



“Hunting for Hazards”

Leaving no stone unturned, no nook or corner unchecked, till we identify all hazards that threaten our installation or personnel or public

INTRODUCTION

The need for process safety expertise is ever increasing and a growing challenge in the hydrocarbon, petrochemicals and chemicals industry across the globe. Especially in India, the energy demands over the past decade have seen an exponential growth in the hydrocarbon and allied sectors. USPT&M-Energy Division is providing their expertise to meet the growing needs of the Indian industry.

Hazard and Operability (HAZOP) Study.

HAZARD AND OPERABILITY STUDY (HAZOP'S) is a systematic procedure of identifying HAZARDS; it is carried out by a small and experienced team of engineers from various disciplines such as: operations, maintenance, instrumentation, electrical etc, vendor representative for package units.



The HAZOP study can be conducted at various stages during the life cycle of the project; ideally it should be carried out on preliminary design process flow sheets, in order identify to potential risks at an early stage. Once the PIDs are ready (issued for client review, rev0), they should be HAZOPed before engineering commences, (issued for engineering status). These PIDs can be 'issued for HAZOP' as a good practice. The next stage for HAZOP is before construction commences on site, (issued for construction status). Finally, the HAZOP must be done on as-built status PIDs.

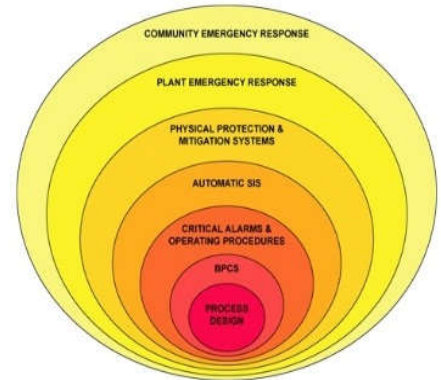
HAZOP stands for **H**azard and **O**perability study. HAZOP uses a set of process parameters and guide words to develop the deviations from the design intent. It then relies on the team members to identify credible causes for the deviation, followed by consequences emanating from the deviation and then assess the adequacy of the safeguards. If the safeguards are not adequate, it allows for recommendations to be made. In recent years, the industry is moving towards quantification; in this direction, the high criticality scenarios are developed further in a LOPA (layers of protection analysis) study to do a semi-qualitative assessment of the protection layers and provide any safety instrumented system that may need to be implemented.

Knowledge and expertise in hazards identification is essential in reducing risk to “As Low As Reasonably Practical” (ALARP) level, for existing installations or new projects. A good and thorough Hazop study is vital for effective risk identification and mitigation. Organizations can ensure good Hazop quality by developing Hazop skills of their professionals.

Layers of Protection Analysis (LOPA)

IEC 61511-1 requires determination of safety function and safety integrity requirements. A number of alternative techniques are given in IEC 61511-3. One of the techniques selected is LOPA (Layers of Protection Analysis) as the most suitable and widely used in the Oil & Gas industry.

LOPA means layers of protection analysis. The method starts with data developed in the Hazard and Operability study (HAZOP) and accounts for each identified hazard by documenting the initiating cause and the protection layers that prevent or mitigate the hazard. The total amount of risk reduction can then be determined and need for more risk reduction analysed. If additional risk reduction is required and if it is to be provided in the form of a Safety instrumented Function (SIF), LOPA methodology allows the determination of the appropriate Safety Integrity Level (SIL) for the SIF. The safety lifecycle defined in IEC 61511-1 requires the determination of a safety integrity level for the design of a safety-instrumented function.



The information required for the LOPA is contained in the data collected and developed in the HAZOP Study. The serious consequences in the HAZOP report generally is entered in the impact event in the LOPA sheets and each causes are entered in the column of initiating cause.

About USPT&M – Energy Division

USPT&M started the 'ENERGY DIVISION' in July 2009 with the objective to provide knowledge based technically innovative services to the hydrocarbon industry including; – plant modelling and process simulation, process safety and loss prevention, process engineering, and technical trainings to the various reputed customers such as Indian Oil, HMEL, GAIL, RIL etc etc.

About Umesh Goel

Mr. Umesh Goel is having vast experience of 26 years in the domain of Oil & Gas Industry. He has worked with reputed organization such as Bechtel London, Air Liquide-France, Axens India, Lurgi India, etc. Later in 2009, Mr. Umesh Goel relocated to India and started the energy division of his family company, USP Trading and Manufacturing P Ltd. Mr Goel is an alumnus of IFP/ENSPM Paris, France.