

ABSTRACT

Pipeline as the main transportation equipment in the gas and petroleum industry has a high risk of failure in its operation to distribute oil and gas from oil-producing wells to gas plant to be further distributed to consumers. PT XYZ is a gas and petroleum processing company. Of the four active operating PT XYZ's pipelines in Tanggulangin gas plant, the TGA#5 gas pipeline has the highest leakage frequency. Therefore, a risk assessment and service life assessment standards are required in pipeline using the Semi-Quantitative Risk Based Inspection (RBI) method.

RBI is a method for determining inspection plans based on the risk of failure. This research is referring to the standard API 581 Risk Based Inspection Technology and thinning damage mechanisms. The purpose of this study is to determine the level of failure risk, propose risk mitigation measures, estimate remaining life, propose pipeline inspection methods, and planning of an efficient inspection program in terms of time and cost.

Based on the analysis of risk level using the RBI risk matrix, the study found three high risk segments and one medium risk segment, and further proposed an inspection to reduce the level of risk and to maintain the durability of the pipeline based on risk level categories and estimated remaining life. The main inspection methods used are those that include NDE (Non Destructive Examination), namely UT scans, profile radiography, and visual examination.

The difference in corrosion rate acceleration significantly affects the results of risk assessment. The value of corrosion rate is determined based on actual wall thickness measurements. More research is needed regarding thickness measurement by using the repeatability method and analysis the cause of corrosion rate acceleration on three high risk segments. Various aspects of implementation can be carried out including maintenance measures for corrosion damage.

Keywords: *Gas Pipeline, Risk Based Inspection, API 581, Risk Matrix, Inspection Program.*