RMC LONESTAR

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November 9, 1992

MAKE AN APPOINTMENT
WE A QUESTION ABOUT THE
HAVE
APPROACH

Mr. Ravi Arulanantham
Alameda County Health Agency
Division of Hazardous Materials
Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

Subject: Bioremediation Treatability Workplan for Non-Hazardous Diesel Contaminated Soils
6527 Calaveras Road, Sunol California

Dear Mr. Arulanantham:

RMC Lonestar is proposing to remediate **approximately 3000 cubic yards of diesel contaminated soil at our Sunol Aggregate Plant.** The material, after significant reduction in levels of diesel contamination have been achieved, will be used on-site as road base or topsoil material to repair haul roads and\or conduct revegetation throughout the quarry. Our first step will be to perform a treatability study prior to any large scale bioremediation project. Earlier treatability studies that we sought to rely on were performed at our Eliot Quarry and they failed. This new attempt will be performed as outlined in the attached workplan. RMC Lonestar is requesting approval by the Alameda County Health Agency to begin this project and is requesting that the maximum contaminant levels for total petroleum hydrocarbon as diesel for use as a road base or topsoil material be set at 10 ppm.

Should you have any questions please do not hesitate to call me at 426-2279.

Sincerely,

Bradd Stalley
Environmental Engineer

attach.

BIOREMEDIATION TREATABILITY WORKPLAN

FOR NON-HAZARDOUS DIESEL CONTAMINATED SOILS

INTRODUCTION:

On August 21, 1990, approximately 2,700 gallons of diesel fuel was spilled next to the above ground diesel fuel storage tank. The spill was contained and all of the contaminated soil was removed from the ground and stockpiled on site. This work along with any reports was completed by GeoStrategies Inc. of Hayward California. All reports have been sent to the appropriate lead agencies, copies were sent to your office.

REMEDIATION:

Cell Construction

Three test cells will be constructed, each designed to hold approximately 100 cubic yards of soil. A 30-mil plastic liner will be used as an impermeable seal between the surface soil and the diesel contaminated soil. A six inch layer of pond sand will be spread out evenly in each cell to protect the plastic liners prior to the placement of the contaminated soil in the cells.

Soil Mixing

Approximately 300 cubic yards of soil will be taken from the large soil pile. This soil will be uniformly mixed, using a front end loader, to achieve a homogeneous soil mixture with uniform TPH concentration levels which will be distributed into each of the test cells. Approximately 100 cubic yards of soil will be placed into each of the cells. Eight soil samples will be taken from each cell and taken to a State Certified laboratory where they will be blend into two composite samples for analysis. Refer to the section on Sampling Protocol for sample handling and procedures.

Biosolve Cell™

Test cell number 1 will use Biosolve™, a biosurfactant manufactured by RTS Biotreatment Products and Supplies, to desorb or strip the hydrocarbon from the soil particles by converting it to an emulsion and moving it into the pore space were the natural microorganisms found in the soil will utilize this as a food source further breaking down the hydrocarbon chain.

The Biosolve will be applied in a liquid form after the soil has been placed into the cell. A 3% solution of biosolve to water will

be applied to the soil. The moisture content will be maintained from 30% to 80%, the ideal being 60%. Both pH and temperature will be monitored.

2

Max Bac™

Test cell number 2 will use Max Bac™ controlled release nutrients engineered by Grace Sierra specifically to speed up the microbial degradation of hydrocarbons.

Max Bac will be applied to the soil in a pelletized form during the loading of the cell using a Whirlie-Bird applicator. Approximately 50 pounds of pellets will be applied to 100 cubic yards of soil. The moisture contents will be maintained at between 40% to 70%. Temperature and pH will be monitored.

3

Manure/Compost Mixture

Test cell number 3 will use a manure/compost mixture to enhance microbial action within the soil/manure mixture. Studies have suggested that by introducing a microbial rich source to contaminated soil, the degradation rate of hydrocarbon is improved.

The manure/compost will be mixed with the contaminated soil at a 1:4 manure:soil ratio. Moisture content will be maintained at between 30% to 50%. Temperature and pH will also be monitored. The piles will be loosely covered with plastic to help maintain the moisture content as needed.

4

Control Cell:

Test cell number 4 will be used as our control cell. Approximately 100 cubic yards will be placed into this cell and monitored to record natural or passive remediation. Temperature and pH will be monitored and the moisture content will be maintained at between 30% to 50%. The piles will be covered only in the event of heavy rains to minimize over saturation.

SAMPLING PROTOCOL: How often

The "Initial Sampling" will take place prior to any of the soil being treated. Periodic samples may be taken to monitor the progress of the hydrocarbon degradation in the soil, these samples will be taken at the discretion of RMC Lonestar. Final "Conformation Samples" will be taken after each cell has had time to perform to the manufactures specifications.

How long

The initial and conformation samples will consist of eight random samples taken within each cell at a depth of at least six inches below the surface of the pile. These samples will be collected in precleaned glass jars, placed into a chilled cooler, and transported to a State Certified laboratory using strict chain-of-custody protocol. The laboratory will composite each set of eight samples into two. Each composite sample will be analyzed for total petroleum hydrocarbon as diesel using EPA method 3550/8015.

CONCLUSION:

After completion of the treatability study, RMC Lonestar will evaluate the success and failures or inadequacies of each process. Project costs will be worked up for each method and used to calculate projected costs for remediating the entire soil pile. A treatment method will be determined after all the factors have been examined. A final workplan will be developed and submitted to the appropriate lead agency for review.

1- GIVEN A CHECK DEPTH

2- CLEAN UP AT 10 PPM FOR ROAD BASE OK?!

3- WANTS TO USE BIOSTIMULATION INSTEAD OF BIOAUGMENTATION (DOES NO BACT.) SEE BELOW.

THERE FACTORS AFFECT GROWTH OF BACTERIA. HE IS ONLY MONITORING A FEW NOT ALL OF THESE

- TEMP
- NUTRIENTS
- PH
- O2 NEEDS
- MOISTURE

4- NEEDS A PROFESSIONAL MICROBIOLOGIST TO MONITOR THE SITUATION CAN NOT EFFECTIVELY HIM TO UNDERSTAND MICROBIOLOGY

BIOSTIMULATION ASSUMES THE FOLLOWING:

1- THERE IS VIABLE MICROBIAL POPULATION WITHIN THE CONTAMINATED SOIL

2- THERE ARE SOME BACT AMONG THOSE VIABLE MICROORGANISM WHICH CAN DEGRADE THE CONTAMINANT

3- THOSE SPECIFIC DEGRADER BACT. CAN OUTCOMPETE NONDEGRADER ORGANISMS