

APPLICATION CONTROL

Liquid and water-soluble products can have adverse affects (e.g. algae bloom) caused by uncontrolled over-stimulation (multiple applications and/or over-treatment). Such conditions can cause oxygen depletion and/or create an environment toxic to indigenous populations.

Similarly, treatment of impacted shorelines can also cause adverse affects due to tidal fluctuations and storm water, which flush the microbes and soluble nutrients from the soil and introduce them into the water column.

PRP[®] addresses specifically the issue of application control. Other products tend to disperse rapidly in the water column and cannot be controlled in the same manner achieved by **PRP**[®]. **PRP**[®] is hydrophobic and oleophilic, and is the only biological product that contains and remediates hydrocarbons in a microenvironment on water's surface. Typically, **PRP**[®] does not require secondary application, further reducing the potential for algae bloom and other adverse environmental affects associated with other methods.

Once **PRP**[®] is applied, it repels water and floats. **PRP**[®] will maintain its position on the surface of the water, rising and falling with the tide, enhancing the opportunity of the **PRP**[®] to come into contact with floating hydrocarbons and those hydrocarbons that have impacted the shoreline. The ability of **PRP**[®] to flow in and out with the tide enables the product to travel to impenetrable areas where fugitive hydrocarbons are present.

When intimate contact is achieved between the hydrocarbon and **PRP**[®], the encapsulating wax breaks down and forms a hydrocarbon and wax matrix. Simultaneously, indigenous microbes feed off of the nutrients, initiating the remediation of the hydrocarbons. The matrix will float on the surface of the water creating a perfect microenvironment in which the microbes can perform. The environment created at the surface of the water allows **PRP**[®] to obtain moisture from the water and at the same time gain oxygen from the ambient air.

Since the nutrients and micronutrients are contained in the wax, the possibility of over-stimulation of the water column is minimized. These characteristics set the product apart from liquid-based products when considering application control.

Residual PRP[®]

PRP[®] that does not have intimate contact with hydrocarbons is, in effect, inert. The inert **PRP**[®] will eventually degrade and will slowly release the nutrients. Naturally occurring microbes will activate when an oxygen source is present and will survive a short time on the nutrients and wax encapsulating material. With the absence of a food source, the microbes will not survive for extended periods of time.

APPLICATION SCENARIOS

PRP[®] can be used in a variety of ways to control and degrade fugitive hydrocarbons as a first or tertiary response tool in open water, backwater, wetland, near shore scenarios and anywhere water comes into contact with hydrocarbons. **PRP**[®] can be allowed to degrade in-situ, recovered mechanically, recycled or relocated for land treatment. BTU value of **PRP**[®] is roughly equivalent to #2 diesel or Saudi crude oil.

First Response

Pre-emptive is the best term that can explain the advantage of using **PRP**[®] as a first response tool. **PRP**[®] can be favorably used to control the impact of hydrocarbons on the shoreline and to float heavy hydrocarbons that typically sink in water.

The application of **PRP**[®] as a first response tool will accomplish three very significant benefits:

- 1) The encapsulating wax will form a matrix that will greatly increase the amount of oil that will ultimately be recovered.
- 2) The **PRP**[®] matrix will also reduce the impact of the hydrocarbons to the shoreline, vegetation or surface that it may contact due to the encapsulating matrix that is formed.
- 3) **PRP**[®] is extremely buoyant and has shown the ability to float hydrocarbons which typically sink in water (e.g. #6 Fuel Oil). These product characteristics support the use of **PRP**[®] as a first response tool.

Near Shore and Wetlands

These environments are a well-suited application for **PRP**[®] since labor-intensive techniques and chemicals are not acceptable means of recovery due to potential damage to the environment. In-situ burning can also cause adverse environmental affects that outweigh the negative impacts caused by a spill. The proximity of sensitive wildlife, structures, or adverse weather conditions can eliminate in-situ burning from consideration.

PRP[®] is a non-toxic and a 100% natural biological response tool. Its use is favored by most in difficult hard to reach environments where other methods cannot be successful.

The **PRP**[®] matrix can be left in-place (in-situ) to remediate the hydrocarbons, or may be recovered for land remediation, land filling or recycling by the RP. Through the use of **PRP**[®], the RP is availed to many final cleanup options that would not be possible in the absence of such a product.

Application Rate

Application of the product is a function of several conditions that must be determined on a case-by-case basis. Variations in the physical properties of the spilled product, water temperature, and dispersion affect the quantity of **PRP**[®] that should be applied to a given area.

The OSC will direct the response team in determining order of priority for treating affected areas. Areas that need immediate attention should be addressed first. An affected area should be broken down into equal-sized areas and each area "painted"-with **PRP**[®]. This technique is the key to effectively covering a given area.

A sufficient quantity of **PRP**[®] should be applied to ensure containment of spilled hydrocarbons. **PRP**[®] should be applied carefully adjusting the spray angle to minimize break-up. Equipment operators will visually assess the situation for each scenario through observation. Once the operator observes containment of the fugitive hydrocarbons, another location should be selected.

Benefits

Some of the benefits of **PRP[®] are listed below:**

- **PRP**[®] is a non-toxic, 100% all natural product
- **PRP**[®] is hydrophobic (floats)
- **PRP**[®] is oleophilic (attracts oil)
- **PRP**[®] minimizes impacts to the environment
- **PRP**[®] maximizes hydrocarbon degradation
- **PRP**[®] is effective in sensitive areas where labor-intensive techniques are unproductive
- **PRP**[®] can be allowed to degrade in-situ or may be recovered for land remediation, land filling or recycling.

Cost Savings:

- **PRP**[®] reduces expense by reducing reclamation costs.
- **PRP**[®] allows the R.P to control the disposition of the spilled hydrocarbon.
- **PRP**[®] reduces disposal and transportation costs.
- **PRP**[®] promotes the minimization of waste stream and eliminates long-term landfill (CERCLA) liability.