Inspection and assessment capabilities in the pipeline industry are constantly improving thanks to competitive technology developments. More advanced in-line inspection (ILI) tools yield better data on pipeline condition, which in turn drives the need for advanced assessment capabilities to leverage the improved data quality and accuracy. Fitness-for-service (FFS) assessments have become increasingly accepted across the pipeline industry over the past few years. FFS standard API 579/ASME FFS-1 (API 579-2007) provides guidelines for assessing types of damage affecting pipelines across all industries.

Metal loss may be internal or external, in the form of isolated pitting, general corrosion, axial or circumferentially oriented, or some combination of those geometries. The high number of variables makes assessing metal loss flaws complex and highlights the need for a more comprehensive metal loss assessment method than one that relies on boxed flaws.

To identify and size metal loss flaws, ILI data is reviewed through a traditional data analysis process. To do this, individual metal loss flaws are bounded by a box, and length, width and depth predictions are provided. Metal loss flaws may be combined into clusters based on interaction rules. After the data analysis process is complete, the results are reported in a spreadsheet format.

It is common to apply remaining strength pressure calculations (e.g., B31G or 0.85dl) to those features identified in the spreadsheet. The length and depth that have been established through data analysis and reported in the ILI report spreadsheet are the only inputs into the metal loss remaining strength assessments. Any differences between actual and predicted flaw dimensions will be reflected in the results of the assessment. Since these results are used in pressure de-rating and flaw repair decisions, any inaccuracies can impact the safety of the pipeline. Errors in length can be due to the often subjective nature of flaw boxing and interaction during data analysis. Any errors in the maximum predicted depth will have a direct impact upon the accuracy of the calculated reduced pressure due to the flaw.

Improvements in data processing make it possible for continuous improvement in automated processing of in-line inspection data.

A more advanced method of assessment of ILI thickness data is to perform a continuous effective area calculation as described in API 579-2007 directly to the data set as validated through the data analysis process. In this method, the data analyst validates the wall thickness data and all of the validated data is used in the effective area pressure assessment.

Improvements in the engineering assessment of metal loss in ILI

Reporting can be focused upon areas of interest as opposed to strict reporting criteria. For example, the deepest locations can be identified on a per metal loss flaw, per pipe joint, per defined length or any combination of the three. This flexibility in reporting can allow for more informative run comparisons. One of the difficulties in performing run comparisons based upon a comparison of ILI spreadsheets is matching up metal loss flaws which, due to growth, may have combined. Being able to compare deepest locations within defined lengths can provide a more meaningful picture of metal loss growth.

For more information, visit www.QuestIntegrity.com/InVista or call (281) 786-4700.