PRESSURE POINTS

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QUALITY MANAGEMENT VS QUALITY ASSURANCE?

Nearly every organization globally producing products of industrial applications is overseen by some form of a management or quality program. These programs exist to help manage business effectively and put in place best practice methodologies. Elements within these practices focus on outcomes which lead to time and cost saving measures, increased efficiencies, and improved customer relationships. These programs are successful due to continuous improvements, gaining greater control over processes, and therefore greater control over the results. These programs provide an organization a business culture which validates inherent quality of any product produced using best practice methodologies. Although some programs are meant to have universal application across cutting multiple industries, there are specific industrial applications in which even the most widely used programs fall short.

ISO 9001 has been implemented by more than one million organizations in more than 75 countries. Many organizations interested in pursuing business in the nuclear industry, find that their ISO 9001 program must be modified to meet the requirements for Nuclear Quality Assurance. In its basic form, a Quality Management Program such as ISO 9001 is a business-process program. ISO standards are considered generic management standards that are universally applicable and do not differentiate between large and small companies.

For the required level of emphasis on safety and regulatory oversight, the aerospace industry is most aligned to the nuclear industry. The aerospace industry Quality Management System (QMS), AS9100, was first implemented in 1997, following cancellation of quality system specifications by the Department of Defense. Due to the lack of a government endorsed quality system by the Federal Aviation Administration, the aerospace industry independently developed a sector-specific quality program so that it could pass uniform requirements to its suppliers. The 2000 edition of AS9100, developed to conform to the 2000 edition of ISO 9001, incorporated 80 additional requirements and amplified the original 18 requirements. Areas that the aerospace industry believed were not adequately addressed by ISO 9001 include design, development, manufacture, assembly, reliability, maintainability, servicing of aerospace products, and regulatory compliance.

In the nuclear industry similar evaluations have come to the same conclusion. Evaluations for nuclear applicability done by the US NRC(SECY-03-0117), ASME(STP-NU-062), and the IAEA(Safety Report No. 22) have shown that an ISO 9001 program alone does not guarantee compliance or quality of end products and services. Most show that requirements in areas such as the quality assurance program, training and qualification, design and independence of design verification, and independence of inspection and testing activities did not meet applicable requirements for the nuclear industry. Other areas such as documentation, nonconformance control, corrective actions, document control and records, inspection and testing, and audits also had to be heavily modified.

Although some standards such as the RCC-M, JSME, and CSA recognize ISO in their code and regulatory framework, there are usually several supplementary requirements added for procurement of components. These requirements include additional provisions for design verification, document and data control, purchasing data, product identification and traceability, inspection and testing, and control of nonconforming products. In some cases ISO is allowed only for procurement of components outside the primary system pressure boundary.

Although ISO has improved many organizations best practices, been proven successful, and is widely used, a nuclear organization using ISO alone would not achieve the required level of assurance required by the nuclear industry. Most nuclear standards reflect industry experience and current understanding of the quality assurance requirements necessary to achieve safe, reliable, and efficient utilization of nuclear energy, and management and processing of radioactive materials. This standard focuses on the achievement of results, emphasizes the role of the

individual and line management in the achievement of quality, and foster the application of these requirements in a manner consistent with the relative importance of the item or activity. The emphasis on the component versus a process orientated approach assures the safe construction and operation of any nuclear power plant.

ULTRASONIC EXAMINATION IN LIEU OF RADIOGRAPHIC EXAMINATION FOR SECTIONS I & VIII DIVISION 1 & 2

By: Codes and Standards

Ultarsonic examinations (UT) is a permitted volumetaic examination method in lieu of the required Radiographic Examination (RT) of ASME Boiler and Pressure Vessel Code Sections I, VIII Division 1. and VIII Division 2. It is important for all three code books, the permitted ultrasonic examinations are restricted to **Time of Flight Diffraction (TOFD**) and **Phased Array (PAUT)** with computer based data acquisition and analysis abilities using automatic or semi-automatic equipment that is **mechanically mounted and guided** on the examination surface. Manual straight beam UT, manual angle beam UT and manual Phased Array (PAUT) are not permitted as substitute techniques when using UT in place of required RT. Listed below are the requirements for Sections I and VIII Division 1 & 2.

Section I

Section I permits UT in lieu of RT by utilizing Code Cases 2235, 2816, or by using PW-52.1. Code Cases 2235 and 2816 utilize fracture mechanics based acceptance criteria, while PW-52.1 references Section V, Article 4, Mandatory Appendix VII, which uses workmanship based acceptance criteria.

While the acceptance criteria are different, in all three references, the use of TOFD or PAUT using equipment mechanically mounted and guided on the examination surface either through automatic or semiautomatic means is required.

Code Case 2235-13 paragraph (d) requires UT to be performed using a “device employing automatic computer based data acquisition”. Code Case 2816 has the similar requirement in paragraph (d). PW-52.1 states that UT shall be in accordance with Section V, Article 4, Mandatory Appendix VII. Mandatory Appendix VII paragraph VII-431 states that ultrasonic examination is to be performed, “using a system employing automated or semi-automated scanning with computer based data acquisition and analysis abilities”. Semi-automated and automated are defined terms within Section V, Article 1, Mandatory Appendix I and are listed below for convenience.

semi-automated ultrasonic examinations (SAUT): a technique of ultrasonic examination performed with equipment and search units that are mechanically mounted and guided, manually assisted (driven), and which may be manually adjusted by the technician. The equipment used to perform the examination is capable of recording the ultrasonic response data, including the scanning positions, by means of integral encoding devices such that imaging of the acquired data can be performed.

automated ultrasonic examinations (AUT): a technique of ultrasonic examination performed with equipment and search units that are mechanically mounted and guided, remotely operated, and motor-controlled (driven) without adjustments by the technician. The equipment used to perform the examination is capable of recording the ultrasonic response data, including the scanning positions, by means of integral encoding devices such that imaging of the acquired data can be performed.

As a result, **manual UT is not permitted** for use as the primary technique for Section I Code examinations with the exception of PW-44.7.3 examinations of bimetallic tubing when clad strength is included.

Section VIII Division 1 & 2

Section VIII Divisions 1 and 2 likewise permit UT in lieu of the required RT. Section VIII Division 1, UW-51(a)(4) states that this UT must meet the requirements of Section VIII Division 2, paragraph 7.5.5. As a result, a Certificate Holder performing UT as permitted in UW-51(a)(4), needs to have access to a Section VIII Division 2 code book. UW-51(a)(4) further references Section V, Article 4, Mandatory Appendix VIII, which utilizes fracture mechanics based acceptance criteria in conjunction with Mandatory Appendix IX.

Mandatory Appendix VIII, paragraph VIII-431 requires that ultrasonic examination must be performed, “using a system employing automated or semi-automated scanning with computer based data acquisition and analysis abilities”. Semi-automated and automated are defined terms as stated above, while equipment with computer based data acquisition and analysis abilities is either TOFD or PAUT.

There are some specific allowances in Section VIII Division 1 to use manual UT in accordance with Mandatory Appendix 12, such as for the final closure seam examination. Section VIII Division 2, paragraph 7.5.4 also permits manual UT examinations on Type 7, and 8 joints in some instances. These allowances for using manual UT should not be confused with the requirements for using UT in lieu of RT.

In closing, please check to ensure the proper utilization of UT in lieu of RT is being performed. If you have any questions, please email Codes and Standards at TechSupport@hsbct.com

ASK THE ENGINEER

By Codes and Standards

Q My Shop has been asked to build and supply a "like-in-kind" tube bundle for a heat exchanger that was built in accordance with ASME Section VIII Division 1, 1989 Edition, 1990 Addenda. The original Fabricator used TEMA rules for the design of the tube sheet. If I design the tube sheet in accordance with Part UHX of the current Edition of Section VIII Division 1, it will be thicker than the original tube sheet used in the existing heat exchanger. Are there any provisions in Section VIII Division 1 to manufacture and stamp a "like-in-kind" replacement unit?

A Per the current Code rules in Section VIII Division 1 [Mandatory Appendix 43], the Certificate Holder is never able to fabricate a replacement part and certify construction to an older edition/addenda. Anytime an ASME mark is placed on a part or a complete vessel, the code edition/addenda in force at the time the contract for this part or vessel is taken must be used.

However, UG-120(c)(2) allows exemption from current design requirements for (Code-stamped) Parts. Such a "Part" would have no MAWP on either the Manufacturer's Partial Data Report or on the Part nameplate / stamping. Part Manufacturer takes no responsibility for design on the Partial Manufacturer's Partial Data Report in accordance with paragraph UG-120(c)(2) and Reference Item 57 in Table W-3 for the U-2 or U-2A, i.e. "design by others".

Q My shop is constructing a Section VIII Division 1 Pressure Vessel which has a nozzle attached to the shell in accordance with Figure UW-16.1 sketch(b). Do I need to perform Non Destructive Examination in accordance with UG-93(d)(3) on the peripheral edges for this nozzle configuration?

A No. The NDE requirements for the peripheral edges mentioned in UG-93(d)(3) are applicable for the corner joints fabricated per Fig. UW-13.2 of Section VIII Division 1. The following Section VIII Interpretation makes it clear that the NDE requirements mentioned in UG-93(d)(3) and (d)(4) are not mandatory for nozzle attachments per Figure UW-16.1 sketch(b) of Section VIII Division 1.

Interpretation: VIII-1-13-11

Subject: UG-93(d)(3) and (d)(4), and Figure UW-16.1, Sketches (a) and (b), NDE for Cut Edges of Holes for "Saddle On" Nozzle Attachments (2010 Edition, 2011 Addenda)

Date Issued: December 9, 2013

File: 12-475

Question: Are cut-edge examination requirements of UG-93(d)(3) and (d)(4) applicable to the cut edges of holes in shells or heads when a nozzle is to be attached with a welded corner joint using a "saddle on" attachment detail such as those shown in Figure UW-16.1, sketch (a) or (b)?

Reply: No.

However, note that ASME Section VIII Division 2 has cut edge examination requirements for the same nozzle configuration. Please refer to paragraph 6.1.3 of Part 6 of ASME Section VIII Division 2 for details.

THE NEW PRESSURE EQUIPMENT DIRECTIVE PED 2014/68/EU

The Pressure Equipment Directive (PED) 97/23/EC which was established May 29, 2002 is being replaced by Pressure Equipment Directive (PED) 2014/68/EU on July 19, 2016.

This revision will be implemented in two parts. The first part became effective June 1, 2015, and is in relation to Article 13 of the new PED. This is a revision of Article 9 of the PED 97/23/EC and references a new regulation for the classification of hazardous substances that must now be followed when determining the fluid group.

The second part of the implementation, effective from July 19, 2016, is the full implementation of the rest of the new directive. The old PED 97/23/EC is repealed on this date, and should no longer be used.

ON THE MOVE

The Hartford Steam Boiler UK Limited, our PED Notified Body office, formally located at Crosby Court, 28 George Street, Birmingham, B3 1Q6, United Kingdom has relocated. *The new address is:*

Hartford Steam Boiler UK Limited
Unit 7, Brewery Yard
Deva City Office Park
Trinity Way
Salford M3 7BB
United Kingdom
Telephone number: +44 (0) 161 832 9502

Within the last month, as required, Hartford Steam Boiler UK Limited (HSB UK) has submitted its change of address to be registered with The United Kingdom Accreditation Service

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(UKAS) and be published on the official website of the European Commission (Nando). We have received notice that the address change has been accepted and Nando's website has been revised to reflect the change.

http://ec.europa.eu/growth/tools-databases/nando/index.cfm?fuseaction=directive.nb&refe_cd=NANDO_INPUT_220764

PAUL FISHER ASME ENGINEER OF THE YEAR

Paul Fisher, HSB Global Standards, recently received the ASME Engineer of the Year award in recognition of his significant contributions to the profession of mechanical engineering and the use of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code.

Paul joined HSB in 1977 as a National Board of Boiler and Pressure Vessel Inspector. His work as an Inspector and Supervisor has contributed to the efficient, Code compliant and economical application of steam power and pressure equipment by providing inspection and consulting services for the boiler and pressure vessel manufacturing, construction, and maintenance industries.

According to Mike Lockwood, Vice President Code Services, **HSB Global Standards**, "Paul's strongest

attribute is his desire and willingness to pass his knowledge on to the next group of inspectors. Paul was the first person I met when I joined the company and he immediately took me in and started mentoring me. At first I thought I must be special, but over the years realized Paul does this with everyone."

His qualifications and professional designations include Supervisor Code Services for the ASME Boiler and Pressure Vessel and ASME Nuclear Codes and Standards; Lead Instructor for **HSB Global Standards** Authorized Nuclear Inspector training program; Inspector and Lead Auditor in accordance with ASME NQA-1, and contributing member to the ASME Boiler and Pressure Vessel Code Standards Committees for the past 19 years, and serving as a member of a number of nuclear subgroups, working groups, special working groups, and task groups.

He began his career as a nuclear plant operator in the United States Navy by completing the Navy's nuclear training program. He was assigned to the USS Enterprise, CVAN-65 from 1972 through 1976 and qualified as Shutdown Watch, Damage Control Petty Officer and various other operator positions.