

Remediation



“We help clients solve problems, get approvals and reduce the risks associated with Local, State and Commonwealth legislation”



Executive Summary

OTEK Remediation specialises in remediation of contaminated soil and groundwater and waste treatment.

Our team of engineers and scientists has extensive experience in remediation of a wide variety of contaminants in soil, groundwater, liquid waste and solid waste and they will identify your remediation needs and provide you with a practical solution that minimises your environmental risk and meets your regulatory obligations.

OTEK provides solutions tailored to meet our client's budgets and time frames.

OTEK has an excellent safety record and ensures compliance of our equipment and subcontractors with all applicable codes and standards.

OTEK also provides emergency response services, ecological and health risk assessments, site management plans (SMPs), remediation action plans (RAPs) or groundwater quality management plans (GQMPs) on an as needs basis for your site's cleanup requirements.



Groundwater Remediation



OTEK Remediation has undertaken and completed groundwater remediation works on numerous sites across the country.

Groundwater contaminated with heavy metals, hydrocarbons, pesticides, chlorinated compounds and other contaminants are a common problem associated with types of sites such as

- Service stations
- Depots
- Terminals
- Refineries
- Paint, Chemical and other manufacturing
- Mining facilities
- Landfills

Remediation technologies utilised by OTEK have included:

- Multi-Phase Extraction (semi-permanent or mobile)
- Soil Vapour Extraction (SVE)
- In-situ Air Sparging (AS)
- Pump and Treat
- In-situ Bioremediation and Monitored Natural Attenuation
- Chemical oxidation or reduction



Case Studies

In-situ Chemical Oxidation (ISCO) - NSW, SA, and VIC.

OTEK performed an ISCO project at an operating service station north of the Sydney International Airport to reduce petroleum hydrocarbon contamination in an isolated area. The ISCO hot-spot treatment was implemented after the successful completion of off-site remediation by soil vapour extraction and air sparging in a downgradient residential area. To reduce dissolved petroleum concentrations, 550 kilograms of sodium persulfate (Klozur™) was injected into six temporary injection locations. The sodium persulfate was activated by hydrogen peroxide at concentrations less than eight percent. As a result of the injection, total petroleum hydrocarbons and volatiles were reduced by approximately one order of magnitude and site-specific target levels were achieved.

OTEK performed an ISCO project at a former service station in Adelaide, SA. The ISCO injection is designed to reduce the entire area of a plume of petroleum hydrocarbons in conjunction with multi-phase extraction (MPE) events. To complete the injection 16 permanent ISCO injection wells were installed to a depth greater than 11 metres below ground surface. OTEK completed 8 of the 16 injection wells as dual-purpose wells to facilitate future MPE events. Four injections are scheduled for completion by the end of the 2010 calendar year with the first event completed in July 2010. The first ISCO injection consisted of 3,500 kilograms of Klozur™ activated with 4,500 litres of 50% solution hydrogen peroxide (diluted to less than 6%). Preliminary results indicate that an oxidative state was created and the Klozur™ was activated. Further monitoring and additional injections will indicate the amount of contaminant reduction.

Multi-phase extraction (Unanderra)

A fuel leak over time at a service station resulted in a hydrocarbon plume approximately 150m long that passed under a road and neighbouring properties. The plume consisted of both phase separated, adsorbed and dissolved phase hydrocarbon (predominantly petrol). The plume was moving through sandy lenses in a clay soil profile at a depth of approximately 4.5m.

OTEK designed and installed a Multi-Phase Extraction (MPE) system and extraction wells and piping to remediate the site. MPE works by applying high vacuum to the soil profile to remove phase separated, adsorbed and dissolved phase hydrocarbon. The recovered hydrocarbon is treated and wastes are disposed of appropriately. The system was able to be turned off after 10 months as the EPA and auditor approved remediation goals had been met.



Soil Remediation



OTEK Remediation has undertaken and completed soil remediation works on numerous sites across the country. Soil contaminated with heavy metals, hydrocarbons, pesticides, chlorinated compounds and other contaminants are a common problem associated with former commercial and industrial sites.

Contaminants such as these can result in serious threats to human health as well as the natural environment.

Remediation technologies utilised by OTEK have included:

- Thermal Desorption
- Chemical fixation (stabilisation)
- Bioremediation
- Chemical oxidation or reduction
- Excavation and disposal to landfill



Case Studies

Bioremediation (Kakadu)

A fuel release and subsequent remediation at a site within the World Heritage Listed Kakadu National Park (KNP) resulted in approximately 1050m³ of diesel contaminated soil being excavated and stockpiled on site. The remediation of the diesel contaminated soil represented a unique challenge due to the site's remote location, wet season conditions and the stringent park regulatory requirements.

After evaluating remediation options, OTEK Australia Pty Ltd (OTEK) personnel determined bioremediation as the most suitable technical and cost-efficient solution to remediate the contaminated soil. Bioremediation is a remediation technique which relies upon the use of micro-organisms to reduce the soil contamination. Bioremediation was selected due to its sustainability as it allows the soil to be treated on-site avoiding the requirement for transport and landfill disposal and allows for reuse of the soil on-site.

Due to restrictions on the importation of organic material into KNP, OTEK was required to determine methods of enhancing bioremediation without using imported organic material. OTEK had indigenous hydrocarbon utilising microbes externally cultured and added to the stockpile to increase the population and applied approved forms of nutrients and trace elements. Monitoring results indicated the bioremediation worked successfully. The levels of diesel contamination present in the soil had reduced such that concentrations were below the relevant regulatory criteria. The technique developed and applied by OTEK personnel in KNP has provided a successful and cost effective diesel bioremediation technique that can be successfully employed for other sites in a sustainable manner.



Liquid Waste Treatment



OTEK Remediation has designed and operated permanent and semi - permanent liquid waste treatment units for many clients across the country.

These units have been utilised for major construction, decommissioning and upgrade projects which have required waste fluid treatment.

The waste fluids have originated from dewatering, other construction processes and everyday or regular operational activities.

Contaminants have included hydrocarbons, acid or alkaline conditions, heavy metals, suspended solids and fire fighting foam.

Treatment technologies utilised by OTEK have included:

- Bioremediation
- Coagulation and flocculation
- Chemical oxidation or reduction
- Co-precipitation
- Air stripping
- Specific gravity separation



Case Studies

Sedi-Sparge Unit (Brisbane Airport)

Brisbane Airport development works included the removal of an Underground Storage Tank (UST) and the associated concrete anchors. The Brisbane Airport is in close proximity to Moreton Bay where the topography is relatively flat and as a result groundwater is at shallow depths below the surface. Environmental investigations in the vicinity of the fuel system to be removed detected the presence of hydrocarbon impact in the groundwater. As a result, dewatering and water treatment works were necessary to remove the underground infrastructure in a safe and environmentally responsible fashion.

The set-up of the dewatering works included the installation of dewatering spears and the Sedi-Sparge treatment unit. Extraction of groundwater and treatment within the Sedi-Sparge rapidly and cost effectively facilitated the excavation activities and also successfully remediated localised groundwater impact at the site. Prior to its final commissioning, the Sedi-Sparge unit was rigorously evaluated and tested by environmental personnel from the airport. The results proved the effectiveness of the equipment to treat the impacted water to a quality meeting stringent Federal government stormwater discharge criteria.

The Sedi-Sparge unit was developed to provide a cost effective, reliable and low maintenance solution for managing water treatment needs. Proven applications include contaminated site groundwater remediation, dewatering, manufacturing wastewater treatment and construction related wastewater management.

The Sedi-Sparge system routinely completes sedimentation, biodegradation, air stripping and / or separation treatment of wastewater streams. The water treatment device is adaptable for numerous other capabilities and is simple to set-up to comply with your site specific requirements. The Sedi-Sparge is available for short, medium and long term hire so contact a member of the Sedi-Sparge team to find out how it can provide a user-friendly solution for your water treatment requirements.

Case Studies

Adjustment Unit (Sunshine Coast)

Commercial development works on the Sunshine Coast included the installation of a rising sewer main at a depth below the groundwater elevation in a location where Potential Acid Sulphate Soils (PASS) and resulting heavy metal impact in the groundwater were known to exist. The groundwater recharge in the vicinity of the site was relatively high, therefore dewatering pumping rates were required to be high and as a consequence, retention times within a reasonably sized portable treatment system would be limited.

Regulatory requirements for treated groundwater discharge to stormwater required the removal of heavy metals and a significant reduction in turbidity. The Adjustment Unit was designed to treat such effluent streams in a fashion which required minimal retention time. The Adjustment Unit was successfully utilised to facilitate cost effective dewatering and treatment operations for the civil infrastructure installation works.

The adjustment unit was developed to address the presence of metals in effluent streams and provide a reliable and low maintenance solution for a common water treatment problem. Historically, inadequate treatment of such effluent streams has commonly resulted in fish kills, unsightly staining in water bodies and a general deterioration of our surface water bodies. The Adjustment Unit applies water treatment principles in an innovative fashion to provide the level of treatment required with minimal system retention time.



OTEK Remediation has undertaken and completed solid waste treatment on contaminated materials from numerous sites across the country.

Treatment of soil and other solid materials contaminated with heavy metals, hydrocarbons, pesticides, asbestos, chlorinated compounds and other contaminants has been managed and directed by OTEK at designated treatment facilities.

Treatment technologies utilised by OTEK have included:

- Bioremediation
- Chemical fixation (stabilisation)
- Thermal desorption

Case Studies

Pesticide and Herbicide Bioremediation

A fire at a pesticide and herbicide manufacturing facility resulted in the contamination of a large volume of soil at concentrations that could not be disposed of to landfill. Contaminants included 2,4-D, chlorpyrifos, MCPA, Trifluralin, Triclopyr and heavy metals. Following transfer of this soil to a remediation area at a lined landfill, OTEK was contracted to supervise and manage the bioremediation of this soil. OTEK's role included determining microbial requirements, monitoring microbial populations and nutrient levels and validation sampling. Herbicide concentrations were decreased from a maximum of 1897mg/kg to a minimum of 17mg/kg. The landfill acceptance criterion was 50mg/kg for Total Herbicides.



OTEK Remediation has undertaken containment and remediation of chemical releases to the environment that pose an immediate threat to human health and the natural environment.

OTEK has undertaken emergency response for releases of contaminants such as hydrocarbons, pesticides, acids, alkalis and many other chemicals.

Treatment technologies utilised by OTEK have included:

- Containment – booms, bunds
- Chemical recovery - skimmers, pumps
- Surface and groundwater treatment – Sedi-Sparge unit
- Excavation and disposal
- Stabilisation
- Bioremediation

Case Studies

Petrol Tanker Rollover (Loganholme)

A fuel tanker rolled over on an off-ramp of the Pacific Highway south of Brisbane late one evening. The tanker lost approximately 50,000L of fuel, which travelled through a stormwater system and into a creek and wetland area. An emergency situation was declared and surrounding residents were evacuated due to the presence of a vapour cloud presenting a significant risk of explosion and health risk via vapour inhalation to residents. OTEK mobilised to site and arrived within 90 minutes of receiving the call from the client. The challenge faced was to reduce the risks to human health and the environment as rapidly as possible and in a cost efficient manner.

OTEK immediately called upon our extensive resources to build a team of experienced staff and contractors to ensure the correct level of resourcing was applied to the project from the outset. OTEK led the response to the emergency situation and assisted the police, fire brigade and the EPA in challenging circumstances.

Works included:-

- Ensuring adequate safety protocols were in place;
- Preventing further spread of the fuel;
- Recovery of the fuel from the stormwater system and waterways;
- Setting up water treatment equipment at the site;
- Flushing the affected section of the stormwater system and waterways with recycled water; and
- Excavation of contaminated soil along the spill pathway with due consideration to minimise destruction of vegetation along the creek and wetland.

Emergency response and recovery works were completed to the satisfaction of the EPA in four days and subsequent monitoring work confirmed the success of the works in terms of removing risks to human health or the environment.





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For more information about OTEK's capabilities and services, please contact your local OTEK office or visit our website at www.otek.com.au.

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