ABSA
the pressure equipment safety authority

# THE PRESSURE NEWS

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## IN THIS ISSUE:



## CAUTION

Previous issues of The Pressure News may contain information which is outdated or no longer valid. Please be cautious when using information from old articles.



## DEADLINE FOR WRITING THE OLD FIRST CLASS POWER ENGINEERING EXAMINATION IS APPROACHING

If you have passed one or more papers based on the old First Class syllabus, you have until August 31, 2011 to complete your certification.

A recent review of our database indicated that 227 candidates have passed at least one paper under the old syllabus. On January 12, 2010, those 227 power engineers in Alberta were sent a letter to remind them of the deadline of August 31, 2011.

The Revised First Class Power Engineering Examination Syllabus was implemented by SOPEEC on September 1, 2006. To assist with the implementation, all candidates challenging the First Class examination were informed that the examinations for both the old and Revised First Class Syllabi were concurrently available for a period of 5 years. However, after **August 31, 2011**, the old First Class Syllabus will be removed and examination candidates who fail to earn their certificates under the old syllabus before that time, must start all over with the Revised First Class Syllabus. Because of the significant revision to the syllabus, examination results are not transferable from the old syllabus to the revised syllabus.

Examination candidates writing under the old First Class Syllabus are urged to review their circumstances very carefully with respect to their ability to complete that certification by **August 31, 2011**. A candidate may wish to consider if it is better to switch to the Revised Syllabus.

Note: The deadline for writing the SOPEEC Second Class power engineering examination based on the old Second Class syllabus passed on December 31, 2009. Candidates must now study topics from the Revised Second Class Syllabus and pass all of the examination papers in order to obtain their Second Class SOPEEC Certificate. ❖

## NATIONAL BOARD—79TH GENERAL MEETING

The 79th annual Meeting of the National Board will be held in San Antonio, Texas in conjunction with the ASME International Boiler and Pressure Vessel Code Committee meetings. The theme of this year's conference is "Safety - Assumed. Never Assured" and the conference will be held on May 3-7, 2010.

For further information, please visit the "infoLink!" Page on the National Board Web site www.nationalboard.org, or contact the National Board directly at:

Tel (614) 888-8320
Fax (614) 888-0750

## Grade C Pressure Welder Mobility

A policy change is to be implemented on a trial basis that would provide for greater mobility of Grade C pressure welders between employers. A new employer may apply for certification without re-test provided the welder's certificate has not expired, the PQ parameters will not change and the welder has welded with the process within the previous 6 months. The new certificate will not extend the expiry date of the original certification.

This policy does not apply to the "equivalent" Grade C certificate issued to a certified welder from another Canadian jurisdiction because that equivalent certificate is portable. ❖

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## Changes to National Board Commission and Examinations

Effective January 01, 2010, the National Board of Boiler and Pressure Vessel Inspectors has introduced two separate commissions: the National Board Inservice Commission and the National Board New Construction Commission. The two commissions can be attained independently of each other. A National Board Commission earned prior to January 01, 2010, is now considered a National Board Inservice Commission.

The National Board Inservice Commission examination is accepted as meeting one of the requirements for the Alberta In-Service Pressure Equipment Inspector Certification Program. The National Board New Construction Commission examination, as it is specifically for new construction and not for in-service inspection of equipment, will not be considered for the Alberta In-Service Inspector Certification.

The commission examination is now a one-day examination. As you may expect, the examination has changed and candidates should ensure that they are familiar with the current Body of Knowledge as published on the National Board website.

ABSA will continue to administer examinations for the National Board and information on applying for the ABSA-administered examinations is available at www.absa.ca. The National Board has also partnered with Applied Measurement Professionals (AMP) to administer an on-demand computer-based examination. More information is available on the National Board and AMP websites. **Note** that there is no transferability of approval or fees between ABSA and AMP. But, ABSA will recognize successful completion of the Inservice Commission examination administered by other jurisdictions or by AMP. ❖

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## Management of Change (MOC)

An explosion and fire occurred in a compressor facility, when the gasket on an elliptical manway failed. The compressor was down to install additional pressure equipment. A contractor doing the work did not have the proper sized replacement gasket. As result, a smaller gasket was modified in an attempt to make do with what was available. This was done without the management of change process!

It is said that repeated attempts to make a seal on the manway were made before the unit was returned to service. The gasket failed an hour later causing a sudden release of gas with an LEL of 40% resulting in an explosion and fire within seconds after gas release. Fortunately no one was injured or killed.

Management of Change is a formal system to evaluate, authorize, and document changes before they are made and to ensure that the changes made do not adversely affect the integrity of the facility. It is used to understand the overall impact to an operating system and to apply appropriate controls for eliminating or reducing identified risks to acceptable levels. Assigning accountability for identifying and controlling hazards associated with change is a key activity.

The MOC process applies to any and all permanent or temporary change during the design, construction, installation, operation, maintenance modification, and decommissioning of facilities or pressure components.

This accident could have been prevented if the Management of Change protocol had been followed and serves as a reminder to all what could happen if MOC protocol is not properly followed. ❖

## THREADED PIPING REQUIREMENTS IN ALBERTA

In auditing Quality Control Programs for the Certificate of Authorization for the construction, installation and repair of pressure piping in Alberta, it is apparent that not all contractors, owners and users are aware that threaded piping falls under the requirements of the Safety Codes Act and the applicable codes and standards.

For regulatory requirements of pressure piping, some of the specific provisions are detailed in Sections 3, 4(1) & (2), 16 (1) & (2), 25, 30(1) & (2),and 31(1) & (2) of the *Pressure Equipment Safety Regulation* (AR49/2006). The applicable codes and standards are detailed under Section 6 of PESR and Clause 8 of CSA B51 *Boiler, Pressure Vessel and Pressure Piping Code*. Attention should also be given to limitations for the use of threaded piping under ASME 31.1 and ASME 31.3. In particular, paragraph 314 of ASME 31.3 specifically limits the use of threaded piping to Normal Service and Category D Service.

Threaded connections are often found in places such as small compressor skid packages, boiler external piping, steam piping, instrument air piping and gas such as $CO_2$. Although threaded piping, on its own, is generally less than 500 litres in volume and therefore, if not being part of a larger pressure piping system, design registration is not required, they must comply with all the applicable provisions of the code of construction.

It is important to note that pressure piping contractors, owner/users and any organization constructing, installing or repairing pressure piping in Alberta must have a Certificate of Authorization Permit for pressure piping for this scope of work. Unlike welded piping which requires a qualified “B” pressure welder for assembly, there are no specific requirements for tradespeople assembling threaded piping under pressure equipment safety related regulations. It is simply good practice to use qualified personnel with a combination of certification (such as a pipe fitter certification) and experience when assembling threaded pressure piping.

The above discussion covers some of the essential aspects of threaded piping assembly in Alberta. For further information, please contact the ABSA office in your area. ❖

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## CODE BOOK REQUIREMENTS FOR AUTHORIZED QUALITY SYSTEMS HOLDERS

All organizations authorized to performing work on pressure equipment in accordance with the CSA and ASME Codes are expected to be knowledgeable of the requirements of and have available the Safety Codes Act and Regulations, the CSA B51 Code and the other applicable codes and standards..

During implementation review audits and whenever required by the Safety Codes Officer (SCO), the organization must be able to provide the codes and/or standards as follows:

Organizations authorized to manufacture boilers and pressure vessels shall have ASME Sections I, IV, VIII Div.1 and/or VIII Div. 2 as applicable to the authorization; and ASME Sections II (Part A, C & D), V and IX.

Organizations authorized to construct fittings shall have the applicable ASME, ASTM and/or ANSI Standards. If fittings are of welded construction requiring Non-destructive Examination (NDE), the organization must have access to ASME Sections V and IX as applicable.

Organizations authorized to construct pressure piping shall have ASME B31.1, B31.3, B31.5 and/or B31.9 as applicable for the authorization; and must also have access to ASME Sections V and IX.

Organizations authorized to repair boilers and pressure vessels shall have ASME Sections I, IV, VIII Div. 1 and/or VIII Div. 2 as applicable for the authorization and ASME Sections V and IX; and the National Board Inspection Code and must have access to ASME Section II Parts A & D.

Organizations authorized to conduct welder testing must have ASME Sections II (Part C) and ASME Sections IX.

Organizations authorized to service pressure relief valves shall have the National Board Inspection Code and must have access to ASME Sections I, IV and/or VIII Div. 1 as applicable to the authorization.

Organizations authorized to conduct inspections of pressure equipment must have the National Board Inspection Code, and applicable API Standards and access to ASME Sections I, IIA, IIB, IIC, IID, IV, V, VIII Div.1 and IX as applicable to the equipment inspected.

*Note: "must have access" means that the Codes and/or Standards must be at the facility at the time of the implementation review and the company must have access to the Code or Standard whenever necessary.*

ABSA will not accept photocopies of Codes and Standards as this is a violation of copyright laws. ❖

# WARNING - BRITTLE FRACTURE AND FREEZING DAMAGE

During World War II, a great deal of attention was directed to the brittle failure of welded Tankers and Ships. It is said that *"Early Liberty ships suffered hull and deck cracks, and a few were lost to such structural defects. During WWII, there were nearly 1,500 instances of significant brittle fractures"* [1]. A majority of the brittle failures occurred during the winter months when it was coldest and regardless of whether the ships were in heavy seas or when they were anchored at the dock. These failures focused attention on the fact that normally ductile mild steel can become brittle under certain conditions and susceptible to catastrophic failure.

In general Brittle Fracture requires three conditions:

1. Flaw such as a crack
2. Stress sufficient to develop a small deformation at the crack tip
3. Temperature at or below Nil-Ductility Transition (NDT) temperature is the temperature above which a material is ductile and below which it is brittle.

The flaws need not be major or even highly visible. These flaws may be inherent in the construction or the result of damage caused by upset conditions, corrosion, or freeze up. The stresses could be the normal stresses that are exhibited under normal conditions or one time upset conditions. Hence, one of the main contributors that can be controlled and monitored is low temperature operation under NDT. Since 1988, pressure equipment designed to the ASME Section VIII Division 1 has been designed with MDMT, Minimum Metal Design Temperature, in mind. Staying above this MDMT would be instrumental in avoiding brittle fracture. Sometimes, however, unforeseen problems such as freeze up and upset conditions (under MDMT) occurs and thus, brittle fracture may already have occurred.

In Alberta, the winters are noted for extreme temperature changes over short periods of time. Winter storms have been noted to bring temperatures down to -40°C (-40°F), then, within hours, temperatures can rise above freezing. This sort of climate creates challenges for humans and equipment. Hence the design and operation of equipment in such an environment must take into account the severity of Brittle Fracture.
Brittle fracture is exhibited when metals fracture with a relatively small or negligible amount of plastic strain. It is considered the catastrophic propagation of a flaw with little or no ductile distortion, hence, there is no visual cue or warning.

Most recently, numerous pressure equipment incidences in Alberta can be attributed to Brittle Fracture. This is the third time our industry experienced brittle fracture due to freezing within one month. We learned from the rig boiler blow down valve failure incident (where there was one fatality and an alert was issued) that visual inspection did not help and full inspection has to be taken. (See Information Bulletin No. IB04-003). Our concern is also related to fittings and piping associated with the frozen/damaged vessels because some of the damage can not be detected easily and, if put back in service, may result in another accident.

Vessels that have been constructed to editions of the ASME Code prior to 1988 should be evaluated to ensure that fracture toughness is adequate to resist brittle fracture. This can be done using the ASME Section VIII Division 1 Code or the API/ASME 579 FFS Level 1 method.

With the low temperature conditions in our Province in winter, there is potential for severe damage to pressure-retaining components from the freezing of water or other fluids. Pressure equipment subject to the freezing of accumulated and retained moisture or water or other fluids may incur damage that would result in the equipment being unfit for pressure service, together with a significant potential safety hazard when under pressure. Any pressure equipment that has been subject to freezing of the contained fluid should be taken out of service. If freezing has been suspected or observed, the pressure equipment or fittings involved must not be placed back in pressure service without proper inspection and integrity evaluation. The use of damaged components in pressure service can be highly hazardous and components damaged by freezing can not likely be repaired. Regardless, the equipment must be thoroughly assessed prior to placing back into service, if indeed it is fit for service. ❖

[1] Report - http://en.wikipedia.org/wiki/Liberty_ship

## BOILERS OR PRESSURE VESSELS MANUFACTURED OUTSIDE OF CANADA

Boilers and Pressure Vessels manufactured outside of Canada brought into the Province of Alberta for use are required to have stamped on it the Canadian Registration Number and the official ASME Code Stamp, and be registered with the National Board. Section 28 (3) of the Pressure Equipment Safety Regulations mandates this requirement.

Registration of designs of pressure equipment manufactured outside of Canada is the same as for designs from within Canada and the submission must include design drawings and specifications, calculations, weld joint details and extent of testing to be performed.

When the Design is deemed suitable for registration a Registration Number is assigned to the design with a digit 2 following a decimal point (see Clause 4.3.2 of CSA B51 Code). ❖

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## REQUIRED VALVE MARKING FOR HIGH PRESSURE STEAM BOILERS

Clause 4.2.6(a) of CSA B51 requires registration of fittings built to a nationally recognized standard to have proper identification markings in accordance with the applicable standard.

On high pressure steam boilers, the required valve marking is covered by Para. 107.2 of ASME B31.1 , which states that *"Each valve shall bear the manufacturer's name or trademark and reference symbol to indicate the service conditions for which the manufacturer guarantees the valve. The marking shall be in accordance with ASME B16.5 and ASME B16.34"*.

ASME B16.34 paragraph 4.1 Marking – General, states "*except as modified herein, valves shall be marked as required in MSS SP-25*". And paragraph 4.2.3 Rating states that *"the valve body shall be marked with the number that corresponds to the pressure rating class designation"*.

It should be noted that in B31.1 Appendix A Table A-1 thru A-9, Note (1) indicates materials that are not acceptable for construction of pressure retaining parts for BEP (Boiler External Piping). As not all materials acceptable for ASME B31.1 construction are acceptable for the construction of pressure retaining parts for BEP, one must not assume that a valve can be used for steam and BEP service even though the valve falls within the pressure-temperature curve for the design condition of the piping under consideration.

It is a requirement of the manufacturer to guarantee that their valve is suitable for steam service by marking the valve with one of the following symbols as listed in MSS SP-25 Paragraph 4 "Rating Designations".

SP - Steam pressure
WSP – Working steam pressure
S – Steam

Note: Boiler External Piping (BEP) shall be considered as the piping which begins where the boiler proper terminates and extends up to and includes the valves required by ASME B31.1 paragraph 122.1. ❖

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