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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The USS *Bennington* was destroyed by a boiler explosion off the coast of San Diego. The story of its 100th anniversary can be found on page 12.

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Safety: Protection Through Inspection

BY DONALD E. TANNER, EXECUTIVE DIRECTOR

There are three words that describe the very essence of what the National Board is all about: *Protection Through Inspection*.

We liked this phrase so much in 1999 that we used it as a title for a National Board video encouraging audiences to examine the trust placed in those responsible for public safety.

In 2005, the continued relevance of this slogan has not been lost on those of us who are in the forefront of communicating the potential dangers of boilers and pressure vessels. That is why we are dusting it off and designating *SAFETY: Protection Through Inspection* as the theme of the 74th General Meeting, May 9-13, in Orlando.

To articulate this important message, we thought it appropriate to invite an Opening Session speaker who can enlighten our audience with words of inspiration and wisdom that are a product of his own personal experiences. In that spirit, we found an exceptional motivator of men in legendary National Football League Hall of Fame Coach Don Shula (see page 27).

In addition to Coach Shula, the General Session will again comprise an outstanding slate of noted industry professionals — including American Welding Society Executive Director Ray Shook — who will address a variety of timely technical issues.

This year, we are pleased to present another excellent guest program that will appeal to just about everyone who participates. And it all begins Monday afternoon with a short motorcoach trip to SeaWorld, where guests will have an opportunity to tour the popular 200-acre marine life adventure park and attend numerous sea-themed shows and exhibits.

The following day, guests will take another short trip to visit one of Central Florida's most exclusive retail venues: the shops of Winter Park. Following a specially prepared gourmet box lunch, it's off to an adventure of another era. At the Tosohatchee "Florida Trail," participants will take a short eco-walk into the "Central Florida Everglades" and enjoy an exciting airboat tour of the area's breathtaking natural preserves.

Of course we saved the best for last: the all-day Wednesday outing to the Kennedy Space Center. All General Meeting attendees are invited to tour these extraordinary space facilities as well as enjoy lunch with an astronaut. And we'll be back in time to enjoy an evening of music, mirth, and magic during a performance by renowned master magician Giovanni.

I would like to remind those contemplating bringing children that the General Meeting is not a function young people would enjoy. However, understanding the natural attraction of Orlando, we respectfully request no children under the age of 16 accompany General Meeting participants to National Board receptions.

Because this year's General Meeting is conducted at a resort hotel, we encourage participants and guests to dress in a business-casual style for all hotel events except the Wednesday banquet (where ties and jackets will be the evening attire).

If you have not yet made plans to attend this year's General Meeting, please review the descriptive information found on pages 20-31 of this *BULLETIN* issue. Or go to the National Board Web site at *nationalboard.org* where you can both electronically register for the General Meeting and secure your hotel room.

The 74th General Meeting is going to be a great gathering spot for exchanging ideas, absorbing new concepts, and renewing old acquaintances. While it is my hope you will be part of this outstanding international event, it is my particular wish that you will also take home a more profound appreciation for the *SAFETY: Protection Through Inspection* message.

See you in Orlando! ❖

Some "Truths" About Practice and Education in Welding and Joining

by Robert W. Messler Jr.

There are few areas of manufacturing fabrication and assembly in which high quality is more essential than in the production of boilers and pressure vessels. Governed by the ASME Code, every aspect of design and manufacture must follow methodical and meticulous procedures, meet stringent requirements, be supported by rigorous analysis and/or testing, with the end-product being right the first time, every time, whether for one-of-a-kind or multiple units. And, behind every task there must be a properly educated and trained person, whether design engineer, process engineer, test engineer, machinist, welder, assembler, mechanic, technician, or inspector. State-of-the-art knowledge, from formal education and training to on-the-job experience, is critical. To be meaningful, such knowledge must be based on truth. Therefore, to be effective, all education — whether formal or informal — must be ever-aware of the truth, or truths, that underlies a discipline or craft. Truth, not lore, leads to strength in knowledge.

It could be reasonably argued that joining, in general, and welding, in particular, are the most critical processes in the manufacture of boilers and pressure vessels. After all, one of the greatest advancements in boiler safety — as well as in capability — occurred when welding replaced riveting, with every aspect of welding defined by the "Code." Yet it can also be shown that more failures of boilers and pressure vessels (including submarines) occur as the result of faulty welds or improper welding than by any other fabrication-related process. Why do failures, no less catastrophic failures, continue to occur even as knowledge and technology continue to advance? The answer is that underlying knowledge is not always built on real truths.

At least as it pertains to welding and joining, we have either lost track of, never fully understood, or failed to heed some underlying truths, both in the practice of and in the education for welding and joining.

There are seven "truths" that prevail or will inevitably prevail in driving not just boiler and pressure vessel design and manufacture, but all design and manufacture of fabricated products and structures. As such, these "truths" should be recognized and accepted in industry, and articulated and used as the basis for the education of future practitioners destined for industry.

Truth #1 Lack of knowledge application, not lack of knowledge, leads to most problems.

The analysis of failures of a product or a process overwhelmingly reveals the root-cause was avoidable if existing knowledge had only been employed. Rarely do failures arise from previously unknown mechanisms. In welding, probably 98 percent of failures are attributable to solidification hot cracking, hydrogen embrittlement/cold cracking, residual stress, fatigue, or weld-aggravated corrosion — all of which are easily understandable. If we don't apply what we already know, what is the value of knowing any more? We should teach future practitioners to apply what they are taught, and never compromise when the consequences could be devastating.

Truth #2 Poor quality results in practice because high quality is not the basis for reward.

Pay a worker for the quantity of his or her output, and that's what you will get: quantity. If high quality results when quantity is the driver, then either you or the worker is lucky. Workers must be rewarded for what we truly want as their output. That way they know we are serious when we say we care about quality. Education must instill in new practitioners that productivity is a measure of the efficiency with which output of acceptable quality is created, not simply the sheer quantity of output. What teacher considers thicker term papers better than thoughtful ones?

Truth #3 Automated processing will increasingly force the replacement of manual processing.

Increasing sophistication of products, greater demands for better product performance, global competitiveness, and a shrinking pool of skilled tradespeople in societies that place so much emphasis on higher education will continue to force automation to replace, and eventually virtually supplant, manual processing. The good news is that human beings will then — hopefully — be used for their creativity and adaptability, not their utility. Education must focus on teaching how individual processes work, on how complex systems of processes can be integrated, and on the optimization of both. Trouble-shooting, not manipulating, will become the key skill.

Truth #4 For automated processing, over-control is as problematic as under-control.

It is sometimes surprising, pleasing, and disturbing how many people can drive a car and yet know virtually nothing about how cars work. The world's best driver need not be the world's best automotive engineer. In a world dominated by automated processing, process control needs to be robust and simple to the operator. We need to move to a new paradigm of "minimal essential control": just enough to get the job done the way it needs to get done. During the education process, including research and development, we need to understand processes well enough to know what not to do as much as what to do to control them satisfactorily. More processes need to employ what in welding power supplies is known as "synergic control": all essential parameters are pre-set (or otherwise interlocked) for the desired outcome of known operating scenarios. Give a person switches to switch and knobs to turn, and they will switch and turn!

Truth #5 Quality begins as a mindset, and quality assurance cannot be meaningful as an afterthought.

Checking for quality at the end of processing or, worse, leaving it to the customer to check, is unacceptable. Consumers are simply too sophisticated, and all too willing to find quality elsewhere, with no brand loyalty. If we've learned anything about quality, it is that it is not quality that costs money, but lack of quality. Quality begins in design (or hopefully in the formulation of the product to be designed!) and carries through manufacturing, for better or for worse. The ability to monitor quality needs to be embedded, and what is monitored must be what matters, not what is just easy to monitor. In welds, for example, it is easy to monitor voltage, current, and travel speed for an arc welding process, but what is wanted is a sound weld. Why not monitor the outcome and not the inputs? Education must instill quality as a mantra, not just a metric!

Truth #6 Joining will increasingly become an enabling technology, not just a pragmatic process.

As materials increasingly become more highly "engineered" for their functionally specific properties, the products and structures they can be used to create will display greater performance, greater robustness, longer life, and lower cost. But, such materials will have to be joined to create products or structures of great size, complexity, or efficiency, and joining will have to also be "engineered" not simply executed. Young engineers of all disciplines must be formally educated about joining, and research must focus on having joining evolve at least as fast as new materials evolve. Otherwise, of what value will such new materials be?

Truth #7 Joining practitioners will have to become more sophisticated as joining processes become more sophisticated.

The era of the welding engineer who learned solely on-the-job is over, if for no other reason than because of Truth #1. As joining increasingly becomes an enabling technology and not simply a pragmatic process for manufacturing, those who oversee it, as well as those who accomplish it, need to become more sophisticated. In the future, scientists, engineers, and physicians will increasingly replace hard-hatted riveters and helmeted welders. The creation of microelectronics and nanodevices, and the practice of microsurgical limb reattachment and tissue engineering, will depend on joining oversight and execution by a new breed.

Joining is changing because materials are changing. Materials are changing because they must — to meet greater demands of designers and consumers, and because they can, as the result of more sophisticated materials science and engineering. Educators must lead the change as they led the Renaissance. The starting point is recognizing, accepting, and building upon what appears to be underlying truths: 5 of which are universal to all processes, and 2 of which are specific to joining alone.

A great future, as in the past, must be built on truth! ❖

About the Author
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Transport Tank Code Section Focuses on Different Needs

BY CHUCK WALTERS, TECHNICAL PROJECTS ADMINISTRATOR

Throughout the history of the *ASME Boiler and Pressure Vessel Code*, ASME's intended goal has been to develop a uniform set of construction rules that can be adopted by the jurisdictions and promote public safety — thereby reducing the potential for accidents and explosions.

Today, the scope of the Code is expanding to include rules for continued service, repairs, and alterations.

The latest Code to reflect this new direction is ASME Code Section XII, *Rules for Construction and Continual Service of Transport Tanks*. Section XII, like other codes, concentrates on a particular class of pressure-retaining items. Section VIII focuses its requirements on pressure vessels, while Section XII addresses requirements on transport tanks. Included in the definition of transport tanks are cargo tanks, portable tanks, rail tanks, and ton tanks transporting dangerous goods over the highways, and by rail, sea, and air. Each of these tanks is controlled under the Code of Federal Regulations, Title 49, Parts 100 through 185, Transportation. The jurisdictional authority for transport tanks is the federal government under the Department of Transportation (DOT).

Section XII was developed under the concept that transported units have different needs than pressure vessels designed, fabricated, and operated in a fixed location.

Consequently, Section XII was written to recognize different types of design rules and material requirements that would both withstand severe operating conditions and pass the proof of time needed to provide reasonable safety to the general public. Proof of time is based on developing rules for the continued service, repair, and alteration for this pressure-retaining item classification.

In developing Section XII, the committee was charged with the responsibility of blending applicable requirements of Section VIII for the construction requirements of transport tanks with the specific rules, based on Title 49, for new construction and continued service, repairs, and alterations of this equipment. The committee fulfilled its responsibility with the adoption and publication of Section XII, effective April 1, 2005.

In the development of Section XII, some very important concepts had to be considered. These included establishing rules for pressures, temperatures, and design more stringent than Section VIII, Div. 1.

The scope of Section VIII, Div. 1 includes pressures from 15 psi to 3000 psi, whereas Section XII includes pressure requirements from a full vacuum to 3000 psi. Section XII limits both the thickness of these units to 38 mm (1 ½ in.) and the minimum metal design temperature to a range of -269°C to 343°C (-452°F to 650°F). Design requirements are implemented by a system of appendices (called modal appendices) for different classifications of transport tanks. For the purpose of Section XII, "modal" is defined as the transport of bulk packaging for dangerous goods.

Section XII is formatted more in line with Section VIII, Divs. 2 and 3, with respect to each part being specific to an activity. As an example, Section XII Part TG, General Requirements, establishes duties and responsibilities of the manufacturer, owner, user, and inspector, and scope of activities. Section XII Part TD only addresses design requirements. In other words, each part is self-contained and not repeated in any other part of Section XII.

Section XII recognizes three classifications of transport tanks: Class 1, Class 2, and Class 3.

Class 1 transport tanks, operating with pressures in excess of 35 psi, must be inspected by an authorized inspector — and depending upon the medium — in a manner similar to pressure vessels constructed to ASME Code Section VIII, Div. 1.

Inspections of Class 2 transport tanks must be performed by a "Qualified Inspector" employed by a "Qualified Inspection Organization." A Qualified Inspection Organization most likely will be accredited by ASME (to QAI-1). The Qualified Inspector probably will be qualified (certified) by the National Board.

The concept of the Qualified Inspector and the Qualified Inspection Organization is unique to ASME Code Section XII and is not found in other code sections.

Verification that Class 3 transport tanks comply with Section XII requirements is performed by a Certified Individual. A Certified Individual is an employee of the certificate holder who is certified by the certificate holder.

A major strength of this code is that all repairs and alterations to transport tanks are required to be in accordance with the *National Board Inspection Code* (NBIC). This requirement ensures a uniform system for this activity will be maintained. Additionally this system mandates a National Board commissioned inspector will be involved in the inspections of repairs and alterations.

With the publication of ASME Code Section XII, the NBIC Committee established a task group to develop a Nonmandatory Appendix to establish requirements for continued service, repair, and alteration of transport tanks. The task group is made up of representatives from DOT, rail car manufacturers, transport tanks users, transport tank manufacturers, metallurgists, authorized inspection agencies, and jurisdictions.

At the task group's first meeting, it developed the following scope:

> *This appendix is to provide rules for continued service, repair, and alteration of transport tanks (e.g., cargo tanks, rail tanks, portable tanks, and ton tanks) that transport dangerous goods as required in the Code of Federal Regulations, Title 49, Parts 100 through 185 and the United Recommendations of the Transport of Dangerous Goods-Modal Regulations. This appendix, where possible, shall be used in conjunction with Parts RA, RB, RC, and RD of the NBIC and Section XII "Transport Tanks" of the* ASME Boiler and Pressure Vessel Code.

The appendix will establish the appropriate methods to be used for continued service, repairs, and alterations inspection requirements of transport tanks. It will also establish the criteria for inspection, reports, document maintenance, and inspector duties and responsibilities. For the purpose of this appendix, the inspector, depending on the class designation of the transport tank, must be a National Board-recognized individual.

The appendix is divided into two parts. The first part is formatted for inspections such as Part RB of the NBIC. The second part is formatted for repairs and alterations and the methods used such as Parts RC and RD.

With the impending need to satisfy Section XII requirements, the task group has established an aggressive schedule for the adoption of the new appendix.

The scope of Section XII covers manufacturing, examination, inspection, continued service, repair, and alteration, and will, like other safety standards, benefit the general public in transport tank safety. ❖

Inspector Notices

Frequently Asked Questions on "R" and "NR" Accreditation

Q. — What is required when an organization changes its scope from that listed on the certificate of authorization?

A. — The organization must first revise the QC manual. Manual and program changes must then be accepted by an authorized inspection agency (AIA) representative. The organization must submit a revised application to the National Board. If the AIA representative is confident the organization is capable of performing in accordance with the modified scope, he or she may verify acceptance of this change by:

- Signing line 15 on the revised application (NB-12 for "R," NB-163 for "NR"), or
- Submitting a letter accepting the change, or
- Signing the revised manual and submitting a copy of the acceptance page with his or her signature.

Q. — What is the difference between a shop and a field site?

A. — The *National Board Inspection Code* 2003 addendum has defined both terms in Appendix 4. These are:

SHOP – A permanent location, the address of which is shown on the certificate of authorization, from which a certificate holder controls the repair and/or alteration of pressure-retaining items.

FIELD – A temporary location, under the control of the certificate holder, used for repairs and/or alterations to pressure-retaining items. The address is different from that shown on the certificate holder's certificate of authorization.

Webster's Dictionary defines permanent as "intended to last indefinitely." The intent of NBIC's paragraph RA-2130(c) is for each permanent location to have its own certificate.

Q. — When a company changes its business name but everything else stays the same, what is required to get a revised certificate of authorization?

A. — The AIA must acknowledge the inspection agreement with the new name in writing to the National Board.

Q. — When a company relocates its shop to a different city, what is required to get a revised certificate of authorization?

A. — If the AIA stays the same and there have been no significant changes in the management structure (extending from the QC manager to the president) or in the quality program, the AIA must acknowledge the continuation of the inspection agreement. If the AIA has changed or there has been a change in the management structure or in the quality program, a review will be required before a revised certificate can be issued.

Q. — When a company changes its postal code/address, but the location is the same, what action is required?

A. — The certificate holder is required to submit a revised application NB-12. No fee is required.

Q. — When a company changes its AIA, what action is required?

A. — The certificate holder must submit a copy of a cover sheet of the new agreement that lists both the AIA and certificate holder, or a letter from the AIA acknowledging the new agreement.

Q. — When the ownership of a company has changed, but the name and location are still the same, what action is required?

A. — The AIA must submit a letter to the National Board confirming an inspection agreement with the new owner.

Q. — What is the procedure for requesting a certificate of extension?

A. — A guideline for requesting a certificate of extension can be downloaded from *www.nationalboard.org/NationalBoard/Programs/Pdf/R_Program/R_extend.pdf*. Alternatively, a letter describing the details may be submitted. There is a fee for the extension; if granted, the National Board may extend the certificate up to 90 days on a case-by-case basis. ❖

General view of the second and third pass flue tubes at the rear of a boiler with scale build-up.

Fuel Efficiency and the Economic Case for a Jurisdictional Boiler Inspection Program

By Geoffrey M. Halley, P.E.

While the primary purpose of any jurisdictional boiler inspection program is to preserve public safety through the prevention of catastrophic boiler failures that can cause the loss of life, personal injury, or property damage, there are several other key reasons to implement a jurisdictional boiler inspection program.

Higher Boiler Operating Efficiency

During boiler inspection, the inspector checks both the fireside (surfaces exposed to flame and products of combustion) and the waterside (surfaces containing the boiler water). The fireside is inspected for soot formation due to improper combustion, furnace hot spots (which can lead to catastrophic failure), and water leakage at such points as tube joints. The waterside is inspected for scale formation, caused by impurities in the feedwater (primarily deposited salts of calcium and magnesium) and/or improper water treatment, as well as corrosive effects of dissolved oxygen in the feedwater.

Table 1 shows the effects of soot formation on the fireside of a boiler, while Table 2 shows the effects of scale formation on the waterside of a boiler, in terms of the extra fuel used to meet a given load or operating condition.

Table 1 — *Effect of Increasing Soot Thickness in Firetubes on Boiler Fuel Usage*

Soot Thickness (inches)	Average Fuel Loss (%)
1/32	2.9
1/16	7.8
3/32	10.7
1/8	13.6

Table 2 — *Effect of Increasing Scale Thickness on Boiler Fuel Usage*

Scale Thickness (inches)	Average Fuel Loss (%)
1/64	1.5–4.0
1/32	6.0–8.5
1/16	11.0–13.5
1/8	16.0–20.0

Lower Pollutant Emissions

The amount of air pollutants emitted is dependent upon several factors. Of these factors, burner design, burner/furnace compatibility (from the viewpoint of furnace heat release), and fuel selection are set once a boiler installation is operating. With a properly adjusted burner and clean heat transfer surfaces, these factors define the optimum performance that can be expected in terms of operating efficiency, pollutant emissions, and fuel cost. The variables that change with time are the cleanliness of the heat transfer surfaces (soot or scale formation) and the adjustment of the burner. Digressions in burner adjustment are typically the cause for soot formation, and lack of a properly controlled water treatment program is usually the reason for scale formation. Soot formation indicates that improper combustion is occurring, and in all probability that there is an increase in carbon monoxide and particulate pollutant emissions as well. Since the total quantity of pollutants emitted from a boiler installation is directly related to the amount of fuel burned, the amount of fuel burned can be reduced by improvements in boiler efficiency (the amount of pollutants emitted to the atmosphere will also be reduced). Efficiency gains will result in reduced fuel usage to meet a given load demand, therefore lowering total pollutant emissions.

Reduced Fuel Costs

If fuel usage is reduced, the cost of the fuel will be reduced in the same proportion. As an example, if a typical 300 Bhp boiler operates on natural gas at 80-percent capacity for 30 days with a baseline efficiency of 82 percent, then the fuel cost (assuming a gas price of $5.25/Mcf and a high heating value of 1000 Btu/cu.ft.) will be $37,035. If this same boiler is operated with 1/8 inch of scale on the waterside heat transfer surfaces, there will be an increase in fuel usage of 16 percent to 20 percent depending upon the type of scale. Using an average of 18 percent, the new cost of fuel will be $43,701. Cleaning the heating surfaces back to their original as-new condition will yield potential savings of $6,666 over a 30-day period. If a boiler is firing oil and has both sooting and scaling conditions, then savings could be even more impressive.

Close-up view showing how scale has flaked off the flue tubes due to overheating. This was caused by the debris-filled water legs considerably reducing the effectiveness of the primary heat transfer surface area (furnace).

Firebox boiler with rear half of outer wrapper cut away showing water leg filled with scale debris, indicating inadequate maintenance. Boiler was said to be no longer capable of carrying the load of a school building.

Reduction in Unscheduled Outages

Unscheduled boiler outages are typically the result of poor maintenance procedures and/or neglect. Typically this type of event can cause problems such as the shutdown of schools or factories, or in extreme cases loss of life or major property damage. There are many instances in today's industrial environment in which a boiler supplying steam to a process is given much lower priority in terms of maintenance dollars than other equipment involved in the process. The reasoning is that while the process may be completely dependent on the boiler, the boiler does not actually produce product.

Reduced Possibility of Carbon Monoxide Issues

A major cause of fatalities related to the use of combustion equipment is carbon monoxide poisoning. Many times this is the result of improperly installed or modified flue gas venting systems (stacks and breechings) and/or improper combustion air supplies. Deterioration of the venting system over time due to the corrosive effects of flue gas condensation may also be a factor.

On the combustion air delivery side, it is not unusual to see improperly sized air intake openings, partially or totally blocked air intakes, or exhaust fans added in the interest of boiler room comfort, all of which can contribute to the generation of excess carbon monoxide.

In an ideal situation, a burner should be set up to burn in a manner that produces the least amount of carbon monoxide. However, some tradeoffs have been necessary regarding the generation of carbon monoxide caused by the lower flame temperatures required to reduce NOx emissions. The present legal limit in many jurisdictions is 400 ppm of carbon monoxide. This amount of carbon monoxide, should it be allowed to leak into and concentrate in occupied areas, has the potential to cause health problems over time.

While there are a number of larger industrial boiler facilities with well-run maintenance and inspection programs, there is a much larger population of smaller facilities operated by personnel with little or no knowledge of boilers and their maintenance and inspection requirements. Although all boiler facilities will benefit from a jurisdictional boiler inspection program, it is this latter group that benefits most. A jurisdictional boiler inspector's annual review of a boiler installation will help in identifying and eliminating potential areas of concern, will aid the boiler owner in avoiding what can be a very expensive situation, and will promote fuel savings. ❖

About the Author: Geoffrey Halley, P.E., has worked in the aerospace, nuclear, and boiler industries. He spent 18 years working in the areas of boiler R&D and engineering and seven years in the contracting business performing design/build/service work on boiler installations. For the past 12 years he has operated Sji Consultants, Inc., providing consulting services to the boiler industry in the areas of design, operations, training, troubleshooting, and product liability. He is director of technical affairs for the American Boiler Manufacturers Association. ❖

July 21, 1905

USS *Bennington*'s Tragedy Remembered 100 Years Later

Steam can be a friend, or steam can be an enemy. On July 21, 1905, steam became an enemy to the crew of the USS *Bennington* (PG-4).

In a frightening and tragic moment, the second of four boilers on the gunboat *Bennington* exploded, shattering the peace of a new summer's day in the San Diego harbor. In an instant, most every seaman within 200 feet of the boiler was killed or injured by scalding steam that rampaged through the ship faster than a man could leap from its deck. At final count, 65 American sailors were killed by the boiler explosion that a Court of Inquiry would determine was caused by human error.

Built as a gunboat of the Yorktown class, the USS *Bennington* was first commissioned in 1891. She was constructed of steel, with a main battery consisting of six 6-inch breech-loading rifles and a secondary battery containing 10 rapid-firing guns and two 30-caliber Colt guns. Her maximum-indicated horsepower was 3,392 with speed of 17.5 knots.

The *Bennington* patrolled the waters off both coasts during her peacetime mission. Her original assignment in 1891 placed the *Bennington* in the Atlantic and European squadrons. In 1894, she was sent to patrol the waters of the Pacific, claiming the atoll at Wake Island for the US in 1899. From there, the *Bennington* headed to the Philippines to assist in the suppression of the Filipino Insurrection.

In what would be her last tour of service, the *Bennington* patrolled the Hawaiian Islands for nearly two years before being asked to accompany the broken-down *Wyoming* to San Francisco. *Bennington* was to depart from San Diego for Port Harford July 21, 1905. The *Bennington's* crew of 197 men was surely in good spirits from the tropical tour just completed.

With steam up, the ship was ready to head out for this next assignment. Commander Lucien Young delayed the departure with his on-shore errands — reported to be business-related, rumored to be saloon-related. Obviously his presence would not have prevented the incident, but his absence surely contributed to his being court-martialed by the Secretary of the Navy.

At 10:38 a.m., the gunboat waiting in the bay for Commander Young, hell broke loose on the *Bennington*. The echo of two devastating explosions sounded through the harbor, halting everyone within earshot. A boiler had exploded, sending it into another boiler which in turn also exploded. In the same moment, steam released from the boilers instantly enveloped the ship and its human occupants. Men were scorched on the spot, and those who lived through the experience were injured in ways too horrible to mention. Plates ruptured on the starboard side of the ship. As a

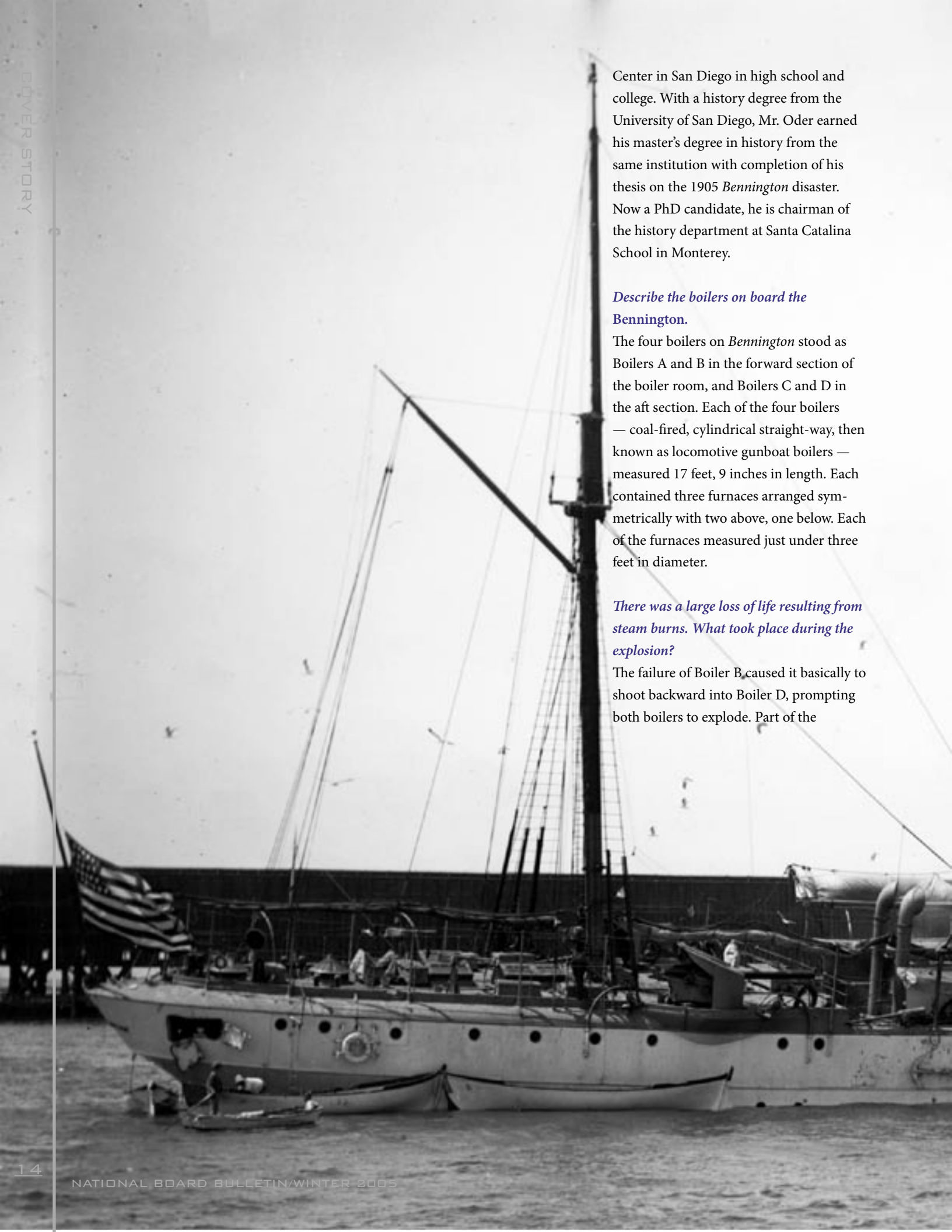
Courtesy of the San Diego Historical Society

result, water was allowed to enter, causing the gunboat to list. The graphic scene of hissing steam and screaming men, a disabled ship shrouded in a cloud of vapor, and a harbor littered with scalded bodies was stamped forever in the mind's eye of onlookers from the shore.

Events surrounding the *Bennington*'s boiler explosion were indeed a tragic mark in the Navy's history. All told, 65 sailors were killed and another 40 were injured. The obligatory Court of Inquiry soon followed. The cause of the explosion was directly attributed to an unresponsive steam gage on the second boiler and the failure of those starting the boilers to notice this fact. Three men were held accountable for the incident, but proceedings against them could not be carried out since they were killed in the explosion. The Court of Inquiry ordered Ensign Charles Wade, in charge of the ship's engineering department, to a court-martial, and Secretary of the Navy Charles Bonaparte subsequently ordered Commander Young court-martialed as well.

This year commemorates the 100th anniversary of the *Bennington* tragedy. In observance of this disastrous historical footnote, the *BULLETIN* reflects on the circumstances surrounding July 21, 1905, with the help of Mr. Broeck Oder.

Mr. Oder resides in Monterey, California, and has a special interest in the *Bennington*. Raised near San Diego, he essentially grew up with the Navy. His father was a lifetime hospital corpsman for the Navy, and Mr. Oder himself worked at the US Naval Training



Center in San Diego in high school and college. With a history degree from the University of San Diego, Mr. Oder earned his master's degree in history from the same institution with completion of his thesis on the 1905 *Bennington* disaster. Now a PhD candidate, he is chairman of the history department at Santa Catalina School in Monterey.

Describe the boilers on board the Bennington.

The four boilers on *Bennington* stood as Boilers A and B in the forward section of the boiler room, and Boilers C and D in the aft section. Each of the four boilers — coal-fired, cylindrical straight-way, then known as locomotive gunboat boilers — measured 17 feet, 9 inches in length. Each contained three furnaces arranged symmetrically with two above, one below. Each of the furnaces measured just under three feet in diameter.

There was a large loss of life resulting from steam burns. What took place during the explosion?

The failure of Boiler B caused it basically to shoot backward into Boiler D, prompting both boilers to explode. Part of the

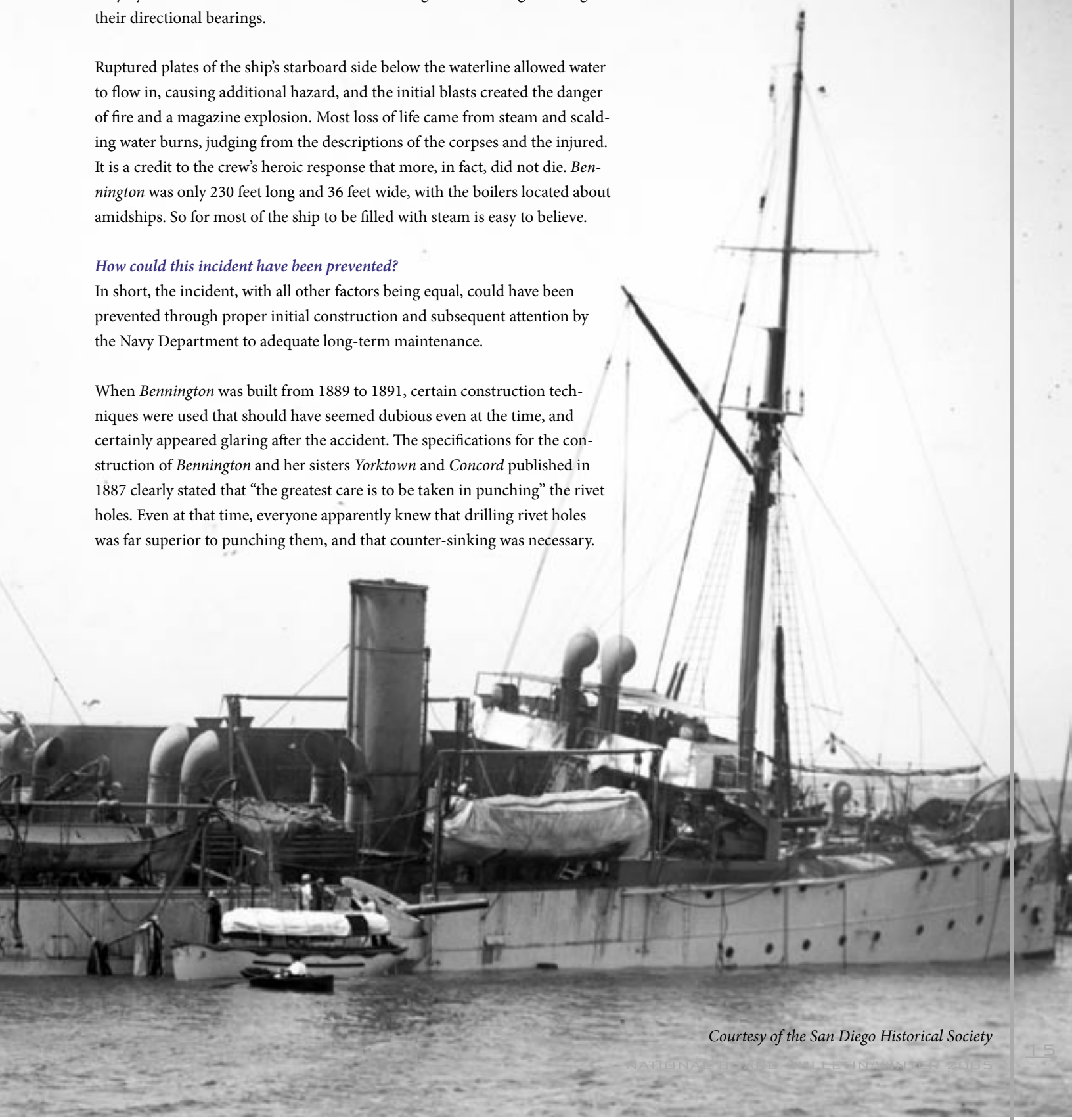
explosive force went upward through the main deck, literally blasting the uniform completely off one officer. An expert testified that the initial surge of the explosion coming from Boiler B probably had a force of about 500,000 foot-tons. The explosion threw crewmen as much as 50 feet. The force of the explosions ruptured all the steam connections, filling virtually the entire ship with clouds of scalding steam. The pervasive steam caused "blackout" conditions. Many sailors later testified they could not see to escape and were saved only by comrades who came below decks shouting, thus allowing men to gain their directional bearings.

Ruptured plates of the ship's starboard side below the waterline allowed water to flow in, causing additional hazard, and the initial blasts created the danger of fire and a magazine explosion. Most loss of life came from steam and scalding water burns, judging from the descriptions of the corpses and the injured. It is a credit to the crew's heroic response that more, in fact, did not die. *Bennington* was only 230 feet long and 36 feet wide, with the boilers located about amidships. So for most of the ship to be filled with steam is easy to believe.

How could this incident have been prevented?

In short, the incident, with all other factors being equal, could have been prevented through proper initial construction and subsequent attention by the Navy Department to adequate long-term maintenance.

When *Bennington* was built from 1889 to 1891, certain construction techniques were used that should have seemed dubious even at the time, and certainly appeared glaring after the accident. The specifications for the construction of *Bennington* and her sisters *Yorktown* and *Concord* published in 1887 clearly stated that "the greatest care is to be taken in punching" the rivet holes. Even at that time, everyone apparently knew that drilling rivet holes was far superior to punching them, and that counter-sinking was necessary.



Courtesy of the San Diego Historical Society

I have never been able to discover why this was put into the specifications for *Bennington*, but I managed to get my hands on the actual specifications and read it with my own eyes. Perhaps it was a cost-related measure; these ships cost about $522,000 each, and while that seems paltry today, that was a lot of money to both the Navy and the federal government in the 1880s.

So, from the very beginning, *Bennington* tempted fate just by virtue of her construction. One even hesitates to blame her builders when the government's own specifications called for inferior construction. Add to this factors such as having to install the safety valves horizontally instead of vertically, and the odds for an accident increased. Then, the other factor kicked in: the Navy failed to remedy known defects such as the safety and sentinel valves, and failed to maintain the boilers properly. The boilers had a life expectancy of nine years before needing complete renewal; *Bennington*'s boilers, almost 15 years old, never underwent renewal, thus contributing to the accident.

Bennington went (at Ensign Wade's recommendation and Commander Young's request!) into drydock at Mare Island in April–May 1905, about two to three months before the explosion, and although Young and Wade had requested major work on the boilers and machinery, the Navy Department refused to allow the work to be done, saying *Bennington* had to sail for Honolulu by May 13. It should be noted that nothing going on in Hawaii necessitated *Bennington*'s presence!

It was speculated at the courts-martial that the cause of the disaster had to involve a relatively small amount of oil settling on the crown sheet of the lower furnace in Boiler B. Expert testimony showed that as little as one-sixteenth of an inch of oil on the crown sheet could cause a condition of red heat to develop. This sheen of oil caused the overheating of the crown sheet, leading to its complete collapse and the explosion of Boiler B. The oil got onto the crown sheet because the device that would have prevented it — a grease extractor — had never been installed, even though the Navy required grease extractors on all boilers on all ships. It was known — via reports from the ship — that all of the boilers on *Bennington* lacked grease extractors! The Navy simply did not attend to the problem.

Additionally, the collapse of the crown sheet on the lower furnace removed a significant longitudinal brace for Boiler B, placing great stress, even at a steam pressure of about 135 pounds, on the boiler. The rivets and rivet holes, inferior from day one and weakened substantially through normal wear and tear and lack of maintenance over the years, gave way when they most likely would not have done so had they been drilled properly and subsequently maintained. It is important to note that in the courts-martial, it came out that at least three other Navy ships had suffered collapsed furnace crown sheets but had not suffered boiler explosions because all rivets in those boilers held!

Why would 15-year-old boilers lose the ability to provide sufficient steam pressure or volume to maintain the ship's speed at 17 knots rather than the reported reduced speed of 12 knots?
The main reason was that in addition to design/construction problems, the Navy never ensured the boilers received the proper long-term maintenance. I suspect this was because money was tight, and the nation, Congress, and particularly President Theodore Roosevelt focused mostly on building battleships, not maintaining small, old gunboats. *Bennington* and her sisters *Yorktown* and *Concord*, already obsolete and largely considered so at the time, remained with the Navy because so few new, smaller vessels were being built, relative to battleships. We had a fair number of other ships, various classes of cruisers and such, similarly kept active when obsolete. However, in fairness to the Navy, many other

navies of the world, including the vaunted Royal Navy of Britain, did the same thing. Failure to perform major maintenance on *Bennington*'s boilers accounts for her inability to do much better than 12 knots.

It was determined that the ship's second of four boilers had a faulty steam gage. Why did this boiler not have at least one operating safety valve?

Part of the confusion came from the findings of the Board of Inquiry, which did a rather quick investigation within weeks of the explosion. And that is no criticism of the Board of Inquiry; they performed well. The board concluded that a fireman on Boiler B had accidentally secured the valve to the steam gage when he meant to secure the air cock. This occurred about two hours before the explosion, based on testimony that the pressure on that gage promptly fell from five pounds to zero, and never moved off zero, still sitting there just before the explosion. This suggested that no one knew the exact pressure in Boiler B and thus the pressure became excessive — some theorized perhaps around 150 pounds, others as high as 200 pounds. So, there is no reason to think the steam gage itself was faulty, per se, but simply secured, although this would not have affected the function of the safety valve on Boiler B.

Bennington had a separate sentinel valve and a separate safety valve for each of the four boilers. The sentinel valves should have given indication of rising steam reaching a given point of pressure, usually set at about 10–20 pounds below the pressure at which the safety valves had been set. The safety valves were supposed to actually release steam from the boiler and thus lower pressure until bleeders could be activated.

This is a large part of the reason why Wade and Young faced courts-martial: alleged failure to maintain and test the equipment, as mandated by Navy regulations. The prosecution in both cases sought to show their negligence had resulted in nonfunctional equipment, which in turn caused the explosion due to overpressure in Boiler B. The defense teams argued that the two officers had reported all the unsafe conditions and had done everything in their power to maintain the ship. They also argued the safety equipment failed not as a result of overpressure, but rather because of design flaws and the Navy's failure to provide long-term maintenance. It was argued, and convincingly proved, the pressure in the boilers probably never exceeded 135 or so pounds — with safety valves set at 140–145 — but that Boiler B failed anyway.

The prosecution's case rested on the fact that basically everybody on *Bennington* admitted they never did anything with the sentinel valves — just didn't even bother with them! However, the defense showed through testimony of countless individuals that the sentinel valves were so poorly designed and so poorly installed they activated practically all the time, even when steam pressure was nowhere near the setting of the valve. Testimony established that this occurred on all three Yorktown class ships (*Yorktown*, *Concord*, and *Bennington*) and that the Navy had known this within two to three years of these ships being at sea (about 1895). The defense teams produced engineering officers who had served on *Bennington* and the other ships in the mid-to-late-1890s, all of whom said essentially, "Oh, those went off all the time, so basically the crews always 'fixed' those valves so they would not go off and accidentally injure someone. Everybody knew/knows that." That this was known in the Navy Department and widely known throughout the fleet, with nothing done to fix or replace these valves, became

compelling evidence for the defense teams who argued Young and Wade essentially did nothing wrong by ignoring the sentinel valves.

As for the safety valves, Yorktown class gunboats again had some of the most notorious equipment in the Navy. Because of the ships' design, the safety valves could not be installed vertically — the correct manner — but instead had to be installed horizontally. As a result, another seemingly endless array of witnesses for the defense testified that condensing steam left the internal spring of the safety valves at least half-immersed in water virtually all the time, thus causing rusting of the springs in the valves. Again, while well-known in the Navy Department and throughout the fleet by about 1895, nothing ever got done about it. This did not stop the Navy from trying to punish Young and Wade for the condition of the safety valves, alleging that they failed to inspect and maintain, et cetera.

However, it was revealed at the courts-martial that in fact the safety valves on *Bennington*'s boilers underwent overhaul in March 1905, just four months before the accident, and that Yorktown class gunboat safety valves could get by with annual overhauls and still function reliably. Additionally, numerous tests done by the Navy years before the accident and specifically for the defense in these cases showed these types of safety valves would function even when filled with rust, with springs coated with cement, when packed with damp sand, et cetera, because the springs needed to be able to move only one-one hundredth of an inch to function. Thus, even though poorly designed and installed incorrectly, the safety valves appeared to be the most reliable equipment in the boiler and engine rooms of the Yorktown class.

The safety valves, set for about 140–145 pounds and clearly in working condition, did not activate before the explosion, indicating, as did other testimony, that the pressure in the boilers most likely did not exceed 135 pounds — a safe pressure — when the explosion occurred. This, of course, discredited the prosecution argument of overpressure and favored the defense theory of another cause. The defense case received clear support in this regard from testimony by several engineering experts. These experts even produced evidence that under some circumstances boilers could explode violently when under less than 55 pounds of pressure, and that this had been known for decades before 1905.

One last factor should be noted: when Boiler B's safety valve was examined by experts after the explosion, they noted it was not packed solid with rust or other sediment — although some rust was, not surprisingly, present. This strongly suggests the safety valves had indeed been serviced in March 1905 as Wade and others testified, and that the safety valves were almost certainly in functioning condition at the time of the accident.

So, Boiler B, like the other boilers, did have a sentinel valve, but it had been basically useless since the commissioning of the vessel. Additionally, the equipment supposedly used to test the safety valves proved difficult to use, almost useless, and thus went ignored for years by the crews on all three gunboats. With American ingenuity, though, the crews of all three ships found different ways to test and check the safety valves, with *Bennington*'s crew using a bar to do the required lifting of the valves. The courts-martial board found the method they used to be effective in achieving the desired goal, even if not done in the prescribed manner. Again, this was something the Navy knew well.

In the final analysis, to what cause or causes could we attribute the explosion?

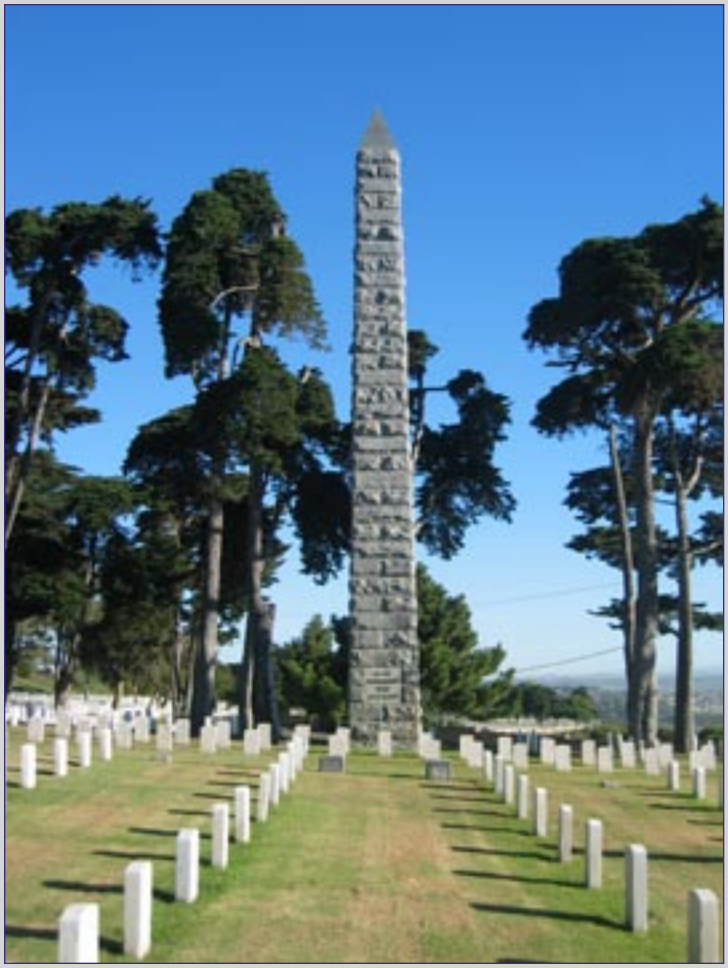
Actually, it was Navy-wide systemic failure, with some equipment failure definitely thrown in. And although the potential for human error always exists in any situation, that possibility is limited here. Some testimony suggested the fire in Boiler B might have been "forced" or built faster than intended. But again, the fact the safety valves, which we are very certain would have functioned, did not activate indicates strongly the pressure in the boiler never became excessive, which would have been the source for substantially contributory human error. Also, given the careful attention Young and Wade had paid to the engineering spaces, especially

the boilers, that avenue of human error — at least on board *Bennington* — seems securely closed.

What we are left with is the strong likelihood that *Bennington*'s lack of grease extractors allowed a thin layer of oil to be present on the crown sheets of the furnaces in Boiler B, leading to the overheating of the crown sheet of the lower furnace. Thus, overtemperature conditions would quickly have come into play, causing the crown sheet to collapse and the boiler to explode. So actually, it wasn't equipment failure so much as a failure by the Navy to properly equip and maintain the ship that caused its demise. And while this is only a potential cause, process of elimination and the physical evidence make it the most likely one.

Commander Young and Ensign Wade were the only two court-martialed. Young received essentially a slap on the wrist and Wade was acquitted. Was the punishment appropriate?

Actually, the Board of Inquiry had recommended only the court-martial of Ensign Wade; Secretary of the Navy Bonaparte became determined to make an "example" of someone and ordered Young court-martialed as well. When the verdicts came out, some people at the time thought the punishments should have been more harsh. Some periodicals expressed outrage that somebody's head didn't roll, but almost from the time of the explosion, many — both inside and outside of the Navy — pointed fingers at the Navy's system. The legendary Rear Admiral Stephen B. Luce, a founder of the Naval War College, even wrote publicly that the Navy needed specialized engineering officers, not generalists standing engineering duty. Commander Young was indeed remiss in not signing some of his paperwork, but that is about as far as you can go in blaming Young or Wade. The evidence just proved to be overwhelming that the Yorktown class gunboats had been badly built, poorly maintained by the Navy, and were just plain old. It is more likely a testament to the officers and men who crewed those three ships that they operated as well as they did for as long as they did!



Courtesy of the Department of Veterans Affairs, National Cemetery Administration

What became of the* Bennington *after the explosion?

Bennington was decommissioned on October 31, 1905, and sat at the Mare Island naval facility for about five years. Sold in 1910 for use as a barge in Hawaii, she toiled away until the late 1920s. When she was no longer useful and not even particularly worthy of scrap, her current owners, aware of her history, afforded her the dignity of being sunk at sea. ❖

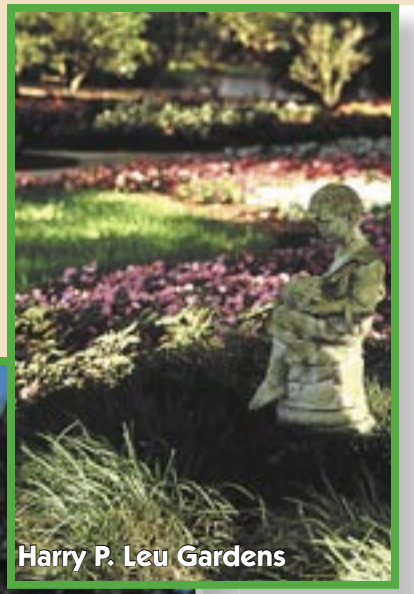
The editors of the BULLETIN *extend a sincere thank-you to Mr. Oder for sharing this incredible piece of history.*

Orlando Experience

There is a good chance that when you think of Orlando, Florida, you think of Mickey Mouse and Walt Disney. But take a look beyond the Magic Kingdom and you will find Orlando offers visitors and residents alike a broad range of entertaining and cultural things to see and do.

Located in Central Florida, Orlando is midway between Jacksonville and Miami, and a short hour's drive to Atlantic Ocean beaches and only a two-hour drive to the beaches of the Gulf. Its tropical clime offers a wonderful backdrop to the many outdoor activities that Orlando offers.

The nickname of Orlando says it all: "The City Beautiful." This lush, colorful town has numerous public parks and gardens, all basking in the sunshine Florida is known for. Harry P. Leu


Harry P. Leu Gardens


Downtown Orlando

the Magic


Reunion Resort Golf Course

Gardens has more than 50 acres of green space and features the largest camellia collection and formal rose garden in the South. Visitors to the 157-acre Historic Bok Sanctuary can walk amongst reflecting pools and winding pathways that lead to a 225-foot Singing Tower with 57 bronze bells.

Golf enthusiasts will especially marvel at Orlando's offering of more than 150 courses, all within a 45-minute drive of downtown. Expert course architects such as Robert Trent Jones, Tom Fazio, and Joe Lee have designed stunning links that accommodate all skill levels.

If you are looking for a theme park and have already visited the renowned Walt Disney World, Orlando offers a legion of choices. At SeaWorld Orlando (next to the host Renaissance Orlando Resort), you can make friends with dolphins and say hello to the one and only Shamu. Take a thrill ride at Universal Studios, touted as being the number one movie studio theme park in the world. Busch Gardens Tampa Bay features rides, entertainment, and one of the largest zoos in North America. If water is more your thing, a trip to Wet 'N Wild or Water Mania will allow you to dip and dive all day. Or visit with the alligators and crocodiles at Gatorland, a 110-acre theme park and wildlife preserve featuring a children's water park, train rides, and the world famous Gator Jumparoo.

Orlando is a city steeped with American history, flavored along the way by ethnic diversity. The recipe has resulted in a metropolitan area rich in culture and heritage. The town had its first settlement in 1843 near an abandoned Army post and was

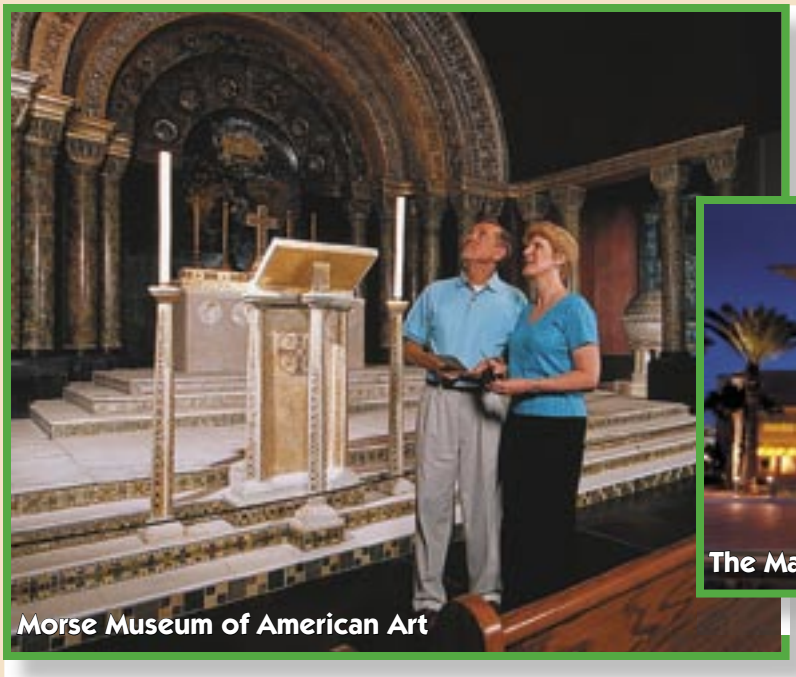
referred to as Jernigan after Georgian settler Aaron Jernigan. By 1857, Jernigan was renamed Orlando, it is said after US soldier Orlando Reeves, killed in 1835 by an Indian's arrow while on sentinel duty in the area.

Eventually becoming an incorporated city in 1875, Orlando now boasts a population of nearly 2 million residents of various nationalities, including Chinese, Japanese, Thai, German, Indian, Italian, Cuban, and Mexican. From this infusion of ethnicity has sprung more than 4,500 restaurants and numerous cultural centers. The Orange County Regional History Center and Heritage Square is a great place to start learning about the peoples who make up Orlando's past and present.

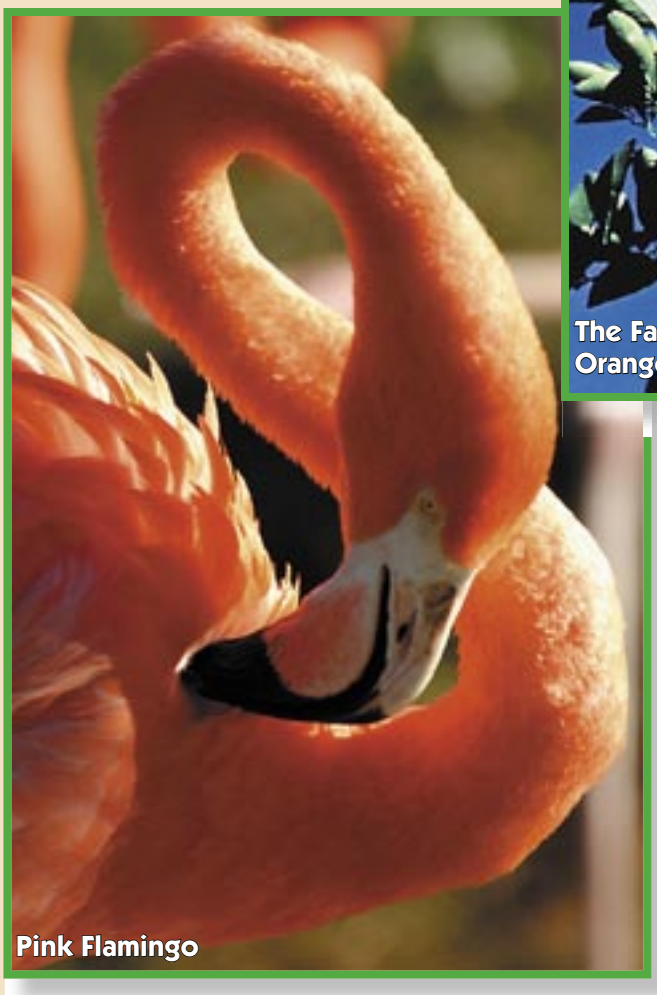
The more than 44 million people who travel annually to Orlando looking for some artistic influence have the option to tour dozens of art museums and attend various musical productions. The world's largest collection of Tiffany stained glass is housed at the Charles Hosmer Morse Museum of American Art. A glimpse of an original Michelangelo can be had with a tour of the Inspirational Living Fine Art Gallery. And an impressive collection of Salvador Dali's work is maintained at the Salvador Dali Museum in nearby St. Petersburg. Musically the city keeps time with treasures such as the Orlando Opera, the Bach Festival Society, and the Orlando Philharmonic Orchestra.

If you get bitten by the shopping bug while in Orlando, have no fear: the medicine to cure you is right around the corner. Orlando has more than 52 million square feet of retail space and counting. One can bargain hunt at outlet malls, find unique gifts at one-of-a-kind boutiques, and power shop at one of the town's eight multi-leveled malls. Orlando's largest mall, The Florida Mall, features anchor stores Nordstrom, Saks Fifth Avenue, and Burdines.

Sports fans, Orlando has you covered. The NBA's Orlando Magic keeps the ball bouncing October through April at the TD Waterhouse Centre. Led by Grant Hill, the team is coached by Johnny Davis. The TD Waterhouse Centre is also home to the Orlando Predators of the Arena Football League, which features high-octane offense and fast-paced defense. The league plays February through June. And for the motorsports enthusiast, Daytona USA allows you to get first-hand experience with the mean speed of NASCAR.


Morse Museum of American Art


The Mall at Millenia


Pink Flamingo


The Famous Florida Orange Tree


Florida Alligator

Kids and adults will enjoy exploring the sciences, Orlando-style. A hub of learning and teaching, the Orlando Science Center offers science buffs the opportunity to interact with exhibits such as NatureWorks, KidsTown, and Wired Science. Another of the center's must-see activities is the IMAX theater, featuring large-format films. Everyone will enjoy a hands-on visit to the Kennedy Space Center, where restricted areas of NASA's launch pad can be accessed and a real spacecraft can be viewed up close.

Las Vegas and the ocean converge in Orlando in the form of off-shore casinos. Sterling Casino boasts the world's largest casino ship, with 1,000 slot machines and 50 table games, adding up to 75,000 square feet of entertainment. Best of all, the sailing is free! Suncruz Casino out of both Daytona and Port Canaveral combines free drinks with games, entertainment, and buffets.

Looking for some late-night fun? Check out Universal CityWalk Orlando, a sprawling complex packed with restaurants, bars, shopping, and entertainment – open 11 a.m. to 2 a.m. everyday. See what Emeril's restaurant is cooking up, rock-and-roll through your meal at the world's largest Hard Rock Café, and sing along at Jimmy Buffett's Margaritaville. If dancing is on the agenda, check out The Groove, CityJazz, or Pat O'Brien's, all guaranteed to get your toes tapping. The retail stores are numerous and varied, ranging from the eclectic to the practical.

The Central Florida Regional Transportation Authority wants to make sure you get where you want to go by providing a public bus service throughout Orlando. Known as "Lynx," the bus service makes 5,000 stops in the three counties in and around town. To locate a bus stop, simply look for signs with a lynx paw print.

Whether you come alone, are traveling with your spouse, or bring your entire family, Orlando has something for everyone. And no matter what it is you end up doing, be it hitting the beaches, riding the coasters, or checking out Epcot, the sunny vistas and warm Florida breezes are sure to delight. ❖

PREREGISTRATION FORM

Name _____

Name on Badge _____

Title _____

Company/Affiliation _____

Telephone _____ Fax _____

Address _____

_____

Email _____

Guest Name _____

Guest Address _____

_____

Additional Guest* Name _____

Additional Guest Address _____

_____

*Additional guests (16 years of age or older) may register for a fee of $120.00.

Those requesting special or handicapped facilities are asked to contact the Public Affairs Department at 614.888.8320.

FEES

Only one registration fee will be charged for each attendee and one guest (guest program participant).

General Meeting Preregistration Fee ..... $ _____
(includes ONE banquet ticket)

Registration fee is $265.00 if received *on or before* April 7.
Registration fee is $295.00 if received *after* April 7.

Additional Guest Fee(s)
_____ Additional guests at $120.00 each..... $ _____
(Each includes ONE banquet ticket)

Additional Banquet Ticket(s)
_____ Additional tickets at $35.00 each ..... $ _____

AMOUNT ENCLOSED..... $ _____

To preregister by telephone or fax using your VISA, MasterCard, or American Express, contact the National Board at 614.888.8320, Ext. 237, or fax 614.888.0750.

❑ VISA ❑ MasterCard ❑ American Express

Card # _____ Exp. Date _____

Signature _____

All checks and money orders must be payable in U.S. dollars to:
The National Board of Boiler and Pressure Vessel Inspectors

Preference for registration confirmation: ❑Email ❑Fax ❑Mail

Accounting Department Only: AMOUNT $ _____ DATE _____

Hotel Reservations:

Hotel reservations must be made through the Renaissance Orlando Hotel by calling 407.351.5555.

When calling please mention Group Name: *National Board of Boiler and Pressure Vessel Inspectors*.

All room reservations must be received by April 7.
RATES INCREASE BEGINNING APRIL 8.

Room cancellations must be received 72 hours in advance of arrival date in order to obtain refund.

The National Board will not be responsible for hotel reservations for attendees.

National Board Registration Desk Hours:

Sunday, May 8 .....9:00 a.m.–2:00 p.m.

Monday, May 9 .....8:00 a.m.–11:00 a.m.

Tuesday, May 10 .....8:00 a.m.–10:00 a.m.

There is no doubt about it: Orlando is the place to be for sunshine, lush tropical paradises, and a myriad of fantasy attractions. And there is perhaps no hotel more central to it all than the luxurious Renaissance Orlando Resort.

Upon arrival, guests are greeted by a dazzling sunlit atrium — among the world's largest resort atrium lobbies — soaring 10 stories high. Adorned with towering tropical foliage, plentiful

RENAISSANCE ORLANDO RESORT at SeaWorld

fragrant flowers, and a spectacular gilded Venetian aviary alive with brilliantly colored tropical birds, the lobby is home to hundreds of rare fish holding forth in a massive freshwater Koi pond fed by a dramatic, cascading waterfall.

Among first-class resorts and convention facilities, this outstanding award-winning resort offers gleaming amenities, superior comfort, and deluxe accommodations. Among the largest guest rooms in Central Florida, each offers nearly 500 square feet of elegantly appointed living space, many with balconies overlooking the breathtaking atrium or the Orlando skyline.

The Renaissance Orlando Resort is also among the largest full-service conference facilities in the area with 185,000 square

feet of meeting space including a dynamic 56,000-square-foot convention center.

And it's all close to where guests want to be. Located directly across the street from the renowned SeaWorld of Florida and adjacent to Discovery Cove, Renaissance Orlando Resort is within 15 minutes (via round-trip shuttle service) of Universal Studios Florida, Walt Disney World Magic Kingdom, Epcot Center, and MGM Studios. In all, at least 17 prominent attractions are within only 10 minutes of the resort and more than 18 additional sights — including Busch Gardens, Cypress Gardens, and Kennedy Space Center — are all within an easy 90-minute drive.

Other amenities at the Renaissance Orlando Resort include three lighted tennis courts, a volleyball/basketball court, and an Olympic-size swimming pool.

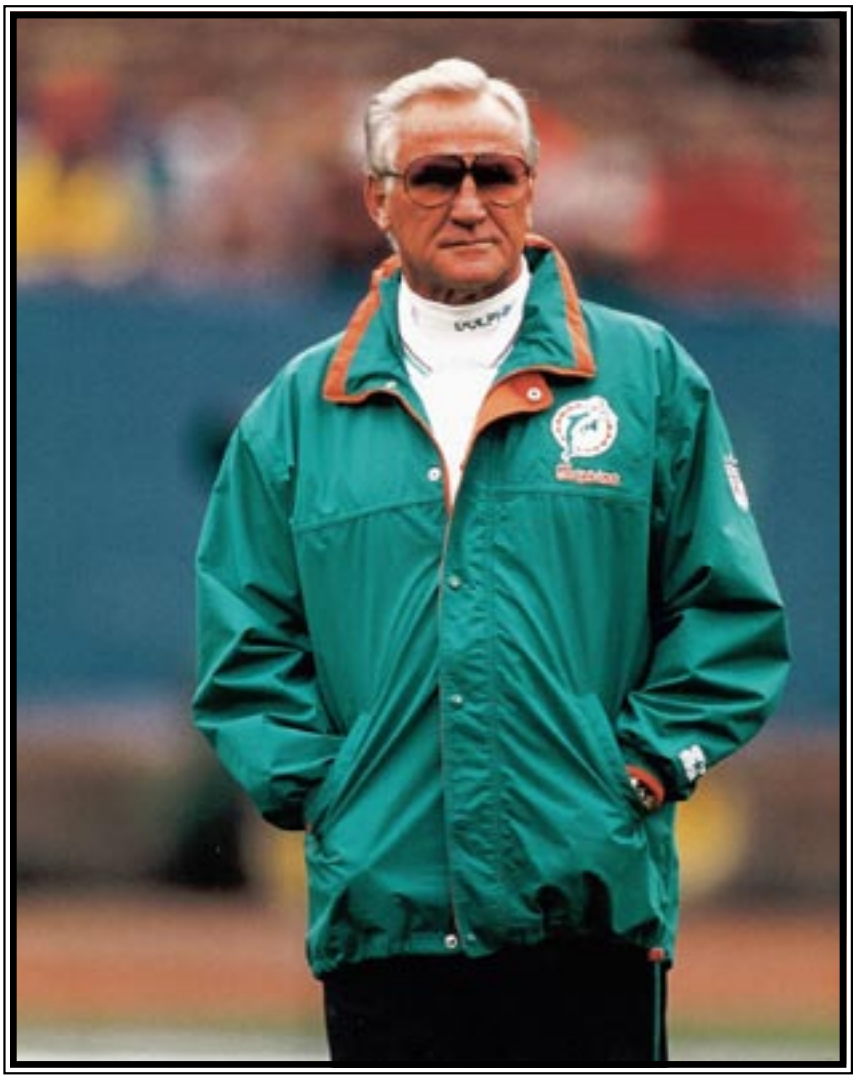
During the day, guests can choose from a variety of indoor or outdoor dining options — catering to all food tastes — or unwind at one of the resort's distinctive lobby or poolside lounges.

In addition to the AAA Four-Diamond Award, the Renaissance Orlando Resort has been honored with the prestigious Pinnacle Award, the Gold Key Award, the Aster Award, and the Award of Excellence.

Come enjoy all Orlando has to offer — virtually at your doorstep — at the award-winning Renaissance Orlando Resort! ❖

Featured Opening Session Speaker

Legendary Coach Don Shula



You Can Inspire Anyone To Be A Winner

When it comes to inspiration, few surpass the words and wisdom of legendary Pro Football Hall of Fame coach and businessman Don Shula.

Coach Shula is perhaps best remembered for taking the Miami Dolphins in 1972 to the only undefeated season (17-0) in National Football League (NFL) history. As head coach of the Dolphins (1970-95) and the Baltimore Colts (1963-69), he holds the NFL record for the most career victories (347), surpassing the immortal George Halas in 1993. At age 33, the youngest head coach in the history of the NFL, Coach Shula went on to appear in more Super Bowls (6) than any other coach. He is only one of two coaches to reach the Super Bowl three straight seasons (1971-73), and is only one of five coaches in NFL history to win consecutive Super Bowls (1972-73).

Coach Shula's teams reached the playoffs a remarkable 20 times in 33 seasons. In that span, he suffered only two losing seasons. In 1995, he concluded his 33rd season as an NFL head coach and his 26th season as head coach of the Dolphins.

Coach Shula has been the recipient of numerous awards, including the prestigious 1993 Sports Illustrated Sportsman of the Year Award, 1994 Horatio Alger Award, the Bert Bell Award, and the Pete Rozelle Award. His unanimous election to the Hall of Fame in 1997 was the ultimate honor in a career full of record-setting accomplishments.

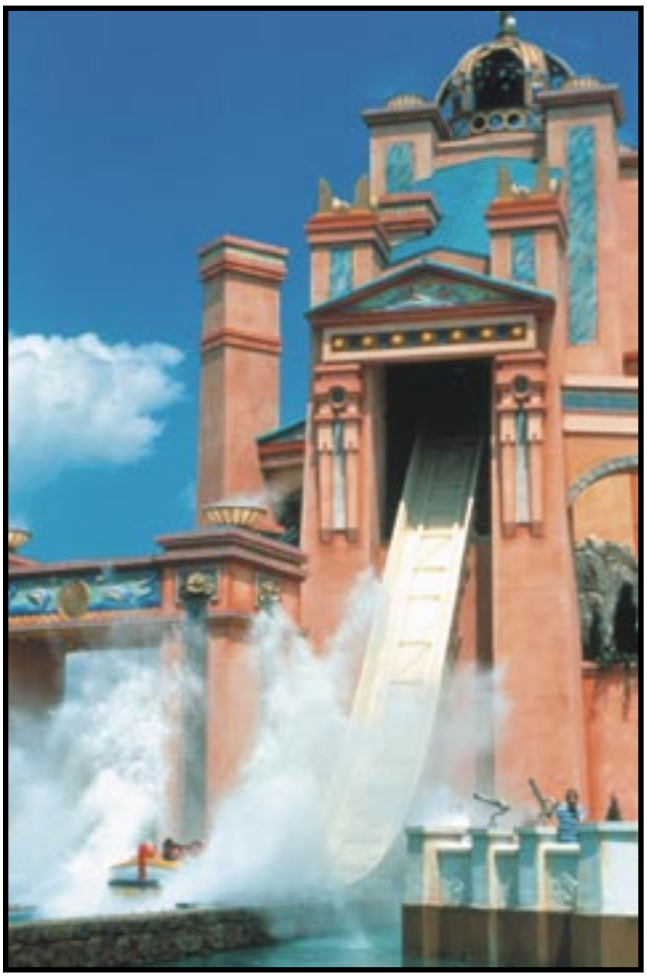
In addition to his considerable charity work, Coach Shula is equity partner in Don Shula's Hotel & Golf Club and Don Shula's Steak Houses, Inc. ❖

Guest Program

Monday, May 9

SeaWorld Adventure
1:30 p.m. – 4:30 p.m.

All tours depart from Convention Center parking lot.



It's one of the most delightful tours ever offered at the General Meeting!

SeaWorld is the world's most popular marine life adventure park featuring 200 acres of sea-themed rides, shows, and animal attractions. And it's conveniently located across from the Renaissance Orlando Resort. After a quick bus trip, guests can get up close and personal with sharks and killer whales, and take in the wild antics of manatees, sea lions, penguins, dolphins, and much more. Enjoy the Shamu Adventure Show and meet — at 25 feet in length and five tons — literally the biggest star east of Hollywood! Visit The Waterfront and share the romance and excitement of all the world's cities built around the sea — their sights, sounds, tastes, and people. Or take in the Wild Arctic Exhibit where you'll be plunged into the frozen north and the icy habitat of beluga whales and polar bears.

Wear comfortable walking shoes. And don't forget to bring your camera! ❖

NOTE: This outdoor tour requires a modest amount of walking.

Registrants are not permitted to attend the Monday or Tuesday tours intended for designated guests. This policy will be strictly enforced.

Guest Program

Tuesday, May 10

Winter Park Shopping Luncheon & Air Boat Tour
9:30 a.m. – 5:00 p.m.

All tours depart from Convention Center parking lot.

It's a day guests won't forget: shopping at the elegant shops of Winter Park and a rustic ecotour of the Central Florida Everglades.

Winter Park is a quaint neighborhood with trees overhanging brick-lined streets. Stroll down Park Avenue to visit an abundance of small boutiques and galleries that make this the ultimate shopping experience. Within walking distance, guests will find over 100 clothiers, bookshops, specialty merchants, and fine jewelry stores.

Following a scrumptious gourmet box lunch, General Meeting guests will be transported to the Tosohatchee "Florida Trail." Here, certified eco-guides lead a short 30-minute walk into Central Florida's pristine wilderness before boarding guests on 15-passenger airboats to explore the picturesque natural landscape. Learn about the fresh water eco-system of the St. John's River and its wonderful creatures, including alligators and American bald eagles. There's no better way to relive the life of Florida's first people.

Again, comfortable walking shoes are recommended. ❖

NOTE: Afternoon refreshments provided. This outdoor tour requires a modest amount of walking.

Registrants are not permitted to attend the Monday or Tuesday tours intended for designated guests. This policy will be strictly enforced.

Guest Program

Wednesday, May 11

Kennedy Space Center Tour
9:00 a.m. – 4:30 p.m.

All tours depart from Convention Center parking lot.

Get ready for a full-day tour providing an exceptional view of the Kennedy Space Center's internal workings.

The adventure begins at the visitor complex where guests walk through a life-sized rocket garden before traveling by motorcoach to three other exciting areas of the center. Guests will overlook the "clean room" where NASA technicians get ready to launch actual components of the International Space Station. Full-sized module mock-ups give guests a true understanding of this tremendous space construction project – the world's next leap into space exploration. The LC-39 Observation Gantry will provide a panoramic view of America's space history and visitors will even get a good look at the Vehicle Assembly Building where space shuttles are assembled, tested, and placed on a mobile launch platform. Your final destination is the Apollo/Saturn V Center where the spirit of the Apollo missions is brought into full perspective.

Guests will also enjoy the experience of dining with an astronaut and hearing fantastic space exploration stories while enjoying a delicious three-course lunch. Everyone will have an opportunity to ask questions and have photos taken with the astronaut. Additionally, each will receive an autographed souvenir.

After lunch, guests will view two awe-inspiring films on five-story IMAX theater screens, and have an opportunity to visit Kennedy Space Center shops.

Sure to be a highlight of the 74th General Meeting, this is a day you won't want to miss! ❖

NOTE: Government-issued photo identification required to enter the Kennedy Space Center.

Preliminary Program

for the

74th General Meeting

of

The National Board of Boiler and Pressure Vessel Inspectors

Monday, May 9

Opening Session

10:15 a.m. **You Can Inspire Anyone To Be A Winner**

Don Shula, Former Head Coach*
National Football League Hall of Fame

General Session

1:00 p.m. **Boiler and Combustion Safety: What You Don't Know Can Kill You!**

John R. Pushkar, P.E., Owner
Combustion Safety, Inc.

1:30 p.m. **Welding Inspection: You Win With People**

Ray W. Shook, Executive Director
American Welding Society

2:00 p.m. Break

2:15 p.m. **Recycling Energy: Identifying and Eliminating Losses in Pressurized Steam Systems to Generate Free Electricity**

Sean Casten, President
Turbosteam Corporation

2:45 p.m. **Understanding the Importance of Insulation and Lagging**

Gary Bases, President
BRIL, Inc.

3:15 p.m. **ASME: 125 Years of Achievement**

Domenic Canonico, Vice President
ASME Pressure Technology Codes and Standards

3:45 p.m. **Inspection Considerations for Pipe Hangers, Restraints, and Snubbers**

George T. Mulvaney, Partner
Ocean State Technical Services

* Autograph session with Mr. Shula to follow Opening Session.

Reminder: General Meeting details can also be found on *InfoLink!* located on the National Board Web site at *nationalboard.org*.

To obtain a discount of $30, all preregistration forms and fees must be received by April 8.

Preregister beginning January 14 via email with your credit card through *InfoLink!* on the National Board Web site at *nationalboard.org*.

Or mail the preregistration form with your check or money order to: The National Board, 1055 Crupper Avenue, Columbus, Ohio 43229.

Distribution of any and all literature, other than informational materials published by the National Board and ASME, is strictly prohibited at the General Meeting.

All photos taken by the General Meeting photographer will be available for purchase at *deanwilliams.net* at the meeting's conclusion. ❖

Donald Jenkins
Chief Boiler Inspector, State of Kansas


KANSAS MUSEUM OF HISTORY

To those who meet him, Kansas Chief Boiler Inspector Don Jenkins is quiet. Soft-spoken. Reflective.

But very few know that beneath this reserved exterior is the heart and soul of . . . a big-game hunter?!

When it comes to putting food on the table, Don can do it. Many times with a single, well-placed round. And chances are that round was made in his basement — not too far from where he processes the meat he and his wife will often enjoy during evening dinner.

Born in Aitkin, located in north-central Minnesota, it was hard for young Don Jenkins not to grow up an outdoorsman. "Having lived in the woods, it was natural to hunt and fish all the time," he volunteers with a nod. The son of a dairy farmer dad and store clerk mom was one of four Jenkins children brought up in the small Midwest resort community 125 miles north of Minneapolis.

Helping his dad work the farm, Don spent considerable time fixing tractors, plows, and a myriad of other agricultural implements.

"Probably the most distinctive recollections I have growing up involve the bone-chilling Minnesota mornings," he offers while shaking his head. And then repeating himself for emphasis: "Bone-chilling."

The Minnesota cold, he surmises, was partially responsible for his decision to leave Aitkin and join the U.S. Navy. Eschewing farming in favor of finding a trade in a warmer climate, he signed with a local recruiter only after the recruiter promised to delay Don's formal enlistment "until after deer season."

On a cloudy Minnesota morning, it was -20 degrees the day Don left to join the service. Putting the future Kansas official through a battery of tests, the Navy determined he was best suited for a career in mechanical engineering. "Not surprising for a farm boy," Don quips with a smile.

Entering machinist mate school in 1962, Don focused on propulsion in preparation to become an engine crew member. During this time, he was exposed to a variety of different propulsion components including those with which Don would become intimately familiar: boilers.

Assigned to the USS *Wiltsie* as a fireman, he joined the ship in Pearl Harbor before heading to ports of call in San Diego (home port), Japan, Hong Kong, Philippines, and Formosa. In 1965, Don completed a tour of duty in Vietnam before returning to San Diego and tending to a very important priority: getting married.

"Ruth and I met in high school," he explains with fond remembrance. "We wrote each other after I left for the service and our relationship sort of developed long distance." (The parents of two grown sons, Ruth and Don will celebrate their 40th wedding anniversary this fall.)

Thinking he had fulfilled his military obligation in January of 1966, Don's service was extended an additional four months. That May, without hesitation, newly discharged machinist mate second class Don Jenkins and his new bride headed to Arizona.

"I had a brother in Phoenix," he notes with an ever-present Minnesota accent, "and he sold us on starting our new life in Arizona. Almost as soon as we arrived, I was offered a job as a machine operator in a paper mill." Within four months, however, the mill closed and Don found himself looking for work. But not for long.

Visiting the local post office to search for federal job vacancies, Don learned of an opening for a boiler operator in the northern Arizona community of Kaibeto. "It was with the Bureau of Indian Affairs at a location 25 miles from a paved road." Accepting the position, Don and Ruth relocated to a remote bureau boarding school on the Navajo reservation 130 miles from Flagstaff.

Three and a half years later, the future National Board member transferred to the bureau's central heating plant in Tuba City, Arizona. Although not having a specific title, Don was responsible for the plant's 24/7 operation and maintenance. Additionally, he served as Tuba City's fire chief and taught at the bureau's Navajo area fire school.

As if these responsibilities were not enough, the Minnesota native started to see his career in a different light. Deciding to obtain a National Board Commission, he prepared himself for the examination. "I gathered just about every book I could find on boilers and pressure vessels and enlisted the help of my assistant fire chief — a teacher — to tutor me in algebra," he explains.

In 1978, Don traveled 220 miles to Phoenix to take the exam. And failed. But he was successful on his second attempt a year later, having "a better understanding of the questions."

In 1982, Don assumed the position of chief boiler inspector for the Bureau of Indian Affairs in Albuquerque, New Mexico. In addition to his considerable efforts to bring the organization up to code, Don is also credited with helping to secure federal funding for and pioneering a training school (see Fall 1993 *BULLETIN*) for Native American boiler operators.

When bureau officials decided in 1995 that no boiler explosions meant no need for a training program, the school was abolished. After 29 years of service with the Bureau of Indian Affairs, Don's job was also eliminated. But not his spirit.

Following the death of Kansas Chief Boiler Inspector Bill Brown in September 1995, he applied for the chief's position despite having some trepidation about his own qualifications. "Interestingly, Kansas wanted someone who could write regulations," Don explains, "and I had plenty of experience in that area."

In January 1996, the "farm boy" from Minnesota became Kansas' chief boiler inspector. Picking up where he left off at the Bureau of Indian Affairs, Don has moved the Kansas program forward by increasing both the number of state inspections and inspectors.

Not unlike his days with the bureau, Don still gets out to personally perform some of the inspections involving state and federal installations to keep himself "directly involved in the process." He is also involved in the industry, having served on a variety of ASME subcommittees and National Board committees. Recently, Don was elected to the National Board Board of Trustees.

Don doesn't miss Minnesota, and even though he must still indulge an occasional "bone-chilling" morning or two, Kansas suits him just fine. And he extends a personal invitation to all his associates and friends to visit him and Ruth in Topeka for some "great Kansas beef."

Just don't come between September and January.

That's hunting season. ❖

Board of Trustees Reelects Advisory Committee Members

The National Board's Board of Trustees has reelected William Carey to the Advisory Committee representing organized labor.


William Carey

Mr. Carey serves as assistant for the international president of the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, with more than 36 years' experience in the industry. He has been with the IBB for more than 25 years.

A certified welder and veteran of the US Air Force, Mr. Carey resides in Northborough, Massachusetts.

Mr. Carey was first elected in 2002. His new term will expire in August 2007.

The Board of Trustees has also reelected Charles A. Neumann to the Advisory Committee representing boiler and pressure vessel users.


Charles A. Neumann

Mr. Neumann is pressure vessel specialist/quality assurance manager for Eastman Kodak Company. With the company since 1970, he has held positions as structural/project engineer and project manager.

A resident of Penfield, New York, Mr. Neumann holds professional engineer licenses in the states of New York and Colorado.

Mr. Neumann was first elected in 2000. His new term will expire in August 2007.

Additionally, the Board of Trustees has reelected Edward J. Hoveke to the Advisory Committee representing National Board certificate holders.


Edward J. Hoveke

Mr. Hoveke has been president of Hudson Boiler & Tank Company in Chicago since 1979. In that time, he has served as president of the Industrial Council of Northwest Chicago and as president of the Boiler & Tank Contractors Association of Illinois. He also served on the Illinois Board of Boiler & Pressure Vessel Rules, and as a trustee of the National Boilermaker Industrial Health and Welfare Trust.

A resident of Chicago, Mr. Hoveke was first elected in 2002. His new term will expire in August 2007.

❖

Chicago's Michael J. Ryan Joins National Board

Michael J. Ryan has been elected to the National Board representing Chicago, Illinois. He is chief boiler inspector for the City of Chicago.


Michael J. Ryan

Mr. Ryan began working for the City of Chicago in 1985. He was an apprentice boilermaker from 1976 to 1980, and became a journeyman boilermaker in 1980. He is a member of Local One Chicago Boilermakers and has a City of Chicago Stationary Engineer License.

The Chicago official served in the US Marine Corps from 1971 to 1973.

Mr. Ryan resides in Chicago with his wife Christine and two daughters. He holds National Board Commission No. 12812. ❖

Ron Scott Remembered for National Board Service

The National Board regrets to announce the October 15, 2004, passing of former National Board employee Ron Scott. He resided in Hemet, California.


Ron Scott

Mr. Scott had more than 40 years' experience in the boiler and pressure vessel industry. He was a nuclear inservice inspection supervisor for the Western US with Kemper Insurance Company, and spent four years in Europe as a nuclear inspection supervisor for Royal Insurance Company. Mr. Scott also worked for the State of California for 10 years as a safety engineer in the Pressure Vessel Unit.

With the National Board for nearly 20 years, he served as both training instructor and consultant. From 1994 to 1999, Mr. Scott was a National Board Governmental Affairs and International Representative. In 2002, he retired from the National Board's field staff.

Mr. Scott held National Board endorsements "A," "B," "N," "S," "I," "IS," "C," and "CS."

"Ron was a true asset to the National Board. His dedication to government affairs, training, and the field staff was exceptional. Our hearts are saddened by his loss," expressed Donald Tanner, National Board Executive Director.

Mr. Scott is survived by his daughter Robin Hillemann and companion Ellie Grainger. ❖

National Board Mourns Death of Retired Arkansas Chief Inspector

The National Board regrets to announce the October 5, 2004, death of former Arkansas chief boiler inspector Samuel "Sammie" E. Lyons. He resided in Ash Flat, Arkansas, and was 71 years old.


Sam E. Lyons

Mr. Lyons was graduated from Riverton (Kansas) High School in 1951. After graduation, he joined the Navy and served 22 years, retiring in 1975.

Joining Hartford Steam Boiler Inspection and Insurance Co. in 1975, Mr. Lyons held numerous positions, including supervisor boiler and pressure vessel inspector, assistant chief inspector, staff engineer, and regional supervisor inspector for engineering services. He retired in 1990.

In 1992, Mr. Lyons went to work for the Arkansas Department of Labor, Boiler Division, as deputy boiler inspector. He became chief boiler inspector in 1994, and retired in July 2003. He held National Board Commission No. 8025 with "A" and "B" endorsements.

Mr. Lyons served as a member of the National Board from 1998 to 2003.

He was a member of the Masonic Lodge, US Submarine Vets, VFW, Vets Inc., and BPO Elks.

"Sammie Lyons will certainly be missed. His contributions to the boiler and pressure vessel industry were many," noted National Board Executive Director Donald E. Tanner. "Our sympathies are extended to Mrs. Lyons and family."

Mr. Lyons is survived by his wife, Karen; two sons, Chris Lyons and Todd Lyons; and brother, Wilmer Lyons. ❖

Fred Harrison
Director
National Board Testing Lab

Fred Harrison had a milestone birthday in July of '04. Looking back on his first 50 years of life has offered him quite a view.

"Turning 50 makes you reflect on life and your purpose in it. I have learned to not be so absorbed in the day-to-day. Appreciate what you have," he says philosophically.

And so goes a conversation of much length with the National Board Test Lab's director. Fred is upbeat and positive, wise and perceptive. It is apparent he embraces life.

As test lab director, Fred oversees the pressure relief department, which includes nine employees who conduct nearly 1,800 tests on safety valves a year.

If the name Harrison rings a bell, it is likely because of Executive Director Sam Harrison, who led the National Board from 1968 to 1985. Sam was Fred's father. In fact, Fred's birth announcement ran in the *BULLETIN* when the elder Harrison was chief inspector for North Carolina.

With a start like that, it is easy to see why this safety official was interested in working with the National Board.

As a mechanical engineering student at The Ohio State University, Fred worked part-time as a technician at the test lab when it was located at the Picway Generating Station. After graduation, he joined the Navy in 1977, did a five-year tour of duty aboard nuclear-powered subs, and rejoined the National Board as Test Lab director in April 1982.

"I had been involved with designing test equipment and procedures for the lab before I left for the Navy. I did not intend to come back to the National Board; I wanted to pursue a career in nuclear energy. But the timing of the job offer was uncanny. I couldn't say no," Fred explains.

It was during his time at OSU that he met Michele, and shortly thereafter that they were married. Now residents of the Columbus suburb of Westerville, they are the proud parents of two grown daughters. And extra-proud grandparents of six-year-old grandson Gabriel.

"Being a grandparent is the most amazing thing! The parenting rules completely change. A little one reminds you of what it was like to discover things for the first time. I am in awe of him," Fred reveals with a smile.

With his naval background, it makes sense that Fred enjoys spending time on the water. More specifically, on *Eagle's Wings*, the sailing vessel he and his wife utilize nearly every weekend of nice weather.

Between family, his boat, his church, and work, this history buff seems to be able to put it all into perspective. "Love for my family and faith in God are the most important things in life to me. Everything else is secondary."

Might this be the wisdom of 50 years of life experiences?

"I am just getting started," Fred says with a laugh. ❖

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

The Future of National Board Web-Based Training

BY RICHARD MCGUIRE, MANAGER OF TRAINING

The National Board considers training a vital part of what makes a complete boiler inspector. That is why it was incorporated in the *Rules for Commissioned Inspectors* (NB-263), requiring inspectors to receive training every three years in order to renew their commission. One great way to satisfy this requirement is to attend a National Board training course held at our Training and Conference Center in Columbus, Ohio, or select upcoming courses in Houston and Minneapolis.

Another option for students is Web-based training programs now online and under development by the National Board. Since the online CSD-1 course was launched in March 2004, more than 120 individuals have taken advantage of the opportunity to update their knowledge of CSD-1 requirements. Because several National Board staff members served on the CSD-1 committee, this new course uses firsthand knowledge, ensuring the student receives timely and insightful instruction. Those who have never been exposed to an online format will find the experience to be a remarkably easy and convenient exercise.

The latest online offering is a training program for Certified Individuals (CIs). Manufacturers call upon a CI (employed by the manufacturer) when the Code does not require an authorized inspector. The CI's responsibility is to ensure the manufacturer meets all *ASME Boiler and Pressure Vessel Code* requirements before the Code Symbol stamp is applied to the vessel.

Five different areas of study are offered as part of the CI program: electric boilers, cast-iron heating boilers, miniature unfired pressure vessels, reinforced thermoset plastic pressure vessels, and pressure relief valves. The courses contain valuable knowledge on each of these subjects, even for those who do not wish to become a CI. Commissioned inspectors (not to be confused with CIs) will find these courses particularly beneficial by employing them to satisfy the new three-year training requirement.

Each applicable section is summarized and explained on the password-protected National Board Web site, where students may review the material to fit their schedules. This program helps prepare students for the examination and to ultimately achieve certification by their employer. Currently, the National Board's online program is the only online training for CI certification.

Later this year, the National Board will introduce a training program addressing the *National Board Inspection Code* (NBIC). Five courses focusing on the NBIC will be offered, starting with Part RB. As with other National Board online courses, the Web site will easily navigate the student through the requirements of Part RB, explaining and applying the various paragraphs of the Code.

Part RB will be followed with courses on RC, RD, RA, and the new appendix for installation recommendations. These interactive courses will use quizzes and examinations extensively to help the student gauge his or her comprehension level.

Other programs on the drawing board include ASME Section VIII, Div. 3, accident investigation, and repairs to heat recovery steam generators.

Web-based training is an easy way to stay current with today's changing world. It's convenient and available whenever the student is. And every National Board student can be assured of top quality training materials — supported by an experienced, eminently qualified staff — all reasonably priced. To find out more about the National Board's Web-based training programs, visit *nationalboard.org.* ❖

ENDORSEMENT COURSES

(A) **Authorized Inspector Course** — TUITION: $2,500

March 7–18 June 6–17

Only time offered in 2005!

(N) **Basic Nuclear Inspection Course** — TUITION: $1,250

April 4–8

CONTINUING EDUCATIONAL OPPORTUNITIES

(CWI) **Certified Welding Inspector Review Seminar** —
TUITION: $1,150 (complete seminar with D1.1 Code)
$1,110 (complete seminar with API-1104 Code)
$375 Structural Welding (D1.1) Code Clinic ONLY
$335 API-1104 Clinic ONLY
$440 Welding Inspection Technology (WIT) ONLY
$335 Visual Inspection Workshop (VIW) ONLY

April 25–29 (CWI Exam April 30)

(IBI) **Introduction to Boiler Inspection Course** — TUITION: $2,200

April 11–22

(PEC) **Pre-Commission Examination Course** —
TUITION: $2,500 Full two-week course
$660 Self-Study (week 1) portion*
* self-study materials sent upon payment.
$1,190 Week 2 of course

May 16–27

(R) **Boiler and Pressure Vessel Repair Seminar** — TUITION: $335

March 30–31 (Minneapolis/St. Paul, MN)
June 27–28

(VR) **Repair of Pressure Relief Valves Seminar** — TUITION: $1,250

April 4–8

(WPS) **Welding Procedure Workshop** — TUITION: $670

March 8–10 June 29–July 1

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 _____

NB Commission No. _____

PAYMENT INFORMATION (CHECK ONE):

☐ Check/Money Order Enclosed
☐ P.O. # _____
☐ Payment by Wire Transfer
☐ VISA ☐ MasterCard ☐ American Express

Cardholder _____
Card # _____
Expiration Date _____

HOTEL RESERVATIONS

A list of hotels will be sent to you with your 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, ext. 300, or visit the National Board Web site at *nationalboard.org*.

Greetings from Greenleaf, Wisconsin

The quiet countryside of Greenleaf, Wisconsin, was disrupted at 3:30 in the afternoon Friday, November 24, 1905, when a boiler exploded at Wilharms' flouring mill. Sadly, the life of one of the mill's proprietors, William Wilharms Jr., was taken in the disaster. He shared the duties of running the mill with his three brothers, and on that unfortunate day was acting as engineer for one brother (A.J.) in his absence.

According to the *Brown County Democrat* of December 1, 1905, "The real cause of the explosion of the boiler is unknown as the proprietor had been in the boiler room 5 minutes before the explosion and everything seemed in O.K. working order."

It is interesting to note that in a September 17, 1896, article in the *Democrat*, it was reported that, "Wilharms . . . is of the opinion that water power is cheaper than steam, and is now expending from five to seven hundred dollars in repairing old dams, new flume, new bulk head, new trunk and wheels curbing, etc., hoping to be able to run his mill day and night . . ."

Reports from the scene paint a sad image of wrecked machinery and a destroyed boiler room, with heavy irons scattered about the mill yard for hundreds of feet. The body of the 17-year-old Wilharms was located some 100 feet from where he was last seen firing the boiler, "partly covered in timbers and stone." The verdict of the coroner's jury was accidental death.

A curious point aside, the postmark of the canceled postcard was January 1910, more than four years after the accident had taken place. The newsworthiness of the event had passed. Can it be safely assumed that the grim scene chronicled on the front of the card was less important to the sender than the message of good wishes on the other side?

Have any information about this picture?
We would like to know more! Email getinfo@nationalboard.org.
Thanks to the Brown County (WI) Library for its contribution to this column.