BIOREMEDIATION SOLUTIONS
RemBind® Solutions Exclusively Available Through Carus in the U.S.
CARUS®
+
RemBind®
At Carus, we simplify remediation solutions for our customers and partners. With our expertise and commitment to SIMPLIFIED SCIENCE®, we help you navigate the complexities of treatment with ease.
carusllc.com

BIOREMEDIATION ENHANCER

RemActiv™ accelerates the bioremediation of petroleum hydrocarbon contaminated soil.

RemActiv™ contains natural surfactants and a specially formulated nutrient mix that result in faster remediation times and lower processing costs.

RemActiv™ is supplied as a liquid concentrate (20:1) and can be simply applied using a water truck or hand sprayer.

RemActiv™ has been independently proven and used at a number of sites with outstanding results by the likes of Pacific National and Fortescue Metals Group (FMG). Most recently, RMIT University evaluated the efficacy of bioremediating Total Petroleum Hydrocarbons (TPH) using RemActiv™, their findings summarized in Figure 1 showed a 50% increase in degradation of TPH over a 28 week period using RemActiv vs natural attenuation.

BENEFITS, FEATURES & APPLICATIONS

BENEFITS

- Faster bioremediation times
- Easy and quick to apply
- Lower cost than standard fertilizers
- Reduced freight costs

FEATURES

- Convenient liquid concentrate (20:1)
- Available in Quart, 1 gal, 5 gal, 55 gal and 275 gal containers
- Nutrients optimized for microbial growth
- Used to degrade aliphatic and aromatic hydrocarbons

APPLICATIONS

- Bioremediation
- Emergency spill response
- Biofarming
- Organic waste treatment

Table 1:
Nutrients designed for stimulating and enhancing the growth of local/ indigenous micro-organisms

Element	%
Nitrogen	20
Phosphorus	2
Potassium	1
Sulphur	2.4
Zinc	0.5
Calcium	0.4
Manganese	0.4
Magnesium	0.2
Iron	0.1

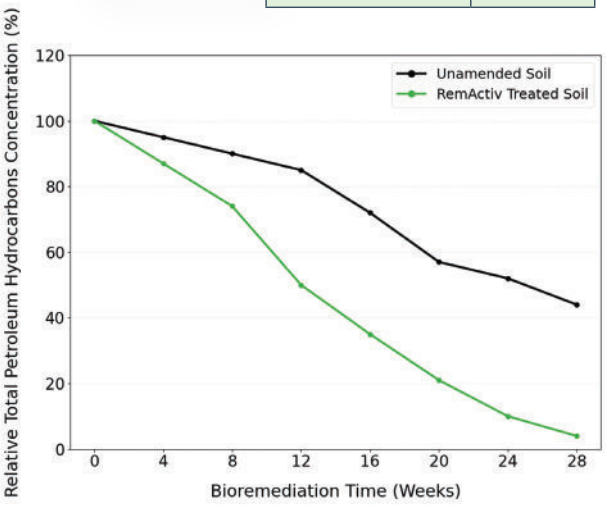


Figure 1:
RMIT University study showing a 50% increase in degradation of TPH using RemActiv™ vs natural attenuation

SHELF LIFE, STORAGE, TRANSPORT, HANDLING & SAFETY

Shelf life:	Unlimited
Storage:	Keep out of direct sunlight
Temperature tolerance:	35.6 to 122 °F (storage and use)
Mix well before use	
Classified:	Non Dangerous Good - Non Hazardous
Precautions:	S25 – use protective eye wear and gloves when handling
Safety:	It is the user's responsibility to handle and apply RemActiv™ safely. **Please refer to SDS**

APPLICATION RATES

Suggested application rates described in Table 2 are for the diluted form of RemActiv.

The recommended dilution rate for RemActiv is 20:1 with non-chlorinated water; however some users have reported success with dilution rates as low as 1:100.

In certain cases where low dose rates over a given area are required, it may be easier to achieve even and consistent application by using higher rates of dilution.

Application rates referred to in Table 2 are suggested as a guide only. Many site variables will impact upon the application rate and ongoing use should be adjusted according to analytical results obtained during the bioremediation process.

IMPORTANT SITE PARAMETERS FOR SUCCESSFUL BIOREMEDIATION

- Soil type, porosity and moisture content
- Type and level of contaminants
- Regulatory targets
- Available oxygen
- Consistency and method of application

PRODUCT SPECIFICATIONS

Specify Gravity: 1.16g/mL

Bingham Yield Stress (τ_{yB}): 0.291 Pa

Plastic Viscosity (η_B): 0.0061 Pa.s

APPLYING RemActiv™ TO ACCELERATE THE BIOREMEDIATION OF PETROLEUM HYDROCARBONS IN SOIL

The purpose of this application note is to describe the step-by-step process for adding RemActiv™ to petroleum hydrocarbon-contaminated soil to accelerate bioremediation. Following this methodology will help to optimize the biodegradation of Total Petroleum Hydrocarbons (TPH) in the soil. The process is relevant for *ex-situ* stockpiles or *in-situ* biofarms.

INSTRUCTIONS

- Calculate how much soil requires treatment. Look up the amount of RemActiv™ required to be added to the soil using the table below:

Table 2 : Suggested Application Rates

Application	TPH Contamination		Application Rate Dilution : 20:1	
Land Farms	Low	<5,000 mg/kg	0.5 L/m^2	0.012 gal/ft^2
	Medium	5,000 to 25,000 mg/kg	1.75 L/m^2	0.043 gal/ft^2
	High	>25,000 mg/kg	3.0 L/m^2	0.074 gal/ft^2
Biopiles	Low	<5,000 mg/kg	10 L/m^3	2.020 gal/yd^3
	Medium	5,000 to 25,000 mg/kg	42.5 L/m^3	8.58 gal/yd^3
	High	>25,000 mg/kg	75 L/m^3	15.5 gal/yd^3
Spill	Low	<5,000 mg/kg	0.25 L/m^2	0.006 gal/ft^2
	Medium	5,000 to 25,000 mg/kg	0.625 L/m^2	0.015 gal/ft^2
	High	>25,000 mg/kg	1 L/m^2	0.025 gal/ft^2

- Stir the RemActiv™ concentrate thoroughly. An 'air wand' can be used if required. This can be made by using a thin PVC pipe (around 50 mm diameter) with holes drilled in one end (the mixing end) and blowing air through the other end of the pipe to generate bubbles to assist in the mixing process. If using a 264 US Gal IBC Tote container, ensure that any RemActiv™ residue that has settled at the bottom of the container is thoroughly reconstituted before use.

- Dilute the RemActiv™ 20:1 with water (non-chlorinated). This can be done by utilizing a water truck, a dosing tank, or a backpack sprayer depending on the size of the application. More sophisticated systems can be used to dilute and dose the RemActiv™, for example a Venturi dosing unit and a series of irrigation hoses.

- If using pumps, see the RemActiv™ Product Specification Sheet for details about the viscosity and density of the RemActiv™ product.

- Once diluted, apply evenly to the soil using sprayers while mixing the soil thoroughly. An even application is important. Soil can be mixed using an excavator or loader, ensuring that the soil is thoroughly broken up and mixed. If using in-situ shallow surface mixing, a rotary hoe or similar can be used.

INSTRUCTIONS (CONT'D)

- Once the RemActiv™ is applied, the aeration and moisture conditions in the soil should be maintained to ensure the optimal performance of the product. **Aeration and moisture are the key parameters that require periodic monitoring to ensure that the bioremediation process is optimized..**

  A: **Aeration:** For *ex-situ* soil piles, aerate the soil by thoroughly and completely turning the soil inside out with an excavator/loader. For biofarm applications, a rotary hoe or similar can be used. If the biofarm is set up <300 mm deep, the soil does not require turning as adequate surface area is exposed to the air. As a guide, aerate after 2 weeks, 4 weeks and then monthly until the desired treatment outcome is achieved.

  B: **Moisture:** This is critical. If the soil dries out completely, the bioremediation rate will slow dramatically or even stop. Moisture can be maintained by watering thoroughly during the initial mixing and during subsequent aeration events. For biofarm applications, a water truck can be used. For larger projects, a series of irrigation pipes, drippers or sprinklers can be employed. Aim for "evenly moist" conditions without excess water. This is equivalent to a total moisture content of ~10% for a sand and ~20% for a clay. If the soil is wet to start with, no extra water may need to be added apart from the diluted RemActiv™.

- Monitor the treatment process by sampling the soil and analyzing for TPH. Monitor the TPH levels over time and a typical decay curve should result. Extrapolating this curve can give some indication of treatment endpoint and timeframes to completion. Treatment times of <3 months are often adequate for lower TPH concentrations and easily biodegradable hydrocarbons. For more challenging projects, 12 months or more may be required. The monitoring of TPH levels is the best indicator of time frames.

- Store any residual RemActiv concentrate under dark, cool conditions. Any residual diluted solution should be discarded safely.

IMPORTANT NOTE

These steps are to be used as a guide only. Actual bioremediation rates will be affected by a number of complex factors including the type of soil, moisture and aeration conditions, temperature, the levels and types of petroleum hydrocarbons present (including how weathered they are), and the presence of other contaminants. Also, the best practical setup will vary based on site access, available equipment, and type of application.

HEALTH & SAFETY

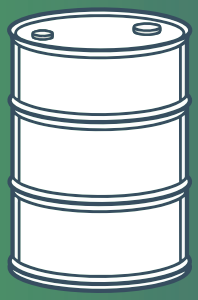
RemActiv is not classified as a hazardous good. Appropriate PPE should be worn when handling and applying the product. It is the responsibility of the user to apply the RemActiv products in a safe manner according to the RemActiv SDS (available upon request).

SUPPLIED TO SUIT YOUR REQUIREMENTS

RemActiv™ is available in various sizes and as a 20:1 concentrate, making it suitable for projects of any scale. Diluted on-site with non-chlorinated water, the concentrate formula significantly reduces freight volumes and transportation costs compared to shipping pre-diluted product, offering a more practical and economical approach to procurement and logistics.

RemActiv™ is stocked and ready to deploy across a wide range of applications. Whether the situation calls for an urgent response to an emergency spill or the sustained supply required for a large-scale biofarming operation, the right volume is always available to keep your project moving forward efficiently and without interruption.

5.3 Gal Jerrican



53 Gal Drum

264 Gal IBC Tote

TECHNICAL SUPPORT

Carus is supported by a dedicated technical team, providing guidance on product selection, dosage optimization, and application methods to ensure successful project outcomes.

- Expert guidance on product selection to suit your specific project requirements
- Dosage optimization to maximize performance and cost effectiveness
- Support with application methods to ensure correct and effective use

RemActiv™ TRIALS SUCCESSFUL FOR PACIFIC NATIONAL

Pacific National engaged environmental engineering consultants RCA Australia to independently assess RemActiv as a bioremediation agent for diesel spills in the rail industry. Soil spiked with diesel to approximately 35,000 mg/kg Total Recoverable Hydrocarbons (TRH) was treated with a single application of RemActiv and monitored over six months.

Stakeholders:	Pacific National, RCA Australia, Australian Laboratory Services
Location:	Greta Train Support Facility, New South Wales
Industry:	Rail
Contaminant:	TPH/TRH
Duration:	6 Months
Key Result:	TRH reduced by more than 80% within 6 months

Methodology

RemActiv™ was diluted and applied evenly to contaminated soil as per manufacturer recommendations. The treated area was then covered with organic absorbent to minimize water loss, replicating Pacific National's existing spill response procedures. Triplicate soil samples were sent to NATA-accredited Australian Laboratory Services for TRH analysis at 0, 1, 3 and 6 months.

Outcome

TRH reduced by more than 80% below the NEPM ESL regulatory trigger value within six months of a single application.

The untreated natural attenuation control still had residual TRH levels of 11,720 mg/kg after six months of treatment, which still exceeded the trigger value by greater than 25%. RemActiv™ delivered compliance where natural attenuation alone could not.

- TRH degraded 65% within the first month of a single RemActiv™ application
- 80% TRH reduction achieved at six months, reaching 6,613 mg/kg
- 9,270/kg Australia's NEPM ESL trigger value. The RemActiv™ result was 28% below trigger value

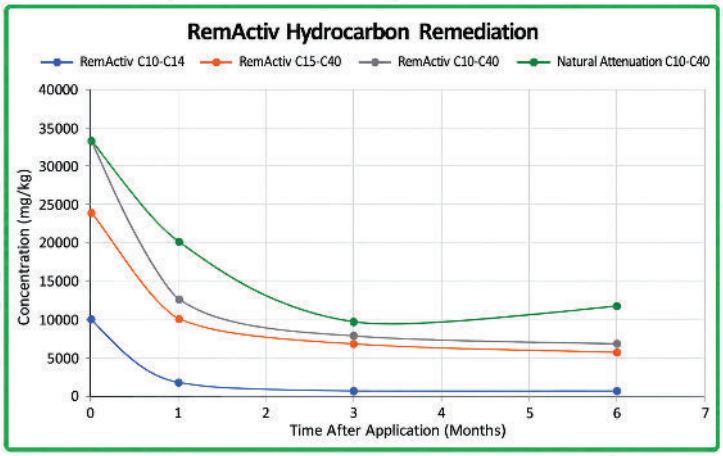


Figure 1: Degradation rates of Total Recoverable Hydrocarbons in contaminated soil following RemActiv™ treatment

READY TO EXPLORE RemActiv™ SOLUTIONS?

Whether you're addressing PFAS, metals, petroleum hydrocarbons, or other site remediation challenges, Carus can help identify the right RemBind solution for your project.

Contact our remediation team to discuss your site conditions, technology selection, and implementation approach.

CONNECT
with a Carus Remediation Specialist Today

(815) 223-1500

salesmkt@carusllc.com | carusllc.com/RemBind

Scan for Product Information & Technical Resources

RemBind® Solutions. Carus Expertise.

Bringing innovative immobilization technologies to remediation professionals across the United States.

Carus Headquarters USA
315 Fifth Street | Peru, IL 61354 | Tel +1 (815) 223-1500
carusllc.com | salesmkt@carusllc.com

RESPONSIBLE CARE℠
Driving Safety & Sustainability

Carus and Design and SIMPLIFIED SCIENCE® are registered service marks of Carus, LLC.
RemActiv™ is a trademark of Rembind Pty. Ltd. RemBind® is a registered service mark of Rembind Pty. Ltd.
Responsible Care® is a registered service mark of the American Chemistry Council, Inc.