Bioscience, Inc.
Environmental Products and Services
ISO 9001:2008 CERTIFIED

Biological Oil Removal from Steel Mill Scale

Using a bioslurry technique and Microcat® XBS Hydrocarbon Degraders- BSE 039

Problem

Mill scale has been historically disposed of in landfills. This has posed an environmental hazard due to the oily content of the scale. While the scale has value in recycling, its oil content rules recycle out due to air pollution issues."Bioslurry Methods" were used for remediation of steel mill waste sludges containing metal oil residues (mill scale). The objective of this pilot program was to economically reduce the oil content of the rolling mill sludges in order that they are rendered non-hazardous and thus appropriate for recycle in the steel mill sinter plant for their metal values.

Products Used

MICROCAT®-XBS Hydrocarbon Degrader, MICROCAT®-NPN Nutrients, MICROCAT®-SH Biodegradable Surfactant

Scale Characteristics

The rolling mill scale and other metal-working oil residues had oil contents of eight to sixty percent.

Pilot Program

Phase I

Initial bench-scale testing determined that a single stage biotreatment process, operating in a semi-continuous mode, could effectively reduce the mill scale oil by approximately 75%. Bench-scale studies indicated that washing steps, readily incorporated into the initial slurry procedure and final metal solids recovery had the potential for further oil reduction in the complete process.

Phase II

Prewashing of the sludge involved slowly mixing in **MICROCAT-SH** surfactants and water followed by high speed high shear mixing. All decanted aqueous suspensions were then added to the bioreactor.The bioreactor consisted of conical bottom reactors, mechanical mixers and an air sparging system. The reactor was operated in a semi-batch mode using **MICROCAT-XBS** as a microbial inoculum. A 10% solids slurry of the sludges containing adjusted nutrients **(MICROCAT-NPN)** was added to the reactors along with daily removal of an equivalent amount of mixed liquor. The hydraulic retention time and solids retention time was 21 days.

Postwashing of the solids was accomplished by high speed mixing and surfactants. All waste process wash water was pumped into an aerated biological wastewater treatment cell for final treatment.

Results

A final solids oil content of 1.3% on average was achieved (Figure 1).

XBS/SH/NPN12013

966 Postal Road, Suite 200 • Allentown, PA 18109 • (484) 245-5232 • Fax (484) 245-5236
E-mail: biosciencebioscienceinc.com • Website: www.bioscienceinc.com

BIOSLURRY OF STEEL MILL SLUDGE
OIL CONTENT OF SLUDGE

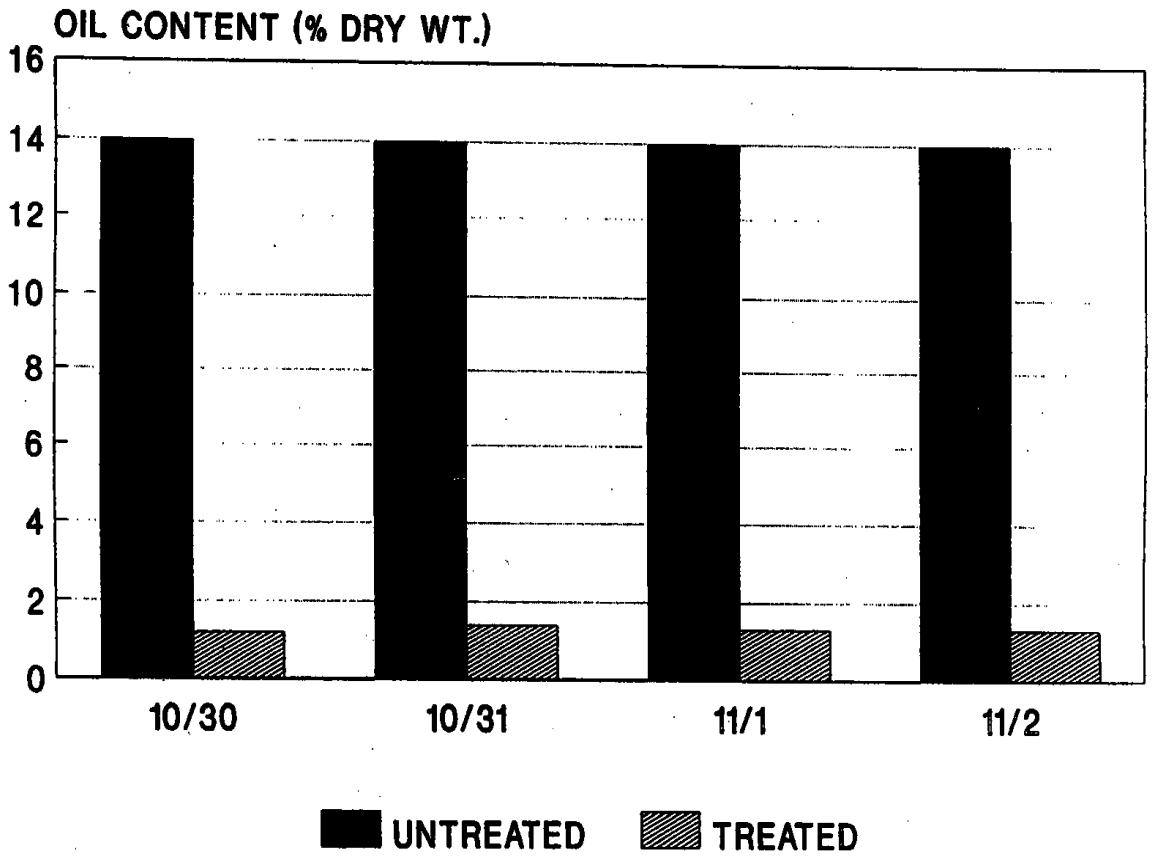

FIGURE 1