Quality Assurance and Quality Control of Pressure Relief Systems

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Abstract

Pressure relief systems are important for the safe operation of refineries and chemical plants. They are generally considered to be the last line of defense against abnormal operation which could lead to serious accidents, resulting in loss of life and property. To ensure that the system provides proper protection for the range of potential process deviations, it is important to properly size the pressure relief systems considering all the possible applicable overpressure scenarios. Quality Assurance (QA) and Quality Control (QC) are important work processes, which help to ensure that relief systems are properly designed and documented. This paper discusses best practices regarding Quality Assurance and Quality Control protocols for pressure relief systems.

Definitions are given for the terminology used for the QA/QC process of pressure relief system studies. A sample workflow of a typical pressure relief system analysis is also provided. Different steps of the pressure relief analysis process are briefly discussed, and sample work instructions are given for each step. An example set of documentation required for a pressure relief system study, as well as a recommended sequence of documents therein, are described. Work instructions are given for the QA/QC process in the different sections of the studies - system information, overpressure contingency analysis, relief rate calculation and relief device sizing, deficiency identification and final documentation. Lastly, some common mistakes which have been observed during the QA/QC of numerous studies of pressure relief systems from commercial refineries and chemical plants are reviewed.

Keywords: Quality Assurance, Quality Control, Pressure Relief