

## RemBind used to Treat Firefighting Foam Contaminants

### Background

An independent study was commissioned by a government airport authority to validate the effectiveness of RemBind to treat Aqueous Film Forming Foam (AFFF) contaminants in soil. AFFF contaminants include perfluorooctane sulfonate (PFOS) which was listed in 2009 as a chemical of major concern by the Stockholm Convention on persistent organic pollutants.

The trial was independently supervised and audited by the environmental consulting company SEMF. This included sealing sample containers, doorways and fume cupboards at the end of each trial day to maintain integrity of the process.

### Methodology

PFOS contaminated soil was collected from two different commercial airport sites in Australia and sent to Ziltek's laboratory for processing (designated Soils 1 and 2).

Soils were air-dried, thoroughly mixed and screened in preparation for the treatment trials. RemBind or RemBind Plus was added to the soils at various rates and, after moisture adjustment, treatments were left to cure for 48 hours.

Treated samples (and untreated controls) were sent to an accredited commercial laboratory for leachability testing using ASLP (Australian Standard Leaching Procedure, based on US EPA Method 1311). Selected samples were subjected to the more rigorous Multiple Extraction Procedure (MEP; US EPA Method 1320) to test for longevity of binding.



Preparing soils for RemBind treatment

### Results

A summary of the results are presented in Tables 1 to 3 below. Results show that PFOS was reduced by more than 98.5% for soil from both sites. PFOA reductions followed a similar trend. For both soils, RemBind Plus reduced PFOS leachability to below the stringent Minnesota Department of Health drinking water guidelines of 0.3ug/L.

MEP results show that Soil 1 treated with RemBind Plus passed the stringent MEP test which simulates 1,000 years of acid rain in an improperly designed sanitary landfill.

### Conclusion

In conclusion, this was a totally independent study that showed that RemBind Plus treatments reduced PFOS leachability by >99.2% to below the Minnesota drinking water guidelines of 0.3ug/L and that this binding was stable longterm as determined by the most stringent soil leachability test available (US EPA Method 1320).

Table 1: Leachability reduction of PFOS and PFOA for Soil 1

Site 1	ASLP Analysis			
	PFOS ug/L	%	PFOA ug/L	%
Untreated Soil	34.15	-	0.65	-
RemBind	0.50	98.5	0.04	93.8
RemBind Plus	0.29	99.2	<0.02	>96.9

Table 2: Leachability reduction of PFOS and PFOA for Soil 2

Site 2	ASLP Analysis			
	PFOS ug/L	%	PFOA ug/L	%
Untreated Soil	376	-	5.51	-
RemBind	1.76	99.5	0.27	95.1
RemBind Plus	0.10	99.9	<0.02	>99.6

Table 3: Multiple Extraction Procedure results for Soil 1 treated with RemBind Plus

Site 1 - RemBind Plus Treatment										
Leach	EP	1	2	3	4	5	6	7	8	9
PFOS ug/L	0.04	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02

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