

ABSA THE PRESSURE NEWS

Alberta Boilers Safety Association

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WATER HAMMER

Once again, an accident has occurred when a high pressure steam line released steam and water in an uncontrolled manner, necessitating investigation by ABSA.

The heating system in question operated at 100 psi, letting down to 10 psi through a reducing station. An unscheduled outage of the steam supply had occurred and on resumption of the supply less than an hour later, the system experienced destructive water hammer. An NPS 6 Class 125 strainer was fractured by a slug of water that had been picked up by the now flowing steam. The steam and hot water that was released into the mechanical room set off the fire sprinklers. Electrical equipment was drenched and patrons of the facility were inconvenienced by elevator shutdowns, fire alarms, etc. Fortunately, there were no injuries in this particular incident; damage was estimated at between \$150,000 and \$200,000.

Water hammer of this type occurs primarily because water (condensed steam) collects in a low point of the steam line. On reintroduction of the steam to the line, the flow of steam over the pooled water creates turbulence that rapidly increases until the liquid water temporarily blocks the pipe. At this point, the steam pushes this slug of condensate along the line at the velocity of the steam. When this slug of water encounters an obstruction or change in direction, it slams into that obstruction or elbow with great force, hence the name water hammer. In this case the obstruction was the strainer, which fractured because of the impact load.

Designers and owners of steam systems should observe the following for introducing steam into a cooled line:

1. Low-point drains should be provided and these drains should be opened and kept open until dry steam is blowing out
2. Ensure that steam traps are in good working condition
3. Support horizontal steam lines to avoid sagging, where water could collect
4. Gradually warm up the steam line
5. Never leave the line unattended until it is up to pressure and temperature. ❖

Pressure Equipment Safety Legislation Seminar

ABSA has developed a seminar to assist people who wish to enhance their knowledge and understanding of Alberta legislation governing pressure equipment safety. This seminar is now being presented in a two-day format. While this seminar does not specifically focus on the Inspector Certification examination, it does provide information on relevant elements of the legislated requirements for pressure equipment safety. It includes presentations on the Safety Codes Act, CSA and ASME codes, governing bodies, quality systems, construction, inspections, accident investigations, repairs and alterations and other topics.

The seminar schedule for 2004 has now been set with the following dates in Edmonton:

- o January 27 & 28
- o April 27 & 28
- o June 22 & 23
- o October 26 & 27

The cost of these two-day seminars is \$400.00 plus GST. Lunches and all materials are included.

If you wish to register for the program, call Geeta Chanana at 780-433-0281 extension 311.

We can also provide an in-house seminar on your site. Please contact ABSA for price and scheduling.

This two-day seminar is also being offered on February 2 & 3, 2004 in Banff in conjunction with the National Pressure Equipment Conference (NPEC). The cost for the Banff seminar is \$450.00 plus GST. For more information, and to register, visit the NPEC website at: <http://www.npec.ca>. ❖

Have you visited us on the Internet yet? - www.absa.ca

ASME CODE STAMP CONSTRUCTION NEW PART UHX OF SECTION VIII, DIVISION 1 MANDATORY ON JANUARY 1, 2004

The 2003 Addenda of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, that were published on July 1, 2003, introduced the new Part UHX, "Rules for Shell and Tube Heat Exchangers". For ASME Code stamped construction, these Addenda will be mandatory on January 1, 2004.

In creating Part UHX, non-mandatory Appendix AA, "*Rules for the Design of Tubesheets*", was eliminated from the Code. The design formulae and rules were rolled into Part UHX, but Part UHX covers significantly more than tubesheet design.

Consequently, in accordance with Clause 4.1.2 of CSA B51-03, *Boiler, Pressure Vessel and Pressure Piping Code*, the registration numbers of designs of heat exchangers, which were based on tubesheets designed to Appendix AA rather than to the

Standards of the Tubular Exchanger Manufacturers Association (TEMA), will become invalid on January 1, 2004. This means that no heat exchanger may be constructed to such a registration number if the order for it is placed after December 31, 2003.

Where it can be shown that such a design (one with Appendix AA tubesheets) will meet all the requirements of Part UHX, the design may be resubmitted to ABSA for registration to the current Code.

To ease the transition to Part UHX heat exchanger designs, ASME has issued Code Case 2429, Alternative Rules for the Design of Tubesheets, Section VIII, Division 1. This Case permits the use of tubesheets designed to the TEMA Standards in lieu of the rules in UHX-11 through

UHX-14 provided that the criteria do not exceed the parameters listed in the scope of the TEMA Standard until the end of 2004. Note that, while the Code Case provides some temporary relief from paragraphs UHX-11 through UHX-14, the other paragraphs of Part UHX must be satisfied for equipment ordered after December 31, 2003. This means that, starting January 1, 2004, standard TEMA heat exchanger designs that have already been registered, must be shown to meet these other Part UHX paragraphs or be revised to comply and be reregistered.

For replacement units and specific applications, consideration may be given to construct to TEMA design through the use of Variance VA03-009 (IB03-010). In that case, call Mr. B. McWhirter at telephone 780-437-9100. ❖

WELDING DISSIMILAR BASE METAL THICKNESSES

When welding a corner joint with dissimilar base metal thicknesses, the thickness of both members must be within the qualified thickness range of the Welding Procedure Specification being used. The requirements for Welding Procedure Specifications for dissimilar base metal thicknesses are given in QW-202.4 (b) of ASME Section IX. Also ASME Section IX Code Interpretation IX-98-20R re-states the requirements and provides illustrations for additional clarification purposes.

This may be of particular concern when carbon steel (P-No.1) components are welded together to form a corner joint and are not subjected to post weld heat treatment ("as-welded condition"). It is suggested that fabricators and constructors review their existing welding procedures to ensure that the requirements of ASME Section IX are satisfied. ❖

WELDING EXAMINER AND PERFORMANCE QUALIFICATION CARDS

In accordance with changes introduced by the Pressure Welders Regulation (AR169/2002), as of October 1, 2003, all ABSA-Authorized Welder Testing Organizations must employ an individual who holds a Welding Examiner Certificate of Competency, issued by ABSA, to conduct pressure welder performance qualification tests.

Pursuant to Section 6 of the Regulation, a performance qualification card must have both the signature and the Certification File Number (E-XXXXX) of the Welding Examiner to meet the Regulation requirements.

An individual who has not received the Welding Examiner Certificate of Competency from ABSA is not Authorized under the Regulation to conduct performance qualification tests and sign any performance qualification cards. ❖

Deadline for In-Service Inspector Certification Without Examination

The deadline for In-Service Pressure Equipment Inspector Certification Without Examination based on equivalencies (at least 5 years employment as Chief Inspector, or equivalent, under an ABSA-accepted Owner-User program) is December 31, 2003. Persons who wish to be certified without examination should submit their application before the deadline.

Persons who held certification as Safety Codes Officer – Boiler prior to October 2001, and are not working for ABSA, are eligible for certification without examination. There is no deadline for these individuals for certification without examination.

There are currently 69 certified In-Service Boiler and Pressure Vessel Inspectors and 159 certified In-Service Pressure Vessel Inspectors. The total number of certified inspectors is 228 which is a significant increase in numbers when

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compared to the 31 non-ABSA Safety Codes Officers who were in place before this certification program was implemented in October 2001. With over 300,000 items of pressure equipment, Alberta needs a strong team of competent certified inspectors to ensure and promote pressure equipment safety. ❖

CAUTION ENERGY MANAGEMENT SYSTEMS

At a recent National Board meeting, a potential safety concern was identified.

Energy Management Systems (EMS), which are installed to achieve energy savings, may be introducing overrides and/or bypasses of safety controls (such as Low-Water-Cutoffs) which could create a potentially severe safety hazard. As well, inexperienced technicians installing EMS instrumentation have inadvertently bypassed plant safety systems.

While this problem has not yet surfaced in Alberta, we need to ensure that this does not happen here. The owners and power engineers must ensure that all necessary safety controls are installed and maintained in good working order. Any proposed EMS must be reviewed to ensure that it does not include any overrides or bypasses of safety controls. We also recommend that the boiler manufacturer be consulted on the installation of such systems.

As well, owners must ensure that individuals working on or installing such systems have proper training on boiler operation and control systems and are properly supervised so that they will not jeopardize plant safety.

Of particular interest to ABSA was the fact that in all incidents reported, it appeared that certification of boiler operators was not part of the jurisdiction's regulatory requirement. ❖

PRESSURIZATION OF A VESSEL

We often receive reports of failures of container which are not pressure vessels. Often these containers were not designed for pressure but pressure is applied.

In one case 90 psig air was applied to a 45 gallon drum in order to push chemical from the drum. The lid of the drum blew off, killing the operator.

In another case, air pressure was applied to a gearbox in order to push oil from the gearbox into a container. The gearbox failed due to over-pressure. Because the gearbox was made of cast iron the failure was brittle fracture of the material.

In all cases the pressurized container was not designed for pressure or a vessel was over-pressured because technicians or operators did not

realize the consequences.

Another example was that 120 psi air was applied to a vessel designed for 30 psi in order to push the water out after a shop hydro test.

There are two things to consider firstly, if you plan to apply pressure to a container of vessel, make sure that the container is designed for the pressure being applied. The second thing to consider is that air is expandable, so any failure involving air has the potential of serious consequences as the stored energy in compressed air can be very high.

In summary, do not apply pressure to equipment that is not designed for pressure. Any pressurization of a vessel with air is considered as a pneumatic test and requires submission to ABSA for approval. ❖

National Pressure Equipment Conference

The Eighth Annual National Pressure Equipment Conference (NPEC) will be held at the Banff Centre February 4-6, 2004. The theme of the upcoming Conference is "Equipment Assessment". Please visit the NPEC website, <http://www.npec.ca/> for more information.

The Pressure Equipment Conference is hosted by the Energy Department at the Southern Alberta Institute of Technology (SAIT), co-sponsored by the Alberta Boilers Safety Association (ABSA) and supported by the Upstream Chief Inspectors Association (UCIA) and the Alberta Refinery and Petrochemical Inspectors Association (ARPIA) among others. The goal of the conferences is to promote technical improvement toward excellence in design, safe operation, and inspection of pressure equipment.

ABSA will be offering a two-day Pressure Equipment Safety Legislation Seminar on February 2 & 3 as part of the pre-conference training. Please visit the NPEC website for more information and to register with NPEC.

Also, ABSA has scheduled the In-Service Inspector Certification examination for the morning of February 4, in conjunction with the NPEC. To write the examination, a candidate must apply to ABSA for certification and must meet the prerequisites. The ABSA website, <http://www.absa.ca>, defines the requirements and provides the application form for certification as an in-service inspector.

JOIN US at the conference and hear the presentations, and meet your colleagues. For the Conference speaker schedule, registration information and trade booth application form please refer to the documents at the NPEC website. ❖



**NATIONAL BOARD SEMINARS
ON
“OPERATION OF BOILERS”
“IN-SERVICE INSPECTION”**
APRIL 19 AND 20, 2004 IN EDMONTON
APRIL 22 AND 23, 2004 IN CALGARY

ABSA is pleased to partner with the National Board of Boiler and Pressure Vessel Inspectors to host seminars in Edmonton and the same seminars in Calgary in April 2004.

One one-day seminar will be targeted at power engineers, operators, building owners, installers, manufacturers, repair firms and maintenance contractors. The other one-day seminar will be targeted at inspectors or people interested in Codes and Standards requirements.

Detail of the seminars will be announced in the future. Please visit the ABSA web site, Education and Certification web page, safety education and training seminars in mid January 2004 for more information about the seminars and the registration form.

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St. Paul
Please note that our St. Paul office has been closed. All services will be provided through the Edmonton Office.

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

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