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IN THIS ISSUE

FREEDOM

A STATE OF MIND

A WAY OF LIFE

GOD BLESS AMERICA!

From the Desk of Mike Bell

This issue of On Line with Mar Tech provides an article on implementation of MACT II for the paper industry. The implementation of MACT II for the paper industry requires the collection of dilute sources of non-condensible gases. The large volume of air and gases will require a fan be used for motive force for most applications. The design of the collection and transportation system will present some design challenges. Tanks, hoods, etc. will require modification to withstand the vacuum that will be placed upon them. The incineration point for the dilute non-condensable gases will require particular study. The article in this newsletter looks at the recovery boiler as an incineration point along with some of the details that must be considered.

BE THANKFUL

Don't ever forget to be thankful
For every blessing you find on your way.
Each small happiness is a measure
That weighs in for you day after day.

Hold on to the blessings you gather;
Fill your mind with the joy that they give.
Your whole life will take on new meaning…
Build on love and you truly will live.
Lola Neff Merritt

You might be an engineer if your three year old son asks why the sky is blue and you try to explain atmospheric absorption theory.

Incineration of Dilute Non-Condensible Gases at the Recovery Boiler

The purpose of this article is to examine the incineration of dilute non-condensible gases (DNCG) at the Recovery Boiler. For the purpose of this article DNCG's are defined as a stream with a mixture of TRS, organics, and air that is typically below the lower explosive limit (LEL) of the gas mixture. Although the streams are normally below the LEL of the mixture, many of the design requirements for flammable concentrations of flammable gases should be employed.

Dilute non-condensible gases can be collected from any source where dilute gases are being emitted and include the following as well as other sources:

*washer hoods
*brown stock knotter hoods
*liquor and misc. storage tanks
*foul condensate storage tank
*continuous digester chip bin
*sewers
*lift station effluent vents

While these gases are considered to be below the LEL for the mixture and not explosive, some sources such as the chip bin can exceed the LEL at times. If turpentine is present it always represents a major threat to process safety.

A number of types of combustion equipment can be used to incinerate waste streams such as DNCG's. The Recovery Boiler has greater operational and safety issues than do the other available potential incineration points. The initial reaction is to not place any waste NCG stream in the Recovery Boiler.

However, the Recovery Boiler has a number of positive attributes for handling the DNCG stream. A DNCG collection system will have a large volume of air flow and the recovery boiler can normally handle this much air flow without problems.

DNCG's have less of an impact on emissions for a Recovery Boiler than other incineration points. The recovery furnace has a high capture efficiency for the sulfur. The sulfur is recovered as saltcake and maintained within the liquor cycle. The sulfur captured is influenced by the liquor sulfidity level and black liquor solids concentration.

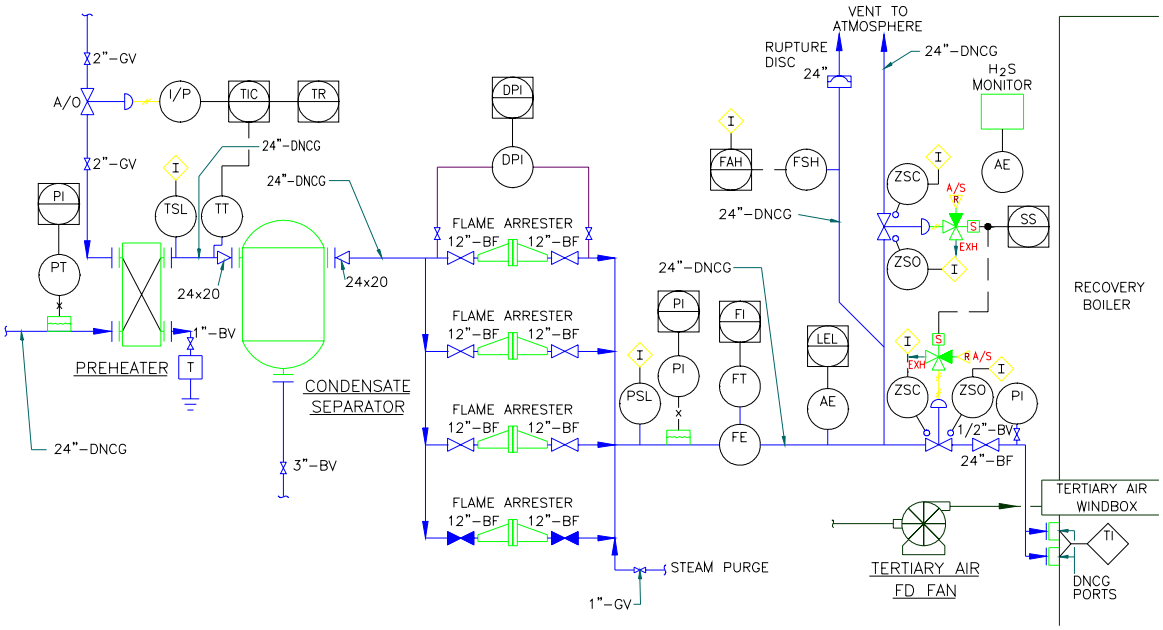
TRS gases are highly toxic and extreme care must be taken to minimize personnel exposure to the gases. Attention must be given to the type of piping, flanges, gaskets, etc. along with the routing in the recovery building.

Injection in secondary air and fan suctions can present opportunities for leaks in existing ducts and equipment. Direct injection of the DNCG stream by special nozzles into the furnace at the correct location provides the best design for minimizing leaks.

There are a number of design and safety concerns associated with placing DNCG's in the recovery. While this article does not pretend to cover all these issues, some of the more pertinent issues are provided:

1. The gas injection nozzles into the furnace must be sized properly. The nozzle velocity must be high enough to prevent flames from traveling back through the nozzle. However, the pressure drop through the nozzle must not restrict the system flow rate.
2. Any possibility of introducing water into the Recovery Boiler furnace is to be eliminated. The piping and duct must be designed to remove all condensate. A gas cooler to condense some of the water vapor and a heater to reheat the DNCG to a relative humidity of 50% or less is necessary.
3. The potential of a NCG explosion within the furnace of the Recovery Boiler is to be avoided. The DNCG stream must not be allowed to become concentrated above its LEL. Obviously, turpentine is of special interest because of the fast flame propagation speed (approximately 500 fps) and its low explosion limit (LEL).
4. The leakage of NCG gases within the Recovery building be prevented and personnel should not be exposed to the gases. TRS monitoring and alarms should be installed wherever personnel exposure to the gases are possible.
5. The logic for starting and tripping of the DNCG should be carefully integrated with the Recovery Boiler logic. At a minimum, the BLRBAC recommended controls should already have been implemented on a PLC based control strategy for the boiler. The appropriate sections of the BLRBAC Recommended Good Practices for Safe Firing of Auxiliary Fuels and Black Liquor in Black Liquor Recovery Boilers should be utilized.

By Mike Bell



NCG INJECTION INTO RECOVERY BOILER

Glossary of Louisiana Terms

Cajun: A descendant of the original Acadian refugees or anyone absorbed into the Cajun culture by marriage or choice. Cajuns settled mostly in southern Louisiana.

A votre sante: A French toast, “To your good health.”

Andouille: A type of sausage used in cooking. Originally made using pieces of intestine or chitterlings stuffed into a large casing with pork or ham, onions, garlic, and cayenne, then smoked.

Beignet: French for “fritter,” a doughnut-type batter usually deep fried in oil and sprinkled with confectioners’ suger. A New Orleans favorite often served with café au lait.

Café au lait: French for coffee with milk.

Cochon de lait: French for a suckling pig. A cochon de lait is often slow roasted over a bed of hot coals. It is usually cooked for a special occasion or holiday meal.

Etouffee: French for smothered. A dish made with onions, seasonings, meat, fish, or vegetables smothered and slowly cooked.

File: A seasoning used in Louisiana to thicken gumbos. Made from the dried leaves of the sassafras tree.

Gumbo: A soup made with a dark roux and water, also with seafood and meat. Eaten with rice and sprinkled with file. It’s also Bantu for the okra plant of pod.

Roux: Flour browned in fat: used to thicken gravies, gumbos, and sauces.

Po-Boy (poor-boy): A New Orleans tradition. Made with a loaf of fresh French bread, sliced in half lengthwise. Filled with meat or seafood with lettuce, tomatoes, onions, and many other ingredients.

LOUISIANA SEAFOOD GUMBO

Start off with your roux – Pam a skillet.

Roux: Mix together 1 ½ c. flour and 1 c. oil and cook over medium heat until it turns about the color of a copper penny. (If the house is on fire or a tornado comes keep stirring the roux). Empty the roux into a gumbo pot.

In the same skillet in which you cooked the roux, put a little oil and add the following: 2 c. celery, chopped; 2 c. onions, chopped; 2 or 3 cloves garlic, chopped. Sauté these ingredients until tender. Put into gumbo pot with the roux.

Add: 1 can Rotel tomatoes w/green chilies (cut the tomatoes up).
Boil: 1 lb. Andouille (gumbo sausage) cut into bite size pieces and drain. Add to gumbo pot.

Add: 2 quarts water, salt and pepper to taste. Let come to a boil, stirring constantly. *Turn heat down and cook for 1 hour.*

Add: 1 lb. crab meat; 1 lb. crawfish tails**;** 1 lb. shrimp, peeled. *Cook for 10 minutes*.

Add: 1 pt. oysters. *Cook for 5 minutes more*.

Turn the heat off and add 1 Tbsp. file. Do not let the gumbo boil after you have put in the file or it will be stringy. Some might like to add more file and/or red pepper at the table.

Serve hot over fluffy white rice. Good with French bread and a green salad.

Enjoy!!!

Filet

File is made from the leaves of the sassafras tree, which grows wild throughout Louisiana. About the middle of September, the leaves are gathered, cleaned and left to dry in the sun. After thoroughly dry they can be crushed easily into a fine powder using a food processor or blender. You can put the powder through a fine strainer to get out any large pieces. Store filet powder in an airtight container. Of course, you can go to the store and purchase file in Louisiana but it's not as much fun.

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