Good till the Last Drop

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Abstract

Validating the effectiveness of safety instrumented systems is an integral and vitally important part of maintaining protection layers and preventing a hazardous condition. However, deciding on the basis for what constitutes ‘sufficiently safe’ can be difficult. For example, when considering valves used as the final element in safety instrumented systems, many in industry are basing the Maximum Allowable Leakage Rate (MALR) on the valve tightness specification instead of the hazardous condition that is being prevented when these valves are closed. This paper will review a pilot conducted at The Dow Chemical Company to compare using the valve tightness class as a basis for MALR versus a safety based calculated MALR. Economics and safety aspects will be evaluated and the general types of safety based calculations used will be reviewed. Key questions answered will include: 1) what exactly is the requirement for estimating MALR, 2) how is MALR calculated using a safety basis, 3) are there differences in cost when basing MALR on valve tightness class versus a safety based calculation, 4) are time efficiencies realized when basing MALR on the safety case versus on the valve tightness class, and 4) which is usually more conservative, a valve tightness class based MALR or a safety based MALR?

Keywords: Leakage Rate; Safety Instrumented Systems; valves; tightness specification; case study; safety based calculation