PD190
ASME BPV Code, Section IX: Welding, Brazing, and Fusing Qualifications

Day One

- Historical perspective of welding and code development
- The relationship of Section IX to other codes
- The secret to using Section IX efficiently
- Review of the welding processes: fuel gas, shielded metal arc, gas tungsten arc, gas metal arc, submerged arc, plasma arc, electroslag, electrogas, beam, stud, friction, resistance, explosion, diffusion, and hybrid
- In-depth review of SMAW (shield-metal arc welding) variables
  - P-numbers, S-numbers and non-code metals, steel metallurgy; hardenability; preheat and postweld heat treatment
  - Filler metal specifications including F-numbers; A numbers; SFA specifications; non SFA filler metals
  - Variables for other common processes

Day Two

- Practical Aspects
  - Basic welding metallurgy for steels
  - Approaches to writing the welding procedure specification
  - Addressing customer requirements
  - Providing direction to the welder
  - Sources of information for preparing intelligent and meaningful welding procedure specifications
- Selecting, preparing, and welding the test coupon
  - Selection of the test coupon materials for maximum cost-effectiveness
  - Recording both necessary and worthwhile data and demonstrating code compliance
  - Practical session: Approaches to writing the WPSs (welder procedure specifications):
    - Samples of the good, the bad and the ugly
    - Section IX form; other formats; checklists
  - Revisions to records and procedures
  - Take-home test

Day Three

- Welder and welding operator qualifications
  - Responsibility for testing welders and welding operators
  - Performance qualification Variables - Welders vs. Operators
  - Selecting test coupons and testing completed welds
  - Maintaining qualifications over time
- Impact Tested Qualifications
  - Learn how welding influences toughness and how construction codes deal with toughness
  - Upgrading WPSs for impact tested applications
  - Supplementary essential variables and documenting them during welding
  - Measuring and recording heat input data and translating heat input data into useful directions for a welder
- Brazing Qualifications
  - Review of Brazing processes and variables
  - Differences between the QW (welding)and QB (brazing) sections
  - Qualification of the brazing procedure and brazers
  - Differences in testing between welding and brazing
- Fusing Qualifications
  - Review of plastic fusing processes and variables
  - Qualification of the fusing procedure and fusing operators