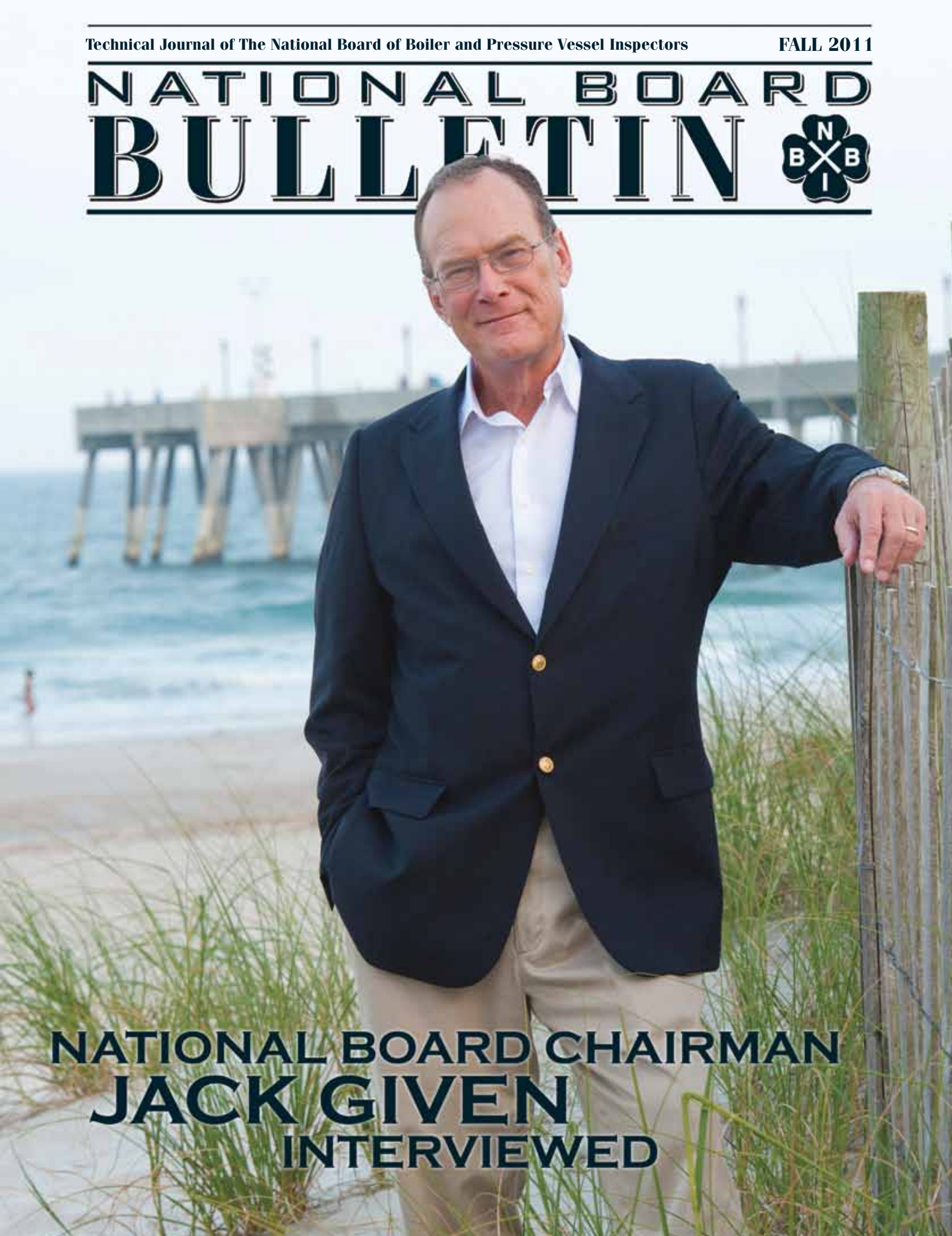
Technical Journal of The National Board of Boiler and Pressure Vessel Inspectors FALL 2011

NATIONAL BOARD BULLETIN



NATIONAL BOARD CHAIRMAN JACK GIVEN INTERVIEWED

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The NBIC – an American National Standard recognized internationally for rules and guidelines for the installation, inspection, repair, and alteration of boilers, pressure vessels, and pressure relief devices.

BULLETIN

FALL 2011 • VOLUME 66 • NUMBER 3

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 ensuring acceptance and interchangeability among jurisdictional authorities empowered to ensure adherence to code construction and repair of boilers and pressure vessels.

The National Board *BULLETIN* is published three times a year by The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229-1183, 614.888.8320, *nationalboard.org*. Postage paid at Columbus, Ohio.

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ISSN 0894-9611. CPN 4004-5415.

On the Cover: National Board Chairman Jack Given

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BULLETIN photograph by Ned Leary

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THE TOOL OF TECHNOLOGY

BY DAVID A. DOUIN, EXECUTIVE DIRECTOR

Hammer, flashlight, and mirror.

For decades, these were the tools of an inspector. And pretty much the only tools.

Then came the 80's and 90's. Inspectors were not only confronted with the Internet and personal computers, but the struggle to appreciate how this new technology would impact their jobs. Today, a more sophisticated generation of that technology engenders more information than many of us can absorb, let alone process.

For a moment, just think about where we were as an industry during the last decade.

Inspectors were reporting to their offices most days rather than communicating electronically from laptop computers in their cars and trucks. Pressure equipment professionals traveled cross country to receive training – training now conveniently available as close as one's own computer.

Remember having to lug around the old three-ring binder containing the National Board Inspection Code? If you don't, it suffices to say NBIC access was at one time far more difficult than simply pulling it up on your smart phone.

These are modest examples of an era now in the rearview mirror. But more sophisticated advancements notwithstanding, there remains a small but significant group of companies – and professionals – who reject new technology for reasons unknown. It is my opinion these entities not only limit their own potential within the industry, but may even be impeding the success of our industry as a whole.

Improvements in the way we do things have run the gamut. Just look at the advances made in composite materials and fabrication, design and analysis, testing, inspection, post construction, and NDE. The introduction of new software, video and computer imagery, as well as refinement in the size and quality of cameras, has launched the pressure equipment industry far beyond what most of us would have expected when we got into the inspection discipline years ago. And witness the progress in engineering design, flaw evaluation, component failure modes, plastic analysis, and controls.

Proudly, every step forward has necessitated bringing both ASME and National Board codes and standards to a new level of modernization.

While a few seasoned pros lament the old days, even the most hardened critic has to admit new technology developments have led to increased production, time savings, and efficiency. Computerization of data involving inspections, billing, violations – and even repairs and alterations – has literally altered the direction of an industry once tethered to rows and rows of file cabinets.

Remember having to type the old data report forms, mailing them to the National Board, and clearing office space for more document storage? Of course, that was before Electronic Data Transfer (EDT). Curiously, even though EDT has streamlined what had been a woefully outdated system, some companies to this day still prefer to register pre-EDT.

When National Board launched its Web site in 1995, our overriding fear was outpacing or technically getting ahead of ourselves with those who lacked a comfort level with the Internet. As younger professionals have integrated our industry, the demand for more sophisticated electronic communication has climbed substantially. Today, smart phones, laptops, and electronic tablets are no longer the exclusive purview of a youthful generation.

That is why I encourage all within our industry to embrace the new equipment, skills, and information sources that will help us do more, and consequently better serve our constituencies (i.e., reducing loss of life, injuries, and property damage).

There are numerous courses available to everyone from beginner to journeyman. Consequently, there are few reasons not to keep on top of the new technology at our disposal. Knowledge can easily be supplemented by becoming more actively involved in ASME and National Board committee activities.

Because of significant recent advances in technology, this is a great time for the pressure equipment industry. While the inspection process will never become fully automated, its continued transformation is not only good for inspectors, but the people who depend on inspectors.

I extend to our industry a cordial invitation to step lively – and proudly – into the 21st century.

Or you can opt for the status quo. Waiting by your fax machine.

2011 Registrations

National Board *Certificate of Authorization to Register* ensures 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 2011 reporting period was 47,061,250.

SIZE		FY 2011	FY 2010	FY 2009	FY 2008	FY 2007
BOILERS						
square feet of heating surface						
≤ 55	(A)	154,964	156,129	161,041	156,766	139,435
> 55 and ≤ 200	(B)	28,823	30,884	32,371	39,115	30,235
> 200 and ≤ 2,000	(C)	8,362	8,032	9,084	10,680	10,050
> 2,000 and ≤ 5,000	(D)	557	420	720	689	891
> 5,000	(E)	572	650	766	1,021	916
TOTAL		193,278	196,115	203,982	208,271	181,527
PRESSURE VESSELS						
in square feet						
≤ 10	(A)	788,752	680,873	774,899	819,791	856,421
> 10 and ≤ 36	(B)	202,902	183,449	214,107	338,811	356,659
> 36 and ≤ 60	(C)	40,017	35,798	43,648	59,371	57,587
> 60 and ≤ 100	(D)	12,924	11,039	14,714	14,983	13,123
> 100	(E)	16,784	13,783	18,509	18,239	16,490
TOTAL		1,061,379	924,942	1,065,877	1,251,195	1,300,280
NUCLEAR VESSELS						
in square feet						
≤ 10	(A)	482	481	494	700	712
> 10 and ≤ 36	(B)	51	30	38	98	182
> 36 and ≤ 60	(C)	14	7	13	19	63
> 60 and ≤ 100	(D)	18	5	5	27	13
> 100	(E)	94	14	9	19	34
TOTAL		659	537	559	863	1,004
ATTACHMENTS*		92,158	90,117	86,961	103,336	89,815
GRAND TOTAL		1,347,474	1,211,711	1,357,379	1,563,665	1,572,626

*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

The National Board Safety Medal

Twenty-Five Years of Honoring Achievements in Safety

At the 81st General Meeting in May 2012, a member of the pressure equipment industry may be honored with the National Board's highest commendation: The Safety Medal award. The 2012 honoree will receive the award on the commemorative 25th anniversary of the first award ceremony (in 1987) when former executive director Samuel F. Harrison was posthumously awarded the premier bronze medallion.

The Safety Medal program was established in May 1986 at the 55th General Meeting, when National Board membership approved founding an annual award to honor individuals for significant contributions to boiler and pressure vessel industry safety. Since that time, 22 professionals have been presented with the medal (two medals were awarded in 2007; no awards were given the years of 1989, 2002, 2004, and 2011). In May 2007 a Safety Medal pin was added as part of the award.

Nominees must meet a high set of criteria in order to be eligible for the award. For instance, candidates must have no less than 15 years of active participation in National Board activities and be responsible for significant contributions in the boiler and pressure vessel industry through involvement in key committees. Four qualification categories – leadership, governmental affairs / statesman, education / training, and codes and standards – help describe a candidate's achievements.

Anyone can nominate a candidate with exception of National Board's executive director and Board of Trustees members. Nominators must provide three letters from individuals who have personal knowledge of the candidate's achievements. At least two of the letters must come from National Board members. Nominators can choose one or more of the qualification categories to highlight their candidate's accomplishments.

Letters are submitted to the executive director, who reviews each profile and selects one candidate to present to the Board of Trustees for consideration. A two-thirds majority vote by the Board of Trustees determines the final candidate.

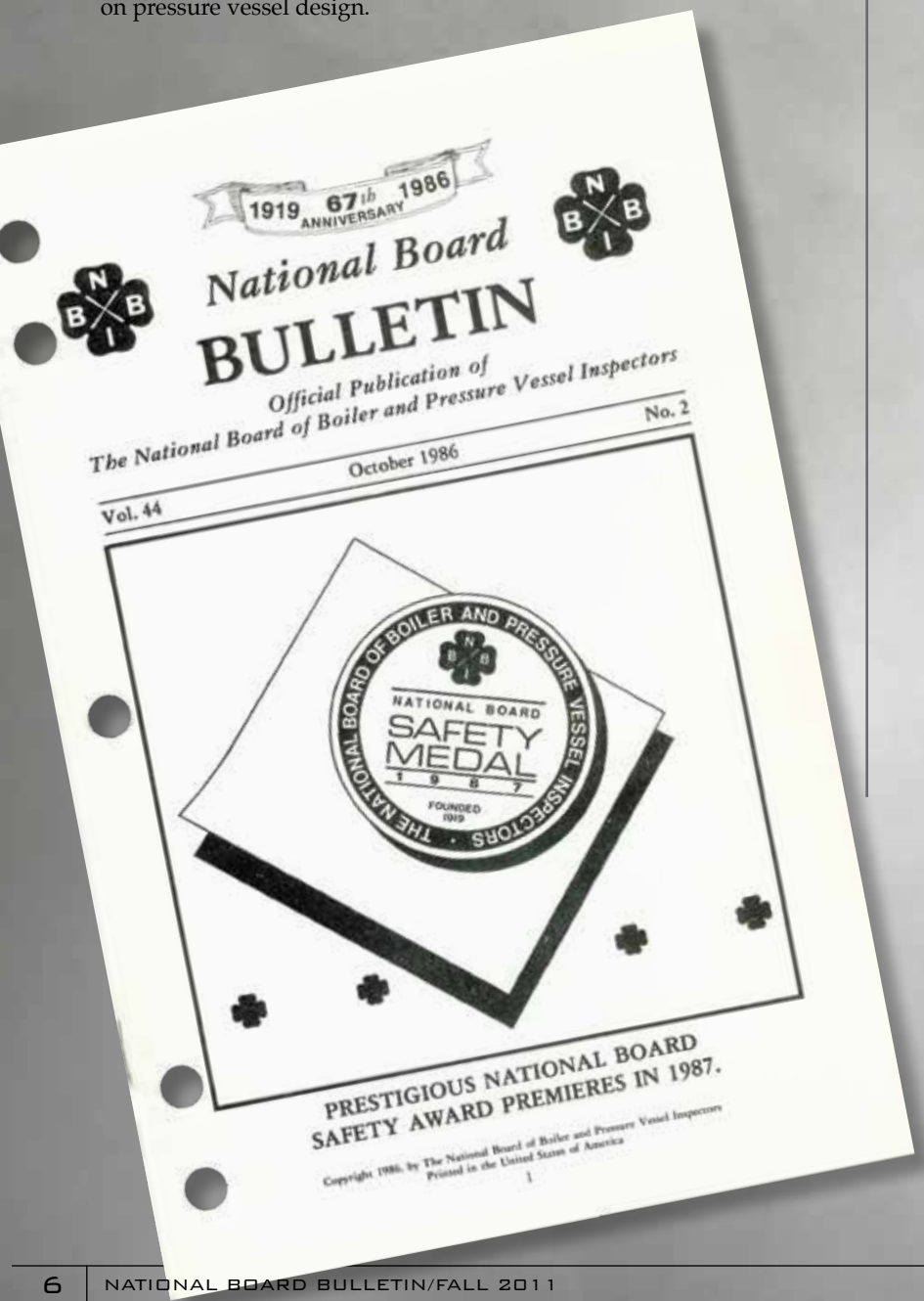
July 1987 *BULLETIN*

Former executive director Samuel F. Harrison's wife, Blanche Harrison, accepts the first award on behalf of her husband.

Past Recipient Ken Lau Looks Back at Honor

"It was a wonderful feeling to be recognized by one's peers and by an organization dedicated to public safety," recalls Safety Medal recipient Ken K.T. Lau, chief inspector and administrator for the province of Alberta. Dr. Lau was the 21st awardee.

Dr. Lau has been involved with pressure technology for 43 years. He graduated in mechanical engineering and obtained his PhD through research in pressure vessel design and stress analysis. "I have never left the field of pressure equipment and have worked in various disciplines, including research, construction, operation, consulting, standards development, lecturing, regulatory programs, and accident investigation." Throughout his career Dr. Lau has remained actively involved in a number of professional and jurisdictional organizations. For more than two decades he has been an adjunct professor with the University of Alberta teaching a master of science course on pressure vessel design.



Past Safety Award Winners

AWARD	RECIPIENT	YEAR
1st	Samuel F. Harrison Sr.*	1987
2nd	Leonard P. Zick	1988
3rd	Helmut Thielsch	1990
4th	Wilford L. Garvin	1991
5th	Guy A. Arlotto	1992
6th	Donald J. McDonald*	1993
7th	Charles W. Allison	1994
8th	Richard E. Jagger	1995
9th	William E. Brown*	1996
10th	Charles E. Ford	1997
11th	Robert J. Cepluch	1998
12th	Morris L. Snow Jr.	1999
13th	Arthur I. Snyder	2000
14th	Ronald C. Howard	2001
15th	George Bynog	2003
16th	Duane R. Gallup*	2005
17th	Albert J. Justin	2006
18th	W. D. Doty	2007
19th	E. A. Steen	2007
20th	Charles H. Walters*	2008
21st	Ken K. T. Lau	2009
22nd	Robert V. Wielgoszinski	2010

*These recipients were awarded posthumously.

Achievements in Safety

Safety Medal recipients are elected for their distinct accomplishments in safety. Teaching has been a personally rewarding achievement for Dr. Lau, and subsequently, has left a distinctive mark on some of his students. "Every now and then I come across successful individuals in the pressure equipment industry who were either students in my classes or attendees of a seminar or presentation I had made. They remember me as having helped in some way in their understanding of the importance of and the need for pressure equipment safety."

In recent efforts, Dr. Lau is passionate about his involvement with helping to bring industry, government, and all stakeholders together to promote public safety, as seen in the success of ABSA (Alberta Boilers Safety Association) – an organization authorized by the Alberta government for the administration and delivery of all safety programs related to boilers, pressure vessels, and pressure piping systems in the province of Alberta.

"The greatest satisfaction I take in my job is to be able to see real and positive impact on public safety. There are many opportunities for anyone in society to perform good deeds and help fellow citizens. In most cases, this involves volunteer work or donations. However, in our work, not only do we contribute to public safety, we actually get paid and are respected for our roles.

"The Safety Medal is not merely a recognition, but truly a reward," he continues. "It is an encouragement to the one who receives the honor and to others in the field as well. Public safety, particularly pressure equipment safety, is vitally important and impacts everyone. It is imperative to recognize people who help us remain safe in our daily lives. I hope in a small way I can repay through my work, particularly my work with the younger folks who are taking up the torch for standards and development and public safety."

Safety Medal Breakdown

- Letters of recommendation for the 2012 nominees are due December 31, 2011.
- Letters should be sent to:
  Mr. David Douin, Executive Director
  The National Board of Boiler and Pressure Vessel Inspectors
  1055 Crupper Avenue
  Columbus, Ohio 43229.
- Candidates must have served at least one term on any of the following: National Board's Board of Trustees, National Board Advisory Committee, National Board Committee or Task Group, or a nationally-recognized standards committee or subcommittee.
- Each candidate must have participated in National Board activities for not less than 15 years, and should be recognized as a contributor to professional organizations relating to the boiler and pressure vessel industry.
- The award may be given posthumously.

Selection Criteria: One or more of the following four qualification categories can be used to make a credible case for the candidate:

- **Leadership:** The candidate should be an executive or top-level manager who has achieved prominence as a leader or spokesperson for his or her particular industry. Candidate should have a record of progressive career accomplishments that reflect leadership over a sustained period.
- **Governmental Affairs/Statesman:** The candidate should contribute to the advancement of boiler and pressure vessel safety through the support of legislation on a local or state level.
- **Education/Training:** Candidate should be a recognized contributor to the development and implementation of new and innovative training programs, and should be recognized as a teacher and mentor to other individuals in the boiler and pressure vessel industry.
- **Codes and Standards:** The candidate should be recognized by peers as having extraordinary technical knowledge in the activity of the code committees and as having fully utilized this knowledge to further the activity of the committee in developing a new code or standard, in making a major revision to an existing one, or be recognized by peers as a forward-thinking individual who has identified and promoted the development of codes or standards for emerging technologies. In all committee work the candidate should demonstrate exemplary dedication to protection of public safety.

Secondary Low-Water Fuel Cutoff Probe: **Is it as safe as you think?**

By Steve Kalmbach

Boiler inspectors, operators, and technicians have all seen them: secondary low-water fuel cutoff probes – the small box on top of a boiler with a probe extending into the boiler. The conduit leads down to a box with indicator lights and Test/Reset buttons. The Test button is pushed when the boiler is firing and the burner shuts down. Reset is pushed and the boiler operates again.

These are conductance-actuated controls. Conductance is an electrical term indicating how well electrical current moves through material. Material can be metallic or liquid, such as boiler water. After a current-sensing device senses current, it activates a set of relay contacts to allow operation of the burner. Unfortunately, most probe controllers cannot distinguish between: 1) current flow through boiler water; 2) a probe with a high resistance-to-ground short, or a short-to-ground equal to or less than the boiler water resistance; or 3) a direct short.

For probe installations using a wire for the probe and a separate single wire for the grounding connection at the probe holder, the simple mistake of misconnecting (or reverse connecting) the wires will cause the control to fail in an unsafe condition. In this case, the control will give a permissive signal to the burner without any water in the boiler. If some of the probe wiring does not have a high enough temperature rating for its location, it may affect the insulating capabilities of the wiring if the wiring is in contact with the hot boiler. And if the insulation is breeched and has a resistance-to-ground equal to or less than the boiler water, the control will also sense this as current flow. A crack in the probe insulator or scale build-up between the probe and other conductive materials, such as boiler internals or piping, will also allow current flow.

The ASME CSD-1 code, *Controls and Safety Devices for Automatically Fired Boilers*, and the *National Board Inspection Code*, Part 1, Installation, require a low-water fuel cutoff. Low-water fuel cutoffs are usually mounted to the boiler externally, making them easily tested. These codes may require a second low-water fuel cutoff, but they do not specify whether it is internally or externally mounted. CSD-1 requires that "each cutoff device shall be installed to prevent startup and cutoff the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gage glass." Boilers shall not be operated when the water level is not visible in the gage glass.

For steam boilers, a daily test of the low-water fuel cutoff device is recommended by CSD-1, which also recommends performing a semiannual slow drain test of the low-water fuel cutoff device. Performing a slow drain test requires caution as the primary low-water fuel cutoff must be jumpered to allow the burner to continue firing after the water level is lowered below the primary low-water fuel cutoff. This normally requires two technicians for close monitoring of the water level so the boiler is not placed in an unsafe condition. This also requires close monitoring of the water level, as the secondary low-water trip point may be below the lowest visible part of the gage. Caution must also be exercised at conclusion of the test to confirm any jumpers installed are removed and the system is functioning properly and safely.

For steam boilers, a daily test of the low-water fuel cutoff device is recommended by CSD-1.

Most boiler manufacturers simply install a coupling at the top of the boiler shell for probe holder installation. There is no way to check operation of this control without doing a boiler draw-down test under load. If the probe is shorted or incorrectly wired, using the Test button will not prove conclusively that a probe is functioning properly and safely. An external chamber can be used for the probe instead. In this application, the external chamber allows for easier testing.

How to test for a potentially unsafe condition when the boiler is shutdown:

1. Disconnect probe and ground wire at controller. Without any water contacting the probe, check resistance-to-ground of each wire.
2. Remove probe and check for any unusual conditions, such as scale or cracked insulators.

How to test for a potentially unsafe condition when the boiler is operating:

1. Perform yearly testing and functionality tests of all probes under normal operating conditions.
2. If secondary low-water fuel cutoff is mounted externally in a water column, a daily blowdown test should be performed to check control operation.
3. To verify that testing of the controls causes a master fuel trip, primary and secondary low-water fuel cutoffs should be tested while burner is operating.
4. Visually check during the annual inspection to confirm probe is not mechanically touching the ground or another probe.
5. Visually check probe wiring for damaged or heat-affected wiring.

How to make probes safer and more reliable:

1. Be cautious using the same type of control for both primary and secondary low-water fuel cutoffs. The same principle of failure can apply to identical types of controls.
2. Mount secondary low-water fuel cutoff externally so it can be checked. Blowdown under load to verify operation.
3. Use of a secondary low-water fuel cutoff with two probes, each probe isolated from ground, will greatly reduce unsafe failures.
4. Use a single probe low-water fuel cutoff assembly with both the probe and ground circuits isolated from the building and boiler grounding system.

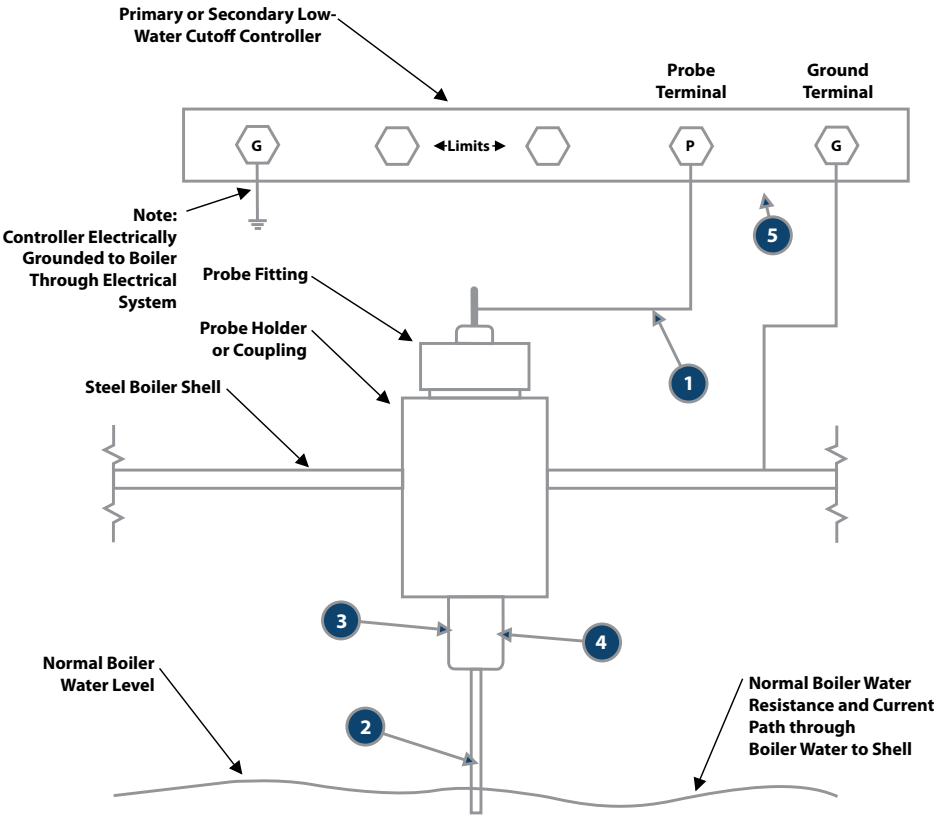
Steve Kalmbach has been involved in the boiler repair, maintenance, and service industry for 40 years. His company, Kasco, has been in operation for 28 years and has a National Board **R** Certificate of Authorization *for repairs and alterations and an ASME* **S** Certificate of Authorization *controlled by their office in Golden, Colorado.*

Alternative resistances that may lead to failure in an unsafe condition:

For illustrative purposes only.

1. Resistance or short-to-ground of any probe wiring equal to or less than boiler water resistance.
2. Short-to-ground of probe such as touching metallic internals of the boiler.
3. Shorting of probe insulator to ground from damage or boiler scale.
4. Shorting of probe insulator to probe.
5. Interchanging of probe wire and ground wire at controller.

Note:
If any of the above conditions exist and the resistance is less than or equal to the normal boiler water resistance, there will be current flow even in the absence of boiler water.



Inspection Tool Review
The Borescope

BY JAMES MCGIMPSEY, SENIOR STAFF ENGINEER

In business and military environments, an essential component in the formula determining success or failure is gathering accurate information in order to make informed decisions. National Board commissioned inspectors rely on the same information gathering in order to perform accurate and detailed inspections of boilers or pressure vessels. Failure could lead to fatalities and property damage with additional consequences, such as loss of employment due to impact on production.

The borescope is a tool boiler and pressure vessel inspectors can utilize for effective inspection. It is an optical instrument used to perform visual inspections of inaccessible spaces. Because borescopes enable the inspection of narrow, remote spaces, they are important tools for inspection of boilers and pressure vessels.

History and Application

Many industries use borescopes. In 1920, the Lenox Instrument Company, founded by American George S. Crampton, began manufacturing borescopes for a variety of uses throughout the world. Today, professionals working in a variety of fields use borescopes for inspection. These include electricians, aircraft and auto mechanics, pest exterminators, and medical practitioners.

In the medical field these precision instruments are called endoscopes. Surgeons use them to explore inside the human (or animal) body. British physicist Harold Horace Hopkins (1918-1994) invented the rod lens and zoom lens endoscopes, giving physicians incredible visual access to their patients and requiring only small, "key hole" incisions, allowing patients to recover more quickly.

RIGHT: *Lenox Portable Videoscope System. Photo courtesy of Lenox Instrument Company.*

BELOW: *Milwaukee M-Spector M12.*

BOTTOM RIGHT: *Olympus IPLEX FX Industrial Videoscope. Photo courtesy of Olympus.*

BOTTOM LEFT: *Students from National Board Authorized Inspector Course* **(A)** *get first-hand experience using a videoscope on a training vessel.*

Types of Borescopes

There are many types of borescopes used for industrial inspection.

FIBERSCOPES are flexible borescopes with bendable insertion tubes. This flexibility allows inspectors to access areas which are around a corner from the insertion point. They are ideal for examining mud legs, staybolts, and other areas of boilers or pressure vessels that are difficult to examine. Fiberscope devices come in varying specifications, such as outer diameter, effective length, direction of view, and image quality.

RIGID BORESCOPES have inflexible insertion tubes made from glass or stainless steel. They generally offer better images at a lower cost than flexible borescopes, but are limited in that the access area must be in a straight line. Rigid borescopes are useful for seeing into confined areas of boiler or pressure vessels. They, too, come in a variety of diameters, working lengths, and direction and fields of view. Types of rigid borescopes include swing prism, zoom swing prism, miniborescopes, and small-diameter.

VIDEOSCOPES, also known as remote inspection cameras or video borescopes, are similar to fiberscopes but use miniature video cameras to display and record inspected areas. Videoscopes are helpful for inspecting larger boilers and pressure vessels, as inspection openings must have a larger diameter in order for the videoscope to fit into the space. Different models and functions are available for a variety of uses.

The current cost, availability, and variety of borescopes has made them affordable and indispensable for detailed inspection, thus ensuring proper documentation and correction of unsafe conditions.

When National Board commissioned inspectors utilize devices such as borescopes to complete their boiler or pressure vessel inspections, they can feel confident signing and submitting the inspection report to the jurisdiction that the equipment has been inspected as thoroughly as possible.

A Look at the National Board's Relationship with ASME – Now and Into the Future

Part one of a two-part series highlighting the relationship between National Board and ASME.

There is no debating the fact that whether employed by a jurisdiction, insurance company, an owner-user, or third-party service provider, boiler and pressure vessel inspectors have a lot of responsibility: serving as front line technical expert; inspecting equipment to ensure compliance; playing the role of diplomatic mediator when an organization is found not in compliance; conducting failure investigations; communicating findings verbally and in written reports; managing staff (for some); managing bosses (for others); and increasingly (particularly for jurisdictional employees) responding to mandates to trim costs – all in a day's work.

Joseph Wendler P.E. is a project engineering manager for ASME Standards & Certification. He has previously served as Secretary of the Boiler and Pressure Vessel Committee on Welding and Brazing (Section IX), the B31.3 Process Piping Committee, and numerous Safety Codes & Standards committees.

On top of this, inspectors are expected to keep up with continuously evolving technical and market changes. Regardless of one's occupation, we all find ourselves living in an era where businesses and workers are under continuous pressure to perform faster, better, and cheaper.

Two things can potentially make you more effective in managing these challenges: first, having a clear understanding of organizational landscapes (and how to navigate them); and second, targeting and communicating with the appropriate audiences.

Navigating Organizational Landscapes

Obtaining a clear understanding of an organization's landscape includes developing an awareness of the organization's mission and stakeholders, the types of issues they commonly encounter, and where their mission and issues may overlap with other organizations.

The history and close working relationship between The National Board of Boiler and Pressure Vessel Inspectors (National Board) and the American Society of Mechanical Engineers (ASME) has been well documented. Most recently, the winter 2011 edition of the National Board *BULLETIN* included an excellent write-up on the first joint meeting of ASME and the National Board in 1921. This relationship carries on today, from the annual joint meeting that takes place every spring, to the chief inspectors whose interests are at the core of the National Board's activities and who are provided a special status as members of ASME's Boiler and Pressure Vessel (BPV) Conference Committee, to the various accreditation programs administered within a framework of checks and balances.

For those who have been involved in the inspection services industry for some time, it is no surprise the missions of National Board and ASME overlap around a shared objective to protect the public by ensuring the safety of boilers and pressure vessels. What may be less apparent, however, is the precise delineation of the scopes of the two organizations. Many people, for example, may not be aware that ASME's standards cover more than pressure-retaining equipment such as boilers, pressure vessels, valves, and piping. Over its long history, ASME has developed standards governing fasteners, hand tools, plumbing components, cranes, elevators and escalators, geometric dimensioning and tolerancing, automotive lifts and service equipment, light rail transit, computer modeling and simulation software for biomedical devices, and industrial energy assessments. Indeed, the scope of ASME's standards activities closely follows the evolution of mechanical engineering practitioners and their respective industries, and is a result of its mission "to serve diverse global communities by advancing, disseminating and applying engineering knowledge for improving the quality of life."

The accompanying diagram depicts respective responsibilities of both organizations, with functions in the red-dashed lines depicting BPV-related areas. In essence, ASME's strengths lie in establishing standards and conformity assessment programs and conducting training which facilitates the safe design, manufacture, and operation of highly pressurized equipment such as boilers and pressure vessels, while the National Board is focused on the challenges of regulating and enforcing these standards in practice, with an emphasis on installation, inspection, modification, repair, and registration. While each organization has its strengths, they are able to effectively resolve challenges by working together – and both organizations benefit by maximizing the participation of a broad range of stakeholders (including manufacturers,

ASME	The National Board		
	Boiler and Pressure Vessel-Related Functions		
Serves as a focal point for engineers and the dissemination of engineering knowledge. Establishes communities of practice to focus on engineering challenges. Develops voluntary consensus standards via committees. Provides organizational, personnel, and product certification and accreditation. Provides technical training and professional development courses. Issues statements for policy makers. Promotes the value of the engineering profession and industry consensus standards development to public and government officials.	Develops boiler and pressure vessel codes. Coordinates the BPV Conference Committee. Responds to technical inquiries by providing interpretations, code cases, and revisions. Facilitates the commercialization of new technology. Accredits authorized inspection agencies. Certifies manufacturers of boilers and pressure vessels. Accredits pressure relief device testing laboratories. Provides training on boiler and pressure vessel codes.	Develops the *National Board Inspection Code*. Examines and commissions inspectors of boilers and pressure vessels. Updates information concerning jurisdictional laws and rules for the National Board *Synopsis*. Accredits inservice authorized inspection agencies and owner-user inspection organizations. Provides registration of manufacturers' data reports. Provides training on NBIC, authorized inspector, welding, relief valve repair, and certified inspectors. Performs capacity testing and certification of pressure relief devices.	Serves as a focal point for boiler and pressure vessel inspectors, insurers, and regulators. Tracks violations. Investigates pressure equipment accidents and issues involving code compliance. Promotes the need for boiler and pressure safety to public and government officials. Certifies individuals capable of verifying manufacturer conformance. Accredits repair and alteration companies. Responds to technical inquiries on products and services. ASME-designated organization to conduct shop reviews, valve selection, and testing witnessing, and laboratory acceptance.

metallurgists, welding and fabrication experts, installers, inspectors, owners, insurers, and regulators) in their standards development, certification, and accreditation activities.

Targeting and Communicating with the Appropriate Audiences

Once the general operating structure of an organization is determined, and any overlap identified, it becomes much easier to determine precisely who you may need to approach to resolve your specific issue. When it comes to code-related inspection questions, the committees that develop both ASME and the National Board codes respond to requests for interpretation. One of the reasons they do this – aside from helping people who have questions – is because it presents an opportunity to evaluate a problem that may affect multiple stakeholders or jurisdictions. So receiving a new question from one individual may help shed light on a problem that others are currently wrestling with or may soon encounter.

One ongoing challenge faced by both organizations is divergence in code adoption and enforcement among jurisdictions. If a regulator decides to grant a variance or exemption on a piece of equipment, or elects to develop rules unique to its jurisdiction, it could create problems down the line for other stakeholders. Manufacturers and contractors, for example, may then be forced to modify their products and services which results in additional cost to both the producer and purchaser. Even worse, an incorrect or inconsistent application of a code requirement from one jurisdiction to the next could result in uncertainty and confusion, which increases risk of an accident. In instances like these, consultation with the appropriate code development committee is often the best way toward a comprehensive solution.

Both organizations benefit from a cadre of volunteers (many of whom have decades of industry experience) who meet frequently to discuss problems as they arise in the field and propose new code language which would help fix them. As they all bring with them their varied perspectives and interests, they often engage in heated and lengthy debates about the precise meaning of proposed wording (and occasionally, the intent of existing wording as well). It is through the rigor of this debate, in an open environment where all views are encouraged, that the codes are developed. Anyone who has attended a code development meeting can assure you every word of a given code is there for a reason. (If you have not yet been to a code development meeting at ASME or the National Board, I'd encourage you to consider getting involved – it is both a personally and professionally enriching experience.)

As an industry, we are all in it together. Communicating potential issues to affected parties is vital to ensuring effectiveness in a globally competitive market. One of the most rewarding aspects of being involved in the boiler and pressure vessel community is knowing there are individuals at every level of an organization who are willing and able to offer assistance.

Spotlight on Key Initiatives within ASME

One of ASME's most noticeable initiatives is the transformation of its Web site (www.asme.org), which is intended to reposition ASME as the center of online engineering conversion, rather than simply a transactional destination. Aside from having an entirely new look and feel, it has dynamic, timely content of interest to technical professionals and the public alike. ASME has also made a commitment to examine what it can do to improve the quality of life for those in the developing world, and, along with partners Engineers Without Borders-USA and the Institute for Electrical and Electronic Engineers, has initiated a new venture called Engineering for Change (www.engineeringforchange.org). By bringing together (in an easily accessible medium) communities of interest in areas such as water, energy, health, structures, agriculture, sanitation, and information technology, it is the intent of Engineering for Change (E4C) to foster cost-effective deployment of affordable, locally appropriate, and sustainable solutions to the most pressing humanitarian challenges.

In addition, quite a few changes have been made (or are in the process of being made) within the boiler and pressure vessel arena, which are highlighted below.

Expansion of Organizations Eligible for Authorized Inspection Agency Accreditation

Historically, ASME's Authorized Inspection Accreditation program, *QAI-1, Qualifications for Authorized Inspection*, which governs the qualification and duties of inspection agencies in the performance of inspection and design reviews of boilers and pressure vessels, provided for two categories of authorized inspection agencies: jurisdictions and insurance companies. This model effectively served the North American market over a span of decades; however, in order to address an increasingly global marketplace, the 2010 edition introduced a third category which permits the accreditation of government-recognized third-party organizations. In December 2010, the China Special Equipment Inspection and Research Institute, based in Beijing, became the first organization to be accredited by ASME under this new category. It is anticipated this action may increase the ranks of commissioned inspectors who reside in other parts of the world.

Transition to a Single Certification Mark

Additionally, in order to better manage the global growth of ASME's product certification program – now used in more than 100 nations – efforts are underway to transition to a single mark. With the publication of the 2011 Addenda to the *ASME Boiler & Pressure Vessel Code* on July 1, ASME proceeded with plans to replace its twenty-five current Code Symbol Stamps and other ASME product certification marks with a single certification mark. To maintain a link to the current marks, the new mark will be used in conjunction with a "certification designator" to indicate the applicability of the certification. The new mark will also be used for equipment built to the Reinforced Thermoset Plastic Corrosion-Resistant Equipment standard (RTP-1) and the Bioprocessing Equipment standard (BPE-1). The following timeline has been established for the single mark transition:

July 1, 2011

2011 Addenda to the *ASME Boiler & Pressure Vessel Code* published with the new product certification and applicable designators replacing the current Code Symbol Stamp. New companies will continue to be issued the current stamps unless they request the new one. Any currently certified company may also request and begin to use the new stamp.

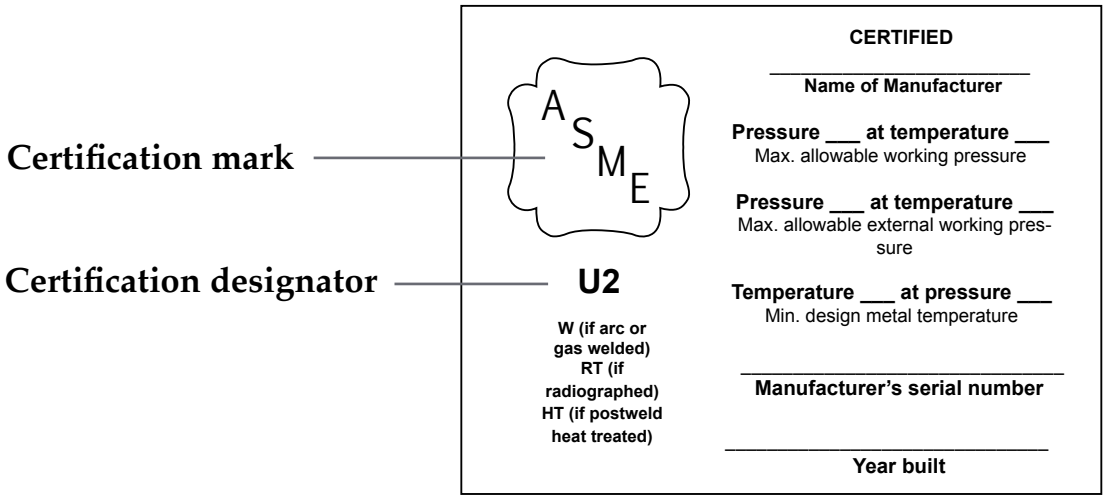
January 1, 2012

The 2011 Addenda to the *ASME Boiler & Pressure Vessel Code* become mandatory. Certified manufacturers may continue to use old Code Symbol Stamps for an additional year.

January 1, 2013

Use of the new stamp becomes mandatory and all of the old Code Symbol Stamps will need to be returned to ASME.

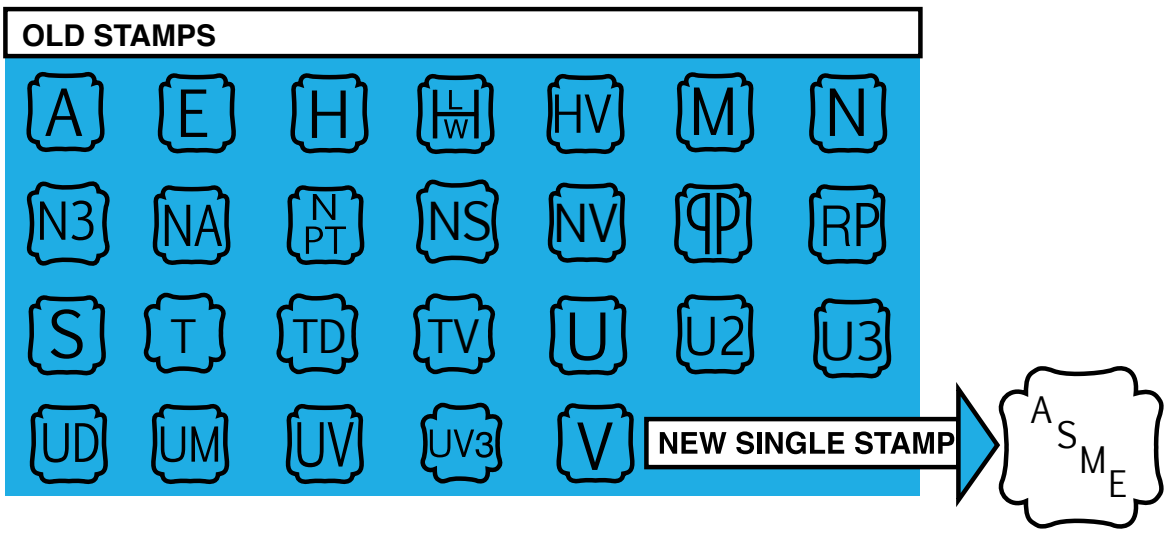
Following is an example of how the new mark will be used on a nameplate:



Sample ASME Product Certification Nameplate

Elimination of Addenda to the *ASME Boiler & Pressure Vessel Code*

Lastly, effective with the 2013 Edition of the *ASME Boiler & Pressure Vessel Code*, ASME will be eliminating the publication of annual addenda and issuing the Code on a two-year publication cycle. It is anticipated this will facilitate administration for regulators, while still being responsive to changes in the industry. Code Cases will still be published four times per year, and Interpretations and Errata will be available online.



Did You Know

- If you have a question on interpreting an ASME code requirement, you can determine the staff contact by selecting the appropriate code committee's web page at: http://cstools.asme.org/csconnect/CommitteePages.cfm
- All ASME standards meetings are free and open to the general public. You can browse all meetings at: http://calendar.asme.org
- You can preview pending ASME Code Cases and Interpretations at: http://cstools.asme.org
- You can subscribe to ASME's quarterly *Standards & Certification Update* newsletter by sending an email to S&CNewsletter@asme.org

AN INTERVIEW WITH
New National Board Chairman
JACK GIVEN

Anyone familiar with Jack Given knows exactly whereof he speaks. It doesn't take a lengthy exchange to fully appreciate the North Carolina Bureau Chief's robust values and unyielding traditional conviction.

And so it should come as no surprise Mr. Given was elected Chairman of the National Board Board of Trustees at the organization's May General Meeting in Las Vegas.

Previously, Mr. Given served on the Board as a member at large from April 2008 to September 2010. He was elected chairman in October 2010 to complete the unexpired term of retiring Michigan Boiler Division Chief Robert Aben. In June 2011 he was elected for a full term of three years.

Professionally deft as he is determined, the Raleigh native attributes many of his successes to two factors: a loving, stable marriage, and the virtues he accumulated while growing up.

This is a very exciting time for the National Board and I am delighted to be a part of it!

Just three months after his birth in Raleigh, North Carolina, Mr. Given's family moved to his father's hometown of Coshocton, Ohio. Not even a year old when his parents divorced, he and his mother relocated to Raleigh where they lived with Mrs. Given's parents. Raised by a working mother with help from his grandparents, the future state official lost track of his father after Jack Sr. remarried.

The North Carolina native joined the Naval Reserve while in high school and attended Naval **A** School in 1968. Following two years of active duty, Mr. Given exited the reserve program in 1974 and subsequently accepted a position as trainee inspector from then-North Carolina Chief Ben Whitley.

The newly elected board official left the state as deputy inspector in 1978 for a series of professional positions that would bolster his nuclear credentials. He rejoined the state in 1996 and was named bureau chief in 2003.

His professional advancements notwithstanding, the North Carolina bureau chief never abandoned searching for his father. In 1977 while attending **N** endorsement school in Columbus, Ohio, Mr. Given traveled to Coshocton in an unsuccessful attempt to locate Jack Sr. But just before Thanksgiving 1987, Jack junior and senior were reunited during a phone call the former initiated. The 40-year hunt over, the two enjoyed a renewal of their belated relationship before the senior Given passed away in October of 2005.

Under Mr. Given's leadership, the North Carolina bureau has focused on a strategic plan of increased efficiency and production – an effort, it should be noted – that made the North Carolina pressure equipment operation financially self-sufficient for the first time in years. He is presently responsible statewide for more than 93,000 registered pressure equipment items and a staff of 25.

Jack and Frances Given were married 42 years ago, having met each other when both were the tender age of 13. Residing in Raleigh, they have a grown son and daughter, three granddaughters, and a grandson.

With Mr. Given having now served as chairman for nearly a year, the *BULLETIN* asked him to share his thoughts on the National Board's fresh wave of leadership.

Photograph by Ned Leary

An Interview with Jack Given

Did you ever think as a young inspector you would rise to become National Board chairman?

I never thought about it until a few years ago. There have been two other North Carolina chiefs who have chaired the Board: the late Sam Harrison and the late Ben Whitley. Sam, as you know, eventually became Executive Director. In 1956, Sam hired Ben Whitley as an inspector in North Carolina. Eighteen years later, Ben took a chance and hired me. Ben was my mentor. About four years ago, Ben told me I really needed to run for a seat on the Board of Trustees and later run for chair. When a person you so deeply admire and respect gives you that type of advice, you think very hard about it. As a result, here we are. I just wish Ben could have been here to witness it. He would have been proud.

How has being chairman impacted your responsibilities with North Carolina?

No serious challenges. Yet. I'm lucky to have an adept staff that doesn't need someone constantly looking over their collective shoulders. Additionally, Cliff Dautrich, our Assistant Chief, could step in and take my place tomorrow. When I'm not there, he does an exceptional job of overseeing our operation and makes sure business is handled in a professional and efficient manner. Additionally, I am fortunate to have the support of management: from my director right up to the Commissioner of Labor. They enable and encourage me to do what is necessary to be effective in both positions.

Does the role of chairman agree with you?

Yes, very much so. I came into this responsibility with eyes wide open. So there was nothing unanticipated. What is so gratifying about – and one of the main reasons I pursued – being chairman is the opportunity to make a difference. I look forward to regularly speaking with Executive Director Dave Douin to be brought up-to-date on National Board activities and to exchange ideas. The essence of those conversations revolves around how we can make a good organization even better. This is a very exciting time for the National Board and I am delighted to be a part of it!

Some chairmen bring with them an agenda for the National Board. Do you have one?

There are two areas I would like to improve upon during my tenure: increasing member support and developing a greater sense of member unity. Times are tough economically in North America and that translates to jurisdictional restrictions on such things as travel and participation in outside professional programs. While I can fully understand the need for austerity, I must also emphasize the importance of member involvement on essential National Board and ASME committees. The input of our members is vital. That's why I would like to see more jurisdiction latitude permitting our members to be more involved on a larger stage; that is, beyond their primary responsibilities at home. To this end, we will reach out to jurisdictions in an effort to communicate and reinforce the message of necessity – the necessity of professional involvement and contributions from *all* National Board jurisdictions. If we make significant progress in this area, I think our goal of improved member unity will also be achieved. It is difficult to obtain unity in any organization where the membership gathers only twice a year. Increased committee involvement, on the other hand, helps build critical communication bridges among the membership. But let me be frank: attaining increased member participation will not be easy. Most jurisdictional cutbacks are across the board affecting all government departments. Justifying an exception for one program will take appreciable time and effort.

How would you describe the relationship that now exists between the National Board and ASME?

Excellent! And getting better each year. I think that's because both organizations have *finally* come to realize how much they rely on one another. I have recently seen a genuine desire on the part of ASME and National Board to strengthen their partnership. And that's because, in my opinion, both organizations understand symbiotic associations are beneficial to each. Today, all communication channels are open and

A look at National Board history reveals our organization has taken a measured approach to fundamental adjustment.

dialogue is both forthright and constructive. Those recent years where we sort of drifted apart were really, from my perspective, the result of ASME and National Board trying to better define their respective roles. However, with the General Meeting back in one hotel, ongoing progress meetings taking place between the two organizations, and alignment of the new *National Board Inspection Code* (NBIC) and ASME code two-year distribution cycle, I believe the relationship has never been more harmonious. And that brings me back to having more member representation on important technical committees. The cross-pollination of ASME and National Board members on code committees, subgroups, etc. not only further strengthens our professional bond, it goes a long way in preserving pressure equipment safety.

How would you describe National Board's relationship with the pressure equipment industry?

I think for groups to cohesively work together, there must be mutual respect. And that's what makes our industry so special. In what other business would you see insurance organizations, trade associations, manufacturers, repair shops, labor, and large user companies coming together to achieve one common goal? Consider these groups individually, and all are competitive in the open marketplace. But when it comes to safety, you can count on our industry to work shoulder to shoulder. As for the National Board: I believe we have always tried as a not-for-profit to be fair to our constituent groups. And we have done this through a variety of methods. It is rare we hear complaints accusing the National Board of charging outlandish prices for its products or services, or demonstrating lack of respect. Contact the National Board any day of the work week and the caller will be treated with the same courtesy and efficiency we afford our members. When and where possible, the National Board – in an impartial capacity – has always gone out of its way to assist the pressure

equipment industry. Among the most visible examples involves National Board's preservation and upgrading of the annual *Synopsis of Boiler and Pressure Vessel Laws, Rules and Regulations*, a critical industry document threatened with extinction when its publisher went out of business.

You have been chairman now for almost a year. How has this responsibility altered your perception of the National Board organization? Or has it?

Being more intimately involved in the organization's day-to-day operation has provided me great insight. Granted, there is a different perspective as a member, particularly when you only come into contact with National Board staff maybe once or twice a year. But one thing I've learned is staff is every bit as dedicated to safety as the members. With our members on the front line of pressure equipment safety every day, that may sound rather peculiar. But the truth is National Board support staff plays a significant part in the success of our membership. And that is not always apparent. There is appreciable research, legwork, and due diligence performed every day by National Board staff. And it's all done efficiently and in a timely manner. There are few places I've encountered where employees truly enjoy not only their work but *where* they work. And that's why there are quite a few National Board staff with 20, 30, even more than 35 years of service.

I think it's important to realize ASME's increased foreign presence will be tied directly to National Board activities and vice versa.

Do you see any substantial changes being made within the National Board organization?

Circumstances change. And when they do, organizations change. At this point in time, I see the National Board as being properly positioned for the future. Now, unless there is a significant external change, I don't foresee a need for considerably altering our strategic direction. A look at National Board history reveals our organization has taken a measured approach to fundamental adjustment. I cite as an example our training program. For years, we depended on classroom instruction to prepare pressure equipment professionals. As electronic communications have evolved, so has our training process. To that end, we have added two new staff members who work exclusively on our Web-based training courses. Additionally, our test lab is experiencing tremendous growth, especially within the international community. Our expansion of that facility (see page 29) will address this changing pressure relief device market. Proper planning, I believe, precludes the need for anything radical. In this regard, the National Board is on very sound footing.

Speaking of the international community, do you foresee the National Board pursuing a more aggressive international agenda?

I don't think we have much choice. In addition to test lab work being done on an international scale, we are seeing rising demand overseas for a number of National Board products and services. Our **R** stamp has enjoyed remarkable domestic growth since 1977. But foreign **R** stamp use has risen almost 800 percent since 1993! The NBIC is also experiencing increased overseas demand, particularly since we made it available electronically. We have entered into an agreement with the Chinese government allowing them to translate and distribute the NBIC. Underscoring all of this international interest is overseas training which is becoming more and more in demand. Finally, I think it's important to realize ASME's increased foreign presence will be tied directly to National Board activities and vice versa. The National Board's "national" scope has been extending beyond the shores of North America for some time now.

What is the single biggest problem facing the National Board today?

As an organization, it is trying to keep jurisdictions active in preventing boiler and pressure vessel accidents. Over the past several years, we have witnessed the retirement of quite a few members. Some jurisdictions have taken advantage of these retirements by electing not to appoint a chief's replacement. While this may have the appearance of saving the state money, it is in reality only exposing the public to increased risk of a pressure equipment accident. Additionally, some jurisdictions are seeking to water down pressure equipment laws – much to the disappointment of our members. The biggest hurdle we face at the National Board is communicating the importance of pressure equipment laws to state administrators facing substantial budget cuts. The fact most pressure equipment departments are self-sustaining is of small importance to a department head creating the illusion of saving the taxpayer money. The problem is compounded by having to make our case every couple of years with administrations that have been newly elected.

Is there a solution?

I think we have to do a better job of making our case before the public. I have always disliked the cliché "preaching to the choir." But it seems we are doing just that: talking among ourselves about the importance of pressure equipment safety. It is the *citizen* who elects the very people who make the decisions affecting our members. It may be time we redirect some of our communications at the voting public.

Are there other issues that concern the National Board?

There are several. We are presently gauging the reaction of those who have had an opportunity to use the new hard copy NBIC. Additionally, we are rolling out the 2011 Edition on the Web. With the NBIC undergoing appreciable structural and cosmetic change, we want to be sure these documents fulfill the needs of our users. Acceptance is never a given. We debated long and hard as to how this information should be organized and presented. Inspectors dealing with the NBIC day to day will be thrilled they no longer have to carry a heavy binder. It's not the hip pocket book I used when starting in the business 37 years ago but it will be much easier to handle than the loose-leaf version. The only complaints

With the NBIC undergoing appreciable structural and cosmetic change, we want to be sure these documents fulfill the needs of our users.

I've heard thus far come from jurisdictional authorities who now have to update their regulations every two years instead of every three.

Another issue of concern also involves the NBIC: illegal sales. We have discovered there are several sources on the Web selling illegal NBIC downloads. And we are not the only victims. Standards from a number of other international standards groups are also being made available illegally. Efforts to thwart these vendors are both difficult and expensive. We can shut down one source only to have another two pop up within days. Our only recourse is to request NBIC users purchase their documents from the National Board or other reputable dealers such as Information Handling Services (IHS) or TechStreet. Ever since the NBIC debuted in 1945, we have attempted to keep prices at a minimum for the benefit of users. Believe me, the real cost of developing the NBIC is far higher than what it is sold for. And that's why we would appreciate everyone using legitimate vendors. It should be noted that should anything go amiss on an illegally downloaded NBIC, the purchaser's chance of locating the seller are nil.

How important is the testing laboratory to National Board's future?

Vital! Yet it is probably the least known of all National Board departments. Pressure relief device manufacturer representatives from around the world come to the test lab to measure the performance of their products against internationally recognized standards. The fact we conduct almost 2,000 capacity certification tests each year underscores the critical nature of preventing potential overpressure conditions. The National Board has been testing pressure relief valves since 1935. Today it is a world leader in the field. And while testing valves may be an important function, the lab is also a major participant in industry research and development. It also serves as a comparative standard for other laboratories and as a testing facility for new designs. Lastly, the lab is crucial to National Board's **VR** program for the accreditation of valve repair companies.

The National Board training program has expanded considerably over the past two years. What can we expect in the future?

More classroom instruction and more Web courses. The transformation of our training department over the past several years has been nothing less than phenomenal. That's because Executive Director Dave Douin has done a remarkable job of providing the resources and personnel to significantly upgrade our program. Whereas course offerings were somewhat limited in the mid-2000s, we now boast one of the most extensive instructional menus in the pressure equip-

ment industry. And new courses are being added almost every month. At present, we have 18 Web-based courses in development. Improvement in our program has not been simply limited to numbers. We are taking a more systematic approach to teaching by harmonizing curricula, targeting classes for development, providing critical evaluation for our instructors, and expanding our teaching staff. This has not gone unnoticed overseas. Requests for courses conducted in foreign countries are at an all-time high. Requests for training at company facilities have also climbed substantially. Speaking of facilities: while the National Board has always been known for its quality of instructors, we can now say, without reservation, we have the best classrooms as well. The collection of real equipment featured in our inspection training room has grown significantly since we opened it in 2008. And it will continue to grow. Quite frankly, there is no other room like it in the world!

Are you in any way concerned about the future of pressure equipment safety programs?

I am. The economy is seriously affecting these programs in many of our jurisdictions. Nowhere is this more evident than what we have seen in staff cutbacks and reduction in budgetary resources. Austerity programs have consequences. And I'm afraid the bureaucratic fallout in a number of our jurisdictions will impact salaries. In order to maintain a quality program, you must have quality people. The best way to attract quality people is by offering competitive salaries. The issue before us is not simply inspecting equipment, but educating those who *use* that equipment. And that is a very important part of our responsibility as inspectors. Without having enough qualified inspectors, pressure equipment safety programs will deteriorate. My fear is that any reductions of inspection staffs could become permanent. The funny thing about austerity programs: they never officially go away.

How would you describe National Board's future?

Outstanding! Consider for a moment: here is an organization over 90 years old, financially stable, supported by a committed membership as well as a dedicated and talented staff, well positioned – as I said earlier – for the future, and headed by an astute and energetic executive director with keen vision. Whereas most organizations would have peaked well before achieving their 90-year milestone, the National Board is just hitting its stride. I see not only *growth* but sustained growth in areas such as training, lab testing, certification programs, and international expansion. I also see wider use and distribution of our flagship publication: the *National Board Inspection Code*. If this is where we stand at 90 years, I am very much looking forward to where we will be at 100!

Thank you, Mr. Given.

Share Your Knowledge with BULLETIN Subscribers

Attention industry professionals!

Do you have technical expertise relating to the boiler and pressure vessel industry? Share it!

The National Board *BULLETIN* is accepting submissions for articles to appear in future issues.

Articles are welcome on all aspects of boilers, pressure vessels, parts, appurtenances, pressure relief devices, and nuclear components, with an emphasis on safety, new technologies, standards, codes, qualifications, rules, and regulations. The viewpoints of engineers, manufacturers, scientists, inspectors, and users are sought. Articles of a commercial or promotional nature will not be considered.

Unsure about writing an article? *BULLETIN* staff will work with you to develop the material.

Simply email a brief summary of your article idea (500 words or less) to Wendy Witherow, publications editor, at wwitherow@nationalboard.org.

For more information on submission guidelines and tips, visit nationalboard.org and click on *BULLETIN*.

SEATTLE

CHOSEN HOST FOR 83rd NATIONAL BOARD/ASME GENERAL MEETING

The National Board and ASME have announced the 83rd General Meeting will take place at Washington State's Hyatt Regency Bellevue May 12 – 16, 2014.

The Hyatt Regency Bellevue is situated in the area's dynamic Bellevue Collection on Seattle's fashionable Eastside. Only 20 minutes from Sea-Tac International Airport, it is connected by sky bridges to more than 250 shops, 45 restaurants and lounges, and countless entertainment options.

"The Northwest has been on our short list of desirable General Meeting locations for some time," explained National Board Executive Director David Douin. "We are pleased to bring our meeting to what we believe is one of the most scenic and desirable travel destinations in America."

Bellevue is located just across Lake Washington from Seattle and is among the country's most rapidly growing communities. Recently ranked number one in CNN Money's list of best places to live and start a business, it was also designated the fourth-best place to live in America. The city is also regarded as one of the state's premiere shopping and dining destinations and boasts one of the region's largest shopping centers. Among the multinational technology giants located in Bellevue: Microsoft, T-Mobile, Boeing and Expedia.

In addition to the hotel's elegant décor of rich woods, natural finishes, and luxurious fabrics, Mr. Douin emphasized the Hyatt Regency Bellevue features an abundance of space to satisfy the General Meeting's considerable meeting room requirements. "With recent construction of a new guest tower and the addition of more than 53,000 square feet of meeting space, participants and guests alike will find this venue both personally inviting and professionally accommodating."

The Hyatt Regency Bellevue features a heated 25-meter lap pool, in-room high definition flat screen television, fully equipped 24-hour gym, spa, lobby coffee shop, and three lounges. A total of four restaurants are situated within the hotel including the award-winning Daniel's Broiler steakhouse which provides an impressive twenty-first floor view of the Cascade Mountains. Just minutes from downtown Seattle and the region's wine country, the Hyatt Regency Bellevue is conveniently accessible to outdoor activities, including hiking, biking, world-class golf, fishing, and skiing.

Specification of Rupture Disk Burst Pressure

BY JOSEPH F. BALL, P.E., DIRECTOR, PRESSURE RELIEF DEPARTMENT

Two common inspection issues reported by inspectors concern correct specifications for rupture disk device burst pressure and ensuring properly matched disk specifications to the pressure vessel being protected. A rupture disk device is a non-reclosing pressure relief device that actuates upon differential pressure across the disk. It consists of two main components: the rupture disk holder which provides the pressure boundary and clamps the disk into position, and the rupture disk (the actuating element).

Rupture disks are replaced after actuation or periodically as part of preventative maintenance or inspection. These devices are manufactured in accordance with provisions of the *ASME Boiler and Pressure Vessel Code* (ASME B&PV Code), Section VIII. They are certified by the National Board through a program that tests samples for correct burst pressure and flow resistance. Flow resistance is a rating value used to determine pressure drop across the disk, and is used by the system designer to size the disk and relief system.

Pressure vessel users are responsible for proper selection of an appropriate rupture disk device. Inspectors performing an initial installation or inservice inspection must then evaluate that selection.

The following ASME B&PV Code, Section VIII (2010 edition), provides the requirements applying to the evaluation:

1. UG-134(a):
"When a single pressure relief device is used, the marked set pressure shall not exceed the maximum allowable working pressure (MAWP) of the vessel." Multiple pressure relief devices are sometimes used and the code allows for staggered set pressures in those cases; however, for simplicity we will discuss situations where only one device is installed.

2. UG-127(a)(1):
"Every rupture disk shall have a marked burst pressure established by the rules of UG-137(d)(3) within a manufacturing design range at a specified disk temperature." Manufacturing design range (MDR) raises some additional issues discussed later in this article.

3. Section VIII, footnote 48 indicates:
"The specified disk temperature supplied to the rupture disk manufacturer shall be the temperature of the disk when the disk is expected to burst." This is sometimes called the coincident temperature.

Vessel information immediately available to the inspector is the vessel nameplate; possibly the data report. Both provide the MAWP and design temperature. Minimum design metal temperature (MDMT) is also listed.

Problems occur when specifying the disk temperature. Often the vessel's design temperature is used. In most cases, coincident temperature (temperature that should be used) is not the same as the vessel design temperature, and should in fact be less than the design temperature. Most rupture disk materials are sensitive to temperature (the burst pressure will typically decrease as temperature increases).

When disk manufacturers qualify a disk lot, they use specified coincident temperature (given to them by customers) as the manufacturing specification for the test temperature. Test procedures require a disk to be installed into a test assembly which is placed into a test oven, heated to the coincident temperature, and tested for burst pressure. When that disk is used in service at a lower temperature, the burst pressure is usually higher, and if the disk marked burst pressure was equal to vessel MAWP, it will burst at pressure higher than the MAWP when an overpressure condition occurs. Per item 1 above, set pressure of the pressure relief device should not exceed MAWP *at any temperature*.

One disk manufacturer supplied a sample of its proprietary data on the effect of temperature on burst pressure for a sample material, where a difference in set pressure for a temperature difference of 100°F could be as much as 10 percent. Therefore, if the specified temperature differed from the temperature of the disk by several hundred degrees when called upon to actuate, the set pressure could be off by as much as 20 percent!

So what is the proper temperature to use for coincident temperature? The next choice is usually normal process temperature. However, upset conditions and normal operation conditions need to be considered. In chemical processing, an overpressure condition can be caused by a runaway chemical reaction, in which case coincident temperature could be higher than the normal process temperature.

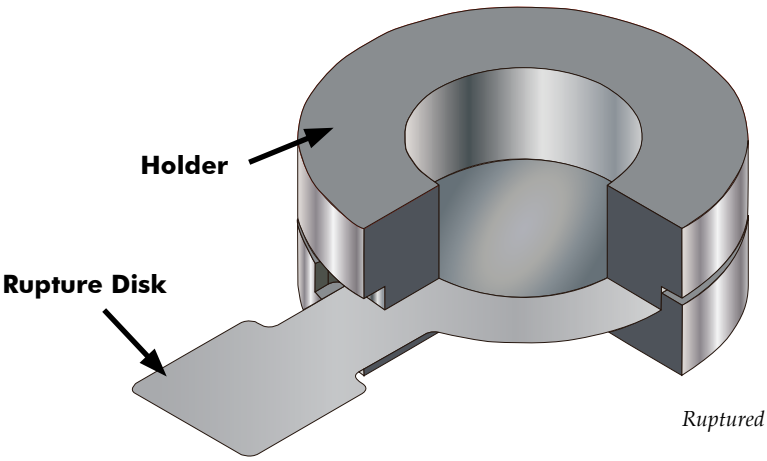
When temperature of the process is known during an upset condition, disk position in the system could be such that it does not experience the same temperature as the bulk process temperature. Disk temperature may be based more upon its environment than the temperature of the process fluid.

A recent incident involving a rupture disk pointed out some of these problems. A vessel was rated at 150 pounds per square inch (psi) at 400°F, and a rupture

disk was specified with a set pressure of 150 psi at 400°F. The process fluid was mostly steam, and at 150 psi, the saturation temperature of steam is about 366°F. The disk was located on a nozzle on top of vessel and extended from the vessel surface approximately six inches. The nozzle and disk assembly were not insulated. Although actual disk temperature was not known, heat transfer theory tells us disk assembly temperature is somewhere between fluid temperature and atmospheric temperature. The disk could have been operating at as much as 200°F lower than the specified temperature, and the actual burst pressure under those conditions would have been much higher than expected. The vessel may have experienced an overpressure condition, but the disk did not open and the head connection failed. It flew across the plant where the vessel was located, causing significant property damage. Fortunately, no personnel were in the area when the vessel failed, so there were no injuries.

Another problem occurs when the manufacturing design range (MDR) is not considered during ordering of the disks. The code definition of MDR is "a range of pressure within which the marked burst pressure must fall to be acceptable for a particular requirement as agreed upon between the rupture disk manufacturer and user of his designated agent" (Section VIII, footnote 47). Sometimes confused with burst pressure tolerance, the stamped set pressure can vary from the value specified by the user and still be acceptable.

Rupture disk burst pressure is usually rated based upon test values determined during lot qualification. The value marked on the disk would be the test burst pressure average. If that average falls within the MDR, the lot is considered acceptable. Because of small variations between tests, it could be difficult to hit the exact required value. Producing another lot to hit an exact specified set pressure adds cost and time to disk production, but the product quality is not changed. If a customer wants an MDR tighter than the standard value for a particular product, the manufacturer can provide it at additional cost to the user.



Ruptured disk device

An example illustrates the use of MDR

A manufacturer offers a disk design having a standard MDR of +6% to -3% for set pressures greater than 271 psig. A customer orders a disk with a specified burst pressure of 300 psig and standard MDR. When the disk lot is manufactured, the two test burst pressures are 302 and 306 psig, resulting in an average burst pressure of 304 psig. The manufacturer marks the disk set pressure as 304 psig, and has met its contractual requirement because marked set pressure is 1.3% above the specified value (MDR allows 6%). The disk lot meets code tolerances because each test burst is within +/-5% of the marked set pressure. The disk is installed on a pressure vessel with a MAWP of 300 psig. An alert inspector performs an inspection and rejects the disk because marked set pressure exceeds vessel MAWP, which is not permitted per paragraph UG-134(a) of Section VIII.

The customer's solution is either to specify a disk with a "zero range" which ensures the marked set pressure will equal specified set pressure (but perhaps be more expensive), or specify set pressure so the MDR will never result in a disk with a set pressure that is too high. If the customer had ordered a disk with a specified set pressure of 283 psig, the highest it could have been marked would be 300 psig (6% above the specified set pressure).

Recognizing this potential problem, most manufacturers' newer designs have MDRs ensuring the marked set pressure can only be equal to or less than specified set pressure. A typical range is -10% and +0%. Older designs often used MDRs like the one above, and the user should be alert to this possibility. This information can be found in catalog literature for each design.

Recommendations to Inspectors When Rupture Disks Are Used

1. Confirm the marked disk set pressure is equal to or less than the vessel MAWP.

2. Look at the marked disk temperature and confirm it has been specified so that it is the temperature of the disk when it is expected to burst, and not the vessel design temperature. Normal operating conditions, upset conditions, and environmental effects should all be considered.

Recommendations to Rupture Disk Users

1. Ensure the disk temperature specification has been determined properly and considers normal operating conditions, upset conditions, and environmental effects.

2. When specifying a disk, check the MDR so it does not result in a disk stamped greater than the vessel MAWP.

3. When ordering replacement disks, supply the previous lot number and specified burst pressure. Disk manufacturers maintain extensive records based upon lot numbers, and the user should always refer back to this information when ordering replacement disks. Specifying only the set pressure marked on an old disk can result in "lot creep" – when each lot has a slightly lower or higher set pressure than the previous lot. ✪

Red Flags and Telltales

By James R. Chiles

When writers or broadcasters want to make the point regulators or politicians ignored clear warnings of trouble ahead – clear to them, anyway, as in 20-20 hindsight – they often ring in the phrase "red flag." They're saying those in charge of protecting the rest of us should have seen the danger and taken action.

The earliest record of the red flag being used as an attention grabber dates to the 1200s. Historians say it was a long red pennant raised to the masthead of a warship. Called the *baucans*, it meant the crew was primed for a last-ditch battle. By 1700 the concept had jumped ship. Smaller red flags, rectangular or swallow-tailed, were warning of a broader range of peril, such as a flood on the way or a storm brewing.

Steam railroad operations contributed the meaning most familiar to the public today: a railroad flagman waving a red flag by day (or a red lantern by night) to warn a locomotive engineer to stop immediately, say because of a bridge collapse or wreck ahead.

While railroads stopped relying on hand-waved flags long ago, red flags can still be found across the technological landscape. On an airport ramp, little red nylon flags remind the ground crew to remove protective gadgets before flight.

As I travel the machine frontier to research and speak on the subjects in *Inviting Disaster*, I've found many occupations have their own set of red flags, collated through long experience with negligence and misdeed. Those who use such information include inspectors, forensic investigators, reporters, and financial auditors.

Treat red flags as cautionary, rather than a license to make hasty accusations. This fits with how red flags were really used on steam railroads, when a red flag didn't always call for a train to come to a nail-biting, screeching halt. For example, a red flag carried on the front of a speeding train meant another train was close behind. That way, as the Double Eagle express blew by a freight train stopped in a siding, the engineer on the local knew he had to wait before pulling onto the main line.

Let's look at a sampling of red flags across a broad span of modern life before zooming in on some red flags discerned by generations of National Board safety experts. While the detection of a red flag today doesn't always indicate that Mr. X is disabling safety gear, or that Y Incorporated is faking records, or the Z-Ray machine needs to be re-calibrated, treat a red flag as carrying this warning: "Hold on a minute! This is a good place to check whether there is more than meets the eye."

Signs of Trouble

The letter Z is a good place to begin. Financial analysts and institutional investors rely on the Altman Z-score to pick out companies a year or two before they declare bankruptcy. Pioneered by finance professor Robert I. Altman in 1968, this well-proven red-flag index is concocted from four or five weighted business ratios. Altman originally set it up to test the strength of publicly-held manufacturing companies.

James R. Chiles, author of **Inviting Disaster** *and* **The God Machine**, *has been writing about technology and history for over 30 years. His work has appeared in* **Smithsonian, Air & Space, Popular Science, Harvard, Aviation Week, Mechanical Engineering**, *and* **Invention & Technology.** *He maintains a blog called* **Disaster-Wise.**

To the FBI and IRS, flags that suggest money laundering include multiple cash transfers by one person that are always a little less than the mandatory reporting limit of $10,000, or multiple people depositing cash that's then combined by wire transfer into a single account. This is most telling if that basket of money shuttles on to a bank in a popular laundering locale like the Caymans or Netherlands Antilles.

Liability-conscious trucking companies are using data from on-board "black box" recorders to help flag down dangerous drivers in their ranks. Braking data tells the tale, because tailgaters have to hit their brake pedals often.

Embezzlers in small businesses often raise little red flags to those who know the signs. For example, embezzlers acting alone often resist taking vacation days or sick leave, for fear a fill-in will uncover the scheme. They cheerily take on extra work, but turn evasive or dismissive when talk turns to outside audits.

Similarly, there are red flags that alert investigators to health care workers who are diverting opiates and other controlled drugs at medical facilities. These include volunteering for late-night or weekend shifts (which are less supervised); persistent mismatches between drug counts and prescriptions; indications that vials of liquid painkiller have been tampered with; and reports of pain by patients that don't jibe with the strong medications being prescribed.

Mechanics inspecting used cars for a potential buyer know that cars with odometers showing less than 30,000 miles should have the original tires, struts, and spark plug wires. If not, it's worth an extra check for fraud or an undisclosed problem.

Steam Blows the Whistle

Boiler inspectors can be proud that steam has led the way in picking out early signs of trouble, even coming up with devices capable of actively warning the operator . . . steam-powered alarms, as it were!

One was the telltale. In a locomotive, long staybolts brace sides of the firebox to cope with pressure from the water-filled boiler space surrounding the firebox. Corrosion and stress from temperature variations put little cracks in these bolts, which grow. If the problem is ignored, a wall of the firebox can give way in a massive steam explosion capable of hurling fragments for hundreds of yards. One solution was the "telltale" staybolt, forged with a hollow space down its length. That way, a crack would reveal itself well before failure, by allowing steam and drops of water to leak into view.

A similar telltale device in steam locomotives was a metal plug screwed into the crown sheet, which is the primary barrier between water in the boiler and flame in the firebox. In a properly operated boiler, this "fusible plug" was completely covered with water. But since engineers and firemen sometimes neglected to mind the water gauge, it had a core of metal with a lower melting point than that of the metal in the firebox. When the lack of water in the boiler caused the core to melt, steam jetted noisily from the boiler into the firebox.

Hartford Steam Boiler Inspection & Insurance Company listed another red flag in its *Locomotive* magazine: cast-iron boilers that operators use to generate steam for applications like engine-part cleaning at a repair shop, steam baths, process supply, or humidifiers. These all need a great deal of make-up water, which brings along minerals, solids, and dissolved gases that produce scale or corrosion on internal surfaces of the sections. Cast-iron boilers aren't intended for this: "The design of most [cast-iron boiler] sections makes it very difficult and usually not practical to attempt complete cleaning of the internal surfaces."

Flags from the Field

Fifty years ago, Phil Corbett of Chicago wrote a series of articles for the *BULLETIN* on tips of boiler inspecting, and tricks of boiler operators. Corbett's list of red flags included low-water fuel cutoffs that had been bypassed, or a coal-fired boiler where ash from the heating season had been left in place over the summer, putting iron at risk of corrosion.

The eagle-eyed tradition continues. National Board Senior Staff Engineer John Hoh recommends looking for discoloration on a boiler casing that suggests the room has been flooded, submerging the boiler. The marks would extend from the

floor up to a line that is level and suggestive of a high-water mark. "This could damage or destroy the refractory, insulation, firebricks, and burner assembly," Hoh warns.

"A plug in the safety valve discharge opening is an obvious violation," Hoh points out, "but spider webs and dust in the discharge opening also means the boiler operator is not checking the safety valve operation on a periodic basis – a secondary problem."

Flame roll-out from boiler damaged the boiler safety control.

Hoh recommends keeping an eye out for modifications that could put a boiler at risk. "A relatively new burner assembly on an older boiler should be a clue for the inspector to verify the safety valve relieving capacity is still sufficient in relation to the burner output. There are many times when a larger capacity burner is installed in an attempt to gain more 'heat' from the boiler. Unfortunately, the safety valve relieving capacity may no longer be adequate for the new operating conditions," says Hoh. "A change in the type of fuel should also trigger a verification of safety valve relieving capacity."

Flame roll-out from boiler jacket, caused by improper venting of flue gasses.

Senior Staff Engineer James McGimpsey also gives a black mark to soot around the burner covers. He says there are multiple possible causes; it might indicate someone removed the burners to clean them and then put them back incorrectly, even upside down. If the boiler is inside a food-service building, the soot could mean powerful exhaust hoods over stoves in the kitchen have reversed the flow of air: the boiler flue has become a fresh-air supply, putting everybody inside in peril as the occupied building becomes the exhaust path of the boiler.

Modern boilers come with electronic safety controls that shut off the fuel flow upon detection of potentially dangerous conditions. A control box holds the brains of this safety sentinel, and low-voltage wires run out to sensors and valves. But are they connected? McGimpsey recommends checking the floor around a boiler when visiting a new installation, looking for pieces of insulation stripped off of the low-voltage wires during the work. If there are none of these colorful pieces ("they're so small it's impossible to sweep up every one") that's a reason to open up the control box to see whether the wires have been connected. He recalls a contractor in Montana who routinely looped wires into the box, and back out again, without bothering to connect them. He's also seen low-voltage "jumper" wires running between terminals on the safety equipment. Just as burglars once used these to bypass bank-vault alarms, some operators use these to cut out safety controls they find annoying.

Some red flags suggest a ho-hum attitude about maintenance. One is the use of hose clamps and rubber membrane used as cheap pipe-patching gimmicks (McGimpsey has seen these on condensate-return lines and even steam lines). Another is finding numerous cans of boiler stop-leak near a boiler showing signs of recent leakage.

Red flags and telltales: danger signals expert inspectors and auditors have gathered over the years. As time goes on and technology evolves, expect more red flags for the list.

More Red Flags for the List – Continue the Discussion

Do you inspect boilers or pressure vessels? What red flags do you keep in mind during an inspection? If you want to pass along your words to the wise, email your "I Learned about Inspecting from This" stories to wwitherow@nationalboard.org

National Board Test Lab

Breaks Ground on Expansion

The National Board broke ground on July 20 for expansion of the National Board Testing Laboratory. The groundbreaking ceremony was attended by National Board executive staff, Chairman of the Board Jack Given, Pressure Relief Department staff, and representatives from the architect and building contractor.

The expansion will add 2,970 square feet to the testing area of the lab and will include new test equipment and upgrades to support equipment. Goal of the expansion is to help with increased volume of work, provide quicker response to certification customers, and to accommodate future growth.

ABOVE: Representatives from the National Board, Schooley Caldwell Associates (architects), and Corna Kokosing (contractor) gather for the groundbreaking ceremony.

Major features will include:

1. Addition of a new air test system with higher pressure capabilities, including dedicated rupture disk test connections. This system will have a number of features to improve the process of rupture disk testing. It is also designed for pressure relief valve work. The system will also operate simultaneously with the current air test stand, allowing two different organizations to test at the same time in separate areas.
2. A doubling of air storage volume and an increase in maximum pressure with the addition of six new higher-pressure storage bottles. Conversion to a nitrogen supply system instead of large air compressors is being included.
3. Relocation of the current low-volume air test stand and a new design allowing it to operate separately.
4. Increased storage space for test objects (allowing for more efficient handling).
5. Consolidation of maintenance equipment into a shop area and organization of all spare parts and supplies into a central location.

"By adding additional space and expanding our capabilities, the National Board will be better prepared to serve the needs of the industry now and into the future. I'm proud of the team effort put forth by all involved in this important project," commented Executive Director David Douin.

The expansion is scheduled to be completed and functioning by the first of the year.

National Board Accreditation:
Preparing for a *Certificate of Authorization* Review

When an organization seeks an **R**, **VR**, or **NR** Stamp *Certificate of Authorization* with the National Board, one prerequisite common to each program is organizations must prepare a written quality system and have it reviewed by either the member jurisdiction or the National Board, depending on jurisdictional stipulations.

A quality system is a written policy describing the organization's intended scope of work (shop and/or field repairs and alterations to boilers and pressure vessels [**R**], pressure relief valves [**VR**], or nuclear components [**NR**]). The policy must establish requirements for the control and documentation of the work. It must also fulfill requirements of the current edition of the *National Board Inspection Code* (NBIC). Other pertinent information regarding the company's quality program (as it relates to the defined scope of work) also must be included.

Reviews of the quality system are conducted for reasons of safety. During a review the company must show it has satisfactorily implemented its quality system as evidence of its knowledge and ability to repair and/or alter equipment according to the requested scope of work.

Tips for a Successful Review

National Board consultant Dewey Anglin and National Board field staff employee Vic Bogosian conduct **R** stamp reviews around the world. Together they have over 40 years experience in the boiler and pressure vessel industry. Here they share a few simple tips to help in review preparation.

Consult with your inspector/authorized insurance agency.

"This is the best advice I could give," says Mr. Bogosian. "Inspectors and authorized insurance agencies have far more experience with the review process than any single certificate holder, and therefore, more insight for how to prepare for the process."

Make a thorough review of the documentation package, representing the demonstration item you will be presenting to the review team.

"If you have undergone a pre-review audit conducted by your inspection agency, adhere to the recommendations provided during the pre-review audit," recommends Mr. Anglin.

"The next three points are common problems I encounter when conducting reviews," he adds. These are:

Check for incomplete information. Make certain your National Board *Certificate of Authorization* application is filled out correctly and completely. (Applicants filing for an **R** Certificate should pay specific attention to the Requested Scopes check box section.)

Bring uninformed personnel up-to-date. Make sure company personnel are familiar with the entire context of your quality control manual and its relationship with the requirements of the NBIC.

Avoid lack of documentation. Make sure your quality manual is complete, with all required forms and paperwork accurately documented.

For complete details on the National Board's stamp programs, including free application downloads, estimated fees, and contact information, visit nationalboard.org and click on STAMPS AND MARKS.

National Board Stamp Programs at-a-Glance

R Stamp *Certificate of Authorization* Program:

For the repair and/or alteration of boilers, pressure vessels, and other pressure-retaining items.

Requirements are included in the current edition of the *National Board Inspection Code* (NBIC), Part 3, Section 1.

Prerequisites

Organizations seeking a National Board **R** *Certificate of Authorization* must complete NB-12, *Application for the National Board **R** Certificate of Authorization* and:

- Have and maintain an inspection agreement with an authorized inspection agency.
- Have a written quality system that complies with the requirements of the current edition of the NBIC and includes the expected scope of activities.
- Have the current edition of all three parts of the NBIC (to fulfill this requirement, organizations have the option of using either a printed version or an electronic version, including a subscription from a National Board licensed reseller).
- Have available a copy of the code of construction appropriate to the intended scope of work.

Prior to issuance of a National Board **R** *Certificate of Authorization*, the organization and its facilities are subject to a review of its quality system (referred to as a Joint Review).

VR Stamp *Certificate of Authorization* Program:

For the repair of pressure relief valves.

Requirements are included in the current edition of the *National Board Inspection Code* (NBIC), Part 3, Section 1 and Supplements 7 and 8.

Prerequisites

Organizations seeking a National Board **VR** *Certificate of Authorization* must complete NB-550, *Application for National Board **VR** Certificate of Authorization to Repair Pressure Relief Valves* and:

- Have a written quality system that complies with the requirements of the current edition of the NBIC and includes the expected scope of activities.
- Have the current edition of all three parts of the NBIC (to fulfill this requirement, organizations have the option of using either a printed version or an electronic version, including a subscription from a National Board licensed reseller).
- Have available a copy of the code of construction appropriate to the intended scope of work.

Prior to issuance of a National Board **VR** *Certificate of Authorization*, the organization and its facilities are subject to a review of its quality system. An important part of that review will be the witnessing of the repair of several sample pressure relief valves.

An independent test for operation and capacity of these sample pressure relief valves will be conducted at a National Board-accepted laboratory. The test is to verify the repaired valves meet applicable ASME Code requirements for performance and relieving capacity.

- The National Board Testing Laboratory is available to perform this testing, along with several other major valve manufacturers which operate National Board-accepted testing laboratories.
- A National Board representative will witness the valve testing.

NR Stamp *Certificate of Authorization* Program:
For the repair and replacement of nuclear components.

Requirements are included in the current edition of the *National Board Inspection Code* (NBIC), Part 3, Section 1.

Prerequisites
Organizations seeking a National Board **NR** *Certificate of Authorization* must complete NB-163, *Application for the National Board **NR** Certificate of Authorization* and:

- Have and maintain an inspection agreement with an authorized inspection agency.
- Have a written quality system that complies with the requirements of the current edition of the NBIC and includes the expected scope of activities.
- Have the current edition of all three parts of the NBIC (to fulfill this requirement, organizations have the option of using either a printed version or an electronic version, including a subscription from a National Board licensed reseller).
- Have available a copy of the code of construction appropriate to the intended scope of work and a copy of ASME Section XI.
- Have completed NB-223, *Pre-Survey Questionnaire*, and submitted it to National Board at least 30 days prior to the review.

Is your organization considering National Board accreditation?

The newly-formatted National Board Boiler and Pressure Vessel Repair **RO** Seminar takes students through the entire accreditation process, which includes an overview of the NBIC and detailed information about quality control programs, quality control manuals, and forms and applications for the **R** stamp program. Instructors also guide students through the repair and alteration process, starting with determining the scope of the repair/alteration and ending with final stamping and proper documentation.

The **RO** Seminar is ideal for organizations preparing to perform repairs and/or alterations in accordance with the *National Board Inspection Code* (NBIC). Similarly, the National Board Valve Repair **VR** Seminar is available to organizations intending to repair pressure relief valves. Visit nationalboard.org and click on TRAINING for more information.

2011 National Board Technical Scholarship Recipients Announced

Two students have been named recipients of National Board's 2011 Technical Scholarship. Mr. Tyler Erikson of Williamsburg, Virginia, and Ms. Kristin Smith of Fallston, Maryland, both received $6,000 toward their collegiate education. Although their courses of study are vastly different – mechanical and nuclear engineering – the awardees have one thing in common: they want to change the world.

"I believe you need to be the change you want to see in the world, and there is a lot in this world that needs to be changed," says Mr. Erikson. The scholarship recipient is a sophomore at Virginia Polytechnic Institute and State University in Blacksburg, Virginia. He is pursuing degrees in mechanical engineering and engineering science and mechanics with a minor in math. With a grade point average of 3.7, he seeks to become chief engineer of a leading automotive manufacturer and oversee his own platform of vehicles.

"My focus is automotive engineering and I'm on course to finish my mechanical engineering degree in Germany at the University of Darmstadt," he shares. "Although my love for the internal combustion engine is vast, I am most interested in the engines of the future. From hydrogen fuel cells to cold fusion, alternative fuel sources are ready to be discovered, designed, and tested – we just need to find the will to move forward." Mr. Erikson is the son of National Board commissioned inspector Ronald Erikson.

Kristin Smith is a junior at Rensselaer Polytechnic Institute in Troy, New York. She is the daughter of National Board commissioned inspector Steven Smith. Ms. Smith carries a 3.47 grade point average and is pursuing a bachelor's degree in nuclear engineering and a master's in management with a concentration in nuclear power plant management.

"With this background I hope to do research into the development of nuclear power plants that produce less radioactive waste," she explains. "I hope to make my way into power plant management as my ultimate career goal. The work I intend to do in the future is important to our nation's well-being and to the well-being of humanity as a whole. I feel my academic experiences will prepare me to live up to Rensselaer's motto, 'Why not change the world?' "

2012 Technical Scholarship Submission Period Now Open

Open submission for the 2012 National Board Technical Scholarship began September 1 and will run through February 28, 2012. Up to two $6,000 scholarships will be awarded to selected students who meet eligibility standards and who are pursuing a bachelor's degree in certain engineering or related studies.

For full requirements click the TECH SCHOLARSHIP button on the National Board Web site or contact National Board Scholarship Coordinator Connie Homer at chomer@nationalboard.org

MICHAEL D. GRAHAM

Chief Boiler Inspector, State of Oregon

Most chief inspectors have appreciated the doors opened for them during ascension to their top jurisdictional posts. But there is one who nearly ignored the unmistakable knock of opportunity. Twice.

"I originally didn't want to become an inspector because it required sitting for that excruciating National Board Commission Examination," comments Oregon Chief Boiler Inspector Michael Graham.

And then there was the time he was reluctant to accept the position of chief boiler inspector.

Mike explains there was good reason for ambivalence in these instances. And yes, he admits, there have been occasions where he started out doing one thing only to end up doing something completely different. "But it usually ends up being for the best."

Early life growing up in the state capital of Salem was anything but typical for Mike Graham.

His parents divorcing when he was only a child, the National Board member recalls bouncing back and forth living with his mother and periodically visiting his father. While his mother continued to reside in Salem, Mike's dad traveled to dam sites in Utah and Arizona, where he was employed in construction. "Mom worked for the state and pretty much raised me, my brother, and sister," Mike acknowledges.

When his son graduated high school in 1968, Mike's dad insisted he join the Coast Guard to avoid the ongoing conflict in Vietnam.

"I entered as a seaman apprentice," the Oregon official explains, "and was immediately assigned to a 210-foot medium endurance cutter, or more specifically, a diesel electric tug boat."

BULLETIN Photograph by Randy Milder

Mike described his job as "essentially keeping the cutter clean." But one afternoon while chipping paint from the mast "for the second time," the new seaman apprentice deduced there had to be better onboard assignments.

"I approached the cutter's engineering officer and expressed an interest in becoming an engineer," he explains. "I was told that if I passed the engineering test, I would be reassigned to the engineering section."

While passing the exam was of little difficulty, finding a place for the new engineer proved to be somewhat of a

problem. And somewhat prophetic.

"I was assigned the unattractive task of tending a small vertical tube boiler used to create steam for onboard heat," Mike recalls with a smile. "While the only maintenance I performed was the occasional electrode and safety valve replacement, it was my first genuine exposure to boilers."

Following his four-year commitment, Mike left the Coast Guard in 1973 and consequently accepted a job running a cutting machine at Salem's Boise Cascade paper mill. "I was there five years when the public tired of the plant's smell," he sighs. The plant closed operations shortly thereafter.

Out of work for a year, Mike subsequently secured a position in 1979 at Container Corporation of America's paper plant in Tacoma, Washington.

"I was hired as a winder operator, which meant I was responsible for keeping the paper flowing," he explains. Mike admits the stress of "keeping the paper flowing" continually kept him on his toes.

Not unlike his experience with the Coast Guard, Mike sought a way to make life a little easier. "I volunteered to be the boiler room grunt guy," he says with a nod.

Not only did the state official enjoy his newfound boiler responsibilities, he felt an urge to become a licensed Washington State boiler operator. "I knew I was accumulating the needed experience and had the aptitude for it, so I went to school, passed the operator's test with flying colors, and almost immediately began looking for operator positions in and around the Salem area."

Mike's research revealed Oregon was advertising for a heating plant operator at its Fairview Training Center. Joining the state in 1989, the Salem native became the center's high-pressure boiler operator for two water tube boilers. "It was a great job," he readily admits. For eight years.

And then it happened again: "The state announced it would be shutting down the training center."

Fortuitously, Mike had enough notice to explore new options, one of which was to become a state boiler inspector. "Didn't want to do it," he emphasizes with pointed finger. "First it meant I had to pass that tough National Board exam for a commission, and secondly: I was making more money as an operator!"

The imminent closing of Fairview forced Mike to reconsider his position and take the National Board exam. "I studied for over 500 hours. Although I failed it the first time – I was never good at math – I passed the second."

In 1996, flush with a new commission, Mike became a state inspector.

Mike toiled in the position a total of 10 years. And while his job, for the most part, was uneventful, bureaucracy issues started to surface in the early 2000s. A statewide austerity effort provoked agency heads to cut costs and generate new revenues. "At the time," Mike recalls," our department was being financially subsidized by the state."

Although Oregon didn't want to completely abandon its statutory obligation to the public, it considered radically changing the boiler operation by exploring the use of alternative construction standards, relinquishing its responsibility as an authorized inspection agency to insurance companies, and turning the inspection process over to local plumbers. To make matters worse, Oregon hired and parted with three chief inspectors between 2000 and 2005.

"No one could argue our boiler program was not in jeopardy," Mike laments. And that's why the Oregon National Board member was dumbfounded to learn he would be in line to become the state's next chief inspector. "Job security immediately came to mind. To say I was reluctant to take the job is putting it mildly," he adds. But take it he did.

Since assuming the role of chief inspector in January 2006, Mike has managed to turn a program in turmoil into one of the best safety operations in North America.

"With an increase in inspection fees, we were able to make the program self-sustaining," he reports with a wide grin. And with strong support from his boiler board, Mike effected a number of important changes in Oregon's pressure equipment rules. And not just cosmetic rules, but changes that have strengthened regulations dating back over 90 years.

Today, having 22 years with the state, Mike oversees more than 46,000 boilers and pressure vessels, over 11,500 of which are boilers.

Much of the chief inspector's success is attributed to wife Judy, whom he married in 2005. "She's the best thing that ever happened to me," he smiles. The Grahams now boast a total of seven adult children between them from previous marriages, and 18 grandchildren.

One thing about which Mike is not indecisive is his downtime. "I've been steelhead fishing for 40 years and bow hunting for 8," he proudly proclaims. Of course, that's when he's not mountain biking or hiking the local terrain.

As to sometimes being hesitant, Mike agrees. Career wise, however, he insists – metaphorically – he clearly heard the knock of opportunity.

"I just needed time to answer the door . . ." ⚙

Code Reading 101

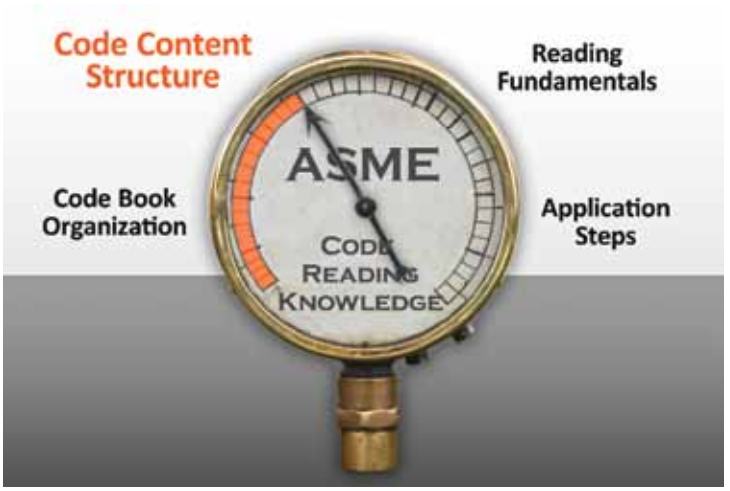
BY KIMBERLY MILLER, MANAGER OF TRAINING

Anyone who has cracked open a code book can attest to the fact it can be at times a bit—*shall we say*—confusing. Just when the layout or style of one book is understood, another is opened reflecting yet a completely different format. Back to square one.

As we all know, it is extremely important to understand *how* the code is written in order to fully understand and implement ASME rules. So what is someone in need of this information to do?

To start, enroll in the National Board's new ASME Code Reading Primer online training course!

Historically, basic code reading has been a topic briefly discussed on the first day of both National Board commission courses (**IC** and **A**). Unfortunately – because of time limitations and the many other vital topics our instructors must cover – only a one-hour session has been allotted to this subject. So to provide students with the best foundation possible, this new online training course has been developed focusing *only* on code reading.



A road map of sorts, the new online course provides students with a solid understanding of the general format, style, and language used throughout the *ASME Boiler & Pressure Vessel Code*. The course is divided into seven easy-to-navigate modules, beginning with the history and perspective of the ASME code. Students are then guided through book organization and content structure, followed by reading fundamentals and the necessary steps to correctly apply the code. To wrap up, a practical experience module allows students to implement the information learned. Module seven provides some important "additional information" regarding the code for those with further interest.

Specific topics discussed include:

- Using the Table of Contents and Index to quickly locate information.
- Recalling code structure such as Sections, Parts, Articles, etc.
- Defining key words like *shall, will, should, may*, and *can*.
- Understanding the reading fundamentals of parentheses, footnotes, and punctuation.
- Applying code-reading principles to industry-specific manufactured products.

This course is not just informational; it offers real-life scenarios which take students directly to ASME code books. For example, Sections I, IV, VIII Div. 1, and B31.1 are all referenced and should be available to the student throughout the course.

As mentioned previously, students enrolled in either of the National Board commission courses were the original target for this new online training, but inspectors new to the industry are not the only audience. Engineers, manufacturers, quality control (QC) personnel, repair organizations, and other industry professionals will also benefit.

Tuition is only $99. For those enrolled in either of the commission courses (**IC** and **A**) the cost of this training is included in their classroom tuition. Upon confirmation of each class date, students will receive instructions for how to access and "pay" for the ASME Code Reading Primer online course. *Since code reading will no longer be covered in class, it is highly recommended all enrolled students take this online course before arriving.*

Coming later this year… a math calculations primer developed as a partner to this code reading course. Stay tuned!

NBIC
July 2011
Meeting Summary

The *National Board Inspection Code* (NBIC) committees met July 18-21 in Columbus, Ohio, at the National Board Training and Conference Center. Subgroups and subcommittees met Monday through Wednesday. The NBIC Executive Committee met on Monday, and the Main Committee met on Thursday.

A summary of the significant activities, by committee, is listed below:

NBIC Executive Committee reports administrative accreditation requirements will be removed from NBIC, Part 3, and placed in a separate National Board procedure. Additionally, the Executive Committee continues to consider developing an international version of NBIC, Part 3, to be used globally.

Subcommittee on Installation is reviewing an additional supplement addressing installation of high-pressure composite pressure vessels. This would become Part 1, Supplement 3, Installation.

The Subcommittee on Inspection is working on adding new reference codes and standards to the current list in Part 2, Inspection. They are also developing a checklist for inspection requirements for pressure vessels for human occupancy.

Subcommittee on Repairs and Alterations approved several interpretation requests including: weld buildup on wasted areas being regarded as a routine repair, and the necessity of a *Certificate of Compliance* from the fabricator for welding of replacement parts to an existing pressure relief device by someone other than the installer. All of the approved interpretations will be posted to the National Board Web site.

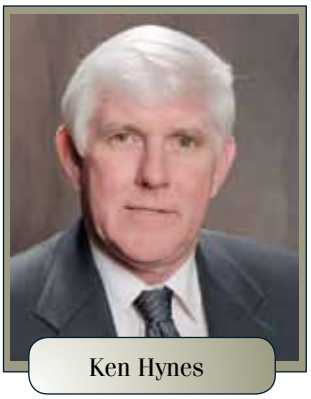
Subcommittee on Pressure Relief Devices is developing Part 4 of the NBIC to address pressure relief device issues including repair, testing, and inspection of these devices. The Subcommittee presented a draft for information purposes and hopes to have this new Part ready for inclusion in the 2013 Edition of the NBIC.

The next meeting will be held January 16-19, 2012, in San Diego, California.

Complete information from the July meetings is available on the National Board Web site under *National Board Inspection Code*.

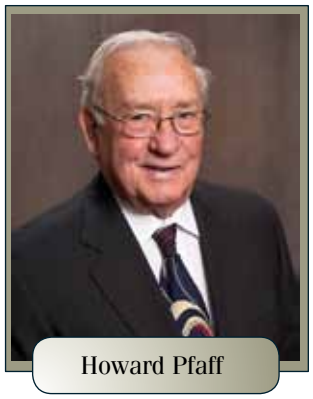
The next meeting will be held January 16-19, 2012, in San Diego, California.

National Board Member Retirements


Ken Hynes

Prince Edward Island Inspector Retires

Ken Hynes retired as chief boiler inspector from the province of Prince Edward Island (PEI) on June 21. Mr. Hynes served in the Canadian Navy from 1960-1965. After returning to PEI he was employed with a local boiler manufacturer. In 1969 he was employed by Maritime Electric, gas turbine insulation in Borden, PEI, and then at the Charlottetown generating plant. From 1975 -1985 he was employed as an instructor with Holland College. He spent the next three years as a commercial diver. In 1988 he was employed with the PEI, Department of Labour, as a boiler inspector. In November of 1993 he became the chief boiler inspector for the province of PEI and remained in that position for over eighteen years.


Howard Pfaff

South Dakota Inspector Retires

Howard Pfaff retired as chief boiler inspector for the state of South Dakota on June 30. Mr. Pfaff served in the US Navy for twenty years from 1953-1973. During his naval career he achieved the rank of Petty Officer First Class and finished out his service as a Navy instructor at the Great Lakes Training and Recruit Command in Great Lakes, Illinois. After retiring from the Navy, Mr. Pfaff worked as an inspector for an insurance company and was a boiler operator at a steam plant. In 1992 he worked part-time as a private contractor conducting inspections in eastern South Dakota until he was named the state's chief boiler inspector in 2000.


Martin J. Sheeron Jr.

Pennsylvania Inspector Retires

Martin J. Sheeron Jr. retired as chief boiler inspector for the commonwealth of Pennsylvania on June 18. Mr. Sheeron served the US Army, Corps of Engineers, from 1969-1972. He was employed by the Philadelphia Naval Shipyard in various capacities working with high-pressure naval boilers from 1968-1995. He joined the commonwealth of Pennsylvania as a boiler inspector in 1995, was promoted to supervisor, and occupied that position for over 14 years. Mr. Sheeron also served 14 years as an ASME and National Board review team leader.

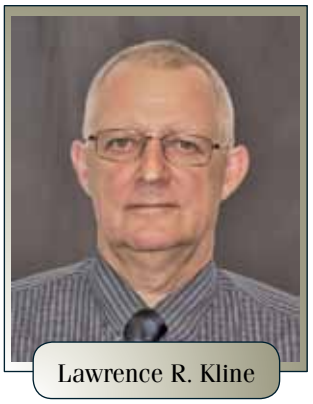

Peter L. Vescio Jr.

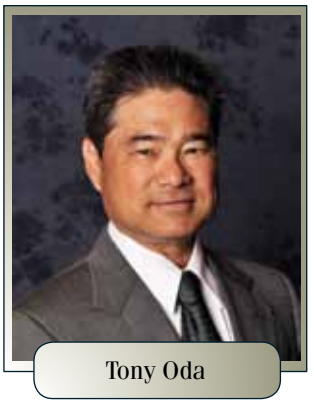
New York Inspector Retires

Peter L. Vescio Jr. retired as chief boiler inspector for the New York State Department of Labor on June 30. Mr. Vescio served as a US Navy boiler technician 2nd class from 1971-1975. Between the years 1977-1984 he worked as a stationary engineer with the New York State Department of Mental Hygiene and then the New York State Department of Education. In 1984 he went to the New York Department of Labor as a boiler inspector and became a senior boiler inspector in 1991. He advanced to supervising boiler inspector in 2003 until he assumed the position of chief inspector in 2007.

Hinkle, Kline, Oda, and Townsend Become National Board Members


Ira M. Hinkle


Lawrence R. Kline


Tony Oda


Steven R. Townsend

New South Dakota Member

Ira M. Hinkle has been accepted to National Board membership representing South Dakota. Mr. Hinkle served the United States Marine Corps from 1953-1957 and the United States Air Force from 1957-1974. After retiring from the military, he worked for the Rapid City Regional Hospital in South Dakota. He obtained his Class A, B, and C boiler operator certificates and was promoted to maintenance manager. In 1982 he joined Hartford Steam Boiler Inspection & Insurance Company as a boiler machinery inspector and then as an authorized inspector until 1992. Between 1992 and 2005 he worked as plant manager for Ellsworth AFB and then as chief of maintenance for Holiday Inns. In 2005 he was employed with the state of South Dakota and assumed the role of chief in 2011.

New Pennsylvania Member

Lawrence R. Kline has been accepted to National Board membership representing the commonwealth of Pennsylvania. Mr. Kline's professional work experience includes installation and maintenance of all types of boiler systems. He worked for Conrail Maintenance of Way and also served as a local-level instructor for the Pennsylvania Fire Academy. In 1980, he joined the Pennsylvania Department of Labor & Industry (liquid petroleum gas safety), and transferred to the boiler division in 1983. In June 2011 he assumed the role of director, boiler division.

New Washington State Member

Tony Oda has been accepted to National Board membership representing Washington State. Mr. Oda was employed with Chevron USA, Hawaiian Refinery, as a refinery operator from 1978-1989 and as an owner-user inspector from 1989-1992. He worked as boiler inspector I and II for Washington State from 1992-2001. In 2001 he became a technical specialist, boiler section, for Washington State until he assumed the role of chief boiler inspector in 2011. For 17 years he has served as both a National Board and ASME team leader.

New Prince Edward Island Member

Steven R. Townsend has been accepted to National Board membership representing the province of Prince Edward Island (PEI). Mr. Townsend has more than 18 years of experience as a shift engineer responsible for the maintenance and operation of central heating plants and steam and ammonia refrigeration systems. In 2005 he became a boiler and pressure vessel inspector for the province of PEI until assuming the role of chief inspector in 2011.

Fatal Spark Ignites Deadly Vapors

October 31, 1963

What started as a night of dazzling entertainment ended in one of the worst tragedies in Indianapolis history. More than 4,000 people gathered at the Indiana State Fairgrounds Coliseum in Indianapolis on October 31, 1963, to attend opening night of a Holiday on Ice show. A review in the *Indianapolis Star* said the program was the "most wholesome family entertainment since the circus had its heyday."

Beneath the stands in a concession area with no ventilation, a liquid propane gas tank was used to heat pre-popped popcorn. While families and children enjoyed the show, gas leaked from a defective valve on the tank. As the show neared its grand finale, deadly vapors wafted across the room and met with an electric heater, ignited by a fatal spark.

An account from the *Indianapolis Star* online library Factfiles says, "At 11:04 p.m. an explosion sent bodies flying nearly 60 feet. A second blast took place a few minutes later, caused by heat rising and air rushing into the vacuumized area. The victims were either severely burned or crushed by concrete."

Seventy-four lives were lost in the explosion. Nearly 400 others were injured. Victims and survivors were awarded close to $4.6 million in settlements. Damage to the Coliseum was eventually repaired. Today the landmark venue, built in 1939, operates under the name Pepsi Coliseum. ✪

References: *Indianapolis Star* library Factfiles, *The Indiana Book of Records, Firsts, and Fascinating Facts* by Fred D. Cavinder, and *Indianapolis Monthly*, October 2003.

Nominate a recipient for the 2012

National Board Safety Medal Award

The National Board's highest honor in recognition of outstanding contributions to boiler and pressure vessel safety.

DEADLINE: DECEMBER 31, 2011

Presentation: May 14, 2012, at the 81st General Meeting in Nashville, Tennessee.

Visit nationalboard.org for complete details and criteria.