

Reinhold Environmental Ltd.



2010 NOx-Combustion Round Table & Expo Presentation

February 8 & 9, 2010

Chattanooga, TN

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NH₃ System Inspections for PSM Compliance

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Purpose Of Inspections

- ◆ Assure Compliance with:
 - OSHA and CFR 29/1910.111
 - ANSI K61.1
 - Plant PSM Requirement
- ◆ Limit Liability Associated with Highly Hazardous Chemicals
- ◆ Safe Work Environment at Site

Areas of Inspection

**NH₃
Tanks**

**Piping
Systems**

Vaporizers

**Pumping
Systems**

**Emergency
Systems**

**Leak
Detection**

**Dilution
Air/
Metering**

**Truck or
Train
Offloading**

**Controls
Instruments**

NH3 Tanks

- ◆ Internal Inspection

- Corrosion

- » UT Thickness Test

- Heat Affected Zones at Welds

- » Stress Corrosion Cracking

- ◆ Photoluminescence Mag Particle Test

- Excess Flow Valves

- » Check Operation and For Debris

- Instrument Functions

- » Level Floats

Tank Entry

- ◆ Removal of Ammonia
 - Move to other tanks at site
 - Bring in spare tank for transfer
 - Scrub with H₂O and dispose of
 - Flare off
- ◆ Vent with N₂
 - Reduce Ammonia concentration to under 15% LEL before exposing tank to O₂
- ◆ Confined Space

Confined Space

◆ Hazards

- Asphyxiation
- Chemical exposure

◆ Precautions and Safety's

- Confined Space Entry Permit Procedures
 - » Ventilation
 - » O₂ Monitoring
 - » Rescue Plan
- Lock Out Tag Out Procedures

Mag Particle Inspection



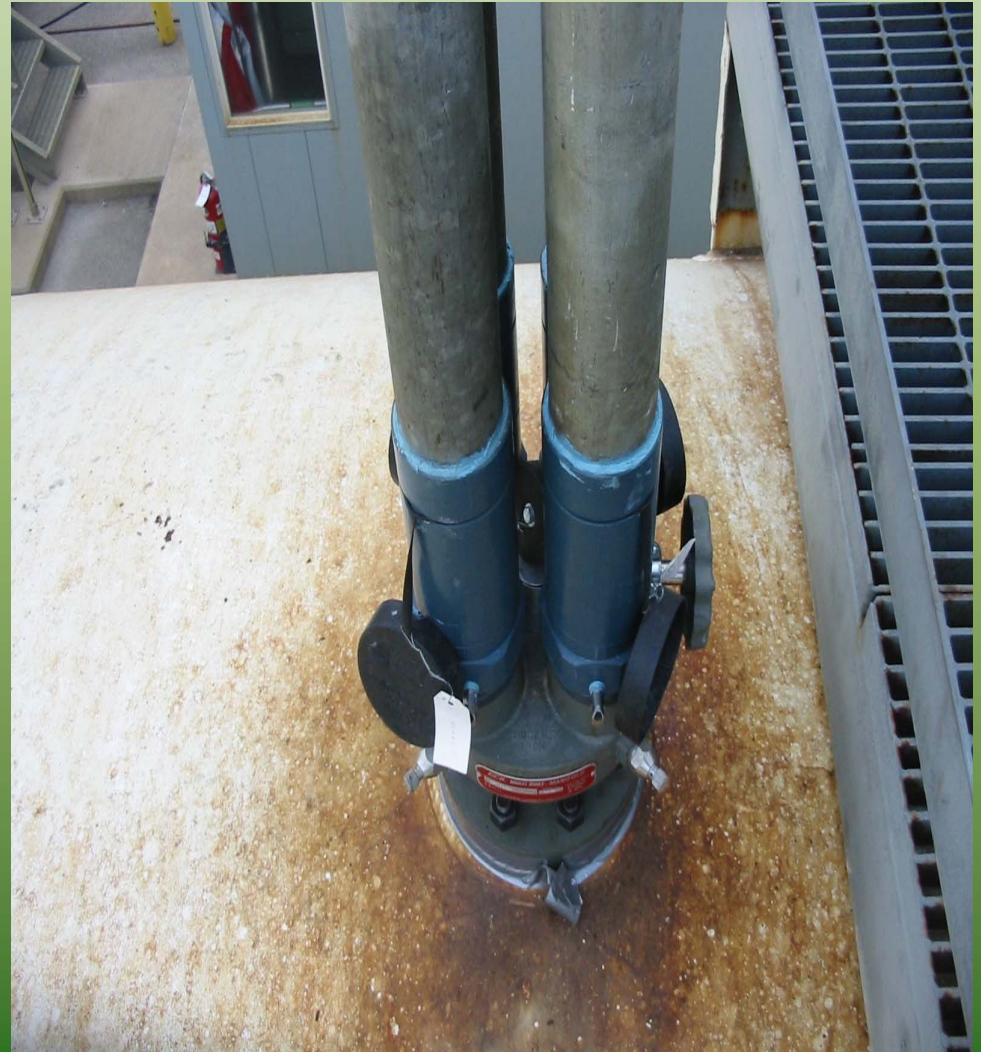
Internal Excess Flow Valve



Tank Level Float



ASME Pressure Relief Valve



After Inspection Completed



After Inspection Purge



Leak Testing



Exterior Corrosion on Tank



Piping Systems

- ◆ External Inspection
 - Corrosion
 - Paint Failure
 - Evidence of Leaks
- ◆ Hydro Static Relief Valves
 - Five Year Replacement
- ◆ Block Valves
 - Packing or body leaks
 - Smooth Operation
 - Positive Isolation

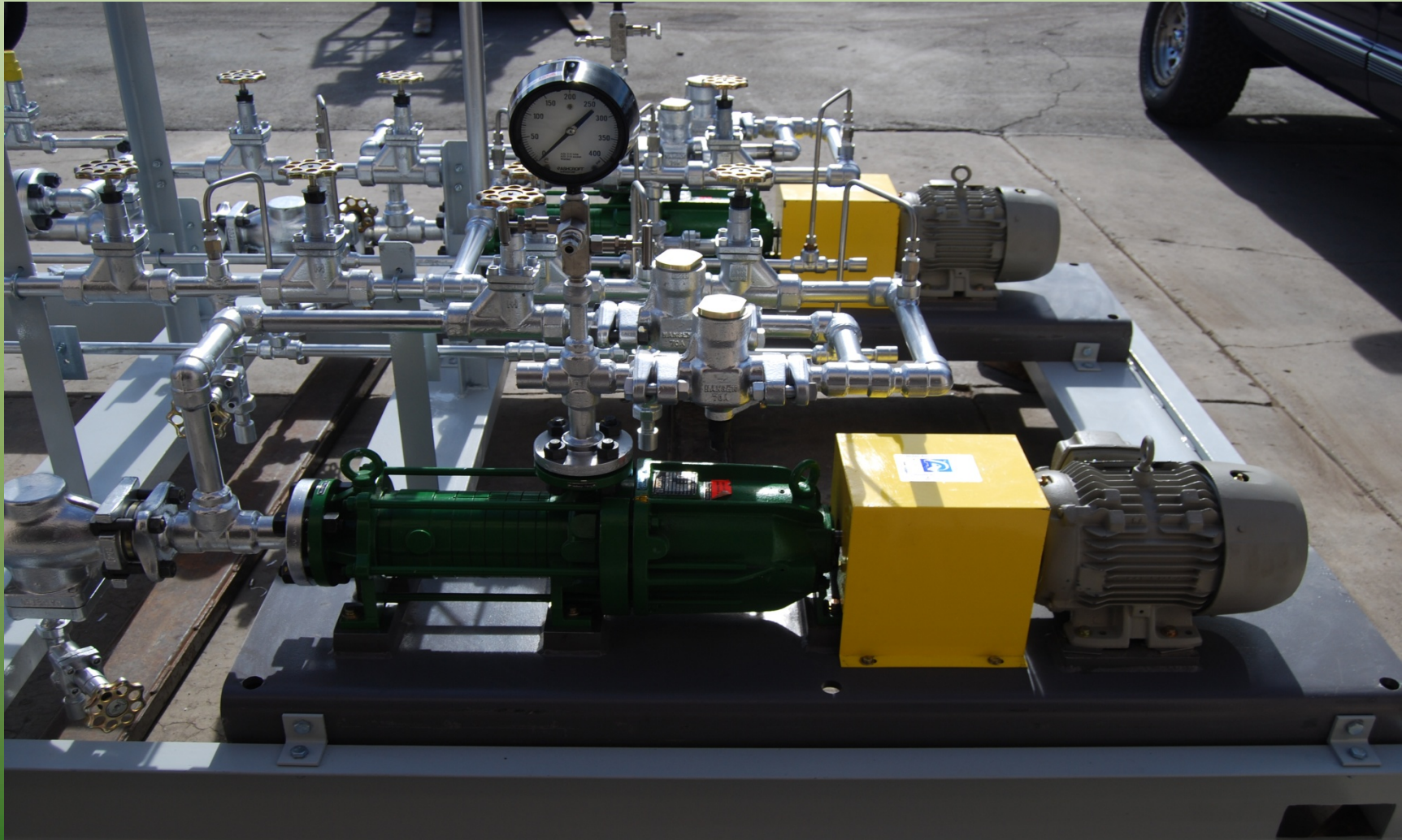
Paint and Corrosion



Pumping Systems

- ◆ External Inspection
 - Corrosion
 - Paint Failure
 - Evidence of Leaks
- ◆ Bearing Maintenance
 - Lubrication
- ◆ Pump Inspections
 - Leaks at Seals
 - Operational Check

Pump Skids



Vaporizers

- ◆ External Inspection
 - Corrosion
 - Paint Failure
 - Evidence of Leaks
- ◆ Drain Shell Section of Oil
 - Compressor Oil from Ammonia

Oil From Vaporizer



Dilution Air

- ◆ External Inspection
 - Corrosion
 - Paint Failure
 - Evidence of Leaks
- ◆ Bearing Maintenance
 - Lubrication
- ◆ Fan Inspections
 - Cracks
 - Wear in High Dust Areas

Controls Calibration


**ENVIRONMENTAL
EQUIPMENT SERVICES** INSTRUMENT CALIBRATION FORM

COMPONENT	MANUFACTURER	PROJECT
INSTRUMENT TAG NO.: CCGE-TT-1004	MANUFACTURER: YOKOGAWA	NUMBER:
DESCRIPTION: TEMPERATURE TRANSMITTER	MODEL: YTA110-DA2DB/FU1	NAME: DP&L - J.M. STUART PLANT
LOCATION: NH3 STORAGE TANK 4	SERIAL: C2G216088	

FUNCTIONS					
	RANGE	VALUE	UNITS	COMPUTE?	CONTROL? ACTION(direct/reverse)? MODES (P/I/D)?
Indicate/Record?	CHART			FUNCTIONS:	SWITCH? UNIT RANGE (value/unit)? -40 TO 185 DEG F DIFFERENTIAL (fixed/adjustable)? RESET (automatic/manual)?
	SCALE	DIGITAL	DEG F		
Transmit/Convert?	INPUT	TC	TYPE K		
	OUTPUT	4-20mA	DEG F		

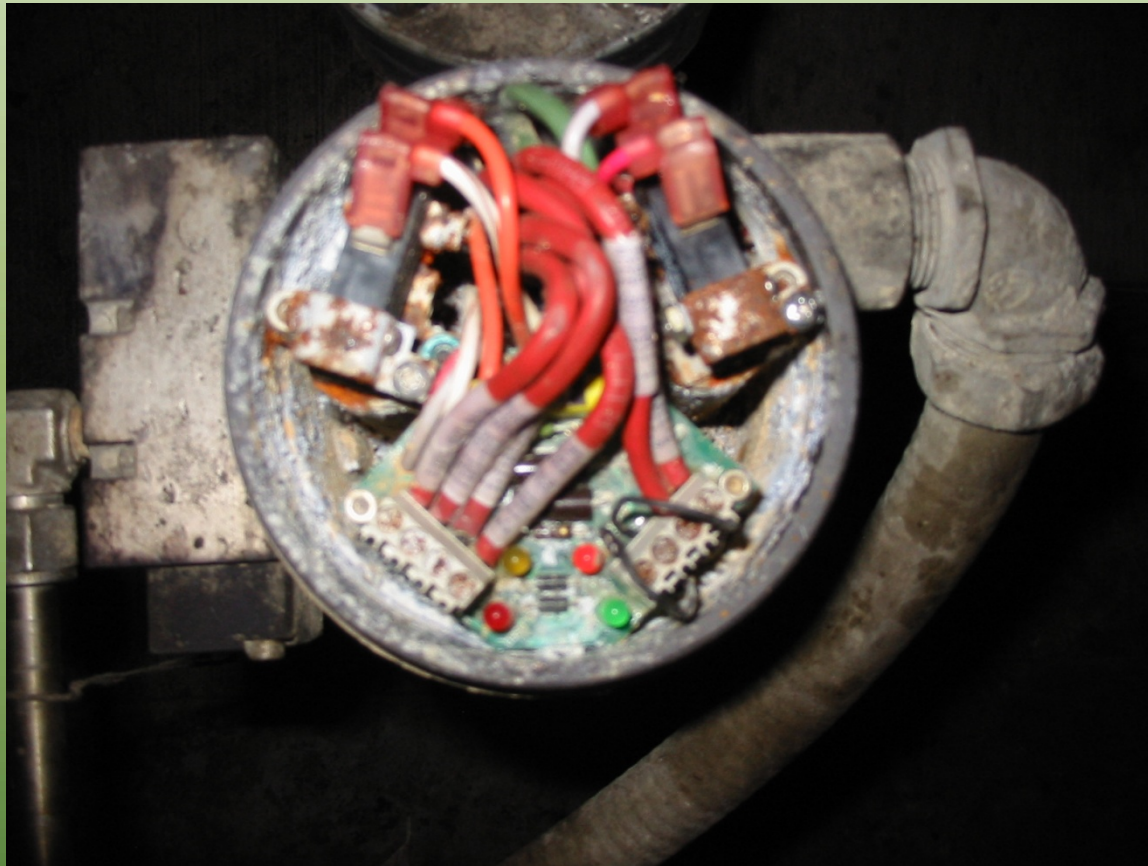
ANALOG							DISCRETE					REMARKS CODE
REQUIRED			AS CALIBRATED				REQUIRED			AS CALIBRATED		
IN	SCALE	OUT	SCALE	OUT	SCALE	OUT	NO.	TRIP PT.	RESET PT.	TRIP PT.	RESET PT.	
TC			-40 F	0.96 V	185 F	4.97 V						
-40 F	0%	1 V	16.3 F	1.96 V								
72.5 F	50%	3 V	72.5 F	2.97 V								
185 F	100%	5 V	128.8 F	3.97 V								

CONTROL MODE SETTINGS: P I D											
REMARKS: UPSCALE BURNOUT, UPSCALE TRANSMITTER FAILURE										COMPONENT CALIBRATED AND READY FOR STARTUP	
										BY: BRIAN ROGERS	
CALIBRATION INSTRUMENT USED: YOKOGAWA BT200, EXTECH 433201A, FLUKE 705										DATE: 10-16-09	
SERIAL NO:										WITNESSED:	

Controls Calibration

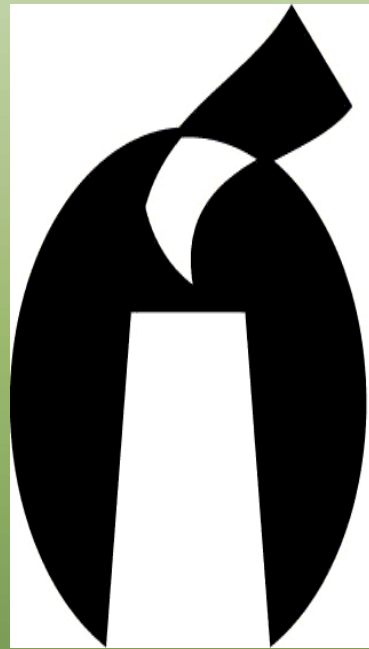


Ammonia Caused Corrosion





Thank You



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EQUIPMENT SERVICES