

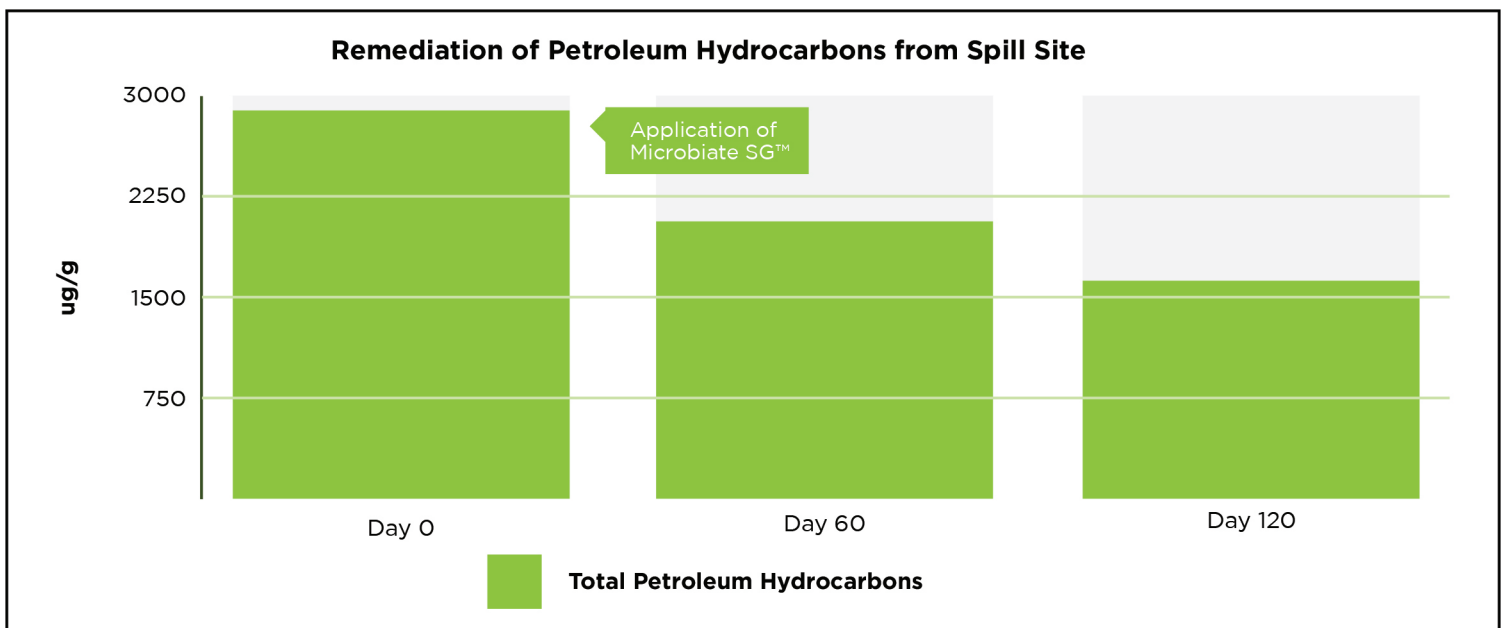


Oil Spill from Hydraulic Hose Failure at a Forestry Site

Client Problem: A spill of hydraulic oil occurred at a site due to hose failure from a heavy equipment machine. After an assessment of the spill site was complete, it was determined that Microbiate SG™ would be an ideal solution to clean the contaminated soil.

Treatment: Using the accompanying directions, a Resolute Forest Products contractor applied Microbiate SG™ to the contaminated soil. At the time of application water was added, but not thereafter. The only time the treated area was exposed to water after the time of treatment was from rainfall.

A BioNorth Solutions Case Study



This graph represents the total petroleum hydrocarbons (TPH) in samples from the site.



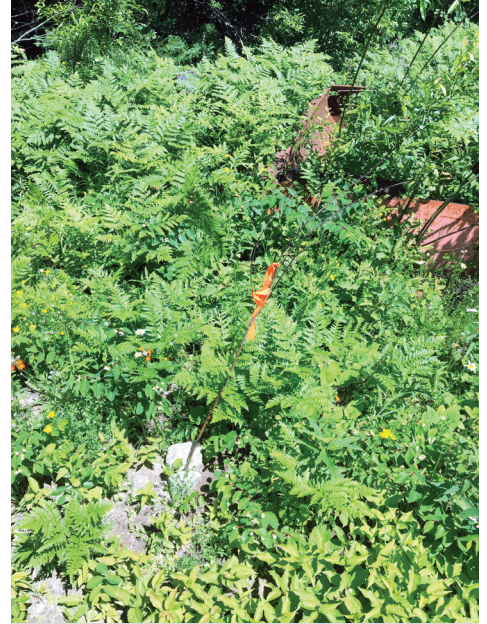
Vegetation Growth Over A Two Month Period After Application of Microbiate SG™



**Application of
Microbiate SG™**



**1 Month
After Application**



**2 Months
After Application**

The pictures above show the spill site over a two month period. The left photo displays the spill site being treated with Microbiate SG™. The subsequent photos display the vegetation regrowth over a two month period. This regrowth is a direct result of the result of the application of Microbiate SG™ and the return to healthier, less contaminated soil.

Results: Over a two month period of time, soil sample test results of the affected area saw a dramatic drop in Petroleum Hydrocarbon's (spilled fuel) due to the treatment of Microbiate SG™. The graph on the previous page shows this drop of almost 50%.

Also, over the two month period rehabilitation period resulted in a dramatic change to the vegetation in the affected area as seen in the images above. The two month span in time the plant life went from nonexistent to vibrant and lively.

Conclusion: The application of Microbiate SG™ was effective in reducing hydrocarbon (spilled fuel) contamination after one application. An application of the product would have resulted in a further reduction. Although application and maintenance of the site was not performed to specifications, Light and Heavy Fuel (F1-F4) concentrations have decreased to below acceptable ministry levels.

Light Fuel (Gas: F1) was reduced to within Ministry standards within the first month, Light Fuel (Gas, Diesel: F2) levels have met standards by the time of testing in year 3, Heavy Fuel (Diesel, Oil: F3) levels were met at just over 1 year's time, and Heavy Fuel (Oil, Crude: F4) levels were within standards at the time of project initiation.

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