

ABSA THE PRESSURE NEWS

Alberta Boilers Safety Association

Volume 4, Issue 1, March 1999

WARNING - DANGERS OF FURNACE EXPLOSIONS

A major boiler explosion was reported in an automobile manufacturing facility south of the border in the early part of February 1999. It was reported that "Historians and auto officials say the blast was the deadliest accident at an auto facility in at least 50 years". There were two immediate deaths and 14 injured. Two of the injured died shortly afterwards. Two weeks later, another major boiler explosion occurred in a large US City where reportedly "There was an 11 story building there, and now it's just five. And then that's just a shell. When you look inside there, it's just a bunch of steel".

Both accidents are under investigation by the respective jurisdiction authorities and concerned parties at present. In due course we will hear of the details leading up to the disasters. With the assistance of the National Board of Boiler and Pressure Vessel Inspectors, we will continue to monitor the accident investigations.

This will allow us to warn our industrial partners to take the necessary precautions to prevent similar occurrences. In the meantime, initial information concluded that in both cases, a furnace explosion occurred.

Furnaces explosions are not uncommon in our province. Late last January, a boiler operator in Alberta suffered first degree burns to face and injury to one eye when a furnace explosion occurred on starting up a heating boiler. This again highlights the very serious concerns we have for pressure equipment safety and in particular, the hazard of furnace

explosion.

In August 1997, we alerted our readers with an article "Furnace Explosions" which was a reprint courtesy of Boiler Safety Bureau of North Carolina where a serious furnace explosion accident occurred resulting in fatalities. It is important that boilers be operated in strict compliance with the manufacturers' recommendations and regulatory and code requirements. Steps must be taken to avoid similar future accidents in our Province. The following information on furnace explosions is



again provided:

A furnace explosion is usually the result of ignition and instantaneous combustion of highly flammable gas, vapor, or dust that has accumulated in a boiler. The effect of the force from the explosion is often much greater than the boiler combustion chamber can withstand.

Minor explosions, commonly known as deflagration, puffs, flarebacks, or blowbacks, may suddenly blow flames from firing doors and observation ports. Anyone in the path of a flame, which might extend many feet, may be

seriously burned. An increase in the intensity of the explosion would naturally increase the probability of a serious accident.

Furnace explosions may be avoided by taking reasonable precautions:

- Ensure that fuel inlet valves on non-operating burners and ignitors are tightly closed and do not leak.
- Ensure that FD and/or ID fans and burners are in good operating order and condition.
- Purge the furnace in accordance with the manufacturer's specifications each time before the first burner is ignited.
- Ensure that the ignitors, fuel regulating controls, and flame safeguards operate as required.
- Ensure that there are no contaminants in the boiler's fuel system.
- Ensure that the fuel/air ratio is in accordance with the manufacturer's specifications.
- Remove oil guns from idle burners after closing the oil and air or steam supply

valves when shutting down oil burners. Drain and clean residual oil from the guns before storage.

- Never use the boiler's soot blowers to blow soot in a cold boiler.
- Ensure that limit and operating controls are in good working condition and are not "by-passed" or "jumped-out".

Proper operation, proper maintenance, and timely inspections are key elements in ensuring safe boiler operation.

CSA B51 AND ASME

(II) ADMINISTRATIVE REQUIREMENTS

As a continuation of our discussion on the different requirements between Canadian Standards Association (CSA) B51 Boiler, and Pressure Vessel, and Pressure Piping Code and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the administrative requirements are examined in this issue.

In both codes, similar administrative requirements are detailed relative to documentation of manufacturers' certification of code compliance and inspectors' verification. In all cases, proper implementation of a documented quality control system and approval from the jurisdiction having authority is required. The one major significant difference here is the application of the ASME Code Symbol Stamp (such as the S, U, UM and other ASME Code Symbol Stamps which are hereunder referred to as the ASME Code Stamp) to ASME Code vessels. It is a requirement that a manufacturer who wishes to hold and apply the ASME Code Stamp must first submit its quality control program to the ASME for review and implementation audit. If successful, the ASME will authorize the manufacturer to hold and apply the appropriate ASME Code Stamp on the boiler or the pressure vessel.

For the CSA B51 equipment where there is a counterpart in the ASME Code, all stamping requirements are the same as the ASME Code on the nameplates of the equipment with the exception of the ASME Code Stamp.

Accordingly, product manufactured with the ASME Code Stamp will have to satisfy the ASME Code Stamp requirements with respect to the manufacturers' data report and, if imported from outside of Canada, the MDR must also be filed with the National Board of Boiler and Pressure Vessel Inspectors. Boilers and pressure vessels produced to CSA B51 without the ASME Code Stamp will need to be documented with the CSA "Manufacturer's Data Reports".

For cast-iron sectional boilers, since an ASME form is not available, the CSA B51 "Installation Form for Cast-Iron Sectional Boilers" must be completed upon installation.

As noted in the discussion in the last issue, the scope of the CSA B51 is considerably wider. In the case of safety relief valve repair organizations, separate guidelines are given and the National Board VR stamp is deemed meeting the requirements. Other CSA B51 administrative requirements include "Manufacturer's Data Report for Fired Process Heaters", "Construction Data Report for Piping systems", "Statutory Declaration for Registration of Fittings" and "Repair and Alteration Form".

One difference in administrative requirements between the two codes is in the design and welding procedure verifications. This may also be interpreted at times as a difference in technical requirements. For the ASME Code, the inspector is required to "make such other inspections as in his judgment are necessary to permit him to certify that the vessel has been designed and constructed in accordance with the requirements." Also, "The Inspector has the duty of verifying that the applicable calculations have been made and are on file in the Manufacturer's plant at the time the Data Report is signed" (see ASME Section VIII Div. 1 Para. U-2(e)). ASME Section I is clear in that "The Authorized Inspector has the duty to review a selected number of the manufacturer's design calculations to verify compliance with Section I".

Unlike the ASME Code but similar to almost all oversea codes and jurisdictional requirements, a design registration is imposed in the CSA B51. The manufacturer is required to submit the design, with all applicable calculations, and upon verification that the applicable calculations have been carried out by the manufacturer and that the design meets all

applicable code and regulatory requirements, a Canadian Registration Number (CRN) is issued. Provided there are no changes in code or regulatory requirements, an unlimited number of boilers or pressure vessels may be built to the registered design. In addition to providing the jurisdiction and, subsequently the users and repair organizations, a record of the design, the individual inspector in the field need not carry out verification of the calculations each and every time a registered design is used, thus providing more efficient inspection monitoring functions. Similarly, the welding procedure registration system is also detailed in the CSA B51.

To conclude, the administrative requirements in the CSA B51 are similar to those in ASME but are very much national in nature allowing the users to obtain the necessary and fairly uniform administrative requirement information for all provincial and territorial jurisdictions. Thus, almost identical forms are used in these jurisdictions. Without the CSA B51 code, these jurisdictions will most likely be using very different forms or imposing different requirements. In the case of the ASME Code, the forms are widely accepted by the industry and jurisdictions but it will be up to the user to ascertain the different and possibly additional jurisdictional requirements each and everytime. Furthermore, some of the ASME Code administrative requirements, particularly those relative to the ASME Code Stamp authorization, are "Trade Mark" related matters and are governed solely by the ASME policy.

We remind our readers that ABSA cannot speak on behalf of the CSA B51 Technical Committee or the ASME Boiler and Pressure Vessel Committee. It is important that articles in this series are brief summaries for discussion only and the Code users should refer to the respective Codes for full details and requirements.

REGISTRATION OF CHIEF ENGINEER

Registration of Chief Engineers will enable Alberta Boilers Safety Association to effectively and efficiently administer that portion of the Engineers' Regulation, which outlines the supervision requirements for Power and Heating Plants. This will also allow the Alberta Boilers Safety Association to effectively communicate with the appropriate persons in the event of any Legislative, Act, Regulation or Code change that may impact a particular plant, and, the appropriate person in the event of an emergency.

The Engineers' Regulations require **Power Plants** to be operated under the general supervision of a designated Chief Steam Engineer who is responsible for the general care and operation of that Power Plant.

In recognition of this, the Alberta Boilers Safety Association is requesting that all owners or persons in charge of Power Plants, submit to the Alberta Boilers Safety Association, the following information:

POWER PLANTS:

- **Name, certificate classification, and telephone number** of person designated as **Chief Engineer** of the Power Plant.

- **Name** of power plant owner or operator
- **Name and Address (location) of Power Plant.**

Also, the Engineers' Regulations require Heating Plants to be operated under the general supervision of a person qualified to supervise such a Heating Plant. In recognition of this, the Alberta Boilers Safety Association is requesting all Owners or persons in charge of Heating Plants to submit to the Alberta Boilers Safety Association the following information:

HEATING PLANTS:

- **Name, certificate classification, and telephone number** of person designated as responsible for the general supervision of the heating plant.
- **Name** of heating plant owner or operator.
- **Name and Address (location) of Heating Plant.**

Information may be submitted by E-mail to Vaughan Ellis at ellis@albertaboilers.com (preferred), or by Fax (780)-437-7787 or by Mail. Thank you for your assistance in this matter.

National Board 68th General Meeting

The annual general meeting of the National Board is always a prominent occasion wherein keynote speakers will dissect important current boiler and pressure vessel safety issues while providing a venue for meetings of jurisdictional, code committees' and industry people involved in pressure equipment.

This year, the 68th Annual General Meeting of the National Board will be held in conjunction with the ASME International, Boiler and Pressure Vessel Code Committee meeting on May 17-21, 1999 in Greensborough, North Carolina, USA. The theme of this year's conference is "Safety by Choice not by Chance". The week will be opened by Robert F. Kennedy, Jr., and Robert Ulrich and features eminent speakers on various aspects of pressure equipment safety in addition to numerous ASME Boiler and Pressure Vessel Code committees' meetings. Anyone interested in attending should visit the website of the National Board:

<http://www.nationalboard.org>
or contact Joan Webster of the National Board at (614) 888-8320 Ext. 226 or Fax (614) 888-8750.

HIGHLIGHTS FROM THE 3RD ANNUAL PRESSURE EQUIPMENT INDUSTRY CONFERENCE

The 3rd Annual Pressure Equipment Industry Conference sponsored by the Southern Alberta Institute of Technology and supported by the Alberta Boilers Safety Association, was an overwhelming success, thanks to the joint participation from industry leaders and supporters.

On February 3 to 5, the conference brought representatives from all facets of the pressure equipment industry together for an informative three days of presentations and discussions. Ms Irene Lewis, SAIT's President welcomed the delegates. There were two Keynote speakers: Mr. Richard Auchinleck, CEO of Gulf Canada Resources Limited and Mr. Dennis Gartner, Acting Deputy Minister of Alberta Labour.

Delegates represented oil and gas, utilities, pulp and paper, manufacturing and insurance. Guest presenters from a wide range of companies hosted insightful seminars on pertinent topics such as safety issues pertaining to pressure relief valves, pressure equipment data management, amine degradation and corrosion in gas plants and AEUB G-55 Storage Tank Compliance.

This conference is entirely driven by industry. The event represented significant cooperation among a wide range of industry

(Continued on page 6)

Index of Newsletter Articles

Accidents and Alerts

- vol1_02 Hazard Alert
- vol1_03 Accident Reporting
- vol1_04 Rig Boiler Safety
- vol2_02 Fall Protection
- vol2_02 Accident - Propane Bottle turned "Boiler"
- vol2_03 Accidents with Hydrocarbon Condensate & Fire
- vol2_04 Safety Alert Bulletin - Pressurized Cargo Tanks
- vol2_04 Furnace Explosion
- vol2_05 A Warning to Heating Boiler Owners & Operators re LWCO
- vol3_01 Waste Gas Used as Fuel for Boiler
- vol3_02 Mixed Steel; 4" A234 WPB Butt-weld Fittings
- vol3_03 Accident - Safety Procedures Ignored (A Word to the Wise)

Cargo Transport

- vol1_03 Anhydrous Ammonia Nurse Tanks & Transport Tanks

Codes & Standards

- vol1_01 News on Codes
- vol1_03 Code Changes - Large Nozzle Reinforcement
- vol1_05 ACI, CSA B51 & B52 Meetings
- vol1_05 ASME Section IX - Code Change
- vol1_06 Placement of Penetrators
- vol2_01 ASME Code Cases Relating to Pressure Relief Valves
- vol2_02 ASME Section I - Heating Surface Change
- vol2_05 National Board Accepts CSA B51
- vol3_02 Application of Code Cases
- vol3_02 Application of Proposed ASME Code Cases 2278, 2284 & 2290
- vol3_02 Proposed Code Case 2260
- vol3_02 ASME Sec VIII Div 2-Exemption of Impact Test of Welds for WPQ
- vol3_03 Code Publication Update
- vol3_04 CSA B51 and ASME, (I) General Review - Scope and Details

Design Registration

- vol1_04 Design Survey and Registration
- vol1_06 Design Registration - New Application Form
- vol1_06 Gas Drips or Drip Pots
- vol2_01 Design Survey Registration Application Form
- vol2_02 Canadian Registration No. (CRN)
- vol2_03 Section F of ABSA Design Registration Application Form
- vol2_03 Pressure Piping Not Over 0.5m³ in Capacity
- vol2_05 Control of Drawing Revisions
- vol2_06 New Service for Fitting Design Registration
- vol3_01 Clarification of X-Prefixed CRN for Used Equipment
- vol3_03 Alteration of Fittings
- vol3_03 Questions and Answers

Information on In-service Equipment

- vol1_01 Accredited Corporation (and Owner User Program)
- vol1_01 Reporting of Boiler and Pressure Vessel Ownership Changes
- vol1_04 Owner User Inspection Summary Report
- vol1_05 QCP Authorization - Manual Review & Implementation Audit
- vol2_01 On-Stream Leak Sealing of Flanges, Valves & Similar Fittings
- vol2_03 Rental Equipment
- vol3_01 Reporting of B&PV Ownership Changes
- vol3_03 Disposition of Boilers and Pressure Vessels
- vol3_03 ASME Sec VIII Division 2 Vessels - reminder to owners/operators
- vol3_03 Rig Boilers - External Corrosion Warning

Jurisdiction and General Administration information

- vol2_01 Iowa Statute and Regulation change
- vol2_02 Export to China

vol2_04 Visit by CBPVI Director, Pressure Equipment Export to China
vol2_04 Ontario's New Directions in Public Safety Delivery
vol2_04 ASME AIA Accreditation Audit
vol2_05 ABSA Forms
vol2_06 China/ABSA Memorandum of Understanding
vol2_06 Excess Flow Stop Valve on Storage tanks
vol3_01 National Board Accepted as ISO 9000 Registrar
vol3_03 Kansas Pressure Vessel Bill Passes

New Equipment and Equipment Construction, Repair & Alteration

vol1_02 Material Test Report
vol1_02 Initial Inspection of Imported Pressure Vessels & Boilers
vol1_06 Repairs & Alteration Inspection Requirements
vol2_01 Documentation Requirements for Parts used in Repairs/Alterations
vol2_03 Highlights from ASME/NB Joint Annual Meeting
vol2_03 Variance - UM Vessels
vol2_04 Testing of Pressure Piping
vol2_05 A Review of New Construction Inspection - AI, AIA
vol3_01 Nameplate Requirements for New Pressure Vessel
vol3_01 Highlights from recent ASME/Alberta Joint Reviews

Power Plants and Heating Plants

vol1_03 Heating Boiler Safety
vol1_04 Correction to "Heating Boiler Safety", Vol. 1, Issue 3, May 1996
vol2_02 Modification of Power Boilers to Heating Boilers
vol2_02 Hot Water Heating System Expansion Tanks
vol2_04 New Brochure for "Safe Operation & Care of Heating Boilers"
vol2_04 General Supervision of Heating Plants
vol2_05 Starting Heating Boilers After Summer Lay-up
vol2_06 General Supervision of Power Plants

Power Engineering and Safety Codes Officer

vol1_01 Power Engineering: Multiple Choice Exam Questions
vol1_01 Power Engineering: Ontario Joining SOPEEC
vol1_01 SCO Examinations
vol1_02 Power Engineers Annual Registration Requirements
vol1_03 New Location for Power Engineering Exams
vol1_03 Safety Codes Officer Examinations
vol1_06 1997 Examination Schedule
vol2_01 Proposed New 4th & 5th Class Certificates of Competency
vol2_03 Proposed New 4th & 5th Class Certificates of Competency
vol3_01 Valid Power Engineering Certificates of Competency
vol3_02 New 4th and 5th Class Power Engineering Certificates of Competency
vol3_04 Implementing the New 4th and 5th Class Power Engineering Certification

Pressure Relief Devices

vol1_05 Revisions to Pressure Relief Valve Servicing QCP Requirement
vol1_05 SRV - Pressure Setting and Nameplate Requirements
vol1_06 Safety Valve Drains and Discharge Piping
vol2_05 Safety Valve Servicing
vol3_01 New Certification of Rupture Disk Devices
vol3_03 PRV Repairs
vol3_03 Protection of Pressure Vessels

Welding and Welder Examination

vol1_02 Welder Testing - Safety
vol1_03 Grade "B" Pressure Welder's Certificate of Competency
vol1_05 Non-Pressure Attachment Welds
vol1_06 Welding Test Centres
vol2_01 Grade "C" Pressure Welder's Certificate of Competency
vol2_04 Pressure Welder's Certificate of Competency
vol2_06 Alert - Pressure Welder's Certificate of Competency
vol3_01 Welder Test Centre Relocation
vol3_03 Brazing Qualifications & Brazing Procedures
vol3_03 Non-Pressure Attachment Welds

CARBON MONOXIDE POISONING FROM BOILER EXHAUST

It was reported in early November last year that a man died in southern Alberta due to carbon monoxide poisoning from the exhaust of a water heater. We wish to warn all boiler owners that in addition to ensuring pressure containment integrity of boiler and associated pressure fittings and controls, it is the owners' responsibility and it is critical to check that carbon monoxide is not a killer let loose by the equipment.

We have also been alerted to incidents occurring elsewhere in Canada and out of the country. In Toronto, more than 600 people in two Toronto apartment buildings were evacuated just before Christmas because of carbon monoxide leakage from furnaces. It was said in one case that "A 911 call by a family that had fallen ill alerted rescue crews to an impending disaster at an 18-storey high rise" and "No one was seriously hurt but 11 people needed hospital treatment". The National Board of Boiler and Pressure Vessel Inspectors, in their Spring 1995 Bulletin, reported that "According to the U.S. Consumer Product Safety Commission, an estimated 250 persons die and almost 5,000 are injured each year in non-fire-related carbon monoxide poisoning. Estimates of non-fatal injuries are

difficult to determine because many victims do not seek treatment or are misdiagnosed as having colds or influenza. However, these estimates suggest that there are 20 non-fatal injuries for every fatal carbon monoxide poisoning".

In the fatal accident in southern Alberta, the source of the exhaust was a small heating boiler that is of a class exempted from installation inspection requirements under the Safety Codes Act. In fact, it should be noted that, irrespective of boiler size, flue gas exhausts and chimneys are not part of the pressure containment and are not subject to the requirements and inspections of the codes and standards adopted as part of the pressure equipment regulations. No different from other areas not addressed specifically by the codes and standards and regulations, owners and operators are strongly reminded that health and safety hazards involved in the non-pressure part of the pressure equipment operation must be addressed with all necessary precautions.

(Continued from page 3)

representatives. The conference was coordinated by SAIT's Energy and Natural Resources Department. It ran at the world-renowned Banff Centre which is set against the majestic backdrop of the Rocky Mountains in Banff, Alberta. The conference was a tremendous opportunity for participants to share ideas and concepts with industry leaders.

Next year's conference will be HELD from February 2 to 4. If you would like more information please contact Mr. Larry Sever at (403-284-8290) at SAIT for details.

ABSA OFFICES

Edmonton - Head Office
#200, 4208 - 97 Street
Edmonton, Alberta T6E 5Z9
Tel (780) 437-9100
Fax (780) 437-7787

Calgary
Tower 3, #590 1212-31 Avenue N.E.
Calgary, Alberta T2E 7S8
Tel (403) 291-7070
Fax (403) 291-4545

Grande Prairie
#203, 10109 - 97 Avenue
Grande Prairie, Alberta T8V 0N5
Tel (780) 538-9922
Fax (780)538-9400

Lethbridge
3rd Floor, 200 - 5 Avenue South
Lethbridge, Alberta T1J 4C7
Tel (403)381-5423
Fax (403)382-4426

Medicine Hat
Main Fl., 346 - 3rd Street S.E.
Medicine Hat, Alberta T1A 0G7
Tel (403)529-3520
Fax (403)529-3632

Red Deer
#402, 4406 Gaetz Avenue
Red Deer, Alberta T4N 3Z6
Tel (403) 341-6677
Fax (403) 341-3377

St. Paul
Room 407, 5025 - 49 Avenue
St. Paul, Alberta T0A 3A4
Tel (780)645-6350
Fax (780)645-6352

Internet address
<http://www.albertaboilers.com>

CONTENTS

Warning - Furnace Explosion	1
CSA B51 & ASME (II)	2
Registration of Chief Engineer	3
3rd Annual Pressure Equipment Conf.	3
National Board 68th General Meeting	3
Index for Past Articles	4
Carbon Monoxide Poisoning	6

This Newsletter is a publication of Alberta Boilers Safety Association (ABSA). ABSA grants readers permission to make photocopies of this Newsletter for free distribution to employees and business associates. Articles may be copied in part or in whole provided credit be given to ABSA.



Alberta Boilers Safety Association
#200, 4208-97 Street
Edmonton, Alberta
T6E 5Z9

**Canadian Publication
Agreement No.
1470019**