



WATERSIDE CLEANING OF RECOVERY BOILERS

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AGENDA

- **Pay Now or Pay Later!**
 - The Price of Deposition
 - Evaluating your Boiler's Health
 - The Decision to Clean
 - Options
- **Summary**

THE PRICE OF DEPOSITION

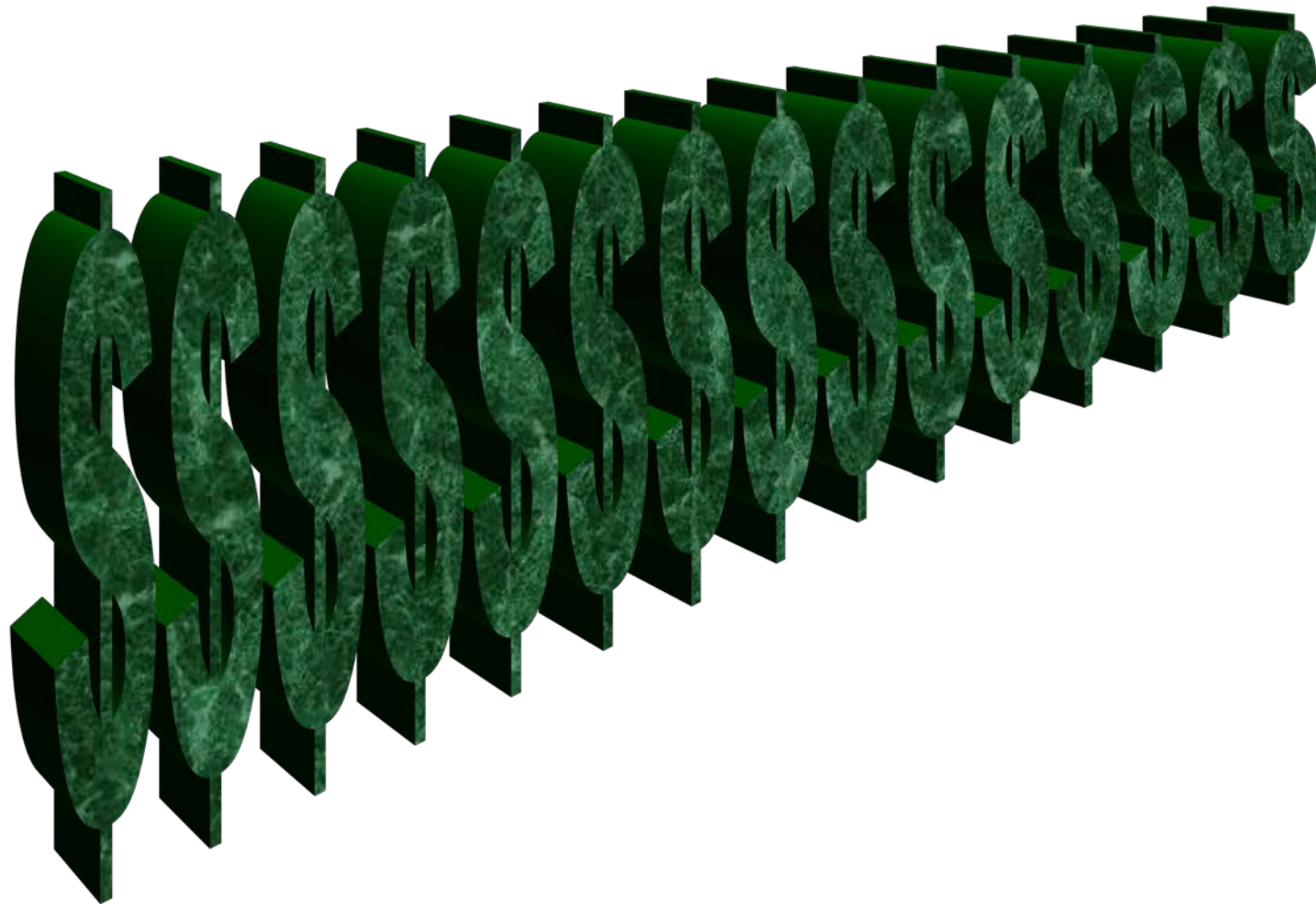
THE PRICE OF DEPOSITION - RELIABILITY

- Surprises!
- Unscheduled Downtime
- Budget Variances

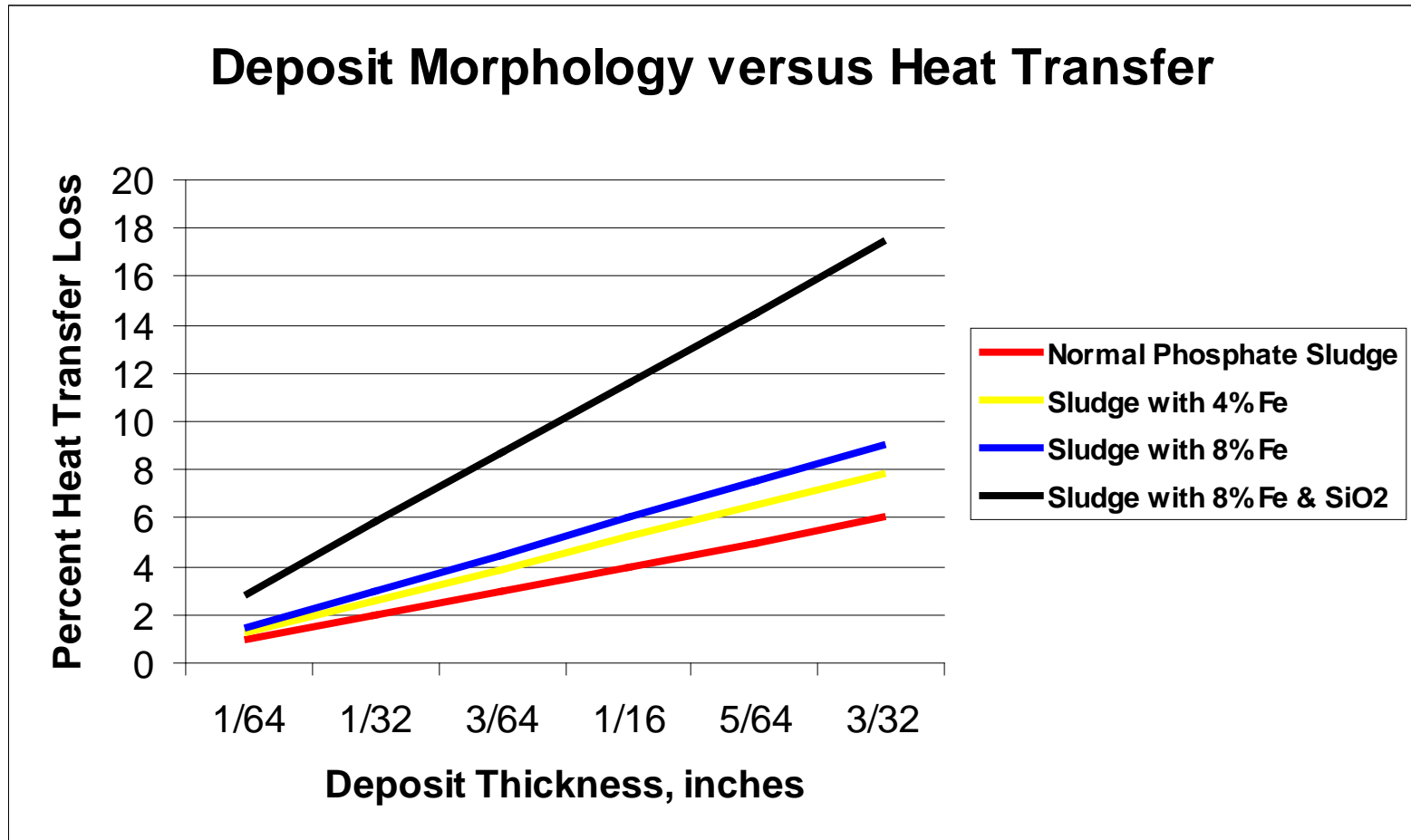
RELIABILITY



SAFETY



THE PRICE OF DEPOSITION - ECONOMY

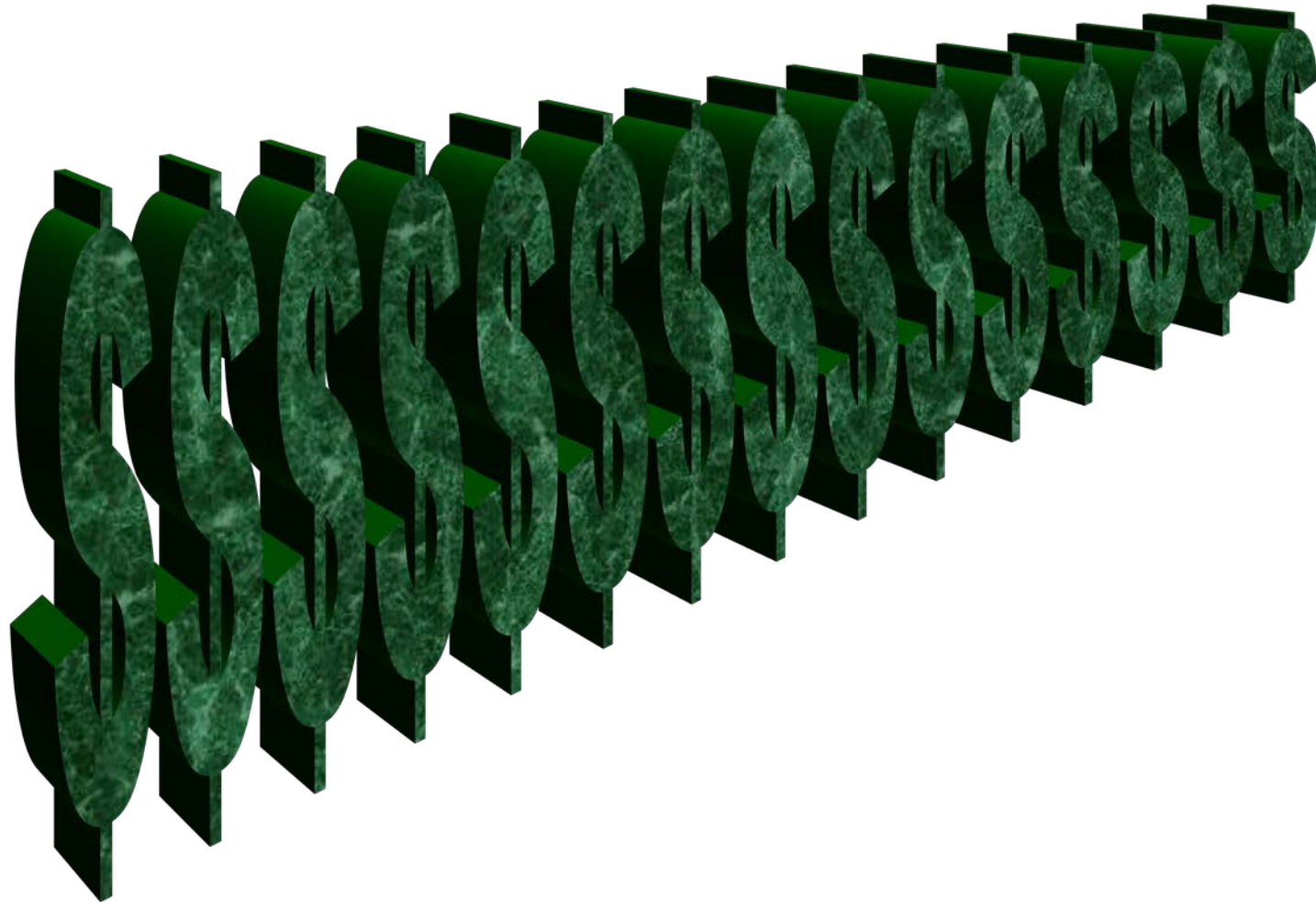


THE PRICE OF DEPOSITION - ECONOMY

Selected Thermal Conductivity Values

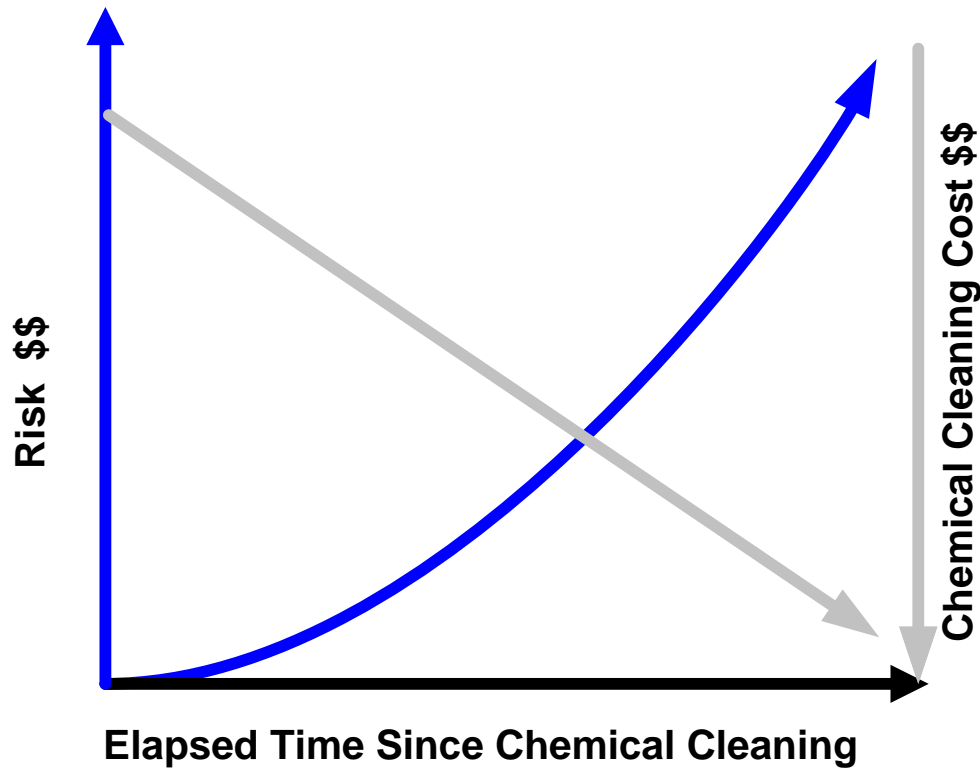
Material	Btu / hr-ft ² -°F/ inch
Boiler Steel	310
Calcium Phosphate	25
Magnetic Iron Oxide	20
Calcium Sulfate	16
Calcium Carbonate	15.6
Magnesium Phosphate	15
Analcite (NaO · Al ₂ O ₃ · 4SiO ₂ · 2H ₂ O)	8.8
Fire Brick	7
Insulating Brick	0.7
Porous silicate scale	0.6

ECONOMY



EVALUATING YOUR BOILER'S HEALTH

THE DECISION TO CLEAN



EVALUATING YOUR BOILER'S HEALTH: THE DECISION TO CLEAN

Convenience

After Failure

Company Policy -- Time and/or Data Based

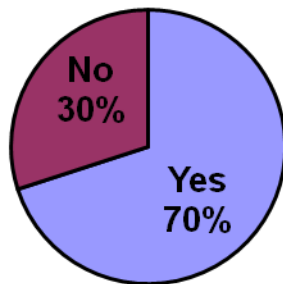
Engineering approach

- History: Failures, Excursions, Inspections
- System: Mechanical Treatment
- Data: Deposit data, BFW Quality
- Control: Duration and Severity of Excursions
- Internal boiler water treatment

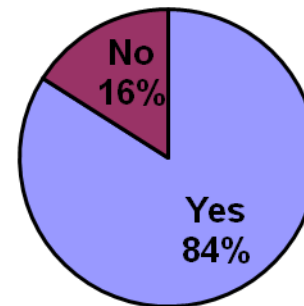
EVALUATING YOUR BOILER'S HEALTH

2005 AF&PA SURVEY RESULTS

Cleaning Policy Enforced



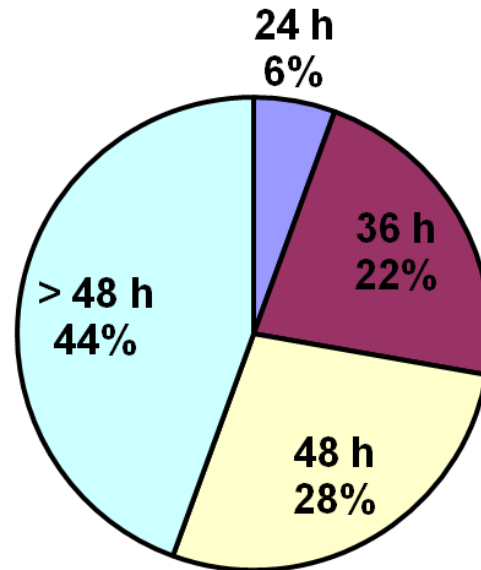
Independent Consultant Used?



EVALUATING YOUR BOILER'S HEALTH

2005 AF&PA Survey Results

Cleaning Time Required



EVALUATING YOUR BOILER'S HEALTH: WHEN TO CLEAN?

Time Based

- Alstom (ABB/CE) = 7 years for Recovery Boilers
- AF&PA Survey says = 30% time based

Data Based

- B&W = 20 to 40 g/ft² @ < 1000 psig
12 – 20 g/ft² @ > 1000 psig and ALL BLRBs
- AF&PA Survey says = 52% data based

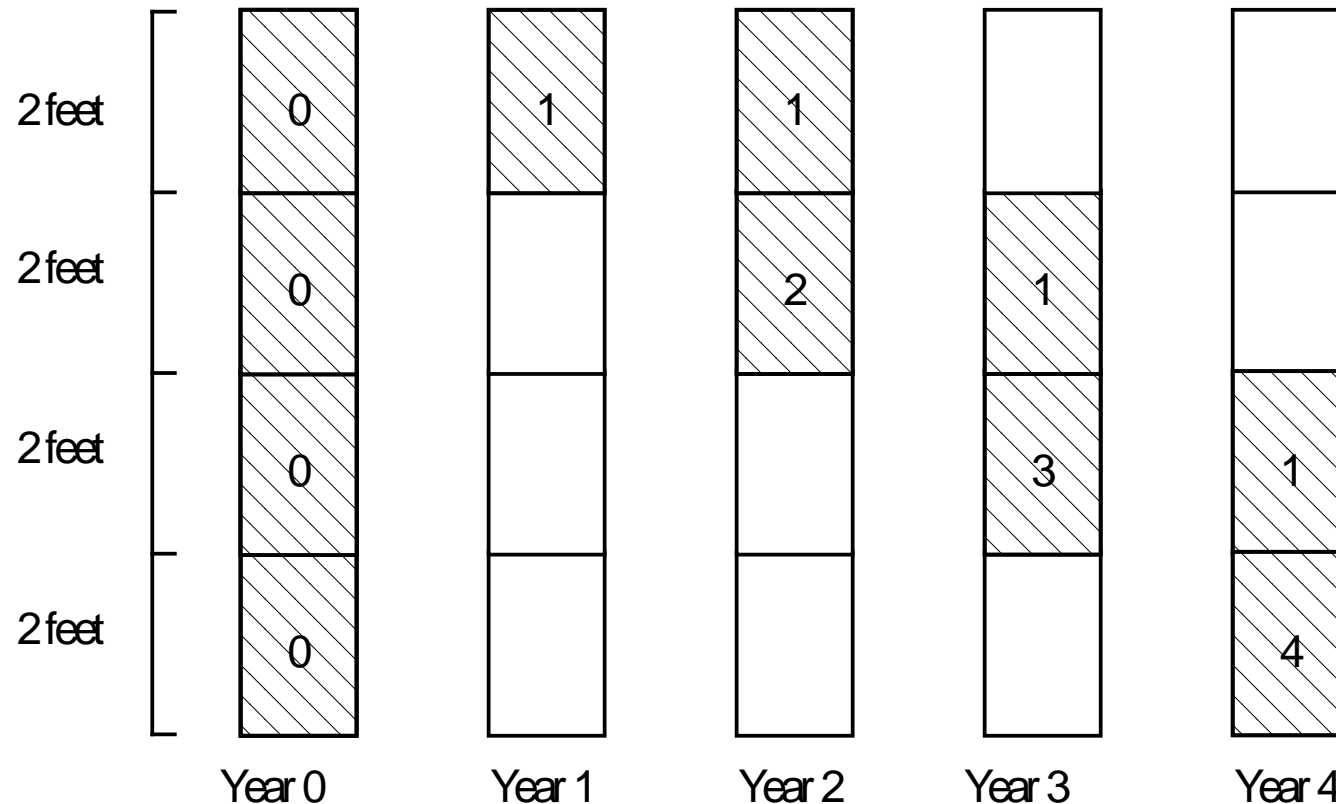
Both Time and Data Based

- AF&PA Survey says = 18%

EVALUATING YOUR BOILER'S HEALTH – WHEN TO CLEAN?

Tube Sample Protocol

 Tube portion to be removed



THE CLEANING PROCESS

Safety

Pre-engineering / Consultation

Preparation and Execution

Post cleaning evaluation

ALTERNATIVES TO CLEANING: “OPTIONS?”

MECHANICAL OPTIONS

Feedwater Makeup

- Demineralized water or better
- Redundant protection against contaminant intrusion

Condensate

- Resin and/or Electromagnetic Filtration Polishers
- Redundant protection against contamination

CHEMICAL OPTIONS

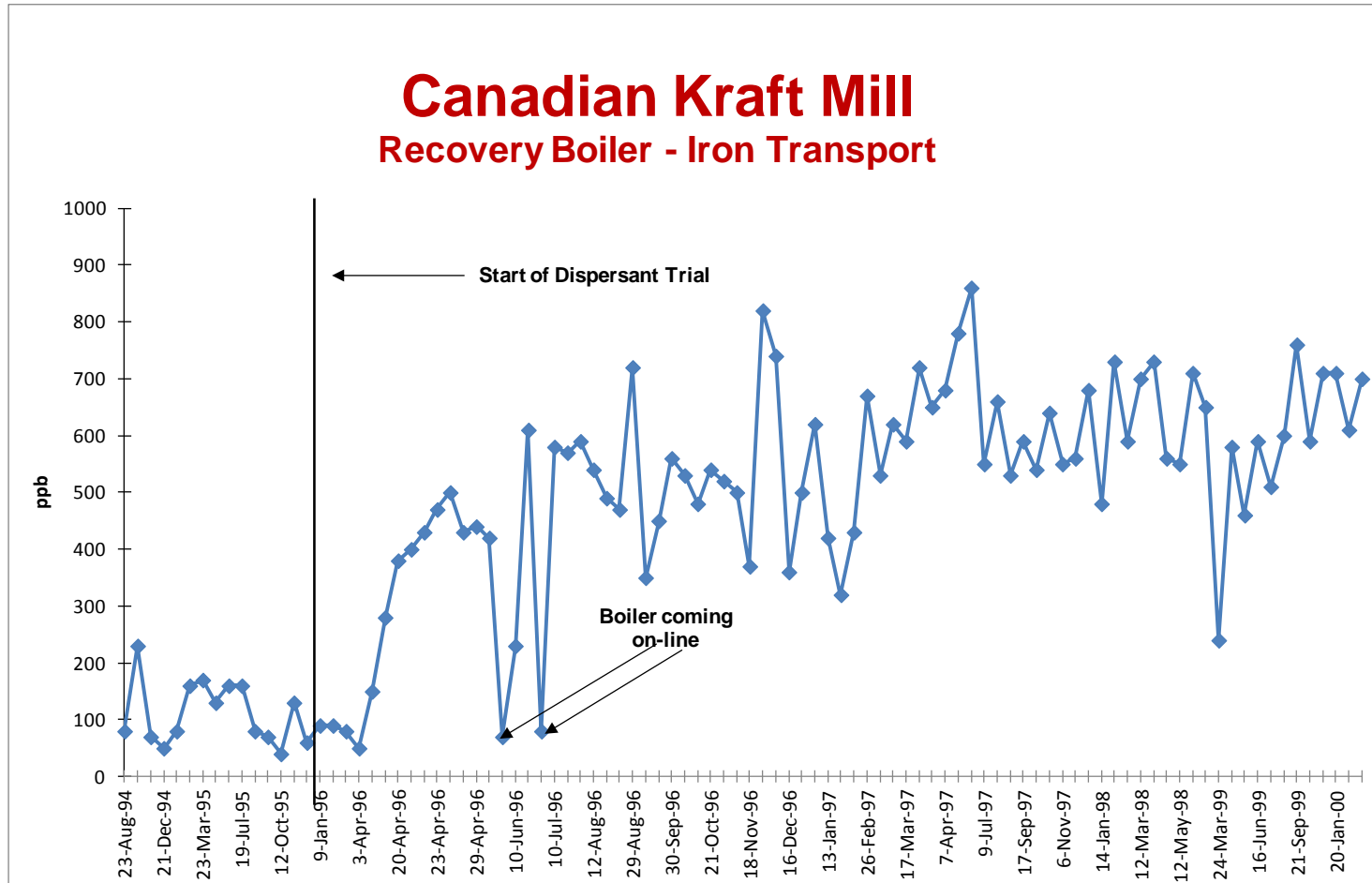
Condensate Treatment Chemistry

- Appropriate treatment for existing metallurgy
- Passivating agent to maximize condensate return

Internal Treatment Chemistry

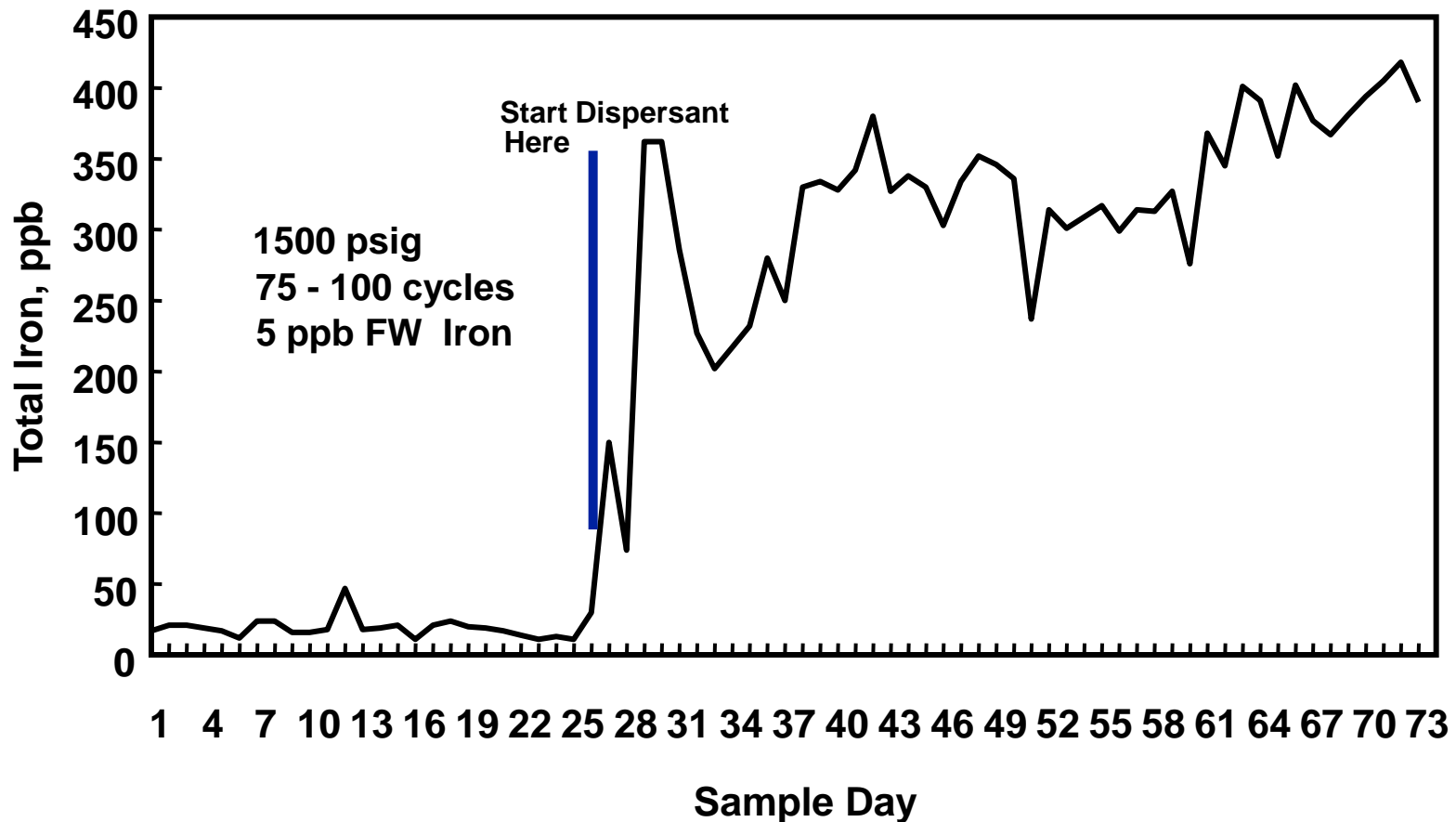
- Congruent Phosphate with high purity feedwater
- Boiler water dispersant

CHEMICAL OPTIONS – BOILER WATER TREATMENT

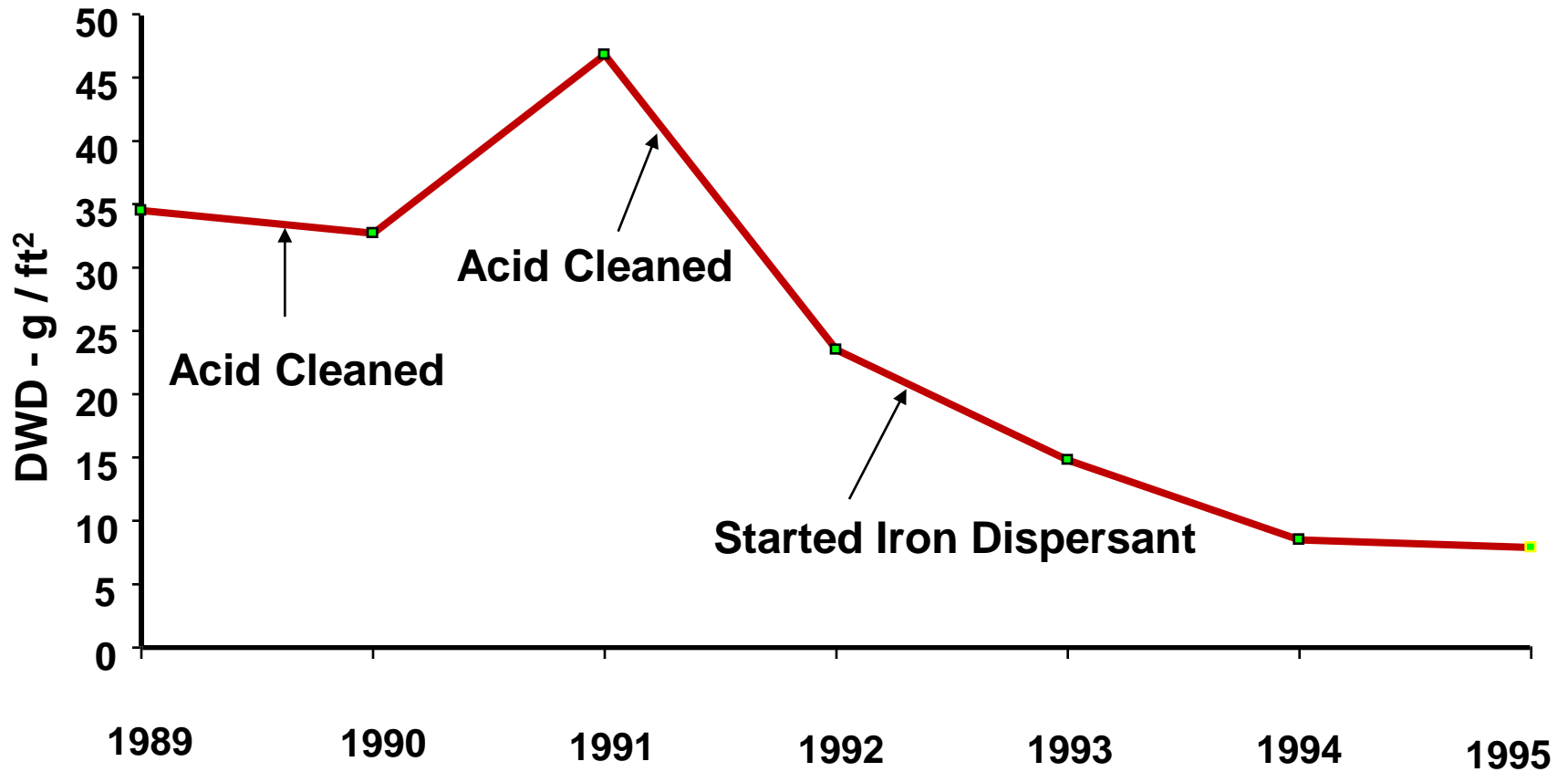


CHEMICAL OPTIONS – BOILER WATER TREATMENT

Blowdown Iron versus Time

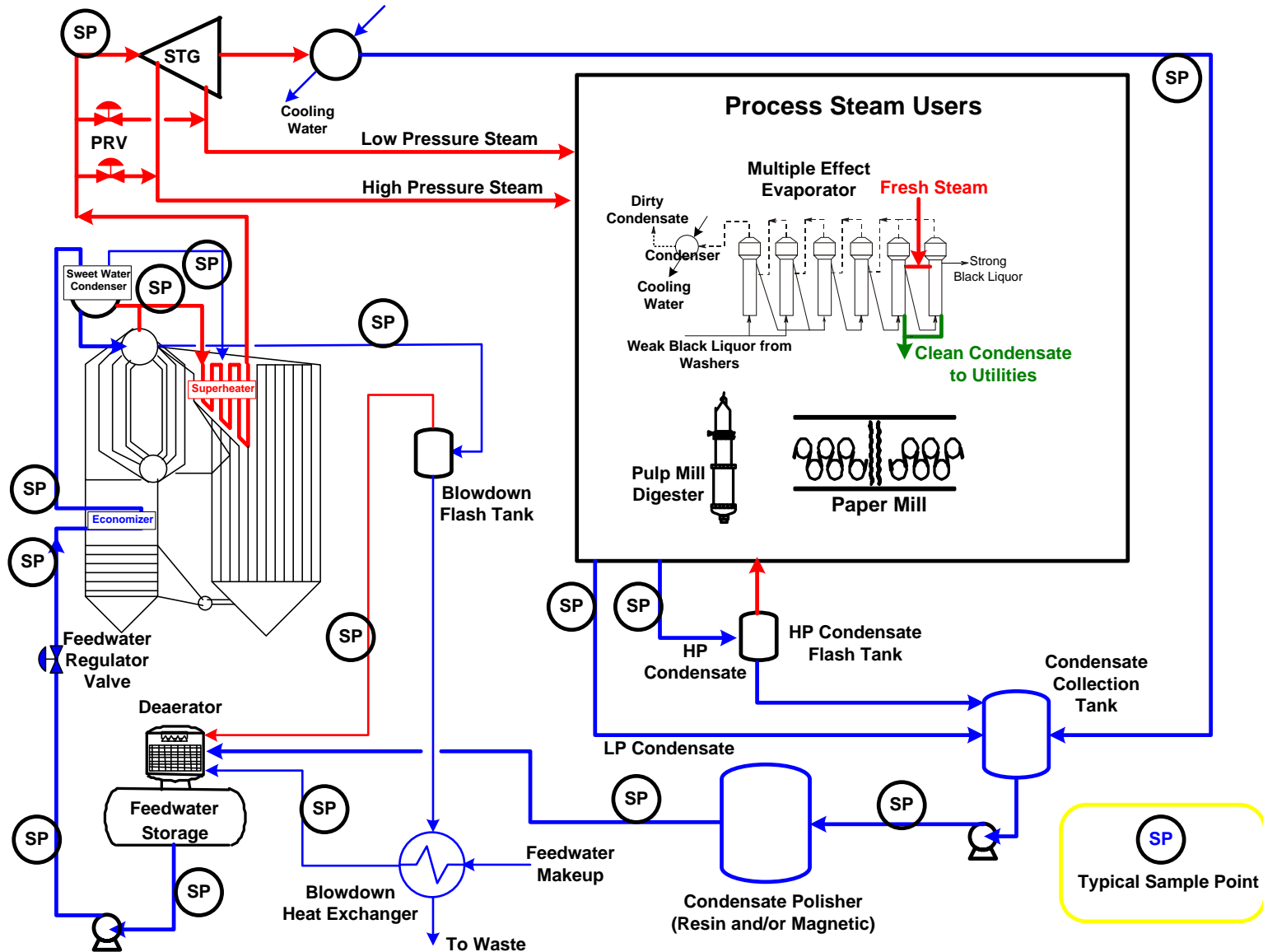


SOUTHERN U.S. PAPER MILL DEPOSIT LOADING HISTORY



MONITORING – DECISION MAKING DATA

BEST PRACTICES – MONITORING AND CONTROL



SUMMARY.....PAY NOW OR PAY LATER

Operating Costs

Treatment Costs

Cleaning Costs

POSTPONE, MAYBE?.....

BUT, CLEAN AT SOME POINT FOR SURE!

QUESTIONS?