

# Site Investigation | Risk Assessment

Investigation of historical contamination in a residential area known to be over a former gas works, Kent.

## **Introduction**

Ecologia undertook a site investigation on behalf of a local authority to assess the significance of contamination beneath twenty-seven residential properties with gardens known to be built over a former gasworks. The investigation included numerous boreholes to assess the concentration of potential contamination associated with underground tar pits, waste drainage and gas holders identified on historical mapping of the former gas works site.



## **Site Investigation and Generic Risk Assessment**

Ninety-eight samples were sent to a UKAS/MCERTS accredited laboratory for a specifically chosen suite of contaminants expected from gas works sites.

Three samples were sent for physical testing to further quantify ground conditions and enhance the risk assessment.

Contaminant concentrations were screened against the latest Soil Guideline Values including those published by the Environment Agency, LQM/CIEH derivations and in-house derived values.

Statistical analysis was used to confirm statistically significant concentrations of arsenic, copper, zinc, benzo(a)pyrene, chrysene, naphthalene and benzene above their assessment criteria. Ecologia proceeded to conduct a human health quantitative risk assessment to further delineate contaminants of concern and refine the conceptual site model.

## **Human Health Quantitative Risk Assessment**

The conceptual site model indicated increased risk to residents from direct exposure pathways and inhalation pathways.

RISK<sub>4</sub> model was selected to assess the risk from groundwater related pathways. The CLEA v1.04 model was chosen to assess the risk to human health from surface soil contamination.

Through refinement of the CLEA model in the risk assessment to produce site specific assessment criteria, benzo(a)pyrene and lead were considered the only contaminants that continued to pose unacceptable risks to human health.

## **Further Site Investigation**

It was considered necessary to produce a benchmark background level of benzo(a)pyrene and lead for the different land uses (Residential, Commercial/Industrial and Rural) to define whether risks posed at the residential site under investigation were statistically significantly different from background levels in the surrounding area.

A further sampling regime was conducted at ten sites across the town to assess background levels compared to national levels found by the UK Soil and Herbage Survey (EA et al, 2007). It was found that typical residential and industrial/commercial areas had typically similar background concentrations. It was considered the site in question did not pose a significantly unique risk to warrant further action, meaning costly and disruptive remediation was avoided.