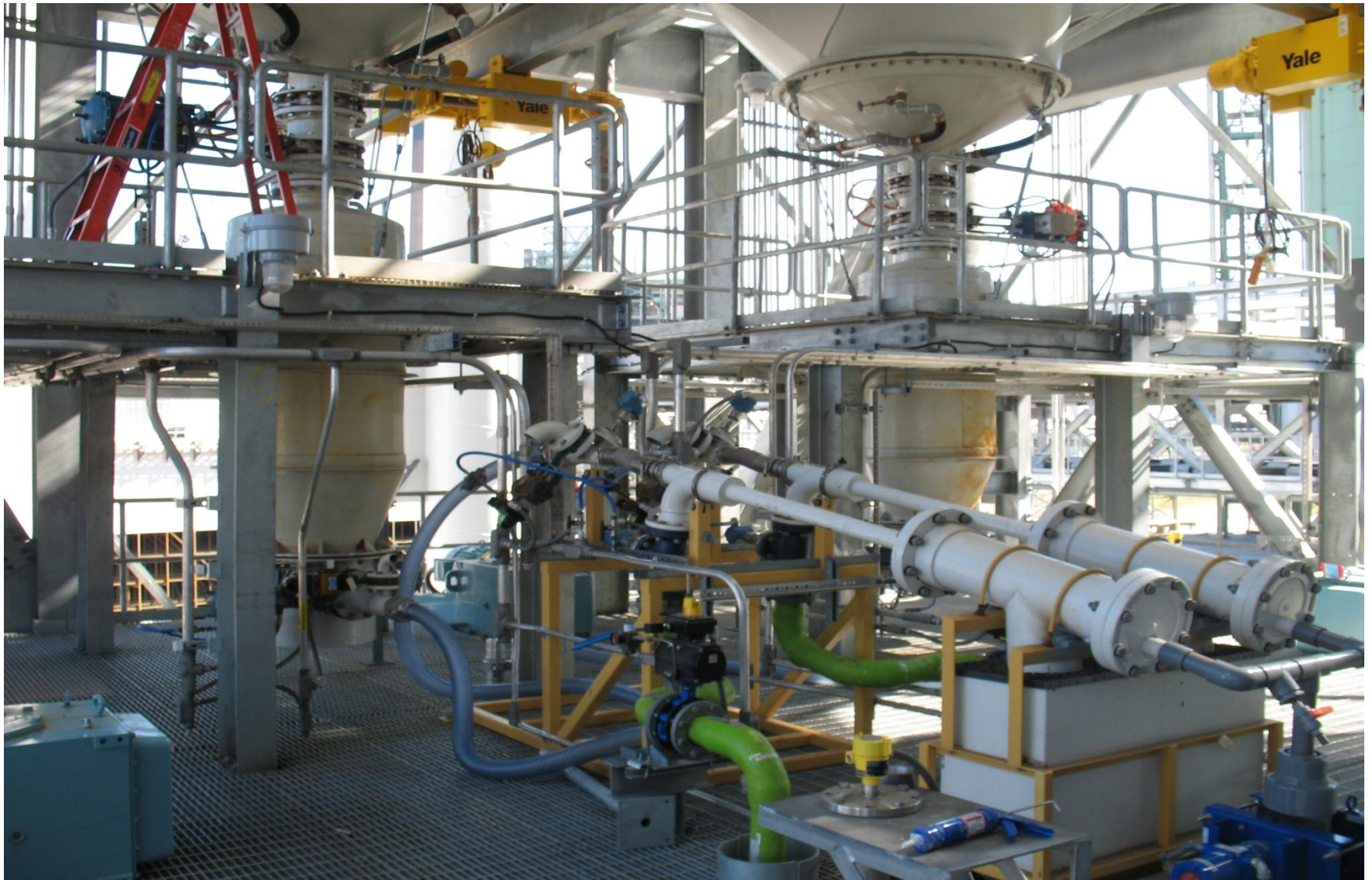


Pulverized Limestone Storage Two silos w/ Dual Cone Outlets



VACUCAM® LIMESTONE SLURRY PROCESS
DUAL EJECTOR MIXER SINGLE PASS IN-LINE SLURRY
DIRECT TO SLURRY STORAGE



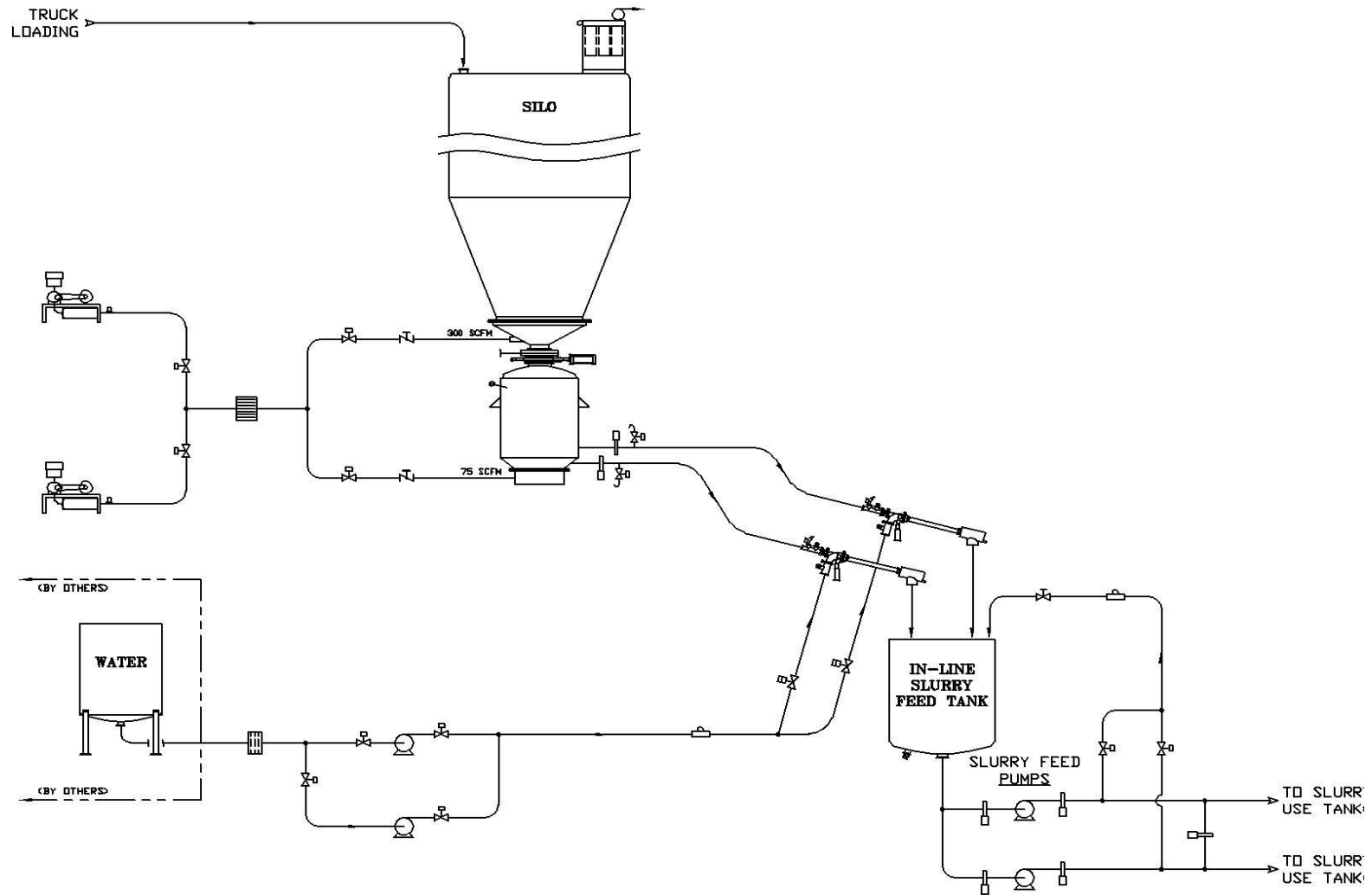




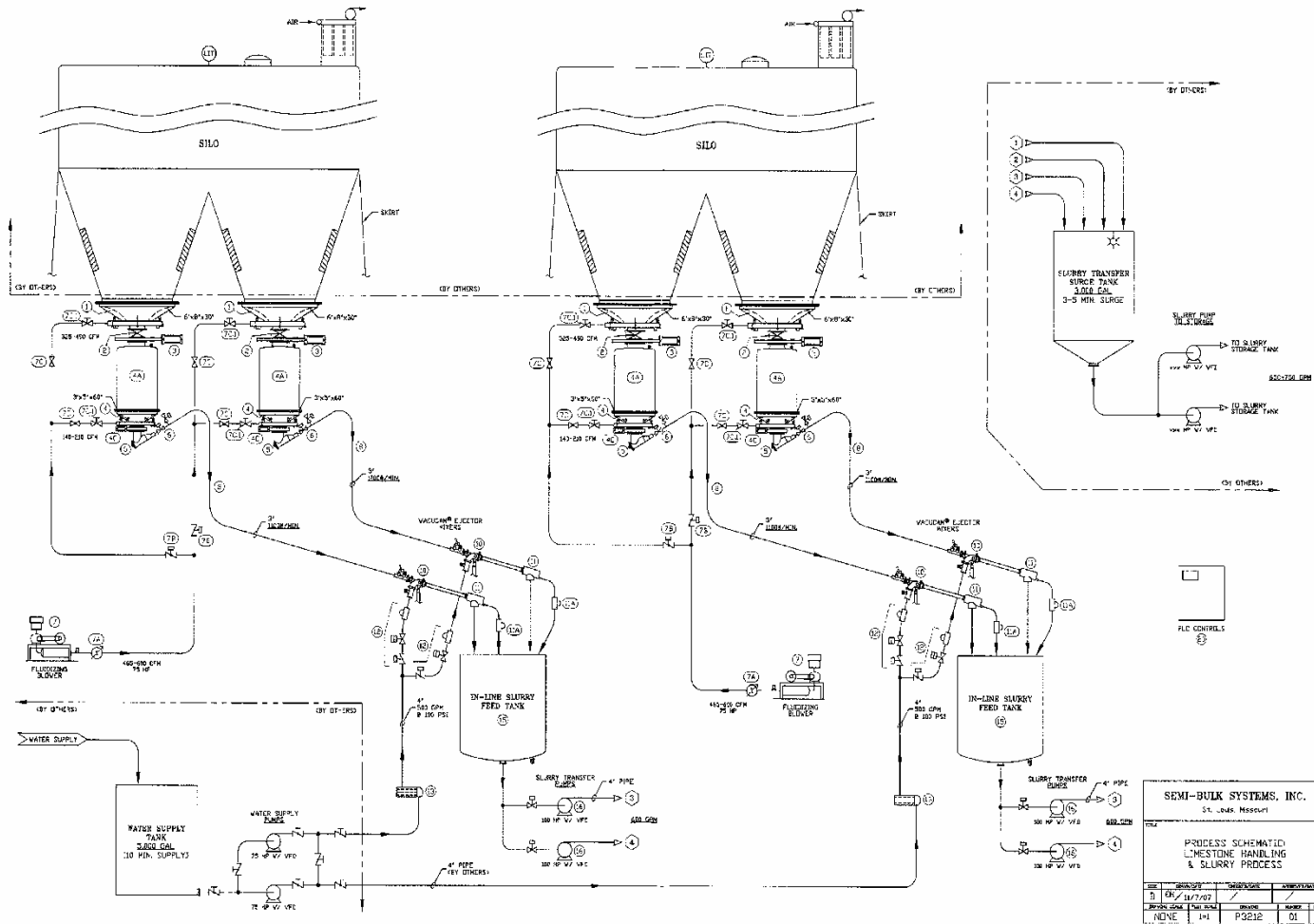
POWER PLANT Process Options

1. Single Pass Process Direct Into Slurry Storage Tank
 2. Single Pass In-Line Process to Remote Slurry Storage Tanks
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Single Pass In-Line Process to Remote Slurry Storage Tanks



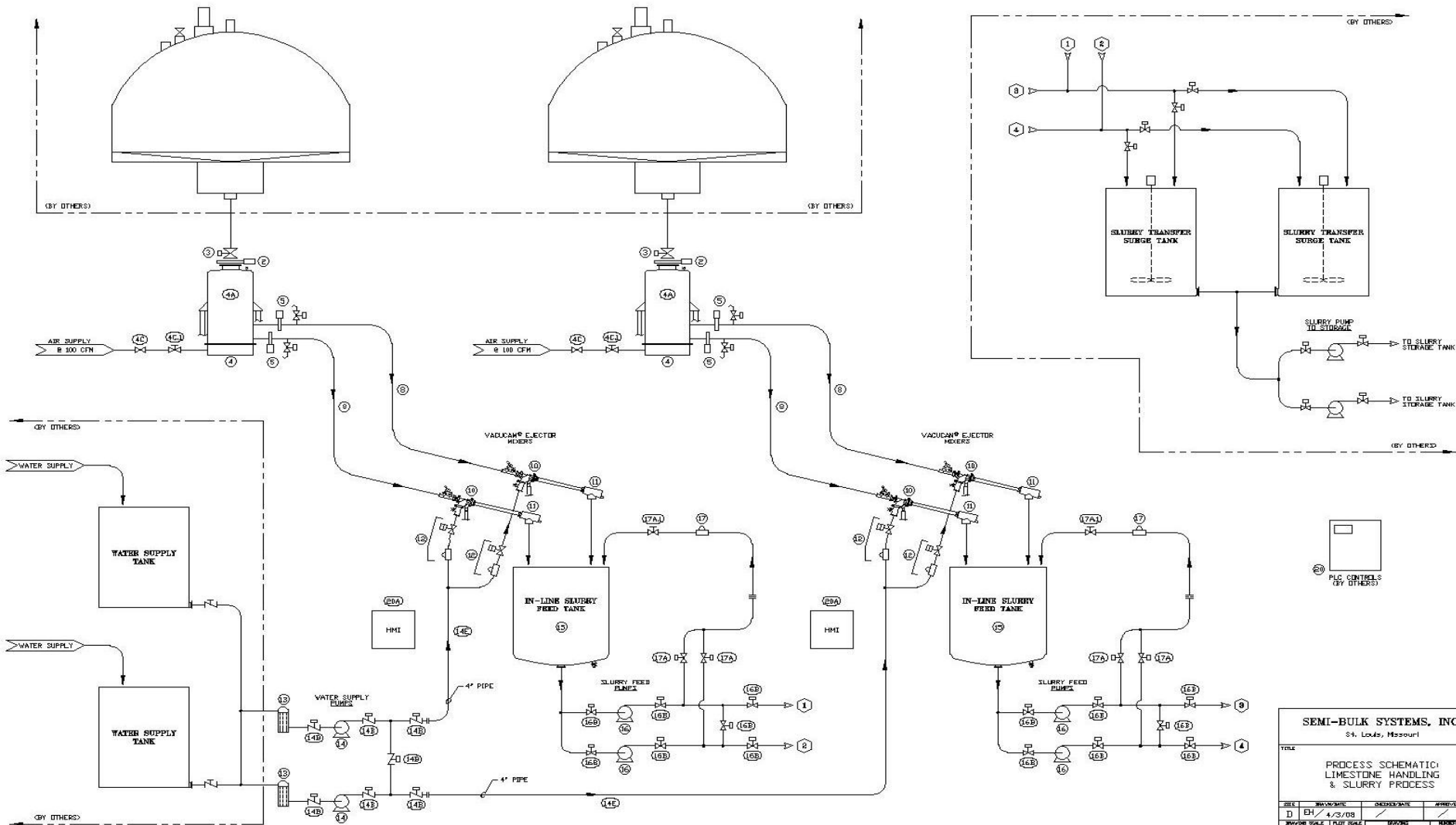
Limestone Slurry Process Dual Silos & Slurry Processes



DUAL DOME STORAGE PULVERIZED LIMESTONE

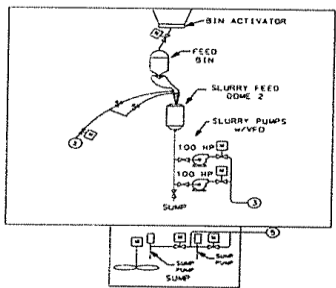
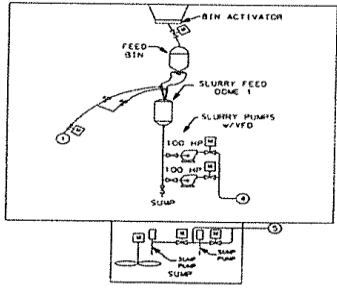
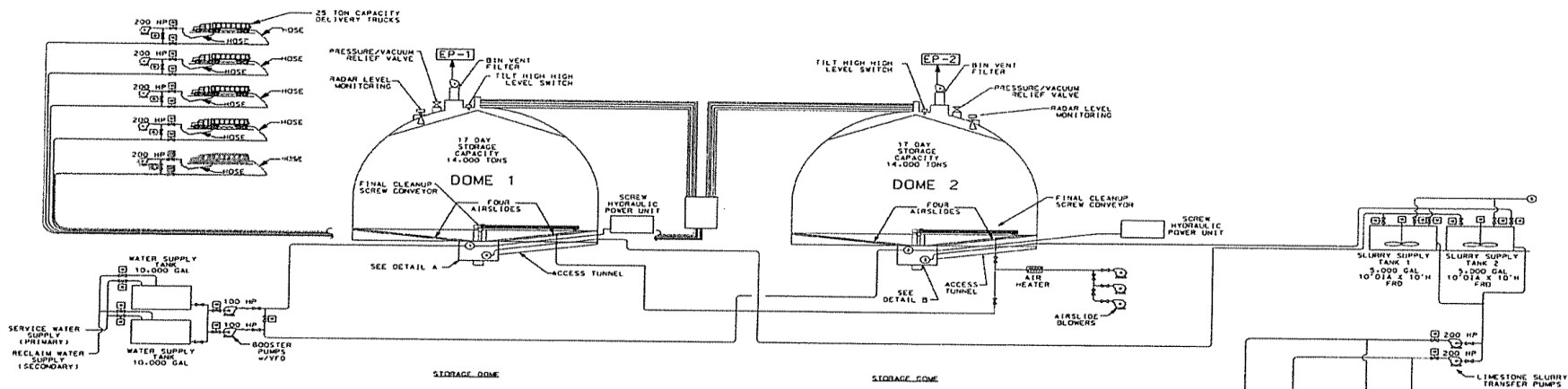


Limestone Slurry Process Dual Domes & Slurry Processes



SEMI-BULK SYSTEMS, INC. St. Louis, Missouri			
TITLE PROCESS SCHEMATIC LIMESTONE HANDLING & SLURRY PROCESS			
DATE	BY/DATE	DESIGNED BY	APPROVED BY
D	EH 4/2/08		
SCALE	FEET/INCH	REVISED	NUMBER
NONE	1=1	P3212	01 B

Limestone Slurry Process Dual Domes & Slurry Processes



LEGEND
EP-1 EMISSION POINT

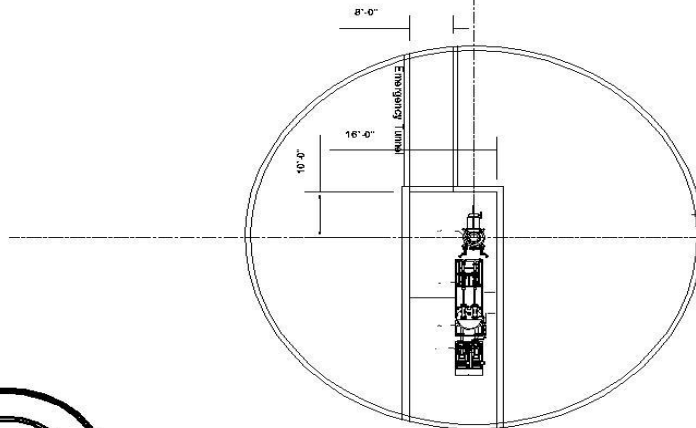
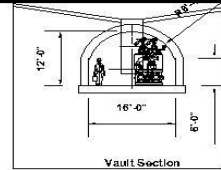
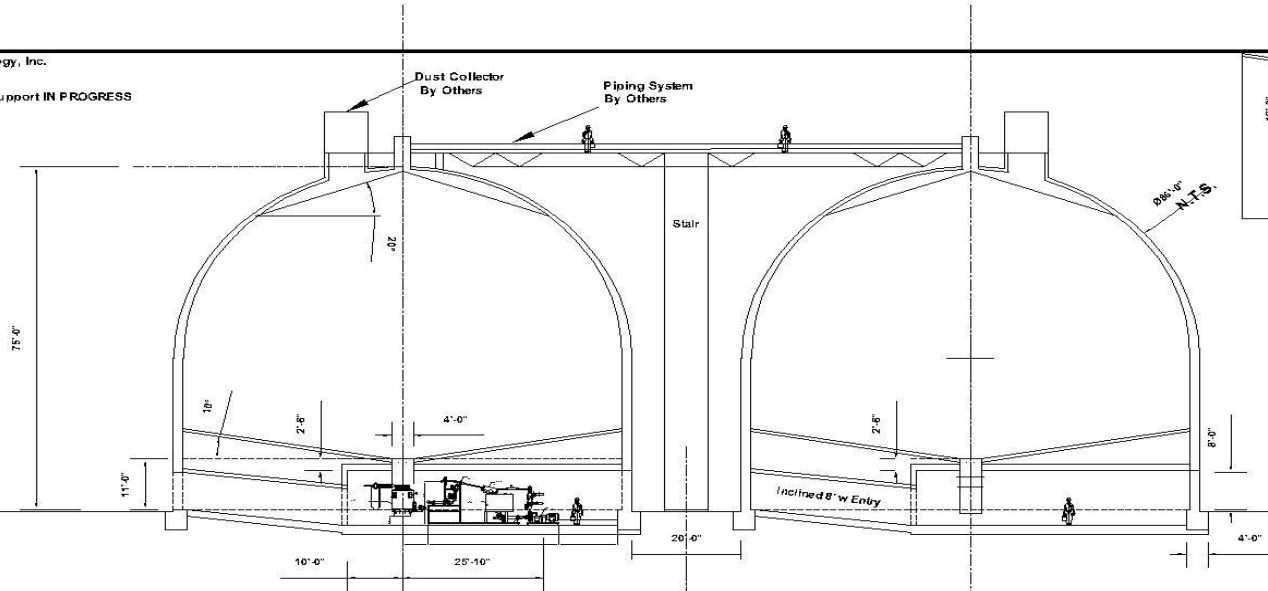
REV	DATE	DESCRIPTION	BY	CHKD	APP'D

PROJECT: MHS-26A	DATE: 11/15/00	SCALE: AS SHOWN
EMISSION FLOW DIAGRAM ENCLOSED LIMESTONE STORAGE DOME MET PGO RETROFIT PROJECT UNITS 1 & 2 SINOX PLANT MHS-26A		

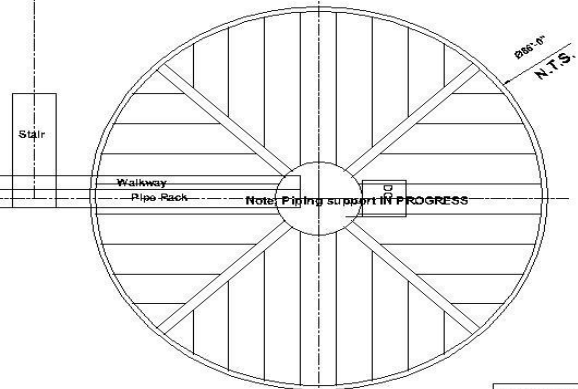
Limestone Slurry System w/ Dome Storage Supply

Copyright 2008, Dome Technology, Inc.

Note: Piping support IN PROGRESS



Plan View at Base Level



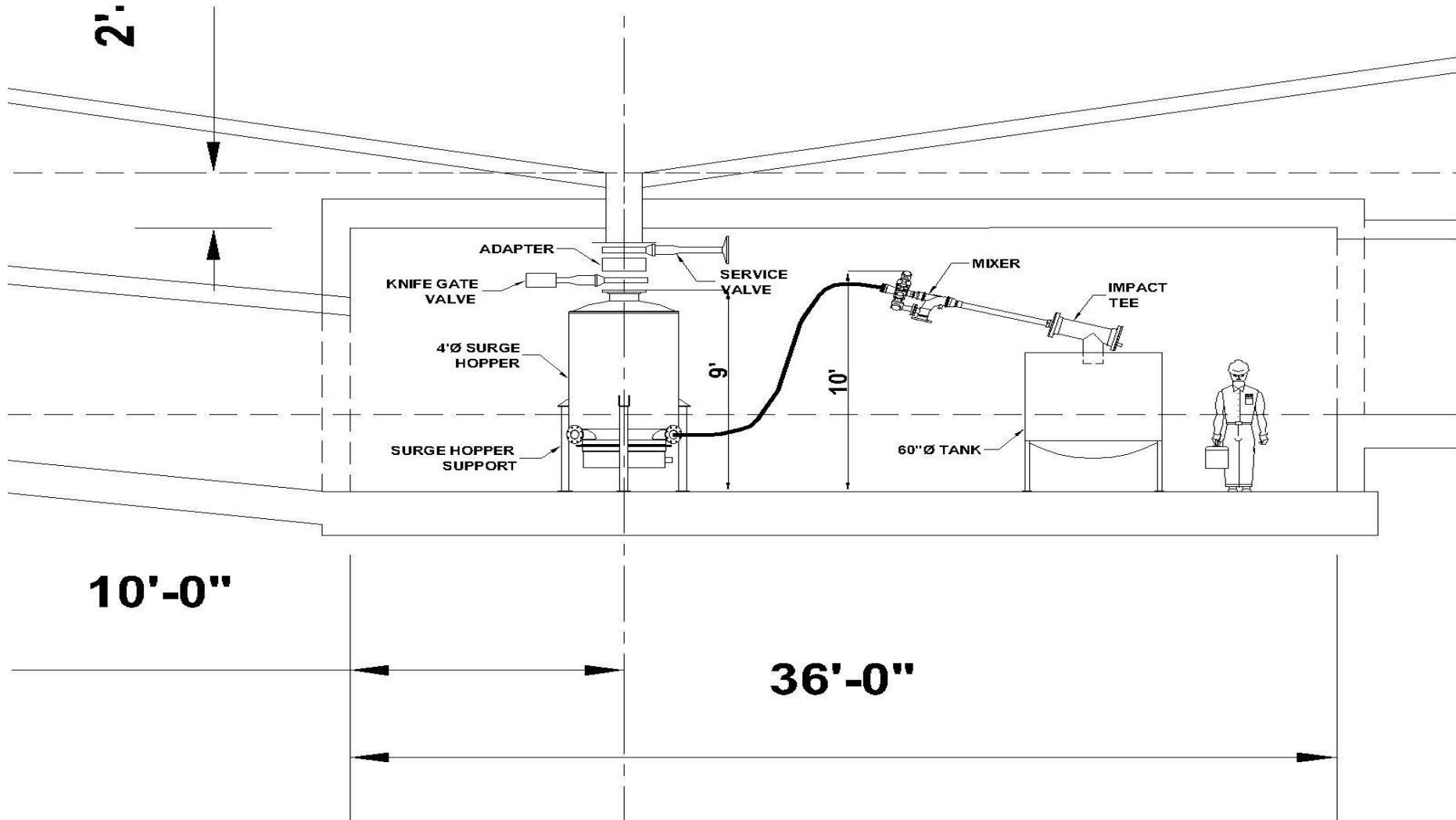
Plan View At Apex
w/ Floor Overlay



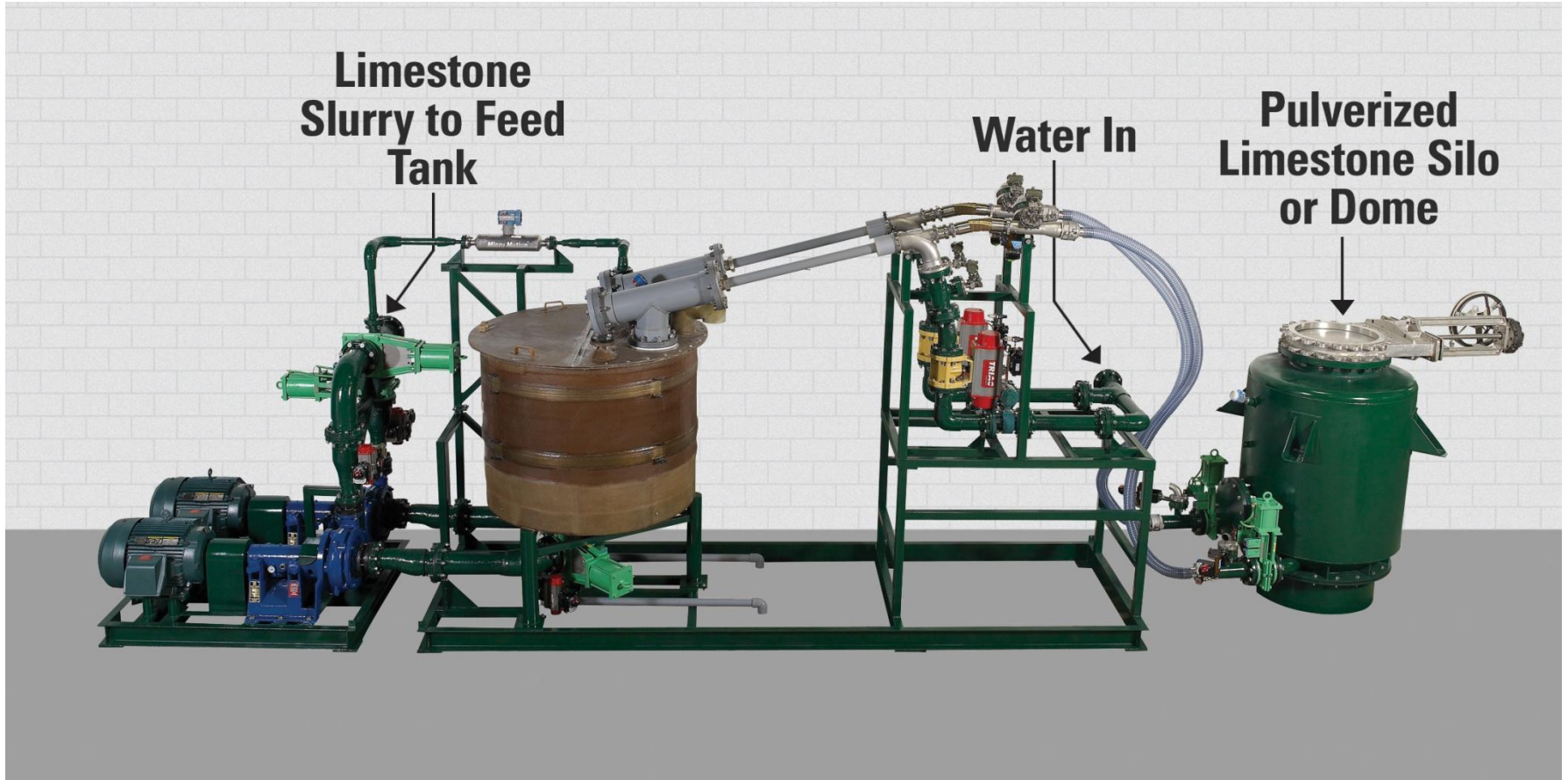
3007 E. 49th N. Idaho Falls, ID 83401
(208) 529-0833 Fax (208) 529-0854

Conical Floor w/ elevated Vault
~22,800 sTons @90 pcf (Combined)
FLS Fully Fluidized Floor
2008 0612-1

Limestone Slurry Process in Dome Vault



VACUCAM® DUAL EJECTOR MIXER PROCESS W/ LIMESTONE SUPPLY HOPPER W/ SLURRY TRANSFER PUMP



WATER SUPPLY PUMP SKID



LIMESTONE SLURRY PROCESS IN VAULT OF DOME



LIMESTONE SLURRY PROCESS IN VAULT OF DOME

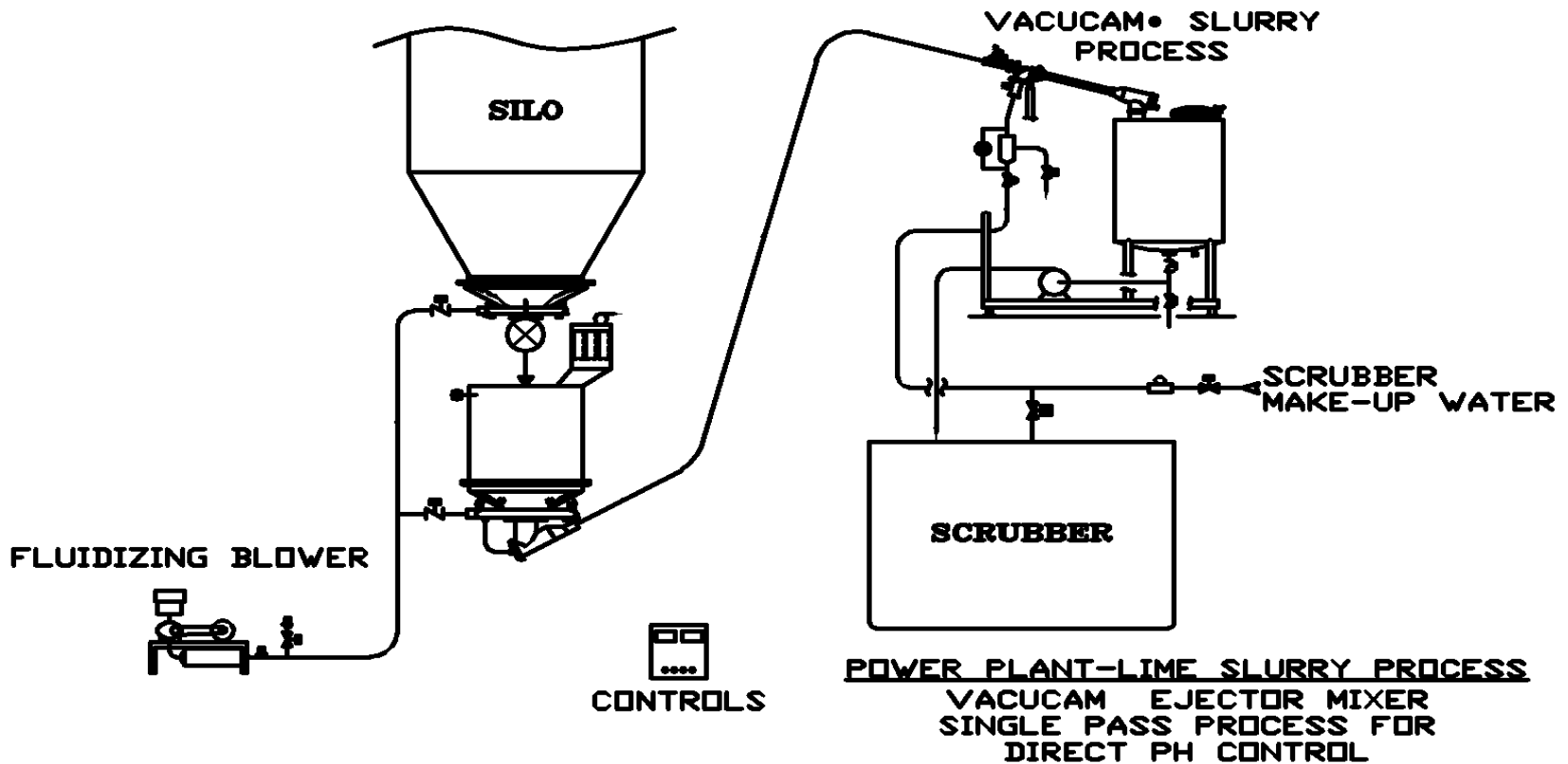


POWER PLANT Process Options

1. Single Pass Process Direct Into Slurry Storage Tank
 2. Single Pass In-Line Process to Remote Slurry Storage Tanks
 3. Single Pass Process for Direct PH Control
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POWER PLANT-LIMESTONE SLURRY PROCESS

SINGLE PASS PROCESS FOR DIRECT PH CONTROL TO SCRUBBER
-DIRECT INJECTION TO SCRUBBER
-ELIMINATE LIMESTONE SLURRY STORAGE



LIMESTONE HANDLING & MIXING

INCORPORATING THE VACUCAM® EJECTOR MIXER PROCESS

- Semi-Bulk Systems has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Limestone Handling/ Slurry Processes for FGD. The Technology offers many benefits over conventional slurry processes.
 - **The VACUCAM® Mixing Systems incorporate no mechanical mixing devices and has no moving parts (other than liquid pumps).**
 - Lower Initial Capital Costs
 - Lower Installation costs
 - Less real estate required for installation.
 - Lower Operating Cost in terms of manpower, maintenance and operating costs
 - System never requires scheduled downtime for prolonged maintenance or preventative maintenance.
 - Capacities to meet any requirements
 - Energy—90%+savings per ton of slurry
 - Much greater Operation Flexibility
 - Instant start and stop of slurry process
 - Total System Automation
 - Simple wash down of slurry process
 - 100% Reliability
 - Quality- efficient dispersion of dry powder to provide maximum surface area contact for scrubbing efficiency –no dry dust collection required.
 - Lowest Cost of Ownership

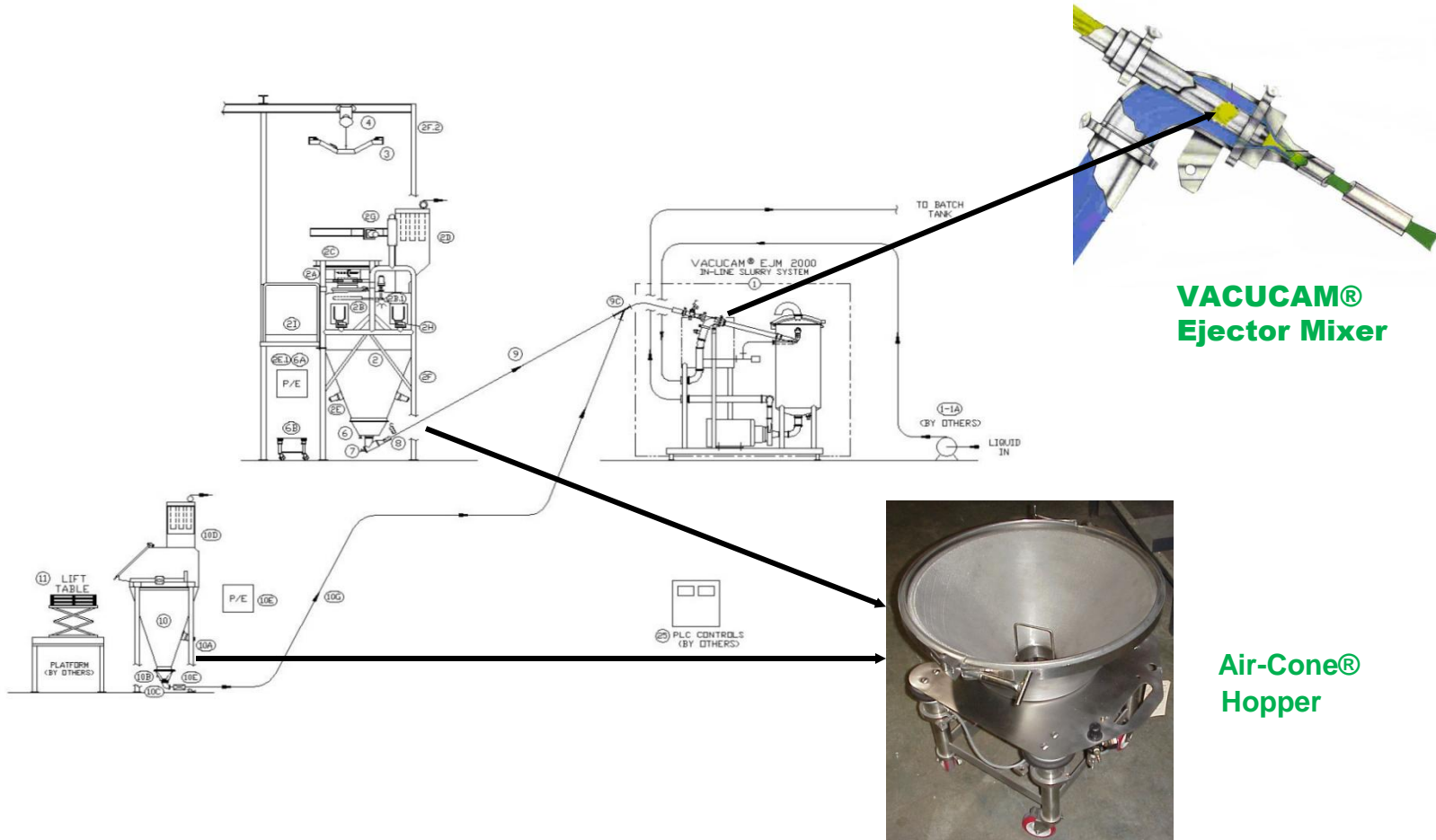
Additional Treatment Options

Wet Scrubber vs. In-Furnace Treatment So₂ and Hg Slurry Treatment Processes

- In-Line limestone slurry w/ direct injection to FGD scrubber or Furnace
 - In-line Sorbent slurry w/ direct injection to FGD scrubber or Furnace.
 - Liquid Chemical feed into sorbent slurry with direct injection to FGD scrubber or furnace.
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SBS Typical System

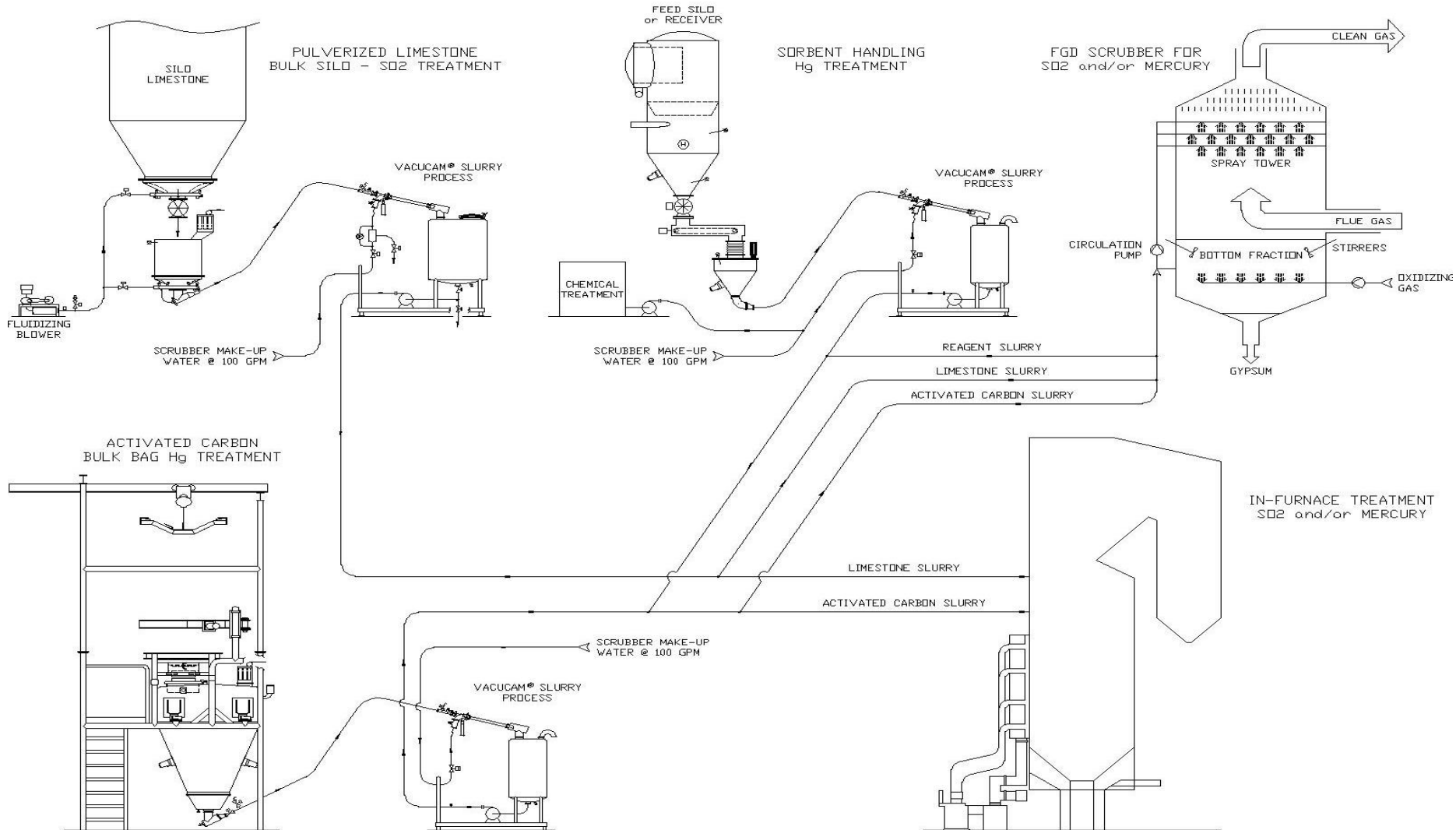
Dry Ingredient Handling & Powder/Liquid Mixing



VACUCAM®
Ejector Mixer

Air-Cone®
Hopper

FGD & Hg TREATMENTS IN SCRUBBERS VS IN-FURNACE SO₂ AND/OR Hg TREATMENTS



FEATURES***BENEFITS**

OF THE VACUCAM® SLURRY MIXING PROCESS

- Direct In-Line single pass mixing. No moving parts.
 - Produces high quality slurry mix w/ rapid and maximum surface area contact to maximize reaction
 - Direct Injection – no slurry storage required.
 - Totally enclosed mixing system – minimal dust
 - Small footprint required
 - Minimal maintenance—very reliable—no scheduled maintenance downtime required
 - High quality slurry mix provides maximum contact and reaction rate while maximizing process yield.
 - Very low energy usage-save 50-90%
 - Minimal dust control required
 - Minimize real estate requirements
 - Easily automated and fine tuned to optimize chemical additions with direct feedback from on-line analyzers
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Questions and Answers

Thank you
