



# The Inspector

Volume 17, Issue 1

Spring 2010 Issue

Editor: Matt Keenan  
715-648-5000

## A WORD FROM OUR PRESIDENT

**By: Dave Homan:**

Have you seen our website lately? We have done some maintenance improvements to it to make it a more useful tool for the WBIA members and officers and just about anyone interested in our profession and related information about Wisconsin.

We have links to other sites that provide forms for use in the field, recall information about products and components used in the industry, information and news clippings regarding failures and incidents in our field.

There is a section that provides information on how to contact a board member. One can read the WBIA Constitution.

There is a section for board members and records only, this password accessible to authorized persons.

We have links to the State of Wisconsin website that hold the Wisconsin Administrative Code, and to many of our neighboring jurisdictions. Many of our members accomplish boiler inspections in other states, so we wish to provide links to their websites as best we can.

We even have a section Matt so aptly titled "Cool Docs". In that section you can view a photo of the burner front on a boiler in a fire room of ship that served in WWII and was decommissioned in the late 1950's. The rumor that is rapidly spreading saying that the navy CPO in the photograph is one of our Wisconsin brethren is unconfirmed at this time. I can tell you all it is not me. I do not have gold hash marks! We even have information from way back on the Hartford Loop.

We hope to maintain a website that is useful to our profession, informative, accurate and even a good place to surf on a motel room night when you know you've already seen the *Law and Order* reruns on TV and Section VIII Div 2 just isn't appealing at that moment.

If you would like to see material added to our website, please contact our webmaster, myself or our Vice President Jay Eckholm. There are links to our email addresses provided.

Finally, if there is something you would like to see on our website, please let us know. You can contact me directly at any time. My telephone number is 262-880-6864 or my email address is: [drhomanjr@yahoo.com](mailto:drhomanjr@yahoo.com)

Our webmaster Matt Keenan or any other WBIA Board Member or Officer can help too. Just let us know.

If you are a business owner, and would like to advertise your business, we have people who can help you with that. Please make your initial contact to our webmaster or to me directly at 262-880-6864 or by email to [drhomanjr@yahoo.com](mailto:drhomanjr@yahoo.com) and I'll get the right board member to contact you and work with you on your advertising.

I look forward to seeing you at our Industry Days event in Racine on April 14 & 15. We were able to get a great room rate of \$80.00 per night, per person, so hopefully that will make it easier for you to attend.

Thank you all for the safety you provide the people of the states you serve as inspectors in our industry. I'll see you in April.

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## IMPORTANT

**Continuing Education Requirements for All National Board Commissioned Inspectors Started in 2005!**

**Attending the WBIA Seminars helps you meet these requirements.**

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# The Chief's Words:

By: Mike Verhagen, Chief Boiler Inspector



The boiler safety section seems to be steaming full ahead. Spring is around the corner and another year is before us. The safety section will focus on the education of our customers for all program areas. A number of Program brochures have been updated and are available from our website to provide basic information. I even suggest everyone sign up to be regularly updated about any program desired. See "website info" below for details. As codes, requirements or forms change, your personal update will arrive via email. Speak of training, make your reservation now to attend our **6<sup>th</sup> Annual Boiler Safety-Industry Days scheduled April 14 -15 2010** at the Racine Marriott. Industry Days this year features an excellent National Board "In-service Inspection Training" program that addresses topics for the plant engineer, maintenance person, contractor and inspector. After a brief introductory each day, National Board instructors have teamed up to present two solid days of boiler training that include combustion basics, power & heating boilers, relief devices, fuel piping standards and all three sections of the NBIC-2007, (Installation, Inspection, and Repair). Registration deadline in March is fast approaching, so register now.

Appears overdue inspections are declining and report processing in Madison has been extremely efficient. I want to thank and extend my appreciation for your help and efforts to make timely inspections and electronic reporting possible. Thanks to inspectors, contractors and plant engineers in Wisconsin, our installations, in-service inspections and repairs make Wisconsin a safe place to work and play. I wish everyone good health and safe travels while assuring public safety in Wisconsin.

## DEPARTMENT NEWS

Late last year with the retirement of our past office manager, Rick Merkle, previously located in Madison, has been assigned supervisory-manager duties at the Waukesha office. Being March 2010, it is unbelievable that he already experienced

three months in the new Waukesha position. Please wish him well at your next opportunity.

The Department of Commerce has determined that "education" is an important priority for all our customers. Due to this fact, our Department in cooperation with other organizations began to develop code specialty training in the multi-areas of responsibility. As everyone should already know, our annual spring WBIA "Industry Days" seminar is a five year stand-out example in the Boiler Program. The Department has teamed up with other organizations to provide training for Hot water heating to building inspectors, Mechanical Refrigeration to HVAC contractors, and will soon assist with training to propane suppliers throughout the state. In cooperation with the Wisconsin Propane Gas Association, state inspectors have been assigned to present Comm 40 and NFPA 58 requirements. These seminars are scheduled this spring at numerous locations throughout the state.

As indicated earlier, Section Chief / Waukesha Office Manager Rick Merkle has moved to the Waukesha office. Waukesha office contact info as follows:

Department of Commerce  
Safety & Buildings Division  
141 NW Barstow St, 4<sup>th</sup> Floor  
Waukesha WI 53188-3789

Rick Merkle, Waukesha Section Chief  
Email: [rick.merkle@wi.gov](mailto:rick.merkle@wi.gov)  
262-561-5065 / fax **608**-283-7415  
(**608** ? Yes, system auto converts a fax to his email)

Mike Verhagen, Chief Inspector  
Email: [mike.verhagen@wi.gov](mailto:mike.verhagen@wi.gov)  
262-548-8617 / fax 548-8614

## DEPARTMENTAL CORRESPONDENCE

Continue to mail general correspondence to the Madison office:

Department of Commerce  
Safety and Buildings Div/Inspection Support  
PO Box 7302  
Madison WI 53707-7302

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# Department News:

By: Rick Merkle, Section Chief Safety & Buildings

Thanks for an outstanding year 2009 in maintaining a safe place to live in Wisconsin and welcome to another decade. I want to promote another 10 years of greater safety and need for everyone to be aware of all the new technologies and challenges out there. Don't take for granted that all of the safety devices are in place on objects just because someone told you so. Make sure you are reviewing schematics and wiring diagrams before issuing the permits to operate.

I have taken on new responsibilities with the State of Wisconsin. With the Boiler Program, I now manage the Waukesha office which includes Building, Fire Suppression and Elevator Plan reviewers and support staff. I feel this is a great challenge and extremely happy about the move. The transfer took place December 18, 2009

Be aware the costs of the boiler and pressure vessel "permit to operate" have gone up from \$35.00 to \$50.00 in Wisconsin, effective January 1, 2010. Please let your customers know when doing inspections so they are not surprised when they receive their invoices.

When I say it's been a great year "2009" I can certainly report that the number of overdues are down. Again, I want thank our State Inspectors, State Contractor (Damarc), City of Milwaukee (Boiler Program) and each and every Service Agent for doing a tremendous job keeping up with work loads and keeping over dues to a minimum for this quarter, ending December 2009. Due to your efforts, you managed to bring the numbers down for Boilers and Pressure Vessels from 2.5 to 2.3%...TREMENDOUS JOB! I would like to see us achieve less than 2.0% for the next quarter.

**6th Annual Boiler  
Industry Days  
April 2010  
April 14 & 15 2010**

**Come One Come All.**

**Presentations by The National Board of Board  
and Pressure Vessel Inspectors.**

As a reminder, the state will pursue anything that is 90 days over due, so ... please make every effort to get to the locations and complete timely inspections.

Notices have been sent recently to all Service Agent Supervisors regarding the Boiler and Pressure vessel installation registrations form SBD-6314, we will continue this on a quarterly basis as well. We need everyone's help returning these forms back to the department. This is only way we know that an inspection has taken place. If you find that a boiler or pressure vessel was installed without the registration form please write up the violation to the owner. We need all the HVAC contractors complying with Comm 41.41. Education first and enforcement second is our recommended practice. When I'm made aware that a HVAC contractor fails to register boiler/pressure vessels, I contact them directly and discuss the matter. So, if you know of contractors continuously violating this rule, please let me know by email or telephone.

On another note; orders you have wrote up, please follow up on a time bases. We will be sending out reminders on these as well.

Your help in the matters above will enhance the efficiency of our Inspection Support Staff during processing.

Thanks for a great winter and see you all at spring training...remember you need 24 hours of Continued Education credits in your 4-year cycle. The training is going to be special...it's offered and being presented by the National Board of Boiler and Pressure Vessel Inspectors.

Best Regards,

Rick Merkle  
State of Wisconsin  
Section Chief, Division of Safety and Buildings  
Bureau of Integrated Services  
201 West Washington Ave. PO Box 2658  
Madison, WI 53701-2658

## INSPECTOR MATERIAL ORDERS

Material orders for registration tags “ B or U” # s, may be ordered preferably via

[materialorders@wisconsin.gov](mailto:materialorders@wisconsin.gov)

## WEB SITE INFO

Get application to register for the **6<sup>th</sup> Annual Boiler Safety - Industry Days**, Racine Marriott -- April 14-15, 2010 from the WBIA website below. After registration then confirm room reservations today at reduced state rate for night at the **Racine Marriott ... reserve now at 262-886-6100**

### Wisconsin Boiler Inspector's Association

[www.thewbia.org](http://www.thewbia.org) ... for 6<sup>th</sup> Annual Industry Days

### National Board

[www.nationalboard.org](http://www.nationalboard.org)

### ASME

[www.asme.org](http://www.asme.org)

**Department of Commerce** ...scroll down to click Safety & Buildings, then Boiler Program

[www.commerce.gov](http://www.commerce.gov)

**Boiler Program** ... Sign-up “Group email” to

<http://commerce.wi.gov/SB/SB-BoilerAndPressureVesselProgram.html>

be notified of program updates

[http://apps.commerce.wi.gov/SB\\_Credential/SB\\_CredentialApp/SearchByMultipleCriteria](http://apps.commerce.wi.gov/SB_Credential/SB_CredentialApp/SearchByMultipleCriteria)

**Credential –License Check** ...verify current certifications, registrations & licenses

<http://commerce.wi.gov/SB/SB-DivCodesListing.html>

**“FREE” Comm 41 Boiler Code** ...scroll down to Comm 41, click & print

Thanks for your cooperation and support. Do register for the Boiler Safety Industry Days Seminar scheduled on **April 14-15, 2010**. Look forward to seeing everyone at our 6<sup>th</sup> Annual Boiler Industry Days in Racine, WI.

## WBIA WEBSITE

[THEWBIA.com](http://THEWBIA.com)

The WBIA operates a website and you should take a look at what it can do for you! The Jurisdiction Section allows you access to Codes and Search engines for eight different States. Our Newsletter back issues and Seminar information is available a click away. We also link to all ASME/NB forms and every important Organization having Boiler and Pressure Vessel information. More links coming daily. Our website is easily usable from your Blackberry or other hand held devices. You are always near the information you need! Try it! Tell others about it!



### Thought of the Day

Success is not the key to happiness. Happiness is the key to success. If you love what you are doing, you will be successful.  
- Albert Schweitzer -



Tube Replacement	High Efficiency Upgrades
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## MACT Emission Requirement?

### Will You Be Affected?

How will Industrial Boilers be affected by the MACT Emission Requirement? Will You Be Affected?

The NESHAPs are air quality standards, issued under Section 112 of the Clean Air Act ([40 CFR Part 63](#)), which regulate 187 hazardous air pollutants (HAPs) from particular industrial sources. These industry-based NESHAPs are also called **Maximum Achievable Control Technology (MACT) standards**. MACT standards are designed to reduce HAP emissions to a maximum achievable degree, taking into consideration the cost of reductions and other factors.

EPA's MACT standards are based on emissions levels already achieved by best-performing similar facilities. This straightforward, performance-based approach yields standards that are both reasonable and effective in reducing toxic emissions. It also provides a level economic playing field by ensuring that facilities with good controls are not disadvantaged relative to competitors with poorer controls. When developing a MACT standard for a particular source category, EPA looks at the current level of emissions achieved by best-performing similar sources through clean processes, control devices, work practices, or other methods. These emissions levels set a baseline, often referred to as the "**MACT floor**" for the new standard. At a minimum, a MACT standard must achieve, throughout the industry, a level of emissions control that is at least equivalent to the MACT floor. EPA can establish a more stringent standard when it makes economic, environmental, and public health sense to do so.

Right now many of the Biomass projects are looking at putting the projects on hold as there is so much uncertainty with the above standards.

Has there been a MACT Standard developed for your Industry?

MACT Standards have been developed and finalized for many categories.

To find out if your industry has a standard check out the below website.

<http://www.epa.gov/ttn/atw/mactfnlalph.html>

## THINKING OUTSIDE THE BOX, COULD SAVE LIVES

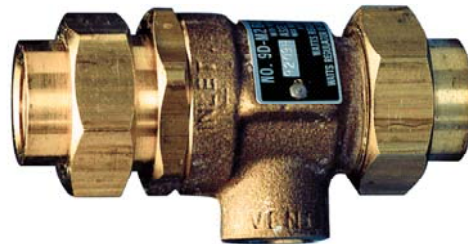
By: Paul Wilcox, City of Milwaukee Boiler Inspection

When we do a boiler inspection, one thing that only takes a moment to do is look at what type of backflow protection is on your boiler. What is backflow? Backflow occurs when the flow of water, in any pipeline or plumbing system, reverses and flows in the opposite direction than intended. The plumbing codes protect our drinking water with a backflow prevention device. A common BFP is a Watts 9D (ASSE 1012) This is only allowed when the boiler it serves is filled with only water, no chemicals, and operated at 15 psig or less steam pressure, or 30 psig or less water pressure. Any boiler treatment such as a descaler, oxygen eliminator, 8-way or the safety relief valve being changed to a higher pressure, will require the use of a model ASSE 1013 Air Gap backflow preventer

Take that extra minute to check what you have on the boiler you are inspecting and notify someone, through proper channels, the potential hazardous condition that may exist. It may not be your job, but that extra minute may save a life.

### Examples of backflow protection for boilers

#### ASSE 1012

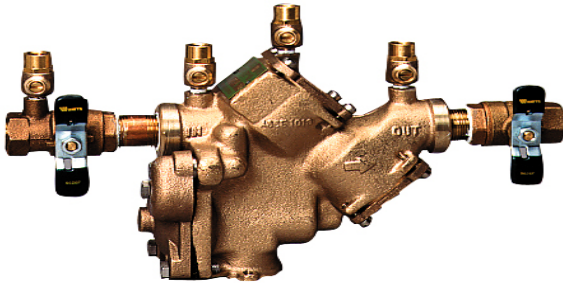


Con't on page 6

## Examples of backflow protection for boilers

Con't from page 5

### ASSE 1013



### ASSE 1013



**High hazard:** means a situation where the water supply system could be contaminated with a toxic solution so as to alter the characteristics of the water making the water unsuitable for the designated use.

**Low hazard:** means a situation where the water supply system could be contaminated with a non-toxic substance so as to alter the characteristics of the water making the water unsuitable for the designated use

## Table for the selection of backflow protection on boilers

	High Hazard	Low Hazard
Boilers with a safety valve setting <u>less than</u> 15psi steam or 30psi water	ASSE 1013	ASSE 1012
Boilers with a safety valve setting <u>greater than</u> 15psi steam or 30psi water	ASSE 1013	ASSE 1013

## I Thought I've Seen it All

By: Jay Eckholm

I was asked to do a boiler inspection on a farm this year and ran up against something bizarre. First of all, doing a boiler inspection on a farm is rare because according to Wisconsin law boilers on farms are exempt. In fact, the last boiler I looked at on a farm was a Clayton steam generator that kept firing on low water until it reduced itself to the ingot from once it was created. Wisconsin law does require that farms using boilers for purposes other than agricultural production or processes be inspected so I did not know for what I was in store.

Upon arrival, I noticed that this was a cattle/dairy farm and the usual foul stench I remembered smelling when I was a child was eerily missing. What kind of cows were these and how did the farmer get them to poop odor free. I began to wonder if while trying to reach the farm I somehow slipped into an agricultural twilight zone. I noticed happy people who all were wearing dungarees. I saw a large outdoor storage tank with a bubble roof made of rubber. I met guys who had nick names like Sludge, Digester, and "The Germinator". I checked with Lolita, the sexy voice who guides my path through my GPS, and she said, "there's no place like home, there's no place like home". I truly was lost.

Once inside the process plant I was brought to the boiler and the lady, who was the chief operator, showed me a large box with two gas tranes and a

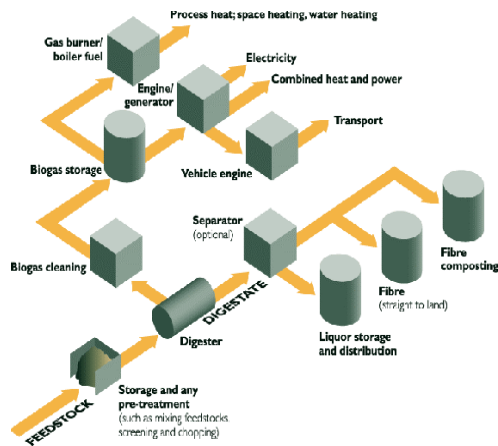
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# I Thought I've Seen it All (Con't)

burner on the front. She told me it runs on #2 fuel. I asked her if she meant #2 fuel oil and she said, "No, #2 fuel". I looked at the fuel line and it had letters spelling out M e t h a n e.

Seriously now, let me tell you what boiler I saw and shed light on the process and the purpose of this box shaped anomaly so you don't have feel dung-founded like me.

The farm was using a process called Anaerobic Digestion which produces methane from dung.



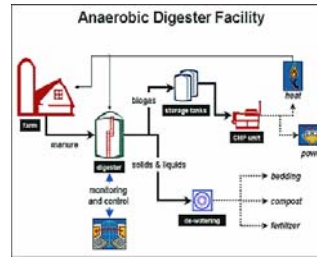
<http://www.mrec.org/anaerobicdigestion>

A farm that has 1000 cows has to manage about 37,000 gallons of manure each day. The anaerobic digestion process converts that manure into usable products like bedding for the cows and dried fertilizer. By converting manure into dried products it drastically reduces waste removal costs. But the main purpose of the plant is to make methane gas for heating and to generate electricity. By selling electricity back to the utility it reduces operational cost and creates a more diverse income flow for the farmer. A digester of this size can produce about of 775 KW of energy which is enough to power 600 homes. At 400 to 500 dollar per cow the initial investment of 1.2 million dollars is impossible to finance for most small farms. The capitol investment is usually a joint venture in which the farm and their partner share the proceeds of the revenue charged back to the utility. On average one cow's effluent can produce about 1 KW per day. The turnaround for the initial investment can be up to 10 yrs. With both the government mandate restrictions on carbon gas and the political pressure to charge not only utility companies but also large cow farms for their carbon foot print it is a common phrase at these farms that, "either you process crap or get off the planet". You can find more specific

information about BIOGAS or "Cow Power" at [www.focusonenergy.com](http://www.focusonenergy.com).

<http://www.insidergreen.com/anaerobic-digestion>

The real focus of this article is the boilers you typically find at BIO GAS production facilities. Typically I find them at municipal waste management but since we live in an agricultural state there's great potential of seeing these on



farms. Below are pictures of what I found and are available at Siemens.com.



Figure 1

Figure one shows an Envirex boiler/heat exchanger made by Siemens. Notice the two fuel lines feeding the boiler. The darker line is for methane, always the larger, and the other smaller line is natural gas.

Figure two shows a cut away view of the internal boiler shell in which 1/2 the boiler is a wet-back fire tube hot water heating unit separated by a

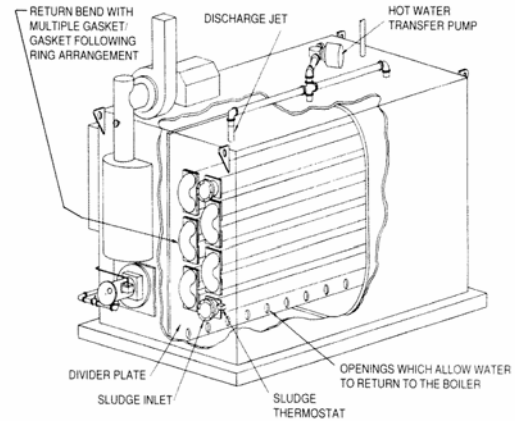


FIGURE NO. 4 - VIEW OF HEAT EXCHANGER SECTION

Figure 2

divider plate and the other side of the boiler houses the heat exchanger. Manure sludge is heated in the heat exchanger to accelerate the digester process.

Con't page 8

## I Thought I've Seen it All (Con't)

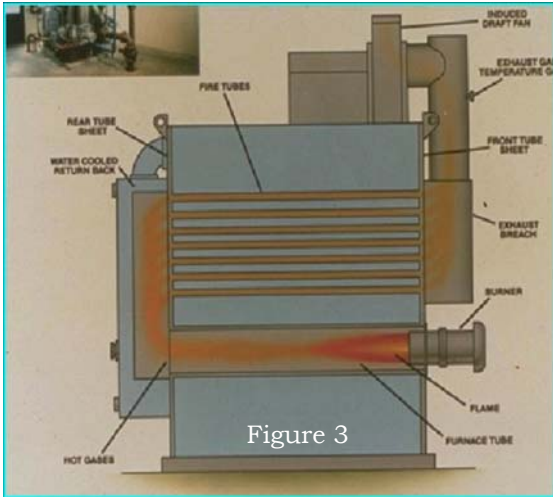


Figure three shows how the products of combustion begin at the burner circulate through the tubes leaving

the boiler through an induced draft stack.

The boiler I saw was a

1997 Envirex 2,500,000 BTU/HR boiler. It is actually a fire-tube hot water heating boiler which has integrated a heat exchanger which shares the boiler's water-side adjacent to the fire-tube section of the boiler. The boiler is used to heat sewage/sludge to temperatures between 160 to 180 degrees F. In Figure 2 you can see the hot water transfer pump on top of the boiler. This pump turns on and off depending on the temperature parameters set for the sludge. The boiler operates independently of the sludge temperature controls and act similarly to a hot water heating boiler. The boiler has both a temperature operating control and a high temperature limit. It is also equipped with a low water cut-off device. On the fire-tube side, the water is heated and circulates normally within itself only crossing over to the heat exchanger side when the hot water transfer pump forces the boiler's water to circulate over the divider plate through the heat exchanger and back to the boiler through the holes at the bottom of the divider plate.(see figure 2) In order to maximize heat transfer the sludge is moved through the heat exchanger at 4 Ft/Sec or approximately 150 GPM. Maintaining the sludge temperature is the primary purpose for this boiler/heat exchanger. By doing so the Anaerobic Digestion process can chemically breakdown manure faster and produce methane Bio Gas (60- 80 percent methane and 30- 40 percent Carbon dioxide). The is how the boiler works and what its purpose is but let me share some more insight about this boiler which should be helpful whether you inspect or operate it.

This boiler is unique because it operates at gas pressures as low as 2 inches of WC. This is accomplished because it has an induced draft which pulls the combustion elements through the boiler instead of pushing it with a forced draft burner. By pulling the boiler's gasses of combustion through the stack it generates a negative pressure. The stack is equipped with a pressure stat for safety control. Methane does not have the additive natural gas has to detect a leaky gas smell in fact it is odorless. Therefore, by maintaining a negative pressure throughout combustion, the gas inside the boiler escapes the boiler room safely.

Figure 1 shows the combination natural and methane gas fuel tranes each having safety pressure switches for low and high pressures. The larger fuel trane is the methane gas from the digester and is supplied at lower pressures so the pipe diameter needs to be larger to accommodate volume. The reason they have combined gas tranes is that the anaerobic digestion process creates inconstant gas pressures and the lack of pressure is compensated by mixing the higher natural gas pressure with the lower methane. Heating boilers other than the Envirex have to use a booster pump to step up the pressure of the methane gas to compensate for the forced draft burners. This boiler uses a mixing valve between the natural gas (1000 BTU/ cuft) and the methane (650 BTU/ cuft). Accurate instruments are used to measure gas pressures and need to be tested regularly to verify that they operate within their designed parameters.

Methane produced from manure has inherent features that can become liabilities if not addressed. Methane will be 95- 100 percent humid, therefore, the gas trane is equipped with a strainer/ dryer which needs to be drained regularly. Wet methane introduced to the combustion process of a fire-tube boiler will condense leaving sulfuric acid to lie upon metal surfaces accelerating corrosion. Therefore not only does the strainer have to be drained of water regularly but also the stack temperature has to be maintained between 350 to 450 F. The higher stack temperatures eliminate the possibility of the moist gasses condensing and can be maintained with increased gas pressures through mixing natural and methane gas. Another liability comes as a byproduct of burnt methane called Siloxane. Siloxane is a complex molecule that is abrasive when traveling through a combustion engine such as a synchronous generator typically found at these farms. A special filter needs to be used to prevent this destructive element from destroying the generator.

As an inspector I make sure that the usual safety controls found on boilers are maintained per the manufacturer's recommendations, but also I would like to suggest some additional test be made to address this type of fuel. I recommended the daily log for a typical hot-water heating boiler be modified to document strainer draining, the stack temperatures, and what actions were taken to adjust for lack of methane pressure. Of course, the other controls for the manure circulation and temperature monitoring need to be maintained per the manufacturer's recommendations as well.

I would like to thank the folks at Siemens in Waukesha for their technical support and specifically Richard Treleven. Also Darrell Stumpf for his support and his gift, or curse, for retaining information he has managed to save throughout his career. His office is indeed an organized mess.

# PBBS

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