CONCEPT

Environmental Monitoring and Modelling: Air Emissions, Water, Soil and Noise Sampling

17 – 21 May 2027
London - Central London four-star



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Introduction:

Industrial sites lose credibility with regulators and neighbours when environmental monitoring produces gaps, unreliable samples or results that nobody can explain. Poorly placed stations, uncalibrated analysers, broken custody records and unvalidated data turn a routine exceedance into an enforcement case. This Core Concept course trains practitioners to design a monitoring programme, measure ambient air and stack emissions, understand dispersion modelling, sample water, soil and noise correctly, and validate and trend the results. Participants work on real site data and produce a Site Environmental Monitoring Plan and Exceedance Response Protocol.

Course Objectives:

- Design a site monitoring programme that links each emission source and pathway to parameters, locations and sampling frequency
- Plan ambient air quality and stack emission measurements and check continuous emission monitoring system data against its calibration and audit records
- Interpret Gaussian plume and AERMOD results, including their meteorological, terrain, source and receptor inputs, against measured ambient concentrations
- Collect surface water, groundwater, soil and noise samples with the correct method, preservation, QA/QC samples and chain of custody
- Validate monitoring datasets, analyse trends and investigate exceedances to a documented root cause and corrective action
- Prepare a monitoring results report and exceedance notification record suitable for submission to the environmental authority

Target Audience:

- Environmental engineers who plan and run sampling and emission measurement at operating plants
- HSE and environmental officers responsible for permit monitoring conditions and site reporting
- Monitoring and laboratory technicians who collect, preserve and analyse field samples
- Compliance staff who compile monitoring data and respond to exceedances and authority queries
- Operations engineers who maintain analysers, stacks and monitoring stations

Course Outline:

Day 1: Monitoring Programme Design and Site Context

- Monitoring Objectives Matrix: Baseline, Operational and Permit Compliance Monitoring
- Source Inventory of Stacks, Fugitive Releases, Discharges and Noise Emitters
- Conceptual Site Model for Air, Water, Soil and Noise Pathways
- Parameter, Location and Sampling Frequency Rationale Worksheet
- Monitoring Programme Gap Assessment Against Current Site Practice

Day 2: Ambient Air Quality, Stack Emissions and CEMS

- Ambient Air Quality Station Siting, Samplers and Analyser Types
- Stack Emission Testing: Sampling Ports, Isokinetic Particulate Sampling and Flow Measurement
- CEMS Architecture: Extractive, Dilution and In-Situ Analysers for SO2, NOx, CO and Particulate
- CEMS Quality Assurance: Daily Calibration Checks, RATA and Missing Data Substitution
- Meteorological Station Records: Wind Speed, Wind Direction and Temperature Data Capture

Day 3: Water, Soil and Noise Sampling with QA/QC

- Surface Water Sampling: Grab and Composite Samples, Preservation and Holding Times
- Groundwater Monitoring Wells: Purging, Low-Flow Sampling and Field Parameters
- Soil Sampling Patterns: Grid, Judgemental and Depth-Profile Methods
- Environmental Noise Monitoring: Sound Level Meter Set-Up, Calibration and Background Levels
- QA/QC Samples and Chain of Custody Forms: Blanks, Duplicates and Spikes

Day 4: Dispersion Modelling, Data Validation and Exceedances

- Gaussian Plume Equation, Plume Rise and Pasquill Stability Classes A to F
- AERMOD Inputs: AERMET Meteorology, AERMAP Terrain, Source Parameters and Receptor Grids
- Data Validation Rules: Outliers, Detection Limits, Flags and Data Capture Rates
- Trend Analysis with Control Charts, Rolling Averages and Non-Parametric Trend Tests
- Exceedance Investigation: Root Cause Analysis and Corrective Action Log

Day 5: Monitoring Case Work and Final Deliverable

- Refinery Case: Validating a Quarter of CEMS and Ambient Station Data
- Power and Cement Case: Comparing Modelled and Measured Ground-Level Concentrations
- Manufacturing Case: Groundwater Trend Review and Exceedance Response
- Monitoring Results Report and Authority Notification Record Drafting
- Site Environmental Monitoring Plan and Exceedance Response Protocol Peer Review

Skills You Will Gain:

- Monitoring Programme Design
- Ambient Air Measurement
- Stack Emission Testing
- CEMS Data Review
- Dispersion Model Interpretation
- Field Sampling Technique
- Environmental Data Validation
- Exceedance Root Cause Analysis

Why Attend This Course:

- Return with a Site Environmental Monitoring Plan and Exceedance Response Protocol built from real plant data
- Defend sample results and analyser data during audits because every step from field to laboratory is documented
- Spot drifting analysers, poor station siting and questionable trends before they become reportable exceedances
- Compare field practice with peers from refining, power, cement, chemicals and manufacturing sites

Conclusion:

Monitoring data only protects an industrial site when it is planned around real sources and pathways, collected correctly and checked before anyone relies on it. This course moves from programme design, through ambient air, stack and CEMS measurement, water, soil and noise sampling, to dispersion modelling, data validation, trend analysis and exceedance investigation. The final day applies these methods to refinery, power and manufacturing cases and produces a Site Environmental Monitoring Plan and Exceedance Response Protocol ready for use on site.