

CASE STUDY # 041

BIOREMEDIATION OF COAL TAR RESIDUES USING A BIOFARMING TECHNIQUE

SUBJECT:

Ex-situ Bioremediation of Coal Tars

PRODUCT APPLIED: Hydrocarbon-degrading microorganisms isolated and from the site, grown and reinjected
MICROCAT[®]-SH surfactants and MICROCAT[®]-NPN nutrients

PROCEDURES & OBJECTIVES:

This field pilot program investigated the bioremediation of coal tar contamination in a 15-acre tract surrounding a former manufactured gas plant. The contamination zone includes a park once utilized by the local municipality for field sports and other recreational activities. Both soil and groundwater are contaminated.

PROGRAM:

The field pilot work developed engineering scale-up data from biofarming as an **in-situ** remediation technique. Eight different treatments of the soil were evaluated. Ten soil boxes were constructed and placed inside a large greenhouse. Each box contained approximately one (1) cubic yard of representative composited site soil. Eight of the boxes were subjected to different treatments of surfactant, cosubstrate and microbial inoculum (the microbial inoculum consisted of indigenous microbes selected for polynuclear aromatic hydro-carbons (PAH) degradation capability, grown under adaptive conditions off site and reintroduced into the test plots on site). Two of the boxes were controls (one live and one killed).

RESULTS:

Total coal tar derived PAH levels in the soil were estimated to range from 100-5000 mg/kg. Low levels of volatile organic compounds (VOC), principally consisting of benzene, toluene and xylenes (BTX), were also present in the soil.

Testing was carried out over a four-month period. PAH and BTX levels were followed by GC/MS and GC/FID. An aggregate of approximately 60% reduction was observed in PAH concentration in the test plots over the initial three months of the program.

CONCLUSIONS:

Inclusion of cosubstrate and microbial inoculum significantly increased the rate and degree of PAH destruction.