

Pipeline Research Council International, Inc.

Industry Research for Crack Management

Current Program and Proposed Path

**PHMSA Workshop
Managing Pipeline Cracking Challenges
August 5, 2014
Chicago, IL**



Topics to Cover

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■ The BIG Picture

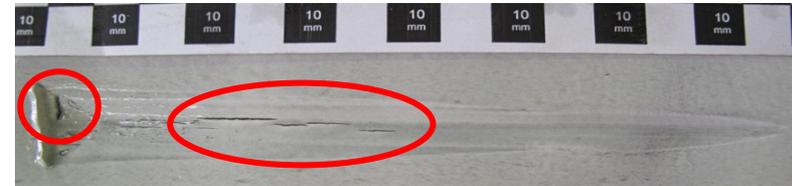
- Roadmaps
- Integrated Programs
- Integrity Management

■ A Deeper Dive - ILI Crack Tool Reliability

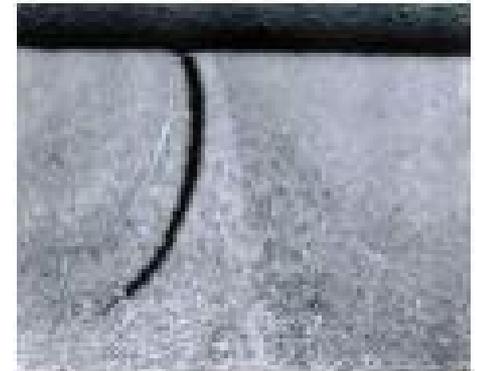
■ Looking Ahead

- Industry Initiatives
- Future Direction for R&D

Dent+gouge w/cracking



ERW Seam anomaly

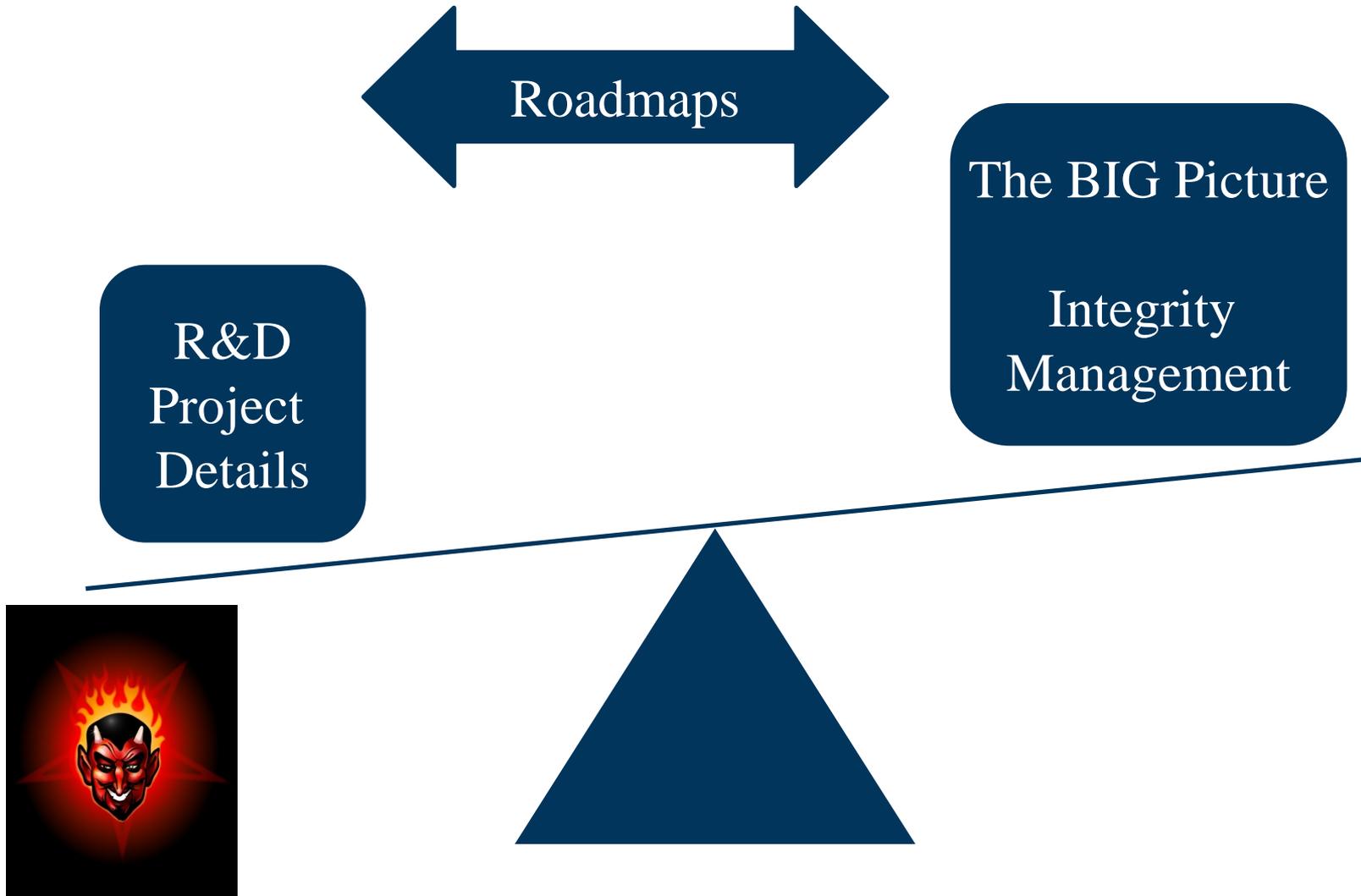


SCC/EAC



Balancing Factors for R&D Programs

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Industry R&D Roadmaps

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- **A Simple Model of our Activities**
- **Use of the Roadmap – Communication Tool**
 - Within PRCI
 - External Stakeholders and R&D Partners
- **Confirming the Top R&D needed Outcomes**
- **Clarify steps needed to achieve outcome**
 - **Define Gaps**
 - **Develop Programs/Projects**
 - **Allocate funding**
- **ILI, NDE, Assessment, Materials, Fracture, etc.**

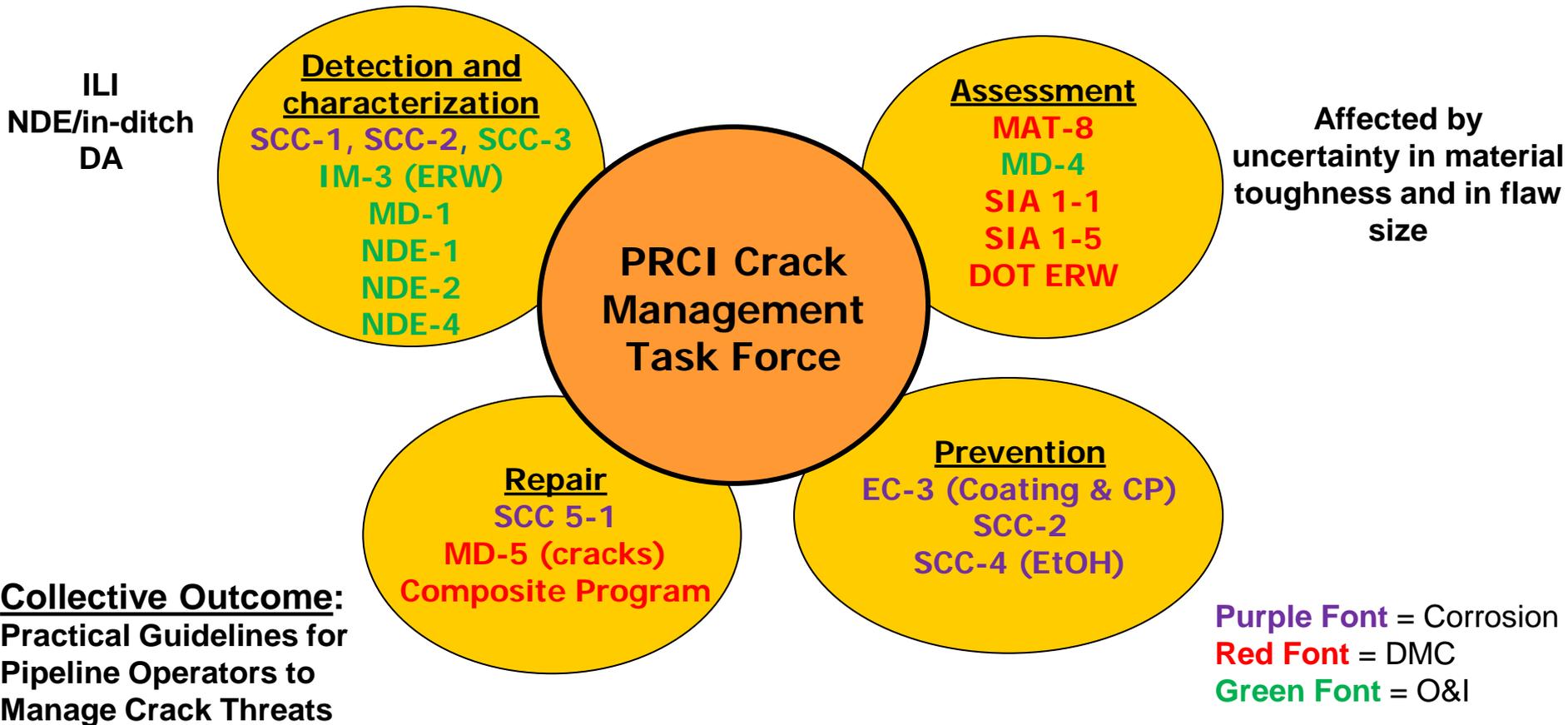
Industry R&D Roadmaps (2)

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Industry Driver	R&D Gap/Need	Problem Definition	Breakdown of issues to be resolved	Current Industry Projects	Who	2013	2014	2015	2016	2017	2018
			ILI and NDE Data as Input to Models	ILI Crack Reliability NDE IWEX	PRCI PRCI PHMSA	Green	Green	Yellow	Red	Red	Red
Accurate and Reliable Methods and Models for Anomaly Assessment to Support Repair Decisions	Improve ERW Pipeline Integrity Assessment Methods and Models - reduce levels of uncertainty	Methods are overly conservative due to multiple levels of data uncertainty associated with all input parameters	Improved Input Data to Address Variability in Material Properties of Seam Weld Matrix/Material	Project D	PRCI		Green	Yellow			
				Project E.1	GTI		Green	Yellow			
				Project E.2	INGAAA Fnd		Green	Yellow			
					PRCI			Yellow	Red	Red	
Example			Full-scale testing for validation of improved models	SIA 1-1	PRCI	Green	Green	Yellow			

PRCI's Integrated Approach for Crack Management

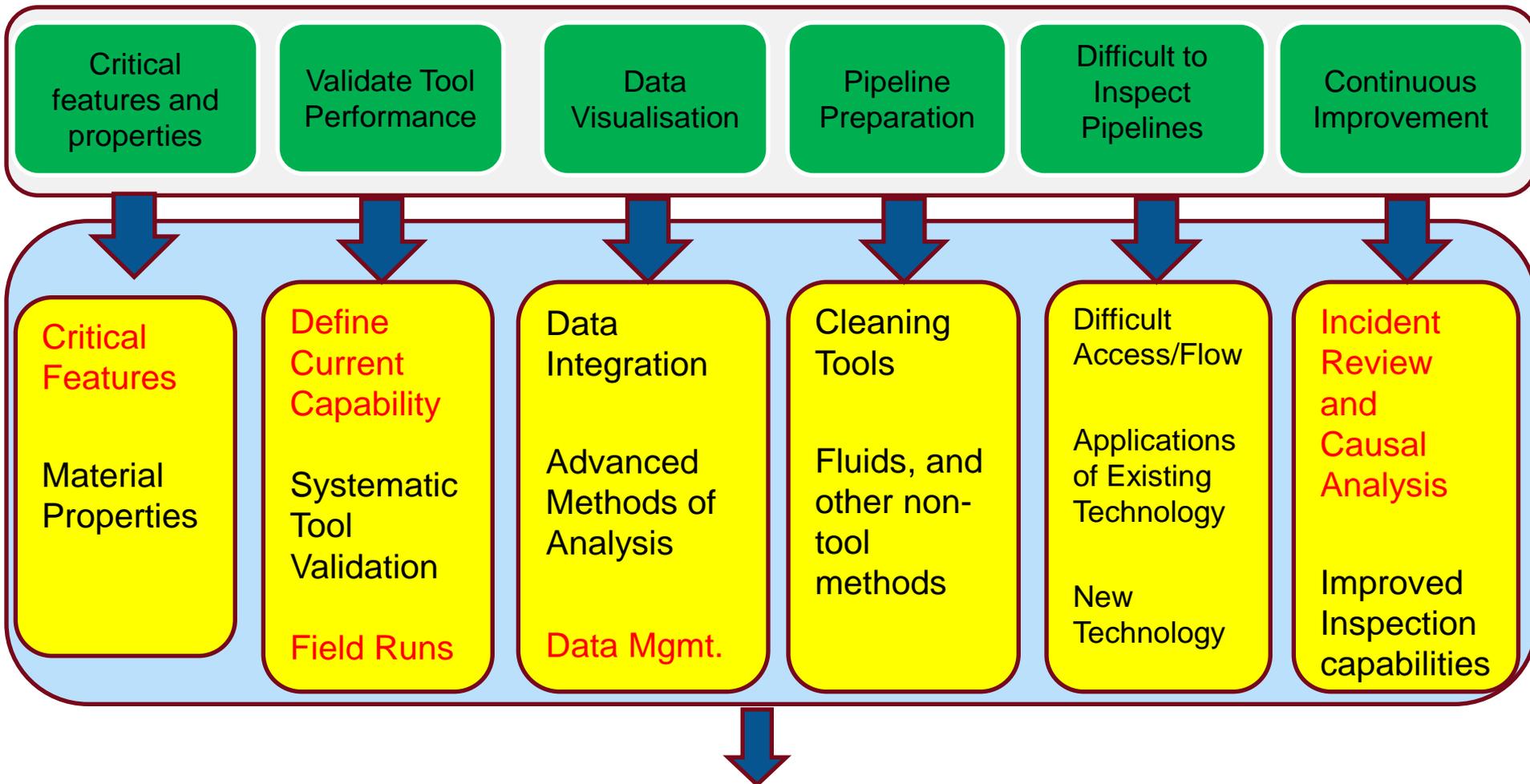
Crack Management Task Force - an integrated research approach, delivering benefits to the pipeline industry



Industry R&D Roadmaps (3)

PRCI ILI Program

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Research Projects - includes Crack Detection and Technology Improvements
Focus Today on ILI Crack Tool Reliability Presentation

PRCI Key Focus Areas

Crack Management R&D

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- **ILI Technology**
 - Current Performance – ILI Project and Data Mining
 - Improving Current Technologies - **Reliability Targets**
 - Alternative to Hydrostatic Testing/ECA
 - Difficult to Inspect Conditions
- **NDE Procedures and Technologies – industry standard practices and knowledge transfer**
- **Assessment Methods and Crack Growth Modeling**
- **Role and Application of Hydrotesting for Effective Seam Weld Management**
- **Developing Practical Operator Guidelines for Managing Crack Threats**

API Crack Management RP

Drive Projects and Programs that Support Crack RP

MD-1 and MD-4

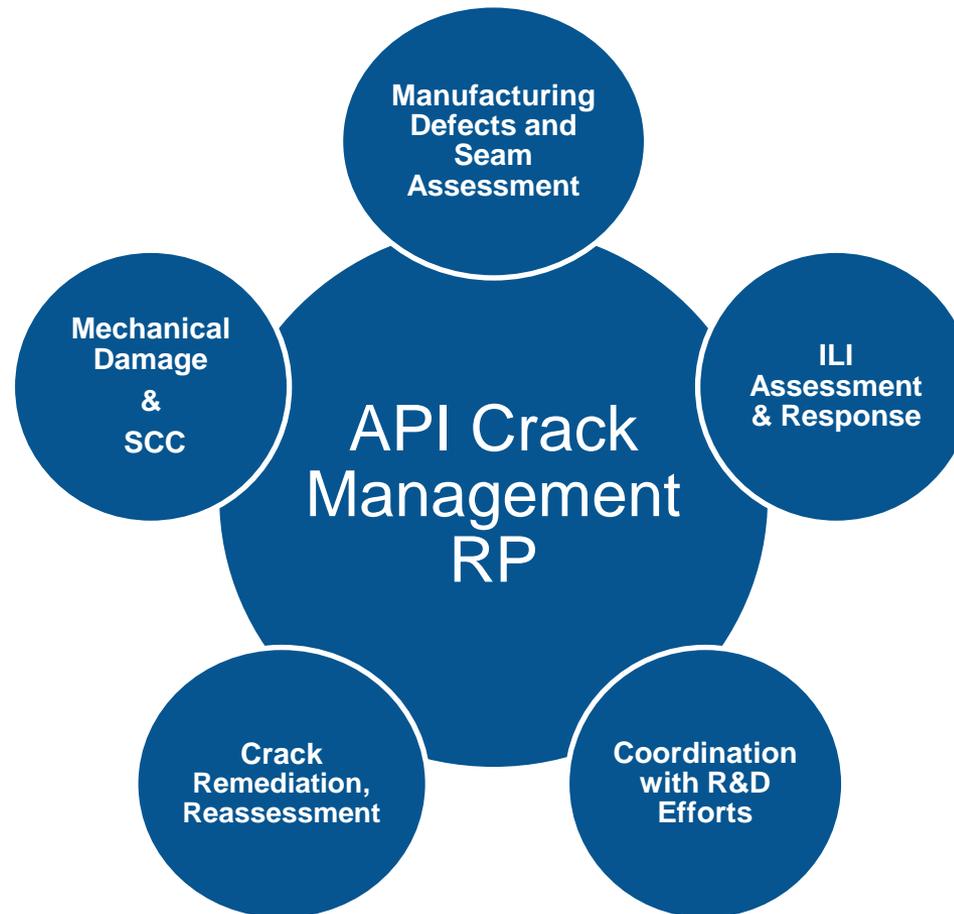
NDE 2-2

Work on SCC Crack Growth & ILI

ERW Pipe Program
PHMSA & PRCI

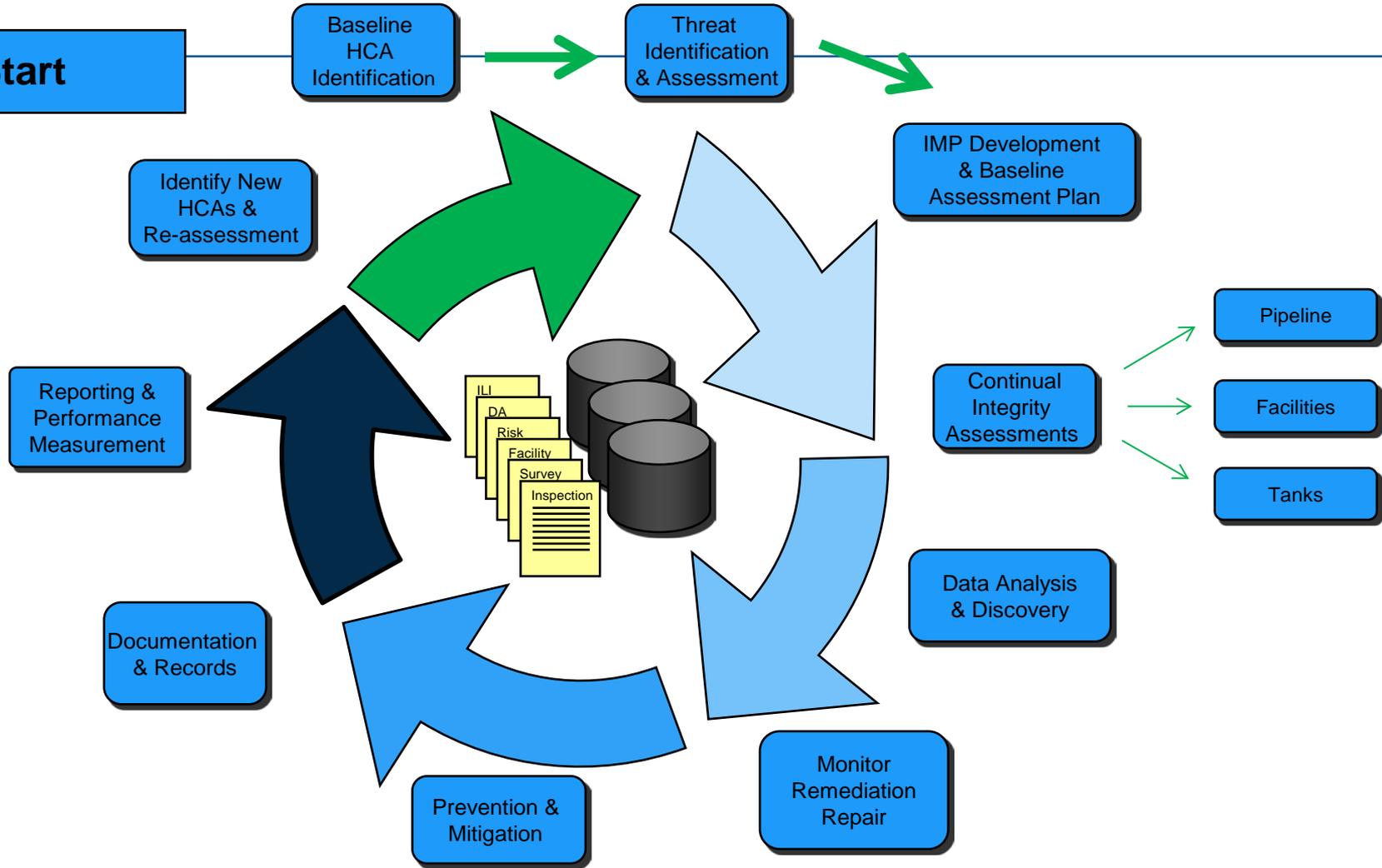
Assessment Methods
SIA 1-1 (Sept 2014)

PRCI-DOT ILI Program



R&D Supports Integrity Management Process

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Cycle of Continuous Improvement

Data is constantly fed back from operations, inspections, and maintenance
UPDATES IMPROVE RISK MODEL AND ADVANCES RISK ASSESSMENT

Looking Ahead - Key Issues for Crack Management R&D

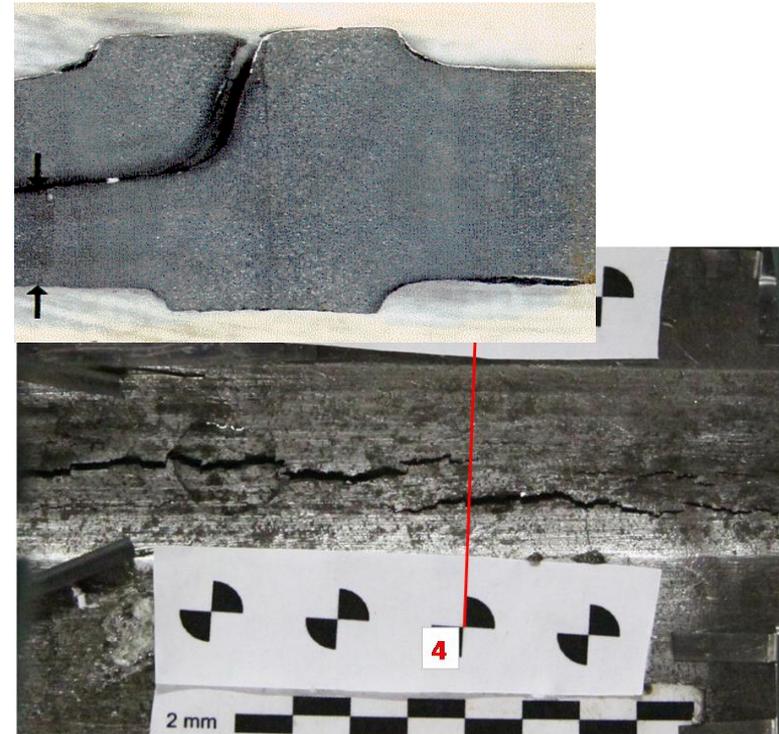
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- **Pipe samples are needed – R&D projects require a substantial inventory**
 - PRCI-PHMSA ILI Program
 - Destructive testing - validation/confirmation, ERW included
 - Reference standards & calibration samples
- **Build the body of knowledge by getting operators to bring data forward – active participation**
 - API Crack RP initiative - strengthening Integrity Management of Crack Threats & Development of “Best Practices”
 - ILI crack tool data for validating technology performance
- **Need improved coordination**
 - Stakeholders – GTI, EMAT User’s Group, PHMSA R&D
 - Competition for resources and samples – PRCI TDC

Technology Development Center – Link to Crack Management Programs and Roadmap

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- **TDC - Located in Houston, TX**
 - ALL ROADS LEAD TO THE PRCI TDC - The enabler
 - Over 600 specimens currently and growing
 - Catalog system tracks origins, fingerprint NDE, field data
 - **Cracking focus in 2014 & 2015 – validate NDE and ILI with destructive testing and data**



Closing Thoughts

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Use SMEs

Consider all the Factors

Know your System

Integrate the Data

Identify Changes

Manage the Asset Appropriately

Metric for Success

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