

# Worldwide Pollution Control Association

**Ameren Seminar**  
**August 19–20, 2008**  
**Effingham, IL**



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**W**

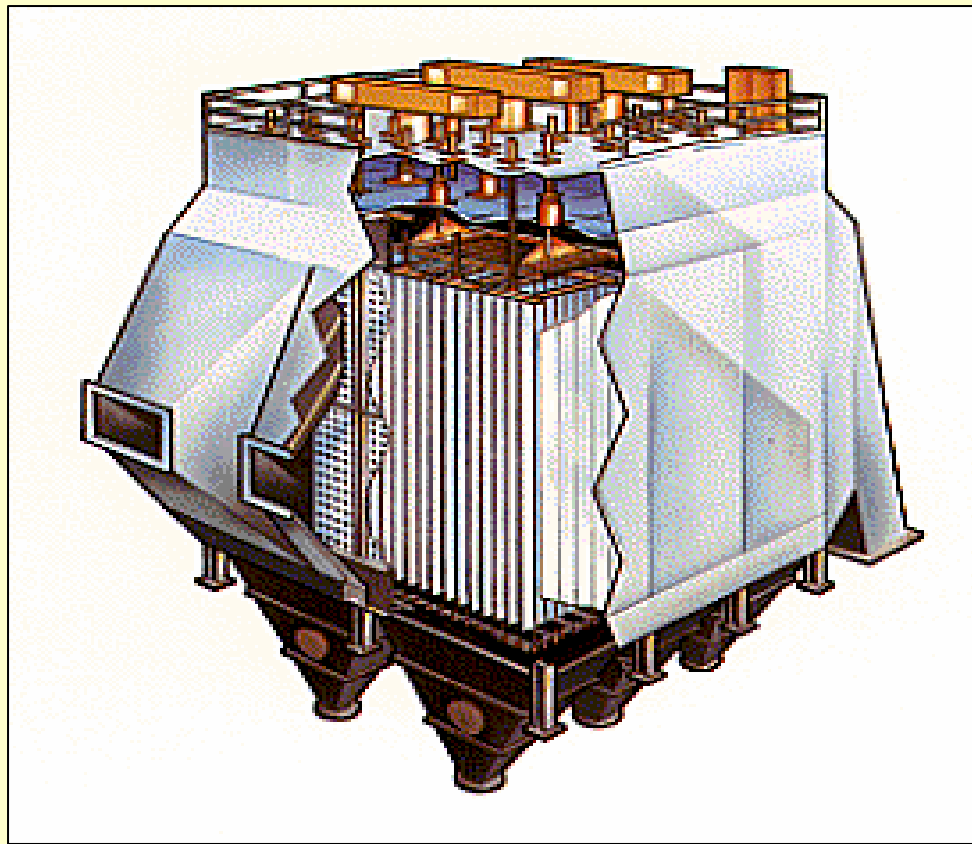
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# Precipitator Maintenance and Operations

By Scott Williams



# External Dust Collection Concerns



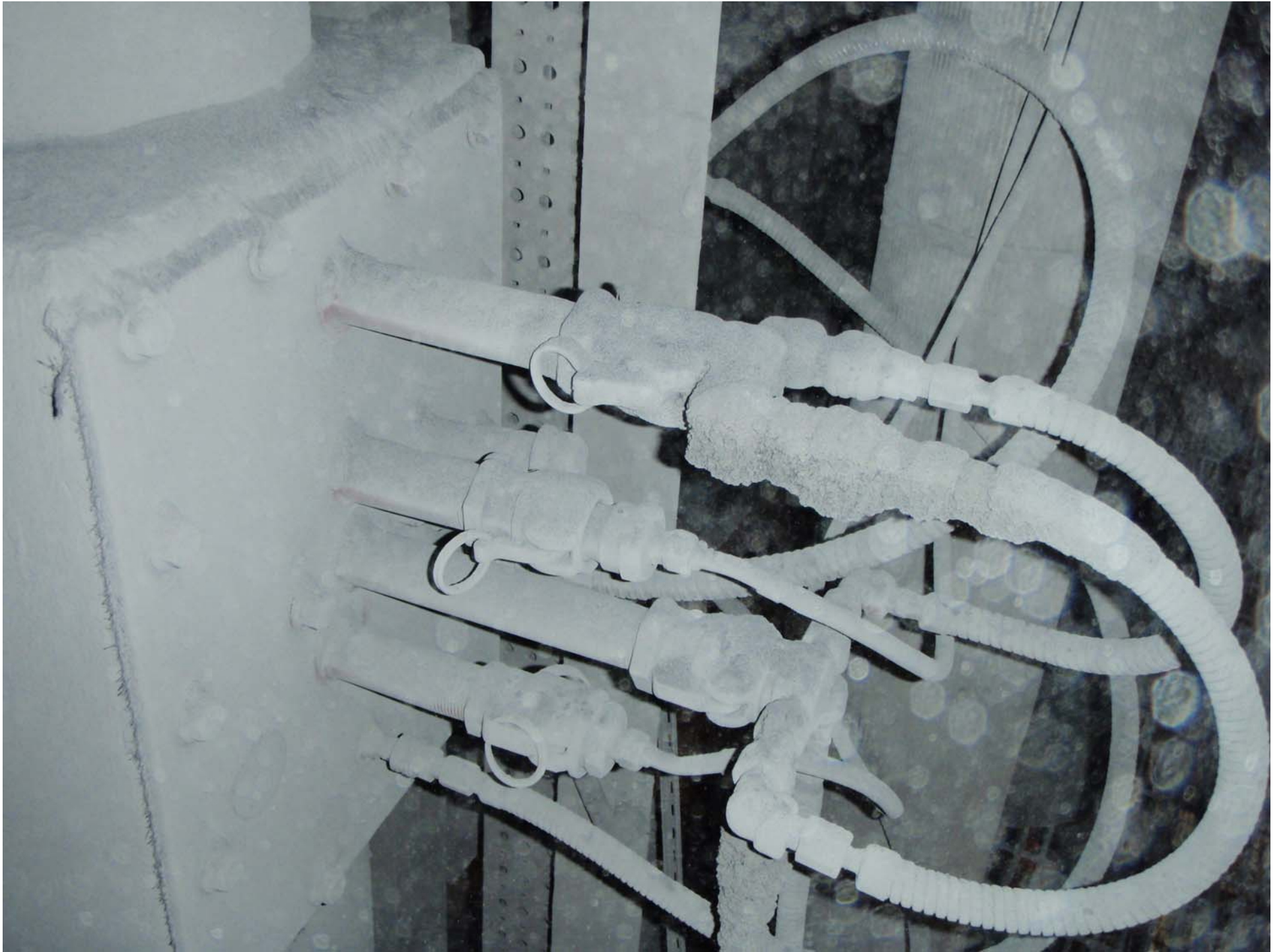
Preheater Basket  
Material Can  
Ground Out  
Precipitators

## Carbon Loss on Ignition Decreases Collection Capability



# Oil on the Plates





# O2 levels

- Proper combustion generally occurs between O2 levels of 2.5 to 3% in the flue gas.
- Outside the O2 range above will result in improper combustion, increased boiler LOI and increased opacity

Proper Gas Flow is Critical

## Ash Build-up on Turning Vanes in the Duct Causes Poor Gas Flow





## Ash Build-up at Precipitator Inlet



## Ash Buildup at Access Door



# Preheater Pluggage

- Preheater pluggage will result in more gas flow through the “unplugged side”.
- Preheater pluggage has increased in units due to SNCR and SCR

# High Voltage Arcing and Tracking Causes Component Failures

## Knife Blade Switch Arcing and High Voltage Cable Failure



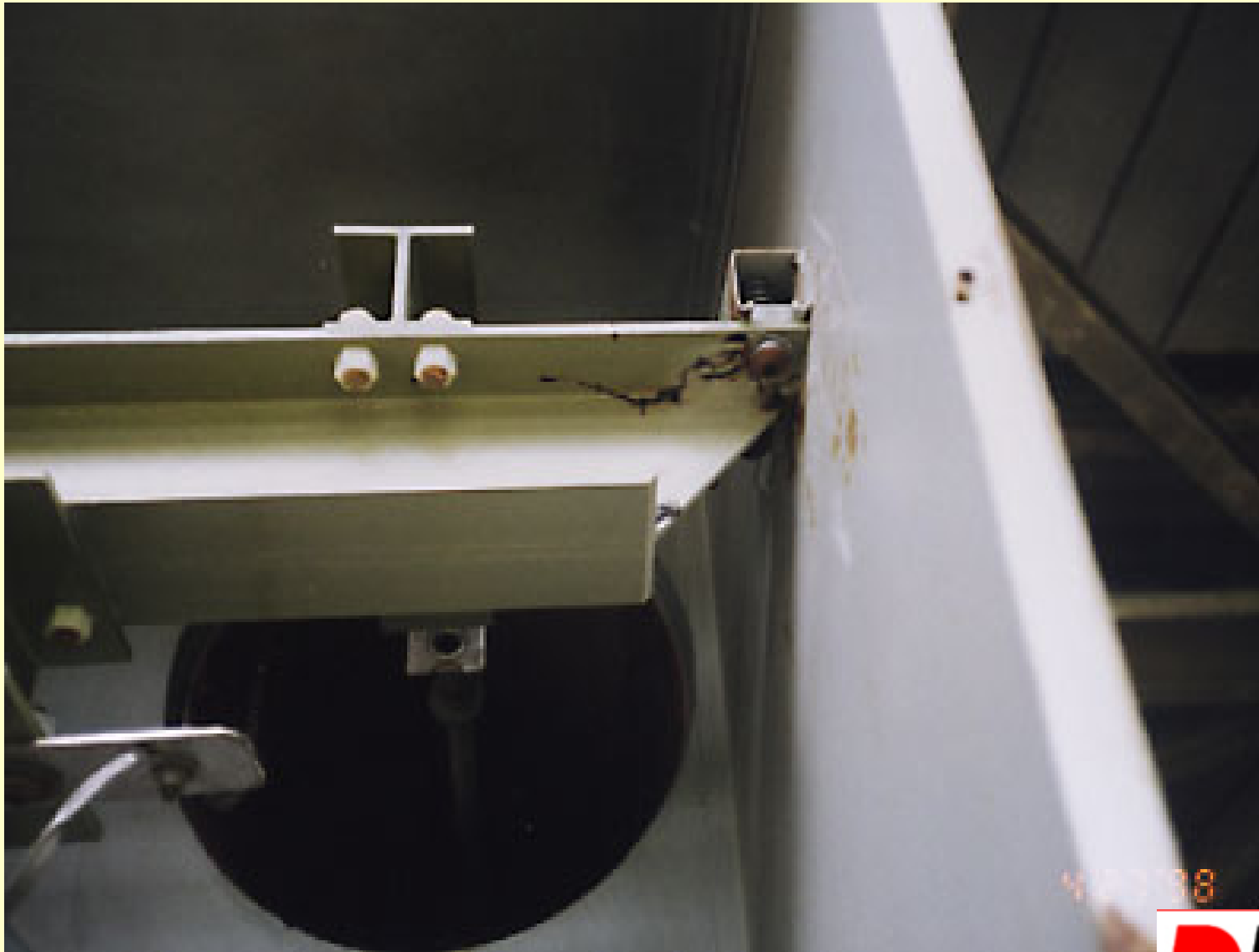
## Power Path High Voltage Failure



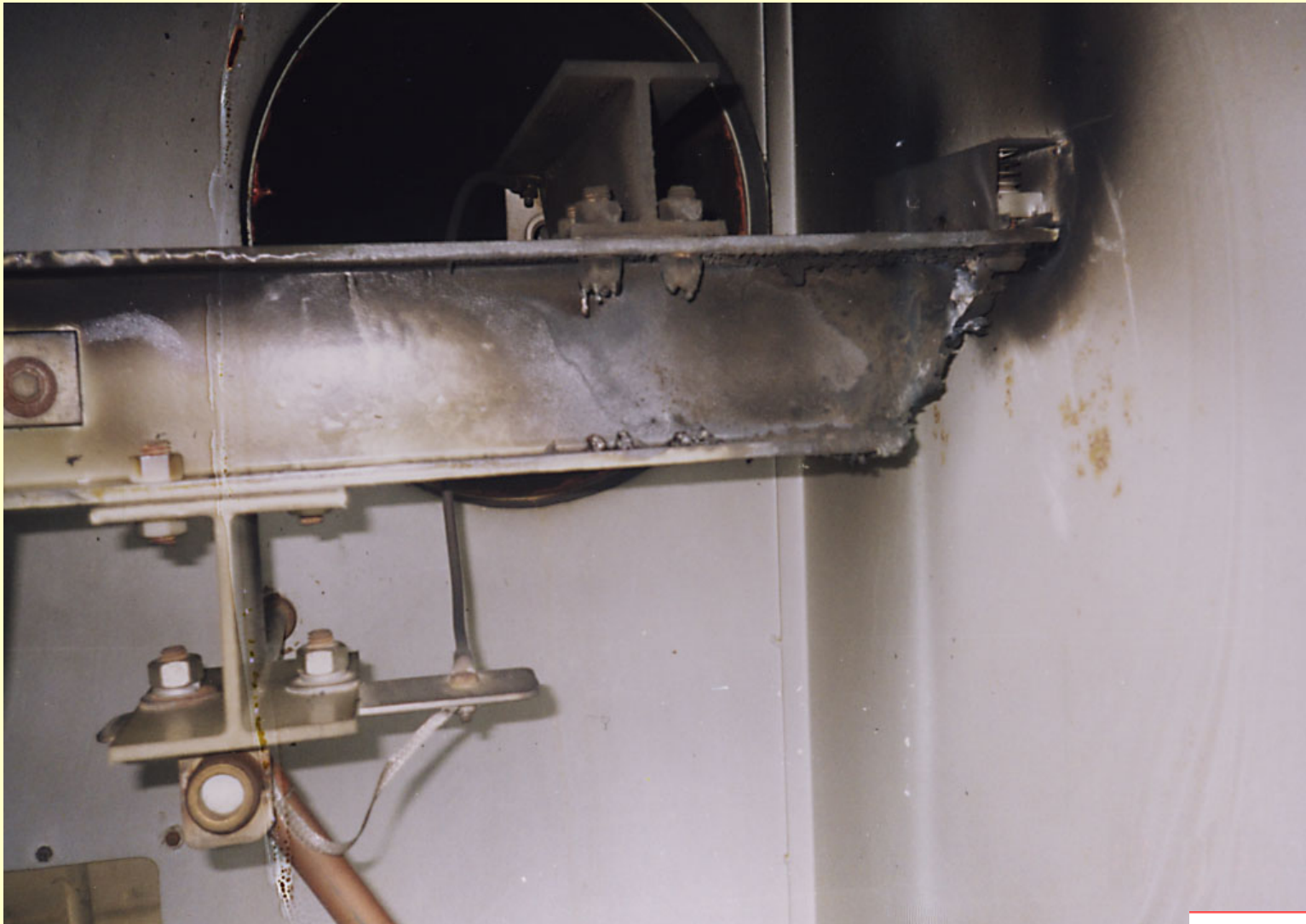
## Broken High Voltage Insulator



## Tracked Post Insulator Inside a T/R Set



## Support Insulator inside T/R - Tracking



## High Voltage Insulator Tracking



# Water/Air Leakage is a Major Concern

## A Hole in the Precipitator Hot Roof due to Thermal Stress/Corrosion



## Holes in the Side of the Precipitator Due to Corrosion



## Water Leaks From Ductwork



## High Voltage Guard Air Leakage



## Corrosion of High Voltage Guard Due to Air Leakage



## Water Leakage Around Rapper Boot Seal



## Water Pouring From Precipitator Hopper



## Ash Buildup in Hopper



## Water Leakage Through the Precipitator Roof



## Roof Corrosion Due to Water Standing for a Long Period of Time



## Corrosion Around Access Door



# Thermal Stress Concerns

## Structural Component Bowing due to Thermal Stress



## Plate Bowing Due to Thermal Fatigue



## Thermal Stress Crack in Casing



## Center Wall Cracking



## Thermal Fatigue Cracking At Turning Vane Support



# Mechanical Component Failures

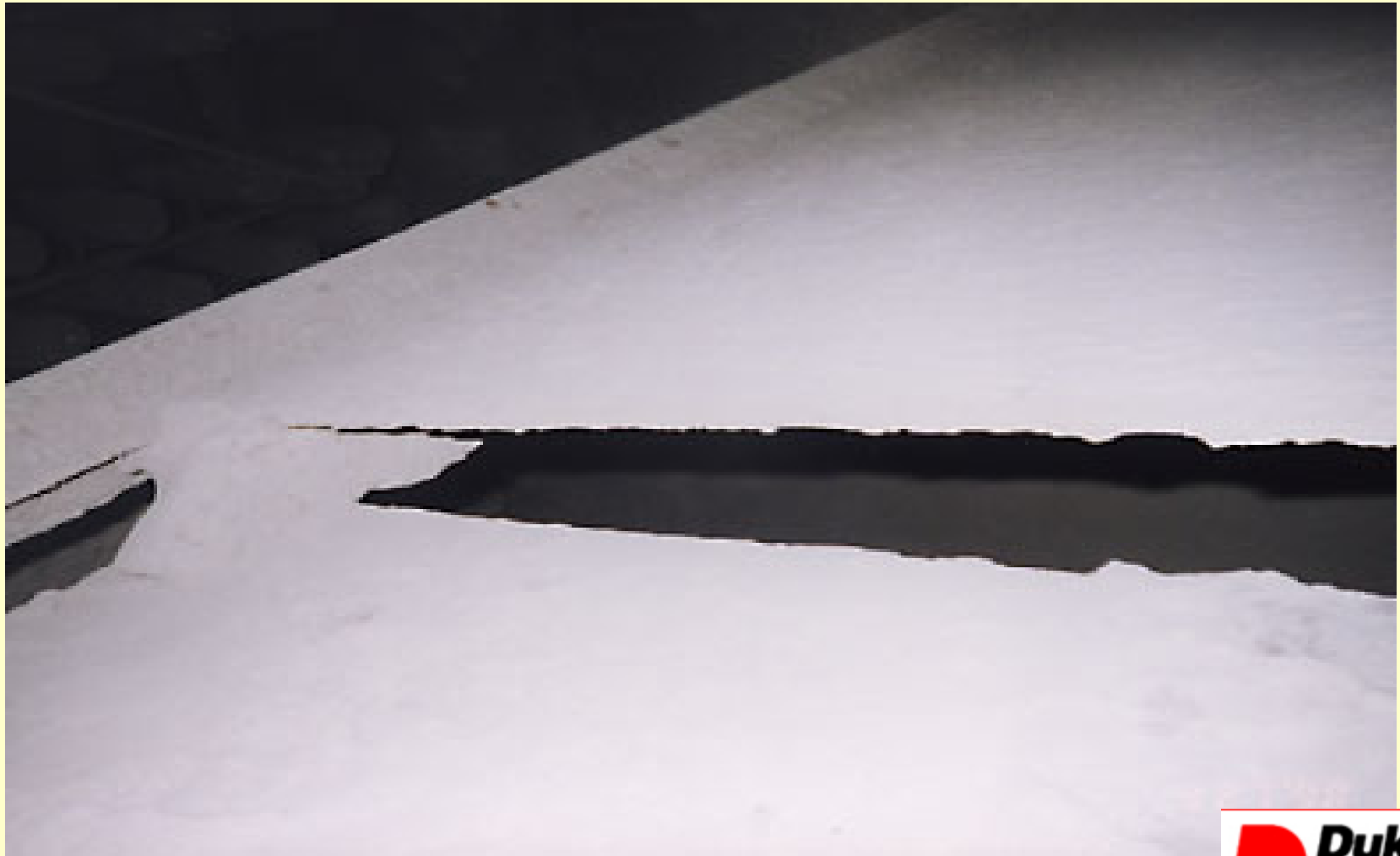
Hopper Baffle Door- This causes increased opacity



## Bent Structural Cross Bracing



Baffle Component Failure- Gas will bypass the baffle



## Cracked Plate- Mechanical Stress



## Crack Plate



## Crack Plate Swords



## Cracked Plate on top



## Plate Repairs



## Weld Failure At Top of Plate



## Channel Cracking at Top of Plate



# Insulation Problems

## Poor Insulation Can Promote Corrosion



# Plate to Wire Clearances are Important

The Wire/Electrode Carries the Charge  
The Plate Collects the Ash  
Plate to Wire Clearance is Critical



Broken rapper shaft fell down and touched wire and plate



# Wire touching plate



# Rapper Failures

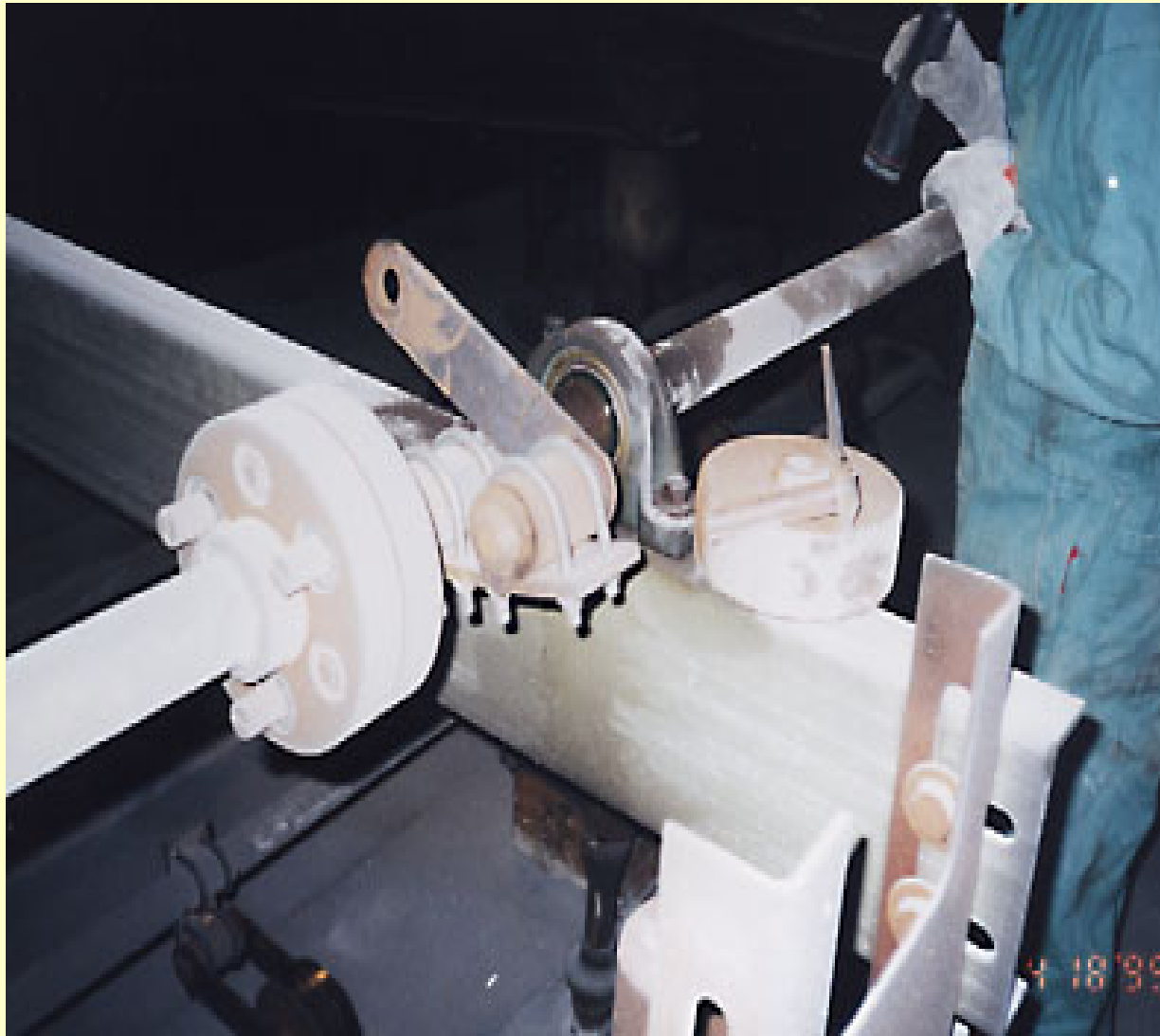
Rapper Shaft Cracked at Anvil Beam- Shaft has fell down



## Broken Rapper Shaft- In the Penthouse



## Broken Tumbling Hammer



## Chain off Tumbling Hammer Sprocket

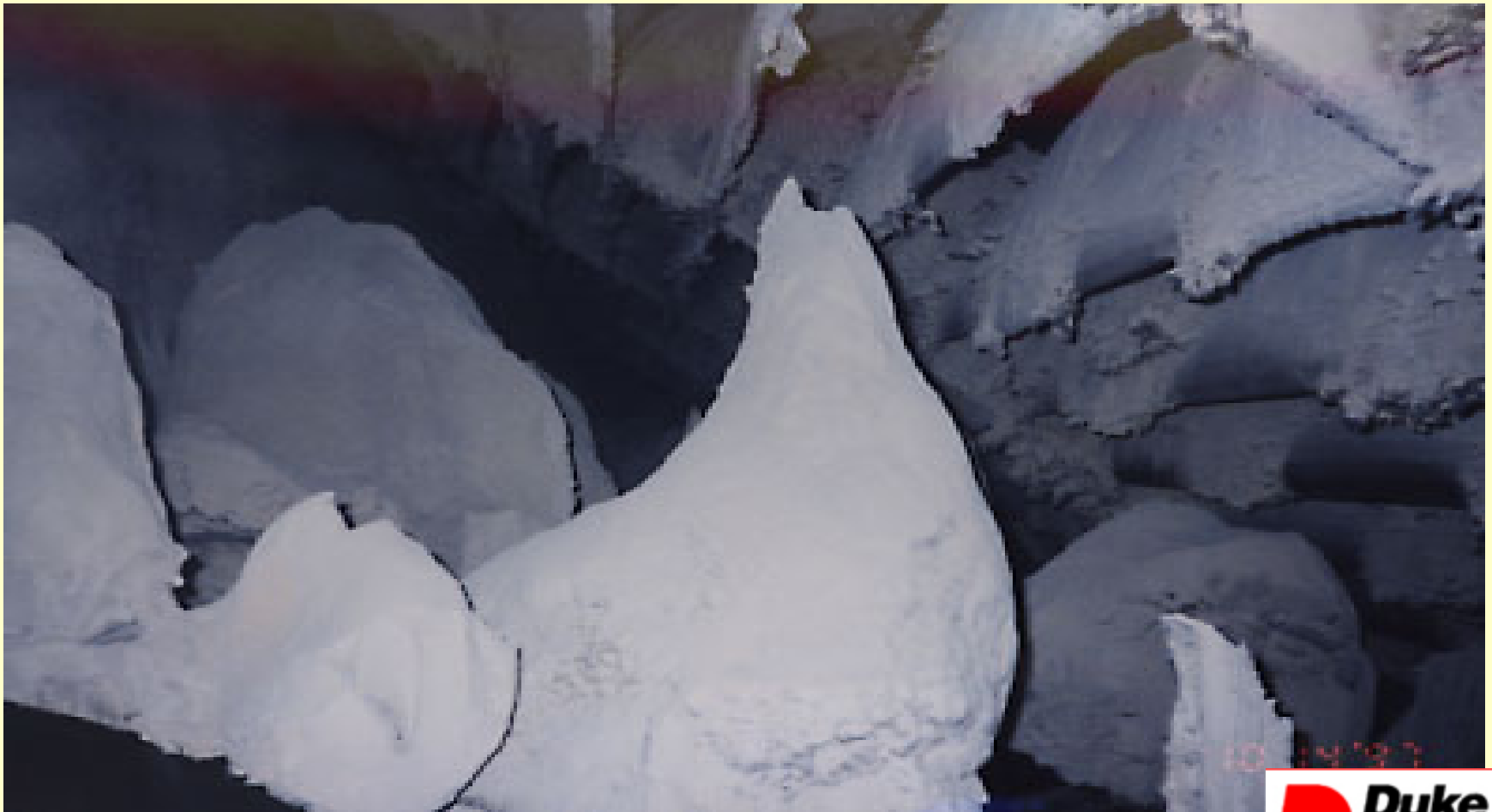


## Vibrator Shaft Broken



# Operational Problems

## Ammonia System Ash Buildup



## Ash Hopper Overfilled



## Ash Buildup on Electrodes- Opacity Can Increase



# Structural Erosion

## Erosion Due to Ash if Flue Gas on Structural Support



## T/R Set Oil Leakage



# Start Up Procedure

- Back section should be energized first at start of first mill operation.
- Sections added as needed.
- Start SO<sub>3</sub> injection at when flue gas is above the acid dew point usually 280 F.
- Start NH<sub>4</sub> injection when SO<sub>3</sub> effects are evident (usually the next day).