ASME Standards Technology, LLC
Request for Proposals

RFP-ASMEST-09-01
BPVC#1: Development of Weld Strength Reduction Factors for Service in the Creep Range
B31#1: Develop Elevated Temperature Weld Strength Reduction Factors for ASME Codes Reporting to BPTCS
B31#3: Develop Elevated Temperature Joint Influence Factors for ASME Codes Reporting to BPTCS

Date Posted: July 21, 2008
Proposal Due Date: August 21, 2008

1. Summary

ASME Standards Technology, LLC, is soliciting proposals for the following three tasks related to Weld Strength Reduction Factors (WSRFs) and Weld Joint Influence Factors (WJIFs) in the creep regime.

This project has resulted from ASME Pressure Technology Codes & Standards (PTCS) Standards Committee requests to identify, prioritize, and address technology gaps in current or new PTCS Codes, Standards and Guidelines. This project is one of several included for ASME FY09 funding and intended to establish and maintain the technical relevance of ASME codes & standards products. An overview of the annual ASME PTCS project selection process is included at http://files.asme.org/STLLC/10192.pdf.

2. Scope of Work

a) Scope Description

1) Task 1: (BPVC#1) Development of Weld Strength Reduction Factors for Service in the Creep Range

Develop a comprehensive and technically defensible approach to the testing of critical welds in pressure vessels, piping, and other ASME Code components operating in the creep range as a basis for establishing weld strength reduction factors (WSRF). Provide recommendations for testing based on an understanding of recent failures of high temperature welded components with due consideration of the relevance of laboratory testing and state-of-the-art creep modeling of weld associated stresses and stress concentrations. It is emphasized that, to the extent possible, the study should be based on a careful evaluation, or re-evaluation, of all available information regarding recent failures in seam-welded components, since much of the information currently available in the open literature pertaining to WSRFs is either incomplete or misleading. Details of a plan for data analysis shall be presented with emphasis on the innovative, relatively short term qualification or life assessment testing and incorporating component service experience. The advisability and practicality of a strategy to develop WSRF based on accelerated or short term tests shall be explained.

Consideration shall be given in the report to the potential influence of consumable selection, post weld thermal processing, over matching and under matching creep properties, component local and system stresses and how such concepts influence WSRF's.

There shall be a clear explanation of the technical basis and justification of the proposed approaches to testing and calculating the WSRF recommended, and, equally important, a discussion of the concepts adopted (or proposed) by other international Code bodies. The elevated temperature test data required in order to develop appropriate WSRF shall be described.

It is essential that the approach developed be sufficiently robust to account for the complex interaction between materials properties, component design, manufacturing tolerances, and operating conditions. As such the deliverable would be a detailed description of the following: (1) a test protocol, to include specimen design and the appropriate range of testing conditions for each class of material of interest, particularly the stress/temperature limitations required to insure accurate reproduction of the primary damage mechanism encountered in service; (2) procedures for data analysis; and (3) guidelines for the development of the WSRF factors. It is the intent that the WSRF's should be materials and application specific. Applications should include those encountered in electric power, petroleum, and other industries of concern to ASME. The technical basis of the approach taken shall be explained, and the explanation shall include discussion of data analysis, creep damage models, materials properties, sources of stress and stress analysis.

2) Task 2: (B31#1) Develop Elevated Temperature Weld Strength Reduction Factors for ASME Codes Reporting to BPTCS

A project Team has been formed at the direction of the BPTCS to address the seam welded piping issues. In order to develop a consistent set of Code requirements, the Project Team has identified the need for data on the influence of the weld joint on the strength of weldments at elevated temperature.

As a result of catastrophic ruptures of seam-welded hot reheat piping at power plants during the mid-1980's a need has been identified to revise the codes and standards to address failure experience and inconsistencies among design and fabrication rules in various ASME standards reporting to BPTCS. The resurgence of new construction plus the "short supply/long delivery time" for seamless piping is leading to new construction using longitudinally seam-weld piping without the application of "additional safeguards" identified by research following the mid-1980s failures.

The task scope of work includes conducting a literature search on the performance of welds in the creep regime, identifying and cataloging all data currently available that is pertinent to the subject. Existing Code published values accounting for weld strength, such as in ASME III, Division 1, Subsection NH shall be considered. The literature search should include public domain reports and data in various domestic and international publications, PVRC, WRC, ASME, EPRI, and API publications, data and reports available from various government agencies and labs, data and reports from various technical organizations and data and reports available from material manufacturers, weld material and welding equipment manufacturers and pipe manufacturers. The data should cover all areas including metallurgy, weld filler metal,

welding process, weld joint geometry, welding technique, heat treatment, NDE, physical properties, time to failure, etc.

Weld Joint Influence Factors (WJIFs) should be developed from the data, including any limitations or restrictions on their use. The WJIFs may be a function of weld joint geometry, weld process, welding technique, joint fit up and alignment and other welding or geometry factors and design life. A WJIF is defined as the ratio of the nominal stress to cause failure of the weld joint to that of a seamless metal with the same strength for the same duration. The WJIFs should be applicable to piping, including components, vessels and other pressure equipment under the jurisdiction of BPTCS.

Note that a separate task (task 3) is being proposed to cover the influence of the weld metal on the performance of the weld in the creep regime and develop Weld Strength Reduction Factors (WSRF). These two projects may draw from much of the same data, however they will be looking at different aspects, one the weld joint factors and the other the material factors.

3) Task 3: (B31#3) Develop Elevated Temperature Joint Influence Factors for ASME Codes Reporting to BPTCS

A project Team has been formed at the direction of the BPTCS to address the seam welded piping issues. In order to develop a consistent set of Code requirements, the Project Team has identified the need for data on the influence of the weld joint on the strength of weldments at elevated temperature.

As a result of catastrophic ruptures of seam-welded hot reheat piping at power plants during the mid-1980's a need has been identified to revise the codes and standards to address failure experience and inconsistencies among design and fabrication rules in various ASME standards reporting to BPTCS. The resurgence of new construction plus the "short supply/long delivery time" for seamless piping is leading to new construction using longitudinally seam-weld piping without the application of "additional safeguards" identified by research following the mid-1980s failures.

The task scope of work includes conducting a literature search on the performance of welds in the creep regime, identifying and cataloging all data currently available that is pertinent to the subject. Existing Code published values for weld strength reduction factors, such as in ASME III, Division 1, Subsection NH shall be considered. The literature search should include public domain reports and data in various domestic and international publications, PVRC, ASME, EPRI, and API publications, data and reports available from various government agencies and labs, data and reports from various technical organizations and data and reports available from material manufacturers, weld material manufacturers and pipe manufacturers. The data should cover all areas including metallurgy, weld filler metal, welding process, weld joint geometry, heat treatment, NDE, physical properties, time to failure, etc.

Weld Strength Reduction Factors (WSRFs) should be developed from the data, including any limitations or restrictions on their use. The WSRFs may be a function of material, filler metal, temperature, heat treatment, and design life. A WSRF is defined as the ratio of the nominal stress to cause failure of the weld joint to that of the base metal for the same duration. The WSRFs should be applicable to piping, including components, vessels and other pressure equipment under the jurisdiction of BPTCS.

Note that a separate task (task 2) is being proposed to cover the influence of the weld joint on the performance of the weld in the creep regime and develop Weld Joint Influence Factors (WJIF). These two projects may draw from much of the same data, however they will be looking at different aspects, one the material factors and the other the weld joint factors.

b) Deliverable

The project deliverable shall be technical reports provided as an electronic file in MS Word format. A report template and style guide will be provided by ASME ST-LLC. The report outline shall be approved by ASME ST-LLC. One peer review cycle is anticipated and modifications required to the report, as a result of the review cycle, are the responsibility of the contractor awarded the contract.

c) Schedule

Investigators shall submit a schedule with their proposal describing the major milestones and reporting schedule. ASME ST-LLC desires that the final deliverable be provided no later than March 31, 2010.

d) Reporting:

A brief status report shall be provided monthly to the ASME ST-LLC project manager. Progress reports shall be provided at ASME BPVC and B31 code week meetings.

e) Travel Requirements

Current travel is anticipated to present project results to ASME C&S committees during ASME Boiler and Pressure Vessel Code (BPVC) and B31 code week meetings. Additonal travel for project meetings may be necessary to review critical information regarding component failures from various organizations. Travel expenses shall be reimbursed, within the project budget, per the project Travel Policy

f) Budget

The total budget is approximately $65,000.

3. Applicant Eligibility Requirements

ASME ST-LLC is seeking proposals from all qualified organizations including, but not limited to, engineering firms, consultants, academic institutions and Federally Funded Research and Development Centers. In addition to relevant technical qualifications and experience, applicants must possess an understanding of relevant ASME Codes and Standards.

4. Basis for Selection and Award

Selection of a proposal by ASME ST-LLC will be achieved through a process of evaluating and comparing the relative merits of the applicant's complete responses. This process reflects ASME ST-LLC's desire to accept an application based on its potential in best achieving program objectives, rather than solely on evaluated technical merit or cost. Evaluation criteria includes, but is not limited to, the following:

- Technical capabilities
- Experience
- Price

- Schedule
- Agreement with Terms and Conditions

ASME ST-LLC reserves the right to award, in whole or in part, any, all, or none of the applications submitted in response to this solicitation.

5. Contract Terms and Conditions

A fixed-price contract is preferred, however labor hour and expenses-type proposals will also be considered. Draft terms and conditions are attached. The final contractual terms and conditions will be negotiated between ASME ST-LLC and the selected applicant(s) following award.

ASME ST-LLC shall provide required access to codes and standards and other technical references necessary for performance of the work.

6. Submission Requirements

a. Proposal Due Date: Proposals and amendments of proposals must be received by August 21, 2008. Applicants are encouraged to transmit their proposal well before the deadline.

b. Anticipated Selection and Award Date: It is anticipated that selection and award will be made within 2 weeks of the proposal due date.

c. Application Preparation Costs: This solicitation does not obligate ASME ST-LLC to pay any costs incurred in the preparation and submission of proposals or in making necessary studies or designs for the preparation thereof or to acquire, or contract for any services.

d. Application Clarification: ASME ST-LLC reserves the right to require proposals to be clarified or supplemented to the extent considered necessary. The award may be made after few or no exchanges, discussions or negotiations. Therefore, all applicants are advised to submit their most favorable application to ASME ST-LLC. ASME ST-LLC reserves the right, without qualification, to reject any or all proposals received in response to this solicitation and to select any proposal, in whole or in part, as a basis for negotiation and or award. ASME ST-LLC reserves the right to modify or cancel this solicitation. All questions relating to the solicitation must be submitted to the contact below. Any amendments to the solicitation will be posted on the ASME ST-LLC web site (http://stllc.asme.org/Requests_Proposals_RFPs.cfm).

e. Treatment of Proprietary Information: A proposal may include technical data and other data, including trade secrets and/or privileged or confidential commercial or financial information, which the applicant does not want disclosed to the public or used by ASME ST-LLC for any purpose other than proposal evaluation. To protect such data, the applicant should specifically identify the data to be protected.

f. Proposal Preparation and Submittal Instructions:

ASME ST-LLC may form a committee of subject matter experts to evaluate the technical qualifications of applicants. To help facilitate this evaluation, responses should include two separate documents, a Technical Proposal, and a Financial Proposal.

1. Technical Proposal

(a) Provide organization name and contact information.

(b) Provide evidence of technical capabilities: the credentials, qualifications, capabilities, and experience of individuals and the organization.

(c) Describe approach to accomplishment of the Scope of Work.

(d) Confirm agreement with the Scope of Work for the specified task(s)

2. Financial Proposal

(a) Provide a fixed price quotation or an hourly billing rate quotation and estimated project maximum.

(b) Confirm agreement with the draft Terms and Conditions, or state any specific exceptions.

3. Submit Technical and Financial Proposals via e-mail to the ASME ST-LLC contact below.

4. Responses must be received on or before the deadline.

7. ASME Standards Technology, LLC Contact Information:

Name: Anthony Amato
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