ABSA
the pressure equipment safety authority

THE PRESSURE NEWS

Volume 13, Issue 1, March 2008

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ASME SECTION VIII, DIV. 2 SEMINAR

There has been interest expressed in another session of the seminar on the new ASME Section VIII, Div. 2 Code that we presented during January in Calgary and Edmonton. We are planning to present it again in July at our Edmonton office. Please check www.absa.ca for details.

IMPACT TESTING RULES FOR STAINLESS STEELS

A recent incident involving the construction of a stainless steel pressure vessel highlights the need for better knowledge of paragraph UHA-51 of ASME Section VIII Division 1 which provides the rules for impact testing of austenitic, austenitic-ferritic duplex, ferritic chromium and martensitic stainless steel vessels.

A common misconception in the application of Code rules by some designers is that the Code makes provisions that a certain material or weld must be impact tested for a certain MDMT. Instead, UHA-51 states that that *"impact tests … shall be performed on materials listed in Table UHA-23 for all combinations of materials and minimum design metal temperatures unless exempted"* by one of the paragraphs under UHA-51. That is why ABSA's Design Survey Department requires the design submissions to indicate the complete number(s) of the paragraph(s) providing the exemption(s). So, unless one can find an exemption in the Code rules, impact tests will always be required. In this respect, the impact testing considerations for the high alloy materials are no different from those for carbon and low alloy steel materials. UHA-51 may also limit the welding processes that may be used for certain materials below certain MDMT's.

The impact testing rules address materials, welding procedures, and, in many cases with the high alloy materials, pre-use testing of each heat, lot, or batch of filler metal or filler metal/flux combination used as well as production impact tests. Thus, when determining if impact tests are exempted, one must examine the Code provisions exempting the impact tests very carefully to see if the provisions truly apply. Regrettably, there have been a couple of occasions over the last few years in Alberta where missed requirements were not picked up until the vessels were well into fabrication; the corrective actions were very expensive, including in one case, the scrapping of the vessel. Needless to say there were serious project delays as well.

Appendix JJ of the ASME Code Section VIII Division 1 provides a number of flowcharts for the determination of impact test requirements under UHA-51. These charts allow for a quick determination of the impact test requirements for materials, heat-affected zones, welding procedure qualifications, welding consumables *etc*. All designers of stainless steel vessels should review these flow charts and the text of UHA-51 fully and carefully to assure themselves of the proper application of Code rules.

Manufacturers of stainless steel vessels should be aware of a significant revision to paragraph UHA-51(f) in July 1, 2007 which provides clarification with respect to the requirements of pre-use testing of each heat, lot or batch of filler metal or heat of filler metal and batch of flux combination to be used in production welding with specific welding processes. This revision is not a change of Code rules but simply a clarification of existing rules. ❖

BOILER OPERATION SEMINAR

With the support of the National Board of Boiler and Pressure Vessel Inspectors, ABSA is planning a one-day seminar in Edmonton and Calgary during the week of July 7. The main speaker of the seminar will be from the National Board. The seminar will benefit personnel involved with heating or power boilers in promoting safety, accident prevention, efficient operation and effective maintenance and will also enhance understanding of the Alberta Power Engineers Regulation.

Details of the seminar should be posted at www.absa.ca by the end of April. ❖

SKID PACKAGES FROM OUT OF PROVINCE

There was an occurrence in 2007 involving a skidded compressor package, from a USA fabricator, which contained pressure piping that was not inspected and certified by an Authorized Inspector, as is required for pressure piping built in the USA for use in Alberta. The Pressure Piping Construction and Test Data Report (ABSA form AB-83F) was incomplete.

Correction of this involved considerable time involving the Alberta Administrator/ABSA Chief Inspector, USA Jurisdictional Authority and the ABSA Authorized Inspector, the manufacturer and the Alberta based importer.

Eventually, following a considerable amount of inspection and auditing, it was possible to demonstrate the systems were of equivalent safety to those inspected by an authorized inspector and a variance was issued by the Alberta Administrator to permit the pressure piping to be operated in Alberta.

A second occurrence in 2007 was prevented when an Alberta importer advised an Alberta Authorized Inspector that a USA based fabricator was planning to use unqualified welders to weld the piping and requested a waiver to exempt the USA Jurisdictional Authority from witnessing hydrostatic testing and certifying the AB-83F for a piping job bound for Alberta. The Inspector advised the importer that the equipment would not be accepted for use in Alberta. The importer clarified the contract requirements to the fabricator.

The USA Jurisdictional Authorities were fully cooperative in assisting ABSA in both of these cases. In both cases, lack of awareness of Alberta requirements was a key causal factor. Below is an overview of requirements for pressure piping.

The Pressure Equipment Safety Regulation Section 26 states that no person shall use in Alberta any pressure equipment constructed outside Alberta unless the person constructing the equipment (boiler, pressure vessel, fired-heater pressure coil, thermal liquid heating system, pressure piping system, or fitting) satisfies a Safety Codes Officer that:

(a) the construction was in accordance with the registered design.
(b) the welding or brazing performance qualification tests of the welders or brazers who were engaged in the construction complied with the ASME Boiler and Pressure Vessel Code, Section IX, and
(c) it was inspected and tested in the same way, or substantially the same way, that it would have been if it had been constructed in Alberta.

The Pressure Equipment Safety Regulation Section 27, Subsection (3) states that :-

The Administrator may waive the requirements (for registration of welding, brazing and other joining procedures) regarding pressure equipment constructed or manufactured outside Alberta for use in Alberta if the welding, brazing or other joining procedure has been approved by an organization acceptable to the Administrator.

The Pressure Equipment Safety Regulation Section 31 Subsection 2 requires:-

For piping constructed outside Alberta, the pressure piping construction and test data report form (AB-83F) must be certified by an inspector acceptable to the Administrator. ❖

PRESSURE RELIEF DEVICE DISCHARGE

Safe discharge from a relief device is a very important consideration. Through in-service inspection, we sometimes find the discharge of pressure relief devices has not been given the attention that is needed. Whether it is a boiler or a pressure vessel, the proper discharge of the pressure relief device must not be overlooked.

ASME Boiler and Pressure Vessel Code Sections I, IV and VIII have very similar rules when it comes to the discharge of pressure relieving devices. In general, the discharge of any pressure relieving device must be such that when the device releases to prevent overpressure of the equipment it is protecting, the discharge is routed to a safe location so as to prevent harm or injury to personnel, or damage to equipment. This location will vary depending on what type of pressure equipment and the service it is in.

For pressure vessels, ASME Section VIII, Division 1, Part UG-135(f) states, "*Discharge lines from pressure relief devices shall be designed to facilitate drainage or shall be fitted with drains to prevent liquid from lodging in the discharge side of the pressure relief device, and such lines shall lead to a safe place of discharge…*" Pressure relief devices which discharge to the atmosphere should also have their discharge lines protected from the elements.

For power boilers, ASME Section I, Part PG-71.3 states, "*All safety valve or safety relief valve discharges shall be so located or piped as to be carried clear from running boards or platforms. Ample provision for gravity drain shall be made in the discharge pipe at or near each safety valve or safety relief valve, and where water of condensation may collect.*"

We recommend that all owners and operators of pressure vessels and boilers examine their pressure relief device discharges regularly to ensure that they comply with the appropriate code sections, and that they discharge at a safe point. Any deficiencies should be rectified as soon as possible. ❖

PROCESS FACILITY PLANT SURVEY

The Safety Codes Act (SCA) and Pressure Equipment Safety Regulation (PESR) establish responsibilities for owners of pressure equipment. Under the PESR, the owner of pressure equipment must establish and maintain an integrity assessment program that is acceptable to the Administrator. An integrity assessment program includes maintaining an inventory of equipment and equipment records and assessing the pressure equipment.

The SCA also provides that, for the purpose of ensuring the Act and regulations are complied with, a safety codes officer may, without a warrant, at any reasonable time, enter any place and may, using reasonable care, carry out an inspection and examine and evaluate quality management systems.

Part of ABSA's duty is to coordinate and encourage the safe management of pressure equipment. To ensure that process equipment, that is not managed under a formal owner/user quality management system, is being operated and maintained in a safe manner, ABSA has recently introduced a simple audit process (sometimes referred to as a *plant survey*) to confirm the owner's conformance to key responsibilities under the PESR. During a plant survey, an ABSA safety codes officer (SCO) will audit the owner's integrity assessment program and may perform some limited visual service inspections, verify pressure equipment inventory, verify correct PRV installation and ensure that field personnel have basic awareness of the PESR requirements. Deficiencies found will be discussed with the owner's representative; internal inspections or NDE may be requested if applicable; and formal corrective instructions may be issued for some deficiencies.

It is the owner's responsibility to make sure that:
(a) the pressure equipment meets the requirements of the PESR,
(b) an integrity management system is in place for the pressure equipment,
(c) the pressure equipment and pressure relief devices, pressure gauges and regulating or controlling devices on them are maintained in good working order and are operated safely,
(d) safe operating limits are established for the pressure equipment,
(e) the pressure equipment is operated within established safe operating limits,
(f) there are adequate and suitable instructions for the safe operation of the pressure equipment, and
(g) the person operating the pressure equipment is competent.

Visiting facilities to inspect the facility and to discuss requirements for safe operation with the owner's staff has proven to be a very useful tool to apply ABSA's expertise to promote safe operation. Please contact your local ABSA office if you would like to learn more about plant surveys. ❖

QUALITY PROGRAM REQUIREMENTS FOR ALBERTA

In order to promote and enforce public safety in the province of Alberta, legislation requires "Certificate of Authorization Permits" for the use, operation, manufacture, repair and alteration of pressure equipment in Alberta. These requirements also apply to inspection companies providing integrity assessments of pressure equipment, owner/users having integrity management systems and companies/individuals providing performance qualification certification of pressure welders and machine welding operators.

Under the Alberta Pressure Equipment Regulation (PESR) section 11(1), a person shall not construct, manufacture, repair or alter pressure equipment or service, repair, set or seal a pressure relief devices in Alberta unless that person holds a Certificate of Authorization Permit to do. This applies to everything from boilers and pressure vessels, to fittings and piping systems not exempt under the PESR or Pressure Equipment Exemption Order.

The ABSA "Certificate of Authorization Permit" has minimum requirements which vary in accordance with the type of program. To obtain a "Certificate of Authorization Permit", a person must provide a written description of an acceptable quality management system along with an application with the intended scope of work. Upon review and acceptance, an implementation review is set up and is conducted by an ABSA safety codes officer. Upon successful completion of the review a recommendation may be made to the Administrator to issue a Certificate of Authorization Permit.

A "Certificate of Authorization Permit" is issued detailing the exact scope of work permitted and normally expires in three years. It can be renewed for a further three year period prior to it's expiry. Depending on the program, periodic (midterm) or yearly audits or assessments are also conducted by ABSA. These audits or assessments are all carried out by an ABSA safety codes officer to verify that the holder of the program is following the program and is in compliance with the requirements of the Act.

ABSA's website at www.absa.ca has information in regards to the requirements for Certificate of Authorization Permits and the Quality Management Systems.

Individuals or companies having any questions or concerns about this topic may call their local ABSA office for further information. ❖

CORROSION HAZARDS

In a recent case in Alberta, it was reported that an unclad part adjacent to the clad zone of a vessel failed. The resulting leak led to a very significant fire and extremely heavy losses for the owner. It is not known at this time whether anyone was sufficiently aware of the difference in the corrosion resistance of the adjacent parts to require more frequent thickness monitoring of the less corrosion-resistant zone; however, that was the part that was reported to have failed.

Some pressure vessels are designed with different corrosion allowances for different zones or components of the vessel. Along the same lines, some pressure vessels have a corrosion-resistant lining or cladding, which constitutes the corrosion allowance, in areas of the vessel where corrosion is anticipated to be more aggressive. These are quite rational things to do and would not violate any Code requirements.

A problem arises when the allowance for corrosion on a part is reduced for reasons other than an expectation that the rate of corrosion on that part will be less than what is expected for the vessel in general or for adjacent parts of the vessel. It is not uncommon, at the design registration stage, for ABSA to find a vessel nozzle that is slightly short on reinforcement area; sometimes the designer's "fix" is to reduce the corrosion allowance on the nozzle to provide additional area for reinforcement. It still meets Code so what is the problem?

End users are obliged to ensure that their pressure equipment is maintained in accordance with the regulations (*Safety Codes Act*, s5). In doing this, one of the steps that is taken is to periodically monitor the thickness of the vessel during its service life. If some areas or parts of the vessel have a reduced corrosion allowance and there is no expectation of a reduced corrosion rate in that area, then special attention will have to be paid to that area because it will probably reach its minimum required thickness before the rest of the vessel does. Therefore, that part may limit the life expectancy of the entire vessel.

Now suppose that the end user is unaware of the difference in corrosion allowance or, in the case of partially clad or overlaid vessels, a difference in the corrosion resistance of a part. There would then be no incentive to monitor that area more frequently and the vessel could end up operating outside of its design limits without anybody's being any the wiser – until the part fails.

The message here is that for vessels constructed with different corrosion allowances or corrosion resistances of various parts, the owner needs to be fully aware of the situation and monitor the vessel thicknesses appropriately. It needs to be recognized also that regardless of the provisions made for corrosion in the original design, there is no guarantee that corrosion will progress uniformly over the entire vessel. Therefore, monitoring the thicknesses of all areas and comparing the readings to the local minimum required thickness is essential. ❖

NATIONAL BOARD—77TH GENERAL MEETING

The 77th annual Meeting of the National Board will be held in Vancouver, British Columbia in conjunction with the ASME International Boiler and Pressure Vessel Code Committee meetings. The theme of this year's conference is "Safety Delayed is Safety Denied " and the conference will be held on April 21-25, 2008.

The last time the National Board annual meeting held in Canada was in 2000 in Toronto, Ontario. Industries are encouraged to attend particularly with the close proximity of the conference venue to Alberta.

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

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