Independent Assessment from Outside the Industry -
Comments from Ward Rummel, Panel Member

(Note: These comments from Ward Rummel were transmitted to the NRC Staff by email dated December 13, 2013, ADAMS Accession Number ML16306A369)

My experience base is from the aerospace and transportation industries.

My comments may be contributions or may be deficient due to a lack of specific knowledge.

Our task was primarily to address potential safety improvements as provided by NDT technology. My comments are as follows:

1. The ASME role seems to be primarily a reactive process and the technology appears to be behind the state of the art. This was evident in both group discussions and the fact that requirements for construction are not consistent with requirements for service assessments and have not been integrated into a coordinated, life-cycle management process. When requirements are not consistent or integrated, NDT procedures and procedure requirements will not be readily implemented.

Recommendation: NRC should direct ASME to assume a proactive role and to support state of the art technology to include NDT as an integrated task in life-cycle management.

2. Prescriptive NDT procedures evolved as NDT evolved and pseudo validation was assumed by reducing variances in industry production processes and by trial and error based on reduced structures / systems failures. NDT detection capabilities and reliability were not quantified and were not known. Large structure performance margins (safety factors) allowed for variances in NDT detection capabilities. “Expert” experience and opinions were developed heuristically as design procedures and NDT procedures were extended and applied to other materials, structures and systems. Since the NDT detection capability is not known and the safety factor varies with application, extension to other applications must be considered to be a “judgment” call. Prescriptive NDT procedures are usually managed as “process control” problems with assumption that the “judgment” call process was correct.

Advancements in NDT address NDT procedures as “measurement processes” and validation is achieved by measurements and adjustment of measured values are used to account for variations in the target object such as grain structure, impedance, velocity, stress state, water (fluid) in a crack, etc. During group discussions it was noted that prescriptive procedures used, are not usually validated, but the validity of the NDT procedures was rarely challenged.

Recommendation: The validity of procedures used should be challenged in addressing all anomalous conditions. I personally challenge the use of prescriptive NDT procedures without addressing varying conditions of the test object and target anomaly properties.

3. Training and mockup testing is highly useful to provide increased assurance that assessments are being done consistently. I am concerned about the operator pass rate and

false call allowances. I question the validity of the procedures being used. Low pass rates or high false call rate are indicators that the procedure is marginal or may not be valid.

Recommendation: This is an obvious focal spot for improvement, but detailed knowledge of the practices and rationale were not presented. I recommend attention to this area with emphasis on procedure validation and applicability to the operating facilities.

4. I strongly support the use of modeling in the development, testing and validation of NDT procedures. Models can be useful tools but should not be used as recipes for success without serious considerations of the data input requirements (form, fit and function), range of validity, fidelity and error bands and conformance to the data and conditions for which it was validated. I strongly support the development and use of models in NDT operator training, skill development and qualification. When perfected and validated, models that provide physical configurations and embedded electronic feedback / response that are representative of materials and geometries, might replace the costly mockups and could be readily replicated and transported to sites for use in refreshing assessment experience out of the radiation area.

Recommendation: All Models used in development of NDT capabilities and procedure support should be rigorously validated, configuration controlled (traceable), traceable to requirements and integral to operator training and qualification.

5. I support the group findings and recommendations as noted in the body of the report with the addition of the recommendations noted above.

Respectfully submitted

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