

# ABSA THE PRESSURE NEWS

Alberta Boilers Safety Association

Volume 1, Issue 3, May 1996

## Message From ABSA's Chief Inspector

A major reason for the publication of *The Pressure News* is the dissemination of administrative and technical information relative to regulatory and standards' requirements in the field of pressure equipment in the Province of Alberta. A rapidly changing environment, including technological advances, impacts on all program services we provide. For example, code changes historically occurred infrequently and not in great detail. Today, these same changes occur annually and can number hundreds of pages. To allow for more effective program delivery and thus better public safety in our field, we must endeavour to keep the people we serve better informed with up-to-date changes and interpretations of these requirements.

In this and future issues, we will focus on subject matter directly relevant to the program services we provide. Safety concerns related to heating boilers are highlighted in one article, while a change in ASME Section VIII, Division 1 pressure vessel code which could have important consequences is highlighted in another. The need and importance for reporting pressure equipment accidents is detailed, and we discuss the use of anhydrous ammonia transport vessels. In this issue we also continue to examine the subject of welding, with information on pressure welder testing. We hope with the help of *The Pressure News*, we can all do our share more effectively towards pressure equipment safety. To that goal, your input on the direction of the newsletter and the material published to date will be very much appreciated.

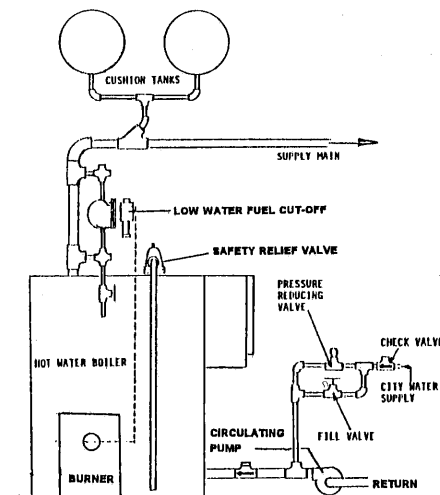
Ken Lau,  
Chief Inspector and Administrator

## Heating Boiler Safety

As we complete a long, harsh Alberta winter, now is a good time for all heating boiler owners and operators, particularly owners of apartment buildings, to have a good look at the equipment that keeps our buildings warm in winter. Every year a number of dangerous and expensive boiler accidents take place in Alberta. Most could have been avoided through simple maintenance of safety features common to all heating boilers. In Alberta, our inspectors find over 100 defective *LOW WATER FUEL CUT-OFF* controls each year when inspecting heating boilers. Such defects, usually due to a lack of maintenance, are the major cause of boiler explosions.

Low water conditions can be caused by one of the following:

1. Failure of the feed pump or feed pump motor
2. Vapour lock of the feed pump or condensate pump
3. Defective check valve or clogged strainer in feed line
4. Blown fuse or tripped breaker
5. Defective electrical wiring or controls



**TYPICAL  
HOT WATER BOILER**

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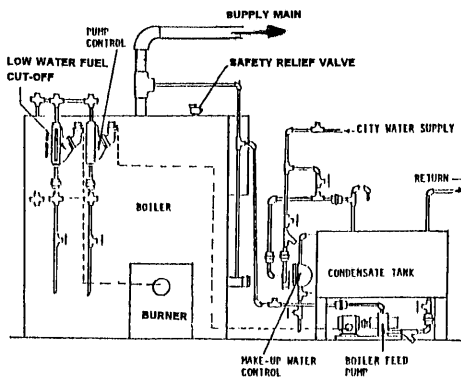
If a low water condition is not properly sensed and the fuel valve does not shut down, the boiler will overheat due to exposed metal surfaces (i.e. not wetted). Overheated boilers will be permanently damaged. If the safety valve has not been serviced properly and does not relieve the pressure adequately, the boiler could explode violently and result in injury or death to personnel.

Inoperative **LOW WATER FUEL CUT-OFF** controls can be caused by one of the following conditions:

1. Accumulation of mud, scale or sediment in the float chamber
2. Mechanical failure of the mechanism in the float assembly
3. Electrical component failure in the float assembly or improper wiring by inexperienced personnel.

Periodic testing of the **LOW WATER FUEL CUT-OFF** control and regular inspections are essential steps in maintaining a safe and operable heating system and ensuring that, come next heating season, you and your equipment will be ready.

**Remember**, a heating system must be operated and repaired by an authorized person who has received this authorization from ABSA's Chief Inspector in writing. A Building Operator's Certificate is required for operation of a heating plant with a rating of 750 kW (75 hp) or more. However, ABSA recommends that persons operating smaller heating plants take an introductory Operator's course available from the Colleges by correspondence at a nominal cost. For further information or a complete brochure on Heating Boiler Safety please call us at (403)437-9100 Ext 315.



**TYPICAL  
STEAM BOILER**

## Code Changes Large Nozzle Reinforcement

This item will be of interest to all manufacturers of ASME Section VIII, Division 1 pressure vessels.

The A95 Addenda to ASME Section VIII, Div.1, Appendix 1-7, *Large Openings in Cylindrical Shells*, contain some significant changes which will impact many pressure vessel manufacturers. Effective July 1, 1996, it will be mandatory to apply these new rules.

Openings exceeding the dimensional limits given in UG-36(b)(1) will still have to have the more compact reinforcement that they have always needed but new requirements have been introduced. Now, openings for **radial** nozzles exceeding the limits in UG-36(b)(1), with ratios of  $R_n/R$  up to and including 0.7 (where  $R_n$  &  $R$  are the nozzle and cylindrical shell radii respectively) shall satisfy equation (1) or (2) of Appendix 1-7 depending on whether there is a repad or not. This calculation of the membrane stress, in itself, will not typically cause any hardship. However, the requirement to meet equation (5) of Appendix 1-7 for the bending stress associated with the large opening will seemingly require significantly more metal to keep the sum of the membrane and bending stresses at not more than 1.5 times the allowable stress from Section II, Part D, for the materials involved.

We understand that these new rules are derived from a 1979 ASME paper by W. L. McBride and W. S. Jacobs entitled *Design of Radial Nozzles in Cylindrical Shells for Internal Pressure*. The difference appears to be that McBride and Jacobs determined that the cross-sectional area near the nozzle-to-shell intersection which can be considered to resist the bending moment was considerably larger than the area which resists the membrane load, while the revised Appendix 1-7 makes the areas equal at the smaller value. Since the section modulus of the area resisting the moment is proportional to the cube of the depth of that section, it can be readily seen that the bending stresses will increase rapidly with a less deep section to resist the moment.

Of additional major concern is the use of the term "radial". It appears that if one has a non-radial large nozzle (i.e. a hillside or tangential nozzle or any nozzle, the axis of which is not perpendicular to the vessel shell) on a cylinder, then even the rules of Appendix 1-7 will not be considered adequate and the designer will have to revert to the rules of U-2(g), which could involve proof testing if no calculation method can be shown to apply.

The Manufacturer should also note that the wording of UG-36(b)(1) is **not** "size of nozzles", it is "size of openings". This means that for non-radial nozzles, if the size of the opening in the shell in **any** plane (think about hillside or slanted nozzles) exceeds the limits in UG-36(b)(1), U-2(g) will automatically apply.

We understand that representations are being made to the Code Committee on this item. You may wish to calculate a large nozzle to the current rules and to the A95 rules to see what the impact is on your design. Then, if you find a radical discrepancy, you may wish to approach ASME yourself.

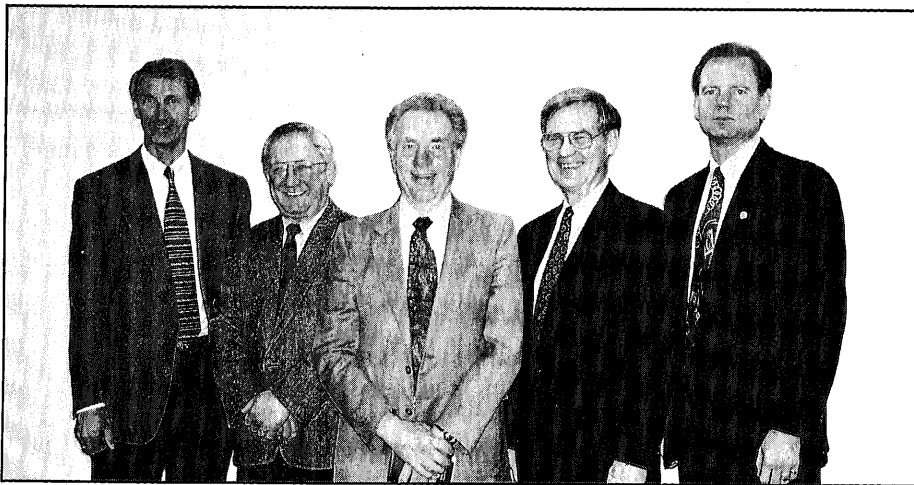
## ABSA Facts

Did you know that ABSA:

- reviews over 8000 design submissions every year?
- conducts over 3500 examinations every year for power engineers and heating plant operators?
- certified 233 B-pressure welders for initial certification in 1995?
- maintains records for over 100,000 pressure vessels?

Did you know Alberta has:

- over 74,000 boilers and pressure vessels under annual registration?
- over 13,000 LP and HP boilers?
- nearly 15,000 registered power engineers or heating plant operators?
- over 800 Quality Control programs registered?
- over one third of Canada's refineries and petro chemical plants?



**ABSA's Board of Directors**

Our first Board of Directors consists of (from left to right) Ted Seaman (Syncrude Canada Ltd.), Frank Kapuscinski, Treasurer (Institute of Power Engineers), Al Fitcher, Chairman (Celanese Canada Inc.), Al Brekke, Vice-Chairman (Alberta Power Limited) and Barry Kossowan, Secretary (Dacro Industries).

These dedicated volunteers, who represent various industries and other interest groups, have spent many long hours in the last few years focusing on the establishment and formation of ABSA. The five volunteer board members are elected for up to a three year period. Four of the members are elected through a nominating committee and the fifth member is appointed by the Minister of Labour.

### **Anhydrous Ammonia (NH<sub>3</sub>) Nurse Tanks and Transport Tanks**

There appears to be a great deal of confusion among NH<sub>3</sub> fertilizer dealers regarding a communique issued by the Canadian Association of Agri-Retailers (CAAR) last summer. Among other issues, this communique made the following statements:

- a) "You do not have to have your nurse tanks tested until after next spring season" and
- b) "Transport Canada has now determined that nurse tanks under twenty years of age will not require testing".

Transport Canada's requirements are being implemented in the field of transportation of dangerous goods and will be examined more thoroughly at a later date. Specifically, on this subject, both statements from CAAR are probably quite accurate but nurse tanks MUST NOT be confused with highway transport tanks or truck mounted delivery tanks. The confusion appears to come from the many uses of the term nurse tank in the fertilizer industry. "Nurse tanks" referred to by CAAR are the wagon

mounted 1000 - 1500 gallon tanks used to move product from storage tanks or transport tanks to the field and often serve double duty as applicator tanks when attached to cultivators. In ANSI K61.1 Standard, which has been adopted as part of Alberta's regulations, requirements for these small tanks are detailed under Sections 11 and 12 for "Systems Mounted on Farm Wagons (Implements of Husbandry)" for the transportation and application of ammonia.

Some people in the fertilizer industry, quite erroneously, refer to the truck mounted tanks used for local delivery of product from the dealer's storage tank to the farm as nurse tanks. These truck mounted delivery tanks are in fact highway transport tanks. In ANSI K61.1, these tanks are classified under Section 9 of the standard as "Systems Mounted on Trucks, Semi-Trailers, and Trailers" and are subject to all the inspection and testing requirements of transport tanks.

Any dealers who have let the mandatory inspection of their

transport tanks lapse because of a misunderstanding of the communique from CAAR, or for any other reasons, must take immediate action to get the inspection of the tanks up to date. An expiry date is indicated in the Certificate of Inspection. Use of transport tanks beyond the expiry date on the Certificate of Inspection is prohibited.

### **New Computer Software**

To help us do our day-to-day business, ABSA will begin using a new custom software application in late May. Once all phases are complete, the new application will allow ABSA to continuously track vessels from birth to scrap; from the design document submission through the data report, initial and periodic inspections and sale or scrap. The initial phase will replace the current mainframe system and provide us with a more user-friendly interface through Windows\*. Ongoing phased development will add additional features.

This will help ABSA to predict upcoming inspections and to balance work loads among inspectors. The application will also provide a grouping of accounts for the same company with equipment in different plant sites. It has been created to be flexible for future enhancements. Possible future enhancements may be to include adding graphical management reporting for the purpose of analyzing trends as well as remote accessibility by laptops anywhere in the province.

The system uses state of the art technology with a Sybase\* database running on Novell\* servers and will interface with a new accounting package which also runs on Windows\*. The development is being carried out by Open Solutions Development Corporation\*, a client/server solutions company with offices in Edmonton and Calgary.

ABSA will attempt to stay at the leading edge of the technology in order to provide timely response and accurate information to our customers. If you have an inquiry, please contact us for further information.

\*Note: All companies and products mentioned are trademarks or registered trademarks of respective owners.

## Accident Reporting

Section 18 (1) of the Administrative Items Regulation under the Safety Codes Act requires that "If an accident involving a boiler, pressure vessel, power plant, heating plant, or pressure plant occurs and the accident results in damage to property or in injury to or death of a person, the owner or person in charge shall send a full report in writing by registered or certified mail to a technical Administrator for the boilers and pressure vessels discipline as soon as possible after the accident and shall specify in that report,

- (a) the exact place of the accident,
- (b) the name of any person killed or injured as a result of the accident,
- (c) a description of any damage to the property, and
- (d) the cause and particulars of the accident, as far as can be ascertained."

Section 44(1) of the Act also provides for ABSA's investigation of accidents, while Section 18(2) of the Regulations notes that, except insofar as may be necessary for the purpose of preventing death or injury or protecting property, no person shall remove or interfere with anything in, on or about the place where the accident occurred until a Safety Codes Officer in the boilers and pressure vessels discipline has made an inspection of the site.

It is critical that equipment owners report accidents promptly. Reporting accidents, in addition to being a legislated requirement, will allow speedy investigation, and thus the possible continued operation of the plant. Accident investigation is one of the programs delegated to ABSA. Between April and October last year, a total of 19 accidents were investigated.

By evaluating the accident reports and investigation findings, measures can be taken on whether or not proposals should be made for changes to ABSA policies and procedures, Provincial legislation or the adopted codes and standards. As well, decisions may be made on the dissemination of information to the concerned public as to how similar accidents may be prevented. Information exchange with other jurisdictions and

jurisdictional bodies such as the National Board in this program area also allows for better pressure equipment safety nationally and internationally.

## New Locations for Power Engineering Exams

Please note that three of our examination centers have changed locations. Effective April 1, 1996 the Edmonton examinations will be conducted at our head office, #200, 4208 - 97 Street. Effective May 10 Red Deer conducts examinations at Red Deer College and Calgary has been conducting examinations at SAIT since March 1, 1996.

## Employment Opportunities

Visit the ABSA Internet e-mail address for current job opportunities.

## Safety Codes Officer Examinations

In accordance with the guidelines of the Safety Codes Council (SCC), all Safety Codes Officer (SCO) examination applicants must first apply to the SCC for certification. This will allow for the assessment of the applicants' education and experience before applying to ABSA for examination and the determination by the SCC if equivalency can be granted allowing for exemption from one or more examination papers. Details respecting SCO applications, including education, experience, examination and other requirements, are specified in SCC Information Bulletin No. 9 "Certification Requirements for Safety Codes Officers in the Boiler and Pressure Vessel Safety Discipline". A copy of this bulletin which was last revised January 23, 1996, may be obtained from the SCC, 6th Floor, 10808-99 Avenue, Edmonton T5K 0G5 or from any Alberta Labour office.

This Newsletter is a publication of Alberta Boilers Safety Association (ABSA). ABSA grants readers permission to make photocopies of this Newsletter for non-profit distribution to employees and business associates.

## Grade "B" Pressure Welder's Certificate of Competency

Due to the increasing number of applications received by ABSA for the Grade B Pressure Welder Certification and numerous queries regarding same, a brief review of the requirements would seem to be appropriate at this time.

Candidates who desire to take the Grade B Pressure Welder Certificate of Competency examination must have at least one of the following qualifications:

- 1) hold a Alberta Journeyman Certificate of Proficiency issued under the Apprenticeship and Industry Training Act, or
- 2) hold a journeyman welder's interprovincial red seal certificate of competency from another jurisdiction, or
- 3) hold an Alberta Journeyman Equivalency Document issued by Alberta Career Development and Employment.

The fee for this examination is \$85.00 payable by cash, credit card or cheque. The examination is conducted using a 6- inch coupon (schedule 80 pipe) in the 2G & 5G positions with an E-6010 root pass (1/8" electrode) and an E-7018 fill & cap (3/32" & 1/8" electrodes).

Candidates must supply their own safety equipment and protective clothing. The time allotment for the examination is 3.5 hours and allows for the preparing, welding and completing of the test coupon. The coupon will then be subject to four root and four face bends.

Application for the Grade B Pressure Welder Certificate of Competency examination may be made at any ABSA office. Candidates should bring the required documentation and funds so their application can be promptly processed and an examination date scheduled.

If there any questions related to the Pressure Welder Competency Examination requirements or testing, please contact a local ABSA office.