



## Remediade Letter of Explanation

10/27/2021

Remediade is an all-natural Plant extract, made up of 3 different lignites. This extract is full of natural enzymes that begin to break the hydrocarbon down to enable the microorganism to digest the hydrocarbons. The natural nutrients of the humates cause a population explosion of the oil eating bacteria whenever oil is the primary contaminant. The normal plate count of bacteria in a good soil is about 7,000 colonies. When Remediade is introduced to a soil that has 20,000 ppm TPH or, more the plate count jumps to 6 Billion colonies. These oil eating bacteria will digest the Hydrocarbon and the waste product of the bacteria is carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O). In every hydrocarbon there are minerals and these minerals will be released from the hydrocarbon back to the environment and this will increase the fertility of the soil.

The bacteria population needs to be boosted by reapplying every 5 to 7 days and retilling the soil for mixing purposes. This process is repeated 3 to 4 times. The product needs to touch the contamination to enable the enzymes to break down the oil. The bacteria will live and die an average of 48 hours. The key for a successful 30 day time frame for cleanup, is to offer enough nutrients from the oil eating bacteria to build multiple generations quickly and continue the cleanup process. If the proper nutrients are not available, then previous generations must die to enable new generations to have the needed nutrients to build cell wall and thus the process is slowed down to a very slow pace.

When all the oil is consumed the oil eating microbes, except a few, will die and all nutrients return to the soil, available for crop growth and or natural habitat growth of healthy vegetation. Bacteria do not digest any divalent or trivalent minerals. All minerals and metals will be left in the soil or water.

Other products: In cases where H<sub>2</sub>S is prevalent or Sulfur, there may be a need to add SP-6000 to the water in small amounts. This is a product that helps balance PH and raise oxygen levels in the soil. When Sulfur is present or H<sub>2</sub>S, SO<sub>3</sub> then SO<sub>4</sub> can form in very small amounts effecting the soils PH. When the PH of the soil drops to 4, the bacteria will die and the project must be started over. It is important to monitor the PH level of the soil daily on a project for the first few days to determine if there is a concern.

Part of the manufacturing process in Remediade, is total sterilization of all bacteria before packaging. This is necessary because bacteria in the air will acclimate to the product and cause the product to react in the drum, thereby spoiling the product. A sign the product has been compromised is the drum swells up due to gas generated in the drum by bacteria. Any testing of the product for bacteria must be done in a completely sterile environment to be able to have an accurate test. The proprietary nature of the product is its ability to accelerate the indigenous bacteria with great plate count increases. We have been able to show from 7,000 colonies to 6 billion colonies growth in 3 days, when Hydrocarbon spills are contaminating the soil at 25,000 TPH or better, using Remediade. Having a large food source is critical for high plate counts.

Varichem International Inc. has work to develop answers to may difficult bioremediation problem. We have developed Remediade 2; Remediade Plus 2; and Remediade Desert Bloom, to help over come several stubborn problems. Our products have been used to bioremediate TPH levels as high at 30% in drill cuttings, heavy oils, land farms and waste pits. Please keep in mind there are several parameters that must be watched and managed to have success and every remediation setting.

Best Regards,

Gordon Winfrey

President

VariChem International Inc.