



**Ecologia**<sup>TM</sup>  
Remediation

# Remediation

When it comes to providing effective solutions to contamination problems Ecologia has expertise in a wide range of innovative and efficient technologies using multi-disciplinary approaches. In addition to traditional decontamination methods, much of our remedial work uses scientifically advanced, in-situ techniques, avoiding the need for excavation. These less intrusive methods reduce environmental impact caused by landfill and lorry movements. We actively develop faster, more efficient remediation methods, researching and testing new techniques, enabling us to meet our clients' needs in the best and most economical way.

## Competence

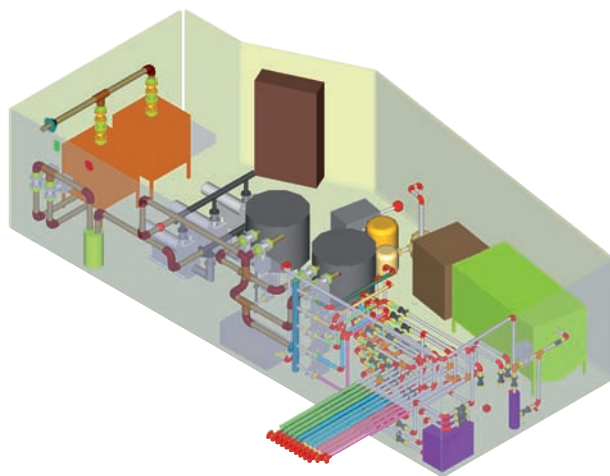
As responsible practitioners we are holders of legally required licences to deal with waste, and provide relevant and ongoing training for our staff. Clients can therefore be assured that our working practices are entirely sound.

- Ecologia is licensed to operate all technologies offered
- We are licensed to carry waste
- We employ full time staff who hold Waste Management Industry Training and Advisory Board (WAMITAB) NVQ Level 4 Certificates of Technical Competence
- We invest heavily in training for all our staff, maintaining optimum product quality and ensuring compliance with current health and safety requirements.

## Capability

We do not merely operate the remediation systems we offer; in most cases they are our own designs and developments. Our in-depth understanding allows us to select and implement the most appropriate strategy for the individual situation.

- Our remediation systems are designed and manufactured in-house by environmental scientists and engineers specifically for the site in question rather than on a generalised basis
- Where appropriate, we are able to use groundwater modelling software to improve the design of our remediation strategies
- We are able to carry out and fully interpret field trials prior to designing remediation strategies for large projects such as soil vapour extraction radius/sphere of influence, aquifer tests and biotreatability assessments
- The equipment we use is manufactured or assembled in our own workshops.



## Innovation/Flexibility

Through our policy of continuous development, Ecologia is able to provide flexible solutions which best meet the needs of the client, the situation at hand and the environment.

- Our wide range of in-situ and ex-situ technology provides effective and flexible solutions to all situations without the need for compromise
- In-house researchers apply their specialist knowledge to upgrade existing technologies and identify new and innovative approaches
- Operational quality is maintained through the design and manufacture of our own advanced remediation systems, which feature discharge monitoring and automated telemetric feedback.

## Techniques

This is a selection of our techniques.

### • High Vacuum Multi-Phase Extraction

Also known as 'slurping', this is an in-situ technique in which a multi-phase process is simultaneously applied via a single well, to remove liquid- or vapour-based contaminants from groundwater or soil:

- Vacuum extraction/recovery removes free product along with minimal groundwater
- Vapour extraction removes volatile contaminants
- The increased oxygen levels allow bioventing to take place, enhancing biodegradation of contaminants.

This technique is particularly appropriate where it is important that water table fluctuations are minimised.

### • Ex-Situ Biopiles

Soil microbial activity is increased in order to encourage biodegradation of organic pollutants. Ecologia biopiles use a vacuum-induced static aerated system, which is particularly effective for hydrocarbon contaminated soils and has significant advantages over the windrows-based system.

- Contaminated soils are excavated prior to treatment and placed in specially designed biopiles
- Nutrients, aeration and water are applied and monitored.

Advantages of this technique include:

- Ease of calculation of soil volumes
- Ease of application, with reduced time, space requirements and costs
- Ability to monitor and control volatile organic compound (VOC) emissions.

### • Pump and Treat

Ecologia is able to draw from a range of technologies for the removal and treatment of contaminated groundwater or non-aqueous phase liquids (NAPL).

- Contaminated groundwater is extracted
- Oil-based contamination is treated with a physical oil/water separator
- Dissolved contaminants are removed via a variety of physical, chemical or biological processes.





• **Sparging**

In this in-situ technique, gases are injected under pressure into groundwater via vertical wells or horizontal lines. Contaminants may be removed by several mechanisms:

- Volatilisation, using air or nitrogen
- Oxygenation, using air or pure oxygen to enhance microbial degradation of organic compound contaminants
- Chemical oxidation, injecting ozone to oxidise organic contaminants.

• **Soil Vapour Extraction (SVE)/Bioventing**

This system is designed to physically remove volatile hydrocarbons, such as petrol and solvents, by inducing a localised vacuum.

- Vertical wells or horizontal lines are drilled
- A vacuum is induced in the wells or lines
- Extracted air and vapour is treated at the surface through the use of activated carbon biological filters or catalytic oxidation.

The advantage of this method is that contaminants can be extracted without the need for excavation or the injection of compounds required for in-situ chemical oxidation or bioremediation.

Ecologia also uses SVE systems to implement Bioventing, where the aim is to provide oxygen to bacteria, enabling them to work within the contaminated soil, rather than physically extracting volatile compounds.

• **In-Situ Soil Heating**

This is an innovative technique where the soil is heated to increase volatility or reduce viscosity of organic contaminants so they may be removed via SVE or High Vacuum Multi-phase Extraction.

- Radio frequency heating  
An antenna is inserted into contaminated ground and transmits radio waves causing the ground to heat, if required, to temperatures in excess of 100°C. This causes contaminants to volatilise, allowing more efficient extraction and providing the benefit of shorter treatment times.
- Steam injection  
Steam is injected under pressure into the ground in order to flush/strip the contaminants from the treatment area. Contaminants are collected via a high vacuum multiphase extraction system.

For further information and to view case studies, visit [www.ecologia-environmental.com](http://www.ecologia-environmental.com)



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