ABSA THE PRESSURE NEWS

Alberta Boilers Safety Association

Volume 4, Issue 4, December 1999

We have just reached our fiscal year end at ABSA - a time of reflecting on last year s accomplishments, but also planning our focus for next year and beyond. Our organization holds pressure vessel safety and the preservation of human life as paramount and we are committed to the effective implementation of appropriate safety programs. Unfortunately, Alberta s pressure equipment industry recorded its first fatality due to pressure equipment failure since 1994. A treater exploded in an oil battery, fatally injuring the operator. Information alerts regarding the incident were sent to all oilfield treater operators in order to inform them of actions they should take to prevent similar occurrences.

Another major accident at an oil recycling plant in Calgary resulted in 2 fatalities and a major public exposure incident. ABSA continues to provide support to the investigating authorities. The incident is not believed to have involved the two registered pressure vessels that were located on the site. However, to ensure that we have taken timely action to address possible safety implications arising from this accident, inspectors made it a priority to inspect all oil recycling plants in the province.

ABSA is moving aggressively to eliminate the backlog of overdue inspections and the Auditor General has recognized the effort in his 1999 report to Alberta Labour. We have eliminated roughly 65 percent of the backlog that was outstanding in 1995 and dealing with the remainder over the next 2 years continues to be one of ABSA s priorities.

In August, we asked an independent consultant to conduct a comprehensive Client and Employee Survey. Feedback confirmed that the most important service elements to our customers are Responsiveness, Reliability and Competency. There was a general improvement in the number of clients satisfied with these elements when compared to a similar 1996 survey, however there is still room for further improvement.

ABSA will continue to concentrate on initiatives that will further improve our customers level of satisfaction with our services. Thank you to all who participated by completing the questionnaires.

The process established to coordinate submissions of owner/user inspection records has proved effective and has been a key element in reducing Owner/User inspection backlog to below 24%, from the 46% that were outstanding at the beginning of the year. This achievement was only made possible by the cooperation of our customers and the effort put in by our staff in promoting owner user programs in the field. This effort is crucial to ensure effective management of this program long term.

ABSA's activity in terms of Codes and Standards development and Administrative programs was significant again this year. Our current participation in the Canadian Standards Association, Association of Chief Inspectors, ASME Boiler & Pressure Vessel Code and National Board venues is crucial to the pressure equipment safety programs in the province. Regarding legislation in the province, we participated in reviews of the Pressure Welders Regulations, Engineers Regulations, and Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

ABSA s stated Vision is To provide leadership in pressure equipment safety through professionalism and our commitment to excellence in service in cooperation with our stakeholders . We are pleased with the results achieved this year and look forward to continued improvements in the service we provide our stakeholders and the people of Alberta.

On behalf of the Board and all the staff at ABSA, I would like to take this opportunity to wish you all the best of the holiday season as you share it with family and friends.

Merry Christmas and a Happy New Year.

Gordon Campbell
General Manager

Season's Greetings

Our very best wishes for
a happy holiday
and
a prosperous New Year

Have you visited us on the Internet yet? - www.albertaboilers.com

Bright Shiny Good Stuff
A Caution to the Use of Austenitic Stainless Steel

A presentation was made by Mr. R. Schueler on the use of austenitic stainless steel on October 28, 1999 during the Annual Chiefs' Technical Seminar held at Columbus, Ohio. The presentation can be summarized as follows:

Type 300 series stainless steel has been used in boiler and pressure vessel applications for quite some time. Typically it is used where contamination and/or corrosion may be considered a problem. Some typical applications include food processing vessels and boiler superheaters.

However, it is important to consider that there may be downsides with the use of these materials. For many years, the oldest code of the ASME, Section I, Power Boilers, has made a number of precautionary statements for the use of austenitic stainless steel. However, because not all people took notice of the provisions, a number of revisions in Section I have been added in the last few years.

In particular, a new paragraph PG-5.5 was added in the 1998 Addenda which states that "The use of austenitic stainless steel is permitted for boiler pressure parts which are steam touched (sic) in normal operation. However, the use of such steel for boiler pressure parts which are water wetted in normal service is prohibited except as specifically provided in PG-12 and PEB-5.3.[1]"

The added footnote (1) of the paragraph noted that "Austenitic alloys are susceptible to intergranular corrosion and stress corrosion cracking when used in boiler applications in water wetted service. Factors which affected the sensitivity to these metallurgical phenomena are applied or residual stress and water chemistry. Susceptibility to attack is usually enhanced by using the material in a stressed condition with a concentration of corrosion agents (e.g. chlorides, caustic, or reduced sulfur species). For successful operation in water environments, residual and applied stresses must be minimized and careful attention must be paid to continuous control of water chemistry."

The 1999 Addenda of the ASME Section I Code introduced a new set of rules under paragraph PG-19 which requires the calculation of percentage strain in the forming of the various shapes used and items exceeding the limits will have to be heat treated at a temperature over 1800°F (982°C) and in some cases over 2050°F (1121°C).

Although not having the statements because the Section is less product specific, ASME Section VIII Division 1 provides for guidance under paragraph UHA-6 that "Specific chemical compositions, heat treatment procedures, fabrication requirements and supplementary tests may be required to assure that the material will be in its most favorable condition for the intended service. It goes on to note that "This is particularly true for vessels subject to severe corrosion. These rules do not indicate the selection of an alloy suitable for the intended service or the amount of corrosion allowance to be provided".

For the National Board Inspection Code, NBIC-23, paragraph RB-3240(g) also provides for specific guidance on this matter. It should be noted that stress corrosion cracking introduced by chlorides could actually occur in such simple instances as a hydrostatic test using city water.

The three factors which promote Stress Corrosion Cracking in this case are a) Stress which could be induced by pressure or weight, b) chemistry of contents, such as a very small amount of chloride and c) a liquid, normally water, in contact with the metal. Removal of any one of the three factors will help to prevent this form of corrosion.

Other possible problem areas with the use of stainless steel in conjunction with carbon steel include the different heat treatment temperatures and differential expansion. P-1 material is typically heat treated in 1100°F range while P-8 in the 1900°F range. Also, stainless steel typically has an expansion rate 1.5 times that of carbon steel. Special attention must be paid when the materials are used together.

Codes and standards provide for good guidance but purchasers, designers, manufacturers and users need to become more aware of the properties of stainless steel for the actual intended services to allow for safe pressure equipment applications."

(Continued on page 4)

FOURTH ANNUAL PRESSURE EQUIPMENT INDUSTRY CONFERENCE

The Energy & Natural Resources Department of SAIT, with support from ABSA, is coordinating the Fourth Annual Pressure Equipment Industry Conference scheduled for February 2-4, 2000. The Conference will be held at the Banff Centre in Banff, Alberta.

The theme of the Conference is Failure is not an Option . The Honorable Walter Paszkowski, Minister of Municipal Affairs (tentative) will be the Keynote Speaker.

For more information, please contact Energy & Natural Resources Department of SAIT:

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USE OF RUPTURE DISC IN COMBINATION WITH PRESSURE RELIEF VALVE

The use of non-reclosing pressure relief devices such as rupture disc devices is permitted by all Divisions of Section VIII of the ASME Code. The *Design, Construction and Installation of Boilers and Pressure Vessels Regulations*, Section 41(2), however, requires that pressure equipment installed under the provisions of the *Safety Codes Act*, must be protected by pressure relief valves (PRVs) when in operation. The use of rupture disc devices as primary overpressure protective devices, either as the sole device or between the PRV and the vessel, requires specific approval from ABSA.

According to ASME Section VIII, Division 1, a rupture disc device may be installed between a vessel and its PRV provided the combined relieving capacity is determined by:

a) multiplying the marked relieving capacity of the PRV by 0.90 [ref. UG-127(a)(3)(b)(2)]

or,

b) capicity certification tests of the combination of the PRV and rupture disc device in accordance with UG-132, at the request of the Manufacturer of the PRV or of the rupture disc device [ref. UG-127(a)(3)(b)(3)]

Section IV of National Board publication NB-18, *Pressure Relief Device Certifications*, lists Combination Capacity Factors of various brands and models of rupture disc devices in combination with various brands and models of PRVs. For the combinations listed in NB-18, the published Combination Capacity Factor is the multiplier by which the marked relieving capacity of the PRV must be adjusted to determine the permissible combined relieving capacity. If the combination of specific devices is not listed in NB-18, the Combination Capacity Factor is 0.90, as noted in a) above.

The combined relieving capacity must be sufficient to prevent the pressure in the vessel from rising to more than 110% of the maximum allowable working pressure (MAWP) (or such other percentage as permitted by Code under specified circumstances) while the combination of devices is relieving the excess pressure [ref. UG-125(c) and UG-133(a).]

The combined relieving capacity shall be marked on the PRV, on the rupture disc device or on a plate or plates which satisfy Code paragraph UG-119. Such marking shall satisfy the requirements of UG-129(c).

When such combination is used, the owner shall maintain documentation on file certifying:

- combined relieving capacity of the PRV and Rupture Disc combination.
- Compliance with ASME VIII-I, paragraphs UG 125.

The documentation shall be available to an ABSA inspector for his review.

Other Requirements:

1. For new installations commissioned after January 1, 1999, rupture disc devices shall bear the official ASME Code "**UD**" symbol stamp unless a supply of non 'UD' stamped discs were procured prior to this date. Non 'UD' stamped Rupture Discs used from the stock shall be accompanied by manufacturer's certificate indicating compliance to ASME VIII-I, Code Edition and Addenda to which the disc was manufactured.
2. When replacing Rupture Discs of existing installations, requirements of paragraph 1 shall apply.
3. The Rupture Disc shall be registered as a category 'G' Fitting in Alberta (for Alberta installations). Canadian Registration Number (CRN) shall be stamped on the disc tab (CSA B51, 5.3.1).
4. Space between a Rupture Disc device and a PRV shall be provided with a pressure gage, a try cock, free vent, or suitable telltale indicator. This arrangement permits detection of disc rupture or leakage [UG 127 (a) (3) (b) (4)].

EUROPEAN UNION PRESSURE EQUIPMENT DIRECTIVE 97/23/EC

As part of the recent ABSA Code seminars for industry, a presentation was made on the European Pressure Equipment Directive (PED) 97/23/EC. A summary of the presentation is briefly described here.

"Directives" as issued by the European Parliament and the Council of the European Union are "laws" which each member state is obliged to translate into their national laws within a specific period of time. The PED is effective November 29, 1999 and between November 29, 1999 and May 29, 2002, pressure equipment may comply with the PED or existing national requirements. However, after May 29, 2002, the PED will be mandatory in the European Community member states.

The PED provides for essential safety requirements. Proof of conformity will necessitate different modules of conformity assessment procedures depending on different categories (levels of risk) of equipment. The PED will impact on pressure equipment of 0.5 bar (approx. 7.5 psig or 52 kpa) pressure. In addition, only "Notified Bodies" will be allowed to perform the necessary third party inspection, verification, and accreditation and certification

(Continued on page 4)

(Continued from page 2)

Coming after the alert we issued in the last issue of the Pressure News concerning the mistaken substitution of stainless steel for carbon steel in a mechanical clamp that caused a catastrophic failure, Mr. Schueler's presentation again alerted our industry to the importance of cautions that must be exercised in the selection and use of materials for pressure equipment.

ABSA wishes to acknowledge the support of the National Board in all matters related to pressure equipment safety in general and in the publication of this article in particular.

(Continued from page 3)

services when such services are required as part of the conformity assessment procedures. Also, only materials acceptable to the PED will be allowed for use in pressure equipment construction.

A new pressure equipment design and construction standard is being prepared by CEN and is expected to provide for extensively different requirements from the international standards currently in use. It is expected that the PED will greatly affect pressure equipment exports to the European Community. Companies exporting pressure equipment to European Union countries should be prepared before the PED becomes mandatory.

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