
ASME
SETTING THE STANDARD

ASME Non-Destructive Examination (ANDE) Personnel Qualification and Certification Initiative

ASME PVPC NDT Workshop
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Issue Overview

- Decline in qualified workforce due to attrition
- Increasing demand for qualified workforce due to aging plant/infrastructure issues and new construction
- Need for greater NDE reliability and accuracy in the evaluation of new high strength/light weight materials
- Variations in employer non-standard qualification and certification
- Human performance issues
- Existing employer based personnel qualification and certification processes do not align with INPO guidelines and best practices used for other nuclear power plant workers

40 Years of NDE Performance Data (See EPRI Report 1016969)

- Pressure Vessel Research Committee 1971
- US Airforce (Have cracks will travel) 1974-78
- PNNL-Piping Inspection Round-Robin (PIRR) 1981-82
- EPRI Round Robin for Depth Sizing 1983
- PNNL-Mini Round Robin (MRR) 1986
- European Base Problem for Inspection of Steel Components (PISC 1, 2 & 3) 1985-94
- United Kingdom Program for the Assessment of NDT in Industry (PANI) 1999
- EPRI PDI Pass Rates, See NRC ADAMS Web Site: http://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber='ML12342A249'

Industry Experience

- Intergranular Stress Corrosion Cracking at Nine Mile Point in 1982
- Thermo Fatigue Cracking in Steam Generator Feed Water Nozzles in Late 1980's and Early 1990's
- Primary Water Stress Corrosion Cracking in Steam Generator Tubing in late 1980's early 1990's
- Stress Corrosion Cracking in Alloy 600/82/182 Materials Starting in Early 2000-NDE Human Performance Issues

  V C Summer, Susquehanna, DC Cook, Millstone, Farley, Pilgrim, Duane Arnold, Crystal River,

  St Lucie, Calvert Cliffs, & within the past year North Anna, Laguna Verde, Diablo Canyon, Nine Mile Point, & Harris nuclear plants

Current NDE & QC Personnel Q&C Process Does Not Align With INPO Guidelines Used for Other Nuclear Power Plant Workers

Employer Based Training, Experience, and Certification:

- Each employer has own qualification program (training and examinations) and issues non-portable certification
- Non-Std varies from Employer to Employer
- Training-Minimum hours only required, No Std, No industry evaluation, No Accreditation
- Experience-Time Based Only No Criteria or Attribute Req'd.
- Written Examinations-Only Minimum # of Questions Req'd., No Standard Difficulty Level, No Psychometric Process
- Practical-Costly with limited sample sets, typically does not address many conditions expected in the field
- No Job Task Analysis (JTA), No Std Level of Difficulty, No Way to Evaluate Effectiveness and Quality of either written or practical exam
- No Effective way to incorporate operating experience (OE) into decentralized process

ANDE-Unique Approach to PQ&C Using the INPO Systematic Approach to Training (SAT)

- Develop new standard requiring the SAT and Performance based concepts
- Identify “Skill” and “Knowledge” req’ts through job task analysis (JTA) with subject matter experts (SME)
- Based on knowledge requirements develop detailed training
- Based on Skill requirements develop descriptive experience exercises & proficiency evaluation, i.e., “Qual Cards”
- Based on JTA Develop centralized examination data base through psychometrics
- Based on JTA Develop standard performance based practical examinations with real or simulated flaws representing field conditions
- Written and practical examinations will be administered by ASME as an independent third party
- Written examinations will be delivered via the web while practical demonstration test kits will be shipped to utility or vendor locations with oversight by authorized nuclear in-service inspection agencies
- Centralized Program can easily be updated based on OE

INPO SYSTEMATIC APPROACH TO TRAINING

INPO ACAD 02-001--The Objectives and Criteria for Accreditation of Training in the Nuclear Power Industry

- **Analysis Phase**
  - Needs or Performance Analysis
  - Perform Job Analysis
  - Perform Task Analysis
  - Biennial Review of Total Task List
  - Rate Tasks for Difficulty, Importance & Frequency (DIF) (Note: All Analysis performed by industry SMEs)

Design Phase

- Determine, Validate Evaluation Setting
- Create, Validate Learning Objectives
- Create, Validate Test Items
- Create, Validate Task-To-Training Matrix
- Biennial Review of Task-To Training Matrix
- Create, Validate Qualification Matrices (Methods Criteria)

Development Phase

- Determine Need for Materials / Development
- Develop Training Material
- Review Training Materials
- Develop / Review Evaluation Instrument(s)
- Conduct Pilot Session (as applicable)
- Approve Training Mat'ls & Evaluation Instrument(s)

Implementation Phase

- Allocate/Evaluate Resources
- Schedule Resources
- Preparation of Instructor
- Present Training
- Conduct and Grade Examinations
- Collect Feedback

Evaluation Phase

- Establish Training & Self-Assessment Schedule
- Perform Self-Assessment
- Evaluate industry events and operating experience
- Evaluate Training Performance
- Provide Feedback to Training and Examinations
- Address Corrective Actions

ASME NDE/QC (ANDE)Training and Certification Program Status

- **ACCOMPLISHEMENTS TODATE**
  - **With professional consultant support developing 5 phase Systematic Approach to Training (SAT) process in accordance with INPO Guidelines**
  - **Organized Subject Matter Experts and completed the second phase for Job Task Analysis (JTA) including MT, PT, RT, Mechanical, Electrical, Instrumentation & Controls, Civil and visual weld. Ready for ANDE Main Committee Approval**
  - **UT JTA approved with questions/training/practical underway**
  - **Developed QA manual and implementing procedures in accordance with NQA-1 and ISO 17024**
  - **May 2012 ANDE was established as an ASME standards development committee within the ASME Council on Standards and Certification**
  - **The new ANDE PQ&C Standard is complete and currently in ballot as an ASME National Standard**
  - **Initial Program funding by stakeholders at $740K**
  - **September 2012 in cooperation between ASME and Chattanooga State Community State College, the US Department of Labor Awarded ANDE $1.5 Million Grant**

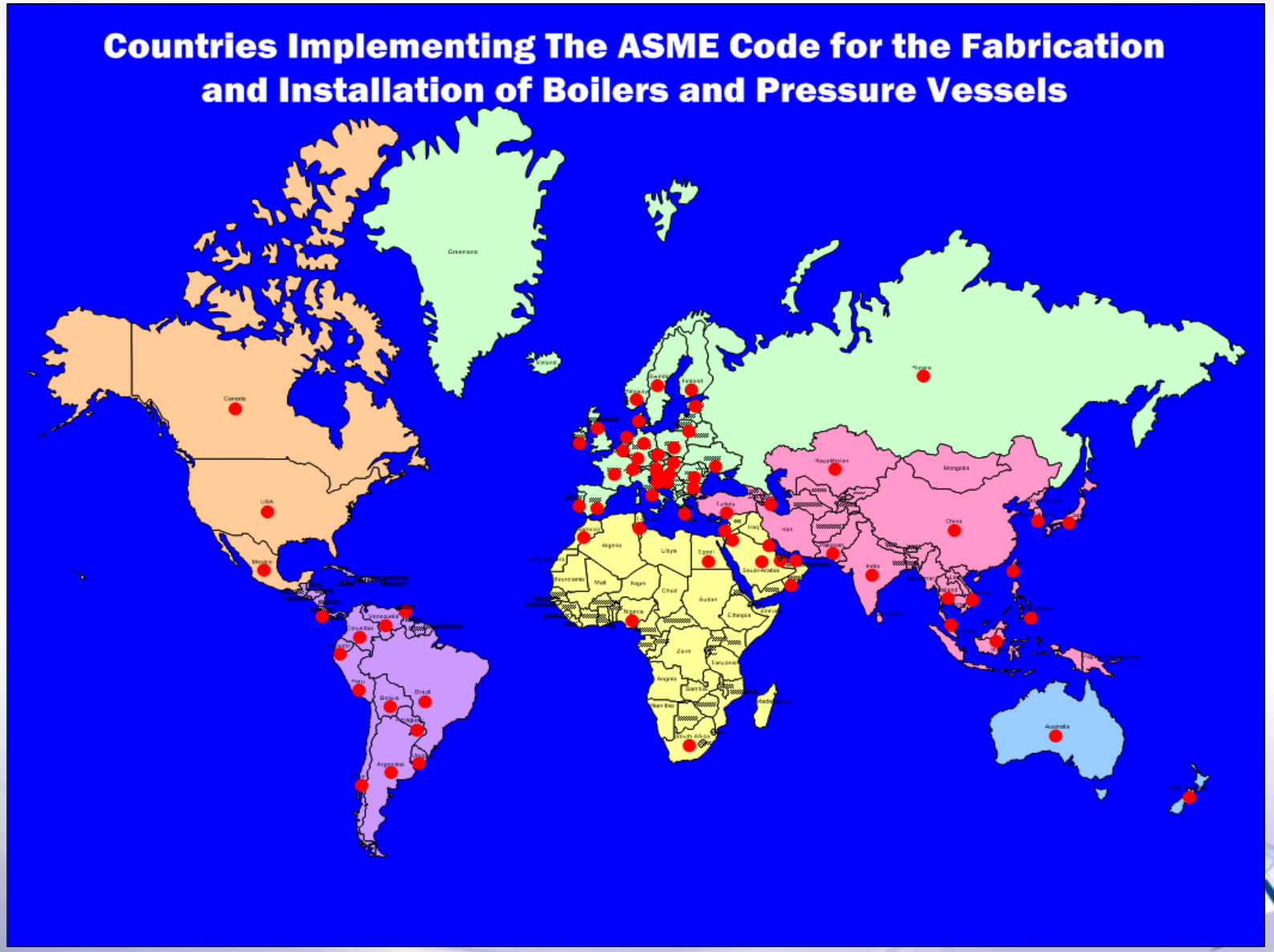
ASME NDE/QC (ANDE)Training and Certification Program Status con't

- **LOOK AHEAD**
  - **DOL Grant Project management, SMEs and contractors organized and ready to accomplish training design and development including examination data bases**
  - **Utilities are donating plant components from canceled units for practice and practical exams (will greatly reduce cost)**
  - **Continue discussions with utility supporters and EPRI NPC members to assure no overlap or redundancy with the Performance Demonstration Initiative (PDI) or Eddy Current Qualified Data Analyst (QDA)**
  - **Considering the high cost of test mock-ups (e.g., EPRI PDI UT test mock-ups costing over $10 Million), pursuing developers of computer simulation for all methods to improve skills learning including detection, flaw recognition and sizing. Accessibility via internet will considerably reduced cost compared to conventional training/testing methods. Developers demonstrate successful proof of concept in June.**
  - **NDE performance and reliability remains on the NRC's RES NDE TOP 10 List (first published June 2012)**
  - **Program completion projected 4th quarter 2013**

Conclusions

- Improved training and experience followed by performance demonstration in accordance with industry best practices and INPO guidelines will result in high performance and reliability
- Consolidates multiple qualification requirements into a single process recognized by code and regulator
- Establishes a consistent level of performance expectation with examinations effectively and efficiently delivered through ASME as an independent third party
- A single all inclusive web based credential will simplify recognition of certification for vendors, utilities, inspection agencies, and regulators by eliminating costly redundant documentation that adds no value
- Centralized certification provides a means to incorporate OE and monitor probability of detection (POD) that is otherwise not possible with conventional employer based programs

Why ASME?



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