NDT Personnel Certification-
Employer/Independent/Accreditation
What is Different About ASME ANDE-1

NDT in Canada
Canada’s NDT Conference
Quebec City, Quebec
June 6-8, 2017

Michael L. Turnbow, Chairman
ANDE Project Team
Employer Based Certification
In a Perfect World

- Employer Responsible to provide Training and Experience as Applicable to the Companies Products and Services
- Employer Responsible for Written and Practical Examination
- Employer Certifies Employee
- Employer Certification is Non-Transportable
- Employer Totally Responsible for Employee Performance
Employer Based Certification
In the Real World

- Implementation varies from Employer to Employer
- Training-Minimum hours only required, No Std, Typically No Industry Evaluation, No Accreditation
- Experience-Time Based Only, No Criteria or Guidance provided,
- Written Examinations-Only Minimum # of Questions Req’d, No Std Level of Difficulty, No Way to Evaluate Effectiveness and Quality of either written or practical exam
- Practical-Costly for each employer with limited sample sets, typically does not address fabrication and in-service conditions expected in the field
- No Effective way to incorporate operating experience (OE) into decentralized process
- No way to address individual performance issues to retrain/retest/recertify
What is the Affect on the End User?

- Performance Issues
- Associated costs (failures/rework/outages/legal)
- Low Confidence in Process
- Search for a New Solution (industry organized or unorganized)
- Performance Demonstrations/Independent Cert./Accreditation
Independent Certification

- May or May Not Address the Employers Specific Needs
- Multiply National and International Schemes Complicated to End User
- Cost/Performance/Applicability Issues
- Slow to React to Changing Technology and Industrial Needs
- Responsibilities Not Always Clear
Accreditation

• Is It Effective, Add Value?
• May Be Industry Specific With High Responsibility to Assure Quality and Safety
• Or There May be Multiply Accreditation Processes Available and Complicated for End Users Concerning Performance Improvement
• Responsibilities Not Always Clear
Why ANDE-1?
NDE Issues Overview

• Decline in qualified workforce due to attrition
• Increasing demand due to aging plant issues and competing industries
• Variations in employer based qualification and certification
• Human performance issues
• Existing PQ&C processes do not align with best practices used in nuclear, military and other industries.
NDE Performance Issues History

• 2008 EPRI Report 1016969 summarizes 30 years of round-robin studies and performance demonstration results, identifies common performance weaknesses and root cause.

• January 10, 2017 NRC Expert Panel Report was made publicly available on the NRC web site ADAMS at Accession Number ML 16306A347.
  - Report concludes that pass rates for experienced certified personnel is rarely above 50% on the first attempt for demonstration test that simulate field examinations.
  - Passing performance demonstration testing alone is not sufficient to ensure reliable examinations.
  - These data on qualification and requalification strongly suggest that improvements in training, skills maintenance, practice and/or continued education are needed.
So What Makes ANDE-1 Different?
Systematic Approach to Training

SAT Process – Five Phases

1. Analysis
2. Design
3. Development
4. Implementation
5. Evaluation

Feedback Loop
Job Task Analysis

- Defines the Specific Tasks to Perform a Particular NDE Method
- Identifies the Required Skills and Knowledge necessary to Perform Each Task
- A Mature, Proven Process Only Recently Introduced to NDE thru ANDE-1
## ANDE Program

### Sample of ANDE Ultrasonic JTA

**JOB/TASK ANALYSIS**
**ULTRASONIC**

<table>
<thead>
<tr>
<th>Element No.</th>
<th>Performance Steps (Elements)</th>
<th>*D</th>
<th>*I</th>
<th>*F</th>
<th>S</th>
<th>K</th>
<th>Skill (S) Knowledge (K)</th>
<th>Level I II III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01</td>
<td>Inservice - Obtain data If documentation does not exist obtain weld profile of the applicable component FAB/Construction - Receive instruction on examination requirements from Traveler/Process Sheet</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>S</td>
<td>K Ability to understand required data How to obtain weld profiles</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.02</td>
<td>Verify data is for applicable component Refer to supervisor/job coordinator if discrepancies exist</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>S</td>
<td>K Comparison of data against assigned component</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.03</td>
<td>Review Technique</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>K</td>
<td>K Understand ultrasound theory and techniques</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.03A</td>
<td>Compare previous technique to current requirements</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>K</td>
<td>K Ability to distinguish new requirements</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.03B</td>
<td>Determine impingement angles/Review procedure</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>S</td>
<td>K Understand the purpose/requirement of impingement angles Ability to perform calculations (geometry and trigonometry)</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.04</td>
<td>Review Coverage Limitations</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>K</td>
<td>K Comprehension of UT theory (geometry, trigonometry, algebra) K Understanding the requirements for coverage calculations</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.04A</td>
<td>Determine component configuration</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>K</td>
<td>K Understanding process pipe and component installations</td>
<td>I, II</td>
<td></td>
</tr>
<tr>
<td>1.04B</td>
<td>Ascertaining if configuration/assembly of adjacent components interferes with examination</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>S</td>
<td>K Capability to determine potential component restrictions based on technique and incident angle to be utilized</td>
<td>I, II</td>
<td></td>
</tr>
</tbody>
</table>

*DIF Determination (see attached definition and numerical rating)
Qualification Cards (Experience)

- Current prescriptive on-the-job (OJT) training/experience does not provide performance measurement for meaningful learning opportunities.
- Time based only and does not recognize training effectiveness and learning abilities.
- Effective feedback when detecting and evaluating actual flaws is seldom provided since they are rarely encountered.
- Varying knowledge and skill of mentors.
Qual Cards (continued)

- Qualification cards are used to specifically identify the essential elements of each task.
- Provides a process to demonstrate skills proficiency at a specified performance level, time is not a factor.
- Field OJT is structured and, where applicable, complemented by structured laboratory experiences.
- Timely and effective feedback is provided and assessed by an experienced and knowledgeable mentor.
ANDE Program

The ANDE Program provides a new and unique approach to NDE and QC personnel qualification as compared to currently used national and international schemes and requires an Industry Sector Specific (SIS) committee to assure sector specific applications and issues are addressed.

It implements the most effective currently known elements, including:

- Systematic Approach to Training (SAT)
- Detailed Job Task Analysis (JTA)
- Defining Experience Requirements (Qualification Cards)
- Independent, psychometrically validated third-party written and practical qualification examinations
Countries Implementing The ASME Code for the Fabrication and Installation of Boilers and Pressure Vessels
“To Me It Seems That All Sciences Are Vain And Full of Errors That Are Not Born of Experience, Mother of all Certainty”

Leonardo Da Vinci
(1452-1519)