

# ABSA THE PRESSURE NEWS

Alberta Boilers Safety Association

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## MAJOR REORGANIZATION POSITIONS GOVERNMENT FOR THE 21<sup>ST</sup> CENTURY

A major reorganization effort was announced in order to position the Alberta Government for the 21st century. With the announcement by Premier Ralph Klein on May 20, 1999, the responsibilities for pressure equipment safety, and other public safety disciplines, have been transferred to the Department of Municipal Affairs from the Department of Labour. There will be no change in ABSA's operation but you will find that certificates issued by ABSA will shortly be reflecting the change to the Department of Municipal Affairs.

## MANUFACTURERS TRAINING WORKSHOP

ABSA will be holding a Manufacturer's Quality Control and ASME Code Fabrication Workshop at Calgary and Edmonton in late September. The workshop in Edmonton will be held on September 28, 1999 in Calgary and on September 30, 1999 in Edmonton.

Workshop topics to be presented are designed for those holding job responsibilities in quality control and inspection and shop foremen. This program is structured in a workshop format, which allows time for questions from the audience at the end of each presentation. A panel of senior ABSA staff members will be available to respond to the questions. In the interest of adding value to the workshop, it is requested that any questions that may involve some

research time, on any topic in the program be submitted by e-mail to [bolt@albertaboilers.com](mailto:bolt@albertaboilers.com) or in writing to Mr. Larry Bolt (Southern Region Authorized Inspector Supervisor, ABSA's Southern Regional Office in Calgary) prior to Sept. 1, 1999. This will allow us to either build the reply into the presentation or have the panel respond during the discussion period.

Due to limited seating, we would suggest a maximum of 2 attendees per Company. Also, seat allocation will be made on a first-come, first-served basis. You may obtain further information and the application form from your nearest ABSA office. The deadline for registration is Sept. 1, 1999.

## PROPER PROCEDURES AND EMPLOYEE TRAINING NEEDED

On November 25, 1998, a coker fire and explosion at a refinery in the State of Washington, USA, resulted in six fatalities. A six-month investigation by the Washington Department of Labor and Industries concluded with "an unprecedented US\$4.4 million compliance agreement designed to make the ..... refinery safer and more healthful for workers".

While the tragedy was initiated "when a storm and high winds knocked out power, depriving the refinery of its ability to generate steam", it is significant to note that administrative violations were found that were essentially all related to inadequate procedures and employee training. We would like to draw the attention of our industry to the fact that, irrespective of advances in pressure equipment technology and design, it is critical to remember the human elements involved. Proper procedures must be put in place and operators properly trained and certified in all pressure equipment operations to ensure proper safety.

Readers who wish to review this incident in further detail may visit the Internet web page <http://www.wa.gov/lni/news/pr52699.htm>. We would like to compliment the excellent work of the Washington Department of Labor and Industries and their boiler and pressure vessel staff in helping to promote pressure equipment safety and making the investigation results available.

## Vendor Evaluation Audits

An important element of ABSA certified Owner/User programs is evaluation of suppliers of goods and services. The evaluation process includes an audit of the vendor by the Owner/User's representative. The purpose of vendor evaluation is to determine the vendor's capabilities to fulfill the Owner/User's specific requirements. In the case of services such as safety valve servicing and welding, the Owner/User must also verify the vendor holds a valid certificate of authorization issued by ABSA for the scope of services to be provided.

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## CSA B51 AND ASME

### (III) PRODUCT AND PROCESS SPECIFIC REQUIREMENTS

As noted in the first article in this series, the scope of the CSA B51, in some respects, is considerably wider than that of the ASME. In particular, CSA B51 provides very specific product- and process-related requirements, while the ASME Code generally does not do so. The products that ASME Code touches on in some way are air and steam/water where some specific requirements may need to be provided for.

The one major product-specific area addressed by the CSA B51 is compressed natural gas (CNG). Part 2 of the CSA B51 deals specifically with "*High-Pressure Cylinders for the Onboard Storage of Natural Gas as a Fuel for Automotive Vehicles*" and Part 3 provides for "*Requirements for CNG Refuelling Station Pressure Piping Systems and Ground Storage Vessels*". Together, Parts 2 and 3 of the CSA B51 provide the mandatory requirements for compressed natural gas usage in the automotive industry.

In accordance with CSA B51, vessels in anhydrous ammonia service, except those used in refrigeration systems, shall be subject to "*post-weld heat treatment prior to hydrostatic test*" and "*the head and shell materials shall be made in accordance with fine-grain practice*" (see Clause 7.6.3). Also, irrespective of ASME Section VIII requirements, storage and transport

tanks for anhydrous ammonia service (like the ones for liquefied petroleum gas service) having a water capacity of 13,660 litres (3000 Imp. gal) or more shall be constructed with a manhole opening under CSA B51. Also for liquefied petroleum gas service, CSA B51 requirements are provided through referencing a list of codes and standards for highway vehicle engine fuel tanks, ground storage tanks, bulk transport tanks and cylinders.

Guidance to the underground installation of pressure vessels is provided in CSA B51. Specifically, there is a reference standard for the underground installation of propane tanks.

CSA B51 requires that where there is a check valve between an air receiver and the safety valve protecting it, the air receiver shall be equipped with a fusible plug.

Another service CSA B51 addresses is "*Pressure Coils in Petroleum and Chemical-Plant Fired Heaters*". In addition to referencing the existing design and construction standards, CSA B51 provides some detailed guidelines including requirements for the inspection of welds exposed to direct radiant heat. Considering the number of pressure-coil-related incidents that are known to occur,

CSA B51 stands out as one of the very few standards giving overall guidelines on this type of equipment.

Another point worthy of note is on "*Blowoff Vessels*" for use in conjunction with boilers. CSA B51 has very specific design requirements as to the design pressure, diameter, volume, thickness, corrosion allowance and inspection openings for this type of equipment in Clause 7.5 of the code.

So, it should be noted that the ASME Code provides specific requirements for the methods of construction (e.g. welded, layered, coil-wound or forged) and materials of construction (e.g. carbon steel, high alloy steel, and non-ferrous metals). In the case of CSA B51, in addition to referencing ASME for these requirements, it introduces product- or process-specific provisions. However, one may say that the CSA B51 requirements are actually complementary to those of the ASME for the products or processes concerned.

In the next issue, to conclude the series, we will look at some additional areas where the technical requirements of ASME and CSA B51 are different or where CSA B51 requirements are over and above those of the ASME.

## ONTARIO ISSUES SAFETY ADVISORY ON FLEXIBLE HOSE ASSEMBLIES

A recent fatal accident involving the failure of a rubber hose assembly at a manufacturing plant in Brantford, Ontario, was investigated by the Boilers and Pressure Vessels Safety Division of the Technical Standards and Safety Authority (TSSA). It was found that "*a section of compressed air piping became detached and an unrestrained section of pipe whipped and struck the worker. The section of piping was attached by means of a*

*rubber hose and clamp to a pressure vessel*".

As a result, TSSA issued the following guidelines which must be followed by owners of piping systems which utilize flexible hose assemblies:

1. The piping design shall consider all the requirements of the piping code of construction including requirements for supports,

anchors and guides of the piping system.

2. The hose assembly design including the hose and connectors (clamps etc.) must be registered with TSSA., prior to installation, for its intended service conditions. The Canadian Registration Number (CRN) is evidence of this registration. Pre-fabricated hose

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## DESIGN FACTOR 3.5 AND THE ASME CODE 1999 ADDENDA

It is expected that the 1999 Addenda of the ASME Code will incorporate ASME Code Cases 2278, 2284 and 2290 into the main text of the Code. This will allow for maximum allowable stresses based on a factor of 3.5 instead of the traditional design factor of 4.0. The Addenda, when published, will be acceptable for pressure equipment construction for use in Alberta under specific conditions.

As a minimum, compliance to the 1999 Addenda of the Code will be mandatory for equipment constructed to the Code six months after publication, i.e., January 1, 2000. However, equipment complying fully with the Code and the Addenda may, in accordance with ASME, be Code stamped upon publication of the addenda.

With a design factor of 3.5, in comparison with a design factor of 4.0, an increase of 14.3% in the allowable design stress, or a reduction of 12.5% in the pressure vessel minimum required wall thickness may be achieved. This reduction is significant, not only relative to material costs but there will be a significant corresponding reduction in all costs with respect to welding resources (consumables and man-hours), transportation and handling and others. It may also result in possible savings in non-destructive examination, heat-treatment and other requirements' being reduced or waived because of the reduction in material thickness.

While there may be economic benefits with a reduction of the design factor, there may be situations that designs are not governed by the membrane stresses under the general ASME Code principles. Pressure equipment may be designed for process conditions where a lower stress level has to be maintained because of stress corrosion, cyclic loading or other operational requirements. In those cases, it is the designer's responsibility under the law and the Code to ensure that the equipment will

have a sufficient safety margin for operation. The higher allowable design stresses may not be applicable. This is no different from some user requirements now, which exceed Code minimum requirements.

It cannot be overemphasized that codes and standards are, as a rule, written in a form so as to provide for the minimum requirements or provisions. Users of all codes and standards are cautioned that for certain applications, the use of values much more conservative than these minimum requirements (whether it be the allowable design stress level, the minimum thickness, inspection opening diameters, NDT, heat treatment, ... etc) may be needed. Some cost saving may be achieved if only the minimum provisions are being applied, but good engineering with respect to the specific applications, may not necessarily be exercised and safety may be jeopardized.

In the Boilers and Pressure Vessels Technical Council's meeting of June 3, 1999, the proposed ASME Code Addenda incorporating the design factor of 3.5 was reviewed in detail and the following actions were approved:

- a) For pressure equipment in toxic, lethal or flammable service, when ASME Code Appendix 2 is used in the design of large flanges, Appendix S is to be made mandatory as a Directive from the Administrator. This will apply to all flanges 1016 mm (40 inch) internal diameter or larger used in services mentioned above.
- b) The Technical Council's decision of November 1997 will be rescinded after January 1, 2000 since the Code Cases will no longer be applicable with the publication of the Code Addenda of July 1, 1999, or upon the annulment of the Code Cases by ASME, whichever comes first.

The proposed action is taken because of the possibility of leakage when large diameter flanges are designed to ASME Section VIII Appendix 2 with the higher design stresses and the significant consequences should leakage occur. Also, the proposed action takes into consideration the cautionary statement in the Code Cases noting that "*The maximum allowable stresses obtained from the Code Cases are not recommended for flanges or other applications where slight distortion can cause leakage or malfunction*".

In the case of vessels for export, designers/manufacturers should note that the latest Code changes may not necessarily be accepted automatically by the jurisdiction(s) of installation. However, unless otherwise advised by jurisdiction(s) of installation with special construction conditions, ABSA will apply only the requirements of the Code without the additional conditions imposed relative to large diameter custom-designed flanges by the Boiler and Pressure Vessel Technical Council.

It must be realized that continued application of existing published code rules without utilizing the change of design factor is a valid option available and indeed, for some applications may be a more suitable engineering option. It should not be inferred from this article that there is any promotion or discouragement of the use of the proposed Code revisions relative to the design factor of 3.5.

Because of the significant implications of the Code revisions, an information bulletin, IB99-001, is being prepared to allow for explanation and guidance to ensure uniformity of application of the Code in Alberta. Upon the publication of the ASME 1999 Code Addenda, you may contact your nearest ABSA office for the Information Bulletin for further details. ABSA may also be organizing a seminar on this subject in the near future.

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assemblies shall be registered with TSSA as fittings by the manufacturer. Alternatively, hoses assembled at the installation site shall be included as part of the piping system registration.

3. The local TSSA Inspector shall be notified prior to the commencement of the installation of a new or modified piping system.
4. The owner of a piping system shall ensure proper installation, operation and maintenance of flexible hose assemblies in accordance with the recommendations of the manufacturer of the hose assembly or the manufacturers of the individual components.
5. Hose assemblies shall be marked with the CRN

TSSA has issued a "Safety Advisory" to the Ontario pressure equipment industry. We wish to acknowledge TSSA for sharing the information with us. For the pressure equipment industry in our province, we wish to note that similar requirements are in place. You may obtain a copy of the TSSA Advisory from your nearest ABSA office. More importantly, should you have a similar operation, please contact an ABSA Safety Codes Office to ensure full compliance of all safety requirements. Prevention is better than cure and we do not want to have a similar incidents occurring in our province.

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When a written quality system or "QC Manual" is used as the basis for the audit, the auditor should base the audit on the vendors manual. Audits based on some other standard, such as an ABSA sample manual, may not result in a fair and accurate assessment of the vendors system since there are many acceptable variations to the basic program described in the ABSA sample manual.

## WARNING BOILER FUEL CONVERSION

ABSA has been advised that because some natural gas suppliers may not guarantee supply of natural gas to some boiler operators because of the Y2K (Year 2000) concerns, in some cases, the owners/operators are converting some of these boilers using propane or others as an alternative/standby fuel.

While such conversions may be carried out without much difficulty, owners/operators are warned that these conversions must be carried out in full consultation with the boiler manufacturers and all responsible parties and in accordance with the boilers' specifications and safety requirements. Conversion without taking care of all necessary precautions may lead to severe damage to the boilers but more significantly, safety hazards such as fire and/or explosion.

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