

# Remediation

Ozone Sparging – Portsmouth, Hampshire.

Ecologia was contracted to carry out groundwater remediation works at a former shipyard in the South of England. The remediation works were designed to address the identified groundwater contamination down gradient of the contamination source area in order to mitigate risks to controlled waters.

Ecologia worked as a Specialised Sub-contractor, with much of our work taking place during the main soil remediation activities (earth moving, complex sorting and soil treatment).

To mitigate the risks to controlled waters at the site, Ecologia treated the groundwater via air sparging with the addition of ozone to the airflow in order to provide a chemical oxidative effect. The treatment unit was operational for five weeks with rebound validation monitoring undertaken over a period of three months.

Site specific remediation targets were derived for the site and used to validate the groundwater treatment.



**Groundwater ozone sparging container and sparging wells on site.**

Groundwater remediation through sparging comprised the drilling of eight treatment wells to a depth of 4.50m below ground level and delivering compressed air into the groundwater to either oxygenate the groundwater or to volatilise the dissolved phase contaminants. Ozone was added to the airflow in order to provide a chemical oxidative effect to the process.

Ozone sparging provides the following key functions:

- A low intensity oxidative effect to oxidise the contaminants of concern in-situ while minimising the possibility of contaminant migration or damage to the geotechnical properties of the ground that may result from the injection of large volumes of chemically aggressive liquid oxidants. The use of ozone will also avoid the significant health and safety issues associated with handling large volumes of powerful liquid oxidants on site.
- The ozone sparging also provides significant quantities of oxygen to the saturated zone to improve the rate of aerobic in-situ biodegradation.
- The sparging can be increased in intensity to cause volatilisation of contaminants from the liquid phase into the vapour phase. An intense sparging system can also lead to desorption of contaminants from soil particles into the liquid phase, thereby making them available for oxidation by ozone or biological processes.

Groundwater monitoring and analytical results undertaken prior to, during treatment and during the rebound period identified an overall reduction in contaminant concentrations to acceptable levels (below the site specific remedial targets) and that overall betterment of the groundwater has been achieved. The data demonstrates that together with the removal of the contamination source (soil hot spot excavation) and direct treatment of groundwater, the risk to controlled waters has been mitigated.