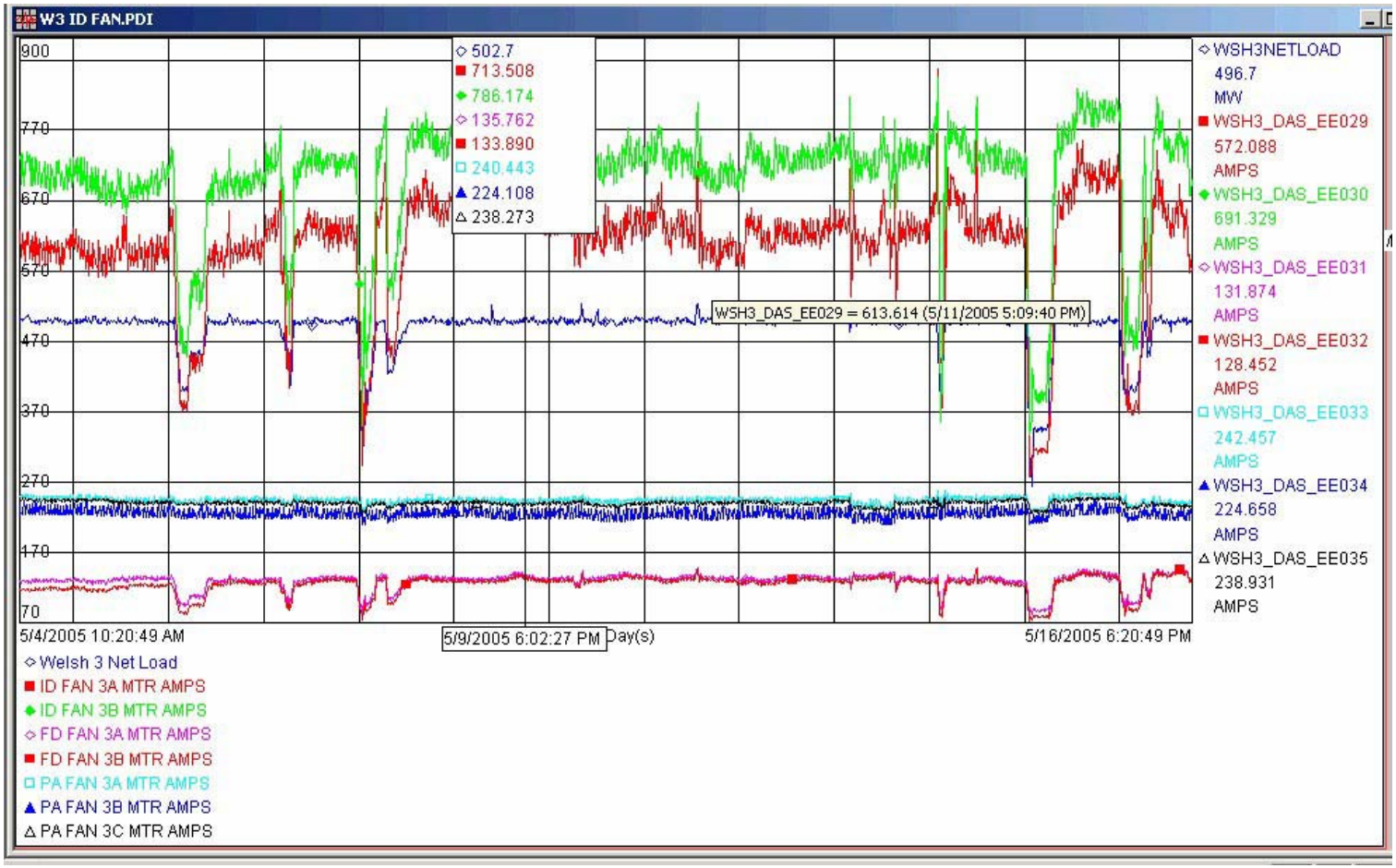
Reinhold Environmental Ltd.

2008 APC Round Table & Expo Presentation

July 13-15, 2008, in Savannah, GA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770
670
570
470
370
270
170
70
◇ 502.7
■ 713.508
◆ 786.174
◇ 135.762
■ 133.890
□ 240.443
▲ 224.108
△ 238.273
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◇WSH3NETLOAD
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MW
■WSH3_DAS_EE029
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AMPS
◆WSH3_DAS_EE030
691.329
AMPS
◇WSH3_DAS_EE031
131.874
AMPS
■WSH3_DAS_EE032
128.452
AMPS
□WSH3_DAS_EE033
242.457
AMPS
▲WSH3_DAS_EE034
224.658
AMPS
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238.931
AMPS
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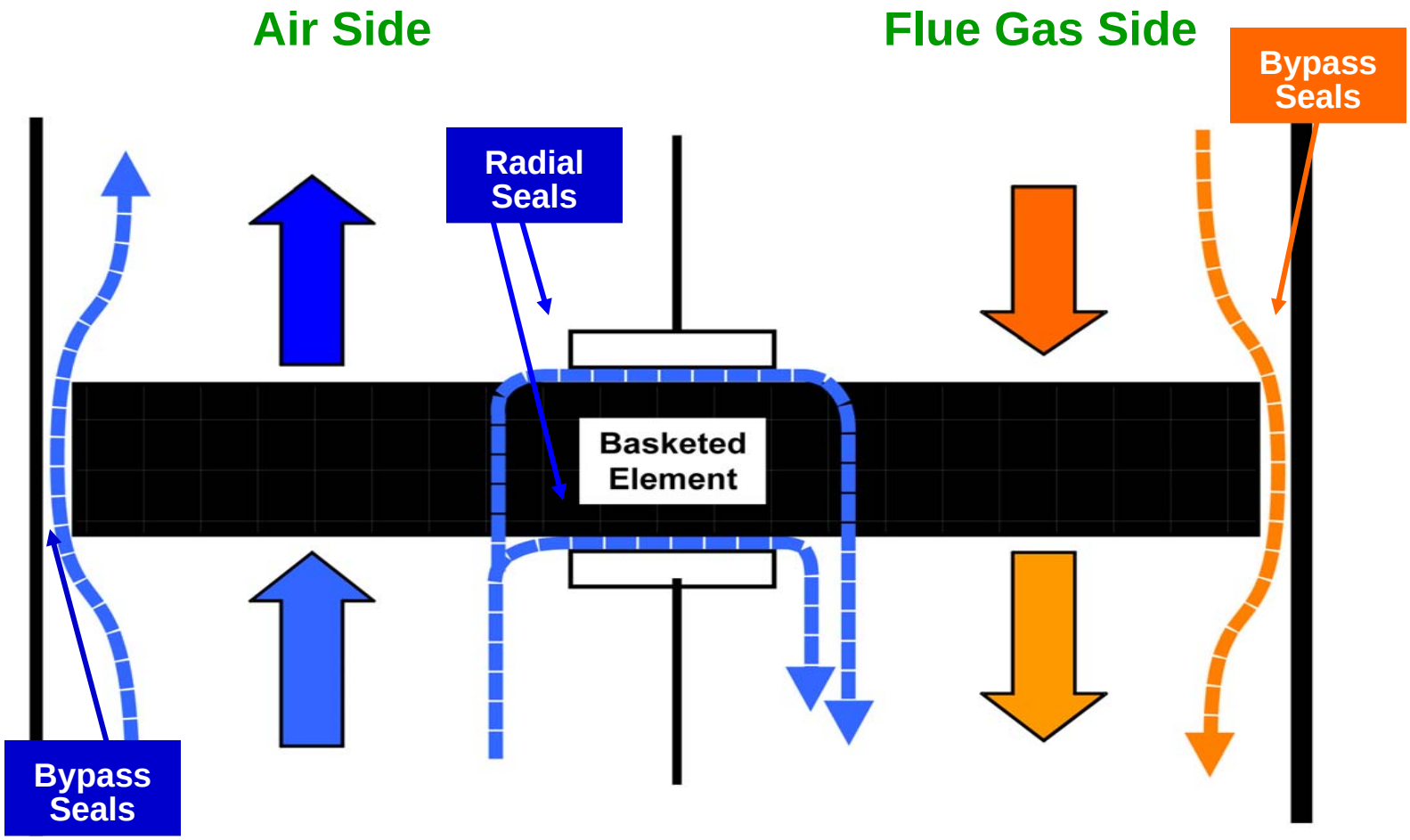
5/9/2005 6:02:27 PM
Day(s)
5/16/2005 6:20:49 PM
◇ Welsh 3 Net Load
■ ID FAN 3A MTR AMPS
◆ ID FAN 3B MTR AMPS
◇ FD FAN 3A MTR AMPS
■ FD FAN 3B MTR AMPS
□ PA FAN 3A MTR AMPS
▲ PA FAN 3B MTR AMPS
△ PA FAN 3C MTR AMPS

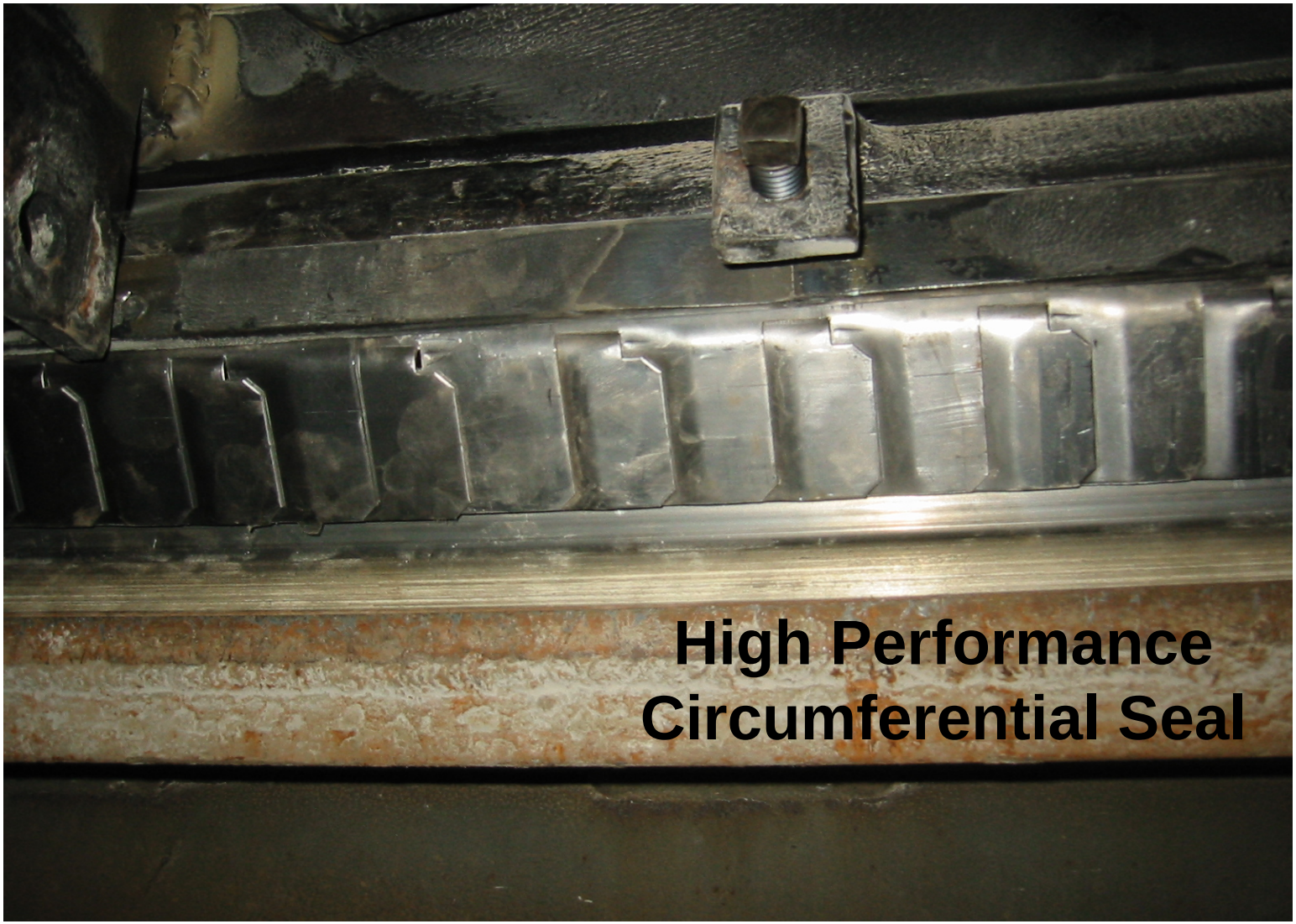
Leakage Overview




Bypass Seal
Axial Seal

Perimeter Leakage Gap Between Bypass Seal and Rotor


Bypass Seal


High Performance
Circumferential Seal

DuraFlex™ Circumferential Seal

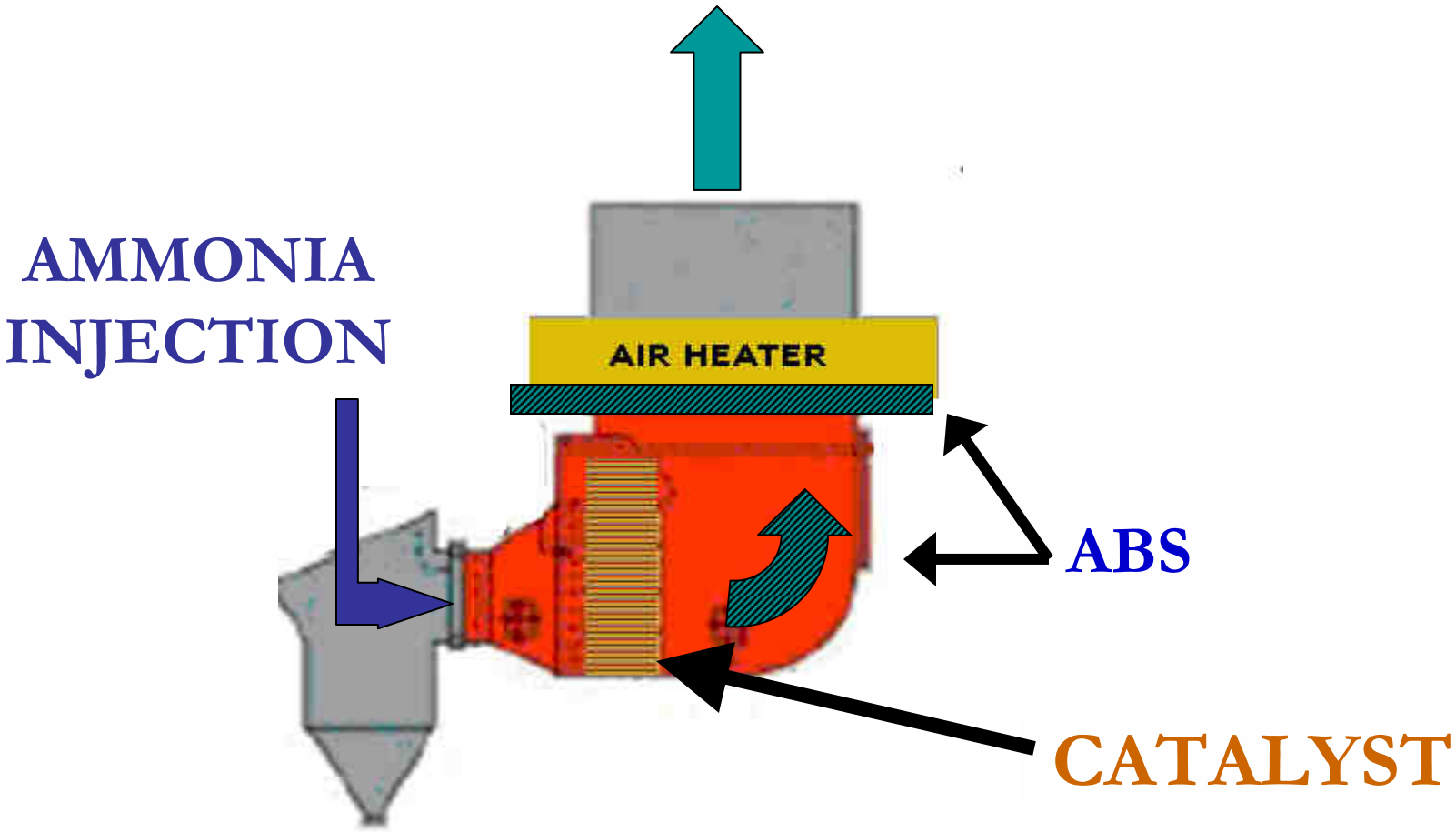
DuraFlex™ Circumferential Seal

ABS

Cost Penalty Attributed To ABS Buildup In Air Heaters – 500 MW Coal Unit

Parameter	Quantity	Annual Penalty
Increased Pressure Drop	4in H2O	$ 198,000
Gas Outlet Temperature Increase	10°F	$ 217,000
Water Wash Outages	6 days/yr	$ 1,000,000
Increased Leakage in Radial Seals	3%	$ 63,000
Increased Circumferential Seal Leakage	5000 ACFM	$ 95,000
Total Penalty		**$ 1,573,000**

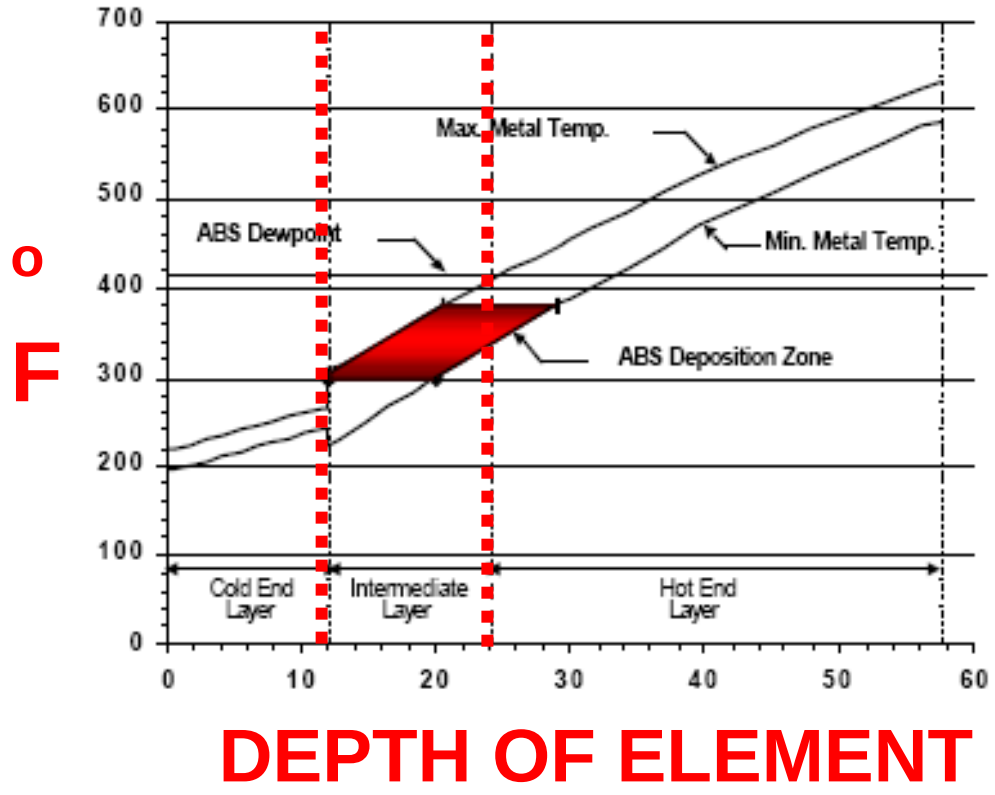
SCR in Relation to Air Heater



Formation of Ammonium Bisulfate

$$NH_3 + SO_3 + H_2O = NH_4HSO_4$$

ABS Temperature Zone



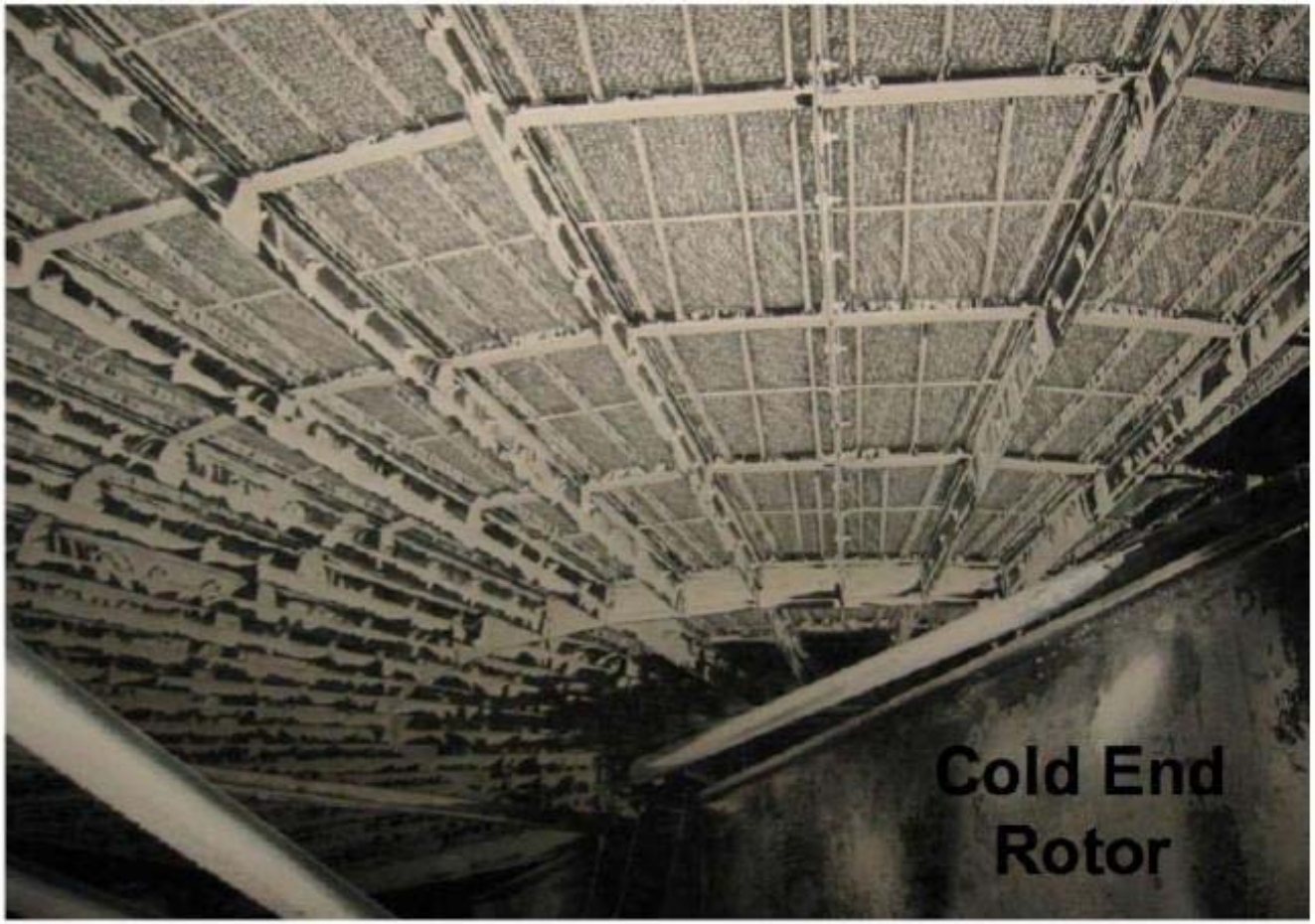
ABS

12 INCHES TO 30 INCHES

300°F TO390°F

ABS Buildup at Precipitator Inlet

TWO ABS ELEMENT STYLES

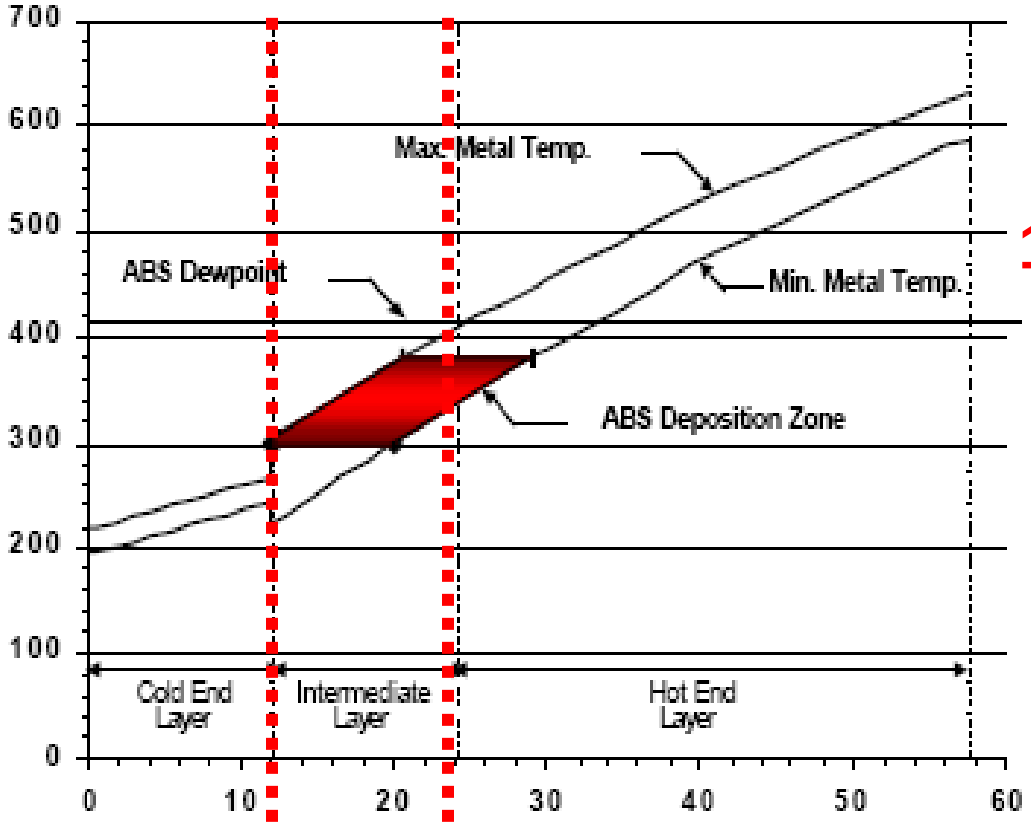


CONDENSATION DEPOSITS

ABS

COATINGS TO CONTROL ABS FOULING AND CORROSION

ABS Build-up Zone

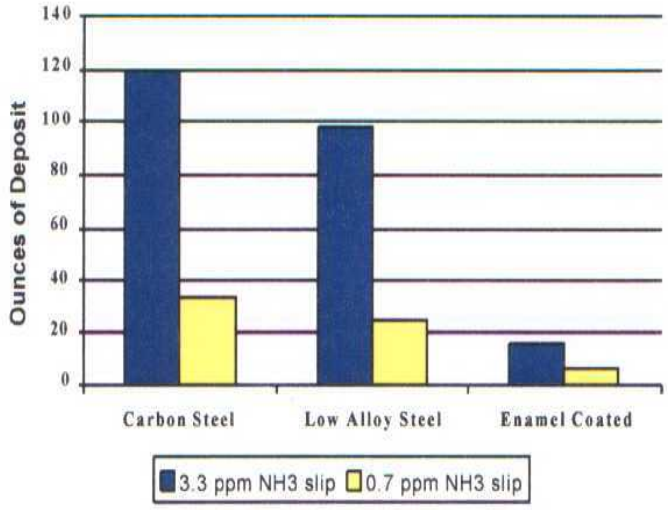


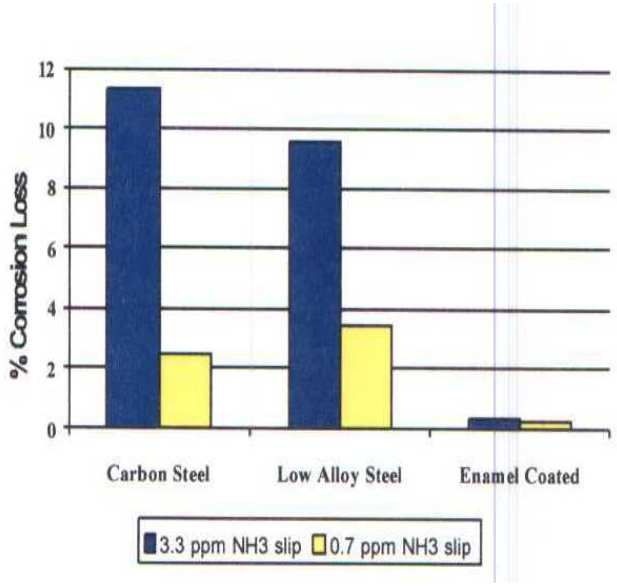
ABS

12 INCHES TO 30 INCHES

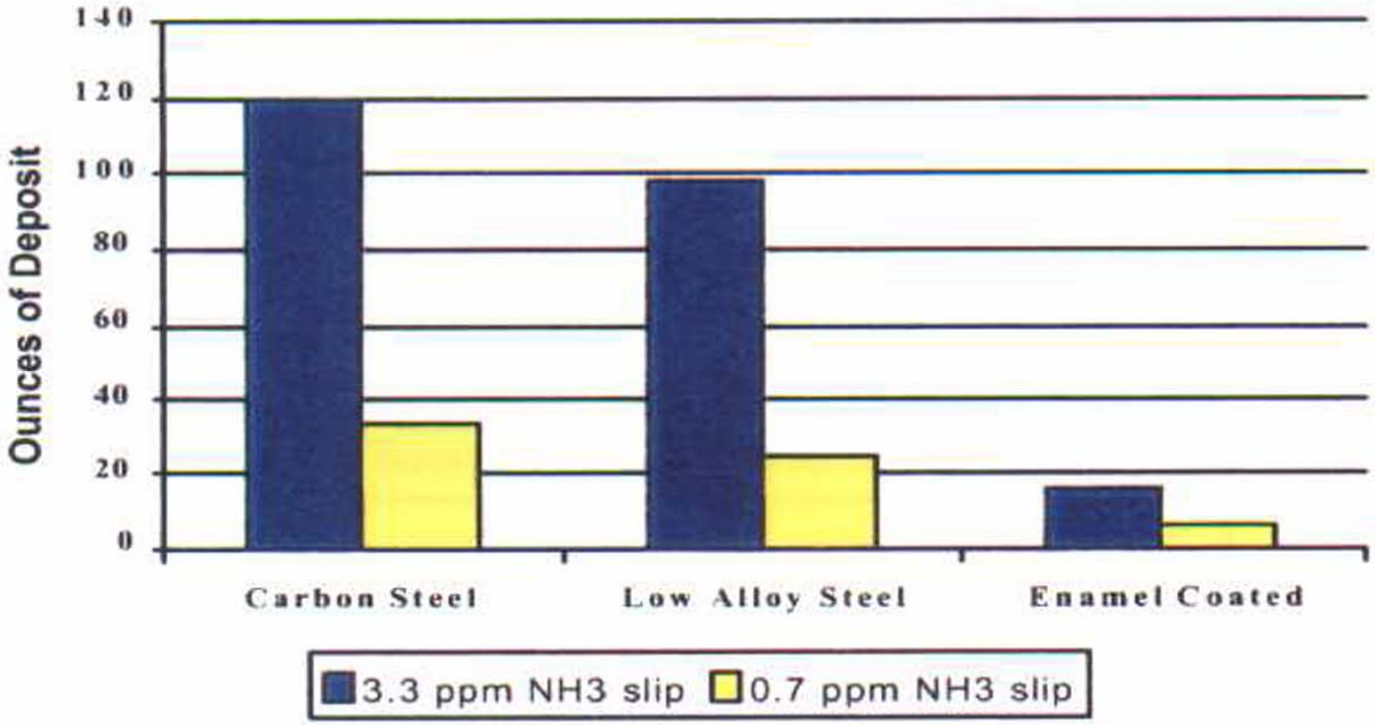
390°F TO 300°F

Benefits of Corrosion Resistant and Lubric Coating in the ABS Zone





Enamel Coated Element for ABS



RESISTANCE TO ABS BUILDUP

Problems with Current Coating Systems

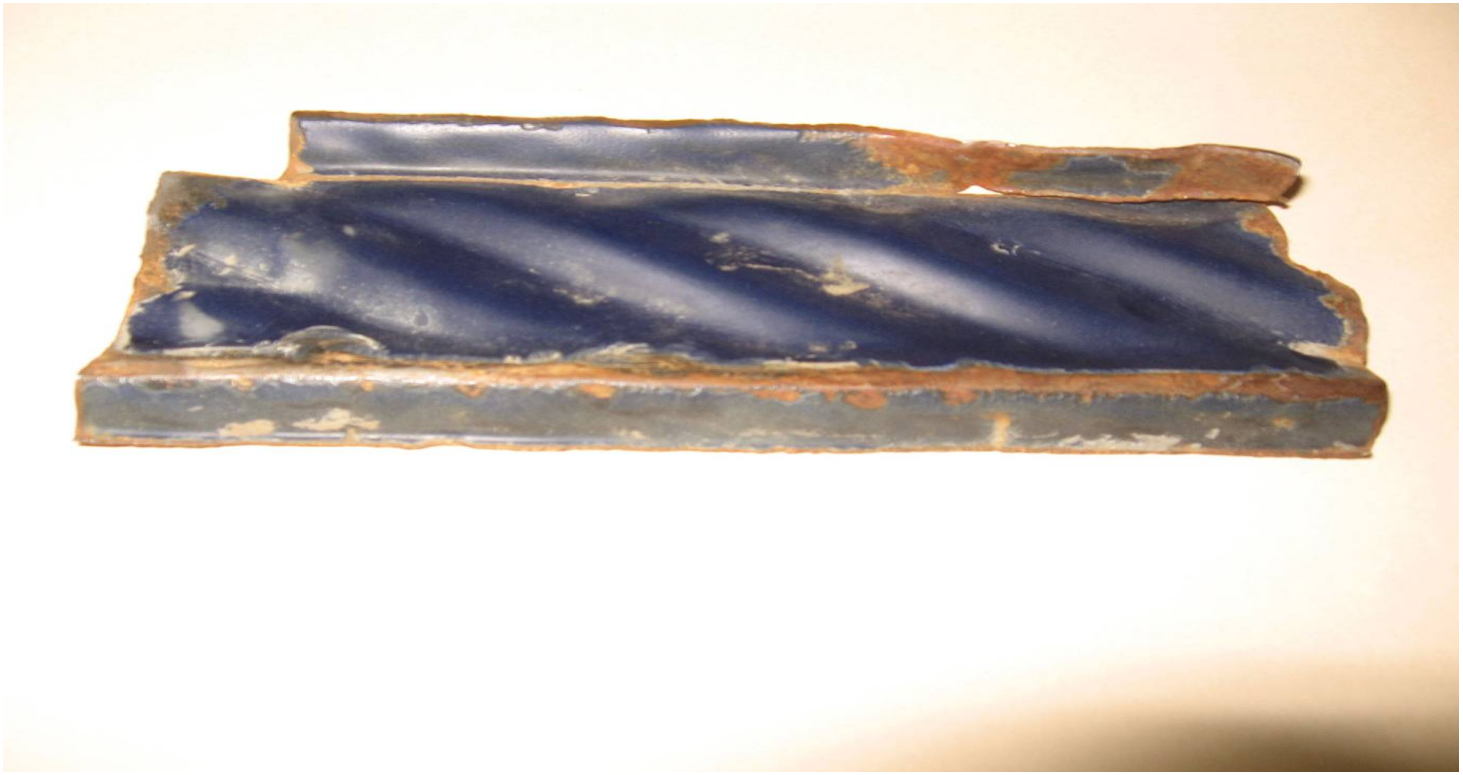
BRITTLENESS

- Enamel class coatings are mostly glass
- Enamels crack easy under stress
- Compression of basket assemblies leaves micro-cracks.
- Stresses in Rotation of Horizontal units cause additional cracking
- Micro-cracks leave paths for acids to attack substrate.

CORROSION

- Enamel class coatings are melted onto substrate at 1500+F
- At 1500F carbon in steel will burn and produce CO2 bubbles – causing voids
- Enamel is used over a specific steel called Enameling Iron with almost no carbon
- Enameling Iron corrodes very rapidly in sulfuric acid
- Enameling iron is brittle after forming – stress cracking failures can occur

Competitive “NEWER” Coating

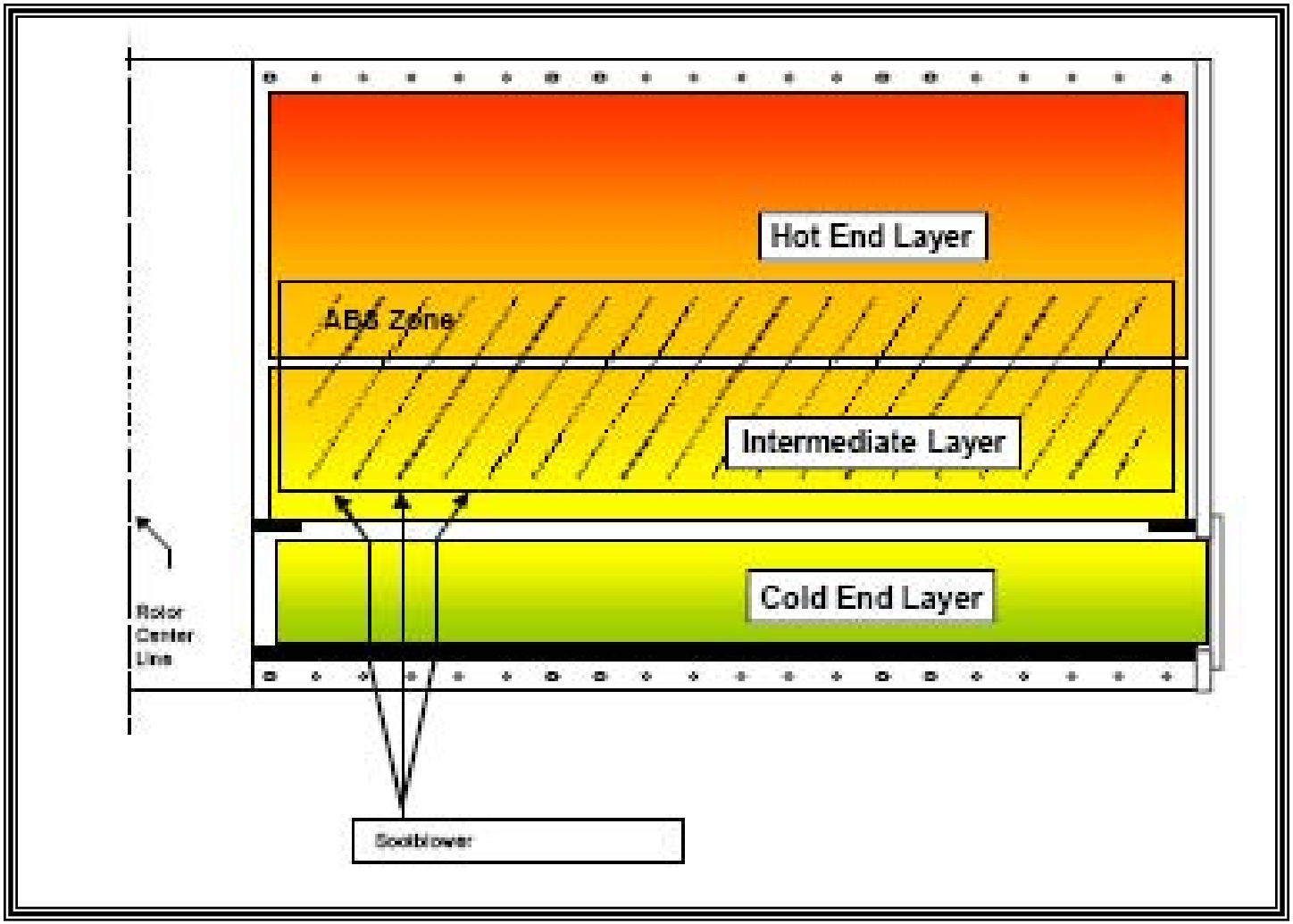


ELEMENT CRACKING FAILURES MOST LIKELY DUE TO CORROSION UNDERMINING THE COATING AND NON-DUCTILE METAL SUBSTRATE FATIGUE FAILURES

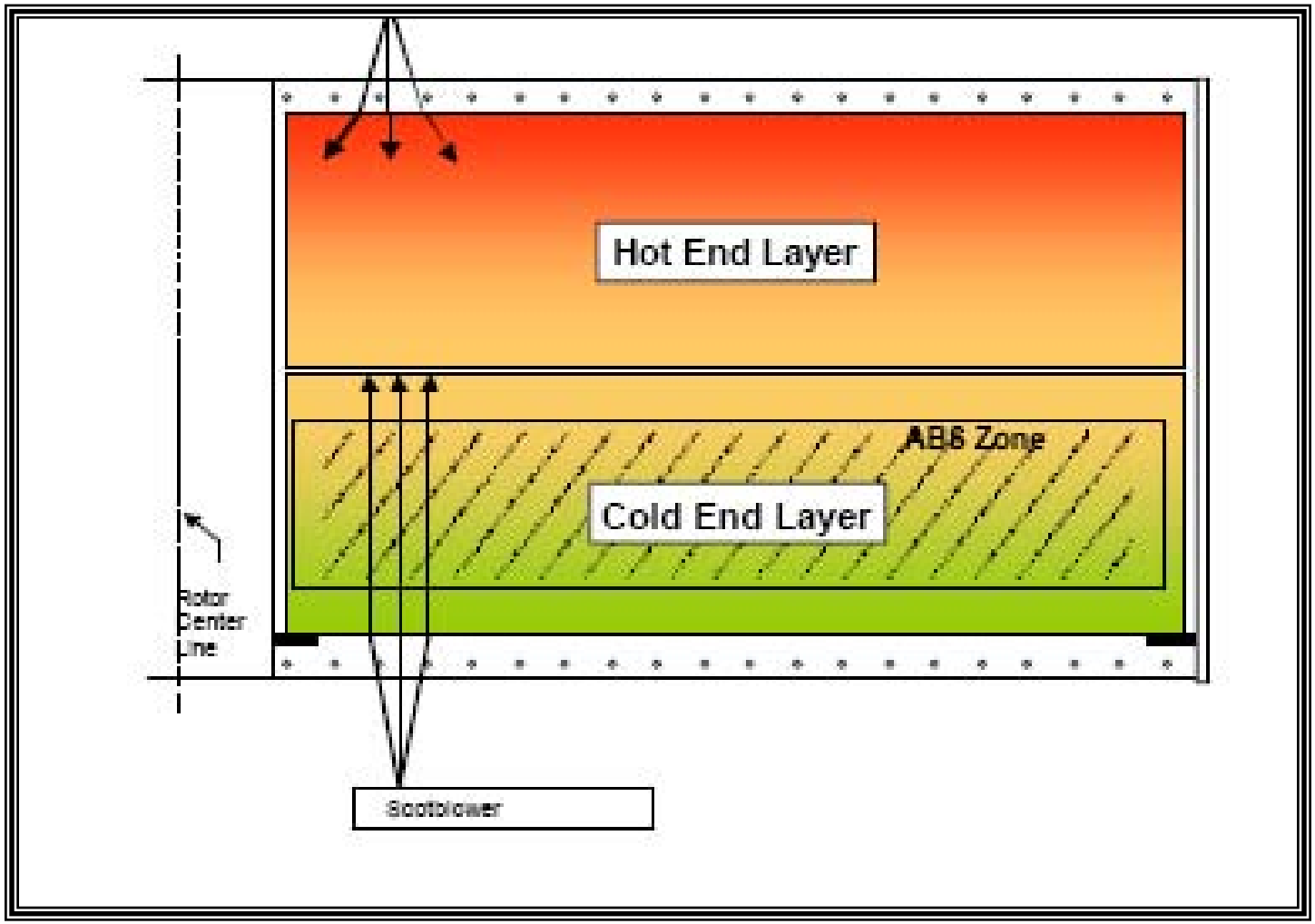
Failed Coated Element Showing Substrate Failure

THE USE OF A FORMABLE CORROSION RESISTANT SUBSTRATE IS CRITICAL TO SUCCESS

ABS Build-up Zone in Traditional Airheater Layers



ABS Build-up Zone in Two Layer Airheater Modifications



TWO LAYER COLD END DAMAGE

ELECTRIC POWER™

TWO LAYER COLD END DAMAGE

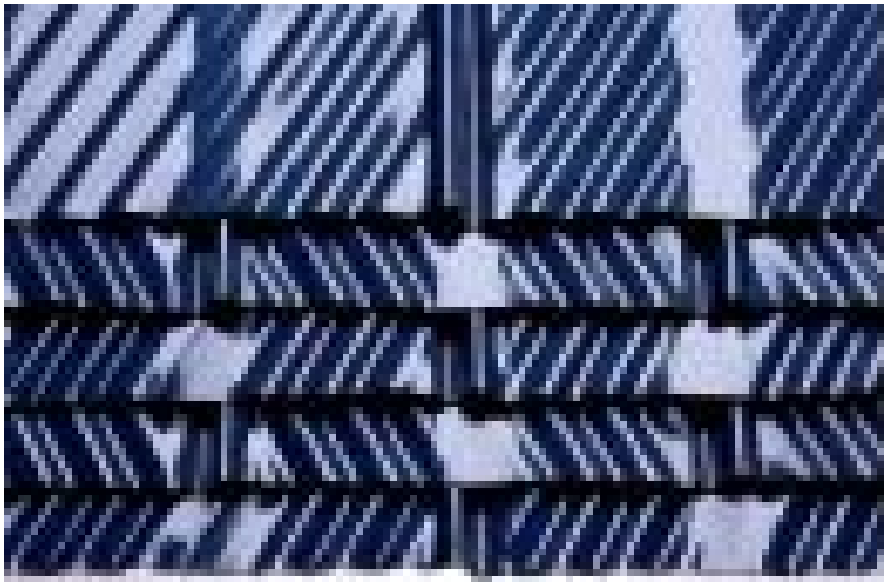
ELECTRIC POWER™

TWO LAYER COLD END DAMAGE

ELECTRIC POWER™

STANDARD

ABS STYLE



Failed Coated Element Sheets with Substrate Failure Station

Element Materials

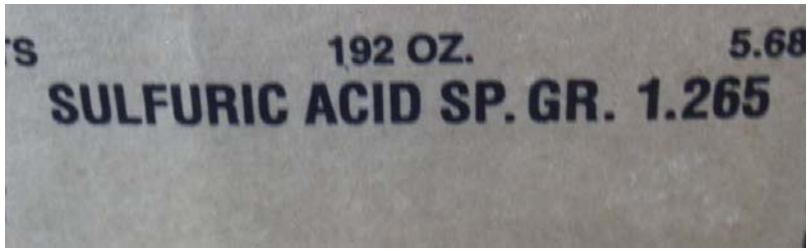
- **Carbon Steel**

  ASTM -1008
- **Enhanced Corrosion Resistance**

  ASTM A606-04 type 2

  ASTM A606-04 type 4
- **Enameled**
- **Powder Coated**

Start of Corrosion Test

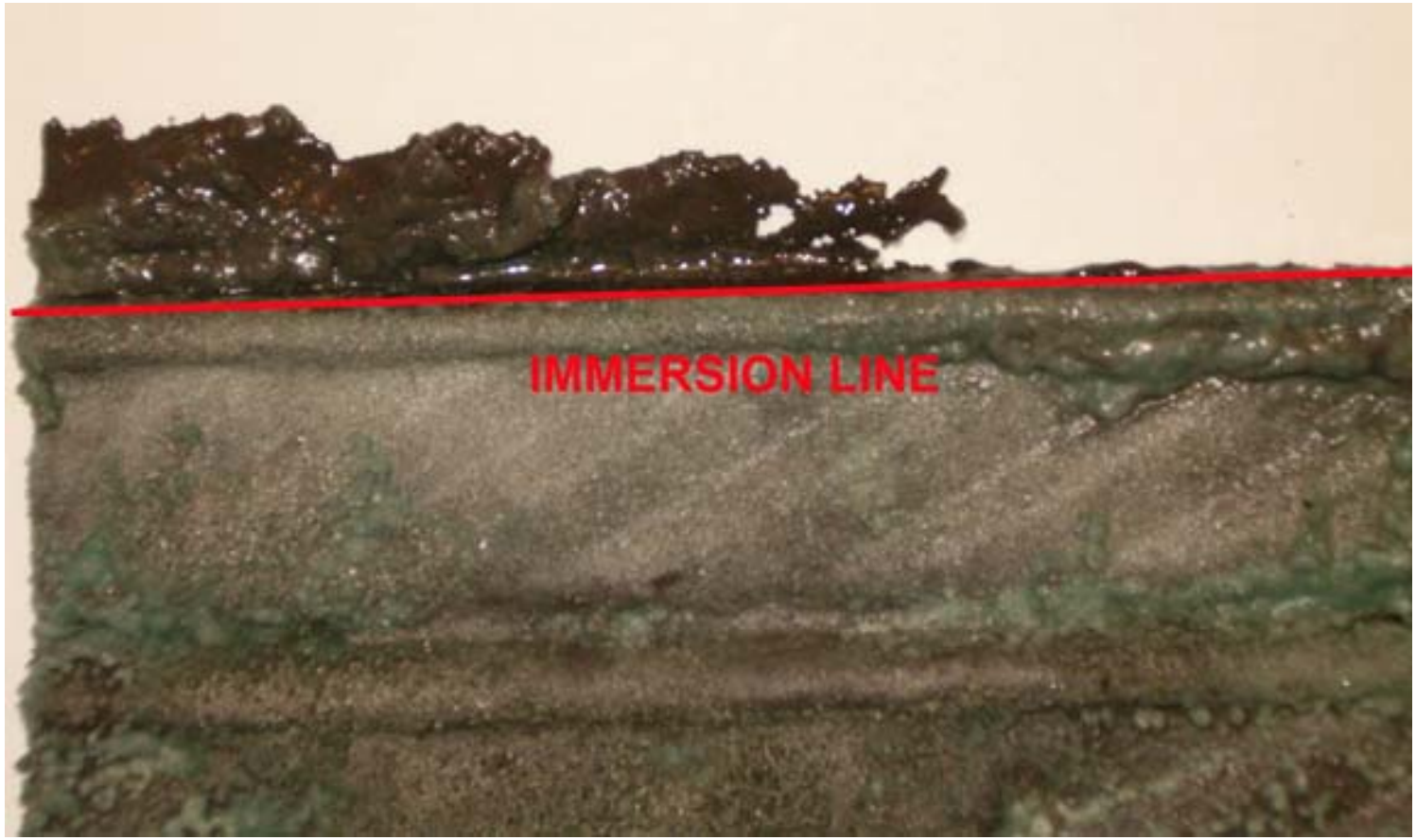


Coating Acid Test

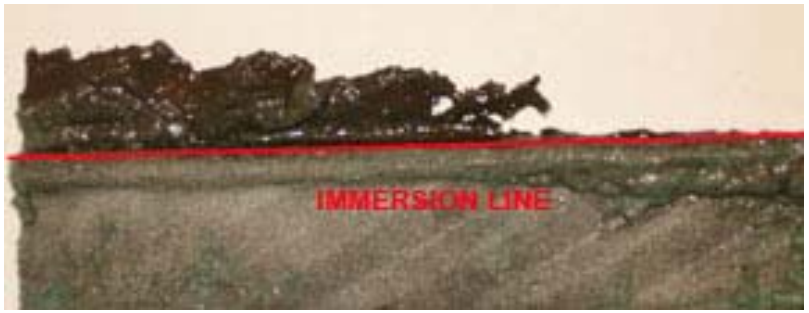
2 HOURS

4 DAYS

Uncoated Corrosion Resistant Alloy Steel in 30% Sulfuric Acid After 30 Days



30 Day Cold Acid Test

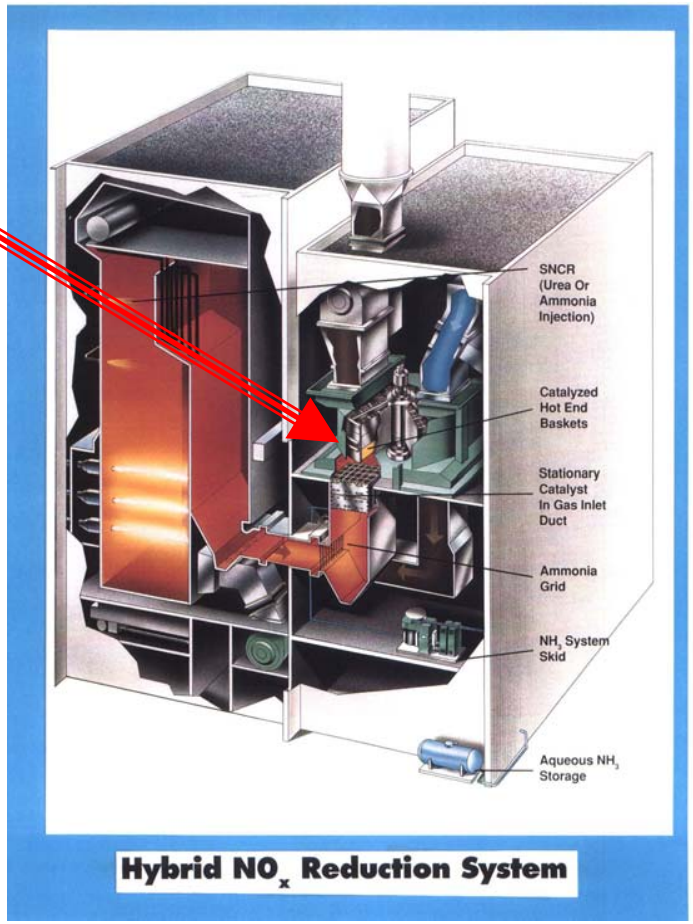


UNCOATED LACR

PARAGON COATING

Catalytic Air Heater

CATALYST
LAYER



Catalyst in Airheaters