REINHOLD ENVIRONMENTAL Ltd.

2013 NOx-Combustion Round Table & Expo Presentations

February 18 & 19, 2013, in Salt Lake City, UT / Hosted by PacifiCorp

NH_3 Tank and Equipment Inspections for PSM and OSHA Compliance

Mike Vukmir

Environmental Equipment Services

Knoxville, TN

Areas of Inspection

- NH_3 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
  - Consume as much as possible
  - Move to other tanks at site
  - Bring in spare tank for transfer
  - Using vacuum pump pull a vacuum on tank down to design vacuum sucking NH_3 out of tank and scrubbing with water and phosphoric acid and dispose of PH neutral solution or flare off

Tank Entry

- For example a 55K gallon tank at 0 PSIG has about 300 pounds of remaining ammonia in the tank. depending on ambiant temperature. Reduce Remaining Concentration with N_2
- Reduce Ammonia concentration to under 50 lbs. to open lid and remain under reportable release.
- Well under LEL before exposing tank to O_2 15.5 – 27%

Tank Entry

Tank Entry

- Remove man way and allow remaining NH3 to vent to atmosphere using a forced air blower over a period of at least 8 hours until NH3 level has dropped to under 35 PPM the time weighted avg.

Confined Space

- Hazards
  - Asphyxiation
  - Chemical exposure
- Precautions and Safety's
  - Confined Space Entry Permit Procedures
    - Ventilation
    - O_2 Monitoring
    - Rescue Plan
  - Lock Out Tag Out Procedures

Initial Entry

Mag Particle Inspection

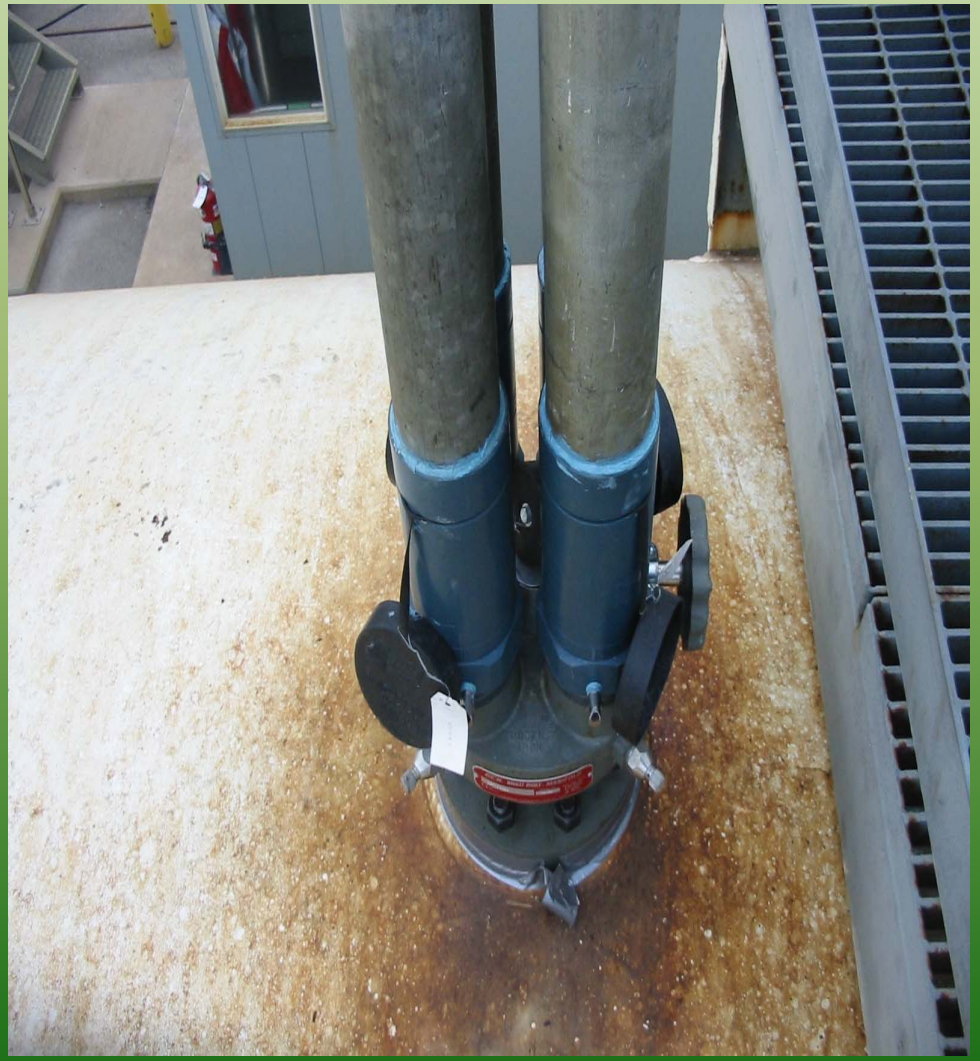
Mag Particle Inspection

Internal Excess Flow Valve

Tank Level Float

Tank Level Float

ASME Pressure Relief Valve



After Inspection Completed

After Inspection Purge

Leak Testing With Helium

Leak Testing With Helium

Exterior Corrosion on Tank

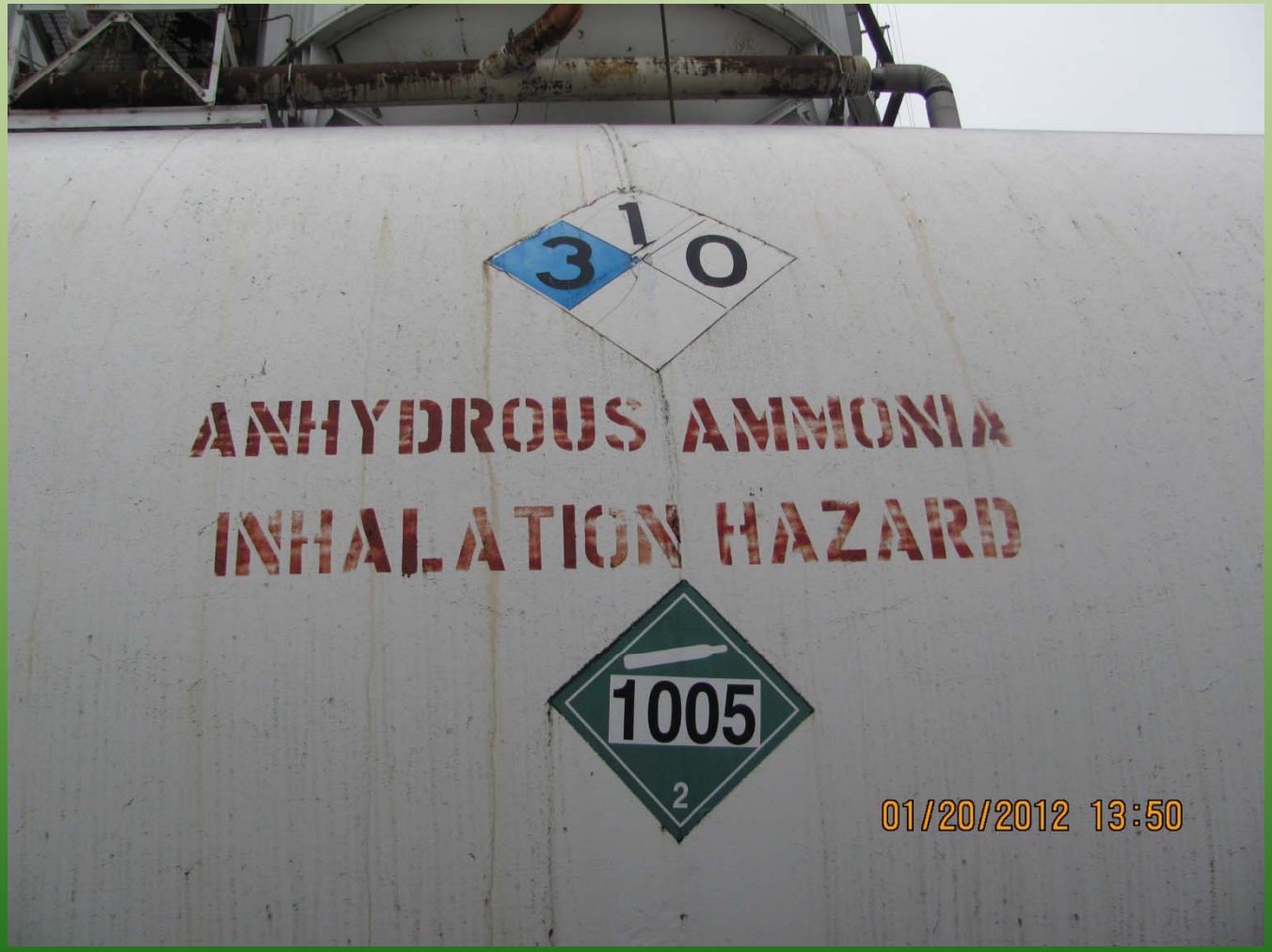
Paint and Corrosion

Paint and Corrosion

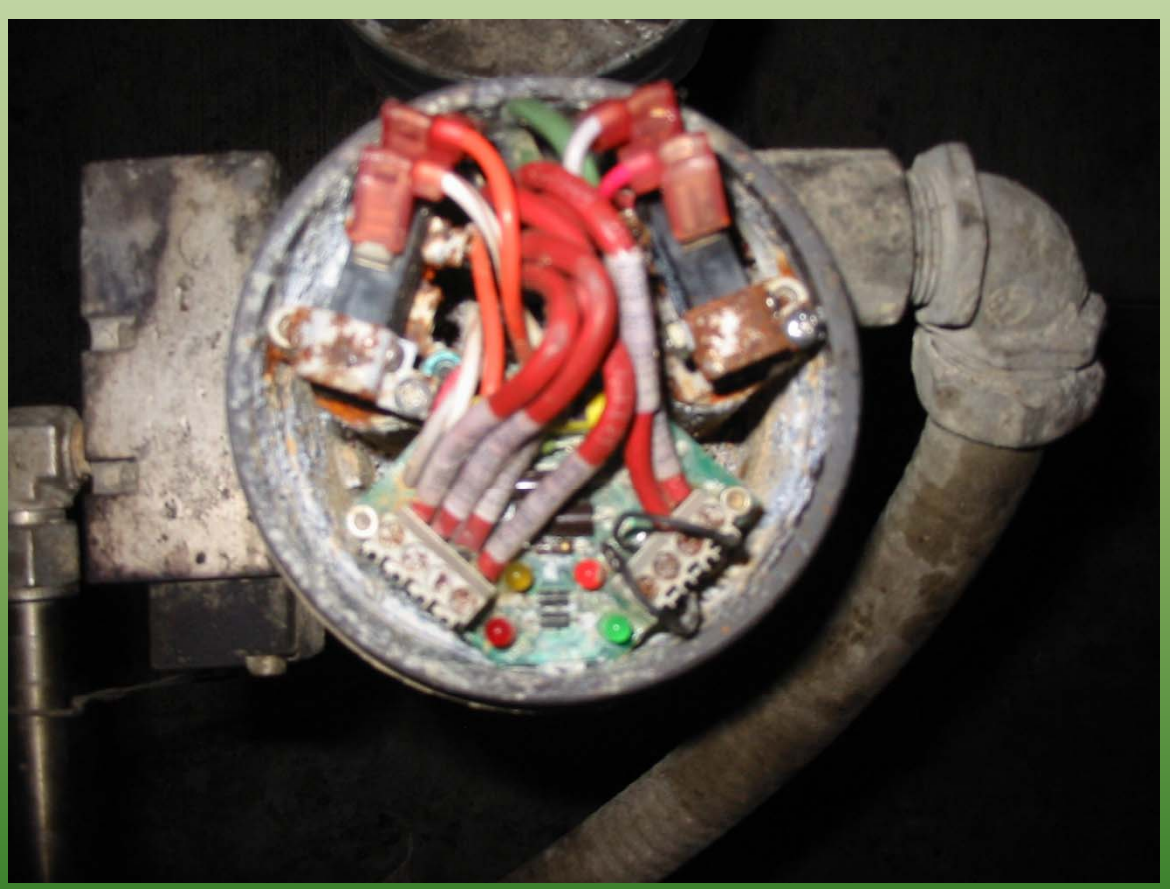
Ammonia Caused Corrosion

Labeling and Warnings

Labeling and Warnings



Ammonia Caused Corrosion



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:	
	SCALE	DIGITAL	DEG F		SWITCH? UNIT RANGE (value/units)? -40 TO 185 DEG F DIFFERENTIAL (fixed/adjustable)? RESET (automatic/manual)?
Transmit/Convert?	INPUT	TC	TYPE K		
	OUTPUT	4-20mA	DEG F		

ANALOG							DISCRETE					REMARKS
REQUIRED			AS CALIBRATED				REQUIRED			AS CALIBRATED		
IN	SCALE	OUT	SCALE	OUT	SCALE	OUT	NO.	TRIP PT.	RESET PT.	TRIP PT.	RESET PT.	CODE
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

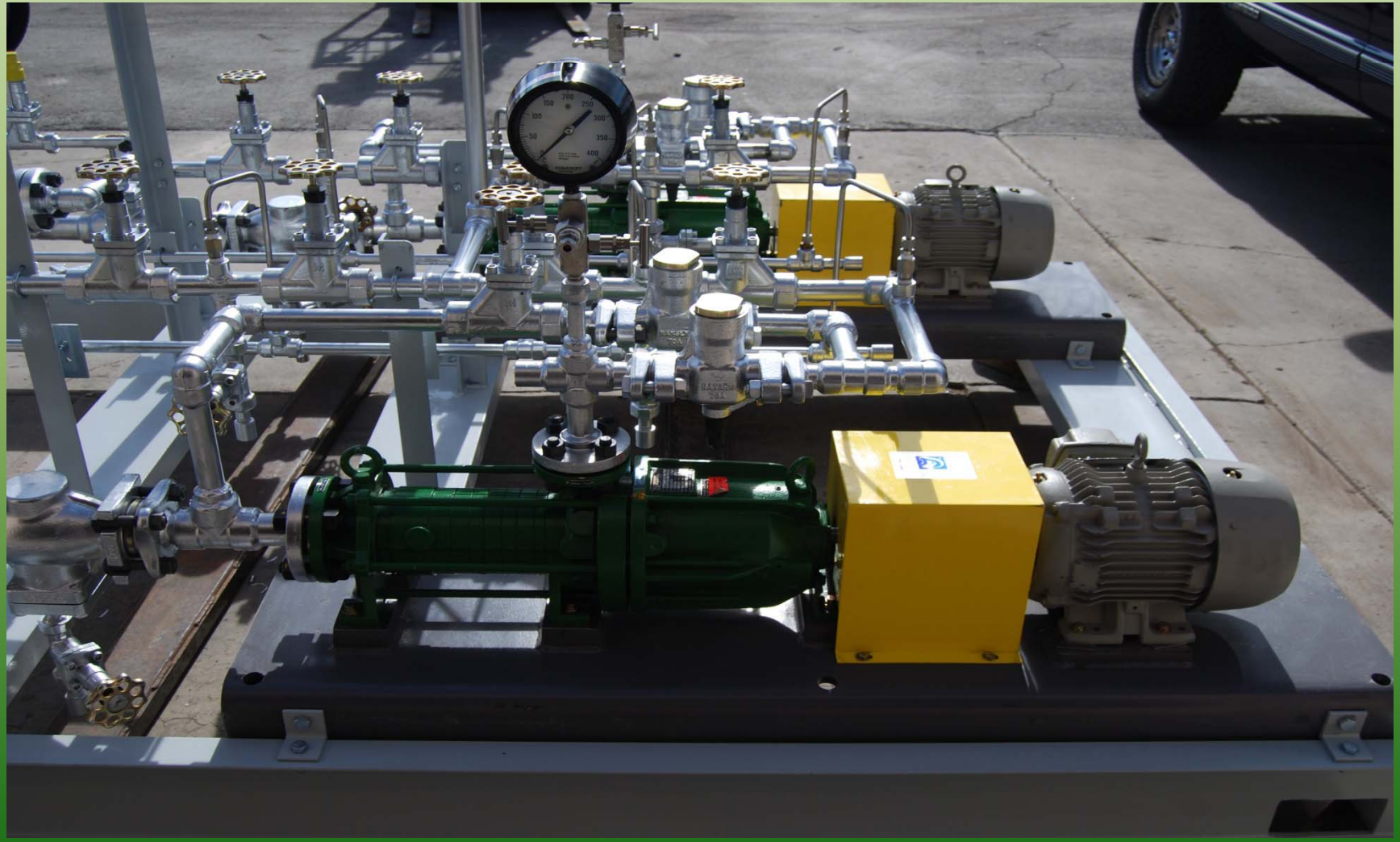
Piping Systems

- 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

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

Personnel Safety Equipment

Thank You