Utilizing Integrity Operating Windows (IOWs) for Enhanced Plant Reliability and Safety

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Abstract

Several industry codes, standards and recommended practices have been developed and utilized to maintain pressure equipment integrity and improve reliability. These industry standards focus heavily on inspections (time or risk based) and guidelines for operating equipment at conditions that enable a tolerable deterioration rate. RBI (risk based inspection), in effect, utilizes process conditions at a snapshot in time to recommend inspection strategies which can cover the span of the equipment’s remaining life. On a day to day level, changes that occur in process conditions (excursions and upsets) are not fed back into the risk and criticality calculation. When such changes to operating conditions affect key process variables, new damage mechanisms could be introduced that affect the remaining life of an asset or accelerate existing damage mechanisms. The increase in risk resulting from these process changes goes unaccounted for until the effect of the deterioration is captured at the next inspection.

Integrity Operating Windows (IOWs) are established limits for key process variables that can affect the integrity of the equipment if the process operation deviates from the established limits. The development of these IOWs requires fundamental understanding of the process and resulting damage mechanisms and is best facilitated by a team of corrosion and process engineers along with feedback from plant operators. A well established IOW program is designed to provide real time notification of an increased risk to the integrity of an asset so that identified actions can be taken by the operators and/or plant managers proactively in a timely manner. Combining a RBI program with an IOW program can greatly increase its effectiveness and provide early recognition of equipment risks due to process changes. This paper will focus on the development of an IOW program and the benefits of combining it with a viable RBI program.

Keywords:

Integrity Operating Window, IOW, risk based inspection, RBI, reliability, corrosion