

## IN THIS ISSUE:

<i>Guideline for Overpressure Protection .....</i>	<i>1</i>
<i>Piping Overpressure Incident .....</i>	<i>1</i>
<i>National Board 82nd General Meeting .....</i>	<i>2</i>
<i>Pressure Relief Devices In-service Requirements .....</i>	<i>2</i>
<i>Pneumatic Testing of Pressure Piping .....</i>	<i>3</i>
<i>Setting and Servicing of Pressure Relief Valves used in Pressure Tests .....</i>	<i>4</i>
<i>Hot Tapping .....</i>	<i>4</i>
<i>External Training News .....</i>	<i>5</i>

## GUIDELINE FOR OVERPRESSURE PROTECTION

There have been requests to clarify requirements for overpressure protection for pressure equipment under the Pressure Equipment Safety Regulation (PESR). As a response to the requests, the Administrator in the Pressure Equipment Safety discipline has issued Directive IB13-003 to establish ABSA Document AB-525 "Overpressure Protection Requirements for Pressure Vessels and Pressure Piping" as mandatory requirements in Alberta. The AB-525 document clarifies Alberta requirements that must be met for systems that consist of pressure vessels and/or pressure piping where overpressure protection is required.

The AB-525 document was created to provide assistance to industry and to simplify the process of achieving compliance with the PESR provisions. Document AB-525 clarifies the requirements that must be met for systems that consist of pressure piping and/or pressure vessels where overpressure protection is provided by Pressure relief valves (PRV) and/or other means of overpressure protection in lieu of PRV.

In addition to providing guidance on how overpressure protection requirements can be met, AB-525 also addresses how certain types of overpressure protection by system design (OPPSD) for pressure vessels and pressure piping may be accepted for registration without applying for individual case-by-case consideration.

For implementation purposes, provisions for existing construction under Section 6 of AB-525 also apply to plants for which:

- (i) the design registration has already been issued; and
- (ii) a design registration application is made to ABSA for review prior to June 30, 2013.

To accommodate the requirements of document AB-525, Form AB-96 and Guideline AB-96a have been revised. You may find all documents listed above on the ABSA website [www.absa.ca](http://www.absa.ca). ❖

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## PIPING OVERPRESSURE INCIDENT

A recent incident in a major facility middle of last month could have had very serious consequences. A small section of plant piping was over-pressurized between two valves (for ease of discussion, they are labeled valves A and B below). During routine maintenance changing out a strainer, because of operator error either due to a lack of proper procedure or procedure not being followed, valve B was unintentionally closed while valve A was being open. The piping specification downstream of valve A was for application of far lower pressure than that for valve A and upstream. In that case, the piping section between the two valves and equipment therein was subject to 10,000 kPa, a pressure far higher than the original design, causing failure of equipment in that piping section. Fortunately no one was seriously hurt.

This incident occurred due to improper controls and possibly improper use of a pressure piping specification break. The incident could have been easily prevented.

Designers of pressure piping systems should design the overpressure protection system to prevent overpressure on both the low and high pressure side. It is imperative that for both the low and high pressure side of the piping specification break, all the components in the entire pressure relief path are properly designed, constructed, installed and maintained to provide assurance that the overpressure protection system functions properly. ❖

## NATIONAL BOARD—82ND GENERAL MEETING

The 82nd Annual Meeting of the National Board will be held in Miami, Florida, USA and will be held on **May 13 -17, 2013** in conjunction with the ASME International Boiler and Pressure Vessel Code Committee meetings.

The theme of this year's conference is "SAFETY - First Choice Last Chance". For further information, please visit the "infoLink!" page on the National Board Web site [www.nationalboard.org](http://www.nationalboard.org), or contact the National Board directly at:

Tel 614-888-8320

Fax 614-888-0750 ❖

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### PRESSURE RELIEF DEVICES IN-SERVICE REQUIREMENTS

Alberta's Pressure Equipment Safety Regulation, (PESR), Section 38(1) requires owners to ensure that all equipment in the pressure system have suitable overpressure protection to ensure that its authorized maximum allowable working pressure is not exceeded.

In addition to the provision of these pressure relief devices in accordance with the PESR and the respective new construction codes and standards, the owner must ensure that all such devices necessary to ensure the safe operation of the pressure equipment are periodically examined, tested, and maintained by competent persons in accordance with documented work processes.

Manufacturer's Specifications, API RP-576, NBIC Part 2 and CSA B51 Annex H cover information regarding the inspection and servicing of pressure-relief devices. The applicable information in these documents should be used to ensure that the pressure relief devices are inspected, maintained and serviced accordingly. AB-506 "Inspection & Servicing Requirements for In-Service Pressure Equipment" also provide guideline on this subject matter.

#### Maintenance of Pressure Relief Devices

PESR Section 39 provides that *"Adjustable parts of a pressure-relief device must be sealed at the time of servicing and remain sealed during operation. Seals must be installed in a manner that prevents changing the adjustment of a pressure-relief device without breaking the seal. Pressure-relief devices must be serviced at intervals acceptable to the Administrator."*

#### Online External Visual Examination

An online external visual examination of pressure-relief devices shall be carried out by a competent person at appropriate intervals, based on the pressure-relief device history. The maximum interval for this on-stream examination is five years.

The scope of this examination shall ensure that;

- the correct device is installed and that the seals are intact,
- there is no external damage or leaks,
- the company identification provides means to establish the last servicing date and correct set pressure for the equipment protected by the device,
- there are no blinds or closed valves that would prevent the device from functioning,
- any isolating valves in the path of relief valves are locked and controlled,
- discharge piping is secured and clear; and correctly installed to prevent build up of liquids,
- any weather protection is in place,
- suitable records are maintained to document the on-line visual examination,
- any lifting lever is operable and positioned correctly; and,
- any rupture disc is properly installed and oriented.

#### Pressure Relief Valve Servicing Intervals

AB-506, Table 1, shows the maximum periods of time a pressure-relief valve may remain in service before it requires servicing, unless it has been deferred or revised in accordance with Section 15 of AB-506.

The term pressure-relief valve (PRV) applies to safety valves, safety relief valves, and relief valves. The applicable progressive interval grading and known service requirements covered in Section 12 of AB-506, shall be used to determine servicing interval for pressure relief valves.

The interval grading system does not apply for thermal relief valves and other protective devices not classed as pressure relief valves. These shall be inspected, tested and serviced/replaced at appropriate intervals based on their service history.

*(Continued on page 3)*

## PNEUMATIC TESTING OF PRESSURE PIPING

Section 30 of the Pressure Equipment Safety Regulation (PESR) states:

- (1) All pressure piping leak tests must be conducted using the hydrostatic method.
- (2) Despite subsection (1), the Administrator may accept, for a specific pressure piping system, alternative test methods that are allowed in a code or standard that is declared in force.
- (3) A pressure piping system shall not be tested at a temperature that is colder than its minimum design temperature.
- (4) When conducting pressure tests, the ductile to brittle transition temperature and the possibility of brittle fracture must be considered by the contractor.

Due to the large amount of energy stored in compressed gas and the potential hazard of a sudden release of the stored energy, pneumatic testing should be avoided if at all possible. However, there may be times where a hydrostatic test has been determined not to be feasible. When pneumatic testing is necessary, there are many critical safety precautions that must be considered.

AB-518 "Pressure Piping Construction Requirements" provides guidelines with respect to pressure testing of pressure piping. If a hydrotest cannot be performed, a pneumatic, or a hydro-pneumatic or an alternate leak test as provided for in ASME B31.3 Code (process piping construction only) may be considered as an alternative, provided prior acceptance by an ABSA SCO is obtained. For all pneumatic testing of pressure equipment in Alberta, a pneumatic testing procedure must be accepted by ABSA.

Provisions for pneumatic testing of piping systems up to 500 liters internal volume and maximum 2172 kPa design pressure or equivalent stored energy level may be included in the quality system, and ABSA's acceptance secured once at the time of the inclusion. For piping systems exceeding the limits specified, procedures must be prepared for each application and ABSA's acceptance secured prior to conducting the test.

In particular, the following points should be considered:

- a) Paragraph 345.5 of ASME B31.3 provides specific requirements for a pneumatic leak test for pressure piping.
- b) Calculations should be made based on the sudden release and expansion of a confined gas.
- c) Preparations and precautions should be made for the location where the test will take place. This would include control of personnel on the test site, isolation of the site, and the restricted distance from the item under test at which barriers are placed to prohibit access.
- d) The control of the pressure source, pressure ranges, and temperature ranges during the test.
- e) Consideration of pressure relief valves. The pressure relief valves must be sized to handle the maximum output of the pressure source.
- f) The materials resistance to brittle fracture. A test temperature above 60°F (16°C) should be used to reduce this risk. ❖

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PRV's must be serviced by an organization that has a valid ABSA Certificate of Authorization Permit to service pressure-relief valves. It is the owner's responsibility to ensure that the organization servicing the PRV is competent for the scope of work. Authorized PRV servicing organizations are listed on [ABSA's website](#).

The owner must have appropriate work processes, methodology, and assessments to ensure that the intervals assigned are appropriate. The servicing interval shall be based on the history in a particular fluid service, cleanliness, and other servicing information. It shall also be assessed by performing an as-received pop test (pre-test). This is required for all process valves, unless the valve is extremely fouled and dirty or if a valve is in a hazardous service that may require neutralizing. When a valve is replaced, it may still need to be assessed through pre-pop, dismantling etc. in order to establish a suitable interval for the valve that has been installed (refer to API RP-576).

When a pressure-relief valve servicing report indicates the valve was in unsatisfactory condition when it was removed from service, a lower interval may be required. The owner should conduct a root cause analysis for the purpose of preventing reoccurrence, because reducing the length of the service interval may not always address the cause. This is particularly important when the valve fails the service pre-pop test or is otherwise found to be in an inoperable condition.

AB-506, Appendix B shows factors that may need to be considered when assigning servicing intervals for pressure-relief valves.

Servicing records and other data must be reviewed by the owner, except as otherwise specified per the owner-user's integrity management program. Servicing records and other required information to support the assigned servicing intervals must be maintained on file. ❖

## SETTING AND SERVICING OF PRESSURE RELIEF VALVES USED IN PRESSURE TESTS

During a periodic review of the operation of a contractor holding a Certificate of Authorization Permit to construct, repair and alter pressure piping, an ABSA SCO found that the pressure relief valves that were used to prevent overpressure during a pressure test was set to the required relieving pressures by personnel that had not been properly qualified.

Section 11(1) of the PESR AR 49/2006 (Pressure Equipment Safety Regulation) states that “A person shall not service, repair, set or seal a pressure relief valve unless that person holds a Certificate of Authorization Permit”. And AB-518 “Pressure Piping Construction Requirements” has been established by the Administrator of the Pressure Equipment Safety discipline to define Alberta requirements for contractors holding a Certificate of Authorization Permit to construct, repair, alter pressure piping. In this document, a manufacturer is required to ensure a procedure is in place when pressure testing to prevent overpressure of the equipment. It should be noted that AB-522 “Standard Pneumatic Test Procedure Requirements for Piping System” mandates when pneumatic tests are being performed, the use of a properly set pressure relief valve by a company with a Certificate of Authorization Permit for this scope of work.

The consequences of not having a properly set pressure relief device in a test could be the overpressure of the equipment, or worse, a catastrophic failure which could lead to injury or death to personnel involved with the test. ❖

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## HOT TAPPING

Section 13 of AB-513 “Pressure Equipment Repair and Alteration Requirements” addresses Hot Tapping, Contractor's or Owner/Users who hold a current Certificate of Authorization Program (CAP) may perform Hot Taps and some of the major provisos are highlighted below.

### **Hot tapping is deemed to be an alteration!**

All requirements of AB-513 for alterations are applicable to any pressure equipment components that are to be hot tapped and these requirements must be met. In addition to the requirements specified in AB-513, API 2201 is recognized as good engineering practice that shall also be followed when developing hot tapping procedures and for executing all hot tapping activities. API 577 Section 11 also provides additional information on welding issues related to hot tapping and in-service welding.

**Hot tapping of pressure piping systems and pressure vessels may be permitted. Hot tapping of boilers is not permitted.**

**Hot tapping can be performed and accomplished safely provided that there are effective procedures in place and proper precautions have been undertaken to control all hot tap activities including:**

1. The owner shall maintain documented procedures that cover the controls for all hot tap activities including:
  - all the relevant information in AB-513 and API 2201;
  - ensuring that competent persons and required resources are assigned for all hot tap activities;
  - conducting job analysis and preparing the justification that no alternative method is feasible;
  - conducting a hazard evaluation and developing a risk reduction plan;
  - preparing instructions for managing the changes safely;
  - developing the design of the hot tap connection;
  - preparing the job-specific hot tap procedures;
  - establishing welding and mechanical attachment requirements.
2. Hot tap procedures must be submitted to ABSA for each proposed hot tap. Notwithstanding this requirement, Contractors and/or Owner/Users, who have acceptable hot tap procedures and appropriate organization, documented work processes and designated competent resources to manage hot taps under their CAP, may be authorized to perform hot taps without submitting individual hot tap procedures for registration.
3. Hot taps to pressure vessels shall be inspected by ABSA. Each Hot Tap on piping shall be reported to ABSA prior to hot tapping and may be witnessed by an owner's certified inspector.
4. A Contractor/Owner installing a fitting by welding for attachments necessary for hot tapping shall:
  - hold a valid CAP for the hot tap activity, per AB-513 Section 6;
  - install the fitting in accordance with the requirements of the engineering design, hot tap procedure and the QMS;
  - certify the installation using an AB-83 form if the installation was done on a pressure piping system, or an AB-40 form if the installation was done on a pressure vessel.
5. The company that uses the hot tap equipment shall have an Alberta CAP for this activity to perform the work in accordance with its own and/or the owner's hot tap procedures. ❖

## EXTERNAL TRAINING NEWS

### Electronic Learning (e-Learning)

ABSA has completed the development of their first series of eLearning training courses and will continue to monitor the value these courses bring to our clients around the globe.

For over a decade, ABSA has been delivering face-to-face training seminars and will continue to do so. With the addition of the new eLearning style of training, many clients, who may be unable to access the face-to-face training, will be able to take training specific to their needs. There is also an advantage of eLearning courses in that the candidates would be able to take the training at their own pace.

The first series of eLearning training is for the registration of pressure equipment designs. In the province of Alberta you can find pressure equipment in almost all industry and in many public buildings from oil and gas refineries to educational institutions. Some of our clients only require to register designs of a specific type of pressure equipment (e.g., pressure fittings) and may not want to learn about the registration of other types of pressure equipment. The courses are set up in a way that will accommodate to their specific needs. There is one course that is a prerequisite to the other four courses providing the general knowledge on design registration and provisions common to all design registration applications. And this course is required to be taken first, before taking any of the other four optional courses. These courses are designed to challenge the student's understanding of the course material and, upon successful passing of the course, a "Certificate of Completion" will be issued to the student.

This new eLearning design registration course is broken down into five components, as follows:

Introduction to Design Registration	<i>Pre-requisite</i> (60 minutes)
Pressure Piping Design Registration	40 minutes
Pressure Fittings Design Registration	40 minutes
Boilers & Pressure Vessels Design Registration	40 minutes
Repair & Alteration Design Registration	40 minutes

For more details on what the courses are about and how to register on-line, please visit ABSA's website and click the Training/Seminar tab.

### Power Engineer Second Class Part A Paper 2 New syllabus topic on Corrosion

The new syllabus topic 5(g) for Second Class Part A Paper 2 on "*Electrochemistry principles applied to corrosion, corrosion forms, control method, testing, monitoring, prevention and failure analysis*" became effective July 1, 2011. Candidates for the examination should be aware that up to half of a question on this new topic may be included in the 2014 examinations.

We understand that PanGlobal, a power engineering course provider is having material on this new corrosion topic available on their website on July 1, 2013. ❖

## ABSA OFFICES

Edmonton - Head Office  
9410 - 20 Avenue  
Edmonton, Alberta T6N 0A4  
Tel (780) 437-9100  
Fax (780) 437-7787

Grande Prairie  
#203, 10109 - 97th Avenue  
Grande Prairie, Alberta T8V 0N5  
Tel (780) 538-9922  
Fax (780) 538-9400

Fort McMurray  
39C Suncor Industrial Campus  
160 MacKenzie Boulevard  
Fort McMurray, Alberta T9H 4B8  
Tel (780) 714-3067  
Fax (780) 714-2380

Internet address  
<http://www.absa.ca>

Calgary  
Tower 3, Suite 590  
1212 - 31st Avenue N.E.  
Calgary, Alberta T2E 7S8  
Tel (403) 291-7070  
Fax (403) 291-4545

Lethbridge  
#300, 515 - 7th Street South  
Lethbridge, Alberta T1J 2G8  
Tel (403) 394-1011  
Fax (403) 327-2483

Medicine Hat  
#103, 346 - 3rd Street S.E.  
Medicine Hat, Alberta T1A 0G7  
Tel (403) 529-3514  
Fax (403) 529-3632

Red Deer  
#304, 4406 Gaetz Avenue  
Red Deer, Alberta T4N 3Z6  
Tel (403) 341-6677  
Fax (403) 341-3377