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From the Desk of Mike Bell

Mar Tech celebrates its 20th anniversary this year. The business was started in 1982 as a small process and mechanical consulting firm. We had a "rocky" couple of years during the 1982-1983 recession but slowly our workload grew. Our discipline capabilities have expanded to include structural, electrical, and instrumentation. We designed and built our own office building in 1990. Our clients include pulp and paper, wood products, refinery, and chemical facilities.

Our larger projects have ranged from a turnkey salt evaporation plant for a chemical client to a grass roots extrusion coater plant at a new site. The majority of our clients are mills and plants but we also successfully work with contractors and vendors on "Turnkey" projects. However, an important part of our business is the many and varied small projects that we accomplish each year.

Our experience gained in accomplishing over 1100 projects in 20 years has broadened our experience and expanded our capabilities that we offer our clients. We continue to upgrade our computers, software, equipment, etc. to better and more efficiently accomplish our work and serve our clients.

The consulting engineering business is a cyclic, challenging occupation that continually demands the best of an organization. Mar Tech has been blessed with its accomplishments for the last 20 years and looks forward to the next twenty years of corporate life.

DESIGN CONCEPTS FOR HVLC SYSTEMS

By Mike Bell P.E.

INTRODUCTION

EPA regulations are forcing Kraft mills to install HVLC systems. The design concepts for HVLC systems vary due to the physical arrangement of the mill, sources collected, and the disposal method. This makes the design of a HVLC system specific to a particular site.

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SWEEP AND SEALED SYSTEMS

It is important to limit flows from the sources as much as possible by minimizing excess air pulled through the transportation system from the sources.

Washer and knotter hoods need a certain amount of sweep air to function. In some instances changing levels in vessels alter the airflow. One of the primary problems is how to deal with tanks. It is desirable to seal tanks and operate with a small vacuum level inside the vessel. However, few existing tanks in mills were constructed to withstand vacuum conditions. The option is to install additional vent nozzles and sweep the tank for the desired vapors. Thus, the economics of upgrading the tank for vacuum service versus the increased HVLC system cost for not upgrading the vessel must be evaluated. It should be noted that even providing sweep air for a tank will impose some vacuum on the vessel.

TRS ABATEMENT

One or more of three processes is normally considered for TRS abatement:

1) Thermal Oxidation
2) Chemical Oxidation
3) Absorption

Thermal oxidation is a popular method and can utilize recovery boilers, power boilers, bark boilers, incinerators, regenerative thermal oxidizers, and lime kilns.

The most common scrubber media is a caustic media. Other liquids used have included ClO_2 solution, acidic chlorination bleaching effluent, and others.

Caustic scrubbing liquids are effective in removing hydrogen sulfide and methyl mercaptan from the gas stream. However, dimethyl sulfide and dimethyl disulfide are not removable in significant quantities by caustic solutions.

LEL METER

An LEL meter can be an important feature in the system operation. The meter is typically located prior to the incineration point.

System design normally provides for 25% or less LEL. An alarm or divert at 50% LEL should be considered.

A thorough evaluation of the TRS components and flow rates for all sources entering the HVLC system is necessary. The evaluation should include %TRS, volumetric flow, temperature, and moisture content. The analysis should include normal steady state conditions and as many upset conditions as possible. The amount of TRS can vary significantly due to start-up and varying operating conditions. An LEL meter provides a final evaluation of the gas stream.

TURPENTINE

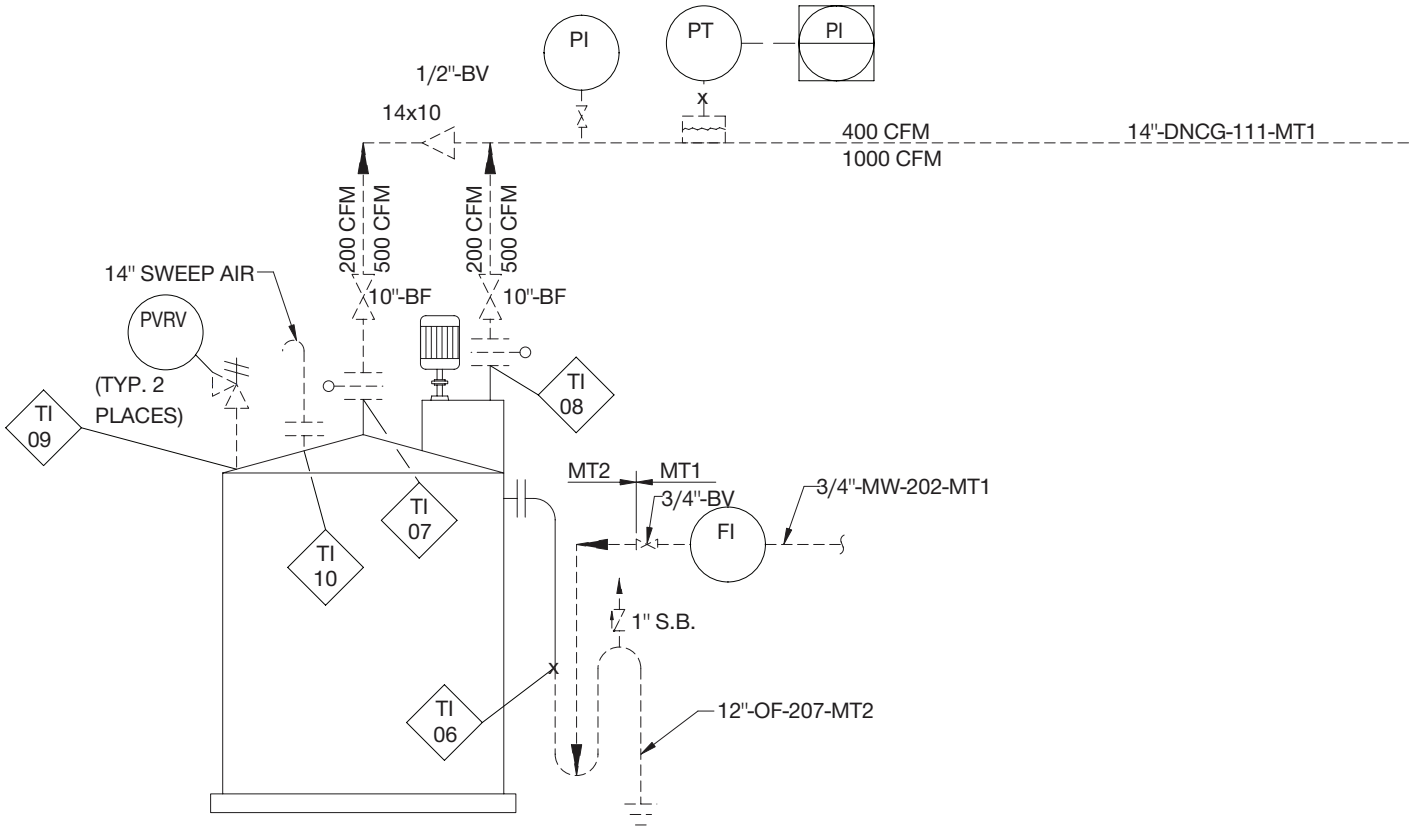
Turpentine is the primary cause of explosions and fires in NCG systems. It can represent a hazard for dilute NCG systems if turpentine is represented in any of the sources. Turpentine can be ignited from sources such as static electricity, electrical spark, welder sparks, or reaching the auto-ignition temperature of 487°F. Turpentine has a LEL of approximately 0.80% with an UEL that is undefined. Thus, turpentine is of concern because of its low LEL combined with a very fast flame propagation speed of approximately 500 fps. Because of these traits turpentine is very dangerous and it is important to remove condensate that contains turpentine from transport lines.

SAFETY CONSIDERATIONS

The design of HVLC systems should be such that escape of any TRS gases to the atmosphere is minimized. A TRS monitoring system and alarms should be installed in any areas that allow personnel exposure.

HVLC systems normally operate below the explosive range. However, it is prudent to monitor the gas stream with a LEL meter as previously described.

Adequate drains from the transportation headers should be installed to drain all condensate. These drains must be sealed and the condensate transferred to a proper collection point.
Other safety devices such as rup-



NO. 2 FILTRATE TANK

ture discs and flame arrestors can be considered but are not needed as much on a HVLC system as compared to a LVHC system. A flame arrestor upstream of the combustion device can be utilized.

GAS CONDITIONING

Depending on the requirements of the final incineration point, the gas stream should be cooled to remove turpentine, water vapors, and other condensable compounds. The gas should then be reheated before injection into the furnace to prevent water from entering the furnace.

TRANSPORTATION SYSTEM

The gas transportation system shall typically consist of some or all of the following components beginning at the outlet of each source:

- Fan
- Transportation Piping
- Gas Cooler
- Mist Eliminator
- Gas Preheater
- Condensate Separator
- Vent Valve to Atmosphere
- Ejector to Atmosphere (interlocked to fan drive and used upon power failure)
- Instruments and Controls

CONCLUSION

This article has reviewed the general design concepts necessary for a HVLC transportation system. The requirements for a HVLC system depend upon the point of incineration, physical arrangement of the plant, tank design, volume and composition of the gas streams, along with other factors.

Word Origin

Golf: named from a club

It is unfortunate that the origin of the name of such a popular game cannot be traced with absolute surety. The majority of the scholars claim that it came from the Dutch word kolf, the term for a club that was used in such games as hockey and croquet. This might indicate that golf began in Holland. It is true that most of the early accounts of the game are out of Scotland, but the records show, nevertheless, that the Scotch imported their best golf balls from the Dutch. The game grew to such popularity in Scotland that the government became disturbed. Golf was crowding out archery as a sport, and practice in archery was important to war. So in March, 1457, the Scottish Parliament decreed that golf be "utterly cryit doun and nocht usit." A few years later James I forbade it entirely, as he had done with bowling, yet the accounts of the Lord High Treasurer for 1503-1506 still show that the Crown's money was going for golf balls. As a side light, Mary Stuart, Queen of Scots, was a golf fiend and played a few rounds several days after the murder of her husband. However, as students of history will recall, the girl came to no good end.

Word Origins—Wilfred Funk

Committee: A group of people who individually can do nothing but as a group decide that nothing can be done.--Fred Allen

The pessimist may be right in the long run, but the optimist has a better time during the trip.

When you help someone up a hill, you get that much closer to the top yourself

I don't know the key to success, but the key to failure is trying to please everybody.--Bill Cosby

If you lead through fear you will have little respect. But if you lead through respect you will have little to fear.