

Preventative treatment at a chemical plant

CASE STUDY

PetroFix coating allows installation of pipeline through
TPH and BTEX contaminated zone, Germany

PROJECT SUMMARY

Site Details

Site Type

Chemical Plant

Contaminants of Concern

TPH, BTEX

Mitigation Approach

Sprayed Application of PetroFix onto Walls and Floor of Pipeline Corridor Post Excavation

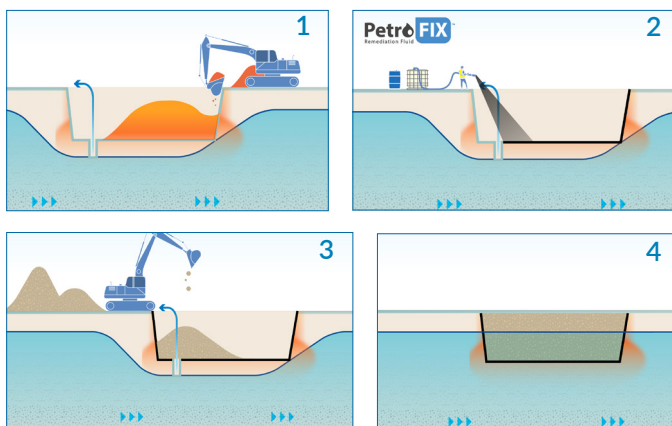
A new underground pipeline was required to be installed across a complex chemical plant in southwestern Germany. It was found that part of the pipeline would intersect an area of soil and groundwater impacted with petroleum hydrocarbons and BTEX compounds.

The impacted soils and groundwater in the immediate vicinity of the pipe-run would be removed through excavation and dewatering. However, residual contamination were to be left in place beside and below adjacent existing structures; where excavation could not be progressed for structural/geotechnical reasons.

The residual contamination in these soils represented an ongoing secondary source of contamination, which could diffuse and desorb into the groundwater and re-contaminate the excavated area. This could result in contamination of the clean backfill around the pipeline; plus the granular pipe-bedding material would provide a conduit through which re-contaminated groundwater could spread further across or beyond the site.

A topical application of **PetroFix®** onto the excavation base and sides was completed to prevent recontamination occurring. PetroFix is a dual-function liquid comprising colloidal activated carbon and electron-acceptors. Upon application, PetroFix rapidly adsorbs petroleum hydrocarbon contaminants out of the groundwater and then stimulates their **natural biological degradation**. The biodegradation regenerates the sorption sites allowing further contaminant influx to be sorbed and degraded.

By applying PetroFix onto the excavation walls and base prior to backfill, a **self-cleaning activated carbon filter** was created in the subsurface, which would prevent contamination of the granular backfill and stop the infiltration and spread of contaminated groundwater in the pipe-bedding.



Step 1. Removal of contaminated soils from excavation; Step 2. Spray application of PetroFix; Step 3. Backfill with clean material; Step 4. Dewatering pump switched off. New backfill is protected from re-contamination.



A field services applicator spray-applies PetroFix to the walls and base of the excavation.

APPLICATION

Excavation was completed to 2.5 meters below ground level (mBGL), where it intersected the groundwater table. Soil samples confirmed high residual concentrations in the base and walls of the excavation.

PetroFix was sprayed onto the base and walls of the excavation. The coating was completed up the sides of excavation to allow for the variation in groundwater table level, which rises to a minimum depth of 0.5 mBGL at this location. Coating to this depth will avoid the treatment being 'over-topped' during periods of high groundwater. PetroFix is a non-hazardous, low viscosity liquid and is simple and safe to use. The required quantity of concentrate was diluted with water onsite and then sprayed across all target surfaces using standard equipment.

The mixing and application was completed in a single day, immediately after which the pipeline installation and backfilling could be completed.

ABOUT THE TECHNOLOGY

Engineered to provide immediate and long-lasting results for fuel depots, industrial tank farms, petroleum retail stations as well as rail, road and domestic oil spills, PetroFix is a cost-effective, in situ treatment for petroleum hydrocarbon contamination.

What is PetroFix?

PetroFix is a water-based suspension of micron-scale (1-2µm) activated carbon and biostimulating electron acceptors (slow and quick-release nutrients).

Target Contaminants:

- Petroleum Hydrocarbons
 - Gasoline Range
 - Diesel Range
- BTEX
- MTBE
- Creosote
- PAHs

KEY BENEFITS

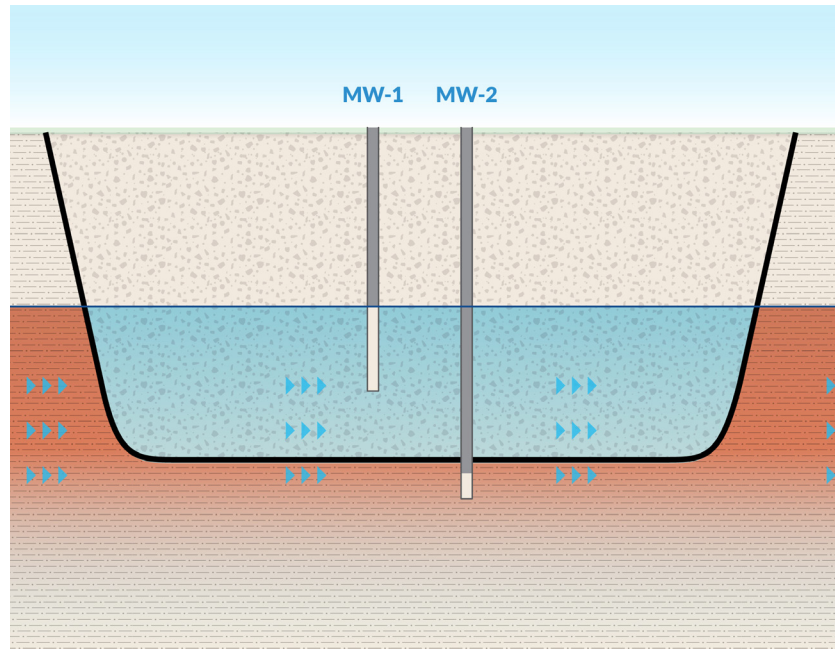
- ✓ **Immediate and long-lasting results**
- ✓ **Simple to use**
 - Can be applied immediately after LNAPL skimming;
 - Inject under low pressure;
 - Pour into open excavations;
 - Inject as Permeable Reactive Barrier (PRB);
 - Add as remedial or preventative treatment to tank farm pipeline, UST or pipework bedding.
- ✓ **Safe to handle**
- ✓ **Cost-effective**



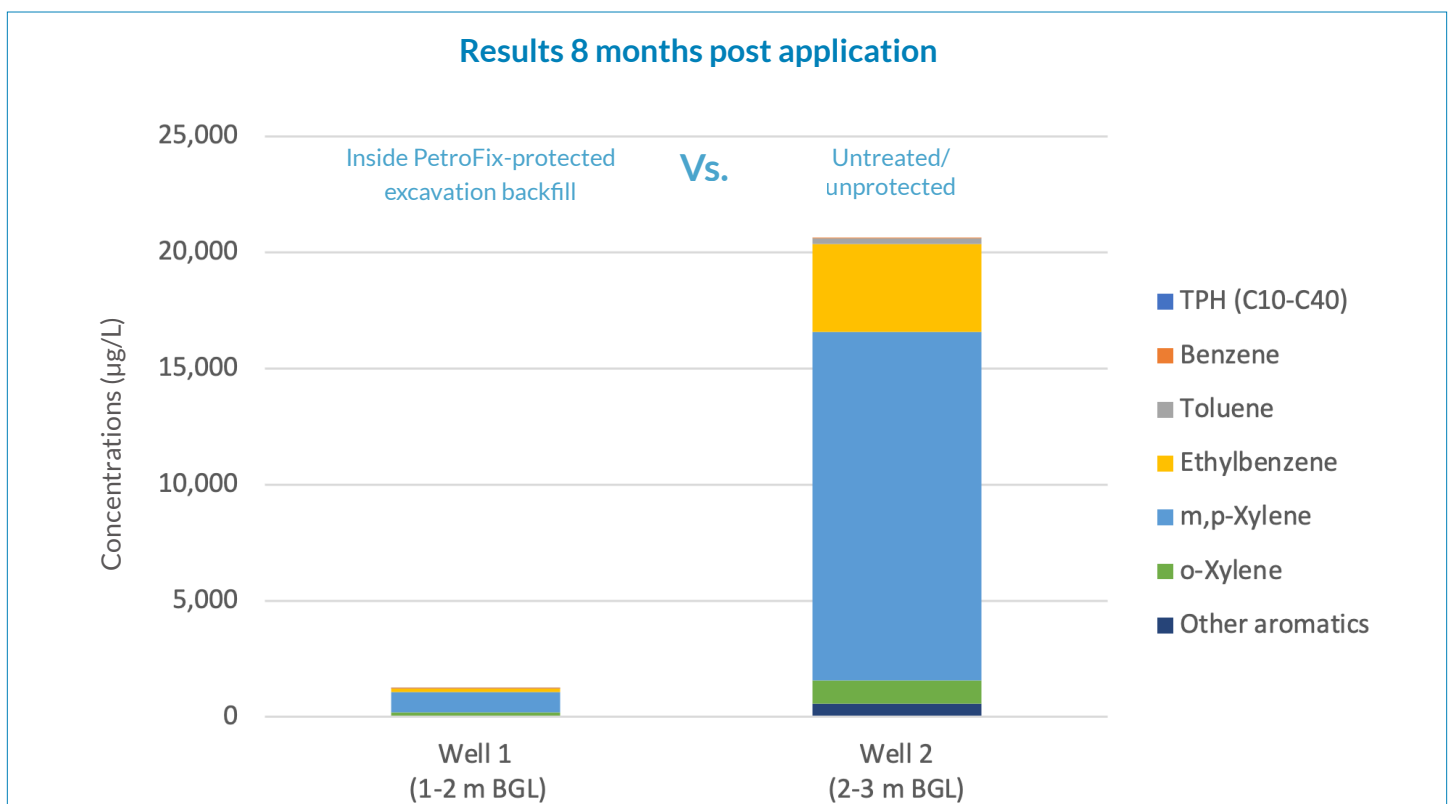
RESULTS

A new monitoring network was installed at the site after the placement of the new pipeline and backfill of the excavation. Two wells were placed directly on the excavation footprint: the shallower well, MW-1, screened entirely in the backfill material (1-2 m BGL) and dry most of the time, and the deeper well, MW-2, screened in the contaminated residual soil below the base of excavation (2-3 m BGL).

Eight months after the PetroFix application the groundwater level increased due to seasonal precipitation. This provided the first chance to compare concentrations above and below the *in situ* PetroFix barrier installed.



Monitoring showed that there was **94% less petroleum hydrocarbons in MW-1 compared to MW-2**. Therefore, the concentrations inside of backfilled area were approximately **17 times lower** than the contaminated water outside. This shows that the PetroFix coating dramatically reduced contamination entering the clean service corridor preventing recontamination and mobilisation.



CONCLUSION

PetroFix was used to prevent future contamination migration from residual sources. The application was safe, simple and quick. The treatment was cost effective, minimising excavation and allowing the pipeline to be installed without delay to the construction programme.

The application was immediately effective and the combination of sorption and biological degradation will result in long term protection of the pipeline and avoidance of potential contaminant migration into and along the pipe bedding.

FIND OUT MORE

For other examples of petroleum hydrocarbon remediation projects, scan the QR code below for a direct link to our website. For questions or to discuss options, please get in touch.



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