Evaluating Loss of a Credited Independent Protection Layer (IPL)

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ABSTRACT

An Independent Protection Layer (IPL) must meet well documented requirements to substantiate its credited Probability of Failure on Demand (PFD) including: i) independence from the initiating event, ii) independence from any other IPLs for the scenario, and iii) auditability from an effectiveness and independence standpoint. However, what happens when an IPL must be taken out of service or is otherwise impaired? How does a plant manager decide if continuing to operate the unit without the IPL (or with the IPL at higher PFD) is acceptable from a risk tolerance standpoint? Where corporate policies do not exist or are not clear in this matter, the plant manager is left with a risk-based decision under what conditions the IPL may be taken out of service, how long an IPL may be out of service, what additional provisions are required to manage the risk, and what impacts the basis of the SIS design if the PFD is higher than originally credited. This paper presents concepts to aide in the decision making process including: risk ranking without the IPL, estimating the risk gap without the IPL, possible temporary or substitute risk reduction measures, and financial analysis of the continue-to-operate vs. shutdown decision.