



TXI Oro Grande, CA



Storage and Reclaim Options And Some New Storage Trends

by

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Dome Technology

DOME TECHNOLOGY

Presentation Outline

- Engineering
- Typical Cost Studies
- Arrangement Investigations
- Cement – Fly Ash Terminals

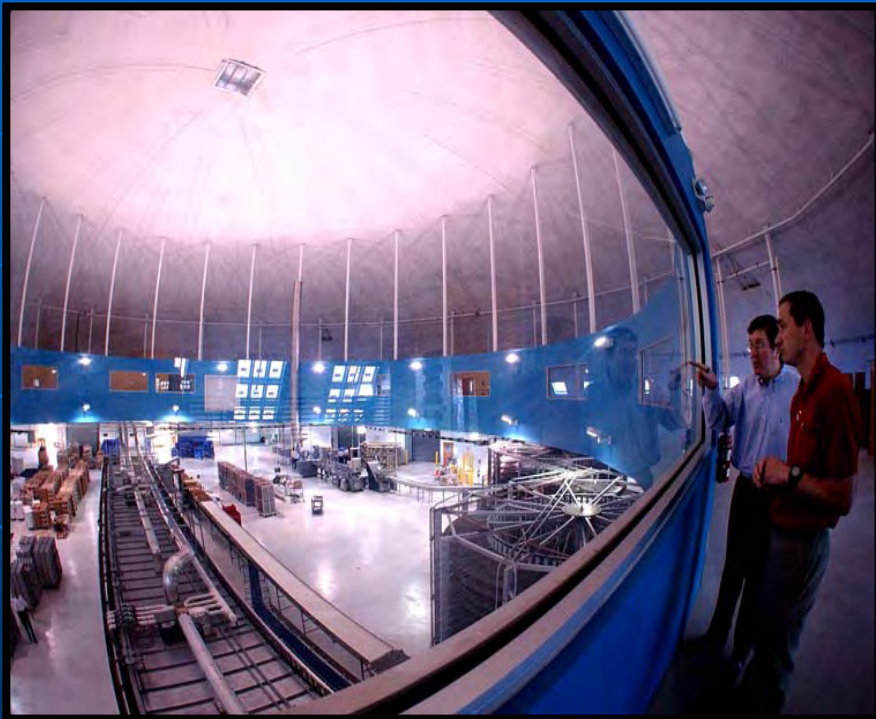
ENGINEERING

- ES² Engineering with Offices in:
 - Idaho Falls, ID
 - Salt Lake City, UT
 - Las Vegas, NV
 - Sacramento, CA

ENGINEERING

- ES² Engineering has engineered:
 - Greatest radius of curvature dome
 - Dome with the heaviest internal loads – 7,000,000 lbs. suspended from the shell
 - Dome with heaviest loads on apex – 1,000,000 lbs.
 - Engineered most large concrete domes built that service the bulk storage industry today

7,000,000 lb Suspended Floor



Bakery Customer Overview



ENGINEERING

FINITE ELEMENT ANALYSIS (FEA) - IDEAS Program

IDEAS - \$100,000 FEA Program

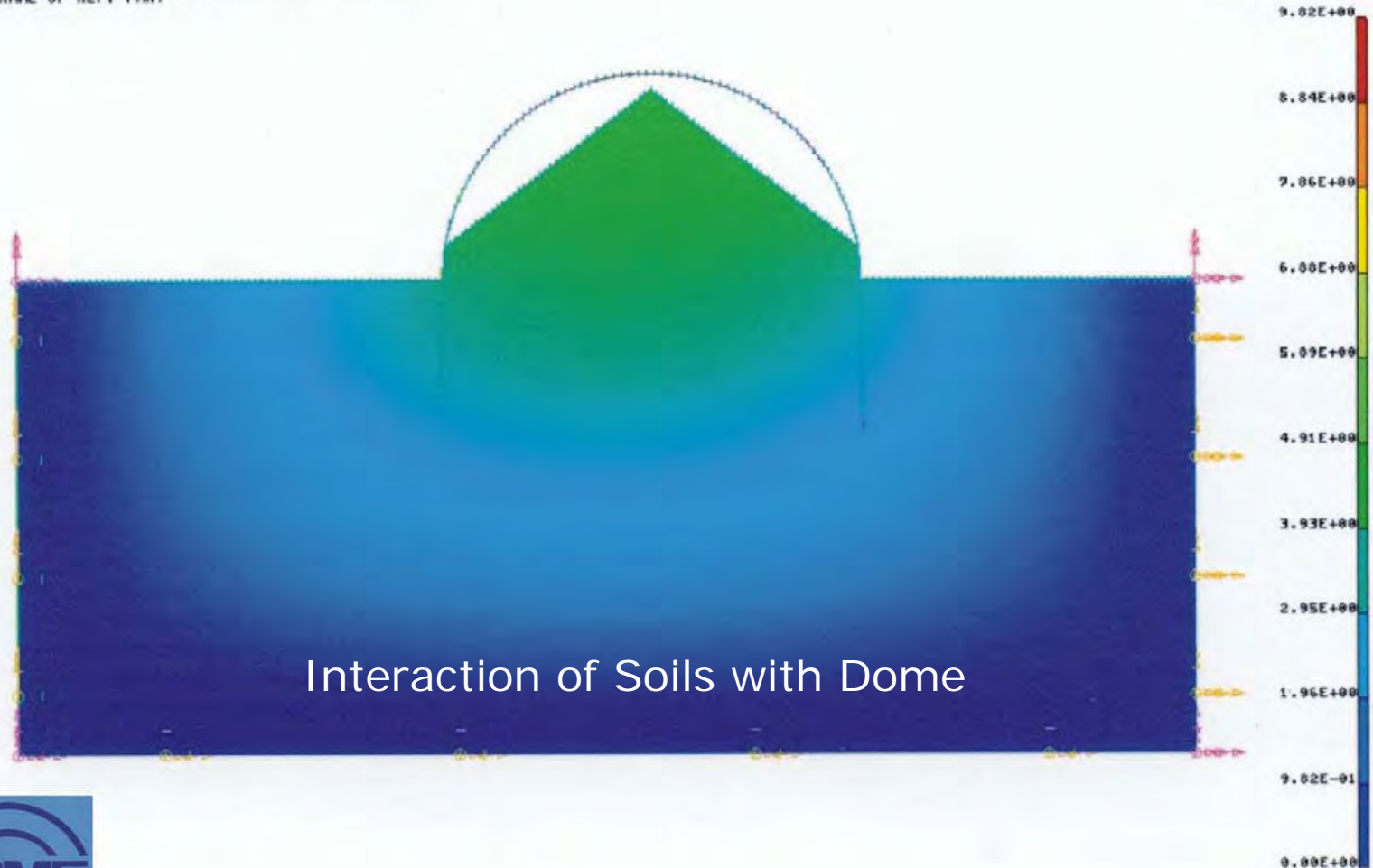
Let's look at some examples:

Finite Element Analysis (4b)

RESULTS: 1- B.C. 1, DISPLACEMENT_1, LOAD SET 1
DISPLACEMENT - X MIN: 0.00E+00 MAX: 9.82E+00
FRAME OF REF: PART

D:\team\hovensacoke1.mf1

VALUE OPTION: ACTUAL



Finite Element Analysis (2)

RESULTS: 3- D.C. 1, STRESS_3, LOAD SET 1
STRESS - Z MIN: -2.72E+04 MAX: 7.09E+04
FRAME OF REF: LOCAL 2

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VALUE OPTION: ACTUAL
SHELL SURFACE: MIDDLE
7.09E+04

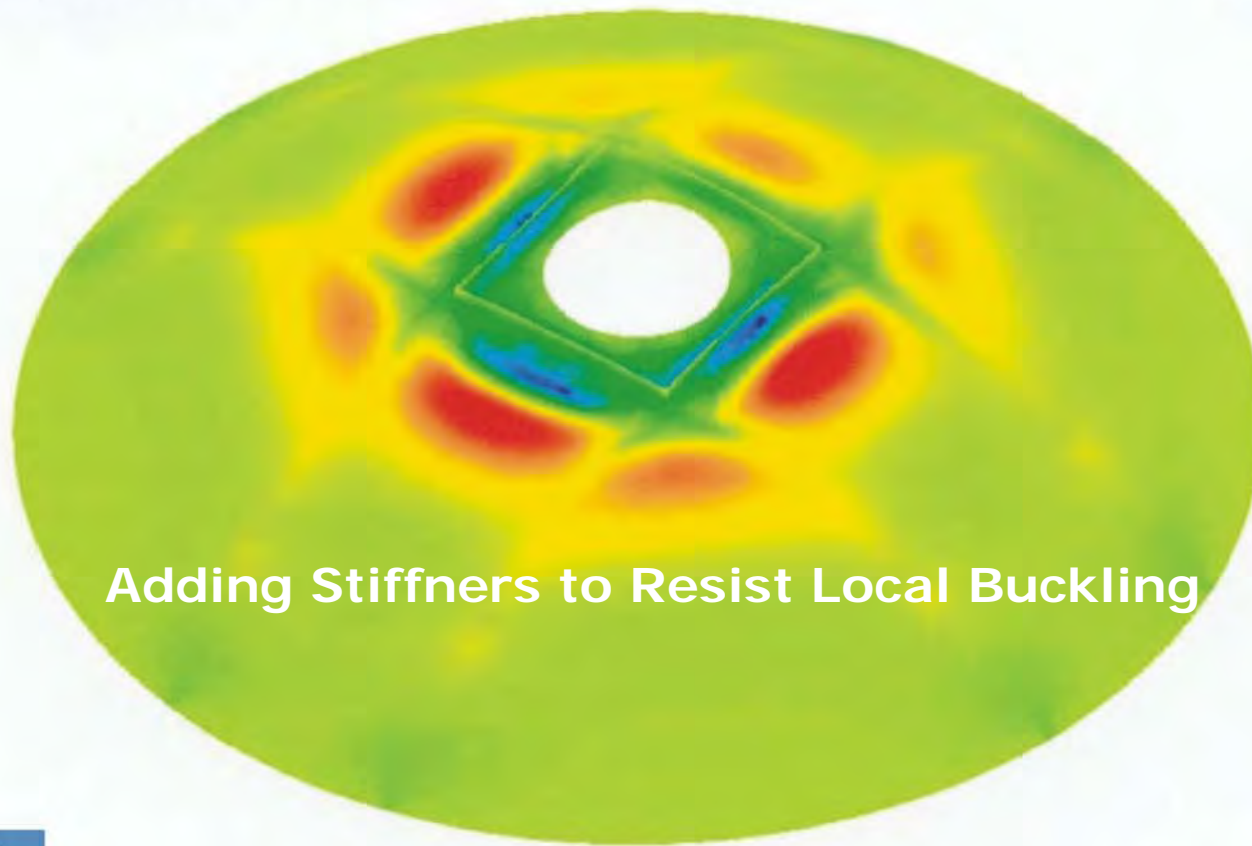


Finite Element Analysis (3b)

RESULTS: 3- B.C. 1, STRESS_3, LOAD SET 1
STRESS - Y MIN: -6.89E+04 MAX: 3.14E+04
DEFORMATION: 1- B.C. 1, DISPLACEMENT_1, LOAD SET 1
DISPLACEMENT - MAG MIN: 5.98E-04 MAX: 2.58E-02
FRAME OF REF: LOCAL 1

D:\team\schollyhill1200x105w03d1.mf1

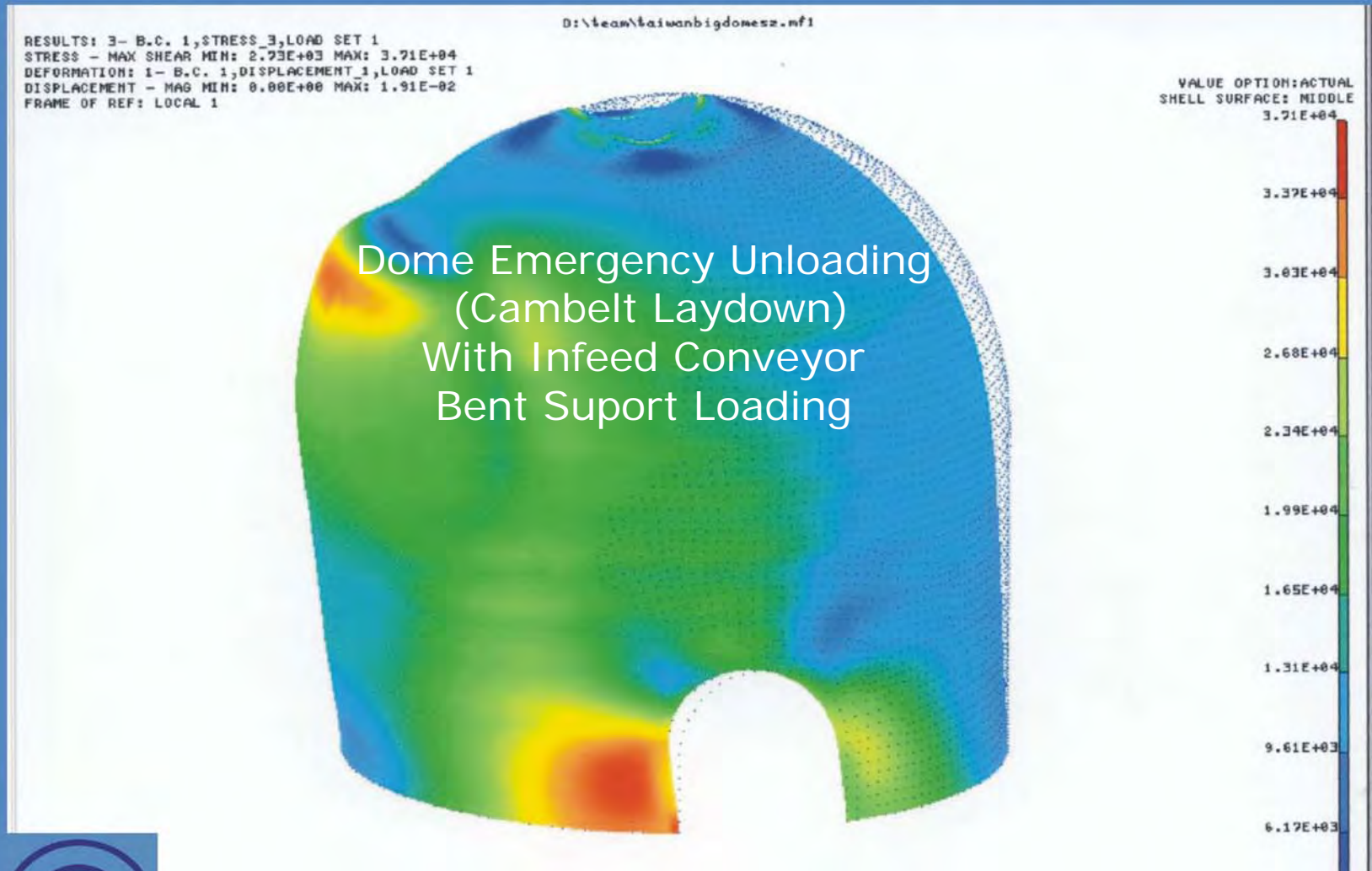
VALUE OPTION: ACTUAL
SHELL SURFACE: BENDING



Adding Stiffeners to Resist Local Buckling

We believe one engineer should be responsible for foundations, tunnels, vaults, dome; everything

Finite Element Analysis (5)



Typical Project: Untypical Schedule



ridge
ners)

Mobilize March 2005; Fill Dome December 2005
(Including truck loading facility)

Illinois Cement; LaSalle, IL

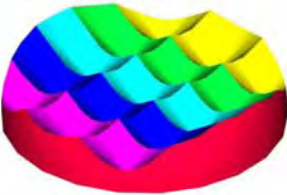
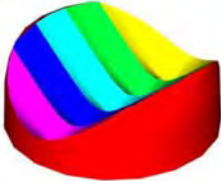
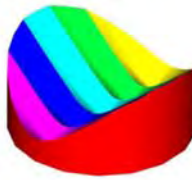
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www.dome-tech.com

Focus on Tunnels



Cost Analysis Services

- Simple Arrangement Comparisons
- Typical Scenarios
 - Tunnel count with excavation cost
 - Ring Beams – Pile Caps
 - live vs. total storage capacity
 - reclaimer differences
- Clearer choices for Project Cost decisions

Diameter (FT) 180	Apex (FT)	94	Comments:
	Fill Points	1	Tunnel Floor - 3 feet
	Fill Height (FT)	93.5	Tunnel Feed Point, + 7 feet
	Tunnel Quan	3.0	
	Length	540.0	
	Depth (top of tunnel)	7.0	
	Vol Dome (mTons)	51,560	
	Volume (Below Grade)	0	
	Total Volume	51,560	
	Static Volume	20,488	
	Live Volume	31,072	
	Percent Live Volume	60.3%	
	Concept Dome Cost	\$ 1,533,300	
	Concept Tunnel Cost (add)	594,000	
	Excavation Allowance	100,000	
	Concept Structural Cost	\$ 2,227,300	
			Tunnels 45' apart, outlet spacing 30' centers Withdrawal cone; 45 degrees from 3' dia circle
			3-D model View at Full Drawdown
Diameter (FT) 165	Apex (FT)	116	Comments:
	Fill Points	1	Tunnel Floor - 3 feet
	Fill Height (FT)	115.5	Tunnel Feed Point, + 7 feet
	Tunnel Quan	1.0	
	Length	165.0	
	Depth (top of tunnel)	7.0	
	Vol Dome (mTons)	62,710	
	Volume (Below Grade)	0	
	Total Volume	62,710	
	Static Volume	31,290	
	Live Volume	31,420	
	Percent Live Volume	50.1%	
	Concept Dome Cost	\$ 1,700,000	
	Concept Tunnel Cost (add)	181,500	
	Excavation Allowance	100,000	
	Concept Structural Cost	\$ 1,981,500	
			Outlet spacing 30' centers Withdrawal cone; 45 degrees from 3' dia circle
			3-D model View at Full Drawdown
Diameter (FT) 120	Apex (FT)	139	Comments:
	Fill Points	1	Tunnel Floor - 3 feet
	Fill Height (FT)	138.5	Tunnel Feed Point, + 7 feet
	Tunnel Quan	1.0	
	Length	120.0	
	Depth (top of tunnel)	7.0	
	Vol Dome (mTons)	46,290	
	Volume (Below Grade)	0	
	Total Volume	46,290	
	Static Volume	12,845	
	Live Volume	33,445	
	Percent Live Volume	72.3%	
	Concept Dome Cost	\$ 1,800,000	
	Concept Tunnel Cost (add)	132,000	
	Foundation (125' dia x 3')	502,400	
	Excavation Allowance	100,000	
	Concept Structural Cost	\$ 2,534,400	
			Outlet spacing 30' centers Withdrawal cone; 45 degrees from 3' dia circle
			3-D model View at Full Drawdown


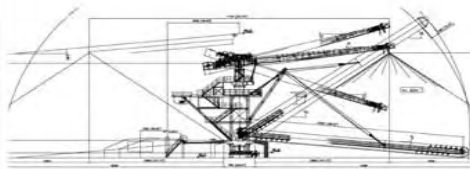
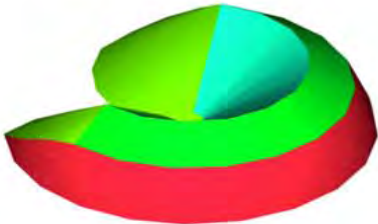
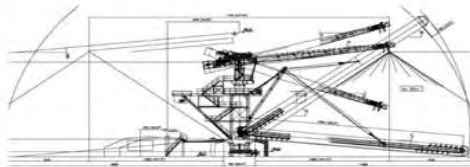
Model to hold Live Storage, and compare Tunnel count and Stemwall Height

Open Pile vs. Donut on Blending Dome

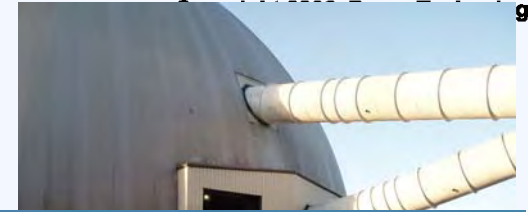
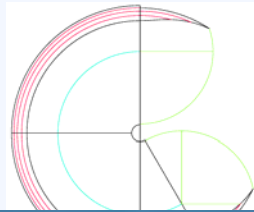
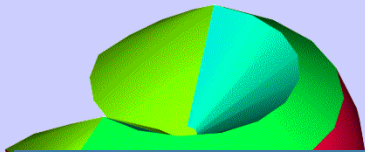
Dome Technology 208-529-0833

Gypsum Storage

Arrangement Investigation

Senerio:	FT	Meters	Comments:	Mechanical Equipment view:
Closed pile, with tunnel to center vault				
Outside Diameter (FT)	228	69.4944	Comments:	
Stemwall Height	0	-	Pedistal Height = 13'	
Apex (FT)	114	34.75	Grade level tunnel 15'w x 13' h; walkin	
Tunnel Quan	1.0			
Length	110.0	33.53		
Depth (top of tunnel)	13.0	3.96		
Vol Dome (sTons)	80,000			
Volume (Below Grade)	0			
Total Volume	80,000			
Static Volume	-			
Live Volume	80,000			
Percent Live Volume	100.0%			
Concept Dome Cost	\$ 3,835,000			
No concrete floor				
Ring Beam Foundation				
				
			3-D model View at Full Fill	MVT Circular Stacker Reclaimer
Closed pile, with tunnel to center vault				
Outside Diameter (FT)	244	74.3712	Comments:	
Stemwall Height	0	-	Pedistal Height = 13'	
Apex (FT)	122	37.19		
Tunnel Quan	0.0			
Length	110.0	33.53		
Depth (top of tunnel)	13.0	3.96		
Vol Dome (sTons)	80,000			
Volume (Below Grade)	0			
Total Volume	80,000			
Static Volume	-			
Live Volume	80,000			
Percent Live Volume	100.0%			
Concept Dome Cost	\$ 3,968,000			
No concrete floor				
Ring Beam Foundation				
				
			3-D model View at Full Fill	MVT Circular Stacker Reclaimer

Blending Stacker/Reclaim System

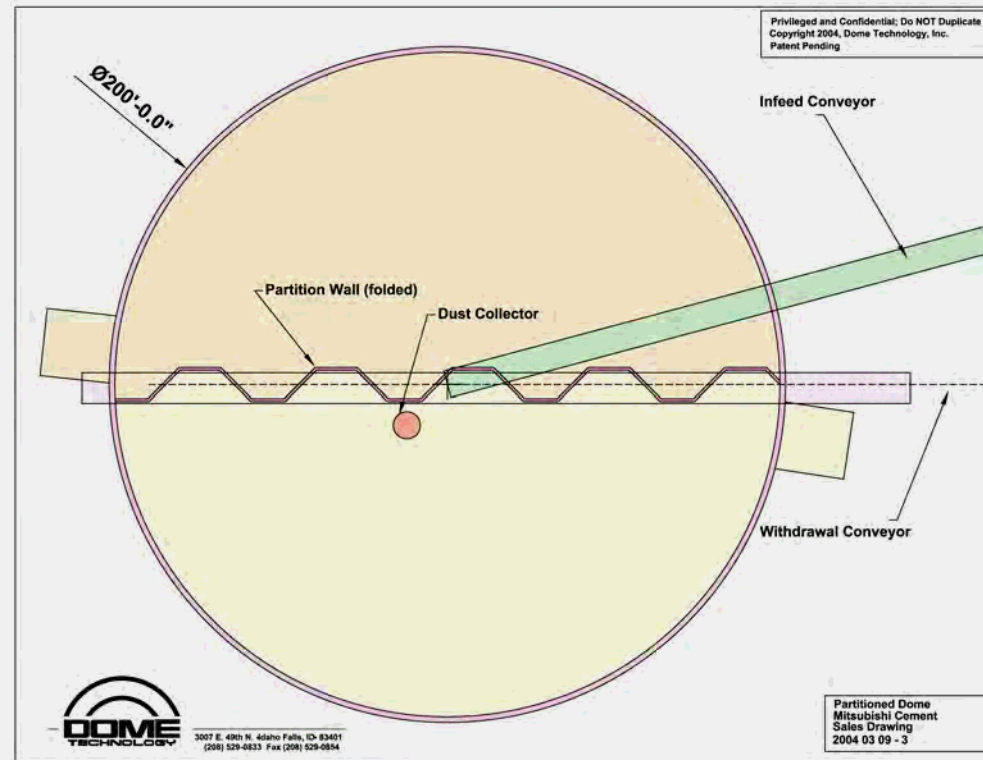
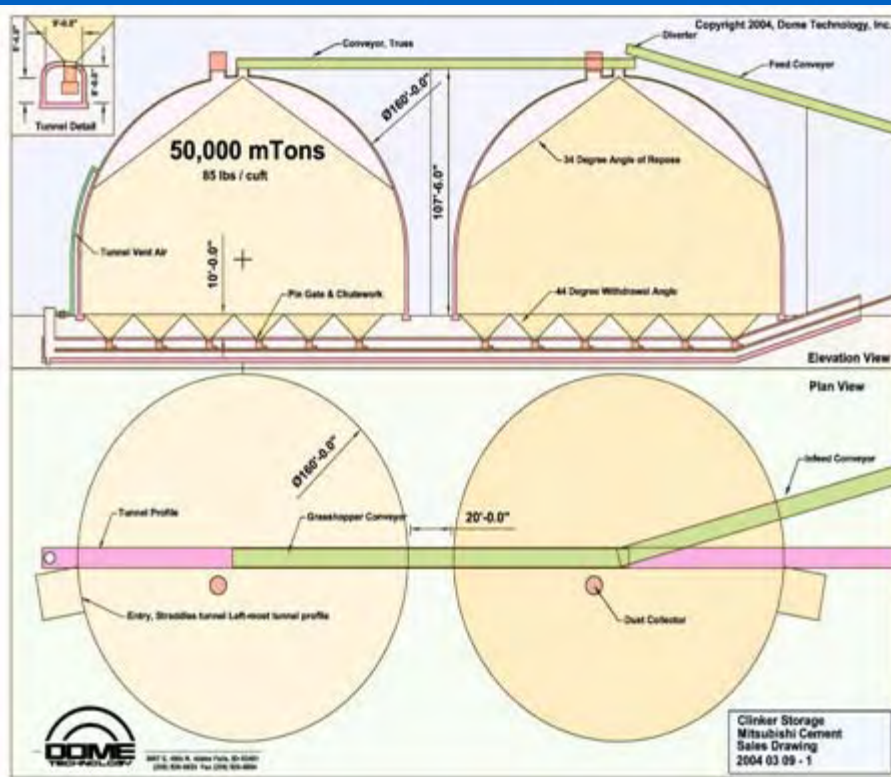


9y



320' Diameter; 165' Apex

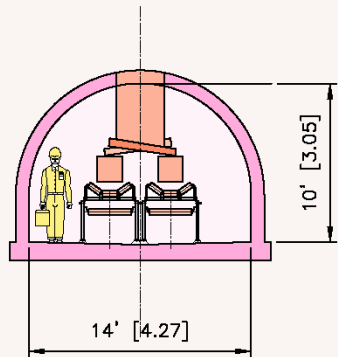
Project Cost; Two Domes vs. One with Partition Wall



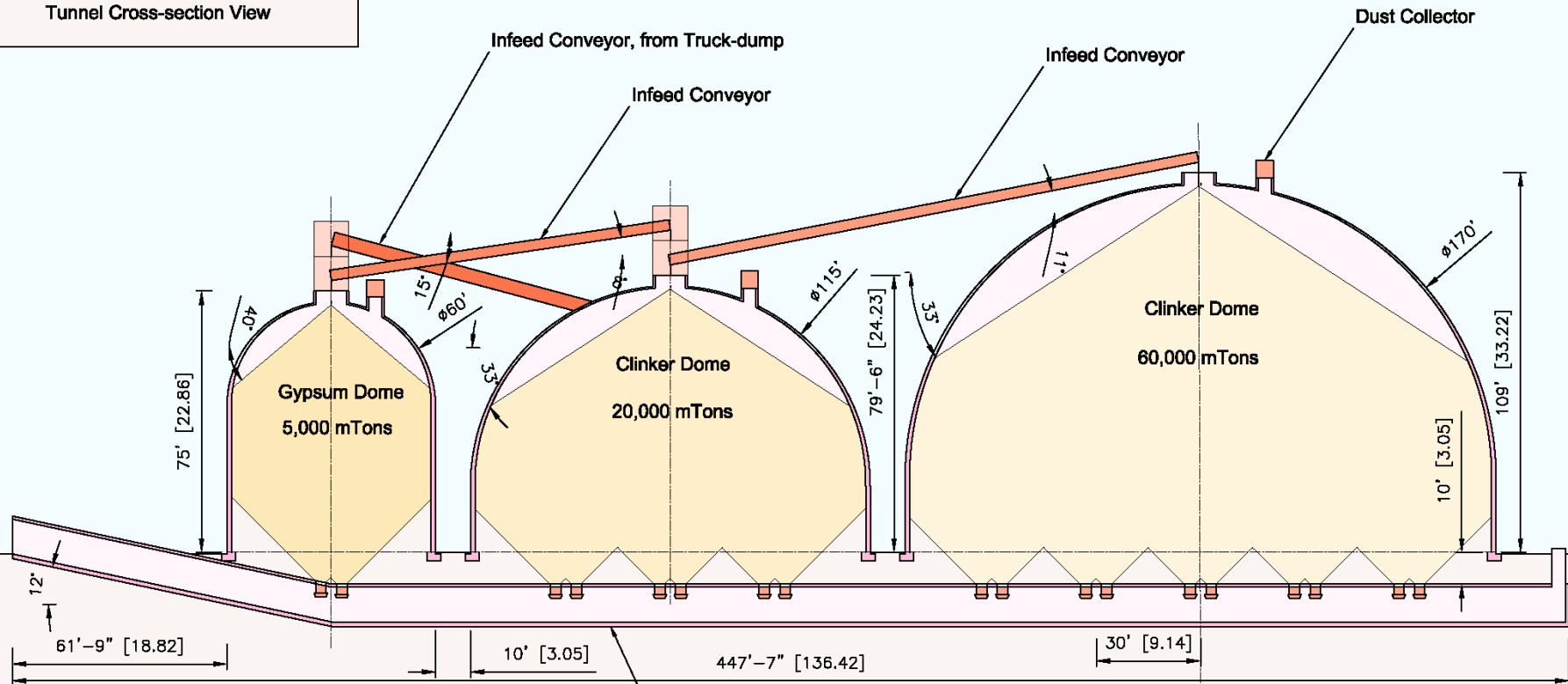


Grinding Plant Arrangement

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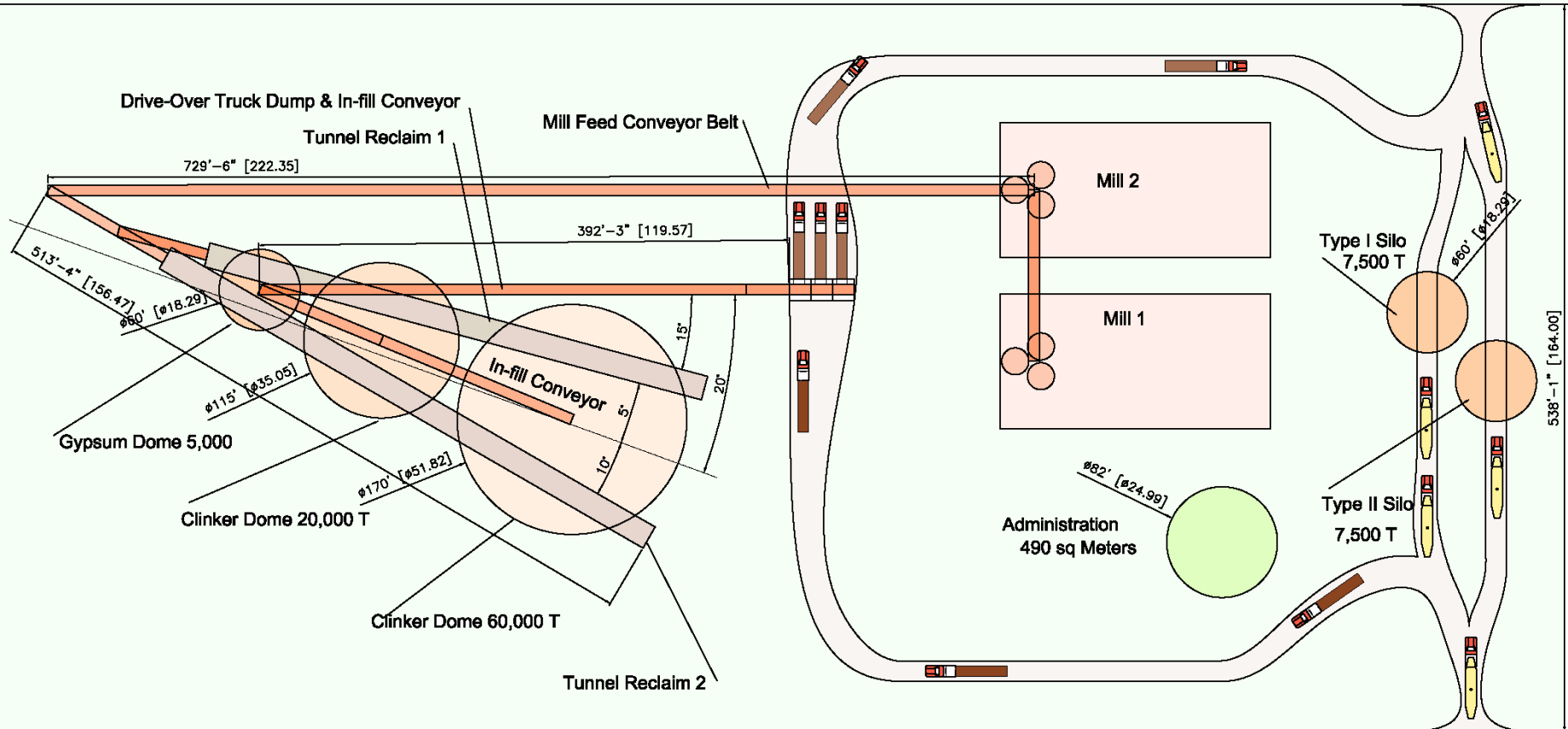


Tunnel Cross-section View



Grinding Plant Arrangement

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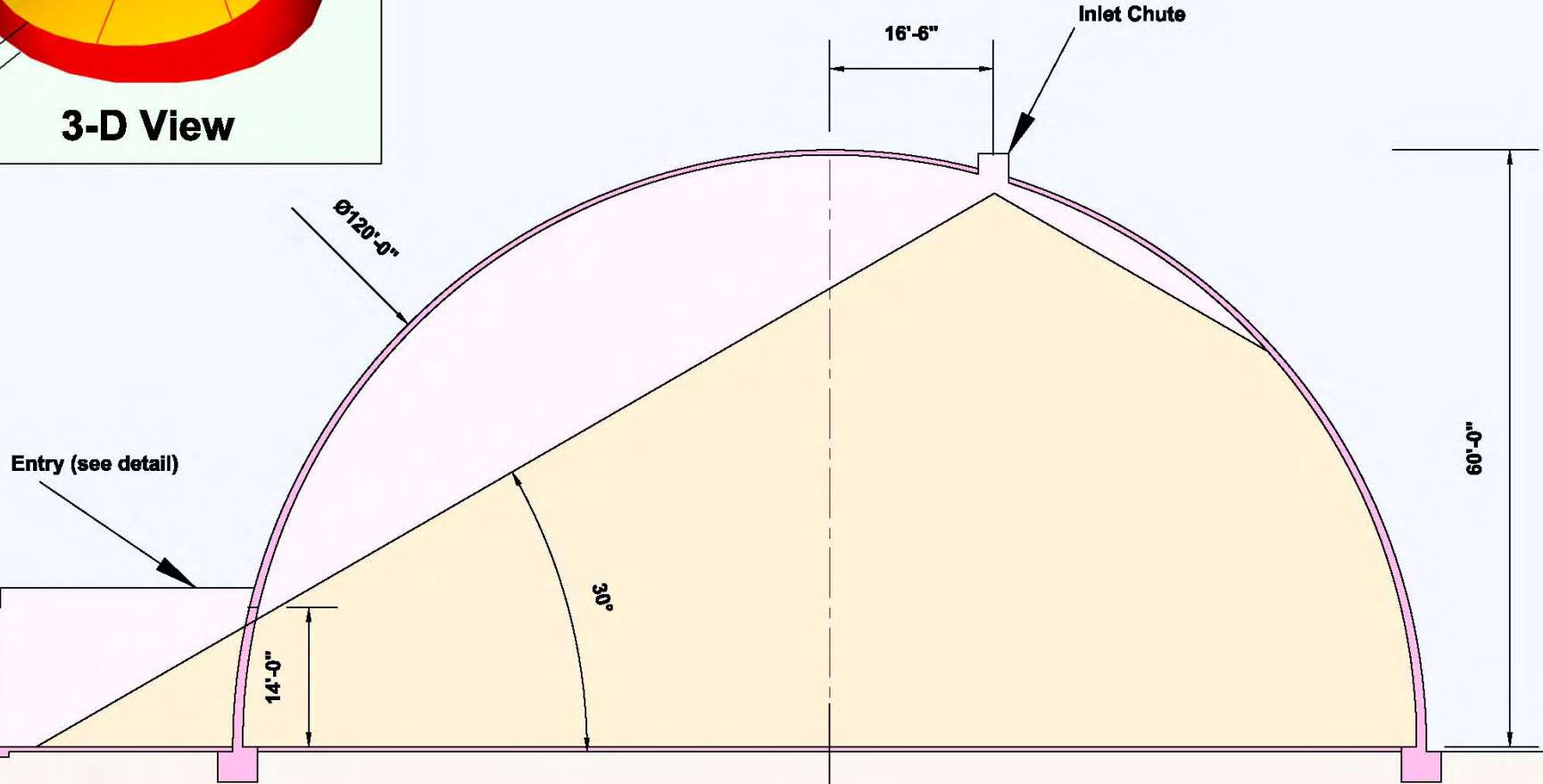


Off Center Loading; entry view

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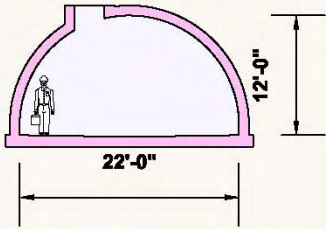
3-D View



Grade Level Access; Bulk Storage

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10,840 sTons Live (63.7%)



Tunnel Cross Section



3-D Drawdown View

22'-0"

12'-0"

Chocked Flow Entry

Roll - Up Door

14'-0"

Limestone
Optimized for Above Grade
And Live Volume

35°

Ø100'-0"

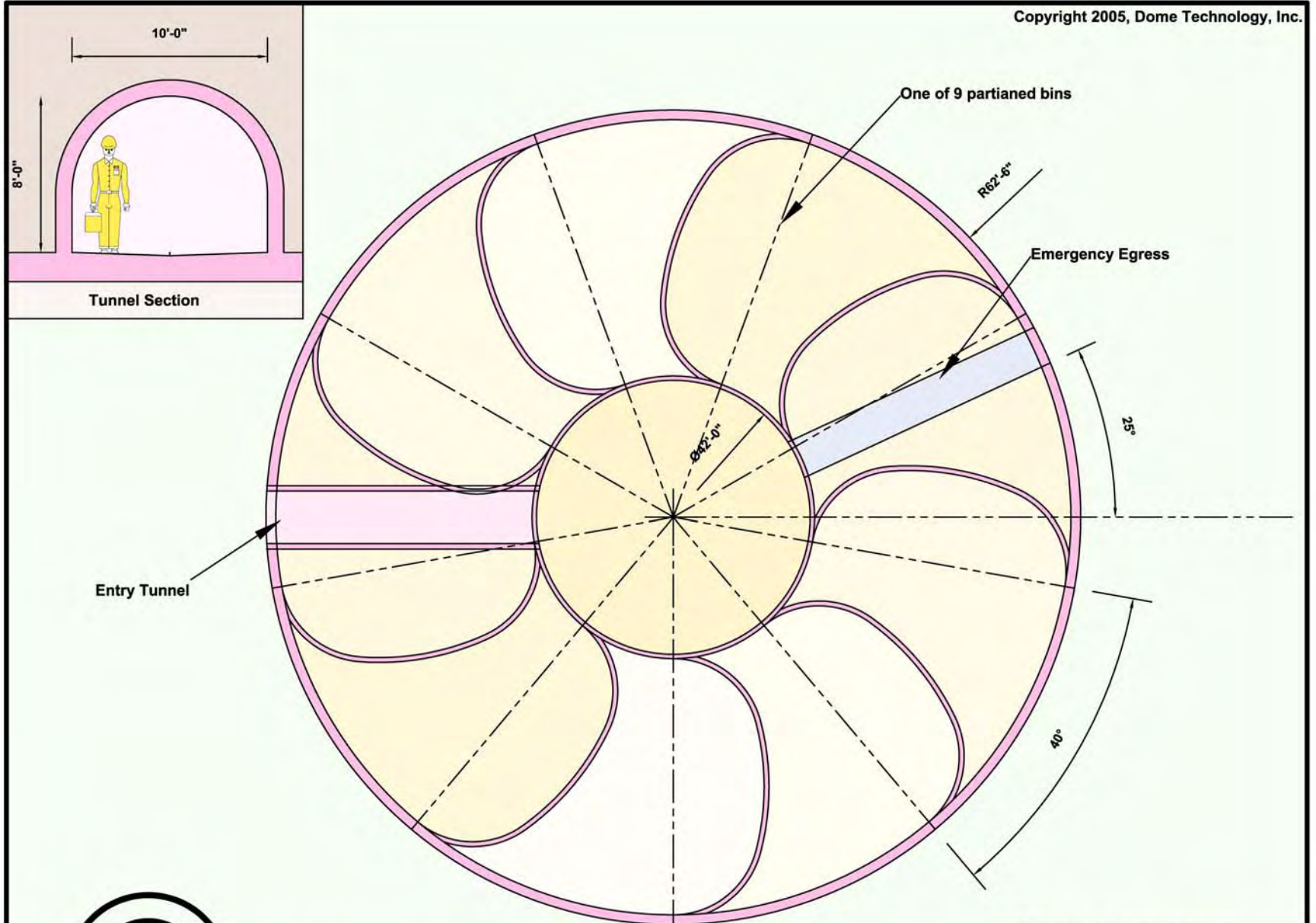
95'-0"

12'-0"

35°

Multiple Partition

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Plan View; 9 Partitions + Center

50,000 stons; DRI

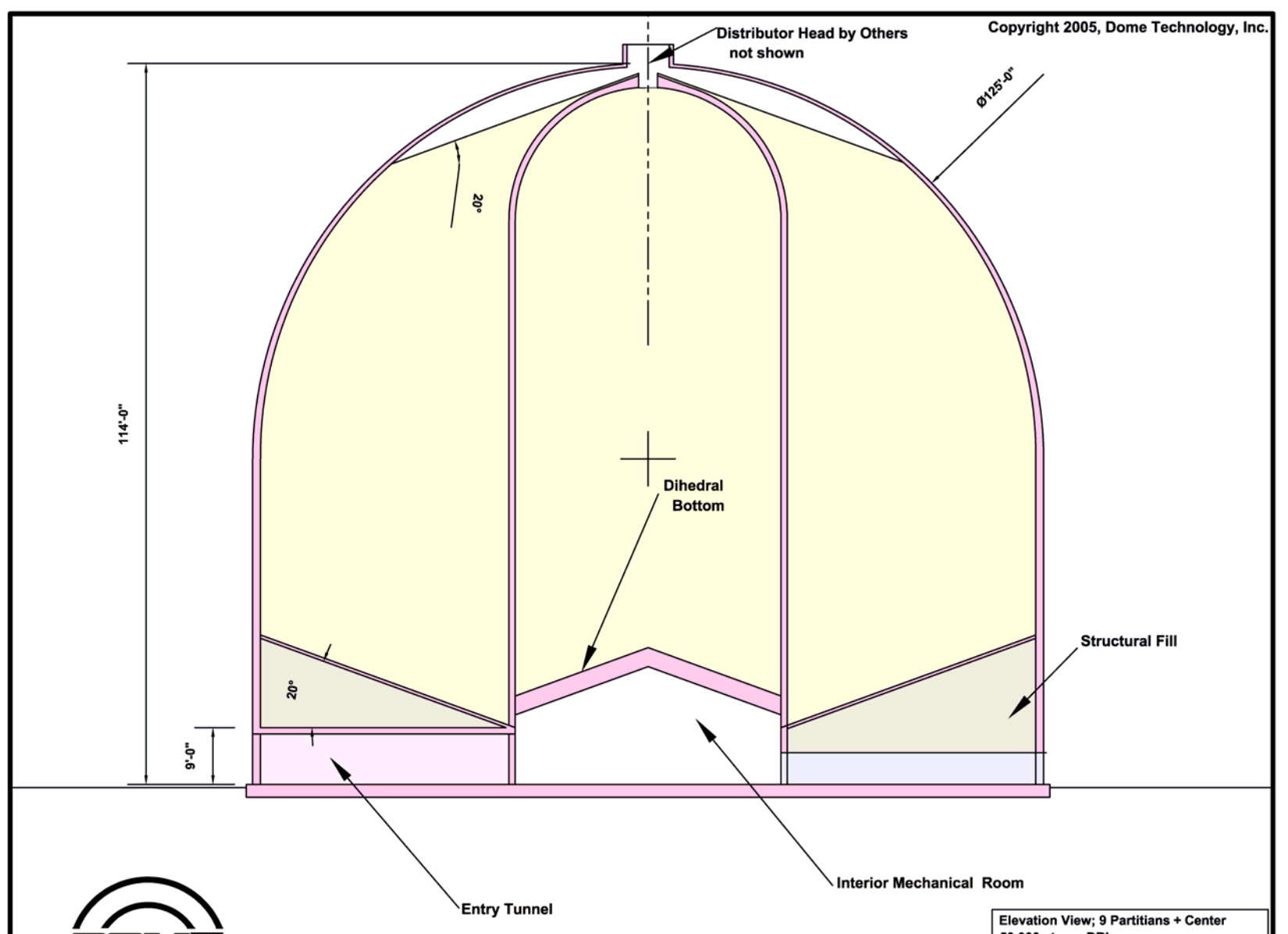
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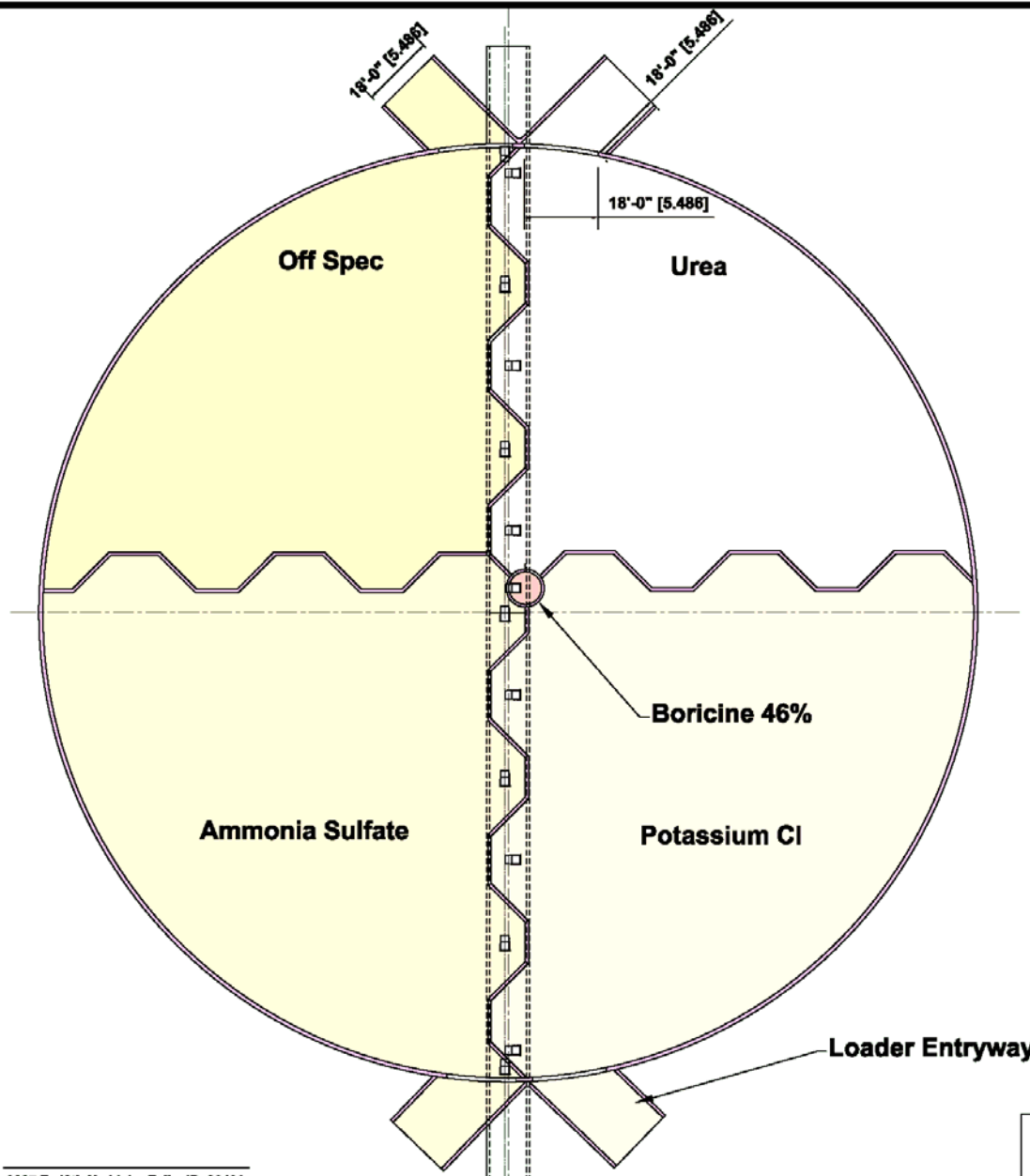


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Elevation View; DRI Storage



Fertilizer Blending



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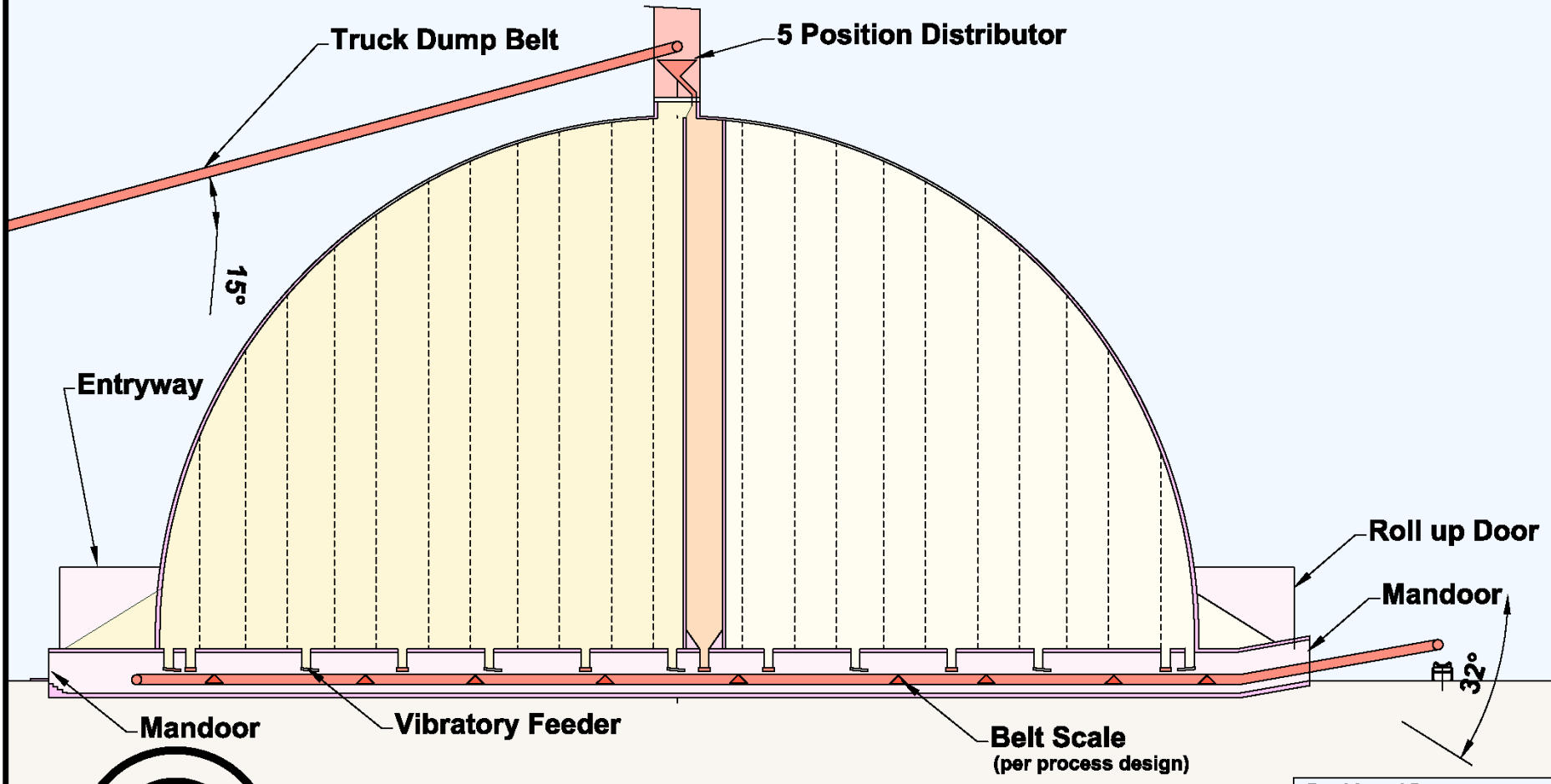
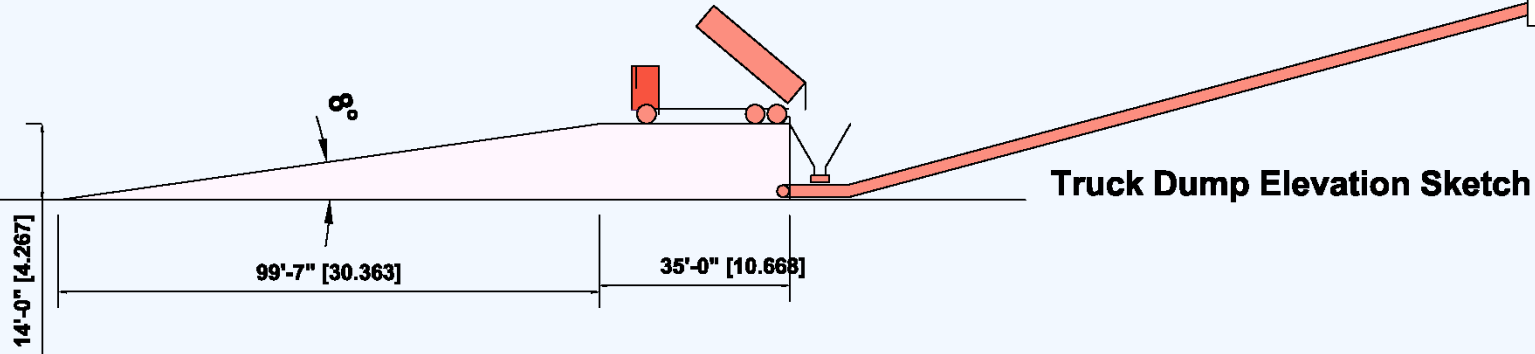


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Partitioned Dome
ICS Industries, Senegal
Sales Drawing
2005 - 0706 - 1

Fertilizer Blending

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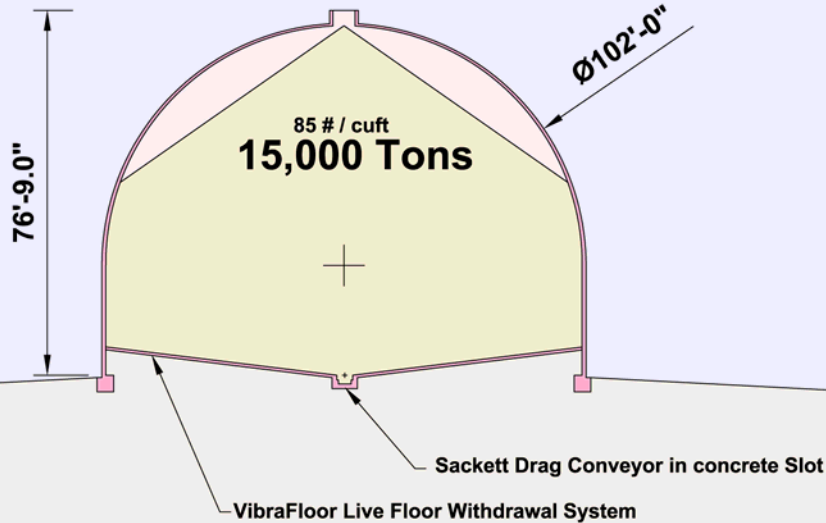


SILEXPORT Vibrating Floor



SILEXPORT Vibrating Floor

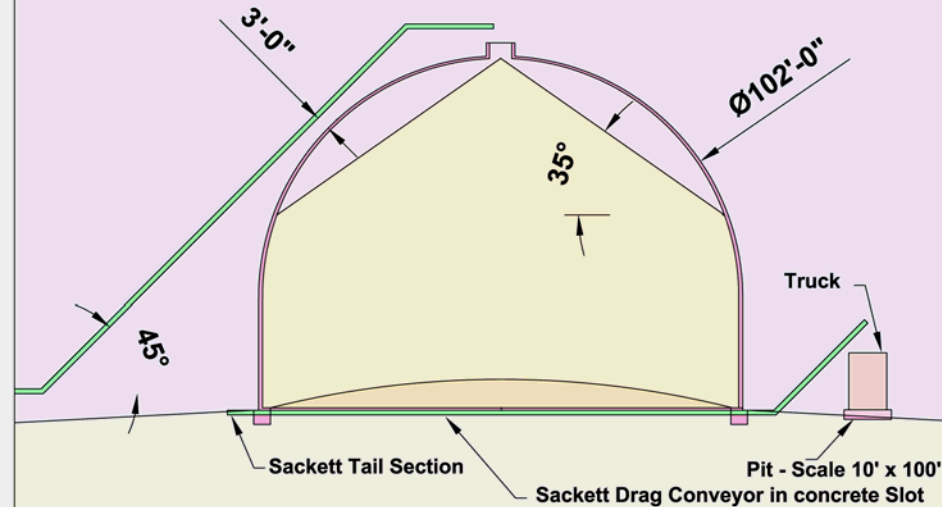
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VibraFloor System
Elevation 2
2004 03 04 - 2

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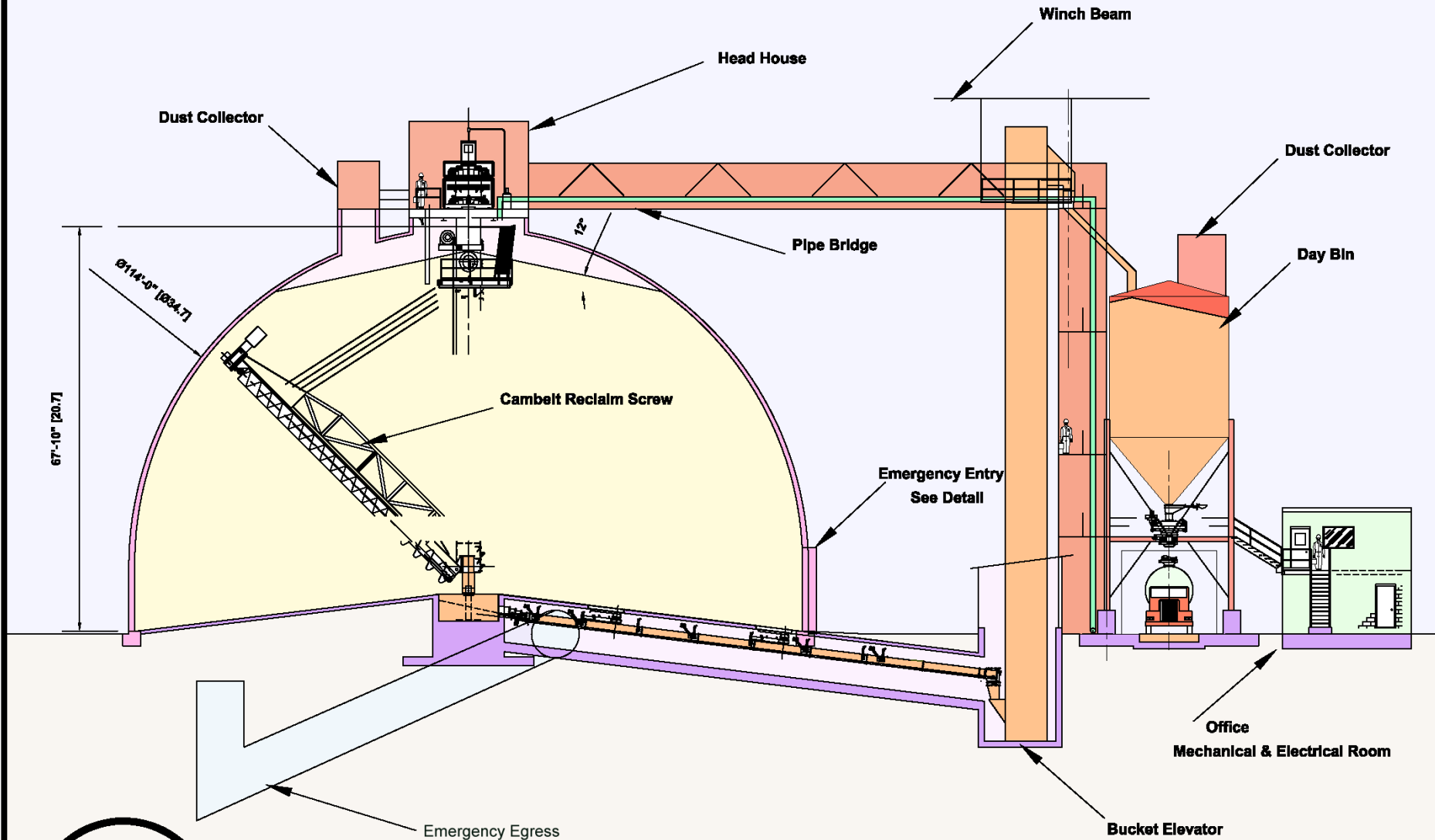
VibraFloor System
Elevation View
2004 03 04 - 1

Project Cost Comparison

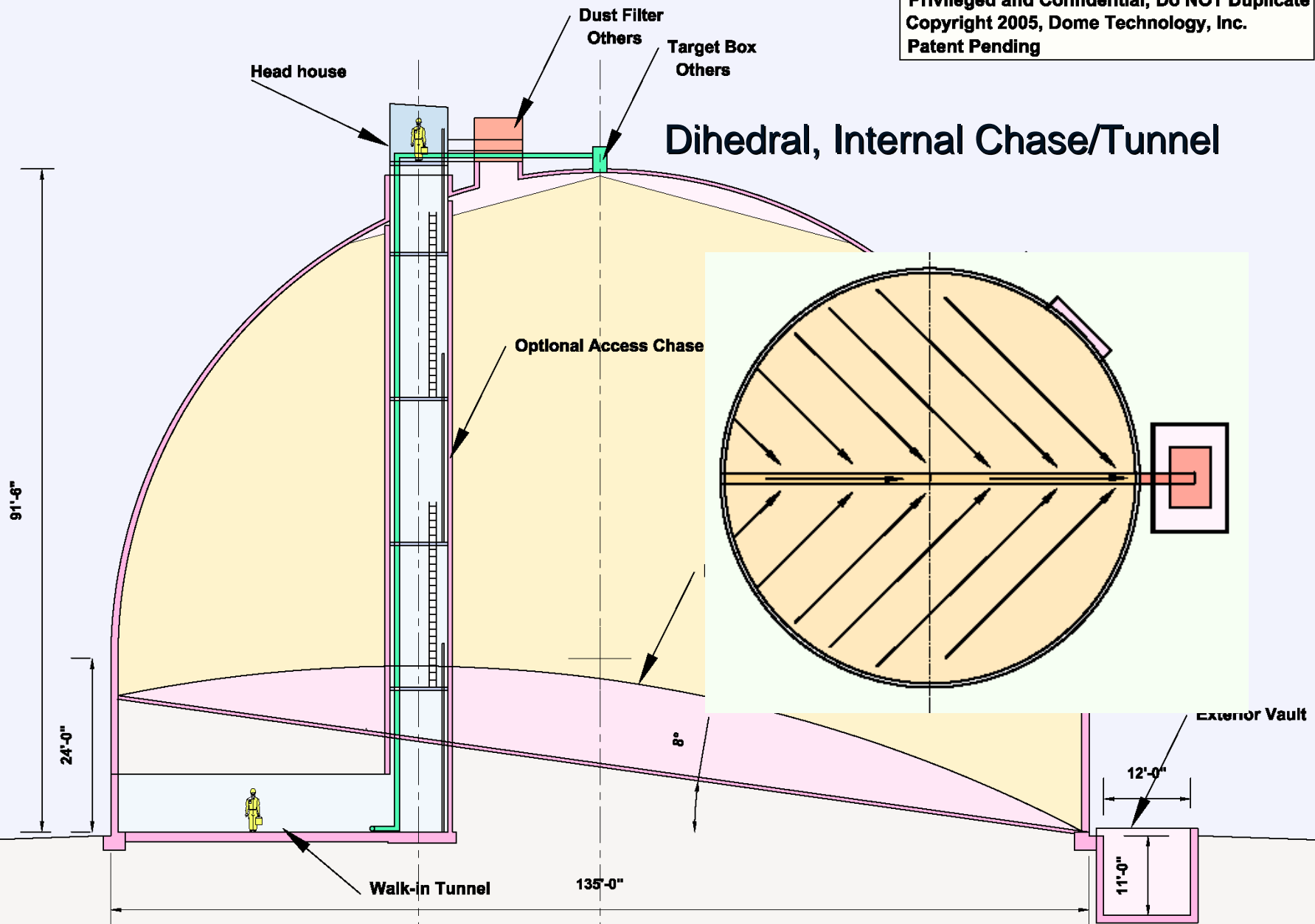
	A	B	C	D	F	G	H	I	J
	Preliminary Engineering Project Cost Estimate		Responsibility	Cambelt Frustum Systems	Cambelt Frustum Systems	Dihedral Floor - Discharge under Ring Beam	Dihedral Floor - Discharge under Ring Beam	Drive-Through and Dihedral Dome	Drive-Through and Dihedral Dome
1									
2				1-15 k dome	1-25 k dome	1-15k dome	1-25 k dome	1-15 k dome	1-30 k dome
3	Capacity in mtms (Summation of all domes)			15,000	25,000	15,000	25,000	15,000	25,000
4	Project Cost, US dollars			\$ 9,260,000	\$ 9,800,000	\$ 7,960,000	\$ 9,340,000	\$ 6,980,000	\$ 7,990,000
5	Project Cost per ton			\$ 617	\$ 392	\$ 531	\$ 374	\$ 465	\$ 320
6	Core (only) Cost per ton			\$ 370	\$ 236	\$ 317	\$ 225	\$ 289	\$ 200
7	Dome Soil Pressure psf			4,800	5,600	5,900	7,000	6,600	7,600
8	Physical Size - Portland			107' x 63'	126' x 73.5'	90' x 81'	107' x 95'	90' x 82.5'	110' x 96'
9	Site Improvements Direct Cost								
10	Site Demolition	Cemex							
11	Fencing	Cemex		\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
12	Roads & Parking	Cemex		\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000
13	Rail Line and Switch	Cemex		\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000
14	Grading and Seeding	Cemex		\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
15	Storm water Structures	Cemex		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
16	Truck Access Platforms	Cemex		\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
17	Utilities Power	Cemex		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
18	Distribution Transformer 4160/480	Cemex		\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
19	Distribution Transformer 480/120v	Mech Supply	incl						
20	Buy 4160 from Tap to Dome	Cemex		\$ 7,000	\$ 7,000	\$ 7,000	\$ 7,000	\$ 7,000	\$ 7,000
21	Phone Utility, PBX	Cemex		\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
22	Utilities Water	Cemex		\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
23	Subtotal =			\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000
24	Core Terminal Direct Costs								
25	Exterior Stair Tower and Bridge			\$ 153,750	\$ 164,000	\$ 179,750	\$ 203,000	N/A	N/A
26	Structural and Mechanical Installation			\$ 58,400	\$ 61,000	\$ 64,900	\$ 70,800	N/A	N/A
27	Deep Foundations Allowance			\$ -	\$ -	\$ -	\$ -	N/A	N/A
28	Dome 1, Portland Cement	Cambelt	Cambelt	Dihedral	Dihedral	Drive-Through	Drive-Through		
29	Deep Foundations Allowance	Cemex		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
30	Ring Beam Foundation	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
31	Scale Pits, Slot, Airlift vault	DT	N/A	N/A	N/A	N/A	N/A	incl - below	incl - below
32	Dome Shell	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
33	Construction Access Doors	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
34	Floor Subgrade Preparation	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
35	Excavation, Fill Compaction, Allowance	DT	\$36,100 allow	\$49,900 allow	\$31,600 allow	\$51,300 allow	\$27,100 allow	\$44,300 allow	
36	Concrete Floor	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
37	Drive-through Tunnel, Surge Bin	DT	N/A	N/A	incl - below	incl - below	incl - below	incl - below	incl - below
38	Access Chase, widow	DT	N/A	N/A	incl - below	incl - below	incl - below	incl - below	incl - below
39	Platforms, ladders, Headhouse	Cemex	\$ 50,000	\$ 50,000	incl - below	incl - below	incl - below	incl - below	incl - below
40	DC Curbie	DT	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
41	Through Tunnel Doors	DT	N/A	N/A	N/A	N/A	Optional	Optional	
42	Electrical Room	DT	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
43	Mechanical Room	Cemex	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
44	Control Room	Cemex	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
45	Exterior Stairs, Interior Catwalks	Cemex	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
46	Doors & Glazing Allowance	DT	N/A	N/A	N/A	N/A	\$5,600 allow	\$5,600 allow	
47	AC & Heat, Equip room vent fans Allow	DT	N/A	N/A	N/A	N/A	\$3,500 allow	\$3,500 allow	
48	Dome System Structural Items (Open Shop)	DT	\$ 960,000	\$ 1,210,000	\$ 862,000	\$ 1,195,000	\$ 2,255,000		
49	Dust Collector	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
50	Dome level indicators	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
51	Over / Under Pressure Valve	Mech Supply	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 70,000	\$ 70,000	
52	Cambelt Reclaim System	Mech Supply	\$ 900,000	\$ 950,000	N/A	N/A	N/A	N/A	N/A
53	Air-gravity conveyor, blowers	Mech Supply	\$ 150,000	\$ 150,000	N/A	N/A	N/A	N/A	N/A
54	Dome Pneumatic Floor System	Mech Supply	N/A	N/A	incl - below	incl - below	incl - below	incl - below	incl - below
55	Full fabric coverage, air gravity system	Mech Supply	N/A	N/A	incl - below	incl - below	incl - below	incl - below	incl - below
56	Aeration Blower, Pressure Blower	Mech Supply	N/A	N/A	incl - below	incl - below	incl - below	incl - below	incl - below
57	Control valves, cut-off gates, flow gates	Mech Supply	\$ -	\$ -	\$ 236,000	\$ 337,700	\$ 264,000	\$ 357,400	
58	Airlift Chamber	Mech Supply	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
59	Blower & Target Box	Mech Supply	\$ -	\$ -	N/A	N/A	\$ 210,000	\$ 210,000	
60	Surge Bin Hopper bottom	Mech Supply	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
61	Blowers, valves, controls, gates	Mech Supply	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
62	Loading spout, dust collector	Mech Supply	N/A	N/A	N/A	N/A	incl - below	incl - below	incl - below
63	2' spout positioner	Mech Supply	\$ -	\$ -	N/A	N/A	\$ 200,000	\$ 200,000	
64	Compressor / Dryer	Mech Supply	\$ 35,000	\$ 35,000	incl - below	incl - below	incl - below	incl - below	incl - below
65	PLC Control System & Program	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
66	MCC	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
67	20 days installation service	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
68	10 days Start-up Assistance	Mech Supply	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below	incl - below
69	Service Manuals	Mech Supply	\$ 100,000	\$ 100,000	\$ 240,000	\$ 240,000	\$ 240,000	\$ 240,000	
70	Systems Integration								
71	Airlift Conveyor Access chamber / Piping	Cemex	N/A	N/A	N/A	N/A	incl - above	incl - above	incl - above
72	Project Management	Cemex	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr
73	Bid Packages for Equipment and Labor	Cemex	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr
74	Mechanical & Electrical Gap Engineering	Cemex	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr	incl - Engr
75	Emergency Blow off Station	Cemex	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500			
76	Installation of Mech Supply Equipment	Cemex	\$ 310,600	\$ 323,100	\$ 369,300	\$ 496,500	\$ 511,900	\$ 628,700	
77	Start-up Assistance	Mech Supply	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	
78	Electrical Installation	Cemex	\$ 450,000	\$ 450,000	\$ 400,000	\$ 400,000	\$ 450,000	\$ 450,000	
79	Lightning Protection	Cemex	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

	A	B	C	D	F	G	H	I	J
	Preliminary Engineering Project Cost Estimate		Responsibility	Cambelt Frustum Systems	Cambelt Frustum Systems	Dihedral Floor - Discharge under Ring Beam	Dihedral Floor - Discharge under Ring Beam	Drive-Through and Dihedral Dome	Drive-Through and Dihedral Dome
1									
2				1-15 k dome	1-25 k dome	1-15k dome	1-25 k dome	1-15 k dome	1-30 k dome
80	Load-out Structure & Misc			Day-Bin	Day-Bin	Day-Bin	Day-Bin	Internal	Internal
81	Combination Office / Mech / Elect building (Elevated)	Cemex	\$ 200,000	\$ 200,000	\$ 200,000	\$ 110,000	widome 1	widome 1	
82	Grade Level Rest Room - Handicap access	Cemex	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	
83	Pt cover - Stairs - Mech Access Door	Cemex	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	N/A	N/A	
84	Bucket Elevator with platforms and ladders	Cemex	\$ 150,000	\$ 160,000	\$ 170,000	\$ 180,000	N/A	N/A	
85	Diverter	Cemex	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	N/A	N/A	
86	Air Gravity Conveyor to Dome	Cemex	\$ 31,500	\$ 37,500	\$ 31,500	\$ 31,500	N/A	N/A	
87	Dust Collector	Cemex	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000	N/A	N/A	
88	Pressure Relief Control Levels Systems	Cemex	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	N/A	N/A	
89	Day Bin Structure	Cemex	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	N/A	N/A	
90	Load-out	Cemex	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000	N/A	N/A	
91	Truck Scale -pittess	Cemex	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	
92	Approach Ramps	Cemex	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	incl-above	incl-above	
93	Access Walkways and platforms	Cemex	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000	incl-above	incl-above	
94	Weather Enclosure over Rail Unload	Cemex	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	N/A	N/A	
95	Boot - Lifts (RR car Unload)	Cemex	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	
96	RR unload conveyor to Dome Fill System	Cemex	\$ 65,000	\$ 65,000	\$ 65,000	\$ 65,000	\$ 65,000	\$ 65,000	
97	Air Gravity Conveyor to Bucket Elevator	Cemex	\$ 250,000	\$ 250,000	\$ 250,000	\$ 450,000	\$ 30,000	\$ 30,000	
98	Mech - Structural Install above	Cemex	\$ 260,100	\$ 264,100	\$ 260,100	\$ 312,600	\$ 30,000	\$ 30,000	
99	MCC - PLC - Program	Cemex	\$ 75,000	\$ 75,000	\$ 75,000	\$ 75,000	incl-above	incl-above	
100	Electrical Installation	Cemex	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	incl-above	incl-above	
101	Tunnel (Dome scope) and excavation Cemex	Cemex	Both	Both	Both	Both	N/A	N/A	
102	Foundations	Cemex	\$ 180,000	\$ 180,000	\$ 180,000	\$ 180,000	N/A	N/A	
103	Deep Foundations Allowance	Cemex	\$ -	\$ -	\$ -	\$ 20,000	N/A	N/A	
104	Subtotal =		\$ 5,160,850	\$ 5,506,200	\$ 4,365,950	\$ 5,233,600	\$ 3,948,400	\$ 4,618,600	
106	Construction Costs								
107	Environmental Work	Cemex	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
108	Stormwater Study	Cemex	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
109	Geotechnical Work	Cemex	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	
110	Geotechnical QC	Cemex	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	
111	Site Survey	Cemex	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	
112	Design Engineering	Cemex	\$ 277,600	\$ 294,900	\$ 237,900	\$ 281,300	\$ 108,500	\$ 125,300	
113	Construction Management	Cemex	\$ 277,600	\$ 294,900	\$ 237,900	\$ 281,300	\$ 217,000	\$ 250,500	
114	Construction QC	Cemex	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	
115	Taxes (reduce by labor - estimate)	Cemex	\$ 166,600	\$ 176,900	\$ 142,700	\$ 168,800	\$ 130,200	\$ 150,300	
116	Freight	Cemex	\$ 55,500	\$ 59,000	\$ 47,600	\$ 56,300	\$ 43,400	\$ 50,100	
117	Construction Utilities	Cemex	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	
118	Insurance and Bonds	Cemex	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	
119	Permits	Cemex	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	
120	Project Startup	Cemex	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
121	Project Cost Subtotal (Direct Projected Cost)		\$ 6,488,150	\$ 6,881,900	\$ 5,581,150	\$ 6,571,300	\$ 4,997,500	\$ 5,744,800	
122	Contractor OH and Profit (non-Dome Tech items)	Cemex	\$ 829,200	\$ 850,800	\$ 707,900	\$ 793,700	\$ 480,400	\$ 523,500	
123	Design Bid Contract MU	Cemex	\$ 973,200	\$ 1,032,300	\$ 837,200	\$ 985,700	\$ 749,600	\$ 861,700	
124	Owner's Contingency	Cemex	\$ 973,200	\$ 1,032,300	\$ 837,200	\$ 985,700	\$ 749,600	\$ 861,700	
125	Subtotal =		\$ 3,710,800	\$ 3,969,100	\$ 3,266,400	\$ 3,710,800	\$ 2,636,700	\$ 2,981,100	
126	Grand Total		\$ 9,260,000	\$ 9,800,000	\$ 7,960,000	\$ 9,340,000	\$ 6,980,000	\$ 7,990,000	

Typical Cambelt Frustum

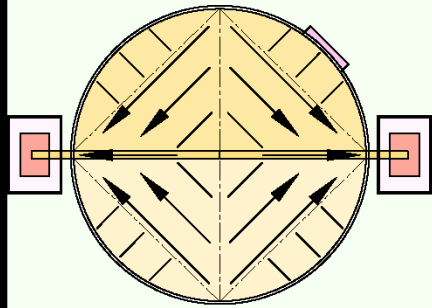


Dihedral, Internal Chase/Tunnel

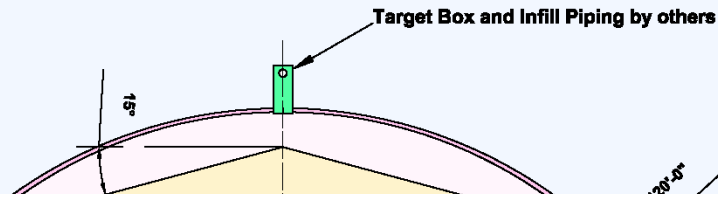


Double Dihedral Floor

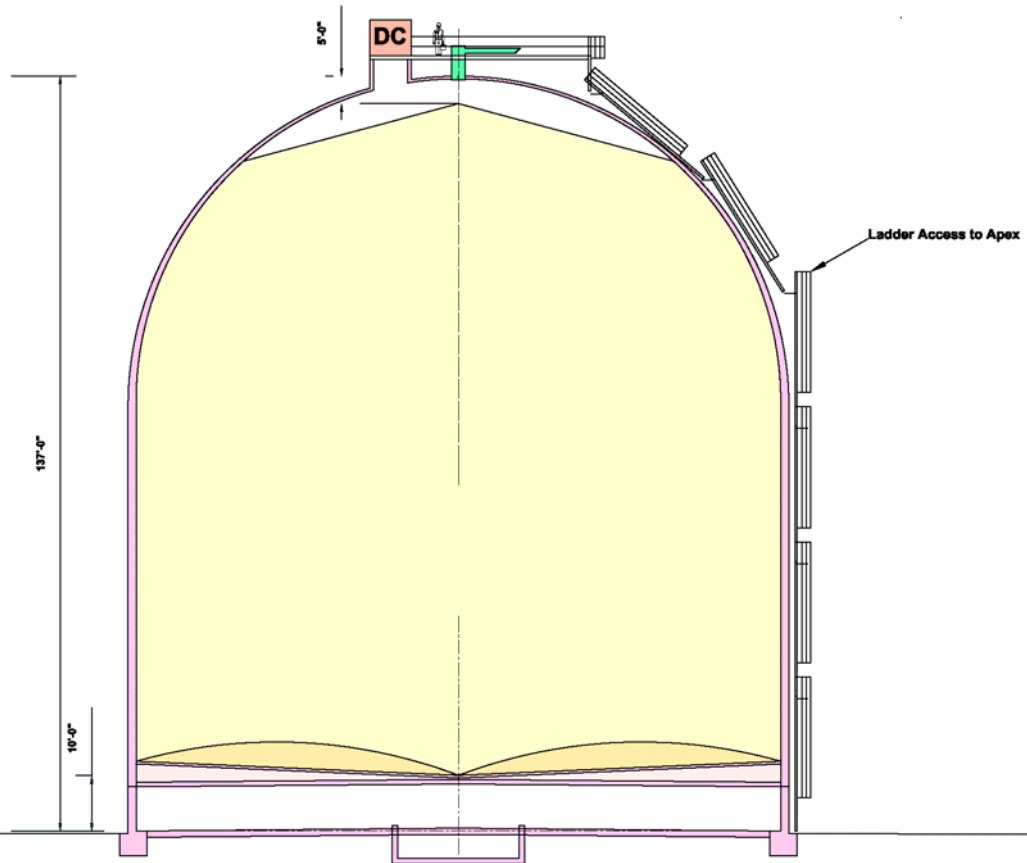
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Plan View; Floor Mechanical Arrangement



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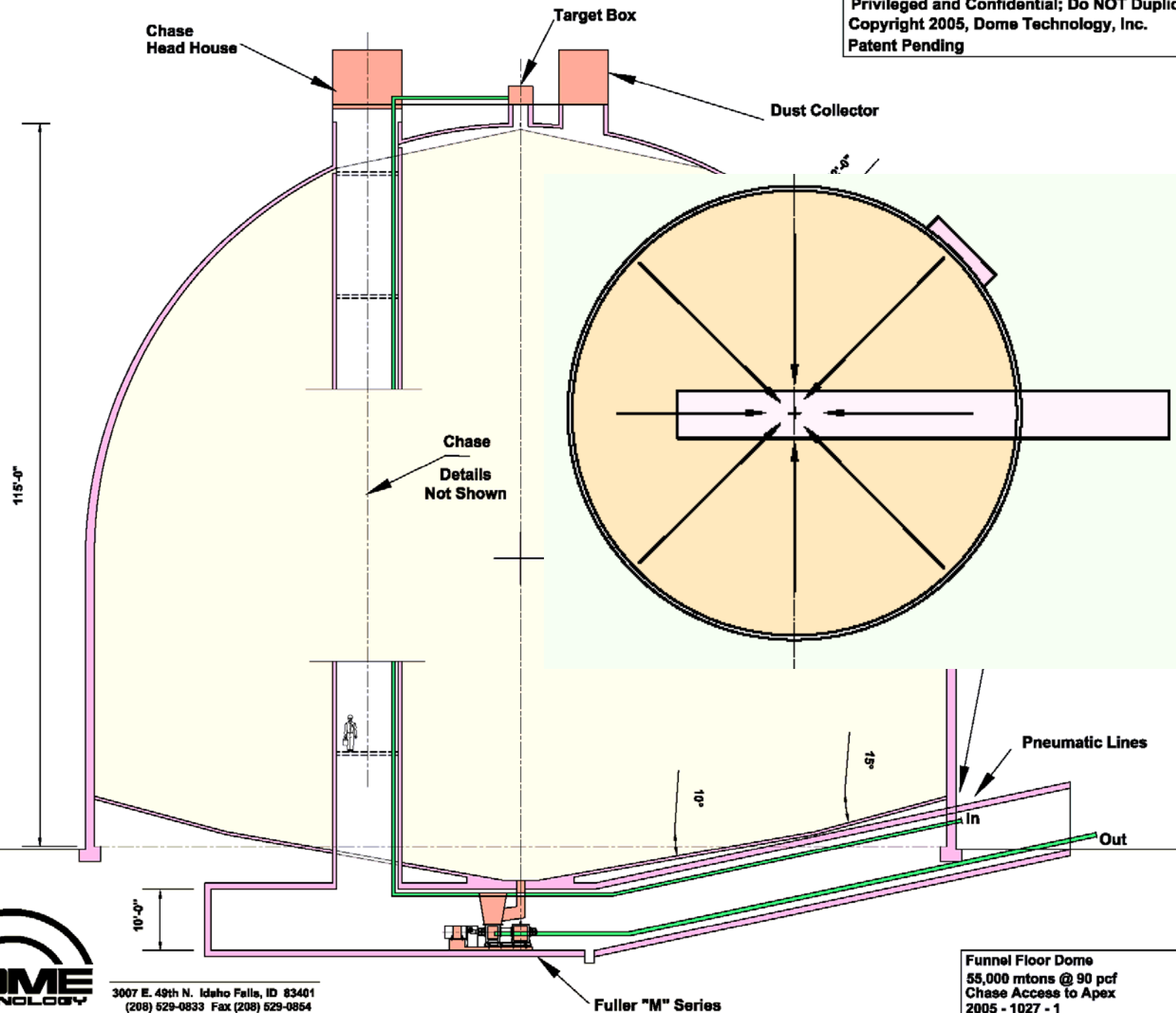
Elevation View from East



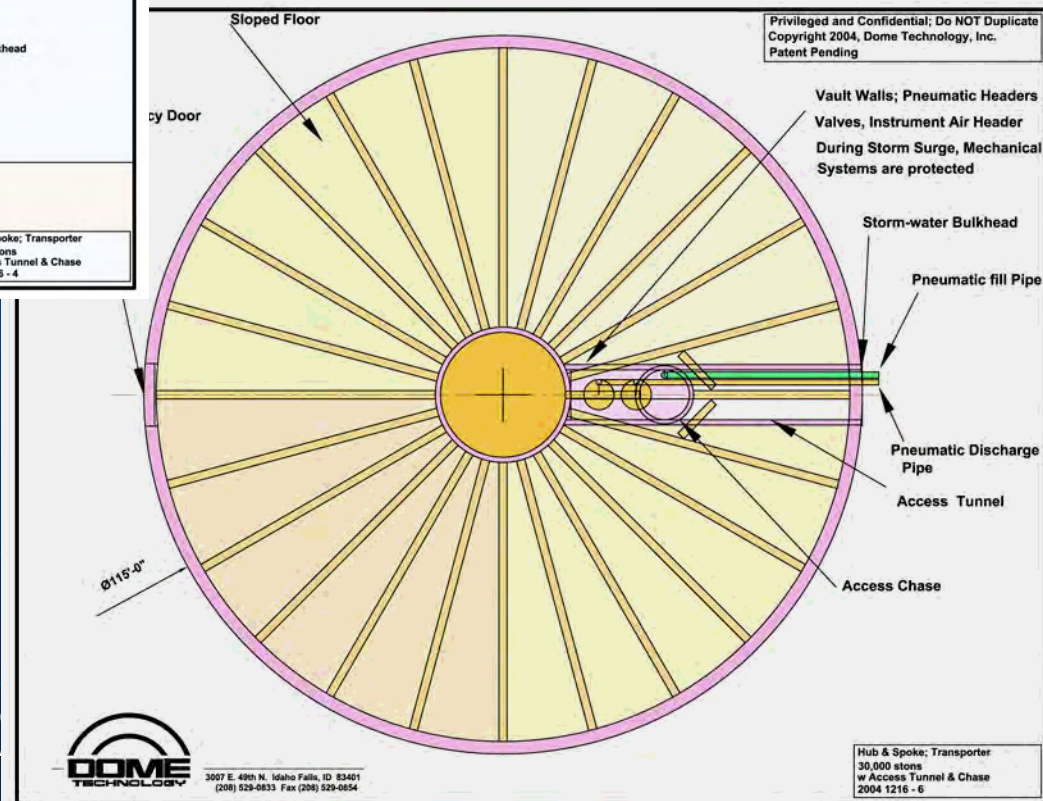
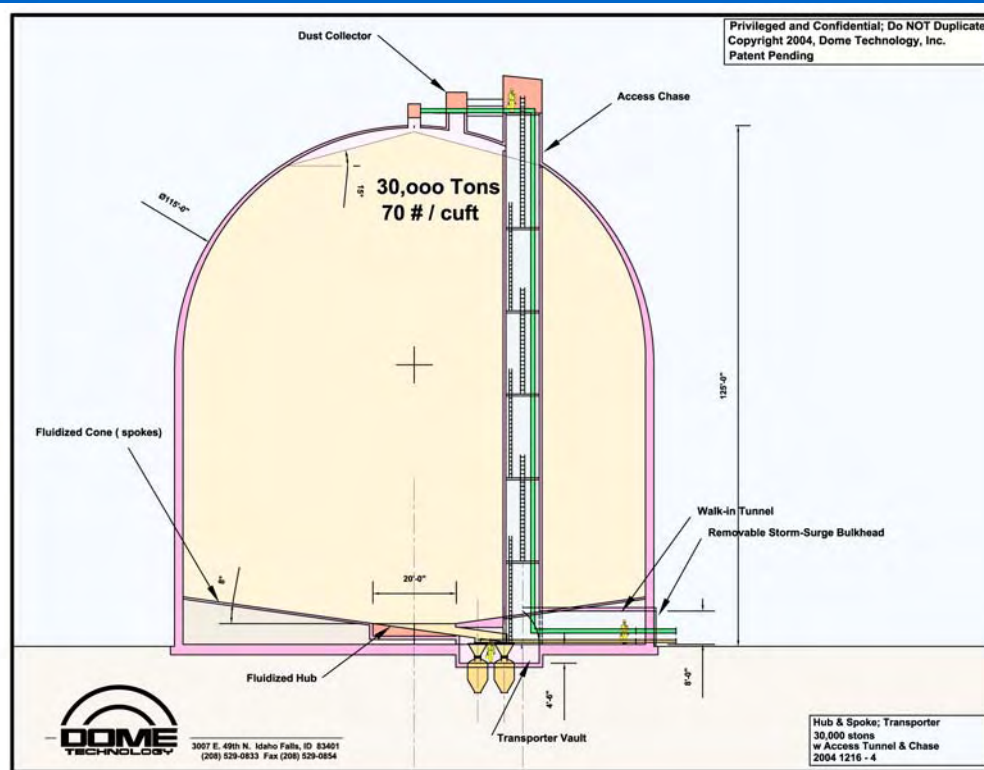
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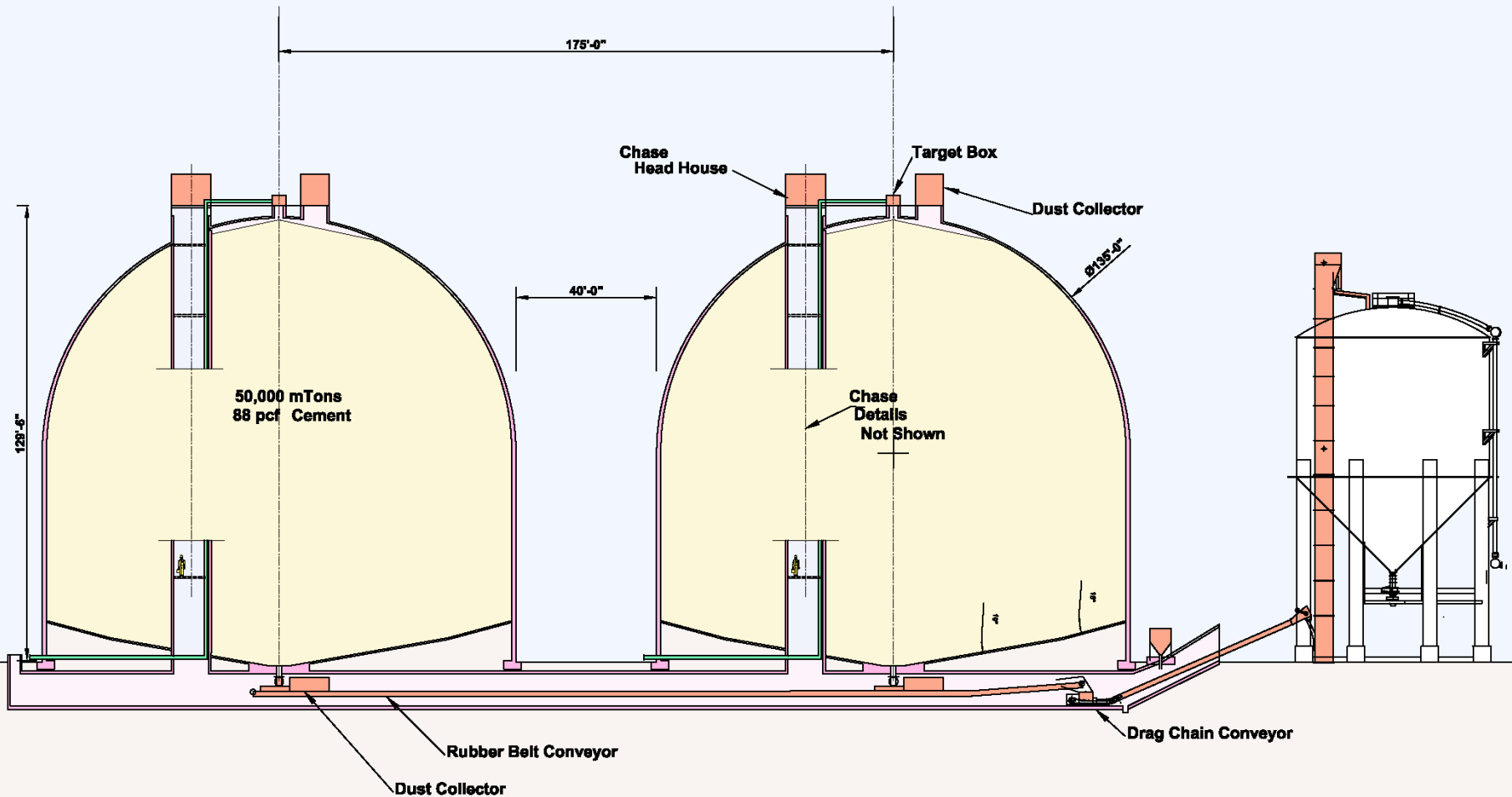
38,500 sTon FA @ 72 pcf (50,000 sTon Cement @ 94 pcf)

38,500 sTon Double Dihedral Floor
Grade Level Access Tunnel
Pneumatic Floor Reclaim
2006 1006 - 2



Hub & Spoke w/ Transporters



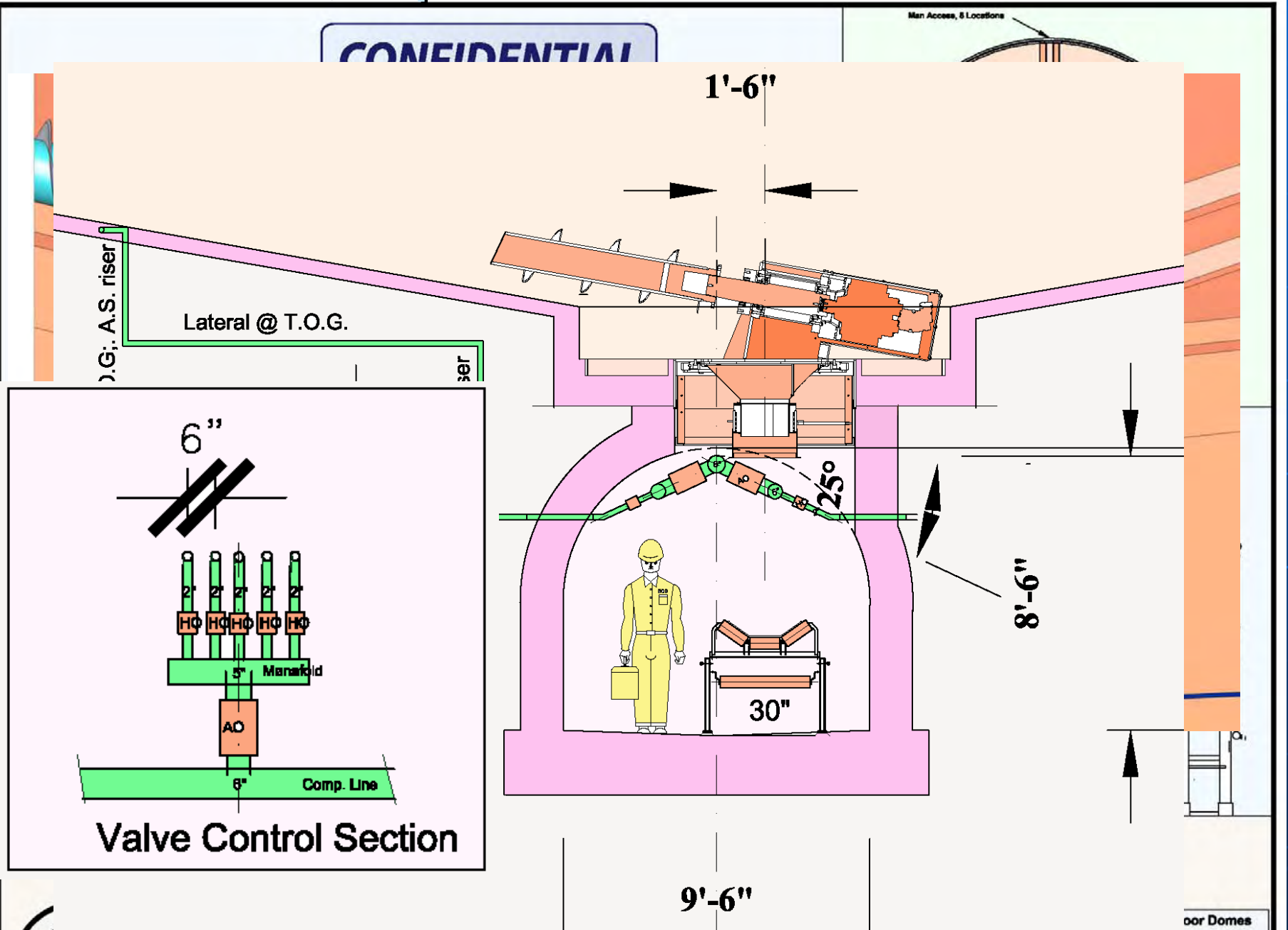


Conical Floor, Mechanical Conveyance



Hub, Spoke & Mech Screw

CONFIDENTIAL



Pneumatic Fill Pipe
(others)

Target Box

143'-6" [43.73]

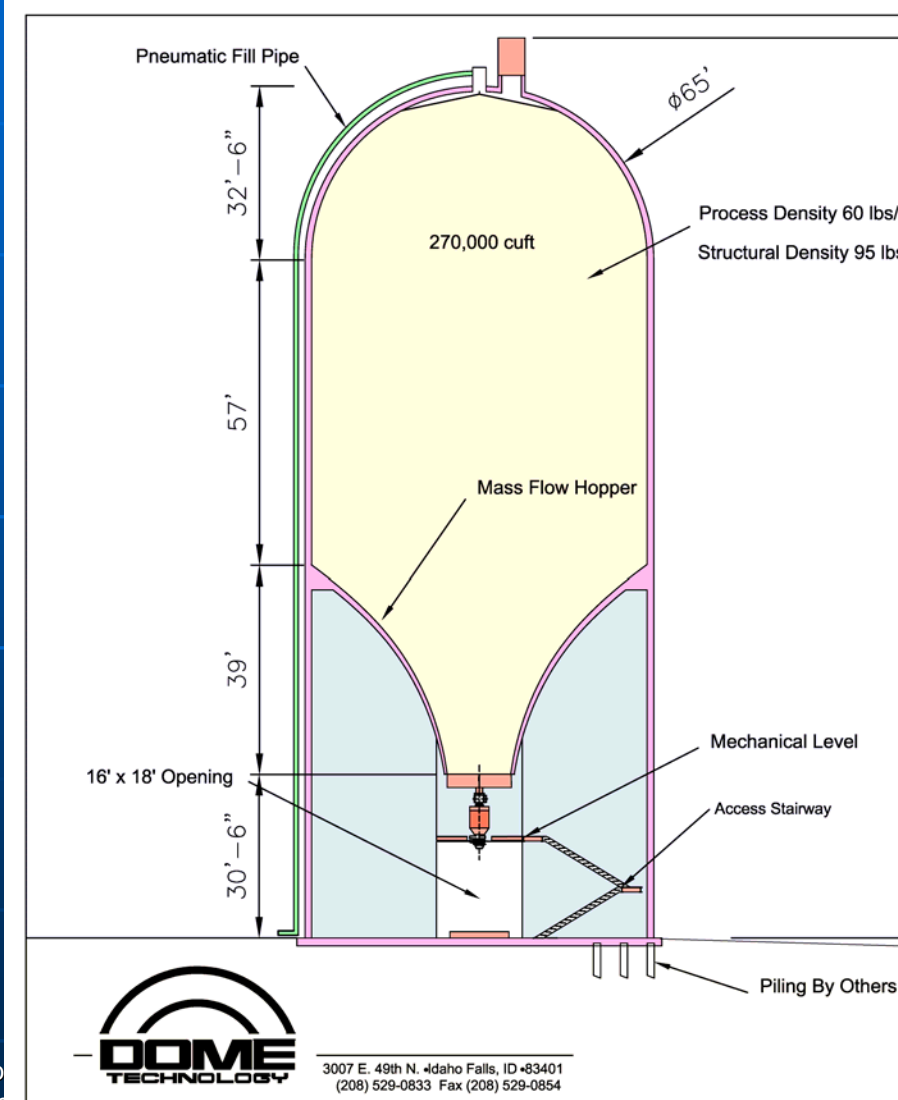
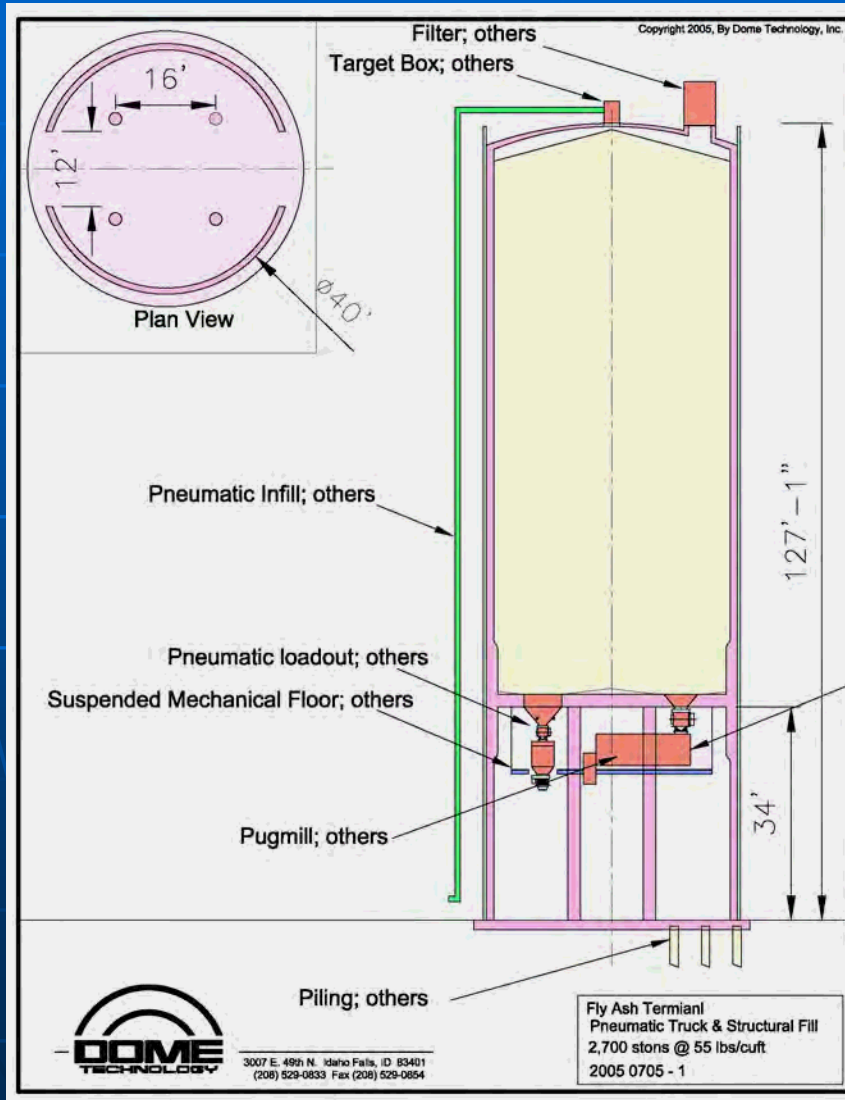
3'-6" [1.07]

Structural Steel
ASTM A-6

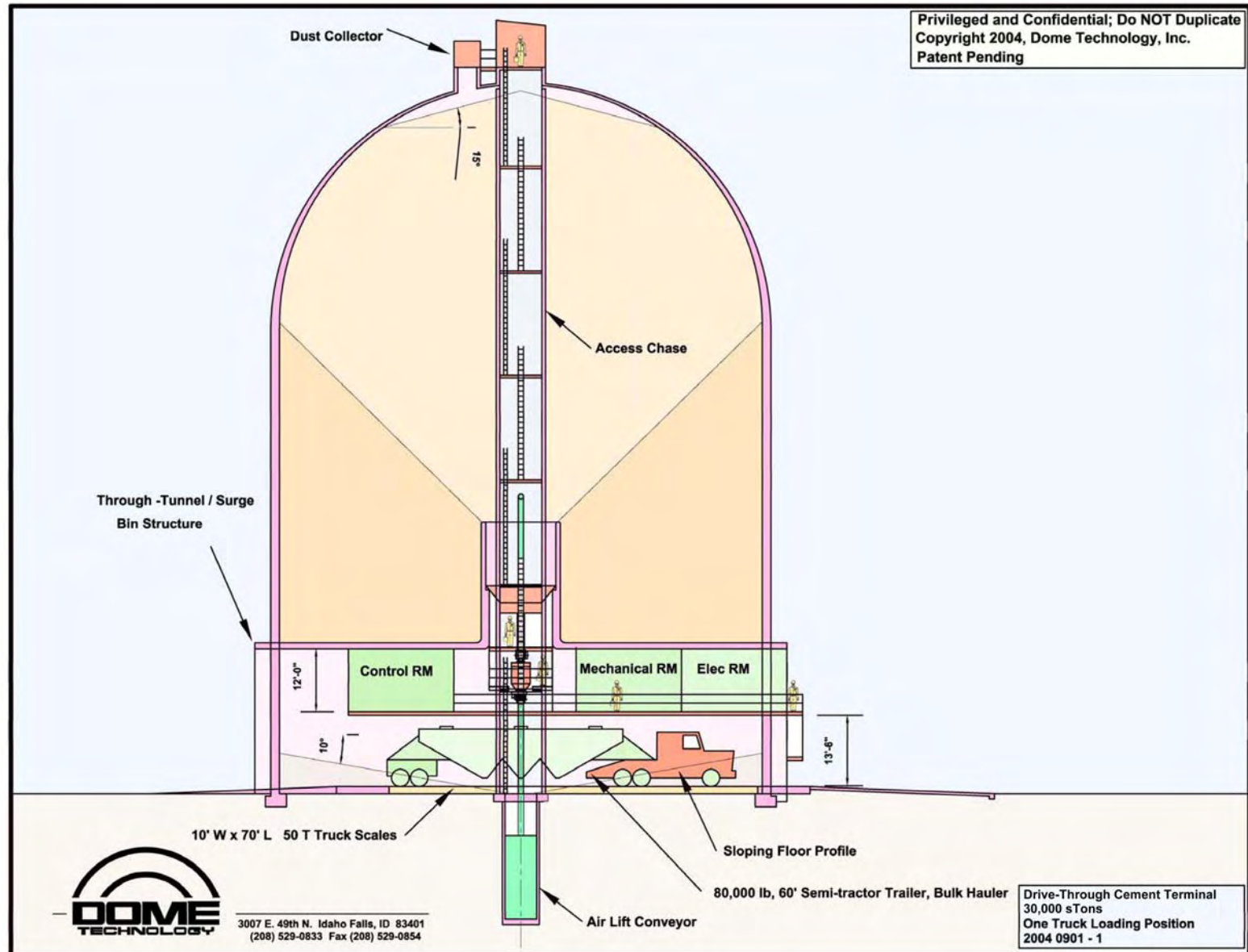
Silo Design
ACI-318



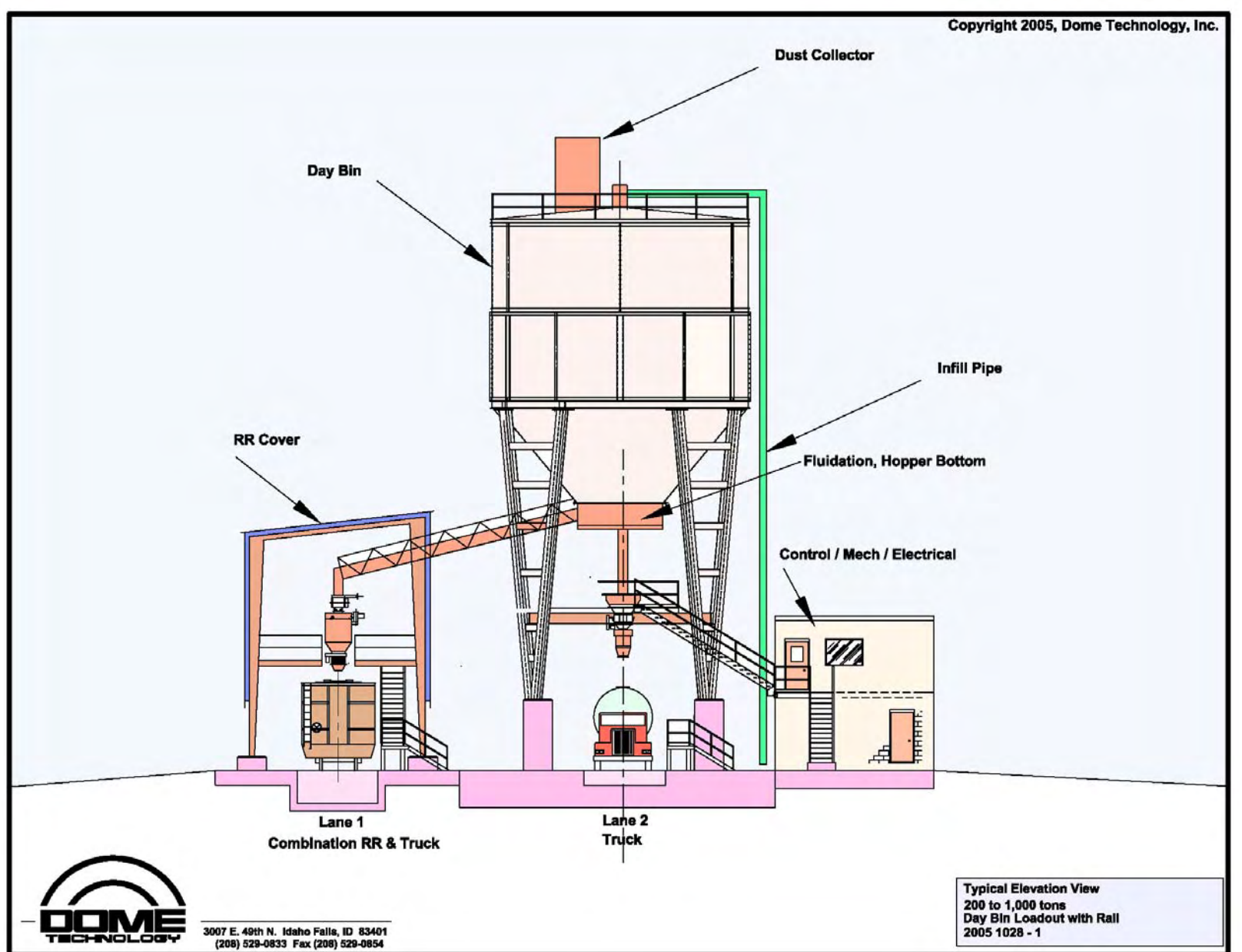
Variations on Hopper / Floor



Simple Drive-through Terminal



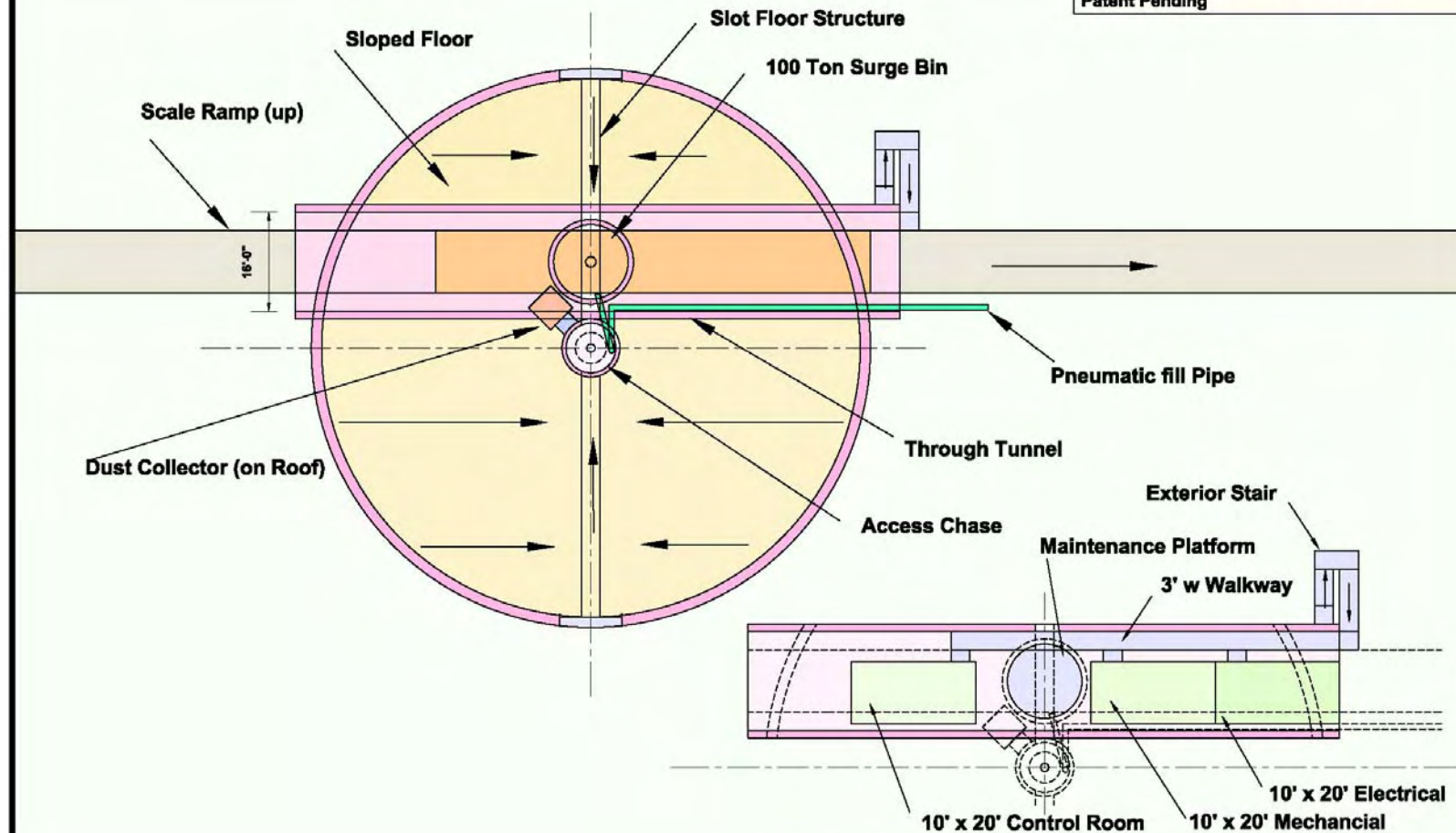
This is no longer separated, but integrated



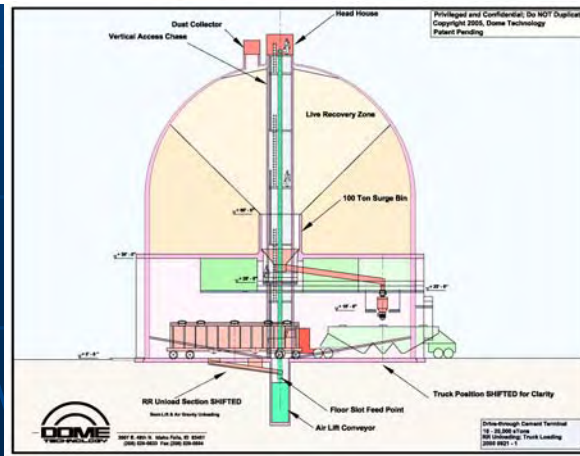
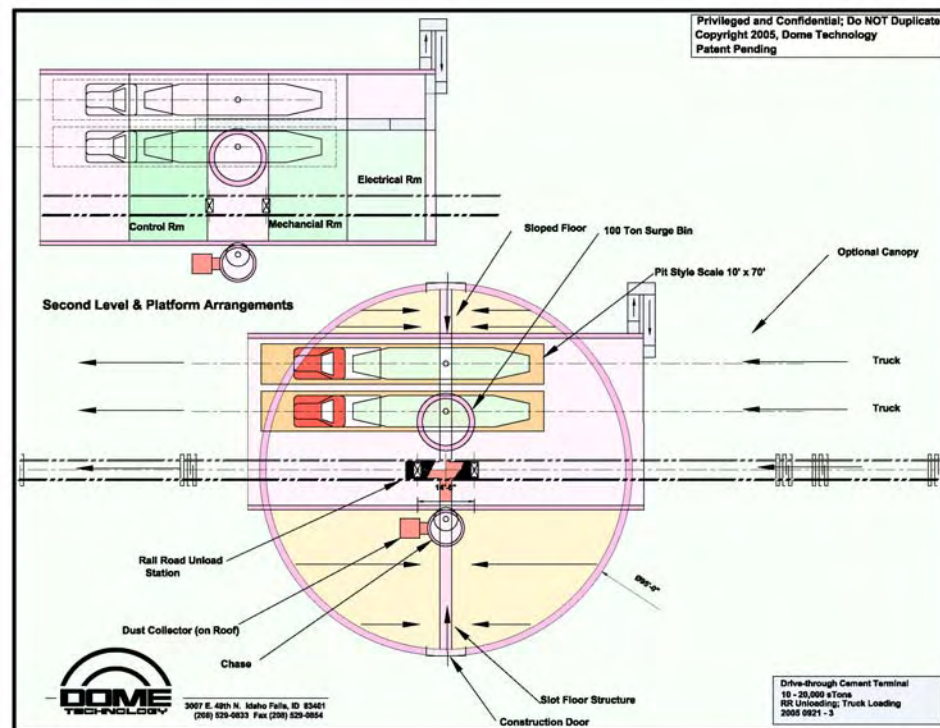
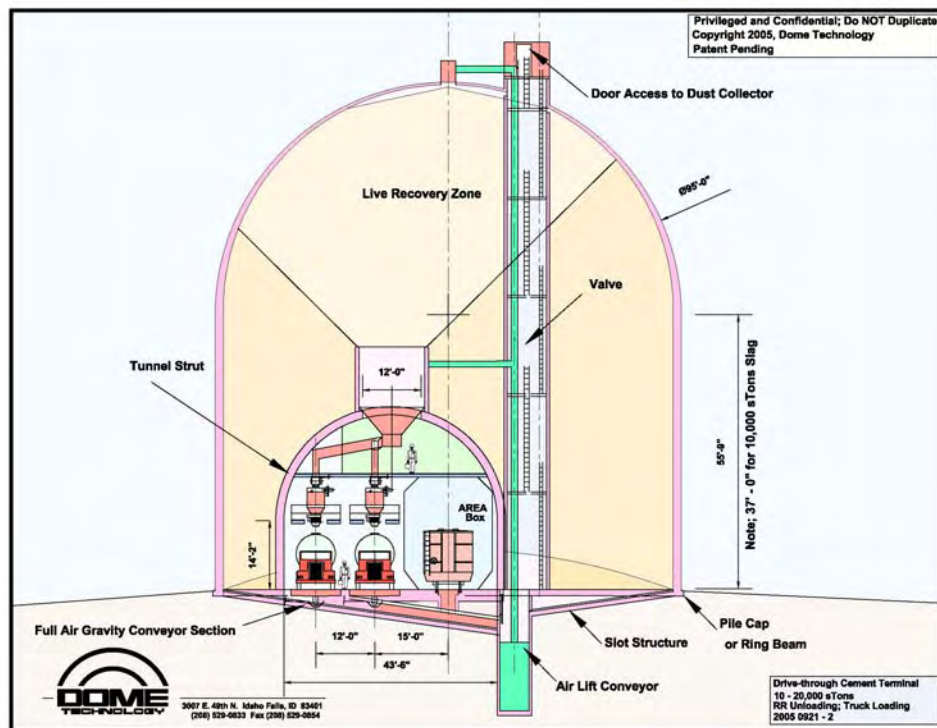
One Lane; Airlift Conveyor

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Patent Pending

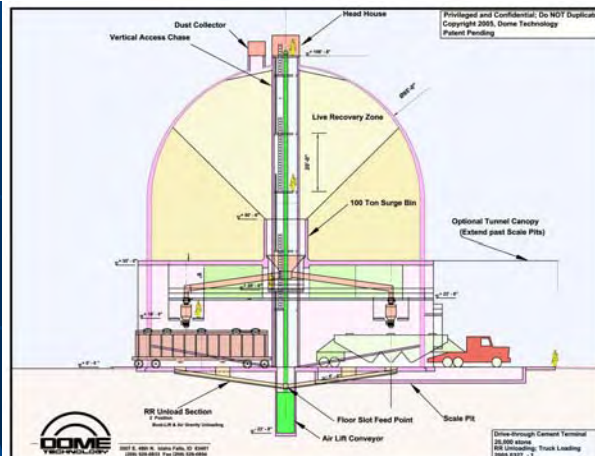
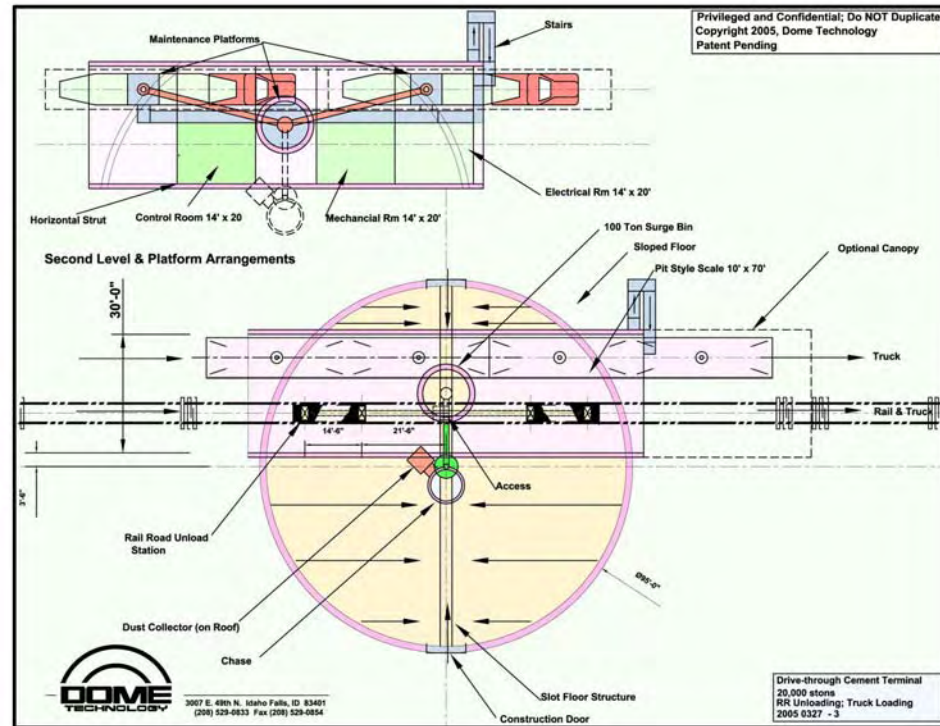
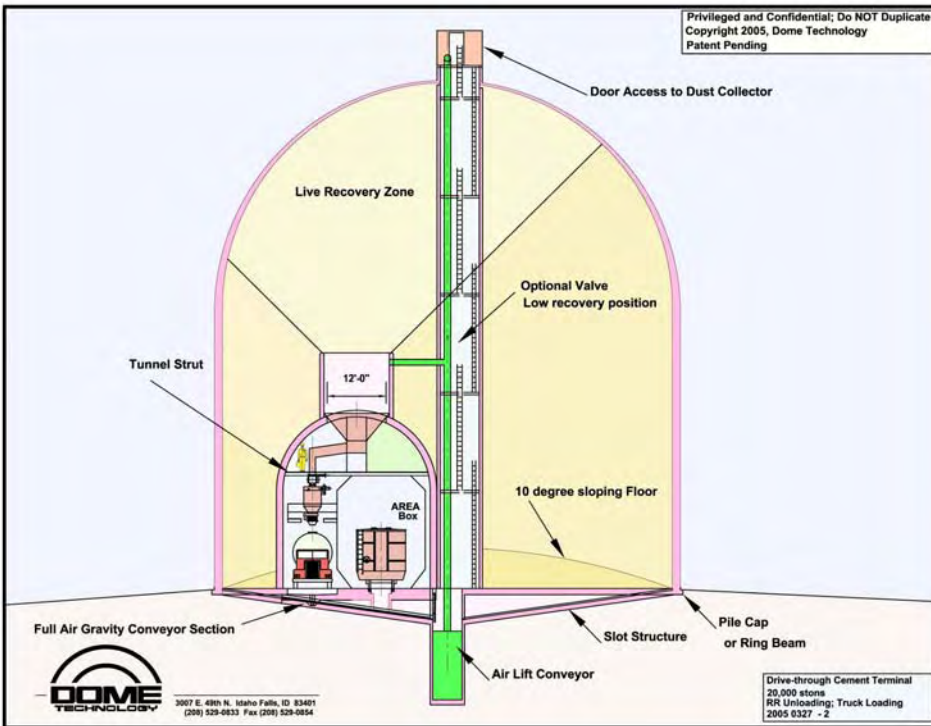
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Patent Pending



3 Lanes; Rail Fill

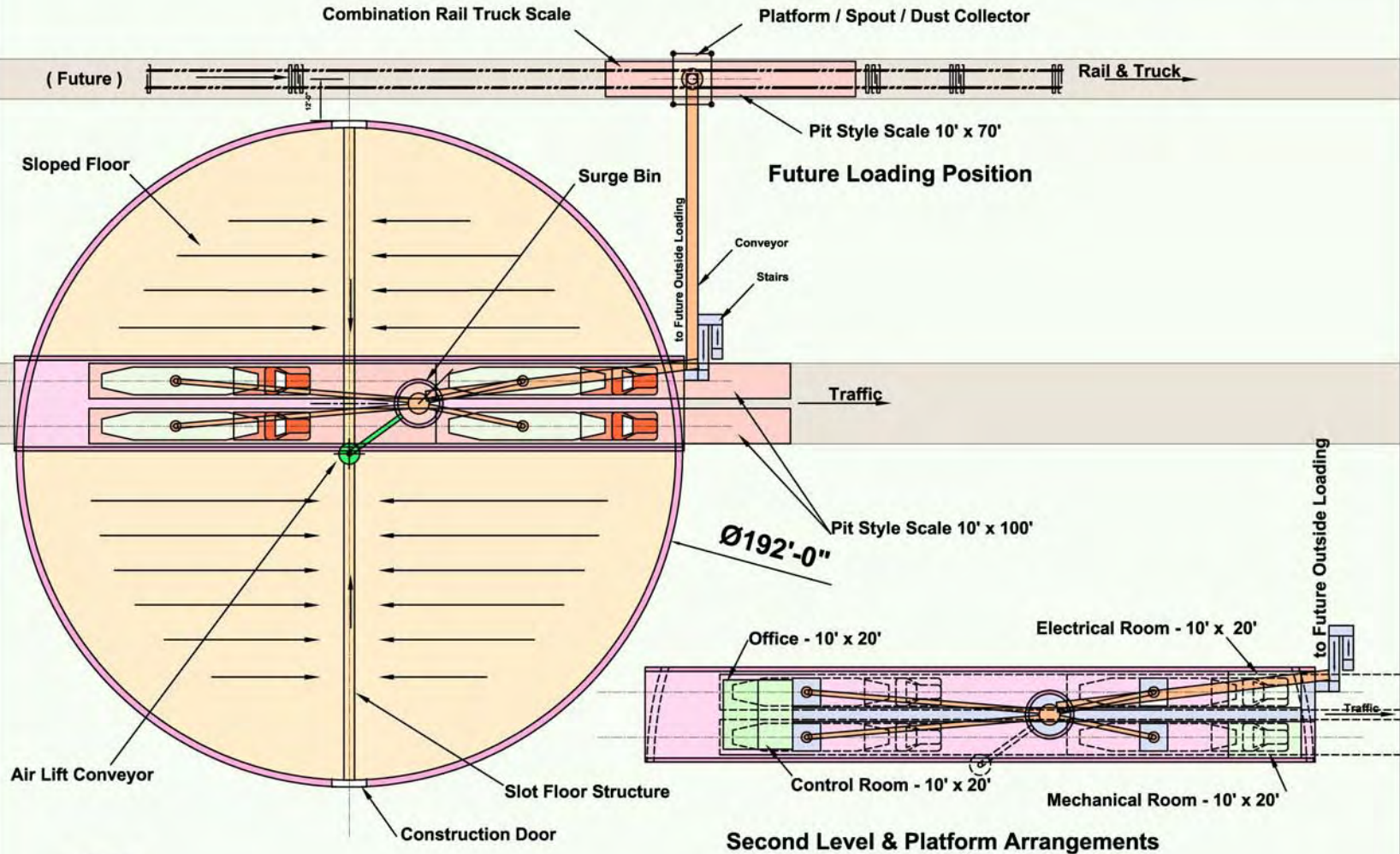


Rail Unload; Two Lane



Exterior; Future Rail Loading

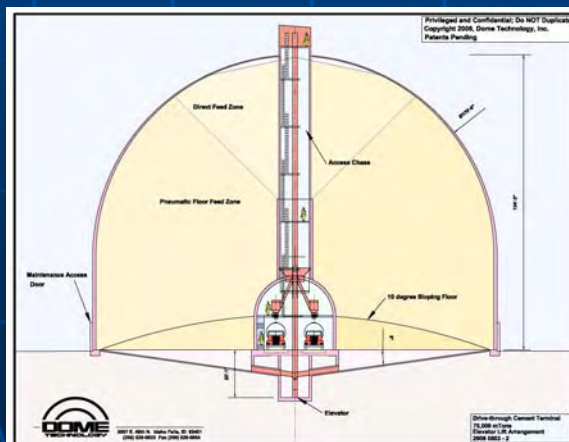
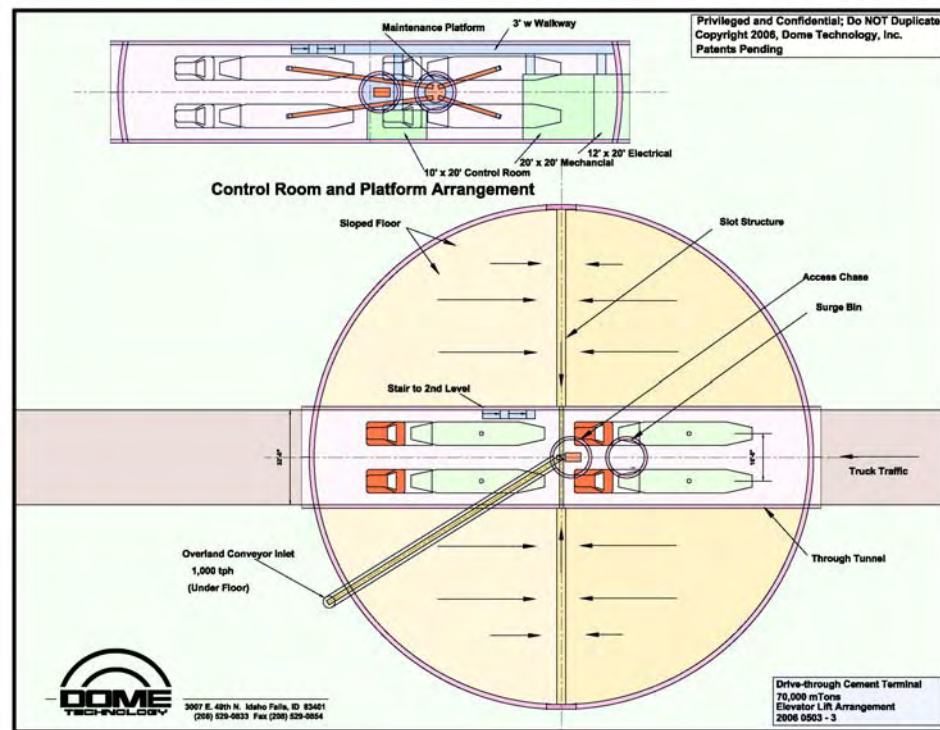
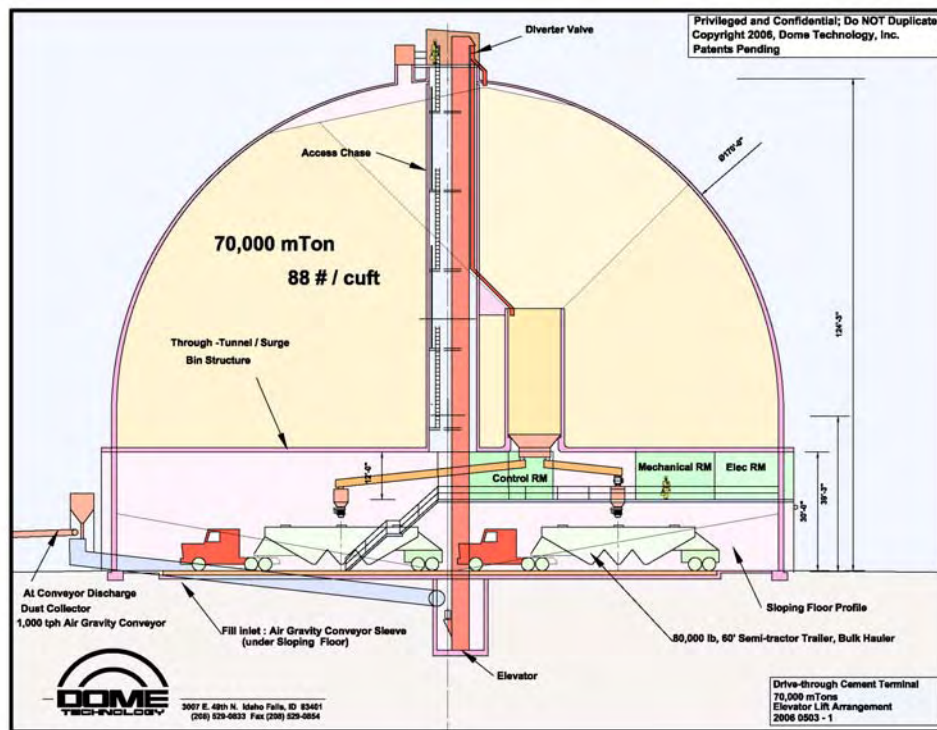
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Patent Pending



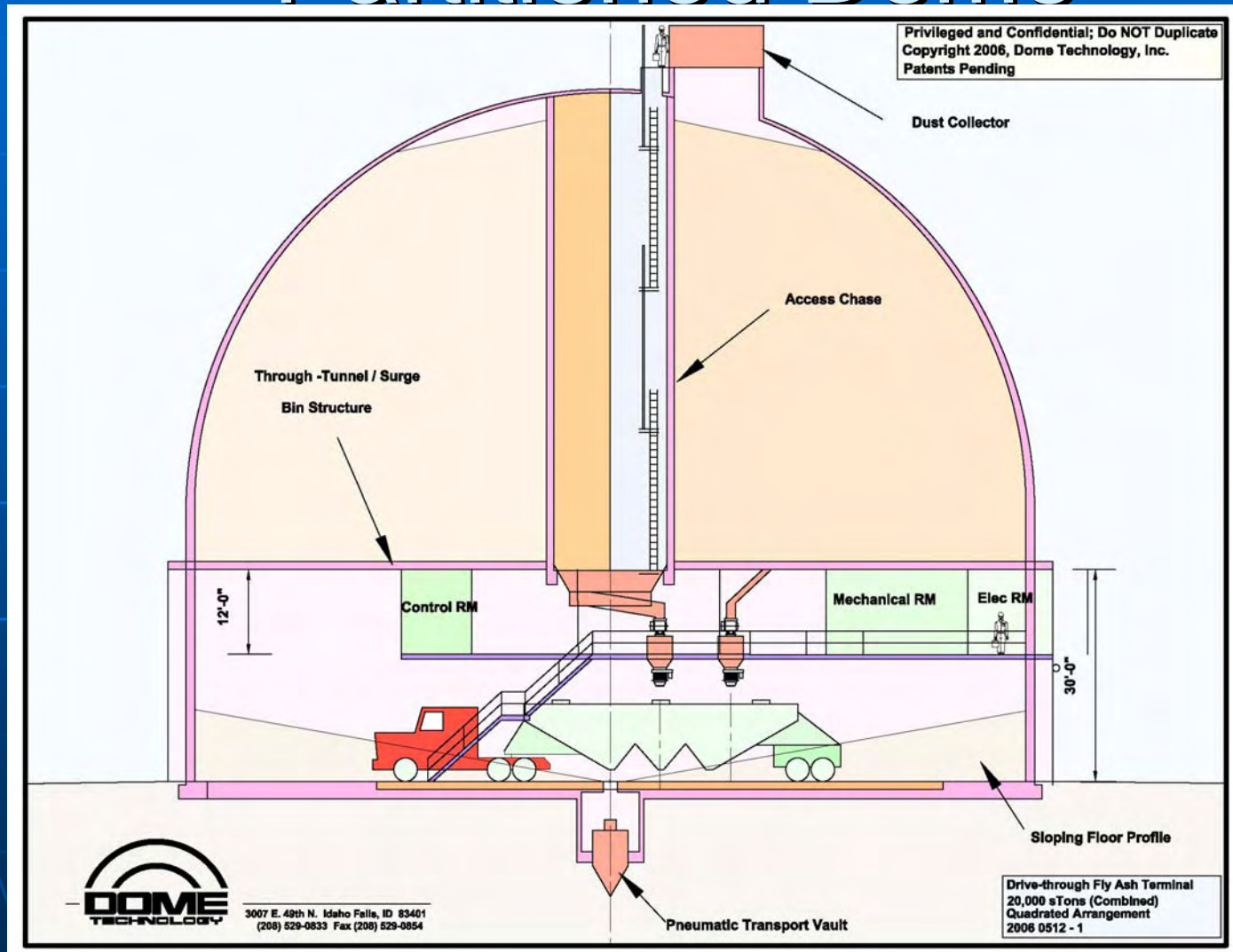
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Drive-through Cement Terminal
100,000 mtons
Truck & Train Loading Lanes
2004 1022 - 3

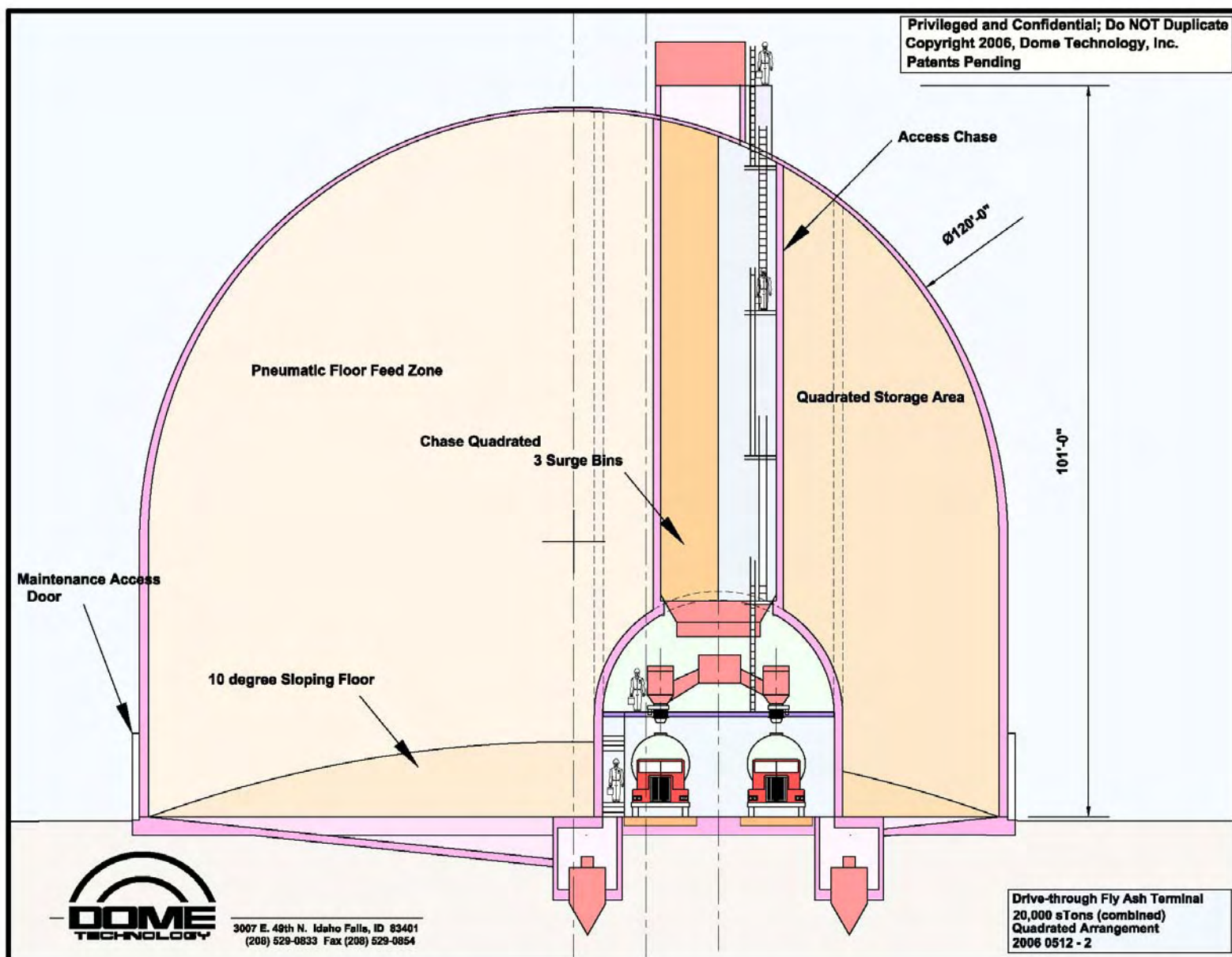
Overland Conveyor- Elevator Fill Drive-through Terminal



Partitioned Dome

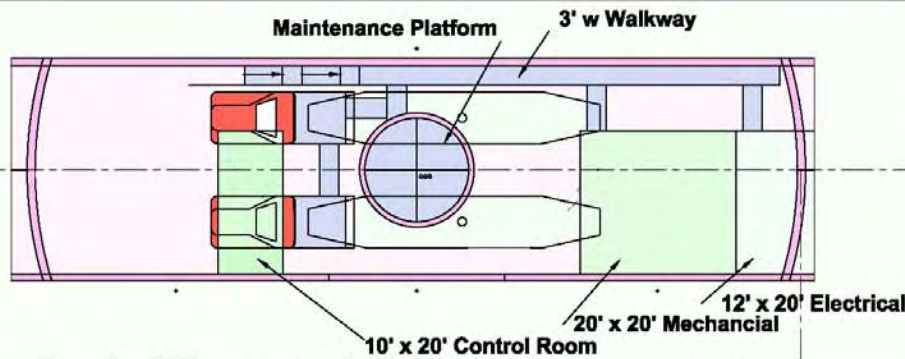


Partitioned Dome

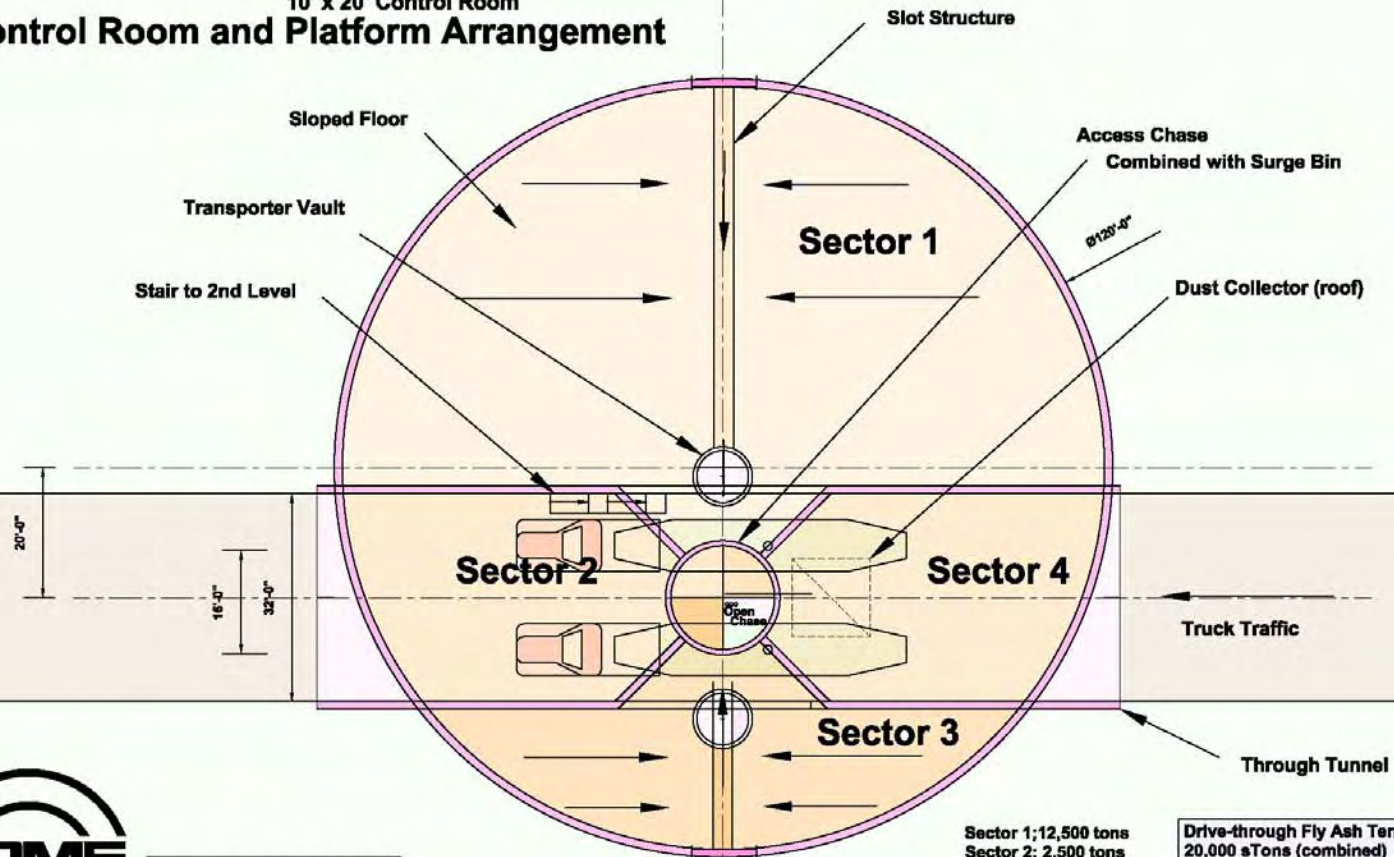


Partitioned Dome

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Patents Pending



Control Room and Platform Arrangement



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Sector 1; 12,500 tons
Sector 2; 2,500 tons
Sector 3; 2,500 tons
Sector 4; 2,500 tons

Drive-through Fly Ash Terminal
20,000 sTons (combined)
Quadrated Arrangement
2006 0512 - 3



EXCEPTIONAL STRENGTH

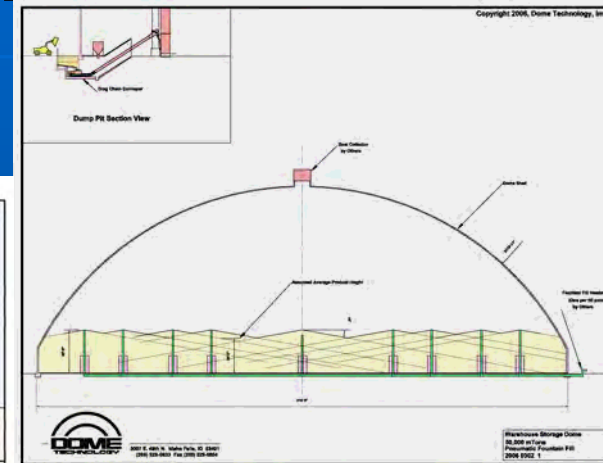


BAGHDAD, Iraq (AFPN) -- A member (bottom right) of the Combined Weapons Effectiveness Assessment Team assesses the impact point of a precision-guided 5,000-pound bomb through the dome of one of Saddam Hussein's key regime buildings here. The impact point is one of up to 500 the team will assess in coming weeks. (U.S. Air Force photo by Master Sgt. Carla Kippes)

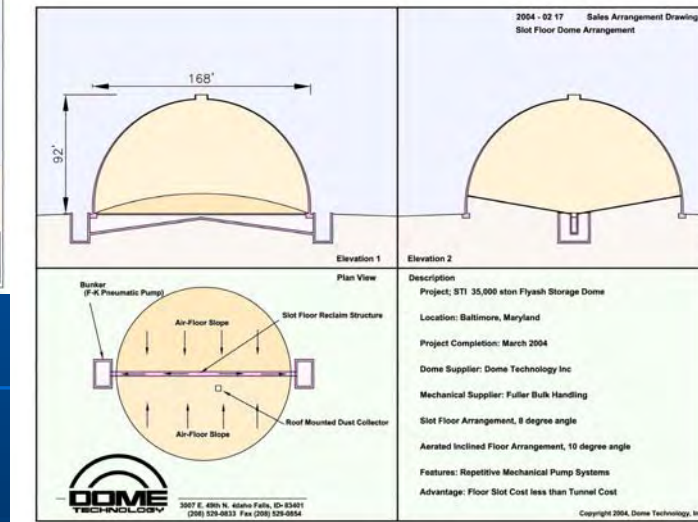


Cement / Fly Ash Storage and Reclaim Options

Inclined Plane Slot Floor



Warehouse Dome



Inclined Plane Floor With 2 Ungula

Thomas W. Hedrick, P.E.
Dome Technology