

Third Party Cased Pipe Risk Assessment Model

Status: Methodology defined and reviewed. Development of spreadsheet model nearing completion

Description: A risk-based spreadsheet model to aid users in defensible decision-making for prioritizing assessment, monitoring or other actions on hard-to-reach cased pipe segments

BENEFITS

A spreadsheet model to estimate and prioritize risk associated with cased pipelines would allow operators the ability to better prioritize pipeline integrity management actions. This would create cost saving through prevention of unnecessary excavations and inspection, it would improve safety because actual risk would be better characterized (i.e., susceptible casings would be identified for action), and it would help operators comply with federal regulations, especially for those pipelines where external corrosion integrity assessments are performed by ECDA.



Cased Pipe Exposed for Test

BACKGROUND

NYSEARCH, the research, development, and demonstration organization within the Northeast Gas Association has retained CC Technologies and Pipeline Risk Ltd. to develop a simple tool for making data-validated decisions on assessing or monitoring cased pipes in High Consequence Areas (HCAs), and to allow a streamlined and formal

approach for prioritizing casing inspection activities that can be integrated with other benchmarking and technology developments for this purpose.

Currently, gas operators with pipes in High Consequence Areas (HCAs) are struggling with how best to respond to Pipeline Integrity requirements for inspection of pipelines in cased segments. As written in the rules, all transmission line segments in HCAs are required to be assessed by in line inspection, pressure testing, direct assessment or 'other technology' and cased pipes are no exception. Many of the LDCs' cased pipeline segments are unpiggable and are considered poor candidates for hydrostatic pressure testing due to the likely ramifications of gas supply interruptions or alternative supply considerations. Also, currently, cased pipes are not able to be fully assessed by the common External Corrosion Direct Assessment (ECDA) process.

The third party cased pipe risk assessment model project was assembled to be part of a multifaceted approach to address NYSEARCH member needs for

cased pipe integrity and evolve the information into an acceptable and structured process for the gas industry and regulators to consider as an alternative or aid to the overall solution.

TECHNICAL APPROACH

The third party cased pipe risk assessment model is designed to provide a quantitative evaluation/prediction of risk for cased pipe segments that are considered 'susceptible' or 'at-risk'. These determinations may come from other assessment processes or simply all cased pipe segment data can be put into the model.

The methodology behind the model is that the primary threat to cased pipe is corrosion, which can occur atmospherically in humid environments and in liquid water that might exist in the annular space. Thus, the model uses equations to calculate risk from three general concepts: 1) Exposure (corrosivity), 2) effectiveness of Cathodic Protection (CP) and coatings (mitigation), and, 3) pipe wall thickness and/or Specified Mean Yield Strength (SMYS) (resistance). Based on the calculated exposure and mitigation, the Probability of Damage (PoD) is calculated.

From PoD, using the resistance, one can calculate the Probability of Failure (PoF). Finally, the model considers various measures and elements for Consequence of Failure. The total risk calculation is then the product of the PoF and the Consequence of that predicted or assumed failure.

One of the keys in delivering a model that can be justified for use is to apply actual data to validate the outcome of the model. The funders of the Third Party Cased Pipe Risk Assessment project have discussed and evaluated how to get data from existing records and knowledge about the cased pipe and how to retrieve information from sampling soil and/or casing annular space environments from the actual pipe segment. There has been much discussion on exactly what data can be used and how to obtain data for areas with limited records. This area of work is important and the contractors and consortium of funders have been discussing ways to make practical yet conservative decisions about the data and what the model should do in the absence of having a full set of data on a particular cased pipe.



Sample Cased Crossing under Highway

STATUS

The methodology, layout and specifics of the model have been defined and are under review.

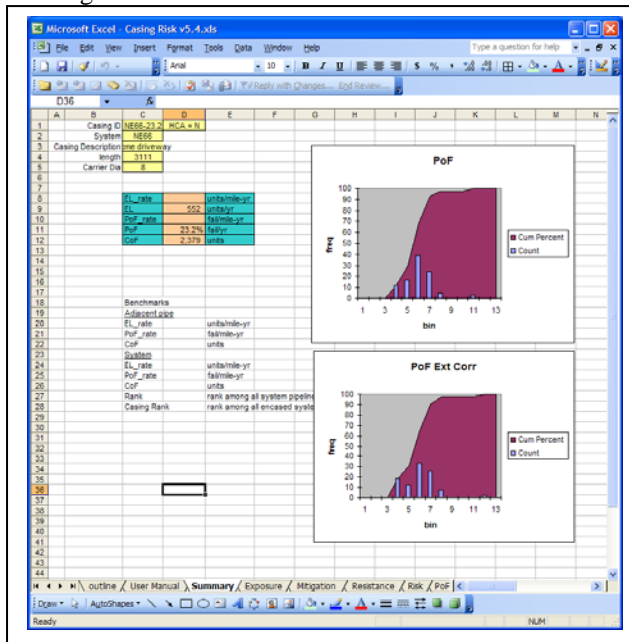
Data validation efforts are underway. Project funders are providing feedback on enhancements and anticipated uses of

the model. Once accepted by funders, the model will be presented to interested parties and agencies who are not part of the funding consortium.

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Sample cased crossing exposed with shoring



Example Output from Model

FOR ADDITIONAL INFORMATION

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