BULLETIN

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

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Executive Director Donald Tanner reflects on his term with the National Board.

Read more on Page 10.

Cover photograph by Greg Sailor

Cover Story

Features

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Now Entering the Danger Zone

BY DONALD E. TANNER, EXECUTIVE DIRECTOR

EXECUTIVE DIRECTOR'S MESSAGE

Fall is always a hazardous time for boiler safety. Starting after laying up for an entire summer is not a practice to be taken lightly. And yet many responsible for this process are in the dark regarding the correct procedure.

If that were not risky enough, we are about to enter a period where the potential danger is compounded – particularly at government-operated facilities. This new danger zone is caused by money, or more specifically, lack thereof.

Many states are presently experiencing a revenue pinch that threatens financial support affecting hundreds of communities. This translates into an appreciable delay of planned repairs and maintenance essential to the public's well-being. In the months and weeks ahead, prepare for announcements on postponement of numerous vital projects involving community infrastructure: road maintenance, bridge work, building repairs, etc.

Lack of resources not only impacts execution of community projects, it results in a cutback of personnel working on those projects. Herein is the troubling reality.

With limited revenue and abbreviated workforce, thousands of maintenance and repair projects will be demoted in priority. Many of these will involve boiler equipment.

The *out-of-sight, out-of-mind* mentality of some bureaucrats is a frightening notion. With boilers enclosed behind nondescript walls, who will know what, if any, maintenance is being performed?

How will *you* know?

You won't. Disbursement of revenue is sometimes a discretionary shell game. The only way to get firsthand information involving repair and maintenance issues is to call officials responsible for building maintenance and repair issues.

There have already been media reports of schools, colleges, and even some public buildings delaying repair projects, some of which have been backlogged for years.

Logic suggests that when badly needed repairs are deferred, routine maintenance is also relaxed along with critical record-keeping. When these important safety procedures are prolonged (particularly without incident), it is easy for bureaucrats to question the value and need for a boiler program and, consequently, funding.

Most government agencies are simply doing what they can with what they have. Not unlike a household budget, cutbacks and sacrifices must be made somewhere.

In coming weeks, public schools will be starting boilers in preparation for the academic year. As is often the case, there will be a handful of news reports involving boiler incidents and even some explosions. Heretofore, a majority of the damage has been limited to property. Fortunately.

Short of providing a massive infusion of capital, there is little any of us can do. But that doesn't mean we should be indifferent to how government cutbacks affect our daily lives.

While we may not passionately care about road repairs and leaking roofs, it is still our individual responsibility to remain vigilant and constantly monitor that which surrounds us.

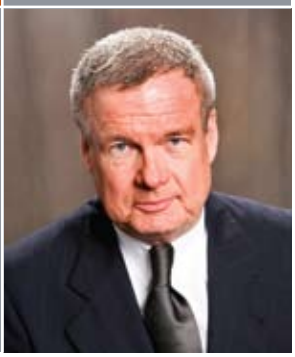
The negative effects of today's economy should be a signal not unlike fluorescent signs and flashing lights cautioning entry into a danger zone. And because we are entering a danger zone, it would be wise not to underestimate the potential for peril.

You have been warned.

Bette Midler Shows off BULLETIN on *Tonight Show* with Jay Leno

If you happened to be watching *The Tonight Show* on Friday, June 20, you still might be wondering if you actually saw what you think you saw – host Jay Leno and his first guest, renowned entertainer Bette Midler, each holding a copy of the National Board *BULLETIN*. Well, we're here to assure you, you did.

As *BULLETIN* readers will recall, Mr. Leno was kind enough to let us interview him for the summer issue ("Keeper of the Flame: An Interview with Jay Leno"). We sent him several copies of the *BULLETIN*, one of which mysteriously ended up in the hands of Ms. Midler, who kidded Mr. Leno about his "fascination with boilers." ✪



NEW CRANE REGULATIONS UP IN THE AIR

BY PAUL BRENNAN, DIRECTOR OF PUBLIC AFFAIRS

PERSPECTIVE

A lot of New York City residents are looking skyward these days. And not just to pray. Two recent construction crane accidents have street goers wary of building activities taking place overhead. Each crane piercing the Big Apple sky serves as a beacon signaling those below to proceed at their own risk.

Unlike boiler explosions, crane accidents command more public and media attention. Strikingly visual, these towering structures hold forth on projects having significant public profiles. And most are erected in high-density population centers.

Although there are precious few similarities between the pressure equipment and the crane industries, there are some parallels involving efforts to achieve a uniform code. If what our industry experienced is any example, New Yorkers, as well as those in cities across the country, will be gazing the heavens for some time to come.

The question authorities in New York City are attempting to answer is: could the aforementioned major crane accidents have been prevented through more frequent and comprehensive inspections?

New York is only one of several US cities recently experiencing construction crane tragedies. In 2008 alone, four incidents killed fourteen people. Other major construction crane occurrences were reported in Miami, Las Vegas, Dallas, Houston and Quincy, Massachusetts.

Given what is known about the crane industry, it appears an end to these devastating accidents is not as close as contractors and developers would hope.

FACT: *Crane inspection standards in the United States are at best disparate collections of numerous state, local, and voluntary regulations reflecting very little consistency or similarity.*

FACT: *Some states, such as the commonwealth of Pennsylvania, have NO crane inspection regulations. Others including California have specific regulations that are enforced.*

FACT: *Most contractors and developers rely on standards established by OSHA.* In **1971**.

FACT: *OSHA crane standards require annual inspections. Of an estimated four million construction sites, OSHA last year inspected only 23,000.*

FACT: *Despite efforts of several local authorities to legislate crane inspection standards, construction industry officials have been successful in preempting jurisdictional mandates.*

These disturbing revelations were recently divulged by the Associated Press. They illustrate in somber detail an industry struggling to agree on uniform standards.

If this were a perfect world, we wouldn't need insurance companies. There would be no boiler explosions, car crashes, bridges falling into rivers, or crashing amusement rides.

But when accidents do occur, especially those having a high profile, you can wager with confidence some type of token legislation or new regulatory oversight will evolve. What generally follows is a feel-good period replete with public assurances all is well. And all remains well. Until the next accident.

The cycle begins anew.

Many in the industry agree more has to be accomplished in regulating construction cranes, including mandatory training and a certification process. Indeed, what crane contractors need is what the National Board offers: leadership in developing a uniform approach to code inspection and certification.

It all seems pretty simple. But as we have historically observed in the pressure equipment industry, construction crane companies will endure a sustained period of indifference before anything material is accomplished.

New York City has witnessed a lot of public finger-pointing. As bureaucrats scramble hither and yon, there have been news conferences aplenty.

Photograph by John Trif

FACT: *A professional advisory committee referred recommendations to OSHA in the summer of 2004. The federal safety body has yet to act on the standards proposal.*

According to *ENGINEERING NEWS RECORD*, "a new OSHA rule could not be fully implemented before 2013."

Sound familiar?

As we in the pressure equipment industry know, there are countless examples of calamitous flash points, i.e., legislative action sparked by loss of life and property destruction. Let's call it what it is: regulatory afterthought.

Translated, that means more people will have to die before public outcry provokes sufficient regulatory controls and oversight.

Rather than build legislation one regulation at a time, jurisdictions would be well advised to pass a comprehensive code package covering all facets of construction crane safety: maintenance, inspection, training, and certification.

This was the case in California following the death of five people at Loma Prieta during the earthquake of 1989. Shortly after a tower crane collapsed, the state mandated both biannual inspections and crane operator training.

ENGINEERING NEWS RECORD reveals fifteen jurisdictions currently require some form of operator licensing or certification while just five are in various stages of implementing operator certification.

While it appears recommended federal regulations will languish well into the next decade, jurisdictions should take a page from the early days of creating a uniform pressure equipment code. Faced with a staggering number of boiler accidents in the early 1900s, some states without regulations borrowed freely from government entities that did.

Because California has what appears to be one of the most comprehensive construction crane regulations in North America, jurisdictions without their own programs would be doing construction workers and the public a favor by using The Golden State's statute as a model.

But what about crane businesses resisting such legislation?

As casualties mount (particularly those of innocent bystanders), public opinion – and lawsuits – will eventually combine to forge a new uniform crane code.

But once again, how many will have to die?

Chances are good some type of increased oversight and/or added inspection schedules will come of the recent crane tragedies. But as is so oftentimes the case, it will develop incrementally as death and destruction statistics mount.

Meanwhile, back in New York City, investigations continue, construction projects rise from excavated crevices, families of accident victims prepare legal action, and street goers stroll Starbucks in hand with a watchful eye to the heavens.

Suddenly, a little prayer isn't such a bad idea. ✪

77TH GENERAL MEETING

SPEAKER ED JOSON, MANAGER, BOILER EFFICIENCY PROGRAM, TERASEN GAS, INC.

COCKTAIL COLLOQUY. MISSISSIPPI MEMBER KEN WATSON, DAUGHTER SOMMER (RIGHT), AND NANCY MYRICK, AT THE NB MONDAY EVENING RECEPTION AT BRIDGES RESTAURANT.

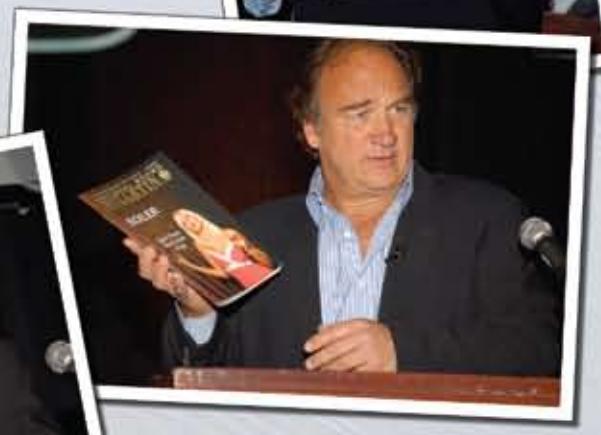
SPEAKER TERRY ADAMS, CONSULTANT, T.N. ADAMS CONSULTING.

OUT OF THIS WORLD. TUESDAY OUTING PARTICIPANTS GET A LOOK AT THE SOUNDSTAGE OF STARGATE ATLANTIS.

HIGHLIGHTS

BULLETIN photos by Dean Williams

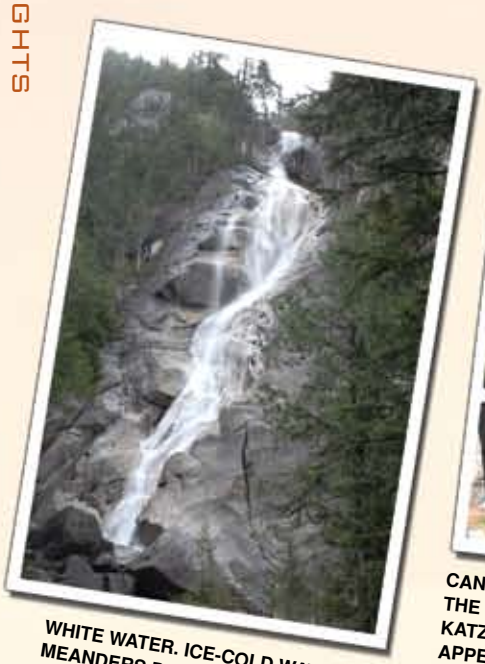
THE FABULOUS FACES OF FEATURED SPEAKER, JIM BELUSHI.



"YEAH, WRITE HERE." PUNS CINCINNATI INSURANCE'S TIMOTHY GOTTSCH TO JIM BELUSHI.

MAURICE NAHANEE, AN ELDER OF THE SQUAMISH NATION, GIVES THE INVOCATION.

WONDROUS WHISTLER. WEDNESDAY OUTING GUESTS TOUR FAMOUS RESORT VILLAGE.



WHITE WATER. ICE-COLD WATER MEANDERS DOWN A ROCK FACE AT BRANDYWINE FALLS.

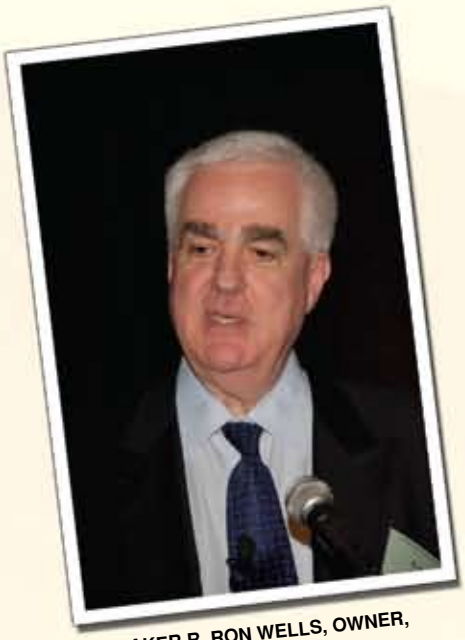
CANUCK CANOPIES. BOARD MEMBER DAN PRICE LOOKS OVER THE SHOULDERS OF MADIHA KOTB (LEFT CENTER), SUSANA KATZ AND BOB KOTB (RIGHT CENTER) AT DELECTABLE APPETIZERS SERVED DURING THE MONDAY NATIONAL BOARD RECEPTION AT BRIDGES RESTAURANT.

QUEEN OF HEARTS. JUICE NEWTON PERFORMS FOR WEDNESDAY EVENING BANQUET ATTENDEES.

ALL ABOARD FOR PEGASUS! THE TELEPORTATION DEVICE ON THE STARGATE ATLANTIS SET.

DRAGON DANCE. DANCERS FROM SETO KUNG FU ACADEMY KICK OFF THE 77TH GENERAL MEETING.

NATIONAL BOARD STAFF WORK THE REGISTRATION BOOTH.



SPEAKER R. RON WELLS, OWNER, WELLS & COMPANY.

SPEAKER MICHAEL BURKE, DIRECTOR, INDUSTRIAL PROGRAMS, NATURAL RESOURCES CANADA.

SPOON TUNE. GUESTS JOIN IN THE MUSIC DURING THE MONDAY NATIONAL BOARD RECEPTION.

THE USUAL SUSPECTS ARE ROUNDED UP FOR GENERAL MEETING REGISTRATION.

SPEAKER RAYMOND SAUNDERS, HOROLOGIST, LANDMARK CLOCKS INTERNATIONAL AND INVENTOR OF THE STEAM CLOCK.

SPEAKER PETER MOLVIE, MANAGER, CODES AND STANDARDS, CLEAVER-BROOKS, INC.

A ROAD WELL-TRAVELED

An Interview with Retiring Executive Director Donald Tanner

When National Board Executive Director Donald Tanner returns to Chattanooga, Tennessee, following his retirement on October 31, his road from Central Ohio will not nearly be as storied as his journey to Central Ohio.

To hear Mr. Tanner tell it, it's been a good ride: sometimes bumpy, seldom devoid of hills and valleys, and often fraught with curves – but a ride he wouldn't have missed for anything.

The final résumé of the farm boy from Erin, Tennessee, reveals a certain strength and resolve not unlike the organization he oversees: 22 years of service in the Navy, 14 years as a state inspector, 11 years as chief inspector, 5 years as National Board Chairman of the Board, and 7 ½ years as executive director. All totaled: more than 54 years of professional experience. Throw in successful battles against lung disease and a heart attack, and it becomes apparent the traveler is every bit as gritty as the road traveled.

As described in a 2000 BULLETIN *profile, Don Tanner exudes "style and charm" underscored by an "engaging smile and cordial disposition." Not alien to self-depreciating humor, he has through it all remained "distinctly southern, exceedingly polite, and unassuming." And this from a man whose professional goal was, by his own admission, to just "have some fun."*

An individual quick to give credit where credit is due, Don Tanner has himself amassed an impressive list of achievements as executive director that includes: metrification and expansion of the National Board Inspection Code*; increasing NBIC Committee size and agenda; initiating Pre-Commission Examination courses for aspiring inspectors; resurrecting the popular* Synopsis of Boiler and Pressure Vessel Laws, Rules and Regulations*; spearheading passage of South Carolina's first boiler safety law; pioneering a new National Board era of electronic communications from Web-based training to the recently introduced NBIC on flash drive; launching construction of the new Inspection Training Center; establishing a new record for National Board membership(64); and introducing the "NB" stamp.*

Like his hands-on leadership at the National Board, the retiring executive director finds relaxation and challenge in woodworking. As he might handcraft a fine piece of oak, Mr. Tanner has fashioned an organization at harmony with his own personal vision and values: resolute, undaunted by outside influence, and leading by example.

When Don Tanner leaves the building, he will also leave a legacy. A legacy as enduring and forthright as the man himself.

And like a veteran road warrior, he will have left a legacy that has charted the course for a great organization.

Mr. Tanner graciously agreed to reflect on his seven and a half years as executive director through a series of questions both professional and personal. Herewith his responses.

BULLETIN: WHAT KIND OF RECOLLECTIONS WILL YOU TAKE BACK TO CHATTANOOGA?

MR. TANNER: All good.

When I turned 17 and joined the Navy, I never would have predicted the good fortune that would come my way. It has truly been a blessing. Not only did I have the opportunity to lead one of the world's truly outstanding safety organizations, I was privileged to serve alongside some outstanding pressure equipment professionals in Tennessee. And speaking of pressure equipment professionals: I don't know of a finer group of people than those comprising this industry. It's a unique fraternity that has demonstrated its dedication time after time. That commitment has made North America an example of professional cooperation. And it has also underscored the positive merits of our boiler and pressure vessel safety standards. I take with me special memories of our members, manufacturers, repair organizations, insurance companies, the board advisory committee, engineers, and consultants. It's too bad the public doesn't have a much better appreciation for the work they do. These dedicated men and women do their jobs each and every day with integrity yet without a lot of recognition. That's what makes our industry, no the *people* in our industry, without equal. I will genuinely miss that special camaraderie.

While I leave with mixed emotions, I do so knowing the National Board is in good stead. It remains a positive example for many organizations and a model for others. I am especially proud of not only our professional reputation, but the foundation of values that has been established for future generations.

BULLETIN: HOW WOULD YOU DESCRIBE THE NATIONAL BOARD'S FUTURE?

MR. TANNER: Outstanding.

This is an organization poised for an exciting future. In addition to being financially solid, it has a certain momentum that will allow a productive transition into the new decade.

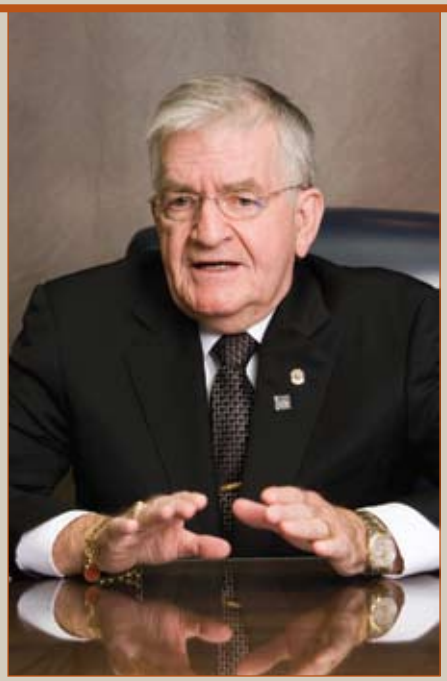
Perhaps the most important component of the National Board's future is training. Over the past several years, we have moved aggressively to provide the kind of instruction pressure equipment professionals need to satisfy industry expectations and obligations. Our revised Web training program is a new industry standard – as it should be. And while the industry has not yet received a formal introduction to our Inspection Training Center, I am certain the innovative approach we have taken to bring a new hands-on dimension to training will have a significant impact on how pressure equipment professionals will be instructed in the future. The interest in our training has never been greater. There are presently more students attending National Board training classes than at any other time in our nearly 90-year history.

BULLETIN: WHAT SURPRISED YOU THE MOST ABOUT THE POSITION OF EXECUTIVE DIRECTOR?

MR. TANNER: The challenge of running a worldwide association.

Not only does this organization have a board of trustees, it also has a diverse geographical and ideological membership: each of whom has his or her own ideas about the National Board's future. Being Executive Director requires having a vision of what the National Board is all about, its unique qualities and its essential yet complex role within the safety industry.

This is not the type of job one can master on a learner's permit. The learning curve is short and it is unforgiving. My tenure as board chairman ideally prepared me for this position. Knowledge of running a business is paramount and this is a business involving members, budgets, personnel, politics, strategic development, marketing, communications, etc. I think one of the reasons Al [Justin] did well before me was a result of his experience as board chairman. There have been many over the years who applied for the job of executive director. And while they may have coveted the title, I think each would have been amazed by the size and scope of responsibility. I know I was!



BULLETIN: WHAT WOULD YOU CONSIDER YOUR MOST IMPORTANT ACCOMPLISHMENTS AS EXECUTIVE DIRECTOR?

MR. TANNER: In an organization such as the National Board, it is impossible to accomplish anything major without membership and the Board of Trustees being in your corner. In this regard, I have been fortunate to receive over seven wonderful years of cooperation and support from both.

The most important thing I wanted to accomplish during my tenure was to discourage what I call industry guilt. For a number of years, we spent too much time discussing death and destruction. Our old National Board Incident Report was used as a measure of our success. The negativity these reports generated – I think – was more of an indictment of the inspection process. Who wants to be involved in an industry where each year – every year – one's work is judged by depressing death and injury statistics? Our business is not about equipment. It is about the men and women who inspect that equipment. I think they should feel good about what they do because they are doing a phenomenal job working under less than ideal conditions. Limited budgets and bureaucratic red tape make their work much tougher than it should be. Despite this frustration, inspectors have been able to limit the dangers of pressure equipment and do it consistently year after year. Our Violations Tracking Program statistics validate that fact.

Another gratifying moment for me was achieving the highest membership participation [64] in the history of the National Board. Of course, once that was reached, we witnessed quite a few members taking retirement. But our efforts weren't for naught. We were able to work with jurisdictions to fill some previously vacant chief positions. Over the longer term, I think that is a positive for the jurisdictions and the National Board.

One of the things I also found satisfying was improving the National Board communications process – particularly as it relates to new technology. We have come a long way over the past seven and a half years. Members now have their own secure pages on our Web site giving them access to vital industry data. Not only can members access an electronic version of the NBIC directly from the Internet, they can also directly communicate information and experiences with one another.

Additionally, new technology has permitted us to make just about all of our published information available on the Web, most of it at no cost. This has not only provided the industry with easy access to a considerable amount of critical resource data, it has allowed the National Board to be more prudent with our resources. I think one of the more unique applications of new technology allowed us to put the NBIC on a keychain-sized flash drive.

BULLETIN: HOW WOULD YOU DESCRIBE NATIONAL BOARD'S CURRENT RELATIONSHIP WITH ASME?

MR. TANNER: On firm ground. Despite some perceptions.

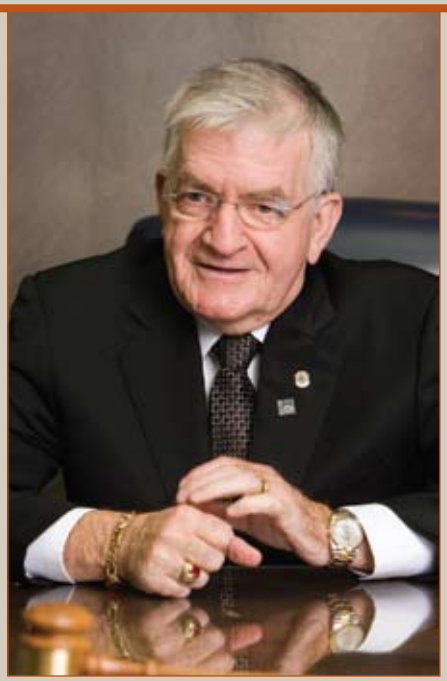
I am always amazed by how many people having limited knowledge of a situation tend to be so negative. Few realize representatives from ASME and the National Board meet on a regular basis. That's because we share one common goal: pressure equipment safety. Yet the National Board and ASME continue to grow. As organizations grow, so do priorities and the way business is conducted. Both ASME and the National Board have diverse memberships that don't really promote a single train of thought, and consequently a unified approach to achieving their respective goals and objectives. And that is what many think is conflict.

Bottom line is that ASME and the National Board continue to work together. And we are rowing in the same direction. And it should be especially noted: very few associations have had the type of mutually beneficial relationship as the one that exists today between ASME and the National Board. A relationship that has endured for nearly 90 years!

BULLETIN: HOW HAVE YOU PERSONALLY BEEN ABLE TO COPE WITH THE SEEMINGLY ENDLESS CHALLENGES OF THE EXECUTIVE DIRECTOR'S POSITION?

MR. TANNER: There are two answers: the love of a good woman and an exceptionally talented staff. My wife Geri has been a rock during our stay in Columbus. She helps keep me focused and makes sure I do all the right things healthwise. I really can't even begin to say enough about what her love and support has meant to me. Without having her by my side, I am sure the last seven and a half years would have been a lot more challenging.

The other part of the formula has been a staff that is without a doubt *the* most dedicated, talented, and loyal group of people I have had the pleasure of working with. I love each and every one of them. There is a spirit at the National Board that just cannot be broken. You can see it in the eyes of people who have worked here for 20, 30, 50 years. And you witness it in the



energy of those who have been with us only a short time. The retention rate of National Board staff is extraordinary – very few leave once they have been hired. I think that's a great testament to how each of them feels about the importance of their work and the National Board organization.

BULLETIN: WERE THERE ANY DISAPPOINTMENTS DURING YOUR TENURE AS EXECUTIVE DIRECTOR?

MR. TANNER: I think my biggest disappointment was being unable to attract more member involvement on National Board committee work. Over the years, many jurisdictions have become more restrictive in limiting employee involvement beyond their immediate job responsibilities. While this may be good for the jurisdictions, it does hamper our abilities to create standards based on input from a wide variety of sources and geographic locations. I can't begin to emphasize enough the critical need for more diverse committee participation. Web conferencing may be a possible solution for the future.

BULLETIN: WHAT DO YOU CONSIDER TO BE THE NATIONAL BOARD'S BIGGEST CHALLENGE?

MR. TANNER: The recruiting of inspectors remains our number one concern. Some jurisdictions experience the problem more than others because of geographical location and such. But the main incentive without a doubt is what inspectors are paid. Until jurisdictions place a higher value on the inspection process, this will continue to be a problem plaguing every Authorized Inspection Agency.

Of course, once we are able to bring more professionals into the inspection discipline, they will have to be properly trained – especially since we can no longer recruit experienced candidates from the Navy. This is where the new Inspection Training Center will play a critical role. For many years, I have wanted to build such a facility because it will provide hands-on experience. So while we still need to recruit those interested in inspection, the National Board is poised to prepare them for a rewarding career.

BULLETIN: HOW WILL YOU SPEND YOUR RETIREMENT?

MR. TANNER: You know, I have spent so much time traveling for the National Board over recent months – it'll be wonderful just staying home! Of course being back in Chattanooga will allow Geri and me to spend more quality time together.

There certainly will be no shortage of time to devote to my hobbies: antique cars and woodworking. Maybe I'll even have a beer in the middle of the afternoon!

After 54 years in this business, it will be nice to do things on *my* time schedule.

BULLETIN: WHAT WON'T YOU MISS IN RETIREMENT?

MR. TANNER: Attending General Meetings as the *host*!

BULLETIN: WHAT DO YOU LOOK FORWARD TO IN RETIREMENT?

MR. TANNER: Attending General Meetings as a *guest*!

BULLETIN: THANK YOU, MR. TANNER. AND BEST WISHES TO YOU AND MRS. TANNER FOR A LONG AND HAPPY RETIREMENT!!

Tube Plugging of Firetube Boilers

BY ROBERT E. FERRELL, SENIOR STAFF ENGINEER

FEATURE

The plugging of leaking tubes in firetube boilers has been an industry practice for many years. The purpose of plugging is to provide a quick fix. This allows the boiler to continue operating until it can be shut down and the tube replaced.

It should be understood a plugged tube is a temporary fix. This type of fix is not addressed in any new construction code. However, it is addressed in the *National Board Inspection Code* (NBIC) through Interpretation NBI 95-35.[1]

Although plugging a tube looks like a relatively simple operation, some considerations must be taken into account:

- How will the plug be installed? Will it be hammered into the tube using a tapered plug, or will it be welded into the tube?
- What type of operational cycling will this plug see?
- How many tubes can be plugged before affecting combustion in the boiler or the stay requirements?

Before plugging a tube, determine the cause of the leak. For instance, if the leak is at the tube to tubesheet joint, this leak could affect the plug's holding power. If it is a through wall leak resulting from corrosion, it implies the tube wall strength has been compromised. If the leak is a through wall leak resulting from a longitudinal heat stress (hoop stress) crack – such a crack usually occurs from the tip of the tube inward across the tubesheet to the waterside (Figure 1) – the crack may be closed by installing the plug. However, it will eventually open up again.

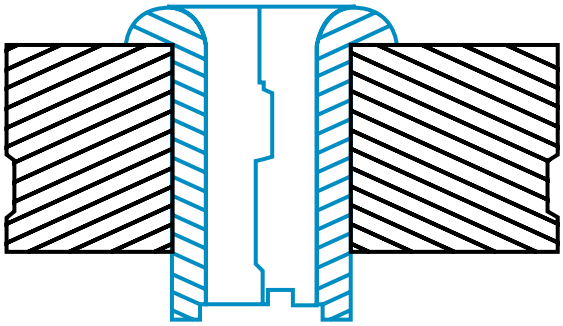


Figure 1

If you ask an "old salt" boiler inspector (i.e., a navy veteran) about the percentage of tubes allowed to be plugged, he will without hesitation say 10 percent. Although that is probably true of a watertube boiler on a US Navy ship, it is not necessarily true of a civilian firetube boiler. The navy boiler may be over designed to

[1] *Interpretation NBI 95-35, R-200 Definition of Terms, 1992 Edition with the 1994 Addendum.*

Question 1: Is the welding of a plug to seal tubes in a boiler or pressure vessel considered a repair?
Reply 1:Yes

Question 2: Does the NBIC apply to plugging tubes by welding plugs to tubes and/or their joints to tube sheets of tubes that have leaked, tubes that have corroded to an unacceptable thin wall thickness, and tubes required to be removed from service for operating reasons in boilers and pressure vessels?
Reply 2: Yes

allow for tube plugging, but the civilian firetube boiler is probably not.

There are two operational concerns for the boiler when a tube is plugged: the first involves the effects on the waterside pressure boundary or membrane; the second is the effects on the combustion process throughout the boiler.

The waterside membrane is a concern because the tube plug creates a flat head segment on the tube sheet. An analysis should be done to determine if the new flat head segment exceeds the allowable pitch of the stays. Initially the tube may act as a stay, but there are several problems with that assumption. If there is a through wall leak, the tube will fill with water. This fireside water doubles the corrosion rate on the tube, limiting its time to be used as a stay. Even if there's no through wall leak, most plug suppliers advise boiler owners to puncture the tube before installing a plug so that pressure won't build up in the tube and loosen the plug. Therefore, there will always be water on the inside of the tube. This water will apply a pressure load on the plug, which will transmit across the tube sheet to the next unplugged tube.

This can be shown using the Power Boiler Code (PFT-31.2) to calculate the tube acting like a stay tube. The diagrams in (Figure 2) illustrate the load increase on surrounding unplugged tubes.

Let's assume the fire tubes are 2-inch OD, 0.095 wall, SA-178-A with an allowable tensile stress of S= 11400 psi. Thickness of the flat head tubesheet is 0.75 inches and the SA- 285-C steel has an allowable tensile of

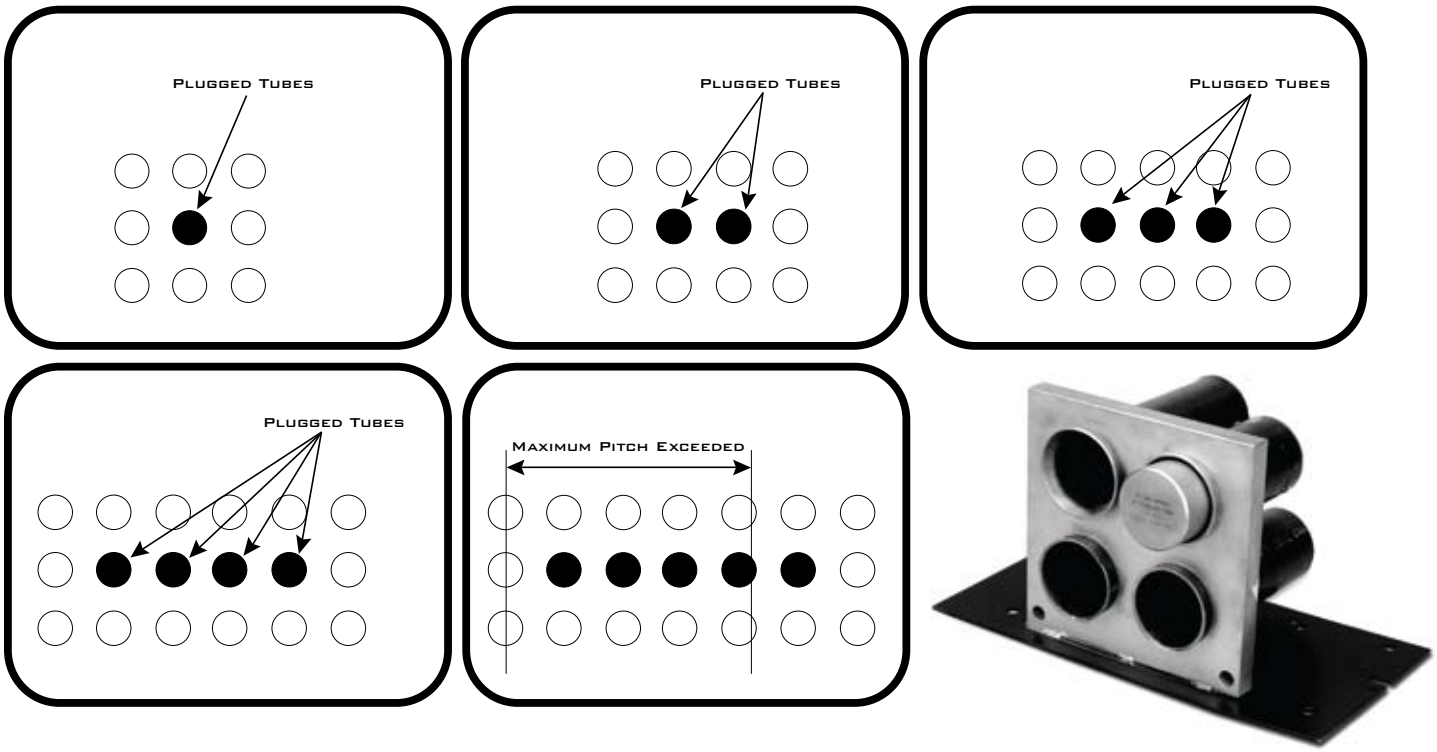


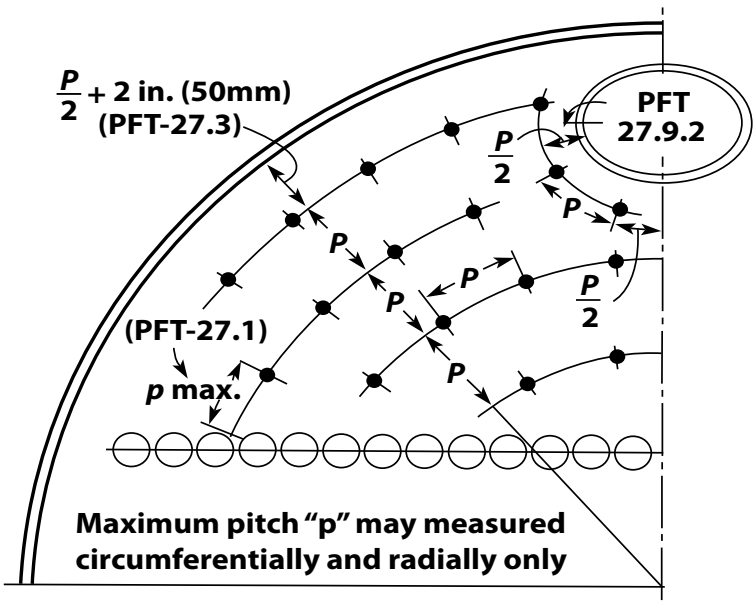
Figure 2

S= 15700 psi. Calculated pitch for the stays in this flat head tube sheet is 10 inches. The MAWP is 200 psi.

As shown in Figure 2, the incremental increase in stress on the surrounding tubes is compounded as the number of plugged tubes increases. Therefore, a combination of tube plugs could exceed the code maximum stay pitch.

Sometimes the plug is welded to ensure it doesn't leak or blow out and turn into a projectile. When it is welded, the plug should have a material test report. The welding must be done in accordance with the jurisdiction's requirements. As shown in Figure 3, the fillet weld may only attach to the tube. The holding strength of the plug depends on holding strength of the leaking tube.

When it comes to combustion process, the impact of plugging tubes results in back pressure of combustion gases through the boiler. A plugged tube reduces the cross sectional area of the flow path. Reduction in area reduces the flow through the boiler and increases pressure drop across



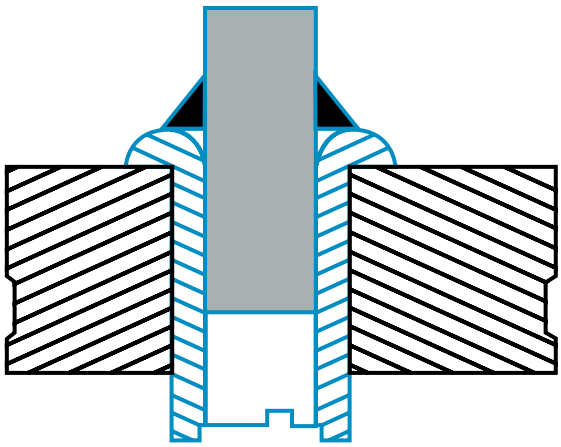


Figure 3

the boiler. Increase in pressure reduces the air output of the blower (forced draft or induced draft). Less air reduces boiler capacity and contributes to incomplete combustion that produces carbon monoxide and soot and thus increases the cost of boiler operation. Smaller boilers would be more sensitive to this impact on combustion because there are fewer tubes per pass.

Although plugging has been an industry practice for many years and can be safely applied in accordance with jurisdictional requirements, boiler owners always need to remember this fix is temporary, and the condition will continue to deteriorate, affecting the pressure boundary stability. They also need to remember this fix immediately impacts the pressure containing capability of the pressure boundary and the safe and efficient process of combustion in the boiler unit. Thus, when convenient, they need to shut down the boiler and replace the tube. ✪

2008 Registrations

National Board Certificate of Authorization to Register guarantees the 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 data reports 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.

	SIZE	FY 2008	FY 2007	FY 2006	FY 2005	FY 2004
BOILERS						
square feet of heating surface						
≤ 55	(A)	156,766	139,435	106,285	111,360	109,064
> 55 and ≤ 200	(B)	39,115	30,235	28,999	31,331	30,642
> 200 and ≤ 2000	(C)	10,680	10,050	9,225	9,325	9,322
> 2000 and ≤ 5000	(D)	689	891	641	651	629
> 5000	(E)	1,021	916	738	733	912
TOTAL		208,271	181,527	145,888	153,400	150,569
PRESSURE VESSELS						
in square feet						
≤ 10	(A)	819,791	856,421	825,423	741,220	718,214
> 10 and ≤ 36	(B)	338,811	356,659	363,092	399,534	449,968
> 36 and ≤ 60	(C)	59,371	57,587	58,987	58,447	64,790
> 60 and ≤ 100	(D)	14,983	13,123	11,729	10,160	9,794
> 100	(E)	18,239	16,490	13,160	10,626	10,426
TOTAL		1,251,195	1,300,280	1,272,391	1,219,987	1,253,192
NUCLEAR VESSELS						
in square feet						
≤ 10	(A)	700	712	519	553	702
> 10 and ≤ 36	(B)	98	182	71	5	90
> 36 and ≤ 60	(C)	19	63	9	1	1
> 60 and ≤ 100	(D)	27	13	23	5	132
> 100	(E)	19	34	24	15	15
TOTAL		863	1,004	646	579	940
ATTACHMENTS*		103,336	89,815	76,707	70,736	77,715
GRAND TOTAL		1,563,665	1,572,626	1,495,632	1,444,702	1,482,416

*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

S/S Norway: The NTSB Final Report

Synopsis

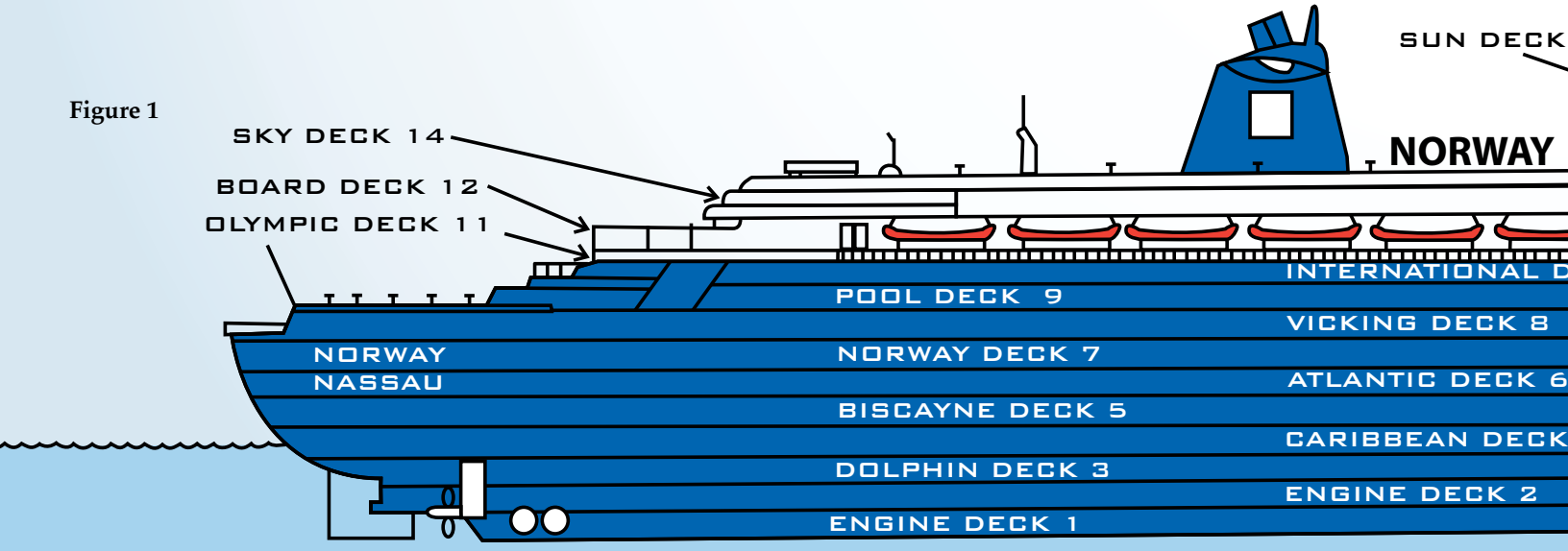
On May 25, 2003, at 6:37 a.m. EST, as S/S *Norway*, carrying 2,135 passengers and 911 crewmembers, sat moored in Miami, Florida, a boiler ruptured. No passengers were killed or injured, but eight crewmembers died (four that day), 10 suffered serious injuries, and seven suffered minor ones.

Shortly thereafter the National Transportation Safety Board (NTSB) began an investigation, the final report of which was issued in December 2007. The report stated the probable cause of the rupture "was the deficient boiler operation, maintenance, and inspection practices" of *Norway's* owners, Norwegian Cruise Line (NCL), and that a contributing cause was the "inadequate boiler surveys" by Bureau Veritas (BV), a classification society that inspected the *Norway*.

The Norway and its Boilers

The steel-hulled liner was built in France and launched on May 11, 1960, as S/S *France*. At the time it was the longest liner in the world at 1,035 feet and, with *Queen Mary* and *Queen*

Figure 1



Elizabeth, one of the grand liners criss-crossing the Atlantic. From 1974 to 1979 it was laid up in a French port; but in 1979 a Norwegian shipping company, Klosters, bought and overhauled it and renamed it S/S *Norway*. In 1980 NCL, a subsidiary of Klosters, began using the ship for Caribbean cruises originating from Miami. At the time of the accident it was one of the last steamships operating out of a US port.

When first built, the *Norway* had eight watertube boilers, four in the forward boiler room and four in the aft boiler room. These powered the ship's main propulsion turbines, steam auxiliaries, and propellers. When it was overhauled in 1979, the four boilers in the forward boiler room were removed since high trans-oceanic speeds wouldn't be necessary.

The aft boiler room extended from the engine deck (deck 2; see Figure 1) to the Caribbean deck (deck 4; see Figure 1), which mostly comprised crewmembers' quarters. The four boilers were 30 feet high, 25 feet wide, and 20 feet deep. They had an upper steam drum, a lower water drum, and a waterwall header (see Figure 2). Heated by oil-fired furnaces, they produced steam at 870 psi. Steam traveled from the steam drum to a superheater, which raised steam temperature, and then to the ship's main propulsion turbines and steam auxiliaries. A boiler management system automatically lit the boilers and burners and shut them down if steam pressure got too high or a burner failed. In addition, each boiler had three safety valves: two on the steam drum and one on the superheater. The two on the steam drum were set to release at 1,014 and 1,017 psi; the one on the superheater at 939 psi.

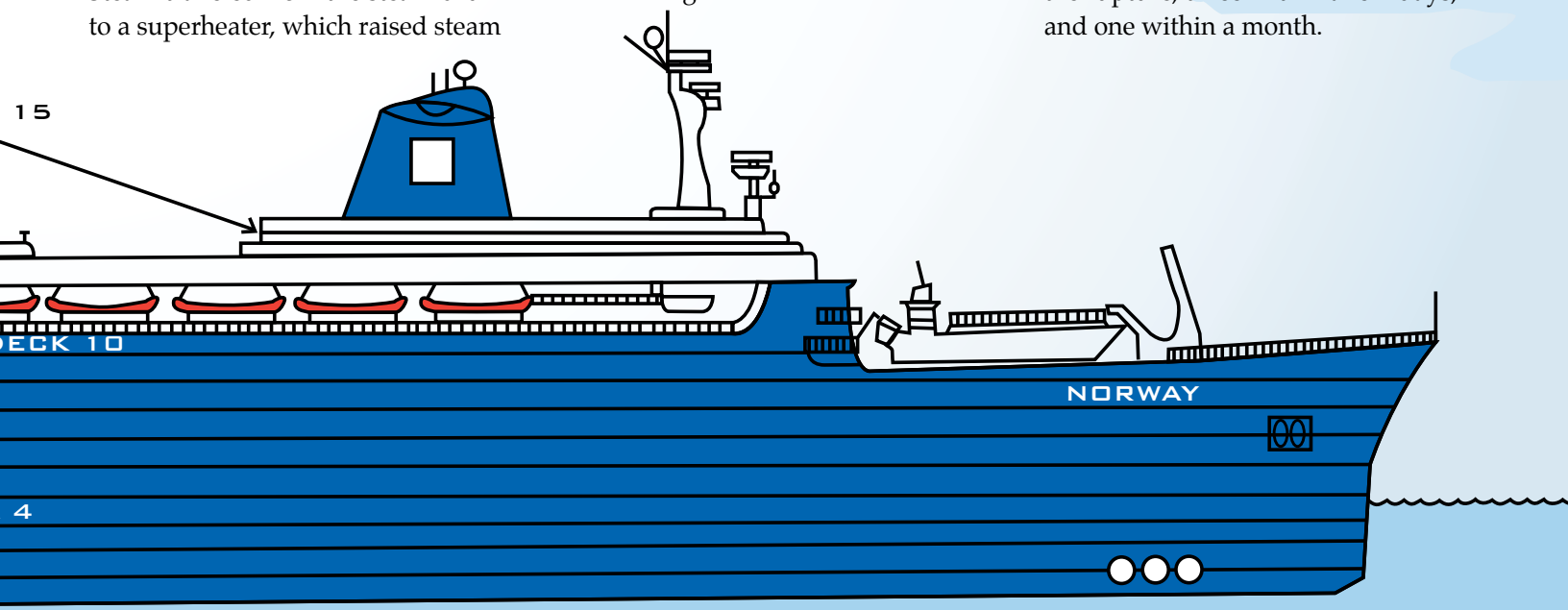
May 25, 2003: A Chronology

On May 25, at 4:00 a.m., as the *Norway* glided toward the Port of Miami after a seven-day Caribbean cruise, the engineering watch in the aft boiler room changed. The engineer going off duty told his relief "all conditions were normal." By 6:00 the ship was docked, and crewmembers preparing to disembark passengers.

In the aft boiler room three of the four boilers were working. On the Biscayne deck (deck 5; see Figure 1), in the engine control room, an engineer monitored the boiler gages, which – he later stated to investigators – read normal.

At 6:37 he heard a "bang" and felt the ship shake: boiler No. 23 – containing 20 tons of water at 528°F under 870 psi – had ruptured. In the normal pressure of the boiler room (14.7 psi), the water expanded 1,260 times into steam, which, with smoke, soot, and debris, swept through the room and up through the Caribbean deck. Immediately the sprinkler system activated, as did smoke alarms in adjacent areas. At 6:38 the boiler management system shut down the boilers. A few minutes later the bridge ordered fire and emergency teams to muster. At 6:51 the chief engineer organized fire teams to check the boiler room and engine room for injured crewmembers. At 6:52 the master told passengers to muster at the lifeboats. By 8:00 all passengers were accounted for; by 9:00 all passengers were ashore, none injured.

On the other hand, six crewmembers in their quarters on the Caribbean deck or in the deck's corridors had been scalded. Seven rigging a gangway on the Biscayne deck had received thermal burns on 6 to 20 percent of their bodies. Eight crewmembers – four on watch in the boiler room and four in their quarters on the Caribbean deck – had sustained second- and third-degree burns on 50 to 100 percent of their bodies. All eight died: four the day of the rupture, three within a few days, and one within a month.



The Investigation

On June 6 NTSB investigators, including a metallurgist, boarded the *Norway* to examine boiler No. 23. With them was another metallurgist, who was from NCL.

Investigators saw the rupture had occurred in the waterwall header (see Figure 2), where a large piece of the wrapper sheet had been dislodged. The waterwall was a series of vertical tubes on the furnace wall; at the base of the waterwall was the header. The waterwall header, 16-1/2 feet long, comprised two half-cylinders, a tube sheet and wrapper sheet; these had been joined by upper and lower longitudinal welds at which, investigators noted, weld repairs had been made. The repairs were 1-1/2 inches wide and extended nearly the length of the original welds. Investigators also noted two fractures occurred at or near the repairs. One fracture extended 11 feet along the upper longitudinal weld. Dark areas inside indicated preexisting cracks extending outward through 40 percent of the wall. The other fracture extended eight feet along the lower longitudinal weld and also had dark areas; they indicated preexisting cracks extending outward through about 60 percent of the wall. The piece of wrapper sheet indicated preexisting cracks and, near the inner surface, copper nuggets.

For a thorough examination, parts of the header and the piece of wrapper sheet were sent to an NTSB laboratory. There, using high magnification, investigators determined the fractures had definitely started near the weld repairs and that the repairs had been made using temper bead welding.

ASME Section IX defines temper bead welding as "a weld bead placed at a specific location in or at the surface of a weld for the purpose of affecting the metallurgical properties of the heat-affected zone or previously deposited weld metal." In a typical weld bead, the parent metal starts to show coarse-grained regions near the weld; these are poorly resistant to fracture. Temper bead welding was developed to reduce these regions and is used when a postweld heat treatment can't be performed. According to *gowelding.com*, although temper bead welding is "easy in theory, in practice it can be difficult to achieve. It requires the production of many test weld simulations and metallographic examinations before sufficient confidence can be gained to perform the actual production weld." In addition, the US Navy repair manual states "considering the requirements for temper bead procedure qualification and welder mock up trials, stress relief may in some cases be the more cost effective and timely alternative."

According to NCL documents, Lloyd Werft, a German shipyard company, used temper bead welding on the *Norway's* boilers on October 26, 1987. The welding had been approved by BV, a classification society. (Classification societies are independent organizations that establish technical standards for the design, construction, and inspection of ships.) Investigators found the welding procedure, as detailed in the working instructions of Lloyd Werft, wasn't specific. It also didn't indicate a qualification plan had been used showing the welders knew how to perform the procedure. Moreover, there was no evidence the welders had received approval to perform weld repairs nearly as long as the original welds. According to the US Navy repair manual, weld repairs more than six inches require special approval.

With regard to the copper nuggets on the piece of wrapper sheet, investigators, when examining the header, found copper fragments on the fatigue crack portion of the fracture. The shape of the fragments was almost identical to the shape of the fracture. Investigators concluded the copper had been mistakenly introduced into the header during maintenance. As a result, the copper had made it difficult for inspectors to detect cracks.

Besides the questionable weld repairs and the failure to repair cracks masked by the copper, investigators determined the following also contributed to the rupture: Lack of adherence to water chemistry composition limits and procedures by both the water chemistry subcontractors and NCL during wet lay-up periods, leading to pitting from oxygen corrosion.

- Failure to take number of boiler cycles into account during maintenance.
- Severe thermal transients from heating and cooling the boilers too quickly and from constraints created by frozen boiler support feet.
- Lack of appropriate nondestructive testing by the BV surveyors and NCL inspectors to determine whether cracks were present.
- Inadequate survey guidance from BV to its surveyors.

Changes at NCL and BV

After the accident, NCL and BV reviewed operating procedures and made several changes. NCL standardized routine maintenance and related documents. With regard to welding, NCL stressed the importance of qualifications, credentials, and third-party inspections. With regard to boilers, it implemented standing orders for crewmembers to report if there was any pitting and if class surveyors (such as those from BV) didn't enter a boiler during surveys. Crewmembers were also required to periodically report on the condition of each boiler. BV revised its rules for surveys, requiring surveyors to review the operation, maintenance, repair history, and feedwater chemistry records since the last survey.

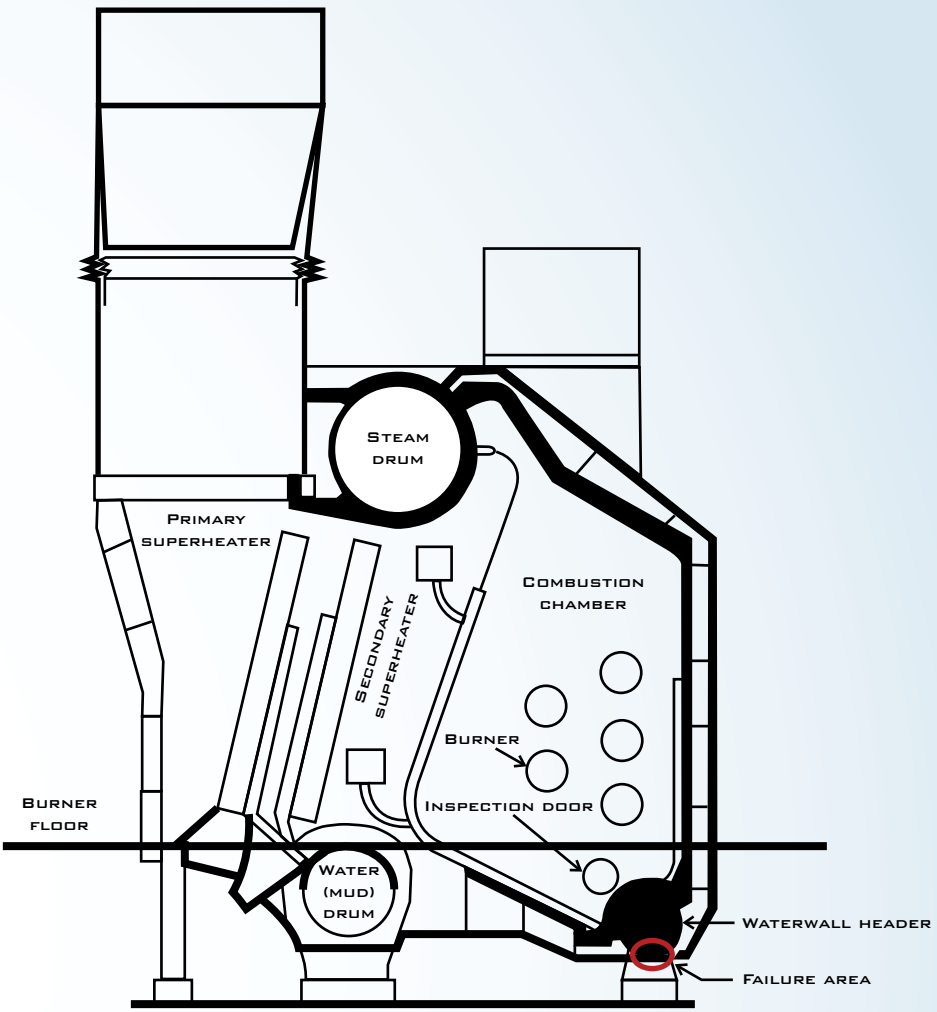


Figure 2

The Norway's Fate

In late June 2003 the *Norway* was towed from Miami. The destination was Bremerhaven, Germany, where the ship would lay up until NCL decided whether to repair it and return to service or remove it from service. It arrived in September. In March 2004 NCL announced the *Norway* wouldn't be returning to service, because of the expense of repairs. After being towed in summer 2005 to Port Klang, Malaysia (where it was renamed *Blue Lady*), it was towed in May 2006 to Alang, India. There the Norway, once one of the great transatlantic liners, was beached in anticipation of scrapping, which began in January 2008. ❂

Source: National Transportation Safety Board "Marine Accident Brief: Boiler Rupture on Bahamian Cruise Ship S/S Norway, Port of Miami, Florida, May 25, 2003"

A TAPPED SUGAR MAPLE lets flow sap.

FROM SAP TO SYRUP

the Art of Sugaring

For Tim Burton, who with wife Angie owns Burton's Maplewood Farm in Medora, Indiana – a city with less than 600 people in southern Indiana – producing maple syrup is an art.

"The art comes from transforming a waterlike liquid, or sap, which has 2 percent sugar content, into thick, sweet syrup that piques the palate at a minimum of 67 percent sugar content. You do this through evaporating, or cooking off, the water in a steam evaporator. The art is most appreciated when you can do it without scorching the syrup, burning the pan, or accidentally making candy."

Though a steam evaporator is the main piece of equipment used in the "art of sugaring" (as Burton calls it), he and many other maple syrup producers have begun using a piece of equipment that helps maximize production – a pressure vessel.

Burton was first introduced to the art in 1999 by a friend who helped a local family with its maple syrup operation. "What was and is intriguing and inspiring is the lost social aspect of people gathering to collect the sap as they once did many years ago. The Miller family [the family his friend helped] still collects all their sap by hand in two-gallon bags."

Burton's operation comprises two seperate farms totaling 55 acres; twenty-five are devoted to a sugar bush on which grow 750 sugar maples and is owned by his partners, David and Mary Abner. Burton's Maplewood farm grows another 400 sugar maples. Besides syrup, the Burtons – helped by son, Greg, and his wife Sabrina – sell maple sugar, maple cream, pecan and walnut maple topping, and maple candy. They also sell a line of flour mixes and preserves.

In 2008, during the first two weekends in March, Maplewood Farm hosted the inaugural National Maple

Syrup Festival *(nationalmaplesyrupfestival.com)*. It was sponsored by the Heads Up!!! Foundation, a nonprofit organization that helps children born with craniofacial anomalies. Burton says the primary grant recipient was Riley Hospital for Children in Indianapolis. "All festival net proceeds were earmarked to Camp About Face, Riley's camp for children with craniofacial anomalies."

The festival included demonstrations on blacksmithing, wood carving, pottery making, wool spinning, candle and soap making, and quilting. Of course it also included teaching the history and process of making maple syrup.

"We don't have an accurate count of how many attended," Burton says, "but we do know on the first day the cook flipped over 2,000 pancakes."

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Maple syrup production in North America has a long history. In an issue of the *Philosophical Transactions of the Royal Society*, published in England in 1684, the author presents "an account of a sort of sugar made of the juice of the maple in Canada." The author, not too concerned with political correctness, writes:

> The savages of Canada, in the time that the sap rises in the maple, make an incision in the tree by which it runs out; after they have evaporated eight pounds of the liquor there remains one pound as sweet and as much sugar as that which is got out of the [sugar] canes. The savages here have practiced this art longer than any now living among them can remember.

In fact the origin of the art stretches so far back it's rooted in myth. In her 1922 book, *Historic American Trees*, Katharine Stanley recounts an Iroquois legend:

> One day, Nokomis, the grandmother of Manabush, was roaming through the forest, and by accident cut the bark of a tree. Seeing a rich syrup flow slowly from the wound, she tasted it, and delight[ing] at finding it so delicious, gave some to Manabush. He also was much pleased with the new sweet-meat, but felt afraid that if the women of the tribe found the syrup could be obtained so easily, all ready-made as it were, they would become idle. So, in order to keep his aunts busy, he diluted the sap, making it thin, as we know it, by pouring water over the tops of the trees. This is why the women must boil down the sap to make syrup.

So, thanks to Manabush, as it were, maple syrup producers, including Manabush's aunts, have always had a more difficult job.

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Maple syrup production is centered in northeastern North America. Canada produces the most. According to New England Agricultural Statistics, Canada produced 6.75 million gallons in 2006; the U.S. produced 1.45 million gallons. Fifteen states produce syrup. In 2006 Vermont led them all with 450,000 gallons or 36 percent. The total value of US production was more than $45 million.

Though many maple trees can be used as a source for sap, the one used most – because it yields the sweetest sugar – is the sugar maple (*Acer saccharum*). Mature sugar maples range in height from 70 to 90 feet and are two to three feet in diameter at chest height. Some in old-growth stands can be between 300 and 400 years old, though this is rare. Tapping – drilling a hole ⅝ in. or 7/16 in. in diameter into a trunk and inserting a spout through which sap

POTS USED BY NATIVE AMERICANS FOR CATCHING SAP.

BRAD GILLILAN OF LEADER EVAPORATOR, explains the workings of a steam evaporator to festival-goers.

can flow – usually doesn't occur until a tree is at least 40 years old and has a diameter of about 10 inches. A tree with a diameter of more than 18 inches or so can be tapped twice, with the spouts opposite each other. During most of winter, the sap stays frozen. About late January, sometimes later depending on the weather and region, it starts to flow.

"The sap," Burton says, "is what the tree uses to 'awaken' into spring and start the process of budding. Flow doesn't begin until after a time of hard freeze followed by several sunny days with temperatures in the forties. The peak flow occurs when it freezes at night and is bright and sunny the next day with temperatures in the forties. The flow usually lasts four to six weeks; we collect the sap daily, preferably in late afternoon."

During the season, a mature sugar maple produces about 10 gallons of sap. When boiled down, the sap yields about a quarter gallon of syrup. "In 2008," says Burton, who uses 1,400 taps, "we harvested about 11,000 gallons of sap; this converted into approximately 250 gallons of syrup."

Sap has the appearance and consistency of water. Burton says, "You can hold a glass of tap water and glass of sap water side by side, and you can't tell the difference. And when you taste it, there's a hint of sweetness." Indeed, according to Baron de la Hontan, a Frenchman who between 1684 and 1695 traveled through what is now Canada and America, sap "has a much pleasanter taste than the best lemonade or cherry-water."

On Maplewood Farm, the sap flows through a spout into tubing, then through a network of tubing into a 1,500-gallon vertical tank. Collecting sap with this network – Burton, who also owns a systems integration company, compares the network to a LAN – is much more efficient than collecting it with metal or wooden buckets, which, Burton says, would take "an army of people." However, during the festival, visitors can collect sap using the more traditional method.

After emptying the 1,500-gallon tank once a day in late afternoon, Burton hauls the sap three miles away to his sugar house. There, before cooking the sap in a steam evaporator, he filters it using a reverse osmosis pressure vessel.

BURTON'S MAPLEWOOD FARM EMPLOYEE monitoring a steam evaporator.

REVERSE OSMOSIS PRESSURE VESSEL
Courtesy of Dr. Gary Graham, Ohio State University Extension, Wooster, Ohio.

CAROL DAVIDSON COOKING PANCAKES at The National Maple Syrup Festival.

Osmosis is the natural diffusion, without pressure, of a solvent through a semipermeable membrane from a solution with low solute concentration to a solution with high solute concentration. On the other hand, reverse osmosis uses high pressure to force a solvent from an area of high solute concentration through a membrane to an area of low solute concentration. It was achieved in 1959 when a UCLA professor, Samuel Yuster, and two of his students, Sidney Loeb and Srinivasa Sourirajan, trying to find a way to extract pure water from salt water, produced a synthetic membrane from cellulose acetate polymer. The membrane rejected the salt, but let the water pass. The operating pressures of the membrane ranged from 800 to 1,000 lb/in² for sea water and 200 to 400 lb/in² for brackish water. Today reverse osmosis is the most efficient way of ridding both salt and fresh water of impurities. And, as maple syrup producers have found out, an efficient way of capturing them.

Straight from the tree, sap has a sugar content of 2 percent; to increase the content to 67 percent (or, to turn sap "into thick, sweet syrup that piques the palate"), producers must reduce the water. "Reverse osmosis," Burton says, "is a process we do with the sap before it even gets to the evaporator. What we do is discard the water and capture the impurities – we want the impurities, the sugar. What happens when you filter the sap is you go from 2 percent sugar content to 4 percent; then if you filter it again, you go from 4 percent to 8 percent. Some producers are even going from 8 percent to 16 percent before it goes to the evaporator."

According to Dr. Timothy Perkins, director of the Proctor Maple Research Center at the University of Vermont, reverse osmosis uses pump-generated pressure to push water through a membrane in a high-pressure chamber. "The sugar in sap can't pass through the pores in the membrane, so it's retained and concentrated; however, the water does pass through the membrane and is discarded or used for washing or rinsing cycles." Perkins says reverse osmosis pressure vessels generally work under a maximum pressure of 200 to 300 psi, though that can vary greatly depending on the vessel and membrane.

Reverse osmosis as a viable method for the concentration of sugar in sap was first tested in 1966 at the USDA Maple Research Laboratory. The first reverse osmosis system was installed in 1971; by the early eighties, a total of about 100 machines were operating in Canada and the US.

Something producers need to be wary of when using reverse osmosis is the contamination of the membrane by microorganisms in the sap. Because sap

DRAWING OFF A BUCKET OF 100% PURE MAPLE SYRUP.

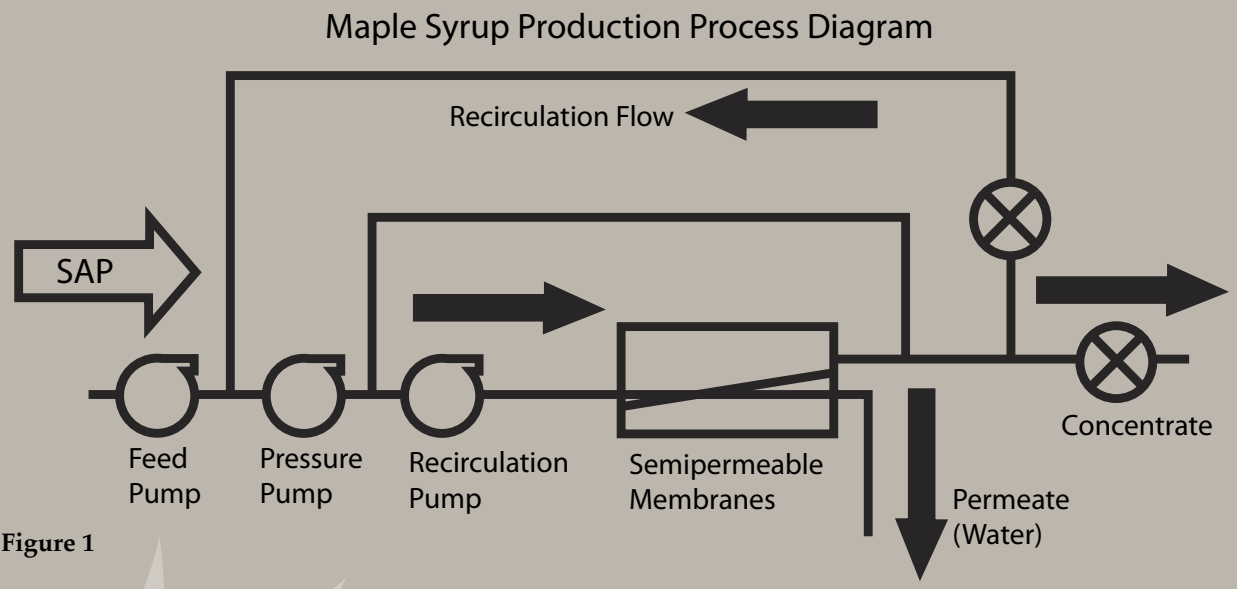


Figure 1

contains sugar, minerals, and amino acids, it's ideally suited for the growth of bacteria, yeast, and moulds, especially in the later part of the season when the weather is warmer.

"Fouling of the membrane," Perkins says, "results in two things: a steady reduction in concentration efficiency of the reverse osmosis machine and an increase in feed pressure to maintain the same concentration production rate, or flow rate. When the membrane gets fouled, it should be washed and then rinsed with permeate "the pure 'waste' water generated in the process rate". The wash and rinse cycles are built into the machine, so the membrane doesn't have to be removed. After it's rinsed, it's ready to go again."

Many producers, however, try to filter the sap as much as possible before it goes into the pressure vessel. One popular way to do this is to use ultraviolet light, successfully tested on sap in 1963 but not implemented until the early eighties. Burton says, "Ultraviolet light will kill most microorganisms in the sap."

After the sap is filtered using reverse osmosis, it's boiled down in an oil- or wood-heated evaporator. Burton's evaporator, a Volcano 2000, is heated by oil. "Our firebox temperature ranges from 1,500 to 2,000 degrees; we can go from cold liquid to boiling in less than two minutes. This past season we increased our Btu efficiency by incorporating two firebrick baffles in the firebox."

Of course the by-product of boiling down the sap is, as Burton says, an "abundant supply" of steam. "We use it to help in other areas of production like preheating fuel oil and sap and cleaning the evaporator and bottling equipment."

However, there are some producers – several near Ontario, Canada, and a few in Vermont and around the US – who use high-pressure steam as an integral part of making syrup. Perkins says: "The benefit is the very even heat and impossibility of scorching the syrup onto the pans. Producers using steam tend to be those with larger operations that can afford the high setup costs of a boiler. Maple syrup packers tend to use steam more often than producers because of the volume of syrup they pack. Those producers and packers who use steam love it."

The reason is that, besides the benefit of not burning the syrup, there are other benefits. According to a report by the Ontario Ministry of Agriculture, Food and Rural Affairs, the benefits include:

- Steam is a constant heat source and offers excellent control of boiling.
- It is easy to pipe steam to wherever you need it in the sugarhouse.
- Most producers find that using high-pressure steam is economical, even less costly for some than using other methods.
- Many producers find it easy to produce high quality maple products with considerable consistency.

So what's the result, finally, of all that work – of tapping trees, of killing microorganisms with ultraviolet light, of capturing impurities with a reverse osmosis pressure vessel, and of cooking sap with a steam evaporator?

"Pure maple syrup," Burton says. "If anything such as corn syrup or cane sugar is added, it's not pure."

He adds, revealing the uncompromising nature of a true artist, "And we produce nothing but 100 percent pure maple syrup."

Call for 2009 Safety Medal Nominees

The National Board of Boiler and Pressure Vessel Inspectors is seeking nominations for the 2009 Safety Medal Award. This award, the highest honor bestowed by the National Board, will be presented at the 78th General Meeting in La Jolla.

To be considered for the Safety Medal Award, letters of recommendation must be submitted by three individuals who are acquainted with the candidate and can attest to his or her safety contributions within the boiler and pressure vessel industry. At least two of the letters must be from National Board members.

Each letter of recommendation should include:

- The name, title, employer, and business address of the candidate.
- A listing of specific candidate contributions or achievements relative to the award.
- A brief biography of the candidate that includes positions held, National Board involvement, and participation in industry activities, including any honors and awards known to the individual making the nomination. (Note: In order to be considered, the candidate must have served on a National Board committee or a nationally recognized standards committee, have participated in National Board activities for not less than 15 years, and been recognized as a contributor to professional organizations related to the boiler and pressure vessel industry.)
- The name, title, employer, and business address of the individual submitting the nomination.

Executive Director Donald Tanner with Mary Walters (center) and her daughter Michelle, who accept the 2008 Safety Medal on behalf of Chuck Walters. *(see story Page 32)*

Letters of recommendation must be received by December 31, 2008, and be addressed to the Executive Director, The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229.

Call for Presentations Announced for 78th General Meeting

The National Board of Boiler and Pressure Vessel Inspectors has announced a call for presentations to be delivered at the 78th General Meeting, May 11-15, 2009, at the Hyatt Regency La Jolla, in La Jolla, California.

The General Meeting is conducted each year to address important issues relative to the safe operation, maintenance, construction, repair, and inspection of boilers and pressure vessels.

To be considered, presentations should address one or more aspects of the aforementioned subject areas and should be limited to 30 minutes. Additional subject areas may include safety valves as well as other unit components, testing codes and standards, risks and reliability, and training. Presentations of a commercial or promotional nature will not be accepted.

Those interested in submitting presentations for consideration should send an abstract of no longer than 200 words in English (do not include supplementary materials) to: Paul Brennan, Director of Public Affairs, The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229. Submissions must be postmarked by November 1, 2008. Abstracts may also be emailed to *pbrennan@nationalboard.org* by November 1.

Speakers chosen to deliver General Session presentations will be notified by November 30, 2008. Each will receive one complimentary National Board registration packet, which includes one ticket to the Wednesday Banquet, as well as entry to the General Session, all guest activities, and General Meeting receptions. It is requested that speakers assume their own travel and hotel expenses.

All speakers will be required to submit a paper for publication. Submission due date is January 31, 2009.

Wayne Brigham

Chief Boiler Inspector, New Hampshire

Within the universe, Wayne Brigham firmly believes there is a natural order of things. And it goes well beyond the yin and yang thing.

"People must go through a variety of life experiences in order to achieve certain personal and professional growth and satisfaction," he observes with a nod.

Waxing philosophic is not the New Hampshire Chief Boiler Inspector's forte. But having sustained an employment history of impressive dimension, he feels eminently qualified to provide both the play-by-play and color commentary of his hypothesis.

"Professionally," he notes, "I have accumulated a lot of experience where each job I've had has prepared me for the next phase of my career development."

Wayne's journey to head a jurisdictional boiler program all began in his hometown of Groveton, New Hampshire. A region known for an abundance of paper mills, a young Wayne Brigham would be raised by a mother and father both employed in the paper industry.

"It was a great community and a fun place to grow up," Wayne agrees with fond recollection. "We played baseball in the summer and skied during the winter." Unlike winters found in other parts of the country, the cold in northern New Hampshire was particularly harsh. "I can remember only one day we didn't have school and that was because the tires on our school buses were frozen to the ground."

Photography by Louis H. Foisy

Following Wayne's sophomore year, the Brigham family moved 160 miles south to Nashua. During his junior and senior years, the future New Hampshire official worked part-time at a local garage where an interest in mechanics evolved. "I really had no desire to attend college immediately, but I was interested in becoming a heavy equipment operator," he recalls.

Following high school, Wayne went to work for a Nashua chemical plant where he discovered an interest in electronics. Wayne

supplemented his curiosity by enrolling in a machine practices night course before going on to study electrical engineering.

And then opportunity knocked. The Groveton native answered an emergency call one evening requesting his presence at the chemical plant. "It was shut down because of an electrical malfunction," Wayne recollects. "Management thought I might be able to do something."

The problem involved boiler controls or as Wayne puts it, "an area of electronics where I knew just enough to be dangerous."

As a result of his vocational training, the future chief inspector was able to correct the trouble – an event that prompted the company to start a boiler department of which Wayne would soon be a part. Having limited understanding of boiler operation and maintenance, the state official began researching pressure equipment by scouring libraries and borrowing books from co-workers and attending Peterson's School of Steam and Engineering. "From that point on," he recollects, "I was hooked on boilers."

And perpetually on call. "It got to the point I was receiving quite a few phone calls in the middle of the night," Wayne laments. "One evening I received a midnight call and agreed to return to work. I was so tired I fell asleep with the phone in my hand and never did get to the plant."

It was during his tenure at the chemical company Wayne married Cheryl, a young lady who was "the best friend of my best friend's girlfriend." As the New Hampshire inspector explains: "We met during my high school graduation and have been virtually inseparable for nearly 43 years."

Following his seven-year career at the chemical company, Wayne accepted a position in the engine room of the Anheuser-Busch Inc., in Merrimack, New Hampshire. It was here he made a rather startling declaration. "I told my counterparts I would never become a boiler inspector," he laughs. "I disliked the idea of crawling in and out of small spaces."

Another dislike that surfaced at this plant was the long rotating shifts. "I had two young kids and I came to the conclusion I would never see them grow up," he reveals.

That "wake-up call" prompted the Groveton native to search for other work. What he found was a position with Hartford Steam Boiler (HSB) as, you guessed it, an in-service boiler and pressure vessel inspector.

Wayne's tenure with the insurance giant lasted 14 months before he made application to fill a vacant inspector position for the state of Wisconsin. But any hopes he had for landing the position were dashed when he opened a response from the jurisdiction explaining the job had been filled. Three days later he received a call from Wisconsin asking if he was still interested in the position. Within a month, Wayne packed up Cheryl, his two kids, and mother-in-law, and moved west.

Wayne had been toiling in the Dairy State for three years when he received a phone call from the chemical plant back in Nashua. His old associates implored the New Hampshire inspector to return to the facility as plant engineer. Anxious to get back home, Wayne and his family again moved half way across country. When the position didn't live up to Wayne's expectations, he joined the Home Insurance Company as a boiler/machinery inspector.

The following 15 years proved enjoyable for the state official as his work brought him into close contact with a number of utilities and paper mills in the region. Having achieved the position of boiler/machinery consulting supervisor, Wayne received word HSB was purchasing his company.

Despite Wayne's reluctance to return to HSB a second time, the company hired him to perform inspection services in the New England region. He served in the position for three years before joining Commercial Union Insurance as a boiler/machinery inspector.

When Commercial Union was bought out by HSB, Wayne again found himself in the employ of one of the country's oldest insurers – for a third time!

In March of 2000, the Groveton native began receiving calls from the state of New Hampshire regarding a vacant chief boiler inspector's position. "We talked over a period of about 10 months before I agreed to take the job," the state official recalls.

Wayne Brigham became chief inspector in January of 2001. Now in the position seven years, he and an assistant inspector divide the state territorially to oversee the jurisdiction's 30,000 boilers and pressure vessels.

Having counted several interesting jobs during his career (including three with the same company and two with another), Wayne savors the roles he and Cheryl have assumed in the cosmos. "God blessed us with three children, health, eternal security, and each other. I even have some extra time for my passion for Civil War History, financial consulting, woodworking, and my classic car ['86 Chevy Monte Carlo with a '67 .327 Corvette engine]."

Given Wayne's accumulation of life experience, what does the next phase of his career development portend?

"Whatever it is," Wayne says with a wink, "it doesn't involve retirement!" ✪

Diehl, Nagpaul, and Neumann Elected as Honorary Members

Two former chief inspectors and a past advisory member were recognized as National Board Honorary Members at the 77th General Meeting.

Honorary membership is bestowed for dedicated service to both the industry and to The National Board. A candidate must have served either as a member of The National Board for six years or the Advisory Committee for six years or meet other criteria showing a demonstrated contribution to the objectives of The National Board.

Myron Diehl is former chief boiler inspector for the state of Maryland and was elected to National Board membership in 1988.

Mr. Diehl joined the state after working for Hartford Steam Boiler I&I, as well as Industrial Risk Insurers.

Prior to starting his professional career, Mr. Diehl spent four years in the US Navy. He also served in the US Army Reserve.

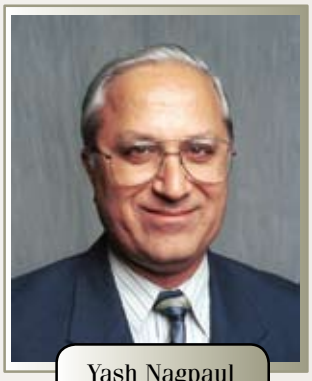
Mr. Diehl holds National Board Commission No. 8860 with "A," "B," and "T" endorsements.

Myron Diehl

Former National Board Member Yash Nagpaul served with the Hawaii Department of Labor and Industrial Relations and became a National Board member in 1992.

Mr. Nagpaul began his career with Hindustan Steel in India as a junior operator trainee. He then became an assistant engineer for Amartara Plastics in Bombay, India. From 1974 to 1980, he worked as a boiler controller in Punjab, India, and then became a boiler inspector for the state of Hawaii. From 1985 to 1991, he was a supervising boiler inspector for the state of Hawaii before becoming a chief inspector.

Mr. Nagpaul was graduated from Rourkela Sc. College in Rourkela, Orissa, India. Mr. Nagpaul holds National Board Commission No. 9959 with "A" and "B" endorsements.

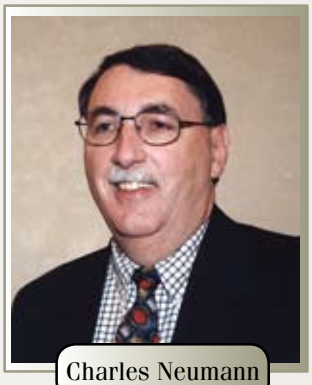


Yash Nagpaul

Charles A. Neumann is a former National Board advisory committee member. Appointed in 2000 to fill a vacant position, Mr. Neumann went on to be reappointed for two more three-year terms until he resigned in 2007.

Representing boiler and pressure vessel users, Mr. Neumann was a quality assurance manager at Eastman Kodak Company in Rochester, New York.

The former advisory committee member was graduated from Syracuse University in 1973 with a degree in civil engineering. He also holds professional engineering licenses in the states of New York and Colorado.



Charles Neumann

Timothy Stewart Joins National Board

Timothy Stewart has been elected to the National Board representing Montana. He is chief boiler inspector for the Department of Labor and Industry.

Mr. Stewart was employed from 1983 to 1993 by Basic American Foods in Idaho as a boiler operator before becoming a line foreman. He continued in that capacity until 1995, when he left to work for the state of Montana. Mr. Stewart has served as a boiler inspector for the state of Montana for the past 13 years.

Residing in Fort Benton, he holds National Board Commission No. 13341. He and his wife Debbie have five children, Clint, Krista, Ryan, Matthew, and John.

Timothy Stewart

Douin, Given, and Krasiun Elected to Board of Trustees


David Douin

National Board members reelected David A. Douin chairman of the board. He will serve a three-year term.

Mr. Douin is superintendent and chief inspector for the Illinois Office of the State Fire Marshal, Division of Boiler and Pressure Vessel Safety. He was elected to National Board membership in 1990.

Appointed to the Board of Trustees in 1997 as second vice chairman, Mr. Douin was installed as chairman in 2001.

Mr. Douin has more than 30 years' experience in the boiler and pressure vessel industry. Before his current position, he served as both assistant superintendent and boiler safety specialist for the Division of Boiler and Pressure Vessel Safety, joining the state in 1982. Previously, he was a boilermaker mechanic for more t han seven years.

Mr. Douin holds National Board Commission No. 9943 with "A" and "B" endorsements.


Jack Given

National Board members elected Jack Given member at large of the Board of Trustees at its meeting in Vancouver, British Columbia. He will finish out one year of a three-year term left vacant earlier this year.

Mr. Given is chief boiler inspector for North Carolina Department of Labor, Boiler Safety Bureau. He was elected to National Board membership in 2003.

Before becoming chief inspector, Mr. Given worked for the state as a boiler and pressure vessel inspector four years from 1974 to 1978. He then worked for Kemper Insurance and Ebasco Services from 1978 to 1982 before joining Carolina Power and Light in 1982, remaining there for 14 years. In 1996 he returned to the North Carolina Department of Labor as assistant bureau chief before becoming chief in 2003.

The board member also served in the US Navy from 1966 to 1974 and the North Carolina Army National Guard from 1975 to 1980.

Mr. Given holds National Board Commission No. 7632 with "A," "B," "I," "N," and "NS" endorsements.


Brian Krasiun

Brian Krasiun, chief boiler inspector for the province of Saskatchewan, has been elected as a Board of Trustees member at large. He will serve a three-year term.

Mr. Krasiun has been employed as Executive Director and Chief Inspector, Licensing and Inspections with the Saskatchewan Ministry of Corrections, Public Safety, and Policing since 2005.

Before becoming chief, Mr. Krasiun was employed for 10 years in the design office and served as a field inspector with the government of Saskatchewan. From 1996 to 2005, he worked as manager of codes and standards compliance with boiler and pressure vessel safety.

Mr. Krasiun holds National Board Commission No. 11562 with "A," "B," and "N" endorsements.

Common Misconceptions When Applying Code Rules

BY PATRICK M. NIGHTENGALE,
SENIOR STAFF ENGINEER, TRAINING SPECIALIST

I like to believe when errors occur or an activity is incomplete, the underlying reason is lack of knowledge or a misunderstanding regarding the requirements.

This is particularly true during the design and fabrication of Section VIII, Division 1 pressure vessels. Knowledge and application of the ASME Code requirements is essential to achieve compliance. What follows are some common areas where misunderstandings have been identified.

Identification of Design Loadings

Paragraph UG-22 identifies a series of loadings "to be considered in designing a vessel." The most obvious load that always occurs is addressed in UG-22(a), internal or external design pressure. If we didn't have pressure, we wouldn't have the need to go any further. Likewise, UG-22(b) would typically apply for vessels containing liquids and/or subject to hydrostatic testing. But how are other UG-22 loadings identified and addressed? Such loadings include superimposed static reactions from the weight of attached equipment, the effect of wind, seismic events, and cyclical loads.

The surest way to identify these loads is for the vessel designer to ask the end user to provide details. For example, if a vessel is to be located indoors, there would be no need to design for wind loads. The design of a vessel to be installed in an active earthquake zone such as the Pacific Rim may need to consider the effect of seismic activity. However, if the end user is installing the pressure vessel as part of a system mounted on a spring-loaded base, the vessel designer doesn't need to plan for seismic events.

Remember, the ASME Code doesn't require the vessel to be designed for all these loadings, but does require all loadings "be considered." Evidence of this consideration is required to demonstrate compliance. Evidence may take the form of a statement such as loadings beyond those addressed in UG-22(a) and (b) do not apply, or such as a list of all loadings with a mark next to the loadings that apply, along with a description of their limits. Other methods that address these requirements may also be developed and used.

Joint Efficiencies for Seamless Shell Sections and Formed Heads

A prevalent problem when assigning joint efficiencies to vessel design calculations is the belief that when a shell section or formed head is seamless, the joint efficiency used in the design formulas must be 1.0 (for shells, see UG-27; for heads, see UG-32). This assumption will not meet the ASME Code unless further requirements are met. As stated in Paragraph UW-12(d), the joint efficiency to be used in the design calculations for seamless vessel sections and heads is 0.85 unless these items are joined using certain joint types and by performing spot radiography as described in UW-11(a)(5)(b). When these additional requirements are met, an efficiency of 1.0 may be applied.

This value may be even lower for hemispherical heads. Section VIII, Division 1 treats a hemispherical head differently when compared with other formed heads such as torispherical and ellipsoidal. A seamless hemispherical head, from the ASME Code's point of view, is never seamless. This is illustrated by the UG-32 symbols, which state the efficiency "E" value of a hemispherical head shall include the head to shell joint. The joint efficiency of the head is directly influenced by the joint type and degree of radiography selected to join the head to the shell. For example, a hemispherical head joint efficiency "E" would be 0.7 if attached to the shell using a type 1 joint with no radiography (per *column* c of Table UW-12).

The bottom line is this: according to UW-12(d), the joint efficiency for seamless vessel sections and heads cannot be 1.0 unless spot radiography is performed in conjunction with

limits on joint types within specific joint categories. A hemispherical head is not considered seamless in accordance with UW-12(d) because of the definition of "E" in UG-32. The joint efficiency of a hemispherical head is established by joint type and degree of radiography of the head to shell joint.

Flange Pressure Class Designations vs. Flange Working Pressure

A fairly common misconception when selecting ASME B16.5 flanges is that a 150-pound flange is rated for 150 psi, a 300-pound flange for 300 psi, etc. This is a perception problem that may lead to a code violation.

Flange ratings are not specified in "pounds," although it is common in industry to hear them referred to in this way. ASME B16.5 flanges are specified by "class." The accurate description would be 150 class, 300 class, etc. The maximum working pressure of a flange is a function of the maximum design temperature to which the flange is exposed (see Figure 1). For example, if a 150-class flange is used in service at maximum temperature of 200ºF, the maximum working pressure is 260 psi. If the maximum temperature inservice is 650ºF, the maximum working pressure is only 125 psi.

So, what is the maximum pressure that may be applied to a flange? First, get the correct edition of ASME 16.5 as referenced in Table U-3 of Section VIII, Division 1. Then select the appropriate material table based on the material grouping. Identify the maximum temperature from the drawing or design calculations. Only then will you be able to determine the maximum working pressure for a flange.

ASME Welding Procedures Qualified Using ASTM Base Metal

ASME Section IX requires welding procedures be qualified for a variety of essential variables, one of which is base metal. In order to reduce the number of qualification tests, base metals with comparable characteristics are assigned P-Numbers (see QW-420.1). QW-424 describes the relationship between various base metal combinations used to weld procedure qualification coupons and the corresponding base metals permitted for production welding. QW-424 also directs the reader to table QW-422 for the assignment of P-Numbers. P-Numbers are not assigned to ASTM metals and are therefore considered "unassigned metals."

A code compliance problem occurs when the Procedure Qualification Record (PQR) records an ASTM metal used for the procedure

Figure 1

Table F2-1-1 Pressure-Temperature Ratings for Group 1.1 Materials

Nominal Designation	Forgings	Castings	Plates
C-Si	A 105 (1)	A 216 Gr. WCB (1)	A 515 Gr. 70 (1)
C-Mn-Si	A 350 Gr. LF2 (1)		A 516 Gr. 70 (1), (2)
C-Mn-Si-V	A 350 Gr. LF6 Cl 1 (4)		A 537 CL 1 (3)
$3^{1/2}$Ni	A 350 Gr. LF 3		

Working Pressures by Classes, psig							
Class Temp. °F	150	300	400	600	900	1500	2500
-20 to 100	285	740	985	1480	2220	3705	6170
200	260	680	905	1360	2035	3395	5655
300	230	655	870	1310	1965	3270	5450
400	200	635	845	1265	1900	3170	5280
500	170	605	805	1205	1810	3015	5025
600	140	570	755	1135	1705	2840	4730
650	125	550	730	1100	1650	2745	4575
700	110	530	710	1060	1590	2655	4425
750	95	505	675	1015	1520	2535	4230
800	80	410	550	825	1235	2055	3430
850	65	320	425	640	955	1595	2655
900	50	230	305	460	690	1150	1915
950	35	135	185	275	410	685	1145
1000	20	85	115	170	255	430	715

qualification coupon and the Welding Procedure Specification (WPS) lists base metals permitted to be welded during fabrication as one P-Number welded to another P-Number.

When a welding procedure is qualified using an unassigned material per QW-424, the base metals listed on the WPS are limited to the same weld coupon material specification identified on the PQR. When a PQR lists the weld coupon material as ASTM, the WPS cannot list any P-Number weld metals.

UG-10 describes methods to convert ASTM materials to a corresponding SA or SB specification. Table ED-1 of ASME Section II, Parts A and B provides equivalency of ASTM materials to SA or SB materials. To use these provisions, the specification year used to produce the ASTM material is required and is included on the material certification issued by the material manufacturer.

Temporary Tack Welds

Tack welds seem to be thought of by many as something less than a real weld. You may ask a welder to see the qualified WPS for the tacks welds. The welder may say, "I didn't use one because it's only temporary. I'm going to remove them soon." Or when performing a fit-up inspection, you observe a cracked tack weld and bring it to the attention to the welder. The welder may say that's OK. It will re-melt and re-fuse by the heat generated from the next pass.

According to UW-33(c) of Section VIII, Division 1, "tack welds whether removed or left in place shall be made using a fillet or butt weld procedure qualified in accordance with Section IX." Additionally, "defective tack welds shall be removed."

Most welders and many QC inspectors have never seen an ASME Code book. To achieve compliance, these requirements need to get out of the code book and into the workplace, where they need to be understood by those performing welding or inspecting the work. Requirements for installation, end preparation or their removal could be included on documents such as process control sheets, drawings, and/or fabrication procedures.

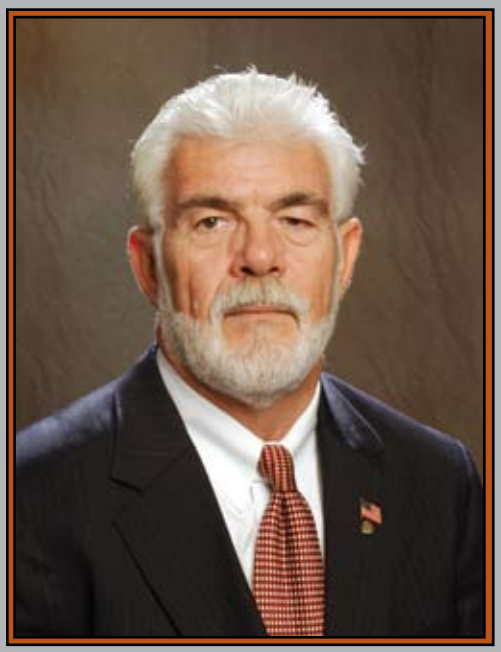
Conclusion

It's safe to say it can be challenging to find and understand requirements within the ASME Code. The more you use the code books, the more you can learn. This can be accomplished either by direct reading and comprehension or by reading and then questioning just exactly what the requirement may mean.

Once an understanding has been reached, you need to ask yourself how the requirements will be implemented. Methods include adding documented controls to the Quality Control Manual or developing an implementing procedure or instruction appropriate to the user.

Once the methods have been established, you need to decide what means will be used as evidence that the activity has been performed as appropriate and that the results are acceptable. Sign offs on process control sheets, forms, records, reports, or other documented measures provide tangible evidence the activity was addressed as appropriate and the results reviewed and ultimately approved as meeting the ASME Code.

Safety Medal Recipient Honored at General Meeting



Former National Board Member and staff member Charles Walters was posthumously awarded the 20th National Board Safety Medal. Accepting the award for him was Mr. Walter's wife Mary and daughter Michelle (see page 29).

The National Board's most prestigious award, the Safety Medal is awarded each year to an individual based on his or her extensive experience and commitment to safety in the boiler and pressure vessel industry.

A native of Southern California, Mr. Walters joined the US Navy in 1964 and was honorably discharged in 1971. He began his career as an inspector for the state of Oregon in 1974 and was named chief boiler and elevator inspector four years later. In 1986, he became a member of the National Board field staff performing ASME joint reviews and nuclear surveys primarily in Asia, Canada, and South America.

In 1997, Mr. Walters joined headquarters staff in Columbus, Ohio, as assistant director of inspections. He assumed the position of director of inspections in April 2006. Mr. Walters celebrated 20 years with the National Board in August 2006. Along with Mary and Michelle, Mr. Walters is survived by three other daughters and eight grandchildren.

Connie Luckeydoo

Administrative Coordinator

Photograph by Greg Sailor

In part, perhaps, because of the 1943 movie *Lassie Come Home* and the TV show *Lassie*, which ran from 1954 to 1973, the collie is one of the world's most recognizable breeds. It's also one of the most popular. National Board employee Connie Luckeydoo and her husband Pete just love them; in fact, they love three of them.

"Twelve years ago," she says, "I bought my first collie, Buddy, and immediately became hooked on the breed. We lost him in March to infirmities of old age. We now own three adopted rescue collies. There's Morgan, who's nine; Marley, who's eight; and Callie, who's five. We've had Morgan three years, Marley since Christmas, and Callie for two months."

Connie and Pete got their collies from Tri State Collie Rescue (TSCR) in Lewis Center, Ohio. TSCR is a group of concerned volunteers who seek to promote the welfare of the collie breed (*tristatecollierescue.net*). Two of those volunteers are Connie and Pete, who've been volunteering since December. "For about a month we fostered two collies until they were adopted," she says. "We make terrible foster parents, as we want to adopt them all. However, after summer, we're going to foster another collie. It's rewarding seeing them go to loving homes."

Before coming to The National Board in March 1994, Connie worked for many years as a customer service representative for a bank. At the Board she's been the receptionist and worked in the data report department. In 1998 she moved to the authorization department, where she now works as administrative coordinator. Her duties include issuing certificates of authorization to register to manufacturers so they can register ASME Code vessels and keeping those data reports on file. "One of the things I love about my job is getting to interact with people from companies all over the world."

Pete, who's retired, is—read this slowly—Connie's sister's husband's brother. "So my sister," Connie says, "is also my sister-in-law." Connie and Pete live on two acres in Hebron, Ohio. They have two children, Rob, 30, and Amy, 29 (Connie also considers Rob's wife Beth "one of her kids"), and one grandchild, Amy's son, Andy, 10.

Besides her fondness for collies, Connie has a fondness for history. "I like to read about the Civil War. I collect biographies and journals and visit Civil War sites. I've been to Gettysburg three times, Savannah twice, and Vicksburg once. I almost feel like I lived a prior life." The Civil War figure she finds most interesting is Confederate General James Longstreet. "He was blamed for the defeat at Gettysburg, but it really wasn't his fault. Postwar politics made him a very misunderstood individual."

But it's not only U.S. history Connie finds fascinating—it's also her own. "I love genealogy. So far, I've traced my dad's side of the family—the McLaughlins—back to Ireland in the 1600s." She does research online, at libraries, county courthouses, and the Ohio Historical Society in Columbus.

One of her ancestors, her great-great-grandfather McLaughlin, almost fought in the Civil War, but got out of it. "He married the only daughter of a doctor. As a wedding present to his daughter, the doctor paid the $300 commutation fee to buy his son-in-law out of the war. So I'm still searching for an ancestor who fought in the war. One day I'd like to see our grandson portray him in Civil War reenactments." ✪

"Do You Know . . .?" is a BULLETIN *feature introducing readers to the dedicated men and women who comprise the National Board staff.*

CSD-1

Back Online and Better Than Ever

BY KIMBERLY MILLER, MANAGER OF TRAINING

Controls and Safety Devices for Automatically Fired Boilers – otherwise known as CSD-1 – is the first standard The National Board will cover with its newly remodeled online training program.

The first online training course ever launched on The National Board Web site in March 2004, CSD-1 was the logical choice to be the first course offered with the revival of National Board online training. Meant to provide students with an overview of the code, the newly redesigned course provides students an interactive guide through the requirements of the standard. Whether an individual is responsible for the installation of such equipment, for its day-to-day operation, or for its inspection to ensure compliance, this online training course is a great place to turn to gain knowledge and stay abreast of what is necessary for the proper installation, use, and inspection of boiler controls.

As before, this course is self-paced and accessible from home or office at any time. The course consists of six modules, one for each Part of CSD-1. Within each module the student will find not only the specific requirements of CSD-1 but also case studies and examples of why this code is so important to the safe operation of boilers. More interactive than its predecessor, the new course also contains more graphics and photographs to illustrate the different types of controls and safety devices covered by the standard.

Currently, each Part of the National Board Inspection Code is "under construction" and will be available within the next several months.

As students maneuver through the virtual pages of CSD-1, they are stopped along the way for "Knowledge Checks." These short quizzes are used to underscore what has been learned to that point within each module. And if answered incorrectly, a reference back to the pertinent code paragraph is provided for a quick refresher.

Upon completion of all six modules students may opt to take the final exam. The exam is offered to assess the knowledge gained from the course through a series of 16 questions. After the last question is answered and the exam is graded, a pop-up screen appears to provide the exam results. This window shows which questions were answered correctly and the proper answer for those that were not. Not only does this offer students immediate feedback on the exam, and in turn their knowledge of the code, but it may also be printed to show successful completion of the training.

It's that simple.

And CSD-1 is just the beginning! Currently, each Part of the National Board Inspection Code is "under construction" and will be available within the next several months. These three new courses will provide easy access to the NBIC for those interested in learning just one Part or the entire book from their own computer on their own schedule.

Stay tuned for more details!

ENDORSEMENT COURSES

(A) **Authorized Inspector Course —**
TUITION: $2,500
December 8-19 March 9-20, 2009

(B) **Authorized Inspector Supervisor Course —**
TUITION: $1,250
January 26-30, 2009

(C) **Authorized Nuclear Inspector (Concrete) Course —**
TUITION: $1,250
October 27-31

(I) **Authorized Nuclear Inservice Inspection Course —**
TUITION: $1,250
September 29-October 3

(N) **Authorized Nuclear Inspector Course —**
TUITION: $1,250
March 23-27, 2009

(NS) **Authorized Nuclear Inspector Supervisor Course —**
TUITION: $1,250
November 3-7

CONTINUING EDUCATIONAL OPPORTUNITIES

(PEC) **Pre-Commission Examination Course —**
TUITON: $2,500.00 Full two-week course
November 10-21 Febuary 10-27, 2009
Pre-Commission Examination Course —
$1,190 Week 2 of course
November 17-21

(RO) **Boiler and Pressure Vessel Repair Seminar —**
TUITION: $400
October 27-28 February 10-12, 2009

(VR) **Repair of Pressure Relief Valves Seminar —**
TUITION: $1,250
December 1-5 March 2-6, 2009 (Texas)

(WPS) **Welding Procedure Workshop —**
TUITION: $670
October 29-31 March 3-5, 2009

REGISTRATION FORM

Please circle the seminar/course(s) and date(s) you wish to attend. Please print.

☐ Mr. ☐ Ms. ☐ Mrs.

Name* _____

Title _____

Company _____

Address* _____

City* _____

State/Zip* _____

Telephone* _____

Fax _____

Email* _____

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PAYMENT INFORMATION (CHECK ONE):

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☐ VISA ☐ MasterCard ☐ American Express

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Expiration Date _____
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***Required**

HOTEL RESERVATIONS

A list of hotels will be sent with each National Board registration confirmation.

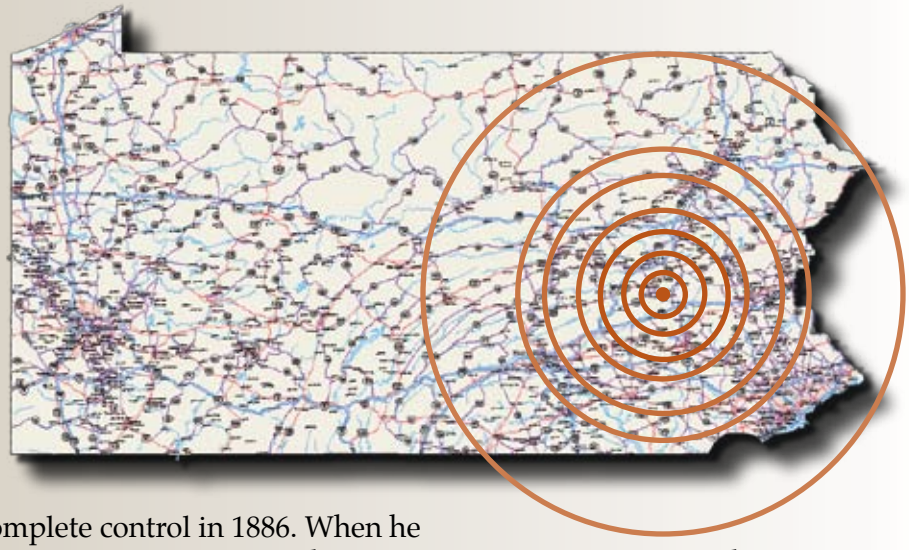
All seminars and courses are held at the National Board Training and Conference Center in Columbus, Ohio, unless otherwise noted, and are subject to cancellation.

For additional information regarding seminars and courses, contact the National Board Training Department at 1055 Crupper Avenue, Columbus, Ohio, 43229-1183, 614.888.8320, or visit the National Board Web site at nationalboard.org.

Rise and Fall in Northumberland

Northumberland, Pennsylvania

Vintage 1908 Postcard



The scrawl across the lower middle of the postcard reads, "VANALLEN [SIC] IRONMILL AFTER EXPLOSION of BOILER NO. 5. NORTHUMBERLAND, PA."

Having been laid out in 1772, the town of Northumberland, by the late nineteenth century, was well-established in a variety of industries. The Van Alen nail mill was one of its most thriving, yet seemed destined to fall.

The mill was owned by T.O. Van Alen, who purchased part of it in 1872 and gained complete control in 1886. When he first took over, the mill operated only five puddling furnaces, one coal-heating furnace, and 15 nail machines. Within a few years, it operated 10 puddling furnaces, one three-ton gas-heating furnace, and 53 nail machines and could make 155,000 kegs of cut iron and steel nails per year. Business was going well for Van Alen, but in 1895 the mill was destroyed by fire.

Not to be deterred, Van Alen moved his operation to an old mill on Duke Street, where he enjoyed prosperity for more than 20 years. Then, in 1908, boiler No. 5 exploded, killing eight men and reducing Van Alen's mill, again, to rubble.