

Biodispersion Technology: A Fast-Acting Bioremediation Option for Basement Heating Oil Spills

By

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Introduction

Heating oil spills in the basements of our homes are of common occurrence and are expensive to treat. The traditional approach to remediating basements involves physically removing the oil before the oil seeps into the soil, and then transport the contaminated soil for off-site remediation. There are many distinct disadvantages to this method including:

- Excavating the soil in the basement often damages the home's structure
- Determine the depth of plume of pollutant
- Transport of the contaminated soil to an off-site remediation facility
- Use of thermal de-sorption or chemical extraction for soil clean up
- Loss of soil productivity
- Cost directed to the insurance company or to the owner
- Chances of the site classified as superfund site that results in loss of property
- Cost of transport of treated soils for fill up and resurfacing the basement.
- No peace of mind

Bioremediation of soil is a well-recognized and environmentally friendly technology¹. However, in the past, bioremediation has not been considered in treatment of basement spills because of the time involved. Older bioremediation technologies required significant time for cleanup and involved frequent additions of large amounts of fertilizers to the soil. Because of this, bioremediation as an alternative treatment option was less attractive to environment companies than conventional methods; until now.

Recent developments of patented biodispersion technology in which products based on oil eating bacteria that are deliverable in a self sustaining oleophilic matrix now satisfactorily overcomes bioremediations previous shortcomings. Biodispersion technology is a multi step process consisting of dispersion of oil, solubilization, assimilation and consumption or mineralization of oil resulting in complete breakdown of oil into water and carbon dioxide. Some salient properties of these products are listed below.

- User friendly
- Available in a ready to use (RTU) liquid form
- Not toxic to aquatic life
- Not harmful to staff
- Do not require addition of supplementary nutrition or fertilizer

- Effective in a short time
- No residue after remediation
- Require minimal human intervention
- Do not contain genetically modified bacteria
- Environmentally safe

The below report describes the results of the on-site treatment of a fuel oil spill in the basement of a residence in Pennsylvania, USA.

Site description

An environment company was treating a 140-gallon fuel oil spill in the basement of a residential house in Pennsylvania. Normal mopping up operations were carried out on an emergency basis. Examination revealed that a major amount of the fuel oil seeped into the underlying soil from the existing cracks in the concrete surface. The concrete was dug up under the supervision of the oil company and homeowner.

Site inspection showed that the basement air was reeking with strong smell of fuel oil fumes. The homeowner hence decided to stay in a hotel during this period. Soil was dark with the fuel oil but still the spill appeared to be located on the surface soil only. It was not clear if the treatment would be effective under these conditions; nor if it could be completed in the short time desired by the homeowner.

The Problem

The main problem the environment company faced was that the access to the basement was limited (Figure 1). Hence, the environment company began looking for a solution that could work at the site itself and thus avoid excavating the soil and damaging the structure.

The Solution

Two months after the spill, Sarva Bio Remed was consulted for on-site treatment using bioremediation products. Based on the estimate of the volume of fuel oil spilled, 15 gallons of biodispersion product were required for bioremediation. These products are effective in the ratio of 1:10 of oil, as determined from earlier studies.



Figure 1. Entrance to the basement giving limited access to major engineering activity.

Schedule of Application

It was decided that there should be three, quick applications of 5 gallons each of the products within one week. Accordingly the environment company made the first application of 5 gallons of the product (Figure 2). The soil was soaked with water before each application so that the entrapped oil could be loosened for direct contact by the oil-eating bacteria in the product.



Figure 2. First application of biodispersion product after wetting the soil with municipal water. Black air vent tubes are seen in the background.

Results

In the first two hours of application, there was noticeable reduction in the fuel fume concentration in the basement. The reaction between the biodispersion products and the fumes of the oil was so dramatic that one could smell the difference immediately. There was a distinct reduction in the intensity of the fumes. The scent removal was complemented with simply regularly flushing the basement with fresh air.

The second application was made on the 3rd day. After this application, the basement was free of strong fuel oil fumes. All concerned parties agreed that there was an appreciable improvement in the situation over the condition in the basement. The homeowner and the oil company were satisfied that the bioremediation treatment was effective in a remarkably short time. After two days, a third application of the product was carried to assure the continuing bioremediation prior to sealing the basement. The environment company felt that the remediation of the spill was satisfactory and completed. The basement was re-sealed with concrete. The house was now ready for reoccupation shortly thereafter.

Discussions

This is the first report that demonstrated that biodispersion technology can successfully remediate basement oil spills. These products have proven effective in a very short period of time and are an alternative treatment option now available to the homeowner, heating oil company and even home insurance companies. Bioremediation through biodispersion products is not only an on-site solution that is environmentally friendly but it's also a cost effective treatment. These products are fast acting since they are already charged with bacteria trained to eat and consume oil.

Conclusions

The above field investigation has shown the following:

1. On-site treatment of oil spills in basements is possible using biodispersion products.
2. The bioremediation products act instantaneously as was seen from immediate reduction of fuel oil fumes
3. Bioremediation is fast if all the conditions are favorable
4. Bioremediation through use of biodispersion products is a cost effective option now available for consumers.
5. Application of biodispersion products can be extended to many other similar situations in homes, industrial plants, and abandoned sites contaminated with oil.

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Short Bios

Satya Ganti, Senior author is the President & CEO of Sarva Bio Remed, LLC and is the inventor of the biodispersion technology. The company is a manufacturer of four types of biodispersion products available off the shelf. These products are applicable for open water spills both in salt water (marine) and fresh water situations.