

**“Risk Mitigation and SCR/SNCR:
Compatible or Mutually Exclusive?”**

**Presented to the 2002 DOE Conference on SCR & SNCR
for NO_x Control**



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As you know by my absence, I travel extensively. I am always amused and impressed with the Europeans' desire to accommodate visitors such as me...



**Sign in a French dress shop:
"Dresses for street walking".**

In my Paris hotel elevator:

Please leave your values at the front desk.

In my London hotel lobby:

The lift is being fixed for the day. During that time we regret that you will be unbearable.



Sign at the entrance to the London Zoo:

Please do not feed the animals. If you have any suitable food, give it to the guard on duty.





Etymology Anyone?



At my Swiss hotel restaurant:
“Special today--no ice cream.”



On the menu in that same Swiss restaurant:
“Our wines leave you nothing to hope for.”

No wonder the Austrians are so efficient! Sign in a bakery:
“For your convenience we recommend courteous,
efficient, self-service.”





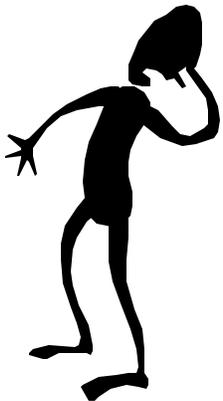
And on to Amsterdam!

**Sign at a laundry (it is Amsterdam after all!)
Drop your trousers here for best results.**

**(Sorry Ladies,I don't make em' up, I just read em' !)
Sign outside of a Doctor's office in Amsterdam:
Specialist in women and other diseases.**



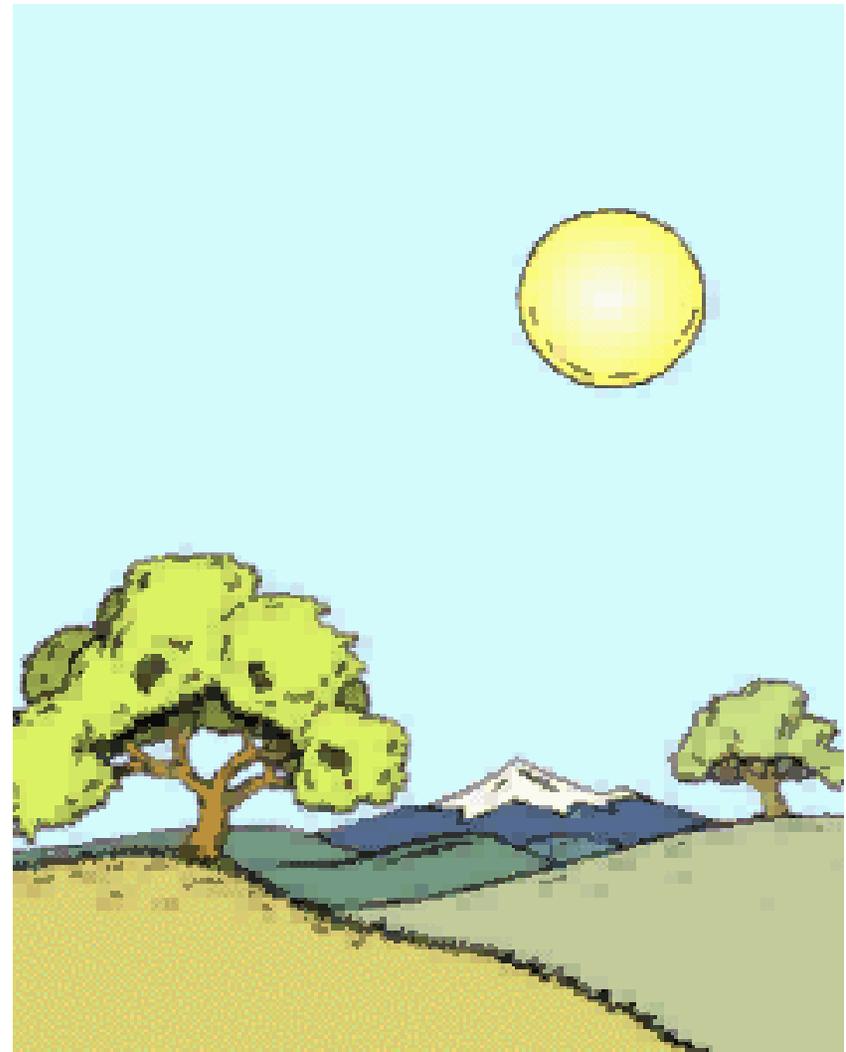
**And for those of you that think Amsterdam is without religious fervor,
here is a sign in what I believe was a dentist's office:
Teeth extracted by the latest methodists.**





Risk Mitigation Process

- Can we modify or affect the risk?
- What has the history been
- A look back to see the future
- A technical review of the process
- Insurance risk assessment/mitigation is like driving a car using the rear view mirror
- No firsts
- No efficacy or performance guarantees
- It is not unlike preparing a weather forecast for the next year....things change, they may look good initially, but degrade over time...



So what do we analyze?



- the application in the specific industry
- utilization history
- component and process assessment
- peripheral effects
- frequency and severity assessments for losses
- the “foreseeability” of loss scenarios
- track record of the technology in other industries
- Essentially, we try to put the puzzle together



Demonstration of Selective Catalytic Reduction Technology for the Control of NO_x Emissions from High-Sulfur-Coal-Fired Boilers

Environmental Control Devices NO_x Control Technologies

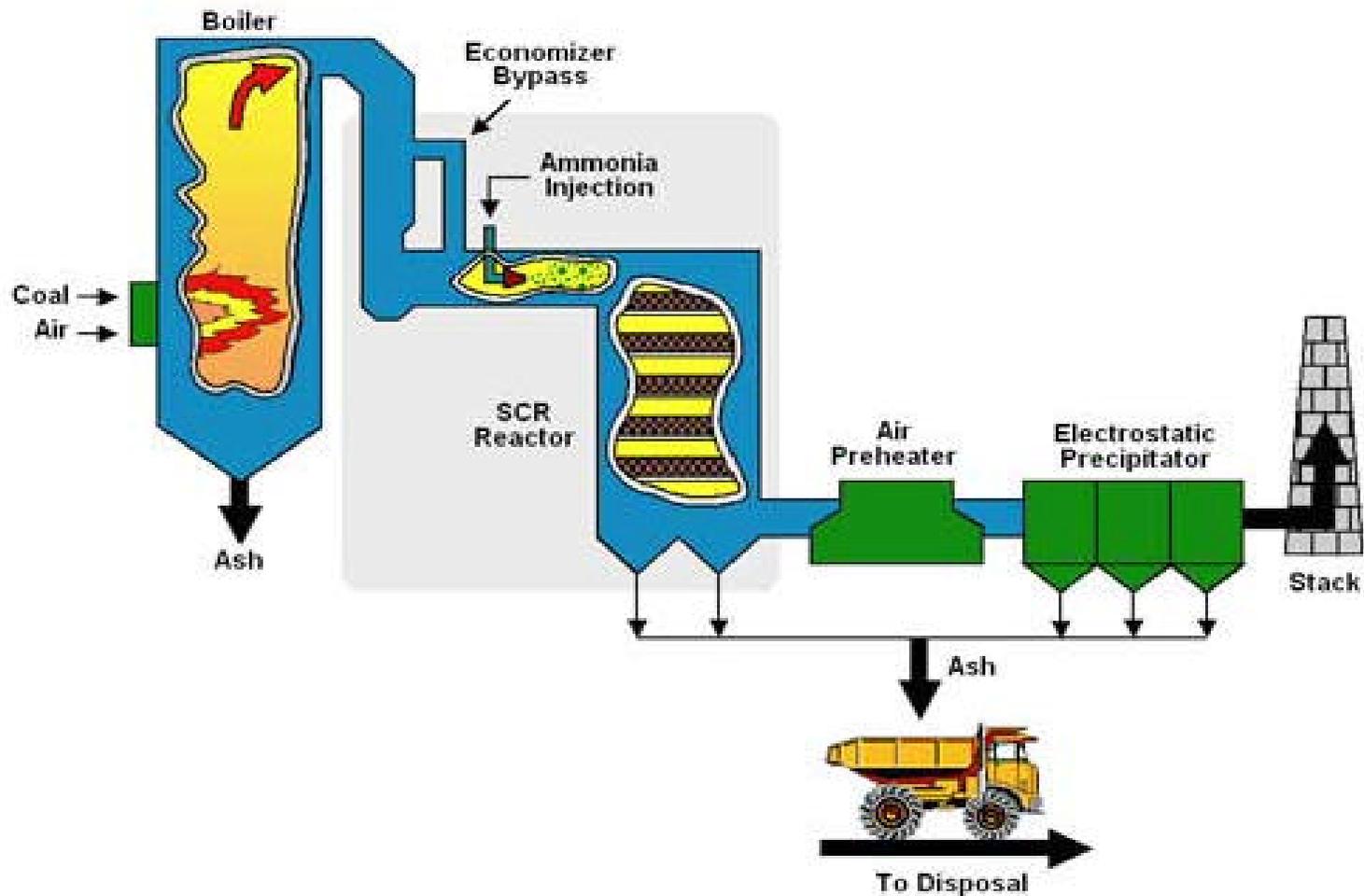


Table 2. Exposure Levels and The Human Body

Exposure (ppm)	Effect on The Body	Permissible Exposure
50 ppm	Detectable by most people	No injury from prolonged, or repeated exposure
134 ppm	Irritation of nose and throat	Eight hours, maximum exposure
700 ppm	Coughing, severe eye irritation, may lead to loss of sight	One hour, maximum exposure
1700 ppm	Serious lung damage, death unless treated	No exposure permissible
2000 ppm	Skin blisters and burns within seconds	No exposure permissible
5000 ppm	Suffocation within minutes	No exposure permissible



What is Anhydrous Ammonia?

Anhydrous means "without water." Thirteen hundred gallons of ammonia vapor will dissolve in one gallon of water. Because of its high affinity for water it readily absorbs water to create a dilute ammonium hydroxide, which is a component of lye. Anhydrous ammonia is a hygroscopic compound, which means that it seeks water from the nearest source, any source, including the human body. This attraction places the eyes, lungs, and skin at greatest risk because of their high moisture content. Caustic burns result when the anhydrous ammonia dissolves into body tissue. Most deaths from anhydrous ammonia are caused by severe damage to the throat and lungs from a direct blast to the face. When large amounts are inhaled, the throat swells shut and the victims suffocate. Exposure to vapors or liquids also can cause blindness. An additional concern is the low boiling point of anhydrous ammonia as it is stored at -28 degrees.

The chemical freezes on contact at room temperature. It will cause burns similar to, but more severe than, those caused by dry ice.

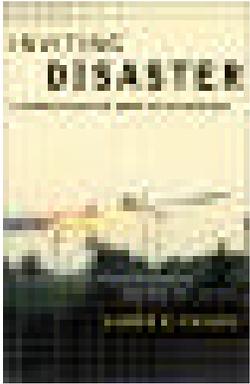


The Law of Large Numbers and SCR/SNCR: the insurance industry seeks to determine...

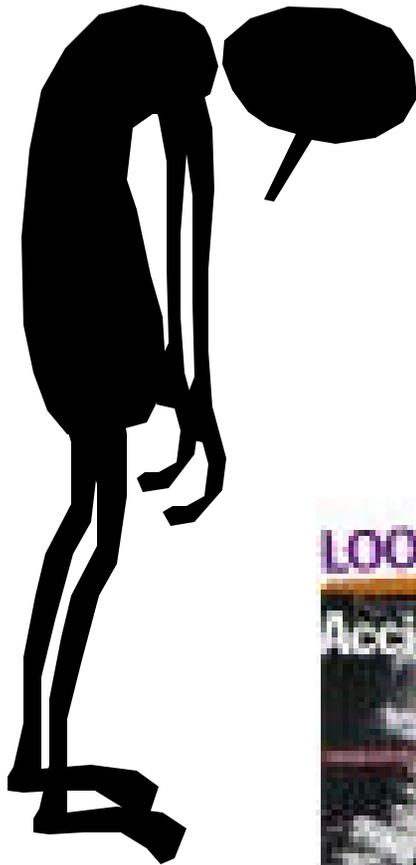


- How many applications have been installed?
- Where are these installed?
- What has the experience been from an operating and loss perspective?
- What are the other possible effects that the application of this technology might be to the balance of plant equipment?
- Does this technology present the potential of non physical damage loss from its utilization?





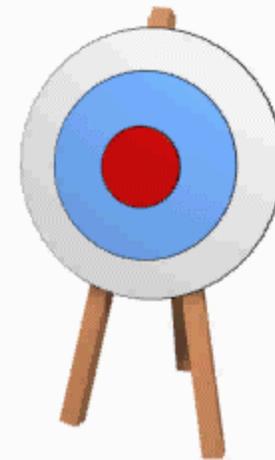
The Law of Unintended Consequences...Again!



- Tight & loose coupling
- Interactive complexity
- Incomprehensible
- Trivial Events in Non-trivial Systems

Frequency and Severity

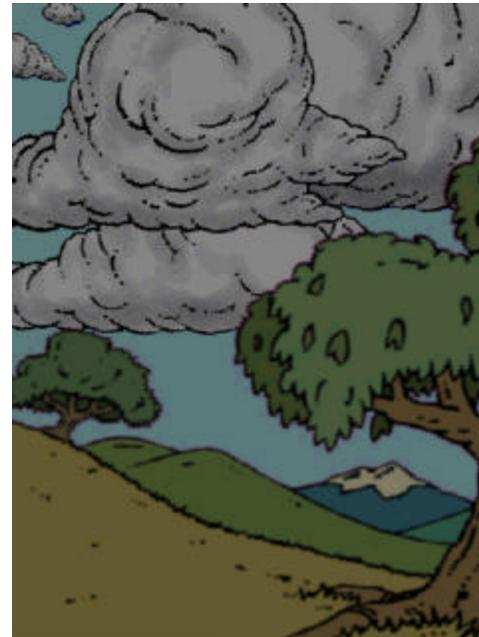
- Severity: It is horrible for us to die, but we only do it once.
- Frequency: We catch on average 3 colds a year, but they are rarely fatal.
- Insurance is classically structured to respond to the severity occurrence.



So what is the answer? Compatible or mutually exclusive...

- The technology is understood
- There are enough installations to assess experience
- The technology does not appear to present adverse selection...

therefore...COMPATIBLE!



Questions ?



Thank You!!

