CONCEPT

H2S Safety and Toxic Gas Protection: Detection, Breathing Apparatus and Rescue

25 – 29 January 2027
London - Central London four-star



H2S Safety and Toxic Gas Protection: Detection, Breathing Apparatus and Rescue

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Introduction:

H2S safety failures on sour wells, gas plants and refineries rarely come from missing equipment; they come from crews who trust their sense of smell, personal monitors left unbumped, breathing sets donned too late and rescuers who enter a pit without air. A single knockdown can turn into multiple casualties within minutes. This Core Concept course trains operating, maintenance and HSE staff to recognise hydrogen sulphide and companion toxic gases, read detector alarms, wear and check breathing apparatus, control sour work and lead first response. Participants build an H2S Contingency Plan for a case site.

Course Objectives:

- Identify H2S release points on sour wells, gas plants and refinery units and describe the effects of rising concentration on workers
- Interpret ceiling, short-term, time-weighted average and IDLH values and apply alarm set points for H2S and companion toxic gases
- Carry out bump tests, calibration checks and field responses for personal and fixed gas detectors
- Select, inspect and don SCBA, airline breathing sets and escape sets for the task and exposure level
- Apply permit conditions, gas testing, purging and continuous monitoring to sour line breaking and vessel entry
- Prepare and exercise an H2S Contingency Plan with wind-based muster areas, rescue arrangements and drill records

Target Audience:

- Operators responsible for sour wells, gathering stations, gas plant units and refinery sour water and sulphur units
- Maintenance crews responsible for line breaking, valve work and vessel opening in sour service
- HSE advisers responsible for gas testing, breathing apparatus programmes and emergency drills
- Shift supervisors responsible for work permits, crew headcount and first response at the worksite
- Contractor leads responsible for crews working inside sour areas and confined spaces
- Emergency response team members responsible for toxic atmosphere rescue and casualty handling

Course Outline:

Day 1: Hydrogen Sulphide Hazard Profile and Sour Service Sources

- H2S Physical Properties: Density, Flammable Range, Solubility and Low-Point Accumulation
- Rotten Egg Odour Threshold and Olfactory Paralysis Knockdown Mechanism
- Sour Reservoirs, Produced Water, Sour Water Strippers and Sulphur Pits as Release Points
- Concentration-Effect Ladder From Eye Irritation to Rapid Collapse
- Site H2S Release Point Walkdown Checklist and Exposure Zone Sketch

Day 2: Exposure Limits, Companion Toxic Gases and Gas Detection Technology

- Ceiling, Short-Term, Time-Weighted Average and IDLH Values in Generic Terms
- Sulphur Dioxide, Carbon Monoxide, Ammonia and Benzene Toxicity Overview Cards
- Electrochemical Cells, Metal Oxide Sensors and Multi-Gas Personal Monitor Selection
- Fixed H2S Detector Status Checks, Beacons and Horn Response in the Field
- Alarm Set Point Ladder: Low Alarm, High Alarm and Evacuation Triggers

Day 3: Breathing Apparatus, Detector Upkeep and Sour Work Controls

- Bump Test and Calibration Gas Routine With Detector Record Card Logging
- Positive-Pressure Open-Circuit SCBA Donning, Pre-Use Checks and Cylinder Endurance
- Airline Breathing Sets With Escape Cylinders, Trolley Manifolds and Air Quality Checks
- Escape Sets and Hoods for Emergency Egress From IDLH Atmospheres
- Sour Well and Sour Plant Permit Conditions: Buddy System, Gas Tests and Line Breaking

Day 4: H2S Contingency Planning, Vessel Entry, Rescue and Drills

- H2S Contingency Plan Structure: Exposure Radius, Alert Levels and Call-Out Tree
- Windsock Reading, Upwind Briefing Areas and Crosswind Escape Routes
- Toxic Atmosphere Vessel Entry: Purging, Positive Isolation and Continuous Monitoring
- Casualty Rescue Principles: Rescuer Self-Protection, Retrieval Lines and Oxygen Resuscitation
- Tabletop and Field Drill Design With Timed Muster Headcount

Day 5: Sour Site Release Simulation and H2S Contingency Plan Capstone

- Case Site Briefing: Sour Gas Wellsite With Nearby Gathering Station
- Timed Release Simulation: Detector Alarm, Masking Up and Upwind Evacuation
- Refinery Sour Water Unit Leak Scenario With a Casualty in a Pit
- Drill Debrief Against Response Time, Masking Time and Headcount Records
- H2S Contingency Plan Build, Presentation and Peer Challenge

Skills You Will Gain:

- Sour Release Point Recognition
- Toxic Gas Alarm Interpretation
- Gas Detector Bump Testing
- Breathing Apparatus Donning
- Sour Work Permit Control
- Wind-Based Muster Planning
- Toxic Atmosphere Rescue
- Emergency Drill Evaluation

Why Attend This Course:

- Return with an H2S Contingency Plan for a case site, tested in a timed release simulation
- Mask up, raise the alarm and move upwind without hesitation when a personal monitor sounds
- Stop a would-be rescuer from becoming the second casualty at a pit, vessel or wellhead
- Compare sour work practice with operators and HSE staff from upstream fields, gas plants and refineries

Conclusion:

Crews stay safe around hydrogen sulphide when they understand the gas, trust their detectors rather than their nose, wear the right breathing apparatus and know exactly where to go when an alarm sounds. The course moves from H2S properties and sour release points, through exposure limits, companion toxic gases and detection, to breathing apparatus, detector upkeep and sour work permits, then contingency planning, vessel entry, rescue and drills. The final day runs timed release simulations and produces an H2S Contingency Plan for a case site.