

Oil, Oil Everywhere, and not a drop of Vinegar

Background

- Bridgeport Harbor Station has a tank farm with tanks of 15 million gallon capacity
- The tanks contain #6 oil heated to 120 degrees F; at room temp the oil is like molasses
- The plant also burns coal
- The plant resides on tongue point protruding into Bridgeport Harbor

Facts

- When the coal unit is ramping up all the bells and whistles are shut off
- During start up and ramping almost every alarm is actuated
- It takes about 4 hours to get to a semi steady state in the operation
- Startup began about midnight

The Problem

- On the shift before start up it was decided to transfer oil from one storage tank to another
- A tanker was expected and the objective was to off load into only one tank
- Due to the bells whistles being off, the tank high level alarm was not noticed
- At 4:30 a.m. the alarm was noticed; by that time 850,000 gal. of oil had been pumped out
- The oil went from out the top relief vent to the ground inside the berm, 50 feet from the harbor
- All electrical sources were disabled
- This was a major media event

What was the major hurdle – it was not foreseen in the Response Plan

Why am I on Fire?

Background

- The Century Brass casting shop casts 4 million pounds of metal a day
- This process creates metal oxides that need to be exhausted
- Over 100 different alloys are produced containing copper, zinc, lead, nickel, chromium, tin
- Baghouses are used to capture the metal oxide fume

Facts

- There is a 2 -3 second residence time from the furnace to baghouse
- Lampblack and charcoal are used to create reducing atmospheres on the molten metal
- The casting shop usually works a 6 day week
- This is a 24 hour per day operation
- When the casting shop is down, the baghouses are shut off

The Problem

- The baghouses periodically catch on fire
- Whether the bags are Nomex, wool, cotton, or fiberglass the fires still occur
- Of the 12 baghouses each has had a fire, there is no pattern
- The bag spacing has been addressed as well as the bag cleaning procedure

What is the culprit ?

We Need to Knock the NOx

Background

- There is a wire mill in the Far East making mild steel wire
- They begin with rod and draw down the product to finished diameter
- This is a high volume mill and it has state of the art processing equipment
- It has a very sophisticated technical staff

The Facts

- In order to process the coarse wire into fine wire it must be annealed
- This annealing process creates oxides on the surface
- In order to retain metal quality, the oxides must be removed
- This removal is performed with a 10% Nitric Acid solution
- The solution is stabilized with urea

The Problem

- New air pollution regulations were established last year
- These regulations limit NOx emissions
- The pickling process is exothermic, so the solution temperature needs to be controlled
- Periodically the solution overheats, decomposes, and billows of NOx are emitted
- 3 – PhD Chemists are assigned to the problem – solution? Limit each load to 40,000 lbs of metal
- Regardless of hour to hour chemistry and temperature measurements there continues to be sporadic spontaneous decompositions

What is the Answer?