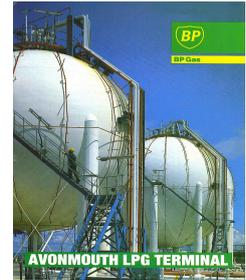


NORM Surveys at LPG Terminals

normtec have successfully undertaken NORM surveys at two main BP locations on the UK mainland; at Wytch Farm production site and Avonmouth distribution terminal with road. Rail and sea terminals.



At Wytch Farm, natural gas was separated into propane and butane fractions, stored and piped to a local rail depot for transfer to Avonmouth where the gases are stored in large vessels for distribution via road and sea terminals. Normtec was commissioned to survey and map NORM contamination throughout both the process and distribution systems prior to decommissioning and was instrumental in the subsequent strategy and implementation.

Our work contributed to the full cycle of work and comprised the following tasks.



- An intrusive Radiological Survey
- The decommissioning strategy
- Cost effective waste options
- Specialist pipe probe for In-Situ monitoring
- Extensive contamination surveys
- Sampling and Analysis
- Mapping contaminated areas
- Issue of 'Local Rules' and Method Statements
- Contractor Training & Site Supervision
- QA Procedures for 'Free Release'
- Radiation Risk Assessments
- Regulatory compliance & closure report
- Refresher NORM Training to resident staff

Oil and gas are extracted from beneath the bedrock and Naturally Occurring Radioactive Material (NORM) accumulates where temperature or pressures change or where there is a disturbance to laminar flow. 'Tubulars', pumps, surface valves and vessels, are particularly susceptible to scale deposition. These require cleaning to reduce contamination to regulatory limits. Characterisation includes:

1. Radioactive isotopes
 - These comprise U/Th radio nuclides with Ra-226 predominating.
 - However, In gas plants and some oil wells Pb-210 and Po-210 occur
2. Hard scale or plated deposits
3. Hydrocarbon contamination
4. Heavy Metals such as As & Hg

The site survey comprised radiation and intrusive contamination monitoring followed by selective sampling and analysis to determine the extent and degree of NORM contamination with photographic evidence.

A Decommissioning strategy was outlined and then developed with a preferred contractor.

An essential process following decommissioning or decontamination is that of proving items are clean. Monitoring protocols have been established in the UK by **normtec** and accepted by the UK Environment Agencies and now used by several decontamination contractors.



normtec regularly use specialist probes and protocols to demonstrate compliance

