



HydroLoc Soil Amendment™ Summary

Introduction

HydroLoc Soil Amendment™ is a Patent Pending, proprietary soil amendment product created to provide a beneficial and environmentally safe option for drill cuttings. HydroLoc Soil Amendment™ is created using a defined and monitored process implemented at the production site itself. The cuttings undergo a treatment process utilizing a proprietary, stable compost mix that includes enhanced levels of specifically designed biological additive (bacteria and fungi) and natural ingredients. The treatment/process results in dramatic decreases in TPH and other limiting constituents such as heavy metals, organic, and inorganic compounds.

HydroLoc Soil Amendment™ has proven successful in providing a truly green and cost effective alternative to mud farm application and landfill disposal. Additionally, it greatly reduces risk associated with trucking, spills, and ever increasing contaminate levels at mud farms and other disposal sites.

HydroLoc Soil Amendment™ is utilized in the same manner as other soil amendment products. When blended with native soils it provides valuable macro and micro nutrients, rich organic matter, and valuable beneficial soil bacteria & fungi. HydroLoc Soil Amendment™ is an ideal soil amendment for use in crop production, water conservation, restoration, erosion control, and reclamation practices and projects. The many benefits associated with the finished HydroLoc Soil Amendment™ product encourage a in-win relationship between producers, landowners, state, federal, and local regulatory agencies as well as special interest environmental groups.

In 2013, the HydroLoc Soil Amendment™ process was utilized to successfully treat roughly 67,200 tons of cuttings. The finished HydroLoc Soil Amendment™ product created met testing requirements below COGCC Table 9.10 post-incorporation. As

much as 28,461 tons of HydroLoc Soil Amendment™ has been beneficially used to reclaim or remediate 156.07 acres.

The Process

The Patent Pending, HydroLoc Soil Amendment™ process is extremely flexible and compliments most operations with very few changes. To begin the treatment process a proprietary HydroLoc Mix™ is blended with drill cuttings and/or soil created from production activities at a defined rate/recipe.

The HydroLoc Mix™ immediately begins absorbing moisture, stabilizing and solidifying the material. The proprietary microorganisms within the HydroLoc Mix™ instantly begin to bio-remediate hydrocarbons in both the diesel range organic (DRO) and gasoline range organic (GRO) ranges, reducing or eliminating toxins such as BTEX, binding metals within the humus structure and actually reducing their bioavailability to vegetation while inhibiting their ability to leach to ground water.

Once a consistent blend is achieved the now blended material is transported to a pre-constructed, designated containment area that includes an organic material leach barrier. The containment area is either on-location, or at a near-by facility.

The blended material is then placed in production piles for continuation of the bio-remediation process. The material is aerated as needed to maintain a favorable environment for the bacteria and fungi. Temperature, weight, analysis, and moisture are monitored and recorded. Once the desired amendment targets are achieved, the material is sampled to insure that target analytical levels have been obtained.

The time required to reach the desirable analytical levels is tied closely to the starting point levels. For instance, most water-base drill cuttings have an initial TPH starting point range of between 800 to 2,000 ppm. Treatment time at these levels will vary between 20 to 45 days, depending on climatic conditions. Oil-base cuttings with TPH levels as high as 120,000 ppm can also be successfully treated and the amendment time required may extend the process to a few months.

Use of HydroLoc Soil Amendment™

Once the treated blend of material has reached the desirable levels each production pile is individually sampled and tested for nutrient levels before being given a Recommended Loading Rate Certificate. The Recommended Loading Rate Certificate is based on the native soil to which the product is to be applied to.

HydroLoc Soil Amendment™ is then professionally applied over the pre-determined area, incorporated, and seeded with approved vegetation seed mixtures. The area of

application is recorded by GPS tracking, and aerial & topographic maps are generated outlining the exact areas and acreage of application.

A Landowner Application Form, designed specifically to meet all COGCC requirements is generated and provided to the Producer completing the HydroLoc Soil Amendment™ process assuring both the Producer and Landowner of final beneficial use. The HydroLoc Soil Amendment™ process and product result in significantly reduced risk and contingent liability for both the Producer and Landowner over current disposal options.

Conclusion

The HydroLoc Soil Amendment™ Process is designed specifically to meet the desired goals of the Oil & Gas Industry to create beneficial use options for E&P wastes. It provides an economical and environmentally friendly means of handling, treating and beneficially using those wastes. It works because it mimics Mother Nature's time-proven design to naturally deal with surface hydrocarbon contaminates.

The finished HydroLoc Soil Amendment™ product is rich in organic matter, nutrients, & microbial activity. HydroLoc Soil Amendment™ acts like a soil amendment on steroids providing soil stabilization, moisture retention, and nutrients that set new standards for reclamation and re-vegetation of disturbed areas and/or those areas simply needing soil improvement.

Thank you for this opportunity to share a brief preview of the HydroLoc Soil Amendment™ process and product created to meet the high standards for the beneficial use of E&P waste, thus creating a brighter future for our industry.

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