Notes from DA Technical Track Session
Gaps & Challenges (G&C), Revision 1
March 26, 2005

The following criteria were applied in characterizing the priority of candidate R&D Gaps and challenges:

<u>High-High</u> if group viewed as exceptionally important

<u>High</u> if gap is
- Critical to effectiveness of early application - reliably identify serious defects
- Addresses key gap in applicability of process
- Critical to validation, including clarification of limitation

<u>Medium</u> if gap is
- Important to refinement of process (<u>e.g.</u>, improved efficiency of application)
- High priority but programs are ongoing and deliverables are not complete

ECDA G&C

High-High

- *Challenging Applications*
    - Cased crossings - For cased crossings, current technology (<u>e.g.</u>, guided wave ultrasonic) doesn't allow differentiation between metal loss and casing contact
    - Presence of stray currents
    - Deeply buried pipe
    - Bare pipe
    - Uncased crossings
    - AC corrosion
    - Multiple pipes in right of way
    - Station piping
    - Shielding coatings
    - Shrink sleeves/shielding coating joints
    - Shielding soils

Potential Solutions
- Characterize No-Pig application and limitations (seamless and ERW piping), practices, tools and field validation (probability of detection)
- Increase resolution and capability of LRUT

High

- Improved ability to integrate multiple sources of information and technologies to help clarify the condition of the pipe and its protection (Gap)
    o Criteria development leading to decision on excavation sites - "Expert-Based" {currently trying to develop predictive model for flaw size}
- Ability of ECDA *as a data collection tool* to provide indications of excavation damage (challenge)
- Ability to predict "active corrosion" using above-ground surveys (as differentiated from historic corrosion that is currently well-protected) – Unknown solution leading to potentially high risk of successful R&D

Medium

- Validation - quality control or comparison basis (Partial Gap). There are some areas where partial validation may be needed.
- Methods to identify probability of failure (defect severity) and reassessment interval from application ECDA of
    o Reassessment interval determination – models expanded in scope – ongoing projects, may not complete needed R&D
- Process does not always differentiate between poor coating and *corrosion that causes damage*

Projects Involving Other Considerations
- Document lessons learned. This is an important challenge, but the group questioned whether it should be funded as R&D
- Need to study root causes of corrosion; (unconventional mechanisms) These studies would be useful beyond the area of DA application

<u>ICDA G&C</u>

High-High

- Validation for dry gas, wet gas and liquids
- Characterizing the range of application of wet gas techniques
- Characterizing the impact of uncertainties (<u>e.g.</u> , elevation profiles, data) on application of process
    o Where do we dig?
    o Length of excavation
    o Probabilistic Methods

High

- Tools and techniques to improve effectiveness
    o Improved on-line monitoring of operating conditions
    o Improved/consistent flow models

- o Inspection techniques to characterize corrosion severity (potential solution LRUT)

Medium

- Reassessment interval determination – development of models - projects are ongoing, some scope expansion may be needed
  - o Corrosion rate determination
- Factors complicating application:
  - o Means to examine/assess difficult to reach locations (<u>e.g.</u>, river crossings, steep ravines)
  - o Treatment of short laterals
  - o Dealing with large number of possible hold-up locations

<u>SCCDA G&C</u>

High-High

- Conditions under which application is suspect
  - o Locating near-neutral SCC
  - o Station piping & crossovers
  - o Tools or equipment that would improve effectiveness
    - ▪ Tools to locate shielding coating
  - o Difficulty correlating incidence with causal factors including those that do not fit SCC criteria

Medium

- Validation of the process; This should be deferred until more tools are available – Need better definition technologies
- Modeling circumferential guided waves
- Probability model development

Projects Involving Other Considerations

- Modeling SCC in dents and stress risers – This doesn't necessarily contribute only to SCCDA, but is a need expressed by session participants

<u>Confirmatory Direct Assessment (CDA)</u>

High

- Validation of CDA (Gap)
- Tools for monitoring defect growth