



CASE STUDY

Removal of LNAPL in Fracture Rock Aquifer, Campinas, Sao Paulo

Background

DURATION: 13 months
LOCATION: Campinas, Sao Paulo
CLIENT: Gas Station
PROJECT VALUE: 423,000 reals

At an active gasoline retail station in the state of Sao Paulo, Campinas, historical spills of diesel fuel resulted in the accumulation of light non aqueous phase liquids, (LNAPL) on the shallow groundwater. Based on API estimates, approximately 430 litres of recoverable LNAPL was present. ASR was retained by the facility's owner to extract the LNAPL from the fractured rock. ASR's design and approach minimized the footprint of the system and energy requirements while considering noise issues for surrounding neighbours.

Approach

The site owner along with their environmental consultant worked with ASR to develop a remedial work plan based on meeting the remedial objective of recovering as much of the LNAPL as technically feasible. After reviewing the geology, hydrogeology and geochemistry of the site, ASR developed a plan that used dual phase extraction (DPE) to recover the LNAPL. The DPE system recovered over 93% of the estimated LNAPL by lowering the water table and thus increasing the hydraulic gradient towards that extraction wells. The two phases were extracted using two pumps dedicated to the extraction of the groundwater and LNAPL, respectively. The liquid phases were treated with gravity separation, organoclay and activated carbon whereas the air phase was treated using catalytic oxidization.

InSitu Remediation Services Ltd. (IRSL) is one of Canada's most experienced remediation companies. Our team has designed, implemented, and optimized, soil and groundwater remediation programs in diverse geological environments in North, Central, and South America, Asia, Europe, and the Middle East.

We confidently implement innovative solutions, based on sound knowledge, using seasoned field staff. Our pragmatic, flexible approach reduces effort, cost to our clients, and environmental risk.



Challenges

A number of conditions at the site made this project challenging including:

- Fractured rock aquifer
- Underground infrastructure including piping and USTs
- Active site
- Traffic and pedestrians
- Noise concerns

Results

The results of the remedial program included:

- Over 389 litres of LNAPL recovered in the NAPL and water phases
- Reduction of BTEX concentrations within the groundwater of greater than 81 percent
- Reduction of diesel range concentrations greater than 51 percent
- Injection program completed on budget and on schedule

