

# Reinhold Environmental Ltd.



## 2010 NO<sub>x</sub>-Combustion Round Table & Expo Presentation

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# SCR Safety 101

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# Safety Concerns Arise From

- The physical design of the SCR system
- The chemicals used to obtain NO<sub>x</sub> reduction

# Moving Catalyst Modules

- Modules are heavy
- Honeycomb modules must be set upright
- Modules must be hoisted to the SCR box and transferred to monorail hoists
- Modules must be moved into position in the SCR box

# Catalyst Module Turning Device



# Catalyst Lifting Fitting



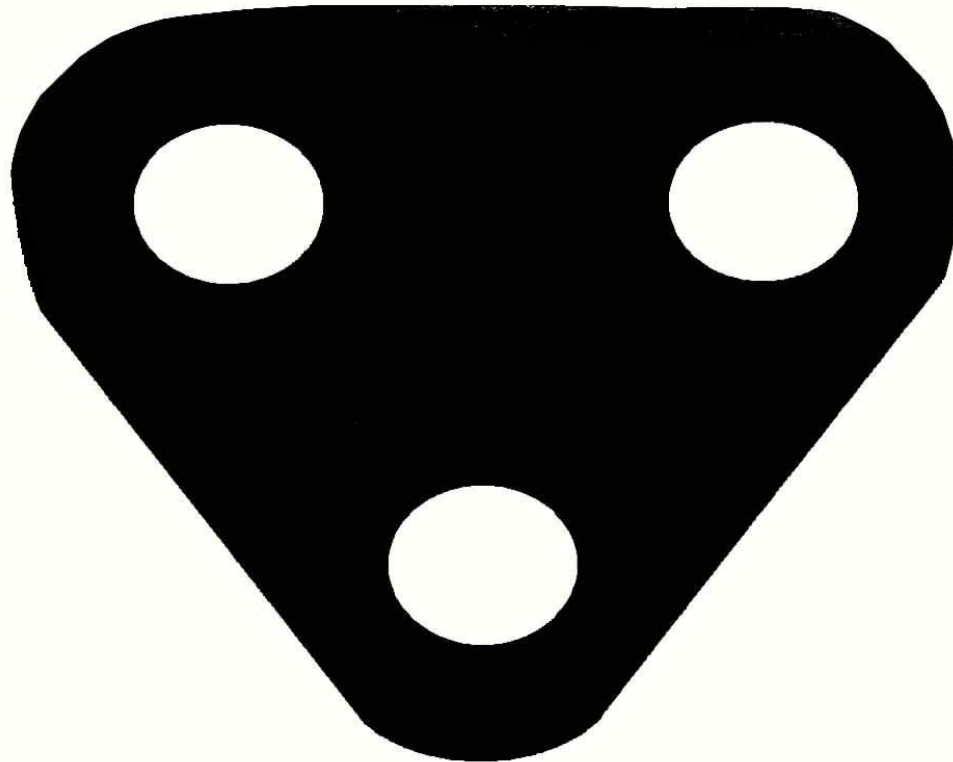
# Hoisting Catalyst Module



# Transfer to Monorail Hoist



# This Hook Block Allows Transfer of the Load Without Setting It Down



# Placing Module in SCR Box



# **SCR Boxes Are Definitely Confined Spaces, So All Of The Confined Space Procedures Must Be Followed When Working Inside One.**

- There have been problems getting SCR dampers to seal properly.

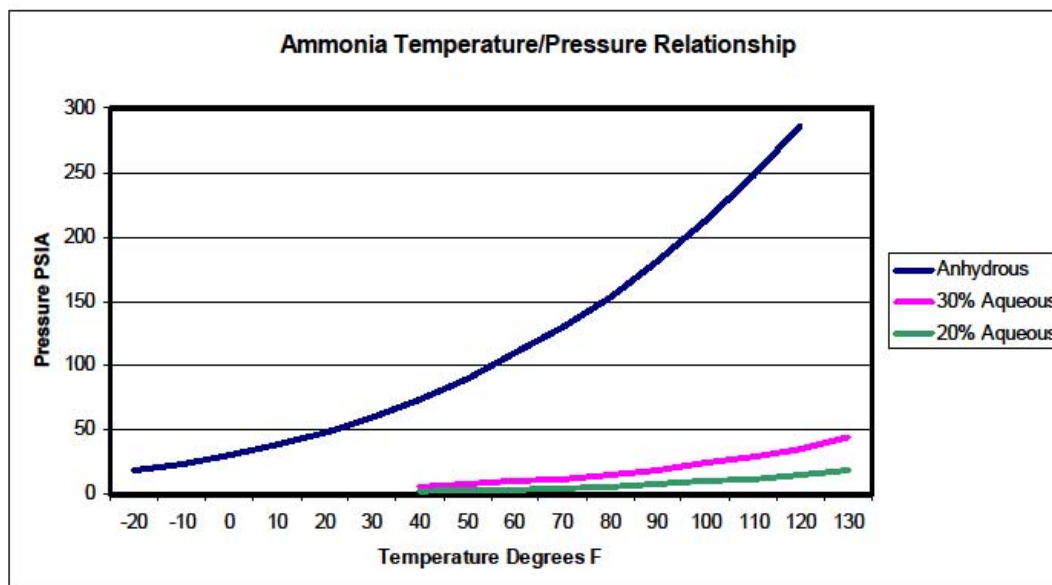
# The 3 Chemicals Typically Used In SCRs Are

- Anhydrous Ammonia
- Aqueous Ammonia
- Urea

# Chemical Selection Factors

- Government Regulations
- Public Concern
- Delivered Cost
- Storage Issues

# Ammonia Vapor Pressures



# Anhydrous Ammonia Storage



# Anhydrous Ammonia Unloading



# Aqueous Ammonia Storage



# Urea Storage



# Process Safety Management (PSM) Regulation 29 CFR 1910.119

- The standard applies to a process which contains a threshold quantity or greater amount of a Highly Hazardous Chemical (HHC) as specified in Appendix A of the standard.

# The HHC list includes:

- Anhydrous Ammonia
- Aqueous Ammonia (with an ammonia content greater than 44% by weight)
  - **Aqueous Ammonia delivered commercially is normally less than 30% ammonia by weight**

# The PSM process includes the following requirements:

- Process Safety Information
- Employee Involvement
- Process Hazard Analysis
- Operating Procedures
- Training

# The PSM process includes the following requirements: (cont.)

- Contractors
- Pre-startup Safety Review
- Mechanical Integrity
- Hot Work
- Management of Change

# The PSM process includes the following requirements: (cont.)

- Incident Investigation
- Emergency Planning and Response
- Compliance Audits
- Trade Secrets

# There is nothing in the PSM process one shouldn't already be doing.

- It is more structured and documented
- It ensures employee involvement
- Records need to be kept
- Compliance needs to be audited

# Questions??