

# **Biodispersion Technology: A Fast-Acting Bioremediation option For Basement Heating Oil Spills**

By

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## **Introduction**

Heating oil spills in basements of 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 soil, and then transport the contaminated soil for off-site remediation. There are many distinct disadvantages including:

- Excavate the soil in the basement, often, damaging the structure
- Determine the depth of plume of pollutant
- Remove the soil and ship 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 soils has been a well recognized environment friendly technology<sup>1</sup>. However, bioremediation has not been considered in treatment of basement spills because of the time involved. Other older bioremediation technologies require more time for clean up and involves frequent additions of large amounts of fertilizers to the soil. Bioremediation as an alternative treatment option is less attractive environment companies than conventional methods.

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 the 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

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

Present 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 was 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 oil company and the homeowner.

Site inspection showed that air of the basement was reeking with strong smell of fuel oil fumes. Homeowner hence decided to stay in a hotel during the 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 will be effective under these conditions and also if it can 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 solution that can work at the site itself and thus avoid excavating the soil and damage 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 time. 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 is 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, the first change in the situation was the reduction in the fuel fume concentration in the basement environment. 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. This was further complemented with regular flushing the basement with fresh air.

One more application was made on 3<sup>rd</sup> day. After this 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 remarkably short time. A third application of the product was made after 2 days to assure continuing bioremediation prior to sealing the basement. The environment company felt that the remediation of the spill was completed satisfactorily and 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 remediated basement oil spill. These products are 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 in-place solution that is environmentally friendly but is 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 spills in soils of basement 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 residences, industries plants and abandoned sites contaminated with oil spills.

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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.