



On-site stabilization of PFAS contamination in soil using Rembind®

– A case study in New Plymouth New Zealand

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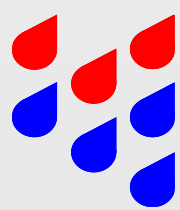
Keywords: Rembind®, Stabilisation, Per- and Polyfluoroalkyl Substances (PFAS), Sustainable Remediation, Containment





Presentation Outline

- PFOS in electroplating
- Site information
- Rembind[®]
- Batch tests
- Full scale application
- Quality control sampling and analyses
- Conclusion

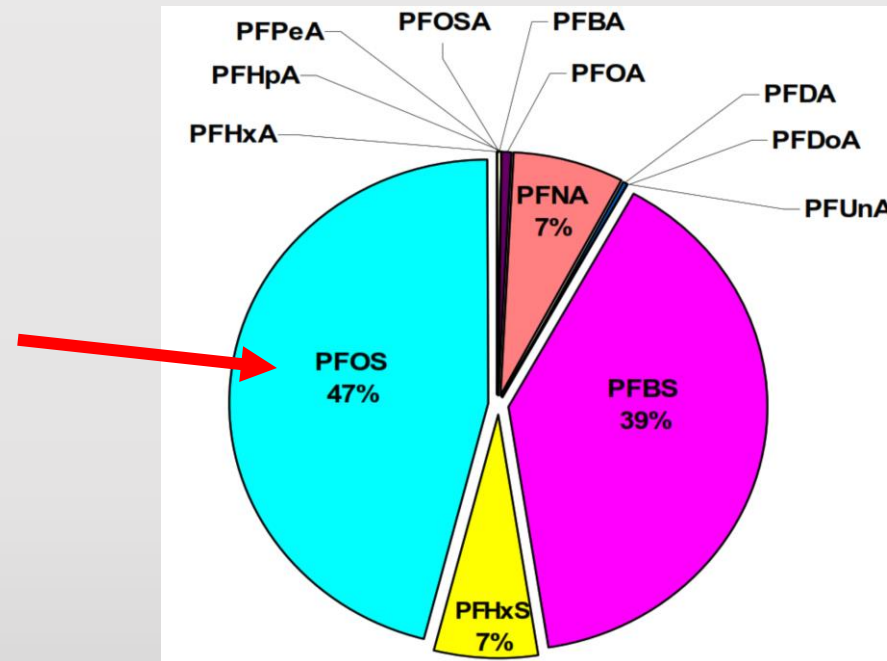


PFOS in electroplating

Electroplating creates a Cr containing mist
Mist-suppressants are added to reduce mist formation
PFOS is a detergent used in mist-suppressants

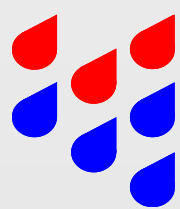


Photo: Mark Conti & David Barna
U.S. EPA-Region 5-Cleveland Office



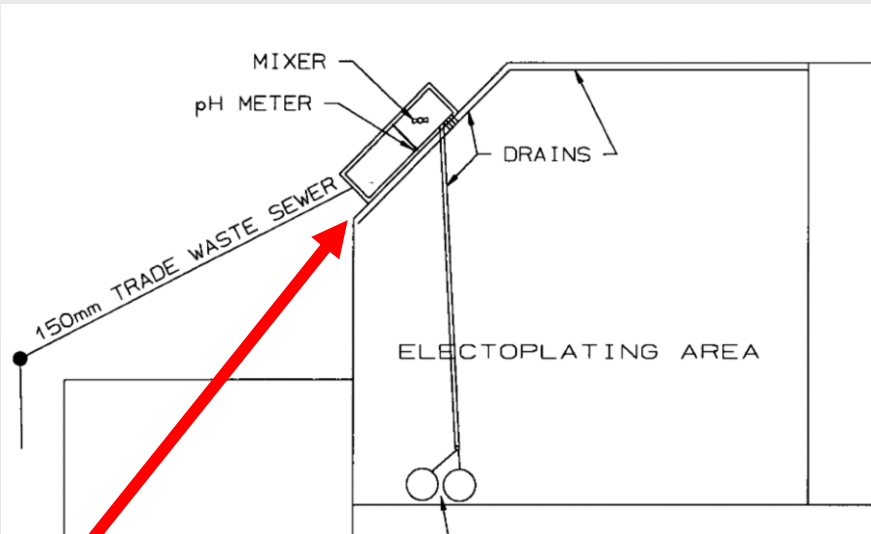
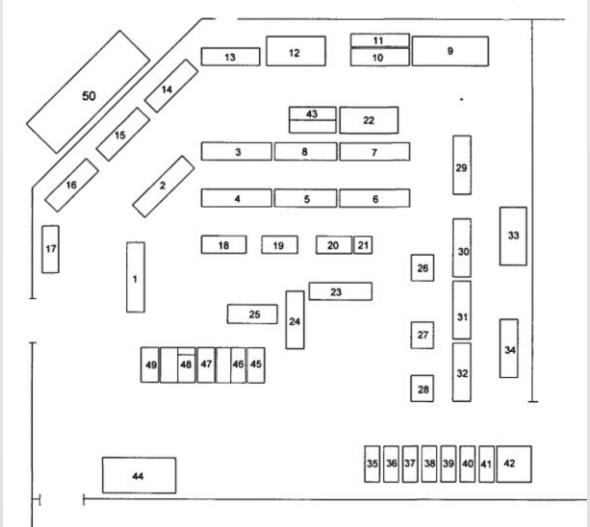
Two main per fluoridated compounds are:
Perfluorooctanesulfonic acid (**PFOS**) used since 1940
Perfluorobutanesulfonic acid (**PFBS**) replaced PFOS after 2003
in Scotchgard and likely in other products

On the New Plymouth site PFOS is the main contaminant



Electroplating from 1980

Site information



Trade waste Interceptor is main source of PFOS in soil



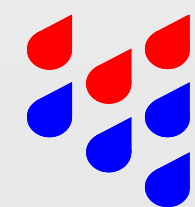


Rembind®



RemBind® is a powdered adsorbent that binds strongly to per- and polyfluoroalkyl substances (PFAS) in soil, preventing them from leaching into groundwater where they can cause serious harm to the environment and human health.





Batch tests

Lab Sample No:	Date of Receipt	Sample Description	Perfluorooctanesulfonic acid (PFOS) ug/L	Perfluorooctanoic acid (PFOA) ug/L	Sum of (PFOS + PFOA) ug/L	Sum of (PFOS + PFHxS) ug/L	Sum of PFASs (n=31) ug/L
21/158	28/05/2021	Original New Plymouth Soil Sample TCLP	0.037	<0.01	0.037	0.037	<0.5
21/159	28/05/2021	1% Rembind NP Soil Sample #1 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5
21/160	28/05/2021	1% Rembind NP Soil Sample #2 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5
21/161	28/05/2021	1% Rembind NP Soil Sample #3 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5
21/162	28/05/2021	2% Rembind NP Soil Sample #1 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5
21/163	28/05/2021	2% Rembind NP Soil Sample #2 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5
21/164	28/05/2021	2% Rembind NP Soil Sample #3 TCLP	<0.01	<0.01	<0.02	<0.02	<0.5



Full scale application

- Creating a level mixing pad

and laying out soil in 150 mm layer





Full scale application

- Mark the middle for application of 500 kg of Rembind® on each half





Full scale application

- Assuring Rembind® has been spread homogeneously





Full scale application

- Assuring Rembind[®] has been spread homogeneously

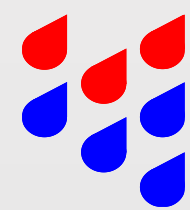
MOVIE C0088



Full scale application

- Assuring Rembind[®] has been spread homogeneously

MOVIE 0728



Full scale application

- Blending Rembind[®] into soil with rotary hoe



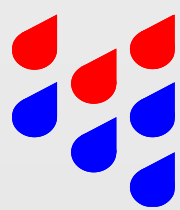
MOVIE C0085



Full scale application

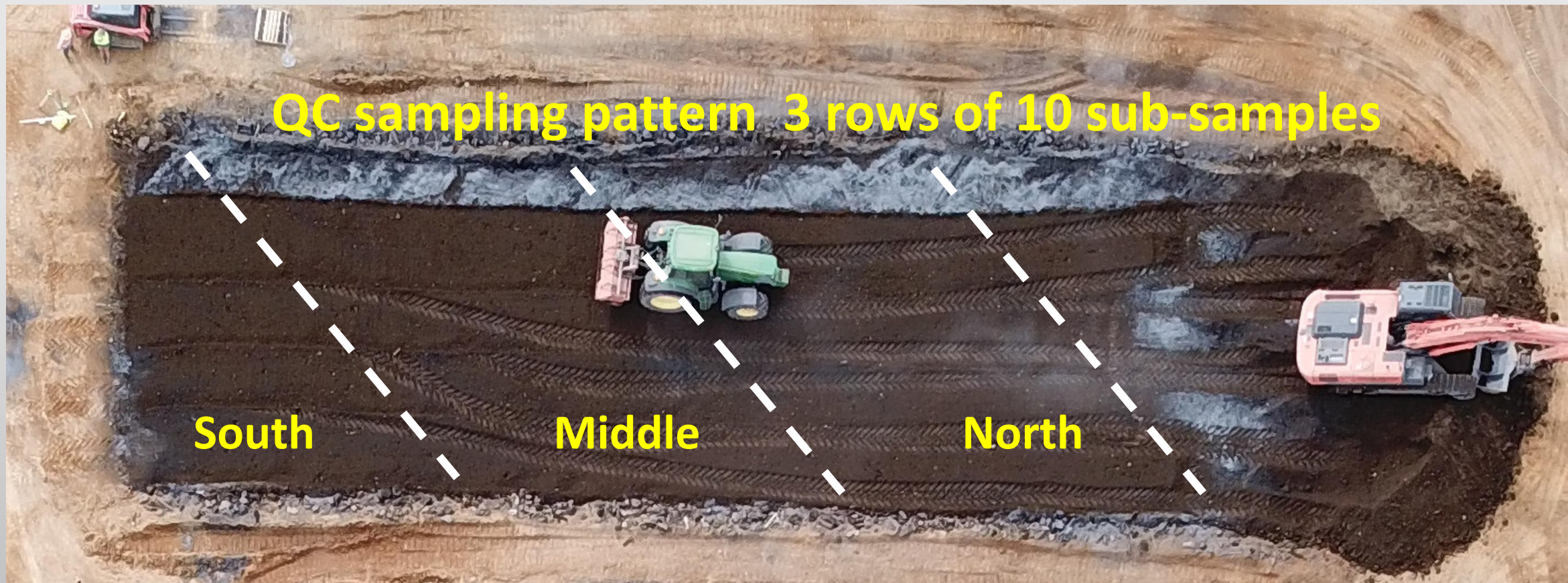
- Blending Rembind[®] into soil with rotary hoe

MOVIE 0742 or 0745



Quality control sampling
and analyses

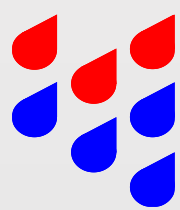
QC sampling was carried out for each of the 7 layers
before and after application of Rembind®





Quality control sampling and analyses

Sample row	South	Middle	North
PFOS in SOIL $\mu\text{g}/\text{kg}$ 0% Rembind	57	58	60
PFOS in leachate -ASLP in $\mu\text{g}/\text{L}$ 0 % Rembind	0.61	0.56	0.47
PFOS in leachate -ASLP in $\mu\text{g}/\text{L}$ 1.0 % Rembind	< 0.01	< 0.01	< 0.01
PFOS in leachate -ASLP in $\mu\text{g}/\text{L}$ 1.7 % Rembind	< 0.01	< 0.01	< 0.01



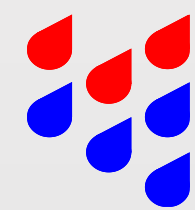
Conclusions

Application of Rembind[®] with standard earth moving equipment has been successful

1% Rembind[®] reduced the PFOS concentration in leachate from 0.55 to <0.01 µg/L.

On-site treatment and disposal is a sustainable remediation method for PFAS contaminated soils.





For additional Information

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