

Process Hazard Analysis (PHA) Worksheet

One form for ONE study session of a process hazard analysis, in the HAZOP style: a team takes a section of the process in turn, states what it is meant to do, applies guidewords to its parameters to find deviations, and writes down causes, consequences, the safeguards that exist today, a risk rating and what to do about it. Sections 1 and 2 record what was studied and who was in the room; section 3 gives example prompts to adapt; section 4 is the worksheet (copy the page for more deviations); section 5 tracks every recommendation to a decision; section 6 is the team's sign-off. The form prints no risk matrix, scale or number: write the scale your own procedure uses, and its version, in section 1. It is a record, not a method: it does not make a study meet any law or standard, and whether a law covers your facility is for you to check. Nothing here is legal advice.

1 Study details

Facility or unit	Study ID	Study date(s)	Method used ☐ HAZOP ☐ What-if ☐ Checklist ☐ What-if / checklist ☐ Other
Node or section studied (boundaries: from where to where, and the equipment in it)		Design intent of this node (what it is meant to do, in words, with the normal operating figures and where they come from)	
Drawings and revision (P&IDs, flow diagrams: number, revision, date)		Other process information used (data sheets, operating procedures, previous study, incident history)	
Risk scale used for the rating column (name, version and where filed; the form prints none)	Revalidation interval (years) your rule sets, and next review due (date)	Where the study records are kept, and for how long (your rule)	
Topics the study also looked at (this list follows 29 CFR 1910.119(e)(3); keep, drop or add your own) ☐ Hazards of the process ☐ Previous incidents with serious potential ☐ Engineering and administrative controls, and detection ☐ Consequences of failure of those controls ☐ Facility siting ☐ Human factors ☐ Effects on people at the workplace ☐ Other			

2 Team, roles, who led and who recorded

Name	Role or discipline (operations, process, instrument, electrical, maintenance, HSE, other)	Knows this process in daily work (Y/N)	Knows the study method (Y/N)	Led the study (tick)	Recorded (tick)	Sessions attended (dates)

Write who led (the facilitator) and who recorded (the scribe) in the two tick columns. Tick one name in each of the two columns. Say in the sign-off why anyone absent from part of the study was not needed there.

3 Guideword and parameter prompts (examples to adapt)

The seven main guidewords below are the ones the ILO guide to hazard and operability studies lists; the meanings are paraphrased, and the example wording and the 'often fits' column are this form's own, to adapt. Take one parameter at a time and apply each guideword to it. A pairing with no meaning is not forced: write n/m in the worksheet and go on.

Guideword	Plain meaning (paraphrased)	Example deviation wording (invented)	Often fits (the team decides)
NO or NOT	None of the intention is achieved, and nothing else happens.	No flow of solvent to the reactor. No cooling water to the jacket. No stirring.	Flows, activities such as transfer, mixing and reacting, signals and utilities.
MORE	A quantity or property is higher than intended.	More flow. Higher pressure. Higher temperature. High level. More of one component.	Any parameter that has a number: flow, pressure, temperature, level, concentration, duration.
LESS	A quantity or property is lower than intended.	Less flow. Lower pressure. Lower temperature. Low level. Less of one component.	The same parameters as MORE.
AS WELL AS	The intention is achieved and something extra happens.	An extra material in the line. Flow along a second path at the same time. A second reaction.	Composition, flow paths, activities.
PART OF	Only part of the intention is achieved.	One component missing from a mixture. One of two reactors not fed.	Composition, flow splits, steps of a longer activity.
REVERSE	The opposite of the intention.	Flow back through the pump. A reaction running the other way.	Mostly flows and reactions. The ILO guide says it suits activities best: the team decides whether it means anything for a pressure, a temperature or a level, and writes n/m if not.
OTHER THAN	Something different replaces the intention.	The wrong material delivered. Transfer to the wrong destination. A different operating mode.	Materials, destinations, operating modes.
Words some studies add	The ILO guide suggests SOONER and LATER for time and sequence, WHERE ELSE for position, source or destination, and HIGHER and LOWER for elevation.	The valve closes too late. Material goes somewhere else. The outlet sits lower than the drawing shows.	Time, sequence, position, elevation.

Parameters to take in turn for each node (examples; write the design value or limit for this node and where it comes from)

Parameter	Questions to ask (this form's own wording)	Design value or limit for this node, and its source (write it)
Flow	Can it stop, be too high or too low, go the other way, go along another path or carry something else?	
Pressure	What happens above and below the intended pressure, including the relief route and what is upstream and downstream?	
Temperature	What happens above and below the intended temperature, including loss of heating, loss of cooling and external heat?	
Level	What happens if the vessel is empty, overfilled or the level reading is wrong?	
Composition or concentration	What happens with a missing, extra, wrong or contaminated component?	
Time or sequence	What happens if a step is too long, too short, too early, too late, skipped or done out of order?	
Position or destination	What happens if material, a valve or an operator action is in the wrong place?	
Other the team adds	For example start-up, shutdown, maintenance, loss of a utility, a human action.	

How to use the prompts. (a) State the design intent of the node before applying any guideword (the ILO guide: until everyone knows what a part is supposed to do, deviations cannot be generated). (b) A deviation is worth recording once someone can name a credible cause (the ILO guide calls it meaningful); write the consequences, then the safeguards that exist today. (c) A conventional hazard and operability study identifies hazards but gives no likelihood or loss (HSE, plant modification guidance), so the rating column takes the team's own scale and the form supplies none. (d) A recommendation gets an owner, a due date and a tracking reference before the session ends.

4 Worksheet (copy this page for more deviations)

Facility or unit (as in section 1)	Node or section (as in section 1)	Study ID	Sheet ____ of ____
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Parameter and guideword together give the deviation. Write n/m for a pairing with no meaning. The risk rating is on your own scale from section 1 (write severity, likelihood and the result). The first row is an invented example for a transfer line, not advice.

No.	Parameter	Guideword	Deviation	Causes	Consequences	Existing safeguards	Risk rating (your scale)	Recommendation	Owner and due date	Tracking reference
Eg	Flow	REVERSE	Reverse flow from reactor to day tank	Pump stops while the reactor is pressurised; no check valve	Reactor contents flow back and contaminate the day tank	Check valve on the pump discharge; operating procedure step	S2 L2 = 4 (invented scale)	Test the check valve and add it to the test plan	Maintenance lead, 15 Dec	R-3

5 Recommendation tracking

One line per recommendation, filled in at the session and kept up to date after it. Write what was decided, who was told, and when it was closed.

Tracking reference	Recommendation (short)	Owner	Due	Decision: accept, reject (with the reason) or defer	Risk rating after (your scale)	Told to operating and maintenance staff (date)	Status and closed on

Rejecting a recommendation is a decision to record, with its reason and who made it; a recommendation with no owner or no due date is not yet resolved.

6 Team sign-off

Each signature says: I took part in this study in the role written, and this record shows what the team found and decided. It does not say the study meets any law or standard.

Role	Name	Signature	Date
Study leader (facilitator)			
Recorder (scribe)			
Operations lead or operator who knows this process			
Process or design engineer			
Instrument or electrical engineer			
Maintenance lead			
HSE representative			
Site manager (final approval)			
Other team member			

Absent for part of the study: who, which part, and why that was acceptable	Next study or revalidation due (date)
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