

WE STAY WITHIN OPERATING LIMITS



Equipment operated with process conditions (e.g., temperature, pressure, level, flowrate) outside of safe operating limits (high or low) can result in unstable and unpredictable operation and the potential for process safety incidents. It is therefore important to understand the operating limits of the plant and stay within that operating envelope. It is useful for teams to discuss how these limits are documented at their site and whether the limits are clear and available.

Overfilling and overpressure are the most common operating limit excursions that lead to process safety incidents. One common type of fatal process safety related incident occurs when a temporary source of high pressure (e.g., pump, compressor, nitrogen bottle, etc.) is connected to the process with inadequate overpressure protection. This can lead to catastrophic failure impacting those working in the area even if the release does not ignite. Teams are encouraged to think about occasions when temporary pressure sources are used at their facilities and confirm that strong process safety barriers are present. Bear in mind that these are usually abnormal activities when regular barriers may not be in place.

IOGP Tier 1 process safety data also includes many examples of overfilling events. Confirming sufficient capacity for material transfers and monitoring the transfer whilst it progresses are important aspects of staying within the operating limits for level. Teams can discuss the potential for overfilling at their facility and whether the requirement for monitoring transfers are realistic given other workload and distractions.

Some potential operating limit excursions are less obvious for example:

- Change in fluid composition – with the potential for corrosion and/or erosion. This could be sudden (e.g., sand breakthrough from a well) or gradual (e.g., increasing water or hydrogen sulphide content of well fluids).
- Velocity changes due to lower operating pressure – leading to excessive vibration or erosion.

Teams can discuss other potential operating limit excursions relevant to their facility. Where there are concerns, advice should be sought from supervision and support groups. While there is always a desire to return to normal operation as soon as possible it is imperative to investigate and understand the causes of an excursion to enable prevention of reoccurrence.

Tips for Managers:

Establish and document safe operating limits for key process variables and make them visible to front-line workers.

Regularly check that personnel have the necessary skills and knowledge to stay within operating limits.

Systematically investigate excursions outside operating limits.

Demonstrate through decisions that cost, production or schedule does not override safety

Additional guidance:

- IOGP Report 456 - *Process Safety – recommended practice on key performance indicators*
- Center for Chemical Process Safety Beacon (November 2007): [Cold Embrittlement and Thermal Stress](#)
- US Chemical Safety Board: [Anatomy of a disaster](#)