



THE RELIEF VALVE



Cherie Berry
Commissioner of Labor

Jack Given
Bureau Chief

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Chris Lehenbauer

For the Good of the Department

He was a good friend to all, very knowledgeable, dedicated and committed to his work. He was instrumental in bringing the Boiler Safety Bureau into the new technology era. What a great teacher of looking beyond the surface of a matter.

He enjoys researching product and finding the one that would work best for our bureau. His insights, good humor, method of explaining things, and intuitive ideas provided a foundation for me, personally to grow and learn a bit more about computer systems and system analysis for

business modeling. Besides, he's a great friend.

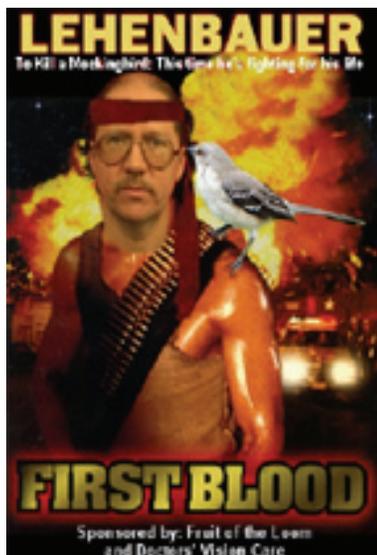
Recently, when I asked our staff to give me their thoughts on Chris Lehenbauer, I was bombarded with their feelings. These are just a few of the compliments paid to Chris Lehenbauer when, after just over seven years, he left Boiler Safety to start working in the Department of Labor's Information Technology Division (IT).

Chris came to Boiler Safety on August 27, 2002. Believe or not, he came to work in a staff clerical position. Chris proved his worth very quickly. Not only could he handle the clerical work but we quickly found out that his degree in computer engineering would help us a great deal. In January 2004, we promoted Chris to a position as administrative officer/QA officer. Soon after, he assumed the responsibility for supervision of the office support staff.

Chris was a thinker and a person who, using his own words, just loves to solve problems. And that he did. Early on, he was able to analyze some of our problems and help us come to solution.

We had fun with Chris as well. About three years ago, Chris was walking back to the office from his parking space when a territorial mockingbird decided that Chris should not walk near her nest. Chris was attacked by the bird and almost went down from the onslaught. Needless to say we had some good laughs over that one. In fact, one of our clever colleagues created a poster to symbolize the bird event. Though Chris will hate this, here is that picture. Chris's good sense of humor really showed through all the ribbing he caught over that one.

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Boiler Safety Bureau

Jack Given
Bureau Chief

1101 Mail Service Center
Raleigh, NC 27699-1101
(919) 807-2760

1-800-625-2267
www.nclabor.com

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STEAM TRAP MAINTENANCE

Don't forget that steam traps require proper installation and proper maintenance. Don't be a casualty of poor maintenance of steam traps.



A Word From Commissioner Berry

The recent fatal accident at a refinery plant in Texas that killed one and injured two may have been caused by a failed boiler, based on preliminary findings. The investigation is underway, but the tragedy should serve as a reminder to us of how quickly our lives can change and how dangerous boilers can be when they are not properly maintained.

Cherie Berry

Commissioner of Labor

www.chron.com/disp/story.mpl/headline/metro/6754237.html

Preventing accidents like this in North Carolina is the primary function of the inspectors with the NCDOL Boiler Safety Bureau. These inspectors provide a great service to North Carolina, working behind the scenes to ensure a safer work environment for millions of employers and employees. They inspect boilers and other pressure-retaining equipment at a wide array of businesses and industries throughout the state to prevent them from malfunctioning in the workplace. With a relatively small staff, they cover a lot of ground.

Between the east and the west regions, there are 14 boiler safety inspectors who serve our state. These inspectors, along with 11 insurance company partners, perform more than 50,000 inspections each year.

Inspectors from the Western Region were featured in the last edition of the Relief Valve. In this edition, we feature inspectors who serve the Eastern Region of our state. The inspectors are listed at the bottom of this page and the top of page 3. Please take a minute to familiarize yourself with the boiler inspector who serves your community.

Technology has evolved enabling inspectors to perform their inspections more efficiently on a daily basis. The addition of personal digital assistant (PDA) devices, for example, has helped streamline the inspection process to minimize errors. While technology is important, however, it cannot replace the work of a skilled professional inspector.

Greg Lundberg provides insight into the importance of a skilled inspector in Transitions-Commissioner Exams and Commissions on page 3, and I echo his remarks:

“No matter what the technology is ... it is ultimately the inspector who determines whether the boilers and pressure vessels are safe for operation. You folks are the heart of the system.”

Cherie Berry

Season's Greetings



For the Good of the Department

continued

Andy Frazier, deputy commissioner and director of the Standards and Inspections Division; Frank Seiber, director of IT; and I had been discussing Chris and what he offers the Department of Labor for over a year. We knew that one way or the other we needed to keep Chris in the department. We knew that Chris's knowledge base and skill sets really wanted him to be in IT. Chris was instrumental in helping us to roll out our new data system through the Praeses Corp. as well as working hard with a couple of our inspectors during a yearlong test to determine that a personal digital assistant (PDA) in an inspector's hands to accomplish inspection reporting would be worthwhile and worth the costs and the time to train everyone. In spite of this and more, we determined that IT was the best place for Chris. Even though we would dearly miss him in Boiler Safety, he would serve us and the entire department better if he were to go there.

So, we offered Chris a position in IT, he accepted, and on Sept. 8, 2009, Chris began his work there. Yes, we miss him, but just as expected, he hit the ground running and started helping to solve problems.

Frank Seiber jokingly told me the other day, "I have to make him take weekends and holidays off." Chris Lehenbauer has been dedicated to the Boiler Safety Bureau for seven years. Now he is doing the same for the Department of Labor. It's a win-win situation. And yes, he's still a good friend.

Jack M. Given Jr.
Jack M. Given Jr.

Eastern Region Boiler Inspectors

In our February 2009 issue, we presented the inspectors that work in our Western Region. I will say it again, we are blessed to have an excellent inspection staff, all across our great state. These 14 inspectors have a combined total of 112 years of experience as inspectors for the Department of Labor. Add to that another 50 years inspections experience with other authorized inspection agencies and 194 years of related experience and you have a well-qualified staff. In this article we will present the inspectors that serve us in the Eastern Region.

Jerome Evers began working with the Boiler Safety Bureau on Jan. 29, 1990. He works our extreme southeastern territory and is headquartered in Brunswick County. Jerome came to us after having worked as a QA/QC technician with Fleur Daniel Corp.

Emilio Garcia, who previously worked as a project engineer with Roberts Co., came to us on Aug. 14, 2002. He works our mid-eastern territory and is headquartered in Pitt County.

Andrew Gunto, who is headquartered in Durham County, is in charge of the eastern Piedmont territory. Prior to joining us, he was a welder with Ward Tank Co. Andrew began his career with us on Oct. 13, 2003.

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Transitions—Commissioning Exams and Commissions

Many of you know I've been in the business since 1978. Some of you have been in longer, many of you much less. When I sat for my exam, it was a day and a half long and consisted of three modules with one math module where you had to list the formula used from the code, the code paragraph you got the formula from and a drawing of the problem. I had to draw a vertical line on the paper and note the mathematics step by step. Each question got partial credit for each step. The other modules were based on Section I criteria and all answers were hand written. You had to have a fair hand at laying out your answer sheets to make it easy to grade. It took anywhere from three to six weeks to get the results back and all tests were hand graded by National Board staff. Endorsements on commissions didn't exist for non-nuclear work. Non-nuclear endorsements came into being in the early 1980s and many people were grandfathered into the system without formal schooling or examinations.

A few years ago, the National Board modernized and went to multiple choice answer sheets that could be read through an optical scanner. There were still three modules but now you could color in a little circle. Oh, and they added other construction codes to the mix, too. Results were now available in about three weeks. All endorsements had to have schooling and examinations.

Very soon now there will be another major change in examinations for National Board Commissions. The scope of the examination will be changed to more accurately reflect items an inservice inspector actually inspects. Basis of the examination will come from Parts 1, 2 and 3 of the National Board Inspection Code and NB-263 Rules for Inservice and New Construction Commissioned Inspectors, NB-410 for feedwater guidelines, ASME Code Sections I, IV, V, VIII-Div 1, IX, and ASME B31.1.

A new body of knowledge will soon be available on National Board's Web site. It will detail specifically what knowledge an inspector candidate should know. The inservice inspector examination will be changed to a one-day format, consisting of two sessions of three and one-half hours each. There will be 85 questions. Thirty questions will be worth 1.5 points each, and 55 questions will be worth 1 point each, for a total of 100 points. A score of 70 or above is required for passing. Inspections will be given through Applied Measurement Professionals (AMP) at select H&R Block locations throughout the country. The restriction of only four examination periods a year will be lifted.

The appearance of the National Board commission card will also change. It will be split into two parts: one for inservice work and the other for endorsements. If you are an inspector, you will see the changes January 2010. Folks capable of inservice work and/or holding endorsements now will be grandfathered

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Eastern Region Boiler Inspectors

continued

Dean Johnson inspects in Guilford and Randolph Counties. Dean worked with his dad in boiler repair before he came to work with the bureau. Dean started on Aug. 21, 1995.

Donald Kidd, who works only Wake County, was self-employed prior to joining us. Don is headquartered in Johnston County and began working with us on Feb. 14, 2000.

Greg Sims spends his time in the Sandhills territory in the south central portion of the state. He was another welder prior to coming to the Department of Labor on Dec. 1, 2003. He came to us from Buckeye Boiler.

Dean Strickland has the extreme northeastern territory, and is headquartered in Wilson County. Dean began his work with us on July 1, 2002. He previously worked as a quality engineer with MTS Systems.

Cliff Dautrich, Eastern Region supervisor, was supervisor for Conoco prior to coming to the bureau on Dec. 1, 1994. Cliff has dedicated himself to serving the inspectors of the Eastern Region in an exemplary manner.



Pictured from left: Andrew Gunto, Jerome Evers, Donald Kidd, Greg Sims, Emilio Garcia, Cliff Dautrich, and Dean Strickland. Dean Johnson not shown here was pictured with the western region inspectors in the February 2009 issue.

CONGRATULATIONS

Greg Lundberg, our assistant bureau chief, recently married his high school sweetheart, Ann Clark, formerly of Indianapolis. Greg and Ann were married on Nov. 10, 2009, in Honolulu, Hawaii. They spent their honeymoon in Hawaii through Nov. 15, when they went to California for a couple of days with his mother. Congratulations and best wishes to the happy couple.

Transitions—Commissioning Exams and Commissions

continued from page 3

in if their employers wish to continue the endorsements, et al.

The card will reflect the scope of work you can do on its front, and the back will flesh out what each endorsement is for.

Transitions—Reporting Inspections and Communications

Back in the day, reports were all hand written in ink with carbon paper between at least four report blanks so you could make an original for the jurisdiction, a copy for your own files, a copy for the owner, and a copy for your company. Mailing reports in was a weekly task. Inspections may have been noted in three ring binders called slip books to keep track of what was done. It was tedious, time consuming and the best technology available. It worked for decades. Communications was through telephone landline about once a week.

Around 1980, carbonless paper made the scene for use by inspectors. The reports were still hand written but now the carbon paper went away. Progress was at hand! Later, these forms were tractor fed through impact printers to create the “pre-printed form.” Now the inspector only had to fill in the data that changed from the last inspection and pull apart the carbonless forms, mail what was necessary to the office and leave a copy with the owner. Slip books were done away with since computers now kept track of what was done. Communication was still land line but there were some cell phones coming along in the 1990s. Now you could communicate daily if you wanted. This was still a bit slow using the mail service.

In the mid-1990s inspectors started to receive computers for

their own use and e-mail had arrived. Cell phones got smaller and more portable, but snail mail was still the way to send in reports.

This technology existed to the last few years where now most inspectors do reporting directly into the database from their computers or a personal digital assistant and then download to the database. Digital cell phones are now commonplace and expected to be used. Texting is common; e-mail, scanning, faxing, and digital imaging from cameras are the norm.

The future may bring PDAs that have direct links to the databases so inspectors can report their inspections within minutes of performance. Perhaps digital communication will be a device as small as a Bluetooth and all you have to do is say the number you want to report.

Transitions—We’ve Come a Long Way, Sort Of

Truly technology has advanced the ease and the speed of reporting. But nothing has replaced the inspector’s sense of curiosity, technical knowledge, skill, sense of observation and know-how. The flashlight, mirror and inspection hammer are still the tools of the trade. The ability of the inspector to perform is critical in ensuring a good inspection and helping to detect flaws or violations that can lead to catastrophic consequences. No matter what the technology is—whether we add on ultrasonic inspection devices, boroscopes, NDE kits or digital cameras—it is ultimately the inspector who determines whether the boilers and pressure vessels are safe for operation. You folks are the heart of the system.

Greg Lundberg

Truths Cannot Be Ignored

The date—January 1982. The location—an elementary school in Oklahoma. A water heater near the lunch room had been neglected maintenance wise. During lunch time the water heater exploded and 36 were injured and seven killed. This unfortunate tragedy could have been averted if proper routine maintenance had been performed on the water heater. This was a water heater. What if it had been a high pressure boiler? Don’t let this happen to you.

A log can help you. An operating and water treatment log in a boiler room will go a long way to help you remember what to do next with your boiler. A log is used to record readings and notes of unusual occurrences as well as other evolutions such as blowdown of the equipment. When you log operating and maintenance, you have a permanent record. If you forget something, check the log and see when you last conducted that evolution. Good logging will help you extend the life and

efficiency of your boiler. By reading the previous shift report in the log, the operator coming on duty benefits by understanding if anything abnormal has occurred.

Maintenance of your fuel/gas train is vital. Failure to properly maintain and test the valves and controls in your fuel/gas train can cause problems that you may not know about until it is too late. Contact a fully authorized and knowledgeable firm that can help you understand what you need to do to prolong the life of your system and help protect you and your employees and customers from a serious accident.

If you don’t know what it does, don’t touch it. Often accidents or equipment failures occur because a person that was not properly trained in the operation of the equipment pressed a button or turned a valve that they should not have pressed or turned. Do not turn untrained personnel loose in your equipment space. You owe it to them and yourself to make sure they have all the knowledge necessary to operate a boiler or pressure vessel.



Substantial Relaxation of PWHT Requirements

In the 2009 Addenda of ASME Section I, *Rules for Construction of Power Boilers*, a significant technical change has been implemented in Table PW-39 for P-No.1, which effectively relaxes the requirements for postweld heat treatment (PWHT) of carbon steels. Research work conducted on behalf of the Electric Power Research Institute (EPRI) and documented in a white paper titled “PWHT Exemptions for Low Hardenability Materials” (EPRI Paper 1008277) reported that hardenability of carbon steels due to welding heat, and the formation of brittle structures in the heat affected zones (HAZ) of such welds, could be largely avoided if a few key factors were properly observed. The critical factors identified in the paper to be limited and controlled were:

- a. The cooling rate of the weld puddle after weld deposit
- b. The base metal chemistry, specifically the carbon equivalent (CE), where the carbon equivalence is calculated using the formula:

$$CE = C + (Mn + Si)/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

Postweld cooling rates for the weld puddle and base metal are affected by the thickness of the base metal and its ambient temperature as welding begins. Base metals whose thickness is approximately $\frac{5}{8}$ inch or greater provide a larger heat sink for welding heat than thinner base metals. This phenomenon is referred to as three dimension (3D) cooling by welding engineers, because the base metal is thick enough for the welding heat to dissipate not just through the length and width of the base metal, but also through the thickness. The added dimension through which the heat may dissipate causes the cooling rate to increase markedly. For greater material thicknesses, the introduction of preheat is an effective technique for controlling the cooling rates and the resulting hardness formation when welding carbon steels.

The existing exemption from PWHT for carbon steels was limited to nominal weld thicknesses not exceeding $\frac{3}{4}$ inch in circumferential butt welds only, with no preheat required. This exemption remains intact. However, with the insights provided by the cited research, it was felt sufficient safety of construction could be ensured, permitting this exemption to be substantially expanded to greater thicknesses. It was also felt restricting this exemption to circumferential butt welds was no longer necessary.

A minimum preheat of 200°F was selected for welds having a nominal thickness not exceeding $\frac{3}{4}$ inch, when deposited in base metals having a nominal material thickness exceeding 1 inch. When the weld has a nominal thickness exceeding $\frac{3}{4}$ inch, but no greater than $1\frac{1}{2}$ inch, the minimum preheat required is increased to 250°F.

It was also recognized that depositing multiple sequential weld passes effectively tempers the underlying weld layer and adjacent HAZ. Imposing a maximum limit on individual weld pass thickness provides additional assurance this tempering effect would reduce hardness formation. A practical weld pass thickness limit of $\frac{1}{4}$ inch was selected for welds having a nominal thickness greater than $\frac{3}{4}$ inch when deposited in base metals having a nominal material thickness of 1 inch to $1\frac{1}{2}$ inch.

But cooling rates were not the only consideration to be reconciled to ensure hardness formation was controlled. The cited research had also demonstrated that base metals having a lower CE tended to have lower hardness levels when measured in the “as welded” (without PWHT) condition. The hardness readings were close enough to those typically found in base metal specimens after PWHT. The research indicated an optimum limit for CE should not exceed 0.50. While implementing this consideration, materials experts agreed that the CE limit should be reduced further to 0.45 as an absolute maximum, ensuring a sufficient margin of certainty had been established to guarantee these benefits would be produced. It was also felt a base metal could meet this requirement even when the complete chemistry was not known, by substituting maximum commonly specified values for trace elements into an abbreviated formula for CE as follows:

$$CE = C + (Mn + Si)/6 + 0.1$$

These revisions should prove to be of great benefit to manufacturers of power boilers constructed of carbon steels, especially package boilers having lesser material thicknesses. These rules will also have the effect of simplifying repairs of boiler when the repairs are specified for compliance with the 2008 Addenda of ASME Section I.

John P. Swezy Jr.
JMM Code Design
www.jmmcodedesign.com

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Boiler Blowdown Benefits

- ❖ Less water, fuel and treatment chemicals needed;
- ❖ Less maintenance and repair cost (minimized carryover and deposits);
- ❖ Saves manual supervision for other tasks (with automatic control);
- ❖ Cleaner and more efficient steam;
- ❖ Reduced operating cost (reduction in consumption, disposal, treatment and heating of water);
- ❖ Minimized energy loss from boiler blowdown can save about 2 percent of a facility’s total energy use with an average simple payback of less than one year.