RJM:

Background B&W
Layout
Not compartmented air flow

6/7/91?

Burners / Combustion Tuning

Testing Services ? Capabilities

PA flow

Clean Air flow
Dirty Air flow

Modeling

+/- 2½ % 5% spread

NOx +/- 3

References:

Burner Line Fires
Pulv Fire

Eyebrows

RAH to nozzle nose

Sec Air Flow Modeling

Life cooling air

Burner Design Pictures
Drawings
Problems Sizing

Outer Air Reg

Operational Problems I/s
O/s

Recom 2-position oper → Worked w/ several consultants
Buying into problems

Combustion

O2 profiles

LOI's

Drum level

Turndowns

- Mach Marines
- Comb Eq Asso CEA
- Tobb Comb.
- York Research

Since 1975
35 staff consultants

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Modeling Testing Techniques

- Fuel/Primary Air Mix · Flow Balance Modeling

- Primary Air Flow

- ~~Bur~~ 2dim
  Eyebrows (Burner Swirl Control)

  Secondary Air Mass Flow

  Burner design { not manufacturing

List of References: w/BW design

Aerodynamics

Hastelloy 800 H Hightemp metal

Public Service of ~~Colorado~~ Oklahoma

NE Unit #2 Vic Nickles

B&W: Peter Waanders

Mandalay Station

So Cal Edison

low Nox

→ Working for B&W

B&W problems

resolving B&W problems

Combustion Groups

International Flame Committee

Need: Paper from Rich Monroe

Overheating:

Reference Book

Comb Aerodynamics Handbook Bible

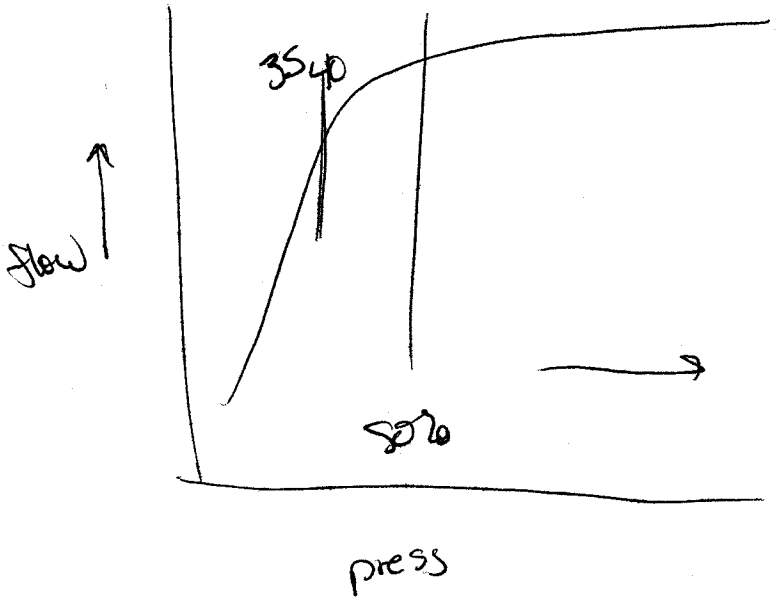
Outer Air Registers [< 50% opening throttling air
[all must be greater than 75% open]

Spin: Swirl # 1.3

↑ spin start to get depression

>.6 → adverse press gradient

>.6 IR nozzle, vortices



Out of service
Outer Register

Either full open or full closed

→ full closed
, perforated back plate

- Eyebrows
  - due to overspeed req

Ash Fusion Temps

Design

→ Never balance air flow w/ burner doors

→ bend outer req air flow boundrey

windbox vortex

Info: Needed

Coal Specs
Ash-fusion temps
max 2600 purchase

min amount purchase only

Eyebrows

Eliminate all coals w/ Ash Fusion Temp below min design temps

others border line 2215

stay > 2300

Jerry (Pres)

Kurz EVA 60° window armoured

Serria

FCI

} electronic measurement

Ask for References:

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o/s testing [modeling tech. w/unit

→ Secondary Air Flow Dist

→ Fuel Flow

↓ O_2

↓ slagging

↓ Nox

↓ erosion

↑ co?

- sprays

if spraying can come down

↑ Sootblowing to maintain temps

probably limited abilities

pozomitor rings

works only w/ uniform air flow

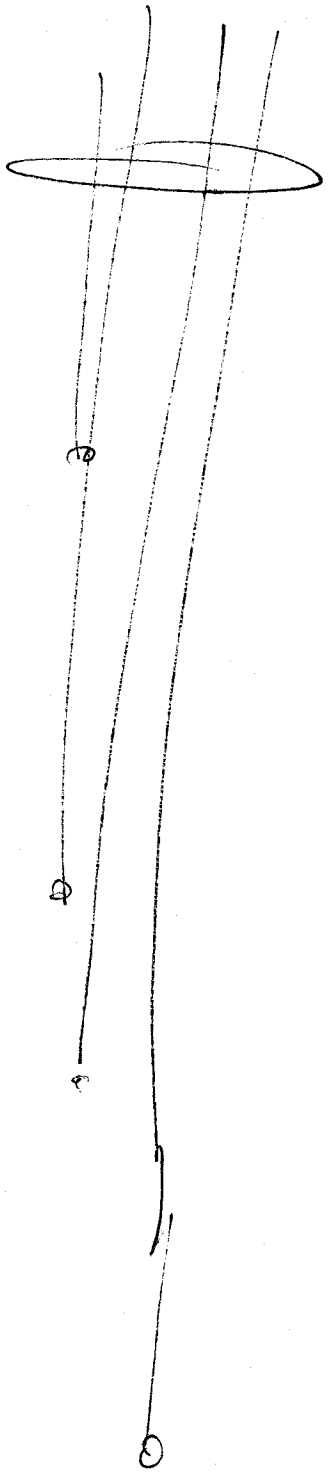
sets up flowing w/i rings

pitot testing

- hot wire anemometer
  flow balancing

$$Q = KAV$$

$$V = \sqrt{\frac{\Delta P}{\rho}}$$



Burner Specs
airflow balancing

Recommendation

setup spin

5day - 10day
~~about~~
for testing
balancing

⟹ During Outage

Time Frame: 5-10 days

⟹ testing ℄ of burner

pull down conical diffusers

pictures - Burners
walkdown

Flip Chart

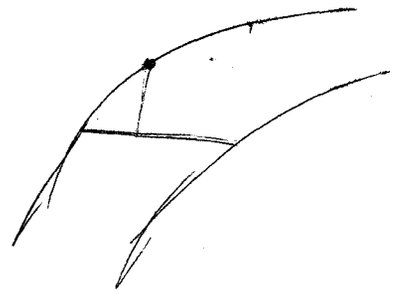
Overheads

Meeting 8:00
~ 2hrs

6/6 Thur

Dimension air door

Door



Fathers of Power Conference

Paper Presentation

Swirl is additive

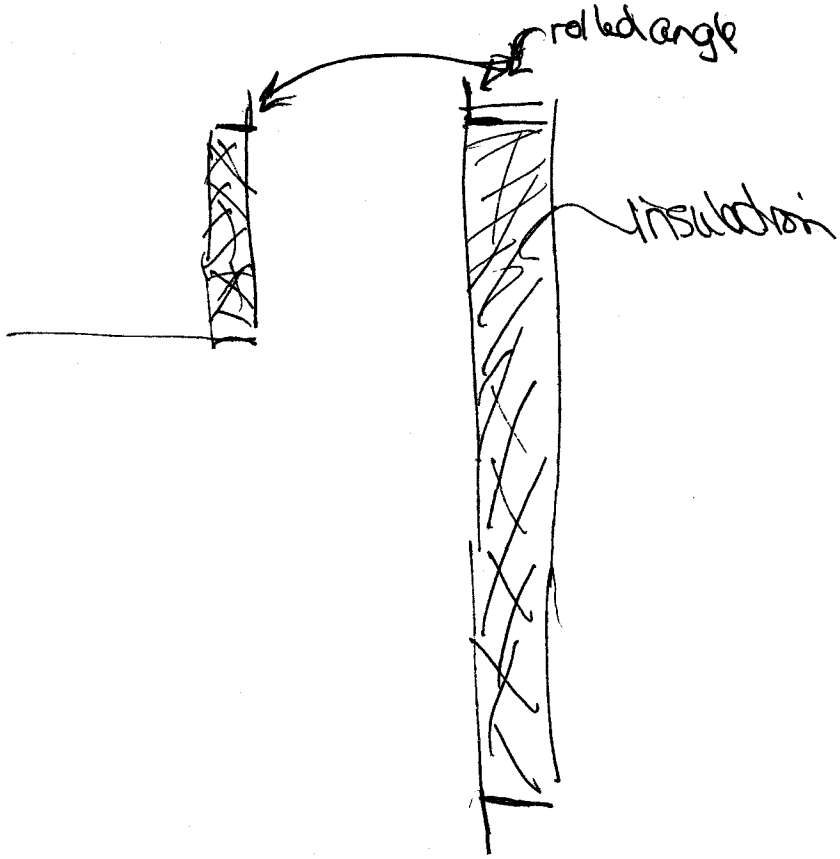
→ same direction

spin + outer

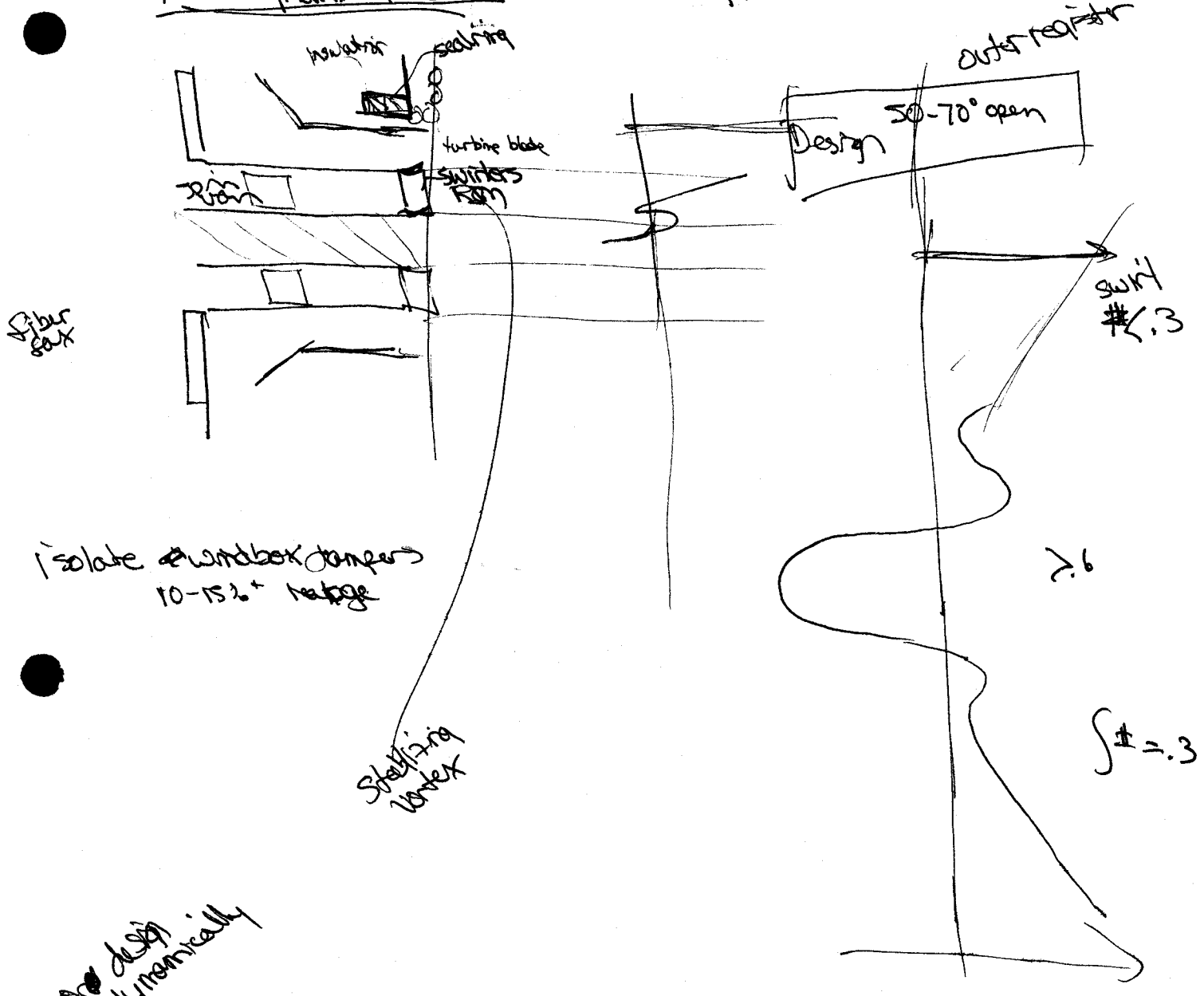
~~Statement~~:

Negligence is burner design

violated aerodynamic laws


rolled angle
insulation

Aerodynamic Model Burner Design



isolate windback dampers
10-15% leakage

- poor design
aero-dynamically

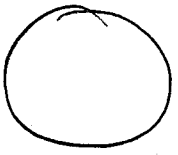
graphic coking
- skeleton structure

locked into coal
[coal structure]

carbon bleed in coal

- Poetic Justice
  Patents

- Ports physically



30+ open
shows up

Air Flow Balancing { Results Air Dist Analysis
apply
retest

setup all burners same
band to balance air flows

Outer Air Register

throats - perforated
slots
obstructions

spin vanes - back plates

Fixed Design - Burners
[fix in place]

Kurtz - Call get evaluation

RJM Presentation

6/6/91

New Design

Better scanner performance

Mines: - Ash Fusion Temps min.

review coal contracts

$\boxed{<2300}$

Tornado effect

Swirler

M7 flame stabilizer
multi-zone

expansion
22°

Air Dist Analysis
1 day

down Coal Nozzle

20 min/sweep
2 sweeps/burner
48 burners
+

Cyclonic Air Flow Action in Windbox
vortex breaker

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~~16wk.~~ 12wks

1) ~~Now~~ after #3 Aerodynamic model
2)
3) 1st

} Design Analysis #45

4) after models in-place

Fuel Analysis - could do now

June 18th Tues

Cost effective

delete { Spin rotors [leave in-place
remove lighter shroud

Need Jim Cost burners

parrold

IP7_003798