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# Oil and Gas Technical Safety Engineering Training Course

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Doha

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Registered in the United Kingdom and Saudi Arabia

# Oil and Gas Technical Safety Engineering Training Course

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Oil and Gas Technical Safety Engineering is a 1-week training course for process, safety and facilities engineers who specify the hardware that detects, isolates and contains hydrocarbon releases, and each participant produces a technical safety barrier summary for one facility. Ageing plants, brownfield modifications and leaner operating crews put more weight on engineered protection than ever. Jupiter Prime Training delivers this Oil and Gas Technical Safety Engineering course.

## Why Oil and Gas Technical Safety Engineering Matters Now

Three forces shape technical safety work today. Brownfield tie-ins add inventory and ignition sources to older layouts. Unmanned and remotely operated sites rely on automatic detection and shutdown rather than people on the spot. Insurers and asset owners ask for clear evidence that each engineered barrier still matches the hazards it was chosen for. A facility that gets this right limits a leak to a contained event; one that gets it wrong faces escalation, extended outages and loss of the licence to operate, whether it is a gas plant or a tank farm.

## Who Gains Most from Oil and Gas Technical Safety Engineering

- Engineers responsible for fire and gas detector placement and voting logic on process units
- Process engineers who define shutdown and blowdown sequences and inventory isolation points
- Facilities engineers who lay out equipment spacing, firewalls and escape routes
- Safety engineers who prepare hazardous area drawings and fire protection specifications

Design and modification groups gain most when process, safety and layout engineers attend together and agree one barrier basis.

## Oil and Gas Technical Safety Engineering Capabilities

Participants link each hydrocarbon hazard to the hardware that limits its consequences.

- Design a fire and gas detector layout from release scenarios and coverage targets — unit layout decisions
- Specify emergency shutdown levels and blowdown rates for isolatable inventories — process design sign-off
- Weigh passive against active fire protection for structures and vessels — capital and maintenance budgets
- Apply hazardous area classification to select zone boundaries and equipment protection — electrical and instrument engineers
- Assess escape, evacuation and muster arrangements against escalation times — operations and emergency response
- Build a barrier summary that ties hazards to hardware and performance — asset owners and auditors

## Key Oil and Gas Technical Safety Engineering Terms

- Technical safety barrier — engineered hardware or a control function that prevents a release or limits its escalation.
- Fire and gas detection — the network of flame, heat, smoke and gas detectors that triggers protective actions.
- Emergency shutdown — automatic or manual actions that isolate inventories, stop equipment and move a plant to a safe state.
- Depressurisation — controlled release of gas from isolated sections to flare to reduce rupture risk in a fire.
- Passive fire protection — coatings and walls that delay heat-driven failure without activation.
- Hazardous area classification — zoning of locations where flammable atmospheres may occur, guiding equipment selection.

## Oil and Gas Technical Safety Engineering Day by Day

### Day 1: Hazards, Inventories and the Barrier Basis

- Major Hazard Identification for Process Units — Setting the Barrier Scope
- Inventory Segmentation and Isolation Points — Limiting Releasable Hydrocarbon Volumes
- Release Scenarios and Leak Size Selection — Choosing Design Cases
- Layout and Equipment Spacing Principles — Separating Inventories From Ignition Sources
- Technical Safety Philosophy Documents — Recording Design Intent for the Facility

### Day 2: Detection and Hazardous Areas

- Gas Detector Types and Placement — Matching Sensors to Release Behaviour
- Flame, Heat and Smoke Detection — Selecting Coverage for Each Fire Type
- Detection Voting and Confirmed Alarms — Balancing Spurious Trips Against Response
- Hazardous Area Zoning Drawings — Setting Zone Extents Around Release Points
- Ignition Source Control and Equipment Protection — Selecting Suitable Electrical Equipment

## Day 3: Shutdown and Depressurisation

- Emergency Shutdown Hierarchy and Levels — Defining Plant Response to Each Trigger
- Shutdown Valve Location and Closure Times — Containing Inventory Quickly
- Blowdown Rate and Sequence Design — Reducing Vessel Rupture Under Fire
- Cause and Effect Charts — Linking Detection Inputs to Protective Outputs
- Barrier Performance Standards — Stating Reliability, Response and Survivability

## Day 4: Fire Protection, Escape and Evacuation

- Passive Fire Protection Selection — Protecting Structures, Vessels and Supports
- Deluge, Water Spray and Foam Systems — Choosing Active Protection Coverage
- Firewater Demand and Pump Capacity — Sizing for the Largest Fire Case
- Escape Routes, Muster Areas and Shelters — Checking Escalation and Evacuation Times
- Explosion Overpressure and Blast Walls — Locating Occupied Buildings Safely

## Day 5: Practising the Technical Safety Barrier Summary

- Hazard-to-Barrier Mapping for One Facility — Applying Release Scenarios and Inventories
- Detection and Shutdown Review — Testing Coverage and Cause and Effect Logic
- Fire Protection and Escape Check — Applying Passive, Active and Evacuation Criteria
- Barrier Gap Ranking — Prioritising Modifications for Brownfield Facilities
- Technical Safety Barrier Summary — Completing and Presenting the Facility Record

## Applying Oil and Gas Technical Safety Engineering After the Course

- Review the gas detector layout of one process module against its release scenarios.
- Update the cause and effect chart for one shutdown level and confirm valve closure times.

## Oil and Gas Technical Safety Engineering Questions FAQ

### What is oil and gas technical safety engineering and why does it matter now?

It is the design of engineered barriers that detect, isolate and contain hydrocarbon releases and fires. It matters now because brownfield changes and unmanned sites depend more on automatic hardware than on people responding.

### Which roles gain most from oil and gas technical safety engineering?

Process, safety, facilities and project engineers gain most. They choose detector locations, shutdown sequences, fire protection and escape layouts that decide how far an incident can escalate.

## How does oil and gas technical safety engineering differ from barrier integrity courses?

It focuses on designing and specifying barrier hardware. Barrier integrity and safety-critical element courses cover keeping existing barriers verified and maintained during operation.

## What do you bring back from oil and gas technical safety engineering?

You bring back a technical safety barrier summary for one facility, linking its hazards to detection, shutdown, depressurisation, fire protection and escape provisions.

## Oil and Gas Technical Safety Engineering: The Way Forward

The technical safety barrier summary becomes the reference for any change to the facility. Its first use is deciding which barrier gaps enter the next modification budget, read by process, safety and operations engineers. After the first brownfield project, revisit the release scenarios to confirm they still reflect the inventories and equipment on site.