



Report on
Restoration of Vegetation Affected By Diesel Spill



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Problem:

A tractor/trailer was involved in a highway accident releasing approximately 100 gallons of diesel fuel from a ruptured saddle tank and ten gallons of motor oil from the truck engine. Wreckage ended at the bottom of the embankment, immediately adjacent the opening of the subsurface storm piping. Diesel fuel, released from the truck, flowed into soil near the wreckage and near the open ditch. Several hundred feet of guardrail was destroyed in the accident, causing engine oil to disperse over approximately 100' of vegetation at the pavement edge. GEC Environmental Contracting Corp. (GEC) was contacted to provide clean up of the release. Accident site is seen in Figure 1.



Figure 1. Accident site showing release of fuel from the truck.

Discussions were held with representatives of the Virginia Department of Transportation (VDOT) and implications of soil removal in this area were reviewed. The spill site was on a slope and it would be difficult to use mechanized cleanup vehicles for the cleanup. Excavation of the soil was not considered as an option for the cleanup.

Solution

It was agreed that this site is suitable for evaluation of use of on-site (*in situ*) bioremediation for cleanup of highway spills. AgroRemed manufactured by Sarva Bio Remed, LLC was selected for direct application at the release point and affected soil and vegetation. AgroRemed has a track record for successful cleanup of contaminated soils after spills of diesel or heating oil both in residential and industrial facilities. AgroRemed has shown ability for reduction in TPH values by 90% in three weeks. In one case the TPH of the impacted soil after a highway spill was reduced from 25,000 ppm to 93 ppm. Advantages of AgroRemed and benefits of bioremediation are listed below.

- Treats the spill at the source and rejuvenates the soil
- Reduces the fumes produced by the spill almost instantly
- Available in easily spray able liquid form
- Easy to apply and environmentally safe
- Generally a one time application under favorable conditions
- Fast remediation time of 3 weeks
- AgroRemed is a complete solution
- No waste for disposal

The conditions essential are the availability of moisture and easy permeability in soil. AgroRemed has cleaned up petroleum contaminated soils even with a history of contaminant more than 10 years. AgroRemed is a bacterial agent and under favorable and moist soil conditions, the bacteria in the product consume hydrocarbons. Bioremediation with AgroRemed require minimum and does not need periodical additions of nutrients or products. A combination of AgroRemed and natural attenuation would provide a practical and cost effective method for highway spills with little or no post restoration costs. The diesel fuel release and surface staining caused by engine oil would both be addressed in this manor. Multiple applications were anticipated for significant decrease of petroleum content in the saturated area.



Figure 2. Application of AgroRemed to impacted soils

A soil sample was collected from the center of the diesel staining, approximately 2” below the surface showed a concentration of 65,000 parts per million (ppm). Impacted soil saturated with diesel was manually turned/tilled to allow natural oxygenation before application of AgroRemed as seen in Figure 2.

A soil sample was collected after 20 days of application from this location and analyzed for TPH/DRO values and the results of hydrocarbon range C-5 to C-30 showed a value of 26,000 ppm or more than 40% reduction in the value. Application of AgroRemed was continued at regular intervals but the reduction in TPH/DRO was not appreciable and was reduced from 26,000 ppm to 11,800 ppm that is attributed to prevailing drought condition

and the soil was very dry. Hence in September before the final application, the soil was sprayed with water from a tanker before application of AgroRemed and the surface of the soil was also covered with straw mulch to prevent excessive evaporation. The TPH of the soil was examined after 15 days and the levels of TPH were reduced to 650 ppm with no signs of tainting of the grass and interestingly no diesel odor. Further, the area was found to support healthy growth of grass and other vegetation indicating no residual toxicity in the soil and AgroRemed helped restoration of the soil to its condition before the spill. The DEQ agreed that there was no further action required. The total time required for the cleanup was a total of 103 days for reaching the accepted levels of contaminant.

Conclusions:

The average amount of fuel spilled in a saddle tank release is 104 gallons while the average cost to clean it up is \$9,200 nationwide. Reuse of the same soil also reduces costs of transportation with minimum disturbance to the local ecosystems. Overall benefits of AgroRemed for highway spill are listed below.

- Cost of AgroRemed for cleanup at site was less than \$ 2,000.00
- AgroRemed cleans up spill in non-invasive manner
- TPH in soil is reduced to accepted levels in just over a month
- Reduces toxic effects of fuel oils
- Restores vegetation without additions of fertilizers
- No residual diesel odors
- Helps Prevention of premature failure of asphalt

Acknowledgements

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