

## IN THIS ISSUE:

<i>Warning - Furnace Explosions &amp; LWCO Malfunctions</i> .....	1
<i>Fatal Accident - Pressurized Truck-Mounted Water Vessels</i> .	1
<i>Pipe Cleaning with Flammable Gas</i> .....	2
<i>Accident - Wrong Material Being Used</i> .....	2
<i>Two-Inch Pipe Support</i> .....	2
<i>Integrity Assessment Program And Equipment Inventory</i> .....	3
<i>New CSA B51 &amp; ASME Code</i> .....	3
<i>ASME BPV Code Week</i> .....	3
<i>ABSA Launches New Seminars</i> ..	4
<i>Power Engineers Regulation Public Consultation</i> .....	5
<i>Deadline for Writing OLD First Class Examination</i> .....	5
<i>National 4th Class Power Engineering Student Award</i> .....	5

## WARNING

### FURNACE EXPLOSIONS AND LOW-WATER-CUT-OFF MALFUNCTIONS

It is said that furnace explosions and low-water-cut-off malfunctions are the two major causes of, and may account for half of, all boilers accidents worldwide. This is no exception in Alberta although, very fortunately, we have no major boiler incidents that resulted in serious injuries or fatalities of late. However, such is not the case elsewhere where, routinely, furnace explosions and low-water-cut-off malfunctions resulted in fatal incidents. Closer to home, it is said that a heating boiler accident late last year in Ottawa, involving a fatality as well as serious injuries, was the result of a furnace explosion.

To ensure the safety of plant operators and the general public, all precautions must be taken to prevent furnace explosions and low-water-cut-off malfunctions. To that goal, all boiler owners and operators are reminded that:

- Light-up procedures, including properly purging the boiler furnace prior to the startup, must be strictly followed together with periodic checking and testing of all fuel lines and controls ;
- Testing and maintaining of the low-water-cut-off controls must be conducted in accordance with the requirements of the boiler manufacturer, the codes and standards and regulatory provisions.

As the winter season is almost upon us, for all boiler owners and operators, particularly those involved in heating boilers, we must take a good look at the equipment to ensure safety of all since, very unfortunately, major boiler incidents could result in disastrous consequences. ❖

## 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Previous issues of The Pressure News may contain information which is outdated or no longer valid.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.

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## FATAL ACCIDENT

### PRESSURIZED TRUCK-MOUNTED WATER VESSELS

We have received a report authored by Mr. Roger Reedy, President of Reedy Engineering, Campbell, California, on a fatal accident involving a pressure vessel failure. Mr. Reedy has served on ASME Boiler and Pressure Vessel Code Committees for many years and is a Life Fellow of ASME.

In summary, the incident involved a truck-mounted water tank pressurized by air at a pressure above 103 kPa. The incident occurred when the tank was under test following repair. It was reported that *"the welder was killed when he was cut in half, as a result of the pressure vessel head blowing off and hitting him"*.

It must be stressed that these pressure vessels are subject to the Safety Code Act and must be constructed, operated and maintained in accordance with the associated pressure equipment regulations under the Act and the codes and standards adopted as part of the regulations. Previously, an Alert was issued as Information Bulletin No. IB05-002 (see <http://www.absa.ca/IBIndex/IB05-002.pdf>) on these pressure vessels. This reported incident resulted in another Alert's being issued as Information Bulletin No. IB10.003 (see <http://www.absa.ca/IBIndex/IB10-003.pdf>). ❖

## DISASTER RESULTING FROM PIPE CLEANING WITH FLAMMABLE GAS

On August 5, 2010, the Chemical Safety Board (<http://www.csb.gov/newsroom/>) released a statement urging the prohibition of flammable gas blows during pipe cleaning operations.

It was reported that *“Six workers were killed and there were numerous injuries on February 7, 2010, at the Kleen Energy power plant under construction in Middletown, Connecticut, USA”*. The US Occupational Safety and Health Administration cited and fined a number of organization involved in the incident.

As a conclusion of the incident investigation, US CSB voted to *“issue 18 urgent recommendations to various recipients, including OSHA, aimed at halting the dangerous practice of releasing large quantities of flammable gas in the presence of workers and ignition sources during cleaning operations”*.

It is not uncommon to clean piping using compressed air or nitrogen and the use of a solid cleaning device propelled by compressed air that is referred to as a pig. The process is inherently hazardous, particularly if proper equipment and/or procedures are not being deployed. Using flammable gas to clean out pipes adds to the significant hazards and obviously, in the case of Kleen Energy power plant, resulted in a major disaster with multiple fatalities and injuries in addition to property damage. ❖

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## ACCIDENT ANOTHER CASE OF WRONG MATERIAL BEING USED

Incorrect material specification was revealed as the root cause in a recent incident that resulted in \$200,000 damages not considering downtime and production losses. The material for a short piping spool was found to be carbon steel when 304 stainless steel should have been used because of the highly corrosive service condition. The spool was installed when the actual check valve used was shorter than what was specified. This required an “engineered” spool but the material used was not properly verified and no one questioned the change of material specification because the spool was supposedly “engineered”.

We alerted our industry to the importance of PMI (positive material identification) in a Pressure News article December 2006 (see <http://www.absa.ca/newsletter/v11-2006/v11-iss4.pdf>). In this incident, it is fortunate that no one was hurt. But, we must all be vigilant that proper materials are used in pressure equipment applications at all time or risk very serious, and possibly fatal, consequences. ❖

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## WHERE ON EARTH DOES A TWO-INCH PIPE SUPPORT COST OVER HALF A MILLION DOLLARS?

Recently, during a start up of a gas plant in Alberta, a two inch PRV inlet pipe failed due to excessive vibration. This failure resulted in the released of hydrocarbon with the estimated clean-up and repair costs in excess of \$625,000.

### CAUSES OF THE INCIDENT:

1. Failure to reinstall a proper pipe support that had been dismantled during plant turn-around maintenance activities.
2. The PRV activated to relieve excess system pressure developed during normal start up. This resulted in vibrations in the un-supported piping system, which in turn resulted in the failure of the two-inch PRV inlet pipe. The start-up procedure should not have relied on the PRV as a means of pressure control.

### CORRECTIVE ACTIONS TAKEN:

Subsequent to the incident, the following corrective actions were taken to prevent similar future occurrences:

1. The owner’s operation and maintenance department developed a check list for verifying installation of PRV piping supports.
2. The owner’s operation department revised the start-up operation procedure and provided hands-on training to the operators.

An account of the incident is provided for our industry so that no others will need to learn an expensive lesson as happened in this case. ❖

## INTEGRITY ASSESSMENT PROGRAM AND EQUIPMENT INVENTORY

The Pressure Equipment Safety Regulation (PESR) Sections 41 and 42 establish that all owners of pressure equipment must implement and maintain an integrity assessment program and also list the minimum requirements of the program.

Establishing and maintaining an inventory of pressure equipment (PESR 41(a)) is a key initial step when implementing an integrity assessment program. An accurate inventory is a fundamental component when developing inspection strategies and test plans for the equipment.

A frequent but serious error made during this initial step is assuming that equipment exempt from annual fees (Information Bulletin No. IB06-001) is also exempt from the integrity assessment program.

A common example of vessels inadvertently placed into the aforementioned category are suction and discharge bottles in compressor skids, that have been a common fixture at many oil and gas facilities in Alberta. Compressor bottles are often exempted from annual fees, based on volume ( $\leq 0.5$  m<sup>3</sup>), and overlooked as items that require inspections under an integrity assessment program. These vessels are regularly subjected to severe service conditions often cyclic and vibratory in nature. Historical data indicates, if left unmonitored, this may lead to cracking in nozzle welds, base materials and possible failure, resulting in lost production, damaged equipment and worse, serious injuries or even fatalities.

Owners are reminded that all pressure equipment under the PESR must be included in the integrity assessment program regardless of whether the equipment has an (A) Number (or not), or is exempted from annual fees. The equipment inventory must be thoroughly scrutinized to minimize the possibility of unsafe conditions arising from the omission of equipment from the integrity assessment program. ❖

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## NEW CSA B51 AND ASME CODE EDITIONS

As previously announced in the Pressure News, a new edition of the CSA B51 Code was published in 2009. The CSA B51-09 Code has been adopted as part of the Pressure Equipment Safety Regulation (AR 49/2006 with amendments up to and including AR 238/2009). Companies undertaking pressure equipment activities with quality systems involving CSA B51 Code will be subject to audit to requirements of the CSA B51-09 edition.

It is also important to note that the 2010 edition of the ASME Boiler and Pressure Vessel Code was released July 1, 2010 and the regulation adoption process has been initiated. ❖



### ASME BOILER AND PRESSURE VESSEL CODE WEEK IN VANCOUVER

The upcoming ASME BPV Code Week will be held in Vancouver, BC, from October 31 to November 5 at the Westin Bayshore Hotel. This venue is the closest one to Alberta for the ASME BPV Code Week meetings for some time to come.

There will be various technical committee meetings held during the week to discuss the ASME requirements for boilers, pressure vessels and nuclear power plant components. These meetings are open to the public; advance registration is encouraged but not required. Educational workshops will be offered covering latest developments related to the design of boilers, pressure vessels, and nuclear power plant technologies.

For event details, please visit <http://events.asme.org/BCW>. ❖

## ABSA LAUNCHES NEW SEMINARS IN FALL 2010

ABSA is launching 3 new seminars in the next three months beginning September. All interested candidates are encouraged to register early for these seminars because seats are limited. ABSA will also continue to offer the Pressure Equipment Safety Legislation and Pressure Piping Fabrication Requirements and Quality Control seminars. Please view the ABSA website ([www.absa.ca](http://www.absa.ca)) for the details on all the seminars.

### Pressure Vessel Design Seminar (1 day)

This seminar will address some of the engineering fundamentals for pressure vessel design. The seminar will examine the responsibility of respective parties and the scope and limitations using the ASME Section VIII Div. 1 Code as an example. Subjects reviewed will include material selection, design factors and establishment of allowable stress values, opening reinforcement, flanges and other pressure vessel design considerations. The seminar will also briefly discuss the ASME Section VIII Div. 2 Code including the basis of the Division and its use in Alberta. The seminar will include a review of common problems and deficiencies to allow participants to gain a better understanding of pressure vessel technology. This seminar is conducted by K. T. Lau, Ph.D., P. Eng., Chief Inspector and Administrator.

September 27, 2010 at the Edmonton ABSA office.  
November 22, 2010 at the Blackfoot Inn, Calgary, AB.

The fee for this seminar is \$460 plus GST. Please register for this seminar using the [AB-136](#) form posted on the website.

### Pressure Relief Valve Seminar (2 days)

This seminar will present the requirements of the Safety Codes Act, Pressure Equipment Safety Regulation, CSA B51 Code and ASME Section I, IV and VIII Codes. The seminar will address selection and sizing, installation, operation, inspection and servicing of pressure relief valves.

The public launch of this seminar is scheduled on October 27 and 28, 2010 at the Edmonton ABSA office.

The fee for this seminar is \$920 plus GST. Please register for this seminar using the [AB-136](#) form posted on the ABSA website.

### Quality Systems and Inspection for Pressure Equipment Construction Seminar (3 days)

This seminar will present the quality system and inspection requirements for pressure equipment construction under the Safety Codes Act, Pressure Equipment Safety Regulation, and CSA B51 Code. The seminar will also address quality concepts and design of a quality manual for the construction of pressure equipment (with a focus on ASME Section VIII Div. 1). Quality system elements will be reviewed in detail and in relation to the relevant ASME Section VIII Div. 1 Code requirements. Specific topics of presentation will include Safety Codes Act, CRNs, NDE, PWHT, MTRs (including verification of reports and charts); inspection controls and responsibilities; control of quality documents; and completion of Construction Data Report Forms.

This seminar will be capped off with a large one day workshop which will encompass the entire construction cycle of a piece of pressure equipment fabricated to the ASME Section VIII Division 1 Code. The workshop will include inspection of a typical pressure vessel along with creating a final turnover package. The first two days will be aimed at creating the technical basis to complete this final one day workshop.

This course will **NOT**, however, review the ASME Code requirements in detail. A general overview of ASME Section VIII Div. 1 is given while participating in the hands-on Modules.

The public launch of this seminar is scheduled on November 23 - 25, 2010 at the Edmonton ABSA office.

The fee for this seminar, including the workshop, is \$1380 plus GST. Please register for this seminar using the [AB-136](#) form posted on the website.

### Annual Code Update Seminars

ABSA is conducting the annual Code Update seminars on the following dates at the specified locations.

October 5, 2010 - Nisku Inn, Nisku, AB

The October 5 seminar is full. If there are sufficient additional applicants, an extra session will be considered at a later date. Contact ABSA if you wish to be put on a waiting list.

October 7, 2010 - Blackfoot Inn, Calgary, AB

The fee for this seminar is \$245 plus GST. Please register for this seminar using the [form](#) posted on the ABSA website. ❖

## POWER ENGINEERS REGULATION PUBLIC CONSULTATION

The Power Engineers Regulation is currently under review. Over a year ago, the Ministry of Municipal Affairs requested public input for the review process. The Ministry is currently preparing a public consultation document of potential changes. It is anticipated that the document will be available later this year and this will provide an opportunity for additional participation in the process. Please watch the Municipal Affairs website and ABSA's website for the availability of the consultation document for your input. ❖

### DEADLINE FOR WRITING

### THE OLD First CLASS POWER ENGINEERING EXAMINATION IS APPROACHING

If you are pursuing certification under the old First Class Syllabus, you have until August 31, 2011 to complete your certification. As previously reported, the Revised First Class Syllabus was implemented September 1, 2006 with a 5 year grace period but, as of **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. Also, because of the significant revision to the syllabus, examination results are not transferable from the old Syllabus to the Revised Syllabus.

Candidates writing under the old First Class Syllabus are again urged to review their circumstances very carefully with respect to their ability to complete that certification by **August 31, 2011**. ❖

## NATIONAL 4TH CLASS ALBERTA POWER ENGINEERING STUDENTS AWARD RETURNED TO ALBERTA

At this year's annual Interprovincial Power Engineering Curriculum Committee (IPECC) and the Standardization of Power Engineer Examinations Committee (SOPEEC) meetings held in June, an Alberta 4th Class Power Engineering student won the top power engineering student award from PanGlobal Training Systems Ltd.

Mr. Brian Gamble, from Keyano College in Fort McMurray, obtained the highest combined college marks and SOPEEC exam marks of 92% in Canada for last year. The award was presented to Mr. Gamble by Bob Clarke (Chief Operating Officer of PanGlobal). This was the fourth time in the last five years that an Alberta student obtained an award. It is good to see that Alberta power engineering students continue to achieve excellence. ❖



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