

# PFAS Remediation at a Former Metal Plating Factory in Sweden

## Background

In June 2018, Envytech won a demolition and remediation project contract for a former metal plating factory in Sweden. Contaminants of concern involved heavy metals such as copper, chromium, zinc, arsenic and cyanide. Low to moderate levels of poly- and perfluoroalkyl substances (PFAS) were detected in selected soil samples. Relatively high levels of both metals and PFAS were also detected in groundwater.

## Soil Classification

After the demolition of the building had finished, classification of the soil was carried out by sampling in so-called Selective Unit Volumes of 10 x 10 x 0.5 m. The classification was performed in 0.5 m depth intervals down to the groundwater level, about 2 m bgl. 30 samples were taken from each Selective Unit Volume and mixed to form a composite sample that was sent to laboratory. The classification gave the following four different classes of contaminated soil and concrete:

- Light Hazardous waste - IFA
- Light Hazardous waste with PFAS - IFA PFAS
- Non Hazardous concrete with PFAS - IFA PFAS concrete
- Hazardous waste - FA

The PFAS contaminated soil could be divided into two groups; soils contaminated with lower PFAS levels, 20-100 µg/kg, and those contaminated with higher PFAS levels of about 1,000 µg/kg.

**envytech**  
*Miljö & teknik*



Demolition of Former Metal Plating Factory

# PFAS Remediation at a Former Metal Plating Factory in Sweden

## Stabilisation Trials

To determine if these concentration levels could be effectively stabilised in these particular soils, test with different addition rates of the stabilisation reagent RemBind® were carried out by an accredited commercial laboratory, Eurofins, using certified method EN-12457/1-4. For soil with lower PFAS levels, tests were performed with the addition of 3% RemBind. For soil with higher levels of contamination, tests with the addition of 3% and 5% of RemBind were performed.

The results showed that 3% RemBind was sufficient to reduce PFAS leachability to around 590 ng/L (LS/2 analysis). For soil with PFAS concentration > 200 µg/kg, results show that an addition of 5% RemBind Plus was required to reduce PFAS leachability down to 4,600 ng/L for the LS/2 analysis.

## Infield Stabilisation and Validation

As the excavated soil comprised large amounts of gravel, stone and rocks, all soil was initially screened through a trommel screen to minimise the amounts of mass that would have to be treated. Assessment was made in dialogue with the county administrative board, and it was agreed that rocks >40 mm diameter could be returned to the property and reused as backfill.

This was confirmed with laboratory analysis showing that if the rock was crushed then the average PFAS leachability levels were very low. This was to increase the sustainability of the project in line with a circular economy approach.

The screened soil was stabilised by mechanical mixing and addition of water and RemBind. The result was a very homogeneous material where the different materials could not be distinguished.

Post-treatment samples were collected and sent to Eurofins for PFAS leachability analysis. Control sampling was also carried out for the rock fraction >40 mm. All treated materials were cleared for deposit except one batch. However, this was co-mingled with the other treated soil and were therefore not considered to case a risk to the surrounding environment.

In total, the project handled 1,000 tonnes of metal contaminated soil, 3,000 tonnes of PFAS contaminated soil and 950 tonnes of PFAS contaminated concrete. The project was finished in early May 2019. The report for the project was submitted to the EPA at the end of June and received approval for safe disposal.

Substance	Levels Sum PFAS SLV 11	pH	Leachate Test	RemBind®	Sum PFAS SLV 11	Reduction PFAS in leach
Unit	ng/kg			%	ng/l	%
Mixed sample 1	1100 + 710	7,5	LS/2	0	230 000	0,0
Mixed sample 1	1100 + 710	7,6	LS/8	0	27 000	0,0
Mixed sample 1	1100 + 710	7,8	LS/2	3	8 500	96,3
Mixed sample 1	1100 + 710	7,7	LS/8	3	1 500	94,4
Mixed sample 1	1100 + 710	7,5	LS/2	5	4 600	98,0
Mixed sample 1	1100 + 710	7,7	LS/8	5	1 100	99,5
Mixed sample 2	22+31+23+13+21+59	7,6	LS/2	3	4 300	0
Mixed sample 2	22+31+23+13+21+59	7,7	LS/8	3	970	0
Mixed sample 2	22+31+23+13+21+59	7,6	LS/2	3	590	86,3
Mixed sample 2	22+31+23+13+21+59	7,7	LS/8	3	77	92

Results from lab tests performed for verification of the function of RemBind on current soils and to identify what amount of RemBind that would be sufficient to reach the required concentrations of PFAS in leachate.