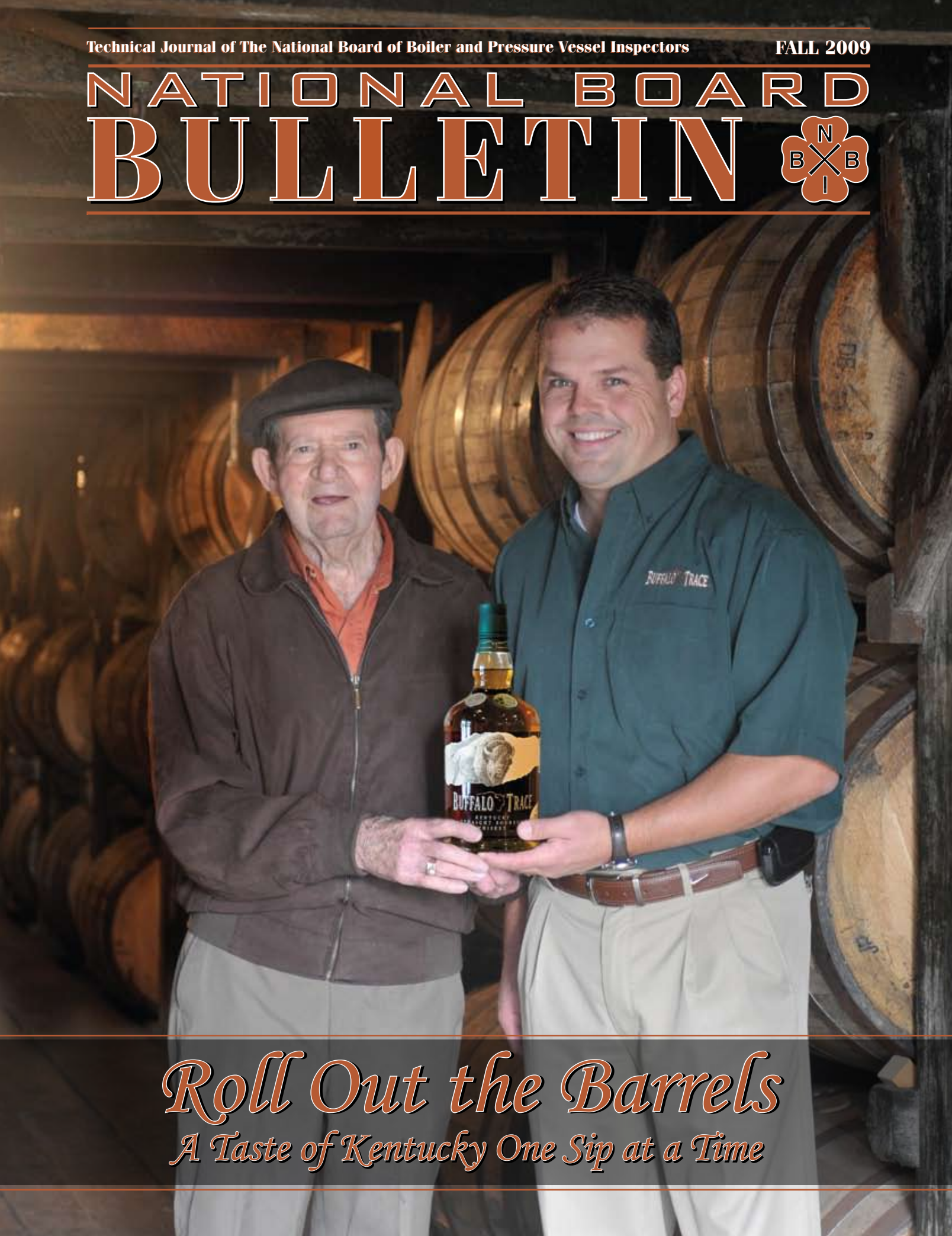
Technical Journal of The National Board of Boiler and Pressure Vessel Inspectors FALL 2009

NATIONAL BOARD BULLETIN



Roll Out the Barrels

A Taste of Kentucky One Sip at a Time

The 79TH General Meeting

May 3-7, 2010

HYATT REGENCY SAN ANTONIO, TEXAS

The National Board of
Boiler and Pressure Vessel Inspectors

BULLETIN

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The National Board of Boiler and Pressure Vessel Inspectors was organized for the purpose of promoting greater safety by securing concerted action and maintaining uniformity in the construction, installation, inspection, and repair of boilers and other pressure vessels and their appurtenances, thereby assuring acceptance and interchangeability among jurisdictional authorities empowered to assure adherence to code construction and repair of boilers and pressure vessels.

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One of II warehouses used for aging whiskey at Buffalo Trace Distillery.

Read more on Page 21.

BULLETIN cover photograph by Jeff Rogers.
Left to right: Elmer T. Lee, Harlen Wheatley, Buffalo Trace Distillery.

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THE POWER OF ONE

BY DAVID A. DOUIN, EXECUTIVE DIRECTOR

It's been long-said there is safety in numbers.

But for the North American pressure equipment industry, the number is singular: one, as in *One Code. One Authorized Inspector. One Stamp*.

For nearly 90 years, this National Board Preamble has inspired a remarkably successful inspection process. Today, however, some have forgotten the rationale behind uniformity.

It all began prior to 1919. Back then, the pressure equipment industry comprised a patchwork of inspection standards that varied widely from jurisdiction to jurisdiction. The outcome of this incompatible network of laws and regulations was the genesis of the National Board.

But that was then. More recently, some jurisdictions have chosen or been pressured to modify regulations without considering the impact upon industry constituencies: other jurisdictions, manufacturers, repair shops, insurance companies, etc.

One need only examine the *National Board Synopsis of Boiler and Pressure Vessel Laws, Rules, and Regulations* to witness numerous disparities in North America. As a matter of fact, confusion sometimes compels those operating in multiple states to use the *Synopsis* as a guide to what is and what isn't applicable.

To illustrate the dangers of differing laws, consider those industries *without* uniform codes and standards. In the crane construction industry, for example, inspection standards vary state-to-state. Some jurisdictions have *no* inspection regulations. Others have only a miscellany of state, local, and voluntary guidelines. In 2008, four crane construction incidents killed 14 people. Other serious accidents were reported in nearly a half-dozen major cities.

Crane accidents occurring more recently have done nothing to reassure a doubting public, thus underscoring the importance of uniformity and the value of National Board's Preamble.

Most law changes begin at the behest of government administrators. Some are introduced for economic reasons while others are advanced to accommodate important constituents and lobbyists. Speaking of economics, there is perhaps no better way to control costs than by being in regulatory harmony with other jurisdictions. Not only is this especially true for jurisdictions themselves, but also manufacturers, engineers, material suppliers, and fabricators – all entities working to achieve a single standard and common objective.

The issue of uniformity is not just limited to our continent. Internationally, there are a number of codes in use. Each year, equipment from overseas is delivered to North American jurisdictions along with pressure on states and provinces to accept these codes. While we respect the parameters of other countries, we all compete on the world stage. In this regard, these countries should be as accepting of North American codes and standards as we are of theirs.

There are those who say regulatory parameters must evolve with technology. In our industry, progress is made almost every day. These subtle yet vitally important progressions are a consequence of thoughtful and critical consideration advanced by respected pressure equipment professionals. The result of their important work is regularly published in the ASME and National Board Inspection Codes.

Parenthetically, it should be noted the ASME Code and NBIC are a consequence of a process open to anyone, thus assuring input from *all* jurisdictions (including international jurisdictions) choosing to participate. Each code cycle, these vital documents reflect common jurisdictional agreements having the full support and regulatory endorsement of the world's foremost pressure equipment associations: ASME and the National Board.

It is widely accepted many pressure equipment laws immediately written after 1919 reflected high standards of quality and a genuine concern for safety. Some of this legislation was the result of catastrophic accidents and patterned after laws passed by neighboring states. Most were reciprocal in nature and universal among jurisdictions.

Unfortunately over the years, a number of modifications to those well-intentioned regulations only served to dilute the effectiveness of our public safety process.

Although it is 2009, our industry should come to fully appreciate that period in history when pressure equipment laws reflected jurisdiction-to-jurisdiction consistency. A period when bureaucrats believed in the virtue of legislative action. A period when safety laws were not yet used as political currency.

The jobs our members perform each day are hard enough without them struggling to keep laws consistent with what the forefathers originally intended. More pointedly, they should *not* have to be involved.

But those who seek to alter the dynamic of safety regulation should fully understand the consequences. And they should be reminded the *One Code. One Authorized Inspector. One Stamp*. Preamble is not simply a trinity of thought, but a proven prescription for safe and reliable pressure equipment.

Our long history notwithstanding, the power of *One* has never been more important.

2009 Registrations

National Board Certificate of Authorization to Register guarantees a third-party inspection process, providing for uniform acceptance of pressure-retaining equipment by member jurisdictions. This important safety process is documented via submission of data reports by the manufacturer to the National Board. These are the only reports carrying the National Board registration number. Once registered, each report is maintained in a permanent file by manufacturer name and National Board number.

The list below identifies boiler, pressure vessel, and nuclear vessel registrations by size for the past five fiscal years. The National Board fiscal year is from July 1 to June 30.

The total number of registrations on file with the National Board at the end of the 2009 reporting period was 44,502,065.

SIZE		FY 2009	FY 2008	FY 2007	FY 2006	FY 2005
BOILERS						
square feet of heating surface						
≤ 55	(A)	161,041	156,766	139,435	106,285	111,360
> 55 and ≤ 200	(B)	32,371	39,115	30,235	28,999	31,331
> 200 and ≤ 2000	(C)	9,084	10,680	10,050	9,225	9,325
> 2000 and ≤ 5000	(D)	720	689	891	641	651
> 5000	(E)	766	1,021	916	738	733
TOTAL		203,982	208,271	181,527	145,888	153,400
PRESSURE VESSELS						
in square feet						
≤ 10	(A)	774,899	819,791	856,421	825,423	741,220
> 10 and ≤ 36	(B)	214,107	338,811	356,659	363,092	399,534
> 36 and ≤ 60	(C)	43,648	59,371	57,587	58,987	58,447
> 60 and ≤ 100	(D)	14,714	14,983	13,123	11,729	10,160
> 100	(E)	18,509	18,239	16,490	13,160	10,626
TOTAL		1,065,877	1,251,195	1,300,280	1,272,391	1,219,987
NUCLEAR VESSELS						
in square feet						
≤ 10	(A)	494	700	712	519	553
> 10 and ≤ 36	(B)	38	98	182	71	5
> 36 and ≤ 60	(C)	13	19	63	9	1
> 60 and ≤ 100	(D)	5	27	13	23	5
> 100	(E)	9	19	34	24	15
TOTAL		559	863	1,004	646	579
ATTACHMENTS*		86,961	103,336	89,815	76,707	70,736
GRAND TOTAL		1,357,379	1,563,665	1,572,626	1,495,632	1,444,702

*An attachment is any type of additional information to be submitted with the primary data report.

For more information on the Authorization to Register Program, access the National Board Web site at nationalboard.org

Graft: The New Green Economy

BY PAUL BRENNAN, DIRECTOR OF PUBLIC AFFAIRS

About 10 years ago, I attempted to rent a car at a major airport.

After taking a shuttle bus to the car lot, I was told in no uncertain terms by the rental manager a "tip" would be a good idea if I expected to get a vehicle some time before the next millennium.

Now this wasn't a small, back alley company. It was a large agency you would know. So imagine my surprise coming face-to-face with a shakedown artist having no reservation (pun unintended) or scruples about asking, nay demanding, a cash gratuity.

Politely declining to complement his questionable earnings, I departed and arranged alternate transportation. But not before coming to realize my views on fraud – and how commonplace it has become in our society – had been changed forever.

Fast forwarding 10 years, I have noticed a recent spate of news articles addressing fraud in the building industry. While these news items bring back memories of my car rental adventure, I cannot help but note how many of these alleged incidents are not simply about money changing hands, but about public safety being compromised.

Thusly: safety is based upon the premise trust is implicit. Stepping onto an elevator presumes this vehicle has been checked and inspected and without a possibility of failure.

But safety is not absolute. Elevators break down. Escalators sometimes injure passengers. Boilers do explode.

And that's where human motivation comes into play. The safety of any mechanism is directly proportional to the motivation of the people maintaining, operating, and yes, inspecting this equipment.

Of course, money is a great motivator. Under the right circumstances.

Conversely (and fortunately), there are a number of other ways to inspire those charged with overseeing the public trust. Integrity, pride, and dedication immediately come to mind.

I am proud to report incidences of fraud and corruption among National Board commissioned professionals are rare. The National Board moves posthaste whenever such wrongdoing is uncovered.

But today's economic conditions have yielded a petri dish of temptation in several other inspection disciplines. Making a fast buck is construed by many to be okay, especially if no one is the wiser.

Unfortunately for inspectors of all disciplines, more and more incidents of graft and fraud in the building and construction industries are finding their way into the news stream.

ITEM: Six building inspectors were caught on video accepting bribes at construction sites. If that weren't enough, some of these inspectors were accused of having mob connections as well as dealing prescription pills and cocaine while on the job.

ITEM: A chief crane inspector was arrested and charged with taking money to allow cranes to pass inspection. Additionally, he was accused of accepting bribes to guarantee passage of a required licensing exam by employees of a crane company.

ITEM: A total of 82 buildings were identified as possibly having substandard

concrete used in construction after executives from a concrete testing company were charged with faking test results. The consequence: retesting concrete from each of the affected structures, including some very well-known building projects.

ITEM: A state investigation found numerous "abuses in new-home construction and inspections." Commission investigators found "a system in which the public trust has been thoroughly shaken by graft, by greed and incompetence and by the failure of government to fulfill its fundamental duty to protect the safety and welfare of its citizens." Among the many deficiencies noted in the 51-page report were "improperly installed heating systems venting poisonous exhaust, including carbon monoxide, into living spaces."

ITEM: City inspectors ignored code issues, generated false reports, and accelerated paperwork for envelopes of cash, home improvements, and tickets to professional sports events. Charged were two zoning investigators, a plumbing inspector, a ventilation and furnace supervisor *and* inspector, and a buildings department clerk. A city official said "Inspections of everything from plumbing to fire systems were undermined."

How bad is graft in the workplace?

As could be expected, frequent incidents of fraud have spawned several Web sites chronicling news accounts of professional corruption.

A number of cities and states have taken to GPS technology. Not to help building inspectors find their way, but to track and record their whereabouts.

But don't think for a moment GPS will stop flyby inspections. There are too many resourceful thinkers – and people willing to dangle tempting incentives – to believe this issue will go away any time soon.

Statistics indicate corruption schemes (bribery, illegal gratuities, and extortion) account for anywhere between 12 and 18 percent of all occupational frauds. About 90 percent involve the exchange of cash.

Unfortunately for many of the businesses and professions associated with the inspection process, perceptions of graft touch everyone. Fire department inspectors, electrical inspectors, elevator inspectors, and yes, boiler inspectors, are often painted with a broad brushstroke reflecting a most unflattering hue.

Over the years, Chicago Mayor Richard A. Daley has answered his share of corruption charges involving city workers by invoking the rotten-apple-in-a-barrel exemplar.

"You cannot condemn everybody for a few," he has said repeatedly. "I don't know if it's systemic, but you can't indict everybody on that." Besides, he added, "It takes two to tango."

Indeed. Would the guy at the car rental counter be as emboldened if *none* of his patrons agreed to grease an already greasy palm?

As mentioned, the public oftentimes overlooks the repugnancy of graft. And that is deeply troubling, particularly as it relates to one's well-being.

Some people argue fraud doesn't impact them, unless, of course, it involves their own personal safety. Most don't realize that when it comes to one's physical security, fraud is often discovered *after* the fact: i.e., through an accident and subsequent investigation. Procedures not followed, cutting of corners, personal greed, and duplicity make for a noxious brew.

The third-party posture of the National Board helps preclude corruption by serving as a kind of arbiter. As states, provinces, and cities professionally engage manufacturers, repair shops, and owners and users, the National Board provides oversight consisting of a well-coordinated system of checks and balances.

The most important component of that system is the commission earned by the inspector. Unlike many other inspection authorities, a National Board commission is not easily achieved. It not only requires professional experience but a demonstrated ability to identify and provide well- defined solutions for equipment problems that could have life or death implications.

I am not implying commissioned inspectors are above suspicion. However, an inspector's commission is not only coveted, it is his or her license to make a living. Given the arduous and difficult path to attain this prestigious credential, most are not wont to chance losing it. They consider upholding high National Board standards a source of pride.

Expect to hear and read more about fraud in the weeks and months ahead, particularly if the economy continues to sour.

And expect public complacency to continue as well.

If you fall into this disinterested category, or think you'll cross that bridge when you come to it, you'd better pray that bridge was inspected by an honest inspector. ✪

Rayonier #2:

The Last Willamette

PHOTOGRAPHY BY BRIAN WISE

Between 1922 and 1929 Willamette Iron & Steel Works, which was established in 1865 in Portland, Oregon, and operated there until closing in 1990, built 34 geared steam locomotives for logging operations in the Pacific Northwest. (A geared steam locomotive uses reduction gearing in the drive ratio rather than the direct-drive design. It was used mainly on logging railroads because it could maneuver better on poorly built tracks.) Although the locomotives, known as "Willamettes," were similar to the most widely used geared locomotives, Shay locomotives, Willamettes had several differences, including being equipped with superheaters and having welded boiler parts instead of bolted ones.

The Willamette wasn't a financial success for the foundry; the last one – Willamette #34 – was built in 1929 for the Neils Lumber Company. In 1949 it was sold to Rayonier Inc., where it became known as Rayonier #2 and operated until being replaced by diesel locomotives in 1962. In 2002, after sitting in storage for 40 years, it was donated to the Mount Rainier Scenic Railroad (MRSR), a railroad service in Mineral, Washington, that conveys thousands of tourists a year on vintage locomotives.

On September 8, 2007, MRSR, composed of staff, volunteers, and contractors, began restoring Rayonier #2. The restoration, which cost more than $350,000, was partially funded by a grant from the Washington State Historical Society. Work was finished in August, and the locomotive – only one of six remaining Willamettes – is now up and running.

During the project, MRSR General Manager Brian Wise kept a blog of the ongoing work. Below are some entries concerning the Willamette's firetube boiler, which was sent for restoration to Seattle Boiler Works, Inc. (see sidebar). Visitors can read the complete blog, as well as see detailed photos of the restoration, at www.mrsr.info/willamette/blog/:

BRIAN WISE'S FIRETUBE BOILER BLOG

October 8, 2008

The plan for today was to get the boiler off of the locomotive's frame, and that's what we did. Preparations began yesterday with [crew member] Rowdy Pierce removing all of the brick from the firebox while [crew member] Gerry [Petitjean] and I fabricated a lifting beam to fit the log stacker's forks. [. . .]

Now that the boiler is fully exposed, serious exploratory work can begin. First up: de-scale the boiler's interior by boiling water with a de-scaling chemical added. Next, remove all the tubes and flues, then sandblast the interior and exterior of the barrel and firebox, followed by non-destructive testing.

January 13, 2009

For several months now, the locomotive's boiler has been sitting in front of the MRSR shop, where workers have been laboring to prepare the boiler for non-destructive examination and repair by an outside contractor. Preparation work included removal of everything attached to the outside of the boiler, removal of all tubes and superheater flues inside the boiler barrel, and removal of all rigid staybolts that were deemed to be broken or in need of replacement for other reasons. [. . .]

By the end of December, 2008, the shop that would perform the boiler repairs was selected. [. . .] On Monday, January 12th, the boiler was loaded onto a truck [. . .] and sent on its way north to Seattle. The boiler was delivered that afternoon to [. . .] be media blasted inside and out to remove rust and scale. Following its deep cleaning, the boiler will be transferred over to Seattle Boiler Works [SBW] for the remainder of the contract. Once the non-destructive examinations (NDE) are complete, repairs to the boiler will begin in earnest. Some of the repairs that are known to be required include a new smokebox barrel, replacement of the aforementioned staybolts that have been removed, replacement of a portion of the inner firebox throat sheet, replacement of a lower portion of the front tube sheet, and associated rivet work. [. . .]

February 27, 2009

And last but not least, the Willamette's boiler finally made it from the sandblasters over to Seattle Boiler Works, where it has been a big hit with the employees there. [. . .] The boiler is nice and clean, inside and out, which made the ultrasonic thickness testing of the sheets pretty hassle free. The sandblasting also revealed other areas of concern inside the firebox, which was not unexpected.

April 6, 2009

The folks at Seattle Boiler Works continue to make great progress on the repairs to the Willamette's boiler. The flush patches (there are three) inside the firebox are all done. The lower portion of the front tube sheet has been removed, and a new piece has been formed. Once the two-inch tube holes have been punched, it can be installed. The area beneath and in front of the front tube sheet has been an area of concern (basically an arc suggesting 5 o'clock to 7 o'clock), as the bottom of the barrel had been severely built up with pad welding (adding weld material to a large area to increase its thickness). Most of the rivets in this area were gone, their heads melted away by the welding. Additionally, the portion of the smoke box barrel that was riveted to the outside of the boiler barrel at this area was too thin for the new smoke box barrel to be joined to. We decided to have the thin portion of the smoke box barrel removed for replacement, thus exposing the bottom of the boiler barrel for inspection. Cracking was discovered in that area of the barrel, most likely due to stresses in the steel caused by the improper welding. The area of concern was sectioned out, a new piece was rolled, punched for rivets, and welded into place, bringing the bottom of the barrel back to as-built condition.

And speaking of the boiler, we've passed the first hurdle in our quest to have the locomotive certified for operation by the Federal Railroad Administration. On March 17th, our FRA Region 8 steam locomotive inspector and his trainee visited the boiler in Seattle to perform the mandated internal inspection. Both were very happy with the boiler's condition and the repairs which it is receiving. [. . .] The next visit by the FRA inspector will be to witness the hydrostatic test of the boiler after all work is completed.

May 5, 2009

Up at Seattle Boiler Works, the front tube sheet is going back together, with a new lower section formed and fitted. Previously, a portion of the bottom of the boiler barrel, just in front of and beneath the front tube sheet, was found to be riddled with tiny fractures, most likely due to the extensive pad welding done by a previous owner. The decision was made to replace the questionable portion of the barrel before the front tube sheet repair was completed. Since then the new tube sheet portion has been fitted in place, but completion of the repair has had to await delivery of special-ordered rivets of a style replicating the original rivets. Once the new rivets are installed, the connection between the tube sheet and the barrel will be caulked.

May 27, 2009

At this point, the boiler is ready for the installation of the new tubes and superheater flues. SBW has the two-inch tubes in stock at their plant, but are awaiting the arrival of new ferrules [. . .]. The superheater flues, as well as the superheater header and all of the rebuilt units, are expected to arrive from Wyoming in about 10 days.

SBW has yet to install a new smokebox barrel onto the front of the boiler, but that is on hold until they can successfully remove all of the badly deteriorated studs that attach the superheater header to the dry pipe flange at the front tube sheet. They have one more stud left to remove, and that one has been putting up quite a fight.

Before the new tubes can be installed, the interior of the boiler barrel is going to be painted with a special high temperature paint designed to protect the boiler plate from the eroding effects of the boiler water. The new paint, called "Apexior 1," arrived at the Mineral shop this week and will be applied to the boiler on Monday, June 1. The installation of the new two-inch tubes can then begin.

July 12, 2009

The boiler finally returned to the Mineral shop on Thursday, July 2nd, from Seattle Boiler Works. Getting it to that point was an interesting mix of frustration and exultation as more repairs were required and completed, closely followed by the FRA observance of its first hydrostatic test.

August 1, 2009

On Saturday, August 1, 2009, at approximately 8:00 pm (no one bothered to check their watch!), history was made at the Mt. Rainier Scenic Railroad. To be more precise, history was brought to life as the very last locomotive built by the Willamette Iron & Steel Works of Portland, OR (construction number 34, ex-Rayonier, Inc. #2, nee-J. Niels Lumber Company #6 built in December, 1929), took its "first steps" down the shop track after an intensive rebuild that began on September 8, 2007. ❂

An Interview with Craig Hopkins, Seattle Boiler Works, Inc.

Recently the BULLETIN *talked with Craig Hopkins, professional engineer at Seattle Boiler Works, Inc., about restoring vintage equipment.*

BULLETIN: *Tell us a little about your shop.*

MR. HOPKINS: Seattle Boiler Works, Inc. is an ASME-accredited shop. We were founded in 1889, so we've been building and repairing boilers for over 120 years. New construction of boilers and pressure vessels and repairs to boilers and pressure vessels constitute the bulk of services we perform.

BULLETIN: *How did you get interested in restoring vintage steam locomotives?*

MR. HOPKINS: We find the work of restoring historically significant equipment, such as riveted locomotives, rewarding. We have always been and remain interested in this type of work when the right opportunity presents itself.

BULLETIN: *Does this type of restoration take a lot of knowledge?*

MR. HOPKINS: Vintage locomotive boilers, particularly of riveted design, required a great deal of skill to manufacture. Much of the equipment and tooling used at the time to construct those boilers is no longer utilized or available, and boilermakers with the skill and knowledge required to perform the work are certainly rare. Seattle Boiler Works still has riveting equipment and is fortunate to have highly skilled personnel. Most of our regular field crew is experienced and knowledgeable in making riveted repairs. Our quality control and design staff are also familiar and comfortable with the unique requirements of riveting.

BULLETIN: *Do you do all the work on-site?*

MR. HOPKINS: We performed the repairs to the Willamette boiler in our Seattle shop. However, with equal success we have performed many riveted repairs at field locations.

BULLETIN: *How many restorations have you done? How many, on average, do you do each year?*

MR. HOPKINS: It would be difficult to answer how many riveted repairs or restorations we have performed because, in truth, we started over 100 years ago and have never stopped. Yes, new construction techniques evolved from riveting to welding many years ago, but riveted locomotive boilers have remained in operation, and riveted repairs have been required to keep them in operation.

Of the total number of repairs we perform each year, riveted repairs are relatively few, but because of the nature of riveting, they are significant in terms of quality control and execution.

BULLETIN: *Explain the "nature of riveting."*

MR. HOPKINS: The riveting process itself is hot and noisy. It seems that relative to other repairs, most aspects of riveted repairs are difficult, which might explain the few remaining operational locomotive boilers.

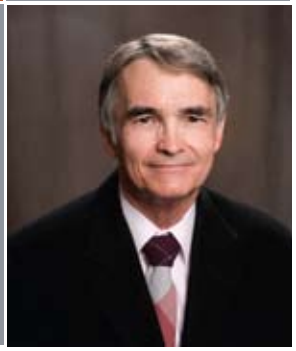
BULLETIN: *What is the most difficult part of restoring the boiler?*

MR. HOPKINS: There are many difficult parts of repairing or restoring riveted locomotive boilers. Initially, of course, much research must be performed to verify design, materials, and operating history. Routinely, additional testing must be performed on the boiler to verify material identification and thickness and compliance to specifications. After a boiler is found to be acceptable for repairing, a repair plan must be developed that includes manufacturing or sourcing of all replacement parts. For complex formed parts, this can be a challenge. Some parts, like rivets and stays, are not readily available, so they must be appropriately specified and made or purchased, with all required testing satisfied.

BULLETIN: *Thank you, Mr. Hopkins, for taking the time to talk to us.* ✪

Editor's Note: Seattle Boiler Works, Inc. holds the National Board "R" stamp authorization no. 1206, as well as the ASME "H," "PP," "S," "U," and "U2." Mr. Hopkins is a member of the NBIC committee and past chairman of the Washington Board of Boiler Rules.

Left: Working on the Willamette.



Manufacturer's Data Report

BY FRANCIS BROWN, SENIOR STAFF ENGINEER

For a boiler or pressure vessel to receive the ASME Code Symbol Stamp, a manufacturer's data report (MDR) must be completed. It must also be completed to register vessels with the National Board. For registration, the National Board requires vessels be manufactured according to the applicable section of the *ASME Boiler and Pressure Vessel Code*. In addition, the National Board requires that each vessel be marked with the registration number and that a National Board commissioned inspector sign the MDR. The MDR must be submitted to the National Board within 60 days of completion.

Each section of the ASME Code specifies the MDR form to use. The forms are available for free on the ASME Web site (*www.asme.org/Codes/Publications/BPVC/Data_Report_Forms.cfm*). They may also be printed, internally generated, or purchased. Another alternative is the generation and completion of the forms by using the National Board's Electronic Data Transfer (EDT) system.

EDT is an interactive system that simplifies and expedites the completion and submission of MDRs to the National Board. The manufacturer has access to his files 24/7 and may create new MDRs or browse reports in the process of being completed.

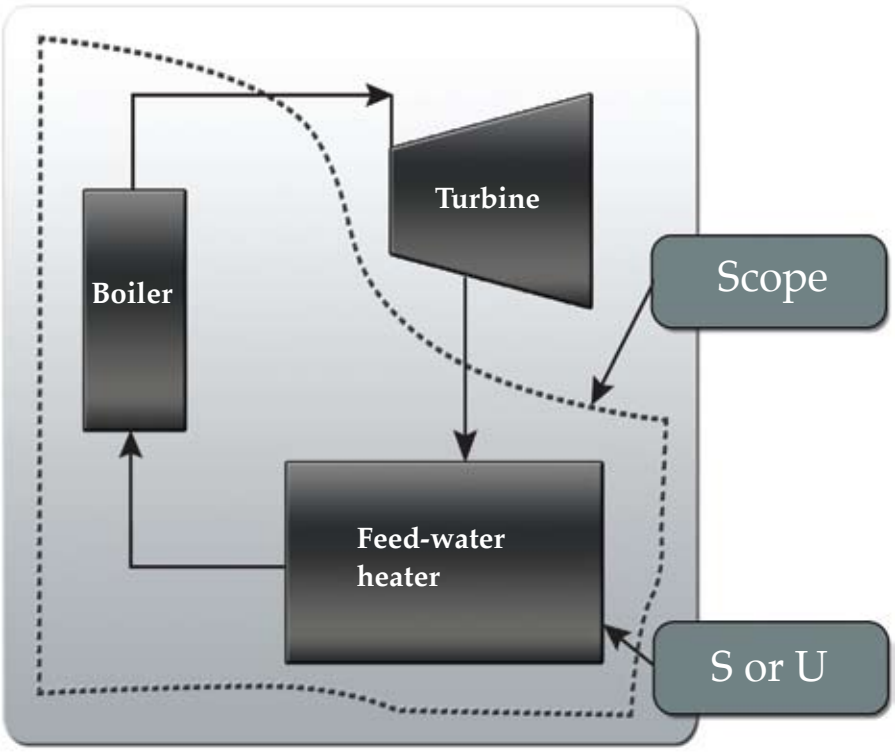
Every data report must comply with the applicable section of the code. A frequent nonconformance found by the National Board is the use of an incorrect data report form by the manufacturer to document a boiler or boiler component.

Section I has 12 data report forms with a specific form for boiler type or boiler component. For example, the P-3 data report form is specifically used for documenting watertube boilers, superheaters, economizers, waterwalls, and all items composing a watertube boiler (PG-112.2.2). The P-3 form is also used to document a superheater, economizer, or waterwall when the item is certified by a manufacturer other than the boiler manufacturer. The P-3 form is also designated a "Master" report when documenting a complete boiler or when the component described in the report can be isolated from other boiler components and is manufactured by a manufacturer other than the boiler manufacturer.

Section I, unlike other code sections, permits some boiler components to be manufactured to other sections of the code. For example, Part PFH permits feedwater heaters within the scope of Section I to be manufactured to Section VIII, Div. 1, requirements for unfired steam boilers (Fig. 1). The feedwater heater is documented on a Section VIII, Div. 1, data report form. This form is referenced on the Section I primary data report form and is included in the data report package submitted to the National Board for boiler registration.

The P-4A data report form for fabricated piping is often misused. To be documented on a P-4A form, the piping must be of welded construction, be

Fig. 1 **Part PFH permits U-stamped vessel**



within the scope of Section I, and not be supplied by the boiler manufacturer. Piping within the scope of Section I extends from the boiler nozzles to – and including – the required stop valves. The design and fabrication requirements of the piping are governed by the *Power Piping Code*, B31.1.

Completing a P-4A form is often difficult because of possibly confusing terms such as "Boiler Registration No." and "Piping Registration No." as well as "Field Fabrication" and "Field Assembly." A discussion of these may reduce the confusion.

The "Boiler Registration No." is the National Board Registration No. (NB No.), or some other number required by the jurisdiction. The number must be obtained from the boiler manufacturer or from the owner of an existing boiler.

The "Piping Registration No." is the NB No. if the piping fabricator registers the piping with the National Board.

Line 4 on the P-4A form is for "Identification" of the piping section. The purpose of the piping, along with any identification number, is to be entered. Is the piping section main steam, blowoff, boiler feed, etc.? There should be only one piping section per P-4A.

The section of piping should be fully described in "Description." The materials should be listed by complete ASME material specifications, including grade and/or class. The diameter, wall thickness, and length of the piping should be included, along with all fittings and valves.

Field fabrication and field assembly are distinct activities, but there may be some work that fits both categories. Per B31.1-100.2, field fabrication is "primarily, the joining of piping components into integral pieces ready for assembly. It includes bending, forming …." Field assembly is "the joining together of two or more piping components by bolting, welding … into their installed location as specified by the engineering design." The definitions appear to be very similar, but closer examination will reveal the differences between them.

Installing a nozzle into a length of pipe and welding a 90-degree elbow to one end of the pipe on the floor next to the boiler is an example of a fabrication. Hoisting that fabrication into position and welding the nozzle, the pipe end, and the elbow to the adjoining piping is an assembly. Welding the same three pieces into place individually on the boiler is also an assembly.

Every MDR received by the National Board is reviewed for content. Each MDR must comply with the applicable section of the *ASME Boiler and Pressure Vessel Code*. The National Board adds requirements to the ASME requirements. Some of the National Board requirements are discussed below.

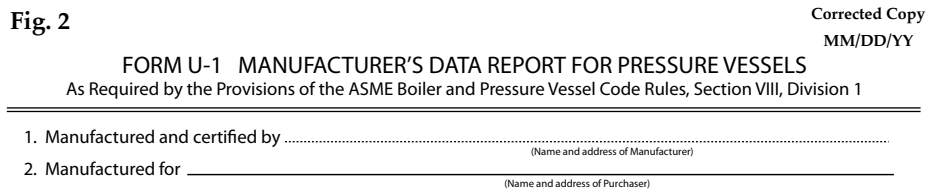
Partial data reports must be listed on the primary report by the name of the part, the manufacturer's name, and the serial number of the part. A copy of the partial data report must be attached to the primary report. Original partial data reports are requested, but legible copies are acceptable. Faxed copies are not accepted as copies of partial data reports.

The certification part of an MDR is completed by the Manufacturer's Representative and the Authorized Inspector signing and dating the appropriate locations. The Authorized Inspector must sign only after the Manufacturer's Representative has signed the report. Any color of ink is acceptable, provided the color copies well. The color red copies well if it is sufficiently dark. The Authorized Inspector must include his National Board Commission Number and "A" endorsement only when the vessel will be registered.

Changes to an MDR may be made by white-out, mark-over, etc. All white-outs, mark-overs, etc. must be legibly initialed and dated by the Manufacturer's Representative and the Authorized Inspector. Changes prior to registration are made as noted. After registration, a copy of the data report is corrected as previously noted and "Corrected Copy" and date are added to the upper right hand corner of the MDR (Fig. 2). Note that the manufacturer is sent an invoice for the registration fee for MDRs revised after vessel registration has been completed.

Manufacturer's data reports are often confusing and difficult to complete correctly. The guides for completing the MDRs in the ASME Code may not completely address the situation. For those problem data reports, contact the National Board for assistance.

Fig. 2



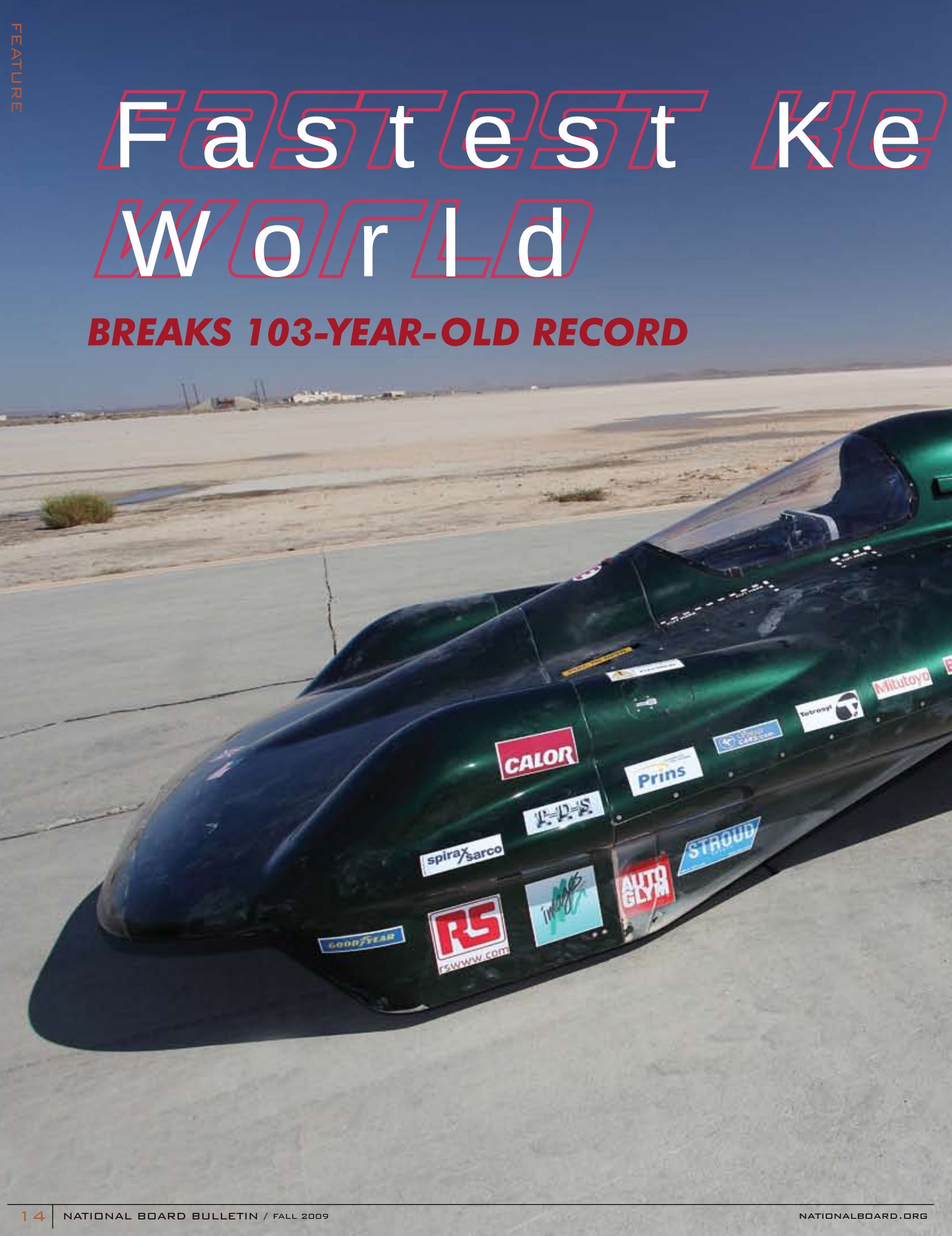
Corrected Copy
MM/DD/YY

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by ..... (Name and address of Manufacturer)
2. Manufactured for _____ (Name and address of Purchaser)

Fastest Ke World

BREAKS 103-YEAR-OLD RECORD



tTle in the

In 1906, on Daytona Beach's hard-packed sands, American race car driver Fred Marriott, behind the wheel of a cigar-shaped Stanley Steamer, set a land speed record of 127.659 mph. That record would hold – at least for steam-powered vehicles* – for 103 years. Then, on August 25, 2009, at 8:19 a.m. (PT), Charles Burnett III sped to a new record of 139.843 mph – the average speed on two runs over a measured mile at Edwards Air Force Base in California. The runs were made on the hard clay of Rogers Dry Lakebed, the largest dry basin in North America, covering 44 square miles.

Burnett is principal driver for the British Steam Car Challenge (BSCC) team, based in Portmore, Lymington, Hampshire (on the southern coast of England). The team had been working for 10 years to break the 1906 record. "It was absolutely fantastic," Burnett says. "We reached nearly 140 mph on the first run. All systems worked perfectly; it was a really good

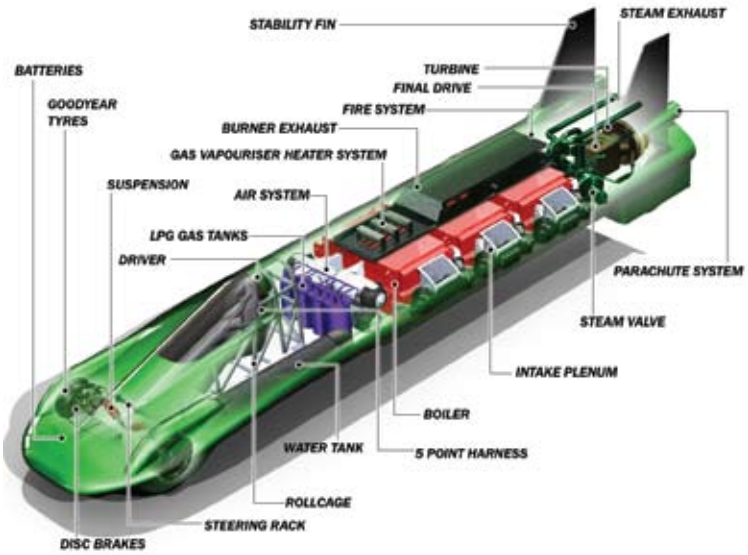
* The current absolute record holder is Thrust SSC (Super Sonic Car), a British-designed jet-propelled car that on October 15, 1997, reached 763.035 mph.

run. The second run went even better, and we clocked a speed in excess of 150 mph. The car really did handle beautifully. [. . .] It is a privilege to be involved with such a talented crew. What we have achieved today is a true testament to British engineering, good teamwork, and perseverance."

The next day, on August 26, the car, this time driven by Don Wales, set another record for steam-powered vehicles – an average of 148.308 mph on two runs over a measured kilometer. Project Manager Matt Candy says, "After Charles broke the record for the measured mile, we decided to have one more run with the car and attempt the kilometer record. We took some of the inhibitors from the boilers, and it helped get a bit more speed out of the car."

Both records are subject to confirmation by the Fédération Internationale de l'Automobile (FIA), the body that governs many motor races and certifies land speed records. The FIA recognizes a land speed record as the average speed of two runs made across the same measured distance in opposing directions within 60 minutes of each other.

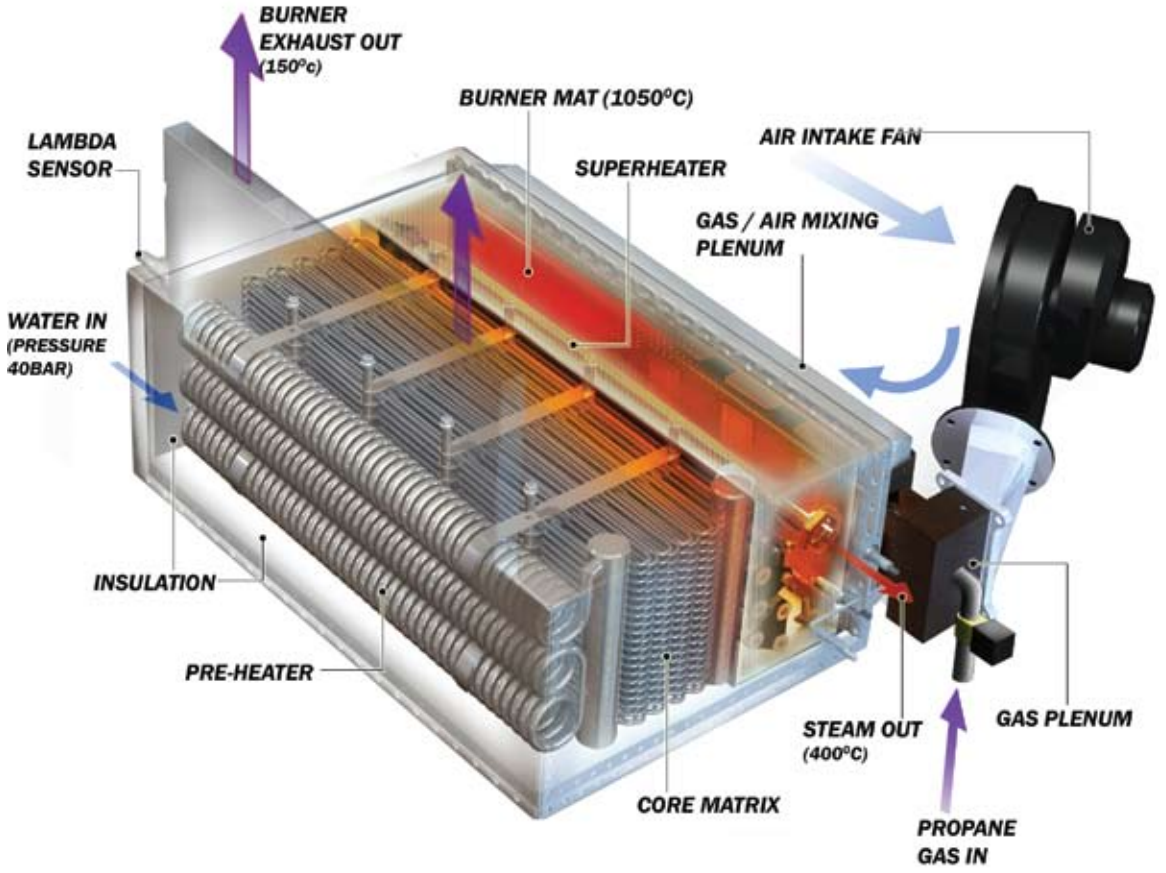
The car, christened *Inspiration* and nicknamed the "Fastest Kettle in the World" because the burners can



Below: Crew members ready the Inspiration for its record run. Right: Test Driver Don Wales.

produce 23 cups of tea per second, bears no small resemblance to the Batmobile of the '60s TV series *Batman*. It's 25 feet long, 5½ feet wide, and 5½ feet tall; it weighs three tons. The front section is made of carbon composite; the rear section, of aluminum panels. The car holds 12 stainless-steel boilers, each about as big as a medium-sized suitcase. The boilers, pressurized at 40 bar, run on liquid petroleum gas and contain nearly two miles of tubing. Water is pumped into the boilers at about 11 gallons per minute. Superheated steam – at twice the speed of sound – enters a two-stage turbine that, at 13,000 rpm, drives the rear wheels. Candy, who holds a degree in industrial design, says in theory the car should be able to reach 170 mph.

He says one reason it took the team 10 years to break the 1906 record was the difficulty in developing the boilers. "There wasn't a book to tell you how to design a boiler to make the sort of steam we're making. We're putting 3 MW of heat in, so all the boiler development was novel, done on an incremental, experimental basis in our workshop. We have three stages. We have a preheater stage at the back, where we get the water from ambient temperature up to about 60°C or 70°C (140°F or 158°F). We have 40 tubes on a couple of expansion chambers. These tubes are in the middle of the boiler, and that's where we get from 70°C to wet steam. Steam exits in a dry superheated condition at 400°C (752°F)." ✪



Basic Weld Inspection – Part 1

BY JOHN HOH, SENIOR STAFF ENGINEER

FEATURE

Note: *The purpose of this article is to provide inspectors with a general knowledge of weld inspection. It is by no means intended to compare with the Certified Welding Inspector (CWI) requirements of the American Welding Society (AWS).*

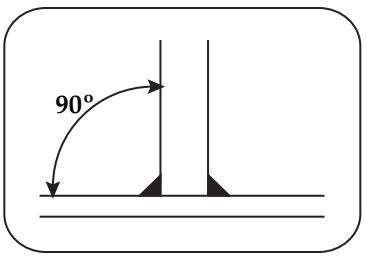
Weld inspection begins long before the first welding arc is struck. The inspector must review the job package to become familiar with the:

- welding processes to be used;
- materials and any special properties;
- joint configurations and preparation;
- welding procedure specifications to be used and any limitations;
- qualifications of welders to be used and any limitations;
- heat treatment (pre-heat or postweld), if any;
- nondestructive examination (NDE), if any; and
- specific ASME Code or NBIC requirements (for example, Section VIII, Div. 1, lethal service).

While not imperative, the inspector should learn to read common weld symbols such as the AWS symbols. At the very least, the inspector should always carry a reference guide to interpret weld symbols. Having reviewed all this information in advance, the inspector will be prepared to recognize any problems as they develop rather than after-the-fact.

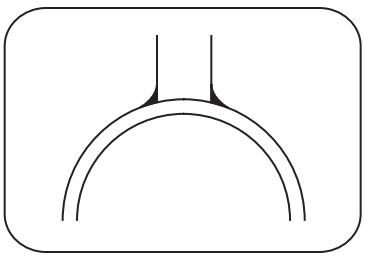
The following examples and tips are practical applications the inspector can use as a guide.

FIG . 1



1. The manufacturer or repair organization (certificate holder) has indicated on the job drawing that a weld joint is to be prepared with a 60-degree bevel and root gap of 1/16 inch. Unless the bevels are milled on precision machinery, it is doubtful they will achieve an exact 60-degree bevel as indicated. The easiest solution for the certificate holder is to allow a range of plus or minus a few degrees of the target value. The same holds true for a root gap dimension with no plus or minus tolerance. Even the best welder will have difficulty maintaining an exact root gap dimension. Providing a plus or minus tolerance will make the welder's job much easier.

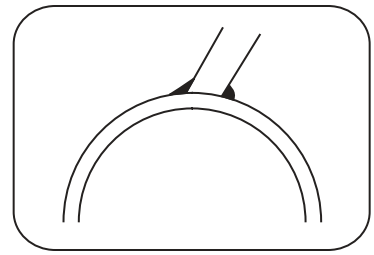
FIG. 2



2. The inspector can use scraps of weld filler wire or rods as a gauge to quickly identify root gaps that are beyond the tolerance range. For example, if the target root gap is 3/32 inch plus or minus 1/32 inch, the inspector should be able to insert a 1/16-inch wire into the gap with little or no resistance. Likewise a 1/8-inch wire should exhibit no side-to-side movement across the gap. Real world situations are rarely this convenient, but the inspector can develop a sense of "too tight" or "too loose" with experience.

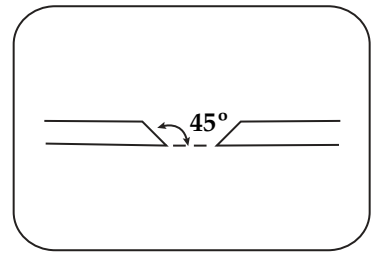
3. The certificate holder has designed a simple nozzle to be welded to a flat head (Fig. 1). The nozzle axis is 90° to the flat head, and the attachment weld includes a 3/8-inch fillet weld. The inspector can easily measure the fillet weld to ensure compliance. Now, let's install the same nozzle in a small diameter vessel shell (Fig. 2). The fillet weld will tend to spread or flatten on opposite sides of the nozzle due to the curvature of the shell. The inspector will need to ensure that the certificate holder has deposited enough weld to meet the design criteria. This example becomes even more critical if the nozzle is installed at an angle other than 90° (Fig. 3).

FIG. 3



4. Using the same nozzle attachment example as described above, let's look at the weld joint preparation. The certificate holder has specified a 45-degree bevel around the circumference of the hole in the flat head and the vessel shell. Again, the flat head will be very easy to measure, since there is a single plane of reference (Fig. 4). The curved shell will present more of a challenge. The inspector will have to determine if the certificate holder is referencing the bevel from the vertical axis of the nozzle (Fig. 5) or from the variable reference plane of the curved shell (Fig. 6).

FIG. 4



5. When bevels are prepared with a cutting torch and finished with a grinder, it is very difficult to maintain an exact angle. This is why allowing a plus or minus tolerance is so important. Even obtaining a perfectly circular hole when using a torch and grinder is difficult. Fixtures are available which attach to the torch to aid in cutting circular holes and bevels, but the setup is sometimes inconvenient.

6. A certificate holder is preparing to weld several hundred circumferential joints in power boiler tubes. ASME Section I requires these welds to be full penetration, but due to the diameter, thickness, and location in the boiler, radiography of the welds is not required (PW-41, Table PW-11). How does the inspector ensure compliance with the code? Inspectors are trained to believe only what their eyes tell them; but when the inspector cannot see the inner surface of the tube, it becomes difficult to accept that situation. This is when the inspector must take what some would call a "leap of faith." If the tube ends are properly prepared (beveled) and a qualified welder is using a qualified welding procedure, the odds are very good that the welds will be full penetration. Does this mean the inspector should just accept all this at face value and walk away? Absolutely not! If the inspector is unfamiliar with this certificate holder's welding procedures and welders, the inspector has the right – and duty – to witness a few of the welds being made to ensure code compliance. One "red flag" to a potential problem would be if the inspector observes that the tube ends have not been beveled. The inspector should immediately ask the certificate holder about this situation. It could be as simple as the certificate holder having just not performed that step in the process yet, or it could be as bad as his or her having tried to save time and money by not beveling the ends. From a practical standpoint, it is extremely difficult, if not impossible, to obtain a full penetration weld when the tube ends are not beveled. The welder would need to start with a large root gap and then be very careful not to "push through" excess filler metal to cause weld build-up on the inside of the tube.

FIG. 5

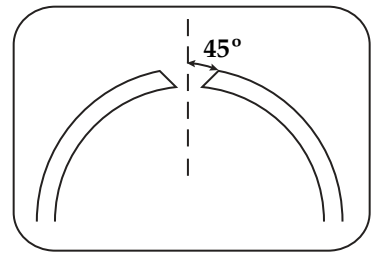
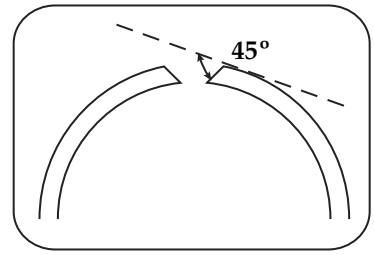


FIG. 6



Part 2 of this article will appear in the Winter *BULLETIN*.


BUFFALO TRACE
DISTILLERY

Distilling Whiskey in My Old Kentucky Home

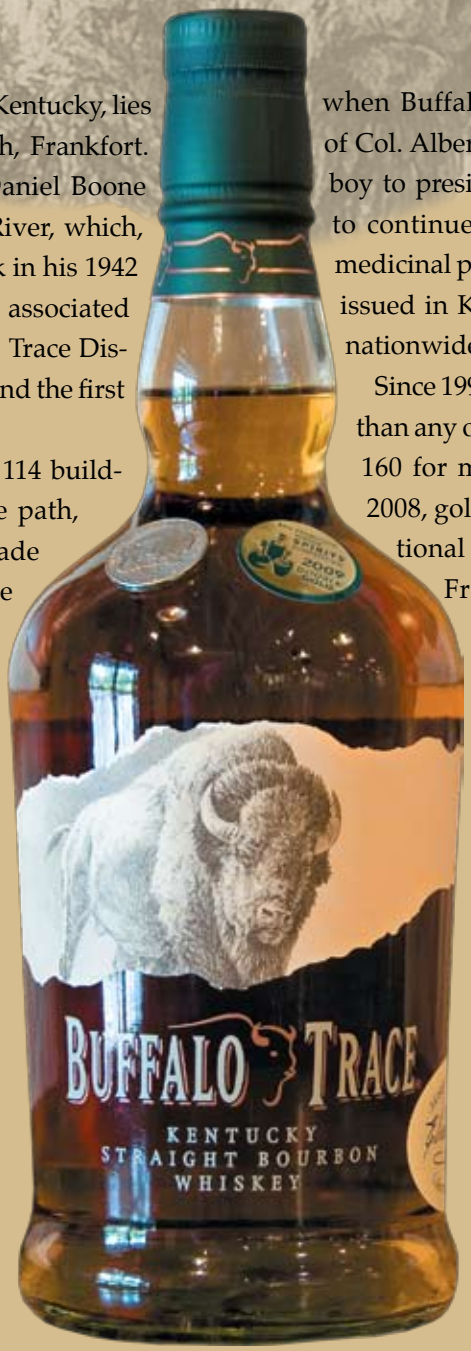
The Great Buffalo Trace

Photos by: Jeff Rogers

About 30 miles west of Lexington, Kentucky, lies the capital of the commonwealth, Frankfort. Here legendary frontiersman Daniel Boone is buried; and here, on the Kentucky River, which, according to historian Thomas D. Clark in his 1942 book, *The Kentucky*, "has always been associated with the whisky business," sits Buffalo Trace Distillery – America's oldest distillery site and the first to use steam in distillation.

Sitting on 119 acres and comprising 114 buildings, Buffalo Trace was named for the path, or trace, thousands of buffalo had made migrating across the river toward the Great Plains. It was settled in 1775 by two brothers, Hancock and Willis Lee, and a small company of men. Because of its proximity to abundant limestone spring water and bottom loam ideal for growing grain, it became site of a distillery in 1787. The first modern distillery, equipped with a state-of-the-art boiler that had cost $1,000, was built on the grounds in 1857. In 1870 Edmund Haynes Taylor Jr., considered the "father of the modern bourbon industry," bought the distillery and committed himself to making an exceptional bourbon whiskey.

He and his successors succeeded – even during Prohibition (1920–1933), when Buffalo Trace, under the direction of Col. Albert B. Blanton, who'd risen from office boy to president, received a government permit to continue making whiskey, though only for medicinal purposes. The permit was the only one issued in Kentucky and just one of four issued nationwide.



Since 1990 Buffalo Trace has won more awards than any other North American distillery – over 160 for more than 15 brands – including, in 2008, gold medals at the Los Angeles International Wine & Spirits Competition, the San Francisco World Spirits Competition, and the International Wine & Spirits Competition. In 2006 Buffalo Trace was named "Distiller of the Year" by *Wine Enthusiast Magazine and Whisky Magazine* and "Distillery of the Year" by *Malt Advocate Magazine*. It remains the only distillery to have won all three awards in the same year.

Of its flagship bourbon – Buffalo Trace Kentucky Straight Bourbon Whiskey – *Jim Murray's 2009 Whisky Bible* says, "As an everyday bourbon, there is little to match this one. It's all about balance and complexity and injections here and there of the elements that make bourbon unique."

Opposite page: micro distiller.


BUFFALO TRACE
DISTILLERY
Beer Still
Capacity
60,000 gallons

Opposite Page: Beer still.
Left: Copper-bearing steel fermenters.
Bottom: Coal-fired boiler; empty fermenter; part of a gas-fired boiler.

Standards of Identity

Believe it or not, for a whiskey to be classified "bourbon," which on May 4, 1964, Congress declared a "distinctive product of the United States," it must meet strict federal regulations. The Federal Standards of Identity for Distilled Spirits requires that bourbon:

- be made "from a fermented mash of not less than 51 percent corn";
- be produced at no more than 160 proof (or 80 percent alcohol by volume); and
- be stored at no more than 125 proof (or 62.5 percent alcohol by volume) in charred new oak containers.

Bourbon that meets these regulations and has "been stored in the type of oak containers prescribed, for a period of 2 years or more shall be further designated as 'straight'; for example, 'straight bourbon whiskey.'"

And, as you probably guessed, it can't be called "Kentucky" unless it's been distilled and aged in the Bluegrass State.

Makin' Bourbon

Production of bourbon begins with inspection of grains – corn, rye, wheat, and barley malt – for any signs of mold. Elmer T. Lee, who started working at Buffalo Trace in 1949 and is now master distiller emeritus, says the distillery receives corn from granaries in Kentucky, Indiana, and Ohio; rye and wheat from granaries in North and South Dakota; and barley malt from malting firms in Minneapolis, Minnesota. If grains pass inspection, they're stored in silos for a time, then withdrawn and mixed into a "mash bill" of at least 51 percent corn. The mash is fed into a mill and ground by rotating hammers before it passes through a screen at the bottom. Lee says that at Buffalo Trace the hammer mill contains a screen which only lets through grain of 10/64-inch diameter, resulting in a substance similar to cornmeal. This is stored in bins to await mashing, the process of combining milled grain with water.

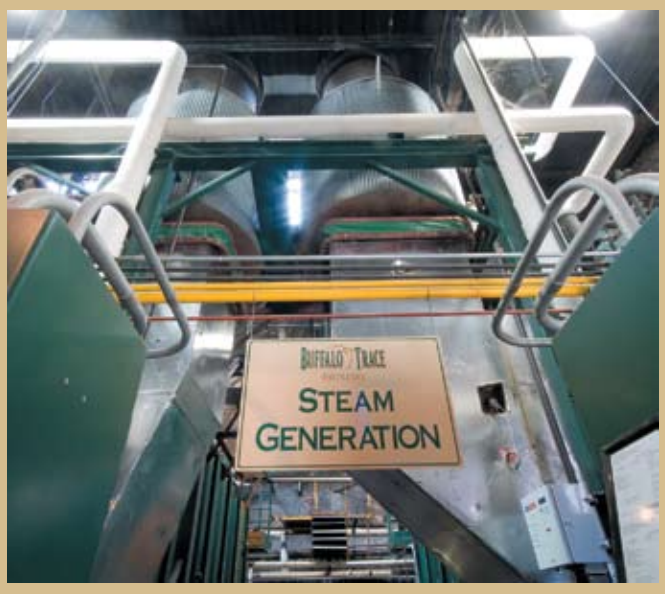
Buffalo Trace uses limestone water. According to Harlen Wheatley, a native Kentuckian who's been master distiller at Buffalo Trace since 2005, the water

is filtered using reverse osmosis. As *BULLETIN* readers will recall from the fall 2008 feature "From Sap to Syrup: The Art of Sugaring," osmosis is the natural diffusion, without pressure, of a solvent through a semipermeable membrane from a solution with low solute concentration to a solution with high solute concentration. On the other hand, reverse osmosis uses high pressure to force a solvent from an area of high solute concentration through a membrane to an area of low solute concentration [see Fig. 1]. It was achieved in 1959 when a UCLA professor, Samuel Yuster, and two of his students, Sidney Loeb and Srinivasa Sourirajan, trying to find a way to extract pure water from salt water, produced a synthetic membrane from cellulose acetate polymer. The membrane rejected the salt, but let the water pass.

Wheatley says reverse osmosis "strips 99.8 percent of impurities from the water." Buffalo Trace – the first distillery to use reverse osmosis – operates two pressure vessels. They operate under a maximum pressure of 4,500 psi.

Mashing begins by adding a measured amount of filtered water to a pressure cooker. Buffalo Trace uses three, each capable of holding 10,000 gallons of water. Wheatley says, "They are direct steam-injected horizontal cookers with agitators [i.e., stirring rods]." After the water is added, a measured amount of milled grain is added. Then the cooker is closed and injected with steam to raise the mash's temperature to between 230°F and 240°F.

Steam at Buffalo Trace is generated using three water-tube boilers: two are 1992 gas-fired Cleaver-Brooks boilers, and one is a 1972 Erie City boiler. The boiler house also contains an inactive 1951 coal-fired Babcock & Wilcox boiler. According to Kentucky Chief Boiler Inspector Rodney Handy, many distilleries, though they've installed more efficient modern boilers, retain older ones because of the presence of asbestos or high cost of removal. "Many of these locations," he says, "have become like boiler and pressure vessel museums. Buffalo Trace, for example, still utilizes several of their original riveted vessels and tanks."



Above: Buffalo Trace steam generator.
Opposite page: 1972 Erie City boiler.

Two boilers produce 60,000 pph, and one produces 150,000 pph. Each runs at 150 psi and has three safety valves: Wheatley says there have never been any serious steam-related accidents, just "minor burns associated with repairing steam leaks, pipe leaks, etc."

The mash in the pressure cooker stays between 230°F and 240°F for about half an hour. Lee says the reason for cooking mash is to break the starch down to soluble starch. Once the mash is converted to a liquid, the temperature is gradually lowered with a vacuum cooling system. When the temperature reaches 152°F, a slurry of germinated barley malt, which has been mixed at room temperature in order to not kill the germs, is added. The barley malt converts the liquid starch to liquid sugar. This is cooled to 65°F and pumped into a tank to undergo fermentation, the process of converting sugar to carbon dioxide and alcohol through yeast.

Buffalo Trace uses 12 fermenters. Unlike some distillers that use cypress ones, Buffalo Trace uses copper-bearing steel fermenters because they're easier to keep sanitary. The largest in the industry, they each are 25 feet tall, about 23 feet in diameter, and hold 92,000 gallons.

While the liquid sugar is pumped into a fermenter, set back, or sour mash – previously fermented and distilled mash – and yeast are pumped into it as well. (The strain of yeast Buffalo Trace uses was first isolated shortly after the repeal of Prohibition.) After 18 to 24 hours, the yeast begins to feed on the sugar, causing the fermenter's contents to bubble and producing carbon dioxide, released into the air, and alcohol. The bubbling increases until, after four or five days, it all but subsides. What remains is alcohol solution similar to beer.

The beer enters the top of a beer still, which at Buffalo Trace is 30 feet tall and 6 feet in diameter, and descends through 13 perforated plates. At the same time steam enters at the bottom and, raising the beer's temperature, strips it of alcohol, released as vapor at the top of the still. The vapor passes through a shell-and-tube condenser

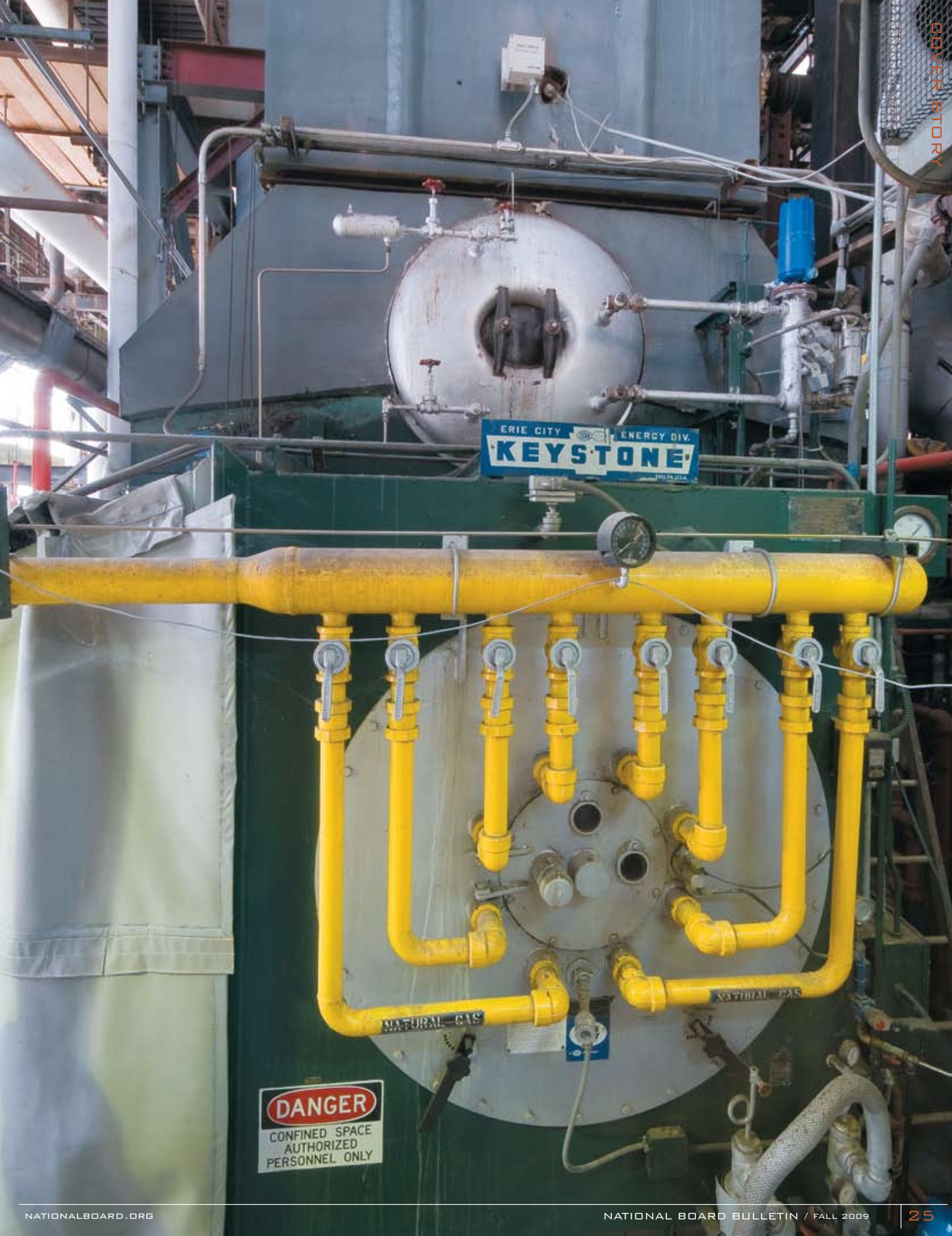
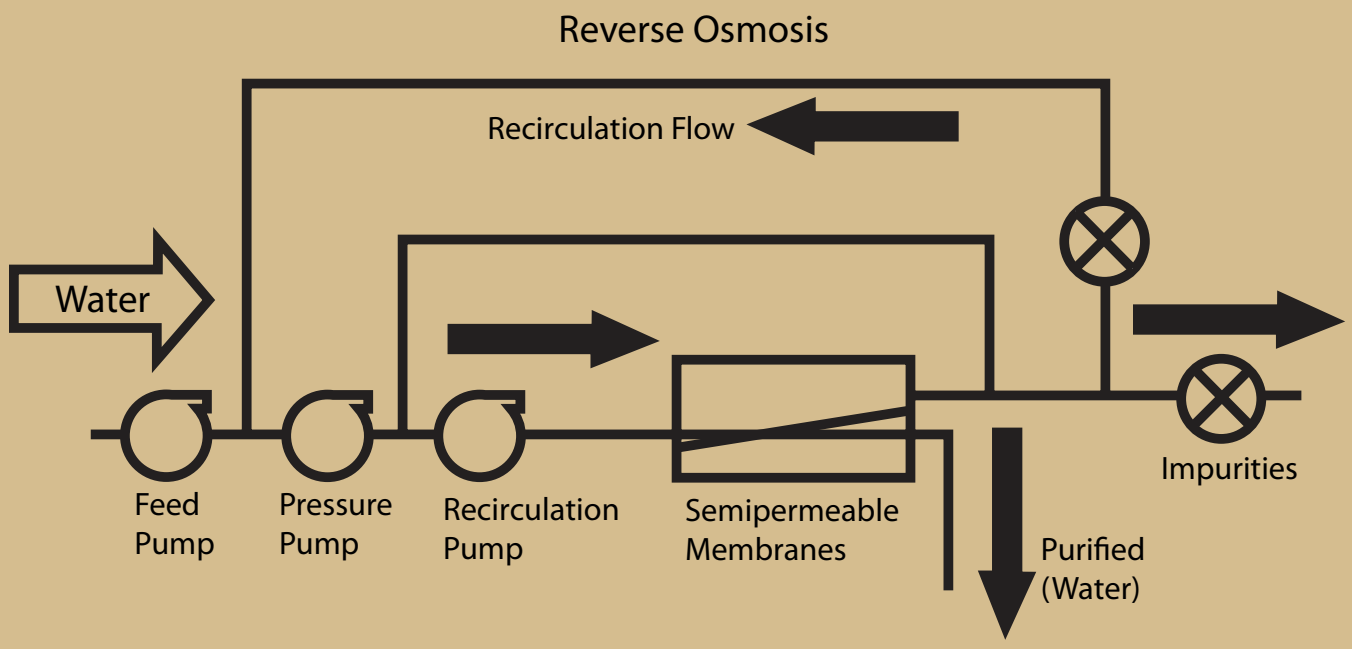

ERIE CITY
ENERGY DIV.
KEYSTONE
NATURAL GAS
NATURAL GAS
DANGER
CONFINED SPACE
AUTHORIZED
PERSONNEL ONLY

FIG . 1



Top: Pressure cooker. Bottom: Barrels of whiskey aging in a warehouse.

and is turned into liquid of 115-120 proof. This descends into a second still, a doubler, a pot with steam-heating coil. The liquid's temperature is raised, and the alcohol again released as vapor, which is condensed this time to a liquid of 130-135 proof. Called "white dog" for its fiery taste, it's pumped into a stainless steel tank, where distilled water is added to reduce the proof to 125 – the maximum proof permitted by law to store "white dog" in new oak barrels, charred to bring out the color and flavor of bourbon.

When full, each barrel holds 53 gallons and weighs 550 pounds. They're stored in one of 11 warehouses for aging – probably the most important factor in producing high-quality bourbon. "The longer it's aged," Lee says, "the more flavorful it becomes." Buffalo Trace ages bourbon for four, six, eight, and ten years. The warehouses are well-ventilated, with windows open almost year round. When the weather turns cold and the temperature of the barreled bourbon drops below 40°F, aging will cease. To remedy this, Buffalo Trace pumps steam into the warehouses to bring the bourbon up to about 60°F.

After bourbon ages for an appropriate time, it's poured from barrels into tanks and chilled to 15°F to filter fatty acids. Filtered water is added to reduce the proof from 125 to a proof of 80, 86, 90, 93, or 100, and the bourbon bottled.

And the final result? Well, according to *Wine Enthusiast Magazine*, Buffalo Trace Kentucky Straight Bourbon Whiskey, which is aged for 10 years, "displays elements of spice, sautéed butter and old leather gloves; following aeration the fat/butter component dominates. Palate entry is corny sweet and almost fruity; at midpalate tastes include sweet oak, cinnamon, nutmeg, honey, tar and beeswax. Concludes spirity and feisty. One of the greatest values in the world-wide whiskey category." ✪

TRAINING WRAP-UP

AUGUST, 2009 "B" CLASS

JUNE, 2009 "RO" CLASS

JULY, 2009 "RTL" CLASS

SEPTEMBER, 2009 "A" CLASS

JULY, 2009 "N" CLASS

DON COOK

Principal Safety Engineer, State of California

Don Cook has a philosophy about coaching sports and being a professional manager.

"Both require similar job skills," he offers without a modicum of doubt. "Patience, integrity, and mutual respect are key to motivation whether it be on a playing field or in a corporate setting."

While the principal safety engineer for the state of California is not the first to link managing and sport, he knows philosophically whereof he articulates. This is a man who supervises one of the largest safety inspection operations in the United States and in the country's largest jurisdiction. But among his many outside interests, coaching sports remains an important component in the relationship Don enjoys with his eight-year-old daughter Olivia.

To understand the Don Cook of today is to understand the Don Cook who was born and raised in Bakersfield, California – about 100 miles north of Los Angeles.

"It was primarily an agricultural town surrounded by lots of oil fields," the state official recalls. "Dad was a mechanic: helicopters, milk trucks, VWs – anything in motion. My mother was a special education teacher."

The oldest of four siblings, Don admits to a rather uneventful childhood. Unless one counts the fact he stood 5′ 7″ in the fifth grade.

"I grew fast," the 6′ 3″ state official reveals. But being extraordinarily tall was not necessarily a bad thing. "When playing pickup sports, I was always the guy doing the picking or the first guy to be picked." Sports, he emphasizes, were an important centerpiece of his young life.

Bulletin Photograph by Alex Schoenfedt

And so was work. At 13, Don took a job with a dairy company for $1 an hour. "My job was to lead this hippo out of his cage once a week, clean up after him, and then return him to the cage."

A hippopotamus? At a dairy?

"The city wanted to start a zoo," Don explains. "But when that didn't work out, there was this matter of having a hippo and not knowing exactly what to do with him so the owner of the dairy bought him.

"The company named the hippo Sam and built an entire advertising campaign around him," the National Board member chuckles. "'See Sam and Save' invited patrons to visit Sam at the dairy convenience store and save on the price of milk and bread."

Rising from hippo cage specialist to gardener, gas attendant, and finally cashier, Don's interest in sports never wavered during his high school years. "I played a lot of baseball, and I was also a member of the varsity basketball team for three years," he smiles with a sense of satisfaction.

"Back then, I really had no idea what I wanted to do with my future," he recollects. Between participating in sports and work, the future California official thought it wise to take a high school aptitude test.

Upon learning he possessed a propensity for mechanical engineering, Don concluded being around his dad and his dad's mechanical skills had influenced his professional calling.

The South Bakersfield High School valedictorian applied to and was accepted by the engineering school at Cal Poly San Luis Obispo. Continuing to work at the dairy company during his summers, Don graduated with a mechanical engineering degree in 1984.

"It took me a couple of months to land a job," the Bakersfield native admits. But it took him practically no time to reconnect with his old high school sports program. "I served three years as a volunteer assistant varsity basketball coach."

In 1984, Don secured his first job as a mechanical engineer at a Bakersfield steel fabrication plant. "This is where I developed an interest in pressure equipment," he reveals. "We did a lot of ASME Code jobs and things just evolved from design and fabrication into work with pressure vessels."

And so it went for six years. "One afternoon, a state inspector visited our shop and told me California was hiring inspectors," he explains with a nod of the head. "I applied, was invited to interview, and went through perhaps one the most trying experiences of my life."

Instead of the pleasant give-and-take exchanged during a conventional interview, Don found himself taking an oral examination to determine the depth of his technical knowledge. "Which wasn't very much," he discloses.

But he did get hired as an associate safety engineer and was subsequently dispatched to San Diego in 1990.

Enter the good life. "Living on the coast was exceptional," Don admits with a smirk. "One of the first things I learned to do was scuba dive." But the good life was about to get better.

"In 1996, my roommate went out with a young woman named Diana, who seemed more interested in me than him," he grins. "She even went as far as calling my roommate to ask if she could go out with me."

While the two dated early in 1997, Don was promoted to San Francisco. Suddenly what had developed into a serious relationship now promised to test his bond with Diana: would she or would she not accompany him?

Don decided a creative approach was needed to lure Diana over 500 miles to the north. And so he assembled a 10-minute video recounting all the reasons she should also make the Bay area her new home. Featuring photos, Don's voice-over, and some of his best romantic guitar riffs, the Valentine's Day video concluded with a proposal. The two married in August 1997 with his ex-roommate in the wedding party.

Following the retirement of chief safety engineer John Lemire in January 2003, Don was appointed his successor.

"Right now, we have a staff of 25 associate safety engineers, five senior safety engineers, and seven clerical associates," he explains. "We have about 300,000 pressure vessels in California, 210,000 of which are active."

Busy as he might be, Don's priority remains family: Diana, who works for the research medical group at Stanford University, and daughter, Olivia, who now holds forth in the third grade.

To spend as much time as possible with Olivia, Don arranges to participate in her athletic activities. "I both coach soccer and serve as an assistant coach for her softball team," the state official explains with pride.

What some of Don's friends and associates don't know about the Bakersfield native is that he is both an accomplished guitarist and amateur brewer. "I've got a nice 35-gallon brewery at home that is just enough to satisfy my fondness for beer," he reveals with a wink. "As for my guitar: I've played for quite a few years. As a matter of fact, I played in a band during college." His brand of music: "Primarily rock and blues."

The California National Board member reflects on his life and career with a sense of optimism, resignation, and satisfaction. Ask him what professional achievements he is most proud of, Don grins and jokes: "I now have nearly 20 years with the state!"

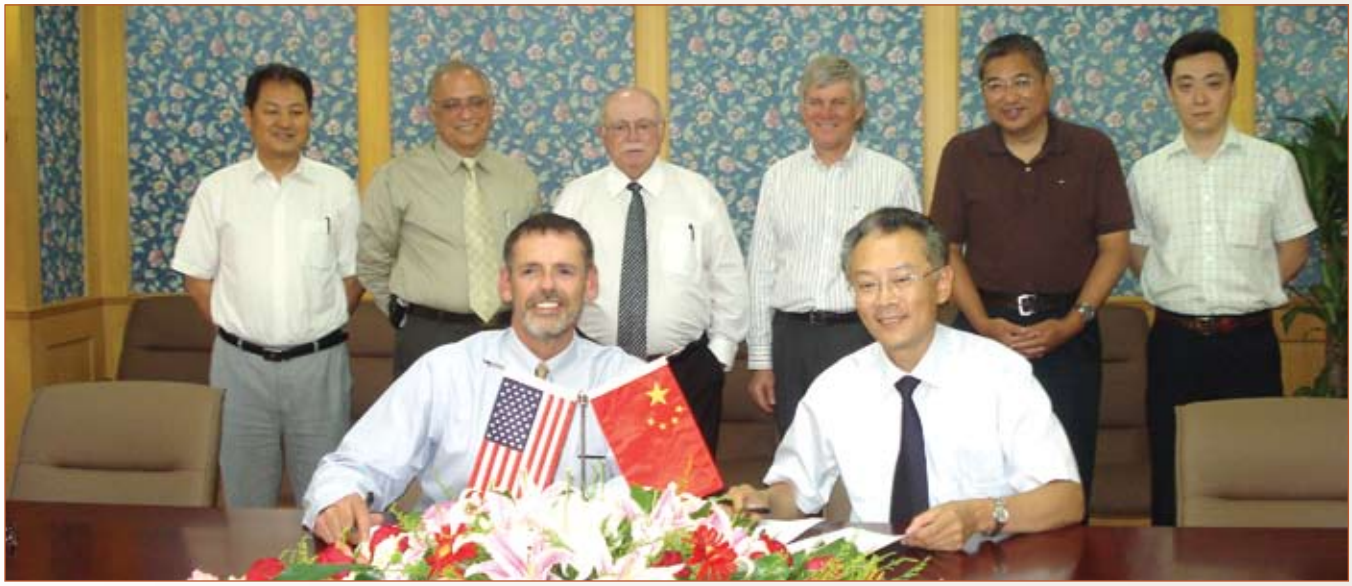
Upon further reflection and a swift tug on his salt-and-pepper beard, the California official quietly adds: "You know in my lifetime, I have only had *three* jobs!"

He quickly emphasizes there are no plans for number four. ◌

NBIC to Be Translated into Chinese

On June 24 the National Board signed an agreement with the China Special Equipment Inspection and Research Institute (CSEI) to translate the *National Board Inspection Code* (NBIC) into Chinese.

Executive Director David Douin says, "By having the standard translated and available in Chinese, we will promote the use and acceptance of the *National Board Inspection Code* within China. We are enthusiastic about beginning this endeavor and working with CSEI."



National Board meets with CSEI. Back row, left to right: Shen Gongtian, vice chief engineer, CSEI; Bob Aben, chairman, Board of Trustees, National Board; Dick Allison, assistant executive director, National Board; Chris Lanzit, senior advisor, National Board/ China; Shen Gang, secretary general, CSEI; and Xu Han, assistant chief of General Office, CSEI. Front row: David Douin, executive director, National Board; and Lin Shuqing, president, CSEI.

National Board Member Earl Everett Passes Away

Georgia Director of Safety Engineering Earl Everett passed away on August 14. He was 65.

Prior to joining the state of Georgia, Mr. Everett worked as an insurance company boiler inspector for Hartford Steam Boiler Company at Watts Bar Nuclear Plant in Spring City, Tennessee. Later promoted to assistant regional manager at Hartford's Atlanta office, he witnessed the passage of Georgia's first boiler law in 1985. That year Mr. Everett applied for and was appointed the state's first chief boiler inspector. He became a member of the National Board in July.

"Earl Everett was among our most knowledgeable members on international issues," explains National Board Executive Director David A. Douin. "His 24 years of dedicated service to both the state of Georgia and the National Board leaves a tremendous void within the pressure equipment industry. He was a consummate professional with both an outstanding reputation and commitment to public safety."

Born in Gainesville, Georgia, Mr. Everett served 12 years in the US Navy, nine of which were at sea. During his last three years of service, he wrote a curriculum for and taught the very first naval course on boiler feedwater test and treatment.

A former member of the National Board's Committee on Internationalization, he was also a member of the Board of Trustees from 1989 to 1991.

In addition to his pressure equipment responsibilities, Mr. Everett oversaw regulation of Georgia's elevators, escalators, and amusement rides.

He is survived by his wife Johnette.

National Board, Members Meet in Columbus

The Board of Trustees and National Board Members held their fall meeting in Columbus October 5–8. The events were held on the campus of National Board's Training and Conference Center. The Board of Trustees met on Monday. The members' meetings began on Tuesday morning with a meeting of the ASME Conference Committee, followed by the members' business meeting Tuesday afternoon. Technical presentations were held on Wednesday and Thursday.

New West Virginia Member Elected

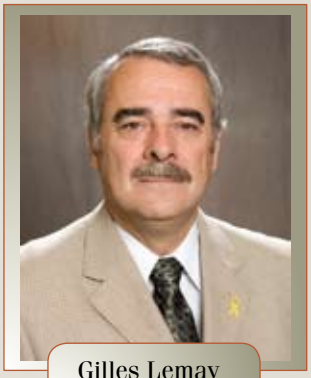
John F. Porcella

John F. Porcella has been elected to the National Board representing West Virginia. He is chief boiler inspector for the state.

From 1991 to 1996 Mr. Porcella was employed by J. H. Ballenger Co. as combustion and control technician. From 1997 to 1999 he worked as a boiler service technician for Link Iron Works in Hickory, North Carolina. From 2000 to 2008 he served as a boiler service technician for Combustion Equipment Company in Gibsonia, Pennsylvania. He joined the state of West Virginia in 2008.

Mr. Porcella holds National Board Commission No. 13758. Residing in Renick, West Virginia, he and his wife Pamela have two children, Joshua and Jamison.

New Ontario Member Elected



Gilles Lemay

Gilles Lemay has been elected to the National Board representing Ontario. He is employed by Technical Standards & Safety Authority as director of Boilers & Pressure Vessels and of Operating Engineers.

From 1968 to 1977 Mr. Lemay served in the Canadian Navy as master seaman, marine engineering technician. From 1979 to 1999 he held various positions, including power plant stationary engineer with Nova Scotia Power, boiler and machinery inspector with Royal Insurance, and boiler and machinery loss control manager with Royal & Sun Alliance. In 1999 he joined the Technical Standards & Safety Authority.

Mr. Lemay holds National Board Commission No. 10416 with "A," "B," "N," "NS," and "I" endorsements. Residing in Whitby, Ontario, he and his wife Shirley have two children, André and Chantel.

New Advisory Committee Member Seated

Michael J. Pischke

At its August meeting the Board of Trustees approved Michael J. Pischke as new Advisory Committee member representing pressure vessel manufacturers. Mr. Pischke is quality manager for Alfa Laval, Inc. He replaces Greg McRae, whose term expired.

NBIC Committee Meets at National Board

The *National Board Inspection Code* (NBIC) Main Committee, subcommittees, and subgroups met at National Board headquarters July 20-23. The groups evaluate needs, then develop, approve, and revise the NBIC. The standards-writing subcommittees, subgroups, and task groups are open to participation of groups materially affected by the code. These include manufacturers, repair firms, authorized inspection agencies, and representatives of government agencies. The next NBIC meeting will be held January 18–21, 2010, at the Omni Austin Hotel Downtown in Austin, Texas.

Call for Articles

The National Board of Boiler and Pressure Vessel Inspectors announces a call for articles to be published in future issues of the *National Board BULLETIN*. Articles should be 500 to 1,000 words and address issues relative to the safe operation, maintenance, construction, repair, and inspection of boilers and pressure vessels. Additional subjects may include safety valves as well as other unit components, testing codes and standards, risks and reliability, and training. Articles of commercial or promotional nature will not be accepted.

Those interested in submitting articles for consideration should send an abstract of no longer than 200 words in English to: David Culwell, Publications Editor, The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229. Abstracts may also be emailed to dculwell@nationalboard.org.

Kristi Meriweather

Receptionist

Bulletin Photograph by Greg Sailor

Kristi Meriweather is the face of the company – well, at least the first face you'll probably see if you ever visit National Board headquarters. And usually it bears a smile. "I love interacting with people," she says, "both in person and on the phone." Her congeniality was quite apparent to late Executive Director Don Tanner, who in 2004, she says, "requested I go up front."

Describing herself as a "small-town girl grown up," Kristi was born and raised in Washington Court House, Ohio, which is about halfway between Columbus and Cincinnati and has a population of about 13,500. She's a distant relative of Meriwether Lewis, leader of the Lewis and Clark Expedition. (Lewis' first name was derived from his mother's side of the family, the Meriwethers. It is through the Meriwethers, who somewhere along the line squeezed an "a" into their surname, that Kristi descends.) She has one brother, who now lives in Mt. Pleasant, South Carolina. One of her fondest memories is of taking trips with him and her parents. "When I was 15, my family flew to New York City, Washington D.C., and to see the Golden Gate Bridge. It was quite an experience for a young girl."

In Washington Court House, she attended junior high and part of high school with National Board employee Marsha Harvey. During high school she and her family moved to Tulsa, Oklahoma. When she graduated from Memorial High School, they moved to Daytona Beach, where her father was a successful realtor.

"Kristi Girl" – as some of her fellow employees call her – came to the National Board in 1996. Before that she worked for various companies, including Universal Guaranty Life Insurance Company, for which she worked as marketing assistant for 11 years; Mid Ohio Chemical Company; and Mac Tools. At the Board, she mainly worked as administrative assistant to former employee Kevin Ennis before becoming receptionist in 2004. Besides greeting visitors and answering phones, she also prepares mailings for the accounting and registration departments, proofs and shreds documents for accounting, and coordinates mailings with the mailroom.

Outside of work Kristi enjoys a variety of things. One of her favorite pastimes is reading, especially the books of James Patterson and Sidney Sheldon. Right now she's reading Richard Paul Evans' *The Locket*. She also enjoys decorating inside and outside her condo with plants and flowers, as well as listening to doo-wop and jazz. Two of her favorite performers are the saxophonists James Openheim, a.k.a. "Boney James," and Kenneth Gorelick, whom most know as "Kenny G."

She also likes to travel when she can find time. She's taken a cruise in the Bahamas and makes occasional trips to Mt. Pleasant to see her brother, sister-in-law, and 17-year-old nephew, Chad. About once a month she travels closer to home, driving to Springfield, Ohio, about 45 miles west of Columbus, to see, as she calls him, "Korkie the Yorkie," a four-year-old Yorkshire Terrier. Well, she doesn't only go to see Korkie; she especially goes to see Korkie's owners – Kristi's mother, aunt, and uncle – but playing with Korkie is a treat.

Training for the NEW National Board Commissions

BY KIMBERLY MILLER, MANAGER OF TRAINING

As you may or may not know, the National Board recently made a major announcement regarding a change in the National Board Commission to take effect in 2010.

The National Board has redesigned its commissioning process to accommodate *two* types of inspectors: the Inservice Commissioned Inspector and the New Construction Commissioned Inspector.

That's a major change for the National Board and the industry – *two* National Board Commissions. So how does that affect the Training Department and the students that pass through its doors after January 1, 2010?

Let's begin with the New Construction Commission.

For students studying to obtain a New Construction Commission, the biggest change means candidates will no longer have to sit for what was once the National Board Commission Examination. Previously students needed to pass the Commission Exam as a prerequisite for the "A" Endorsement, which allowed them to perform shop inspections. Beginning in 2010, students are now only required to attend the two-week **Authorized Inspector (A) Course** and take the exam on the tenth day. The current "A" Course material has been slightly adjusted to accommodate the needs of candidates entering the class with no previous experience with the ASME Code – something prior students already had been exposed to.

Upon passing the examination with a grade of 70 percent or higher, students will be eligible to receive what will be called the New Construction Commission with "A" Endorsement. Of course, the necessary on-the-job training requirements noted in the *National Board Rules for Inservice and New Construction Commissioned Inspectors* must also be met before the Commission is granted (see NB-263 for details).

Overall, for those wishing to perform new construction/shop inspections the path to do so just became slightly shorter and more direct.

Now what about training for the Inservice Commission?

In the past the National Board has offered what was known as the **Pre-Commission Exam (PEC) Course**. This was a preparatory course for Commission Exam candidates with the main focus on preparing to take the exam. That course is being replaced with the **Inservice Commission (IC) Course**. A more focused two-week course, the new "IC" course is designed not only to prepare students for the National Board Inservice Commission Exam but also to train them on topics every inservice inspector should know, as well as provide a more "real world" experience for the students. New items will include controls, safety devices, basic water issues, and an emphasis on repairs. Although attending National Board training is not required to sit for the Inservice Commission Exam, it is highly recommended as a valuable tool in preparing to become an inservice inspector.

Beyond the issue of training, the most noticeable change for those individuals looking to become inservice inspectors is with the National Board Commission Exam itself. Renamed the Inservice Commission Examination, the exam will move from a three-part to a two-part test and will cover inservice inspection topics only. And there is another bigger change: students may take the examination *any time* of the year by utilizing the new computer testing process employed by the National Board and provided by Applied Measurement Professionals, Inc. (AMP). Within two days of a request an exam candidate can be seated at one of the 170 AMP locations worldwide. (More information on AMP will become available on the Web site as the calendar approaches January.)

When will all of this training occur? The **Authorized Inspector (A) Course** will continue to be held four times a year in Columbus. Dates for 2010 have been set with a class in March, June, September, and December. The new **Inservice Commission (IC) Course** will initially be offered in February and May with more offerings to be announced as we approach the second half of 2010. Exact dates can be found under the Training Menu on the National Board's Web site. Please reference the Courses and Seminars page for further details.

Training Courses and Seminars

ENDORSEMENT COURSES

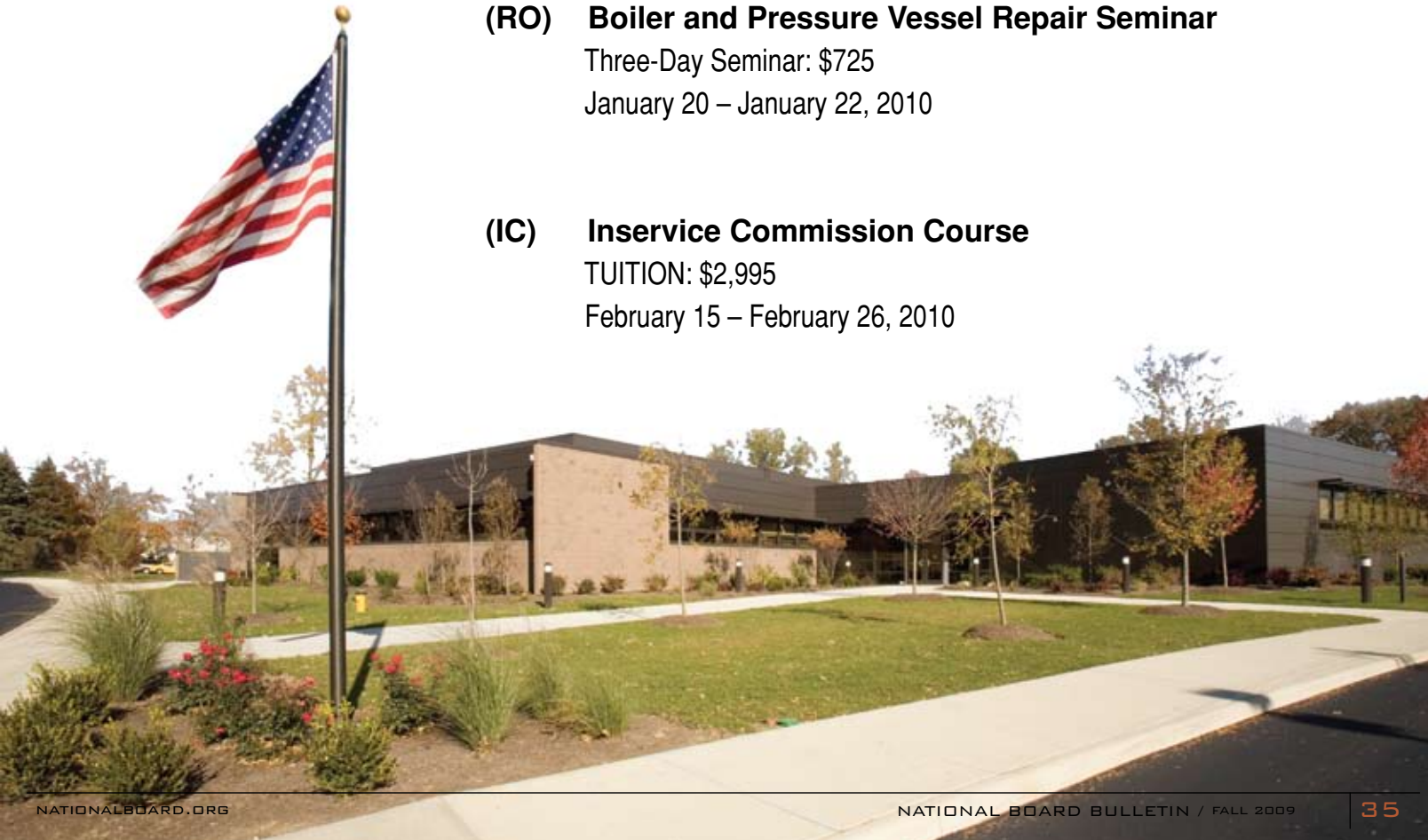
(B) Authorized Inspector Supervisor Course
TUITION: $1,495
January 25 – January 29, 2010

(O) Owner-User Inspector Supervisor Course
TUITION: $1,495
January 25 – January 29, 2010

CONTINUING EDUCATIONAL

(RO) Boiler and Pressure Vessel Repair Seminar
Three-Day Seminar: $725
January 20 – January 22, 2010

(IC) Inservice Commission Course
TUITION: $2,995
February 15 – February 26, 2010



"WRONG FROM THE FIRST"

The Boiler Explosion at Bingley

EFFECTS OF THE STEAM-BOILER EXPLOSION AT BINGLEY, YORKSHIRE.—SEE PAGE 18.

On June 9, 1869, about 10:00 a.m., at a bobbin mill in Bingley, England, a boiler exploded, leveling the grounds, flew through the air, and, as *The Annual Register, 1869* wrote, "fell a shapeless mass about forty yards off." Fifteen people were killed and 25 injured.

An investigation headed by L.E. Fletcher, chief engineer of the Manchester Steam Users' Association, found the boiler had been constructed of inferior metal and thus, according to *The Journal of the Franklin Institute*, "was wrong from the first." For eight or nine years the boiler had been used in another factory. A boiler maker then bought it and, finding corrosion underneath, inadequately repaired it by riveting half-inch plates to old plates worn to ¼ inch. The boiler maker sold it to the bobbin mill, where it worked for three years before exploding. The investigation found that leakage had begun at the repair site.

But the boiler's poor construction and repairs hadn't been the only things that had contributed to the explosion; the boiler's tender, Robert Hodgkinson, had also contributed with "his want of care and skill" (so wrote *The Annual Register, 1869*). A coroner's inquest found him guilty of manslaughter – though he himself had been killed in the accident.

Nashville

2012 Site of The 81st General Meeting

May 14 – 18

Gaylord Opryland Hotel and Convention Center
Nashville, Tennessee

Among North America's most distinctive hotels, the Gaylord Opryland Hotel and Conference Center in Nashville features nine acres of indoor gardens, cascading waterfalls, an indoor river complete with a delta flatboat, and more...

Watch the National Board Web site for additional details.

nationalboard.org