

Reinhold Environmental Ltd.



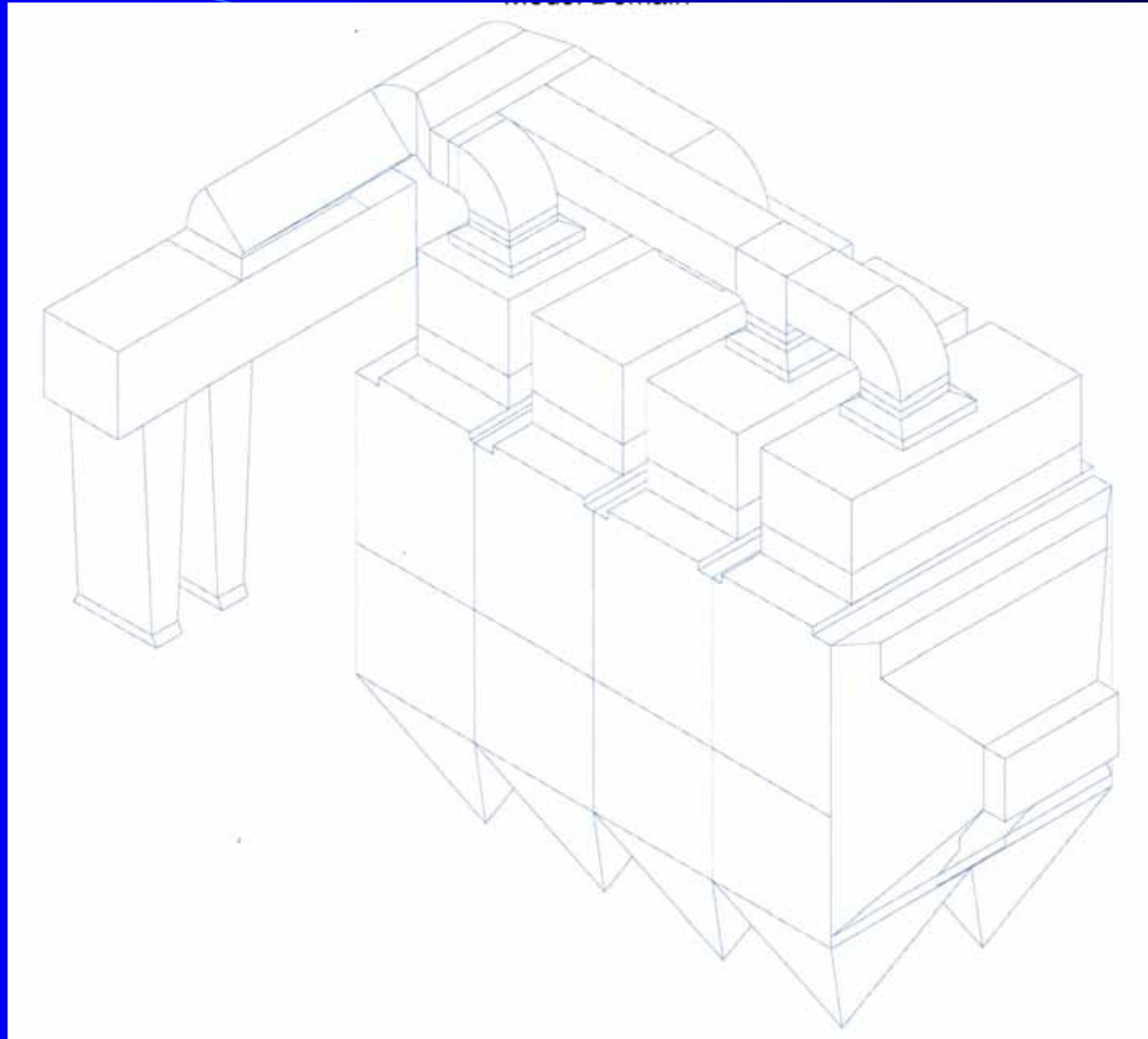
***2007 APC Round Table & Expo
Presentation***

***July 8-10, 2007
Chattanooga, TN
Hosted by TVA***

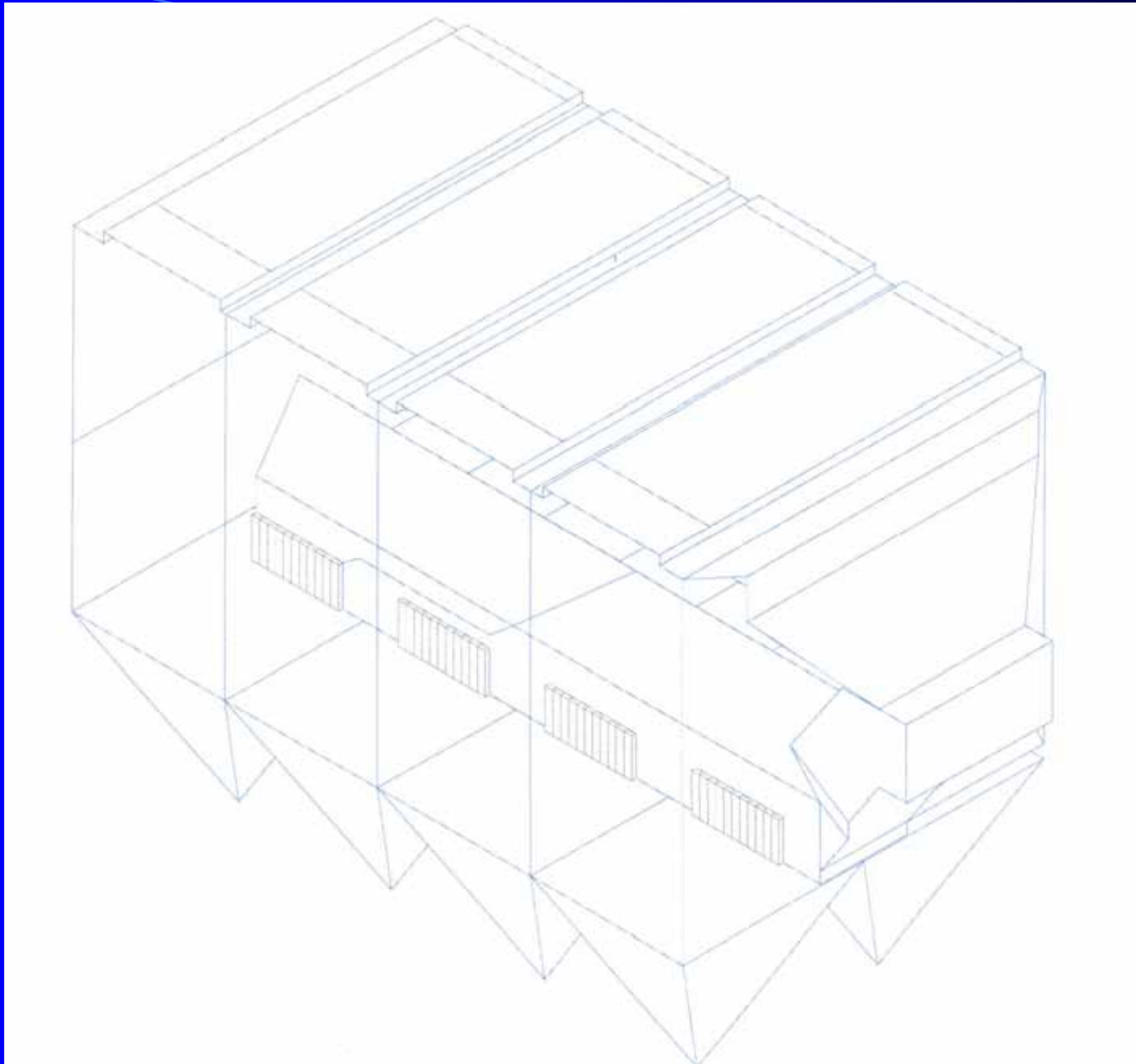
Big Stone Model Study

AirFlow Sciences Corporation

- **Numerical Model Study**
- **1/12 Scale Physical Model Study**



Big Stone One Chamber Configuration



Big Stone Single Chamber Configuration

Numerical Modeling

Goals

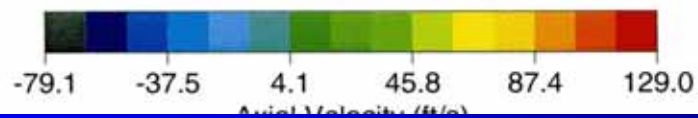
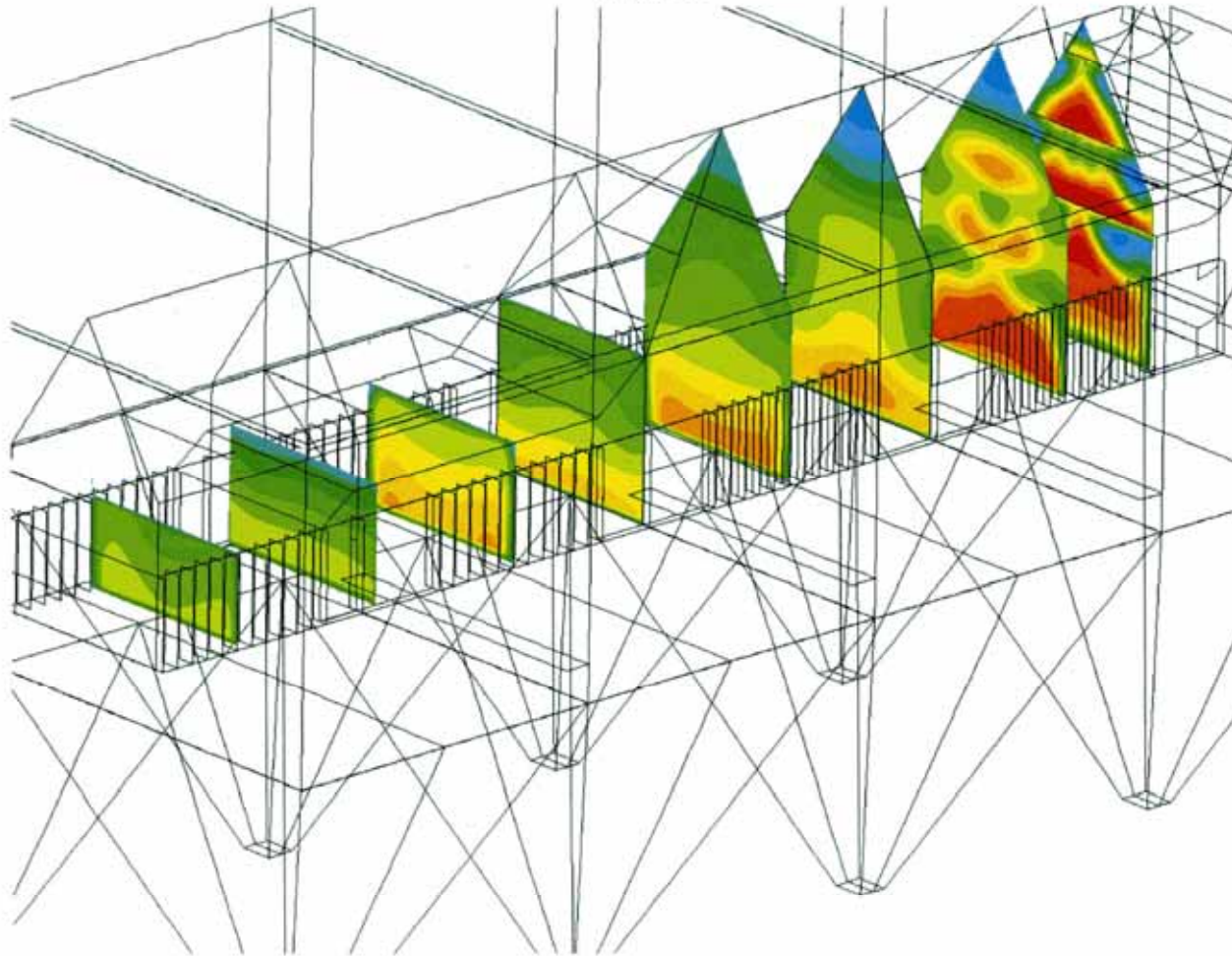
- Assure Flow Split Between compartments in a Chamber Meets ICAC F-7 Criteria (+/- 10%).
- Optimize Gas Flow Distribution and Minimizes Losses in Inlet Transition to the FF Inlet Manifold

Results

- Flow Split Meets ICAC Criteria
- Inlet Transition Flow & losses Optimized

Design Results

Isometric View
Manifold



Airflow Sciences Corporation 

Big Stone Flow Modeling

Physical Modeling

Goals

- Confirm Numerical Modeling Results
- Ensure no significant Ash Buildup in Ductwork and Inlet Manifold Floor Through Dust Deposition Tests
- Quantify System Pressure Losses

Results

- Good Agreement Between Numeric and Physical Model Results
- Majority of Dust Swept Clean From Inlet Manifold Floor at 75% Full Load Velocity, No Significant Dust Buildup at 100% flow



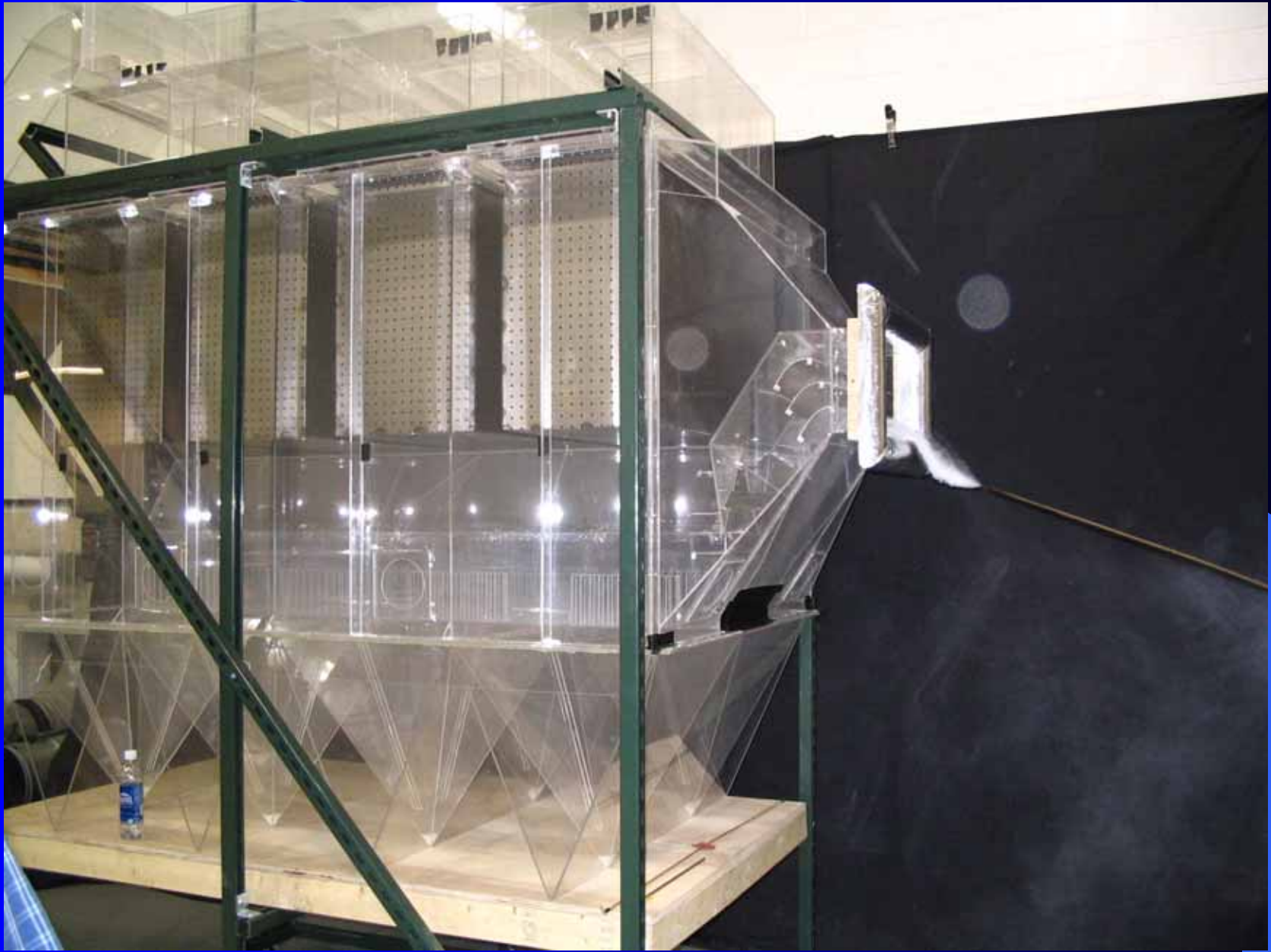
Physical Model Side Elevation View



Physical Model – Inlet Plenum



Physical Model Inlet Transition



Physical Model, One Chamber of 4

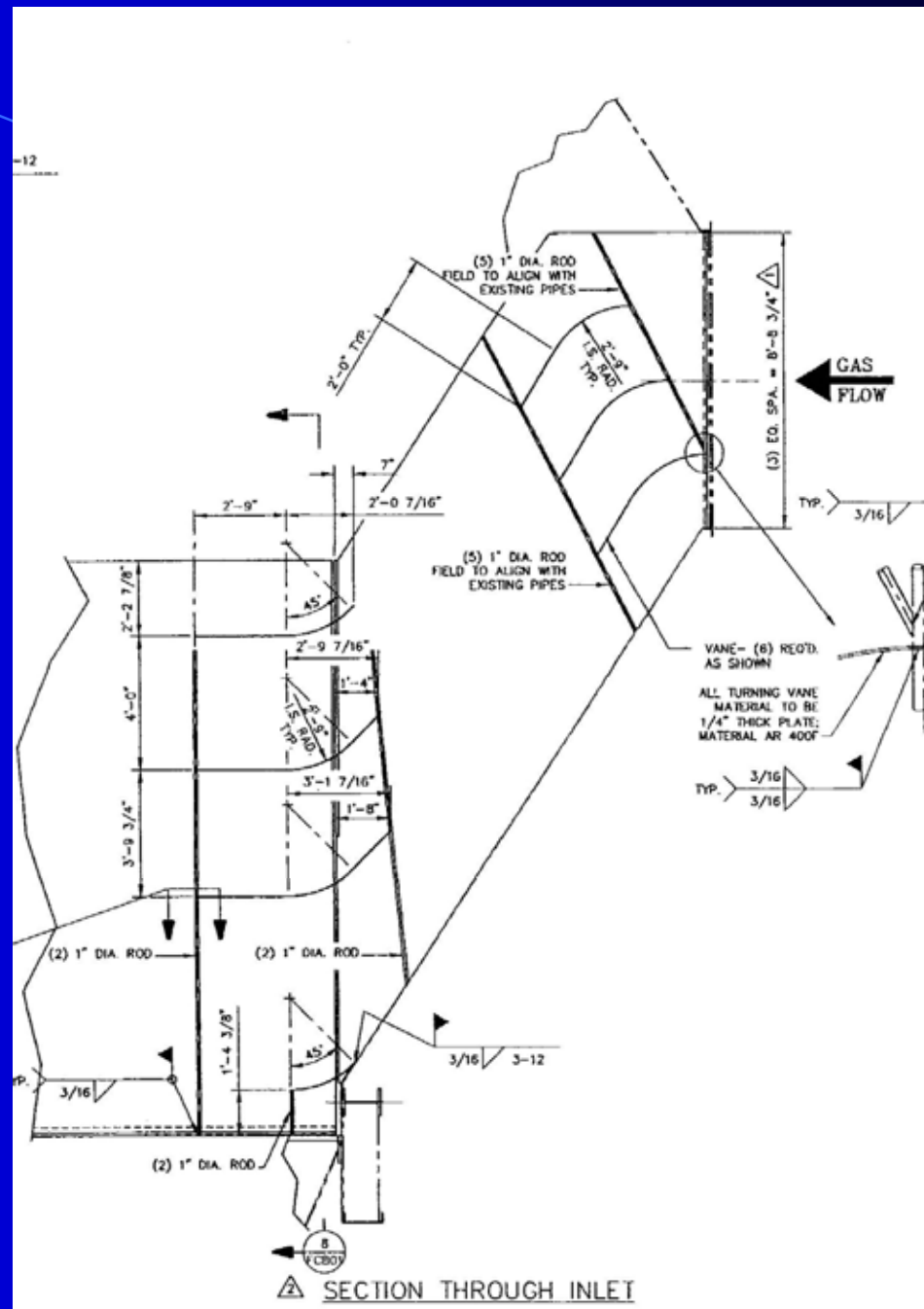
Big Stone Flow Modeling Results

Flow Split Determination

% of Total Flow

Compartment 1 Inlet	23.1
2	22.8
3	26.6
4	27.5

Big Stone Inlet Transition



Big Stone

Blowpipe Design & Optimization For Pulse Cleaning

- Due to the pulse cleaning air flow required for 27 bags per blowpipe, 4" blowpipes and valves where selected.
- Tests were performed on a 27 bag blowpipe to determine the staggered pipe orifice sizes along the pipe to provide equal pulse air volume to each bag (within +/-10%).
- Tests were performed to determine the optimum blowpipe pulse air straightening nozzle diameter, length and height above the tubesheet.
- Determine the air consumption required per blowpipe.

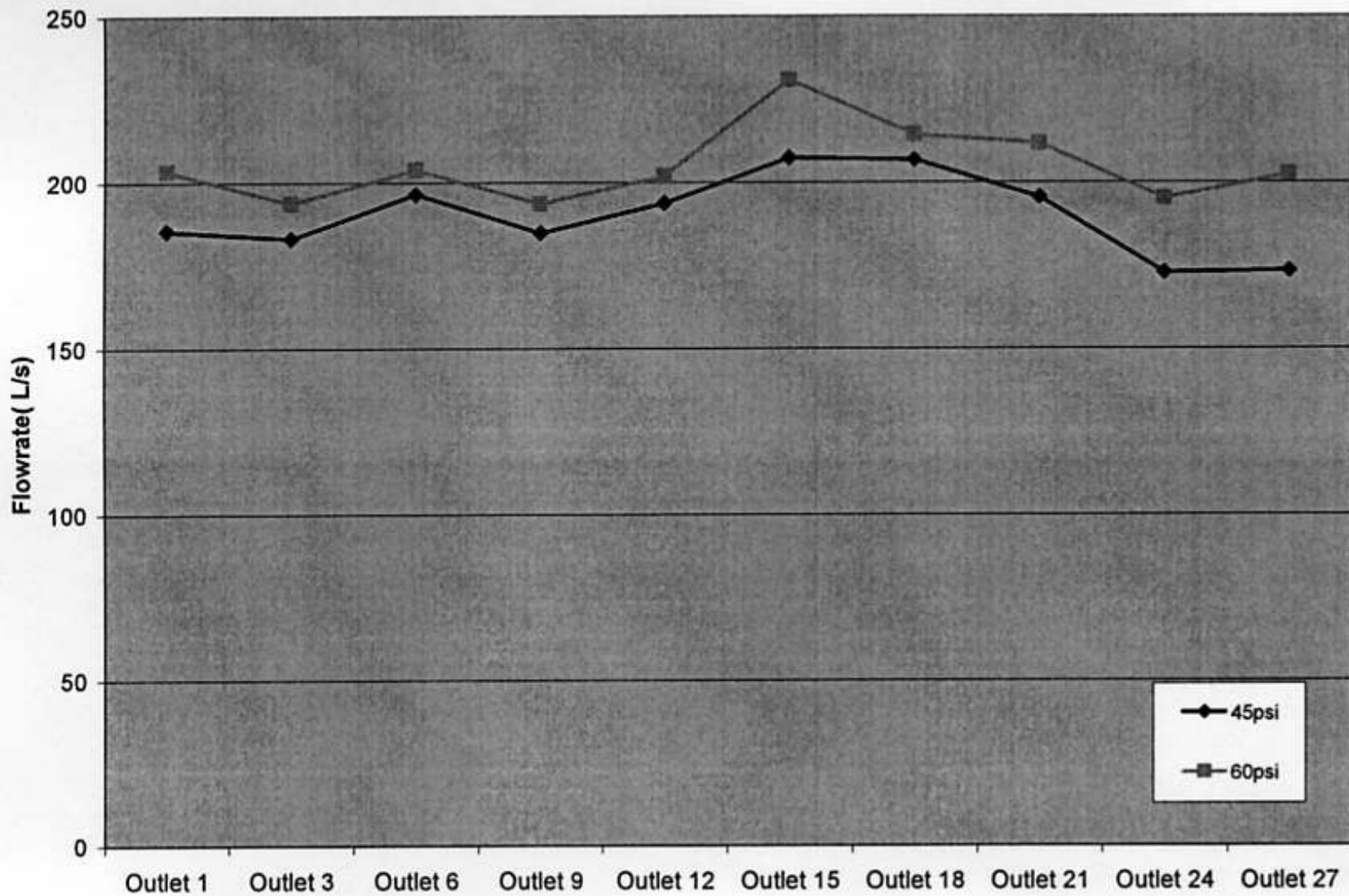


Table 2: Flowrate Distribution Along Blowtube

Big Stone Pulse Blowpipe Design Tests



Big Stone Blowpipes



Pulse Air Orifice and Straightening Nozzle



Compartment Tubesheet Shelf Installation



Big Stone Tubesheets



Pre-Assembly of Inlet Plenum Sections



Inlet Plenum Vaned Compartment Entrance

Top Of Inlet
Nozzle Cut Out
For Installation
of FF Duct
Transition





Pulse Valve Header Assemblies



ESP Side Cut-outs for AHPC Demolition



Compartment Wall Sections and Blowpipes



Split Cages

Big Stone
Pulse Headers





Pulse Headers – 4" Valves



4" Pulse Valve Header Assemblies



One Compartment's Tubesheet



Allen Bradley Logix 500 Control Cabinet

CHAMBER D

BAGHOUSE OVERVIEW

Differential		Hopper Level Status			
D1 DELTA P	3.19	D1	1.59	A7 OK	A8 OK
D2 DELTA P	3.09	D2	2.04	B7 OK	B8 OK
D3 DELTA P	2.69	D3	2.35	C7 OK	C8 OK
D4 DELTA P	2.81	D4	2.12	D7 OK	D8 OK
CHAMBER AVG	2.95				

D1	D2	D3	D4
OFF LINE DP Mode	OFF LINE DP Mode	OFF LINE DP Mode	OFF LINE DP Mode
Damper	Damper	Damper	Damper
OPEN	OPEN	OPEN	OPEN
ONLINE	ONLINE	ONLINE	ONLINE
Compart D1	Compart D2	Compart D3	Compart D4

Pulse Jet Conversion Chamber D On-Line