

# UOP Hazard and Operability (HAZOP) Study

A HAZOP study is a high level process of identifying hazards to mitigate potential risks

UOP-facilitated HAZOP studies provide 50 to 70 percent shorter schedules and lower costs.



## Introduction

The public has been continuously asking for better assurance that communities will not be adversely impacted by fires, explosions and releases from oil refineries and chemical plants. The banking and insurance industries also are frequently asking for this guarantee.

UOP can provide this assurance through a Hazard and Operability (HAZOP) study, which is a method of identifying deviations to UOP process designs that could cause potential hazards and the safeguards required to minimize them. The HAZOP study is recognized worldwide as a primary methodology for conducting hazard analyses for oil, petrochemical and chemical process units.

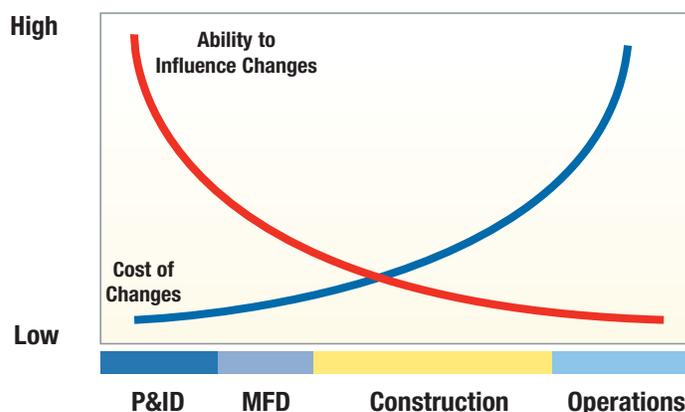
UOP offers a number of options to suit each customer's needs:

- A full HAZOP study that reviews all applicable deviations to each node of the process
- A limited HAZOP study that discusses one to two significant parameters for each node
- Provision of pre-populated worksheets with information generated from previous UOP HAZOP studies on process technologies similar to the customer design for use during customer-led HAZOP studies

A UOP HAZOP study provides benefits to the owner and the contractor in the following ways:

- Identifies improvements for the safe operation of the process unit at an earlier stage in the project, making it easier and usually significantly less expensive to make those changes (see the graph of Cost of Changes vs. Project Lifestyle)
- Provides information to reduce the chance of unplanned shutdowns

## Cost of Changes vs. Project Life Cycle



- Significantly reduces time and costs for future HAZOP studies due to changes made to the process unit during construction or revalidations (a government requirement in some parts of the world) with the UOP electronic HAZOP study report
- Provides information for developing process-unit-specific operating and maintenance procedures
- Helps answer questions during the training of operators and maintenance personnel about deviations or unusual scenarios that may occur in the process unit operation
- Identifies links to process equipment "outside battery limits"
- Provides guidance for developing mechanical integrity programs, including information required by the ANSI/ISA S84 (USA) or IEC 61511 (International) instrumentation standards
- Identifies scenarios that may impact communities and could be subject to government-required modeling, such as the Seveso Directive in Europe and the EPA Risk Management Program rule in the U.S.
- Demonstrates to the communities that potential hazards have been assessed and safeguards to control these potential hazards have been identified

## The UOP HAZOP Report

UOP HAZOP studies are well documented and include information in prepared worksheets developed before the HAZOP study itself. All of the changes and additions discussed during the HAZOP study sessions are useful to the owner and to the contractor. The contents of a typical UOP HAZOP study report are below.

### HAZOP Report Table of Contents

#### Executive Summary

- 1.0 Introduction
- 2.0 Objectives and Scope
- 3.0 Team Composition
- 4.0 Study Approach
- 5.0 Results

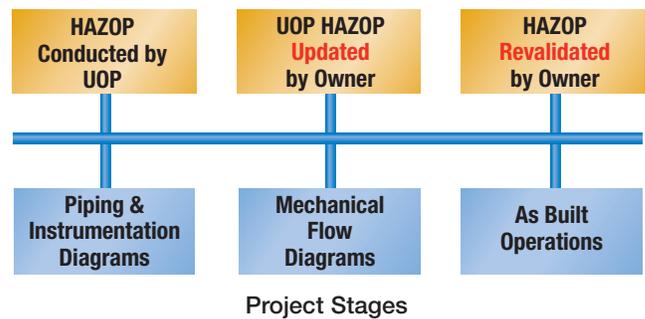
#### Typical Tables

- 1 Severity Definitions
- 2 Likelihood Definitions
- 3 Risk Ranking Matrix
- 4 Risk Ranking Definitions
- 5 Distribution of Recommendation Risk Ranking

#### Typical Appendices

- A Process Description
- B Study Nodes
- C Session Progress Reports
- D HAZOP Methodology Description
- E Technology-Specific HAZOP Worksheets
- F List of Technology HAZOP Recommendations
- G Process Drawings

## The UOP HAZOP Life Cycle



## UOP HAZOP Expertise

UOP process unit HAZOP studies are conducted with a team of UOP experts including a process engineer, a process technology expert, an instrumentation specialist, and an equipment and relief system specialist.

- UOP uses formally-trained HAZOP study team leaders
- UOP has conducted more than 500 HAZOP studies on UOP process technologies

## For more information

For more information please contact your UOP representative, UOP's Engineering Health, Safety and Environmental group, or visit us online at [www.uop.com](http://www.uop.com).

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