



**Bioscience, Inc.**

Environmental Products and Services

ISO 9001:2008 CERTIFIED

# Formaldehyde In-Situ Bioremediation

*In railroad ballast using Microcat<sup>®</sup> -XR Hydrocarbon Degradar - BSE 042*



## Problem

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Accidental release of 50% formaldehyde solution from a rail car (20,000 gallons) on a siding had resulted in significant rail ballast (gravel) and site soil contamination. The main body of the spill was contained by an emergency spill control contractor and residual concentrated formaldehyde solution recovered. Contaminated rail ballast and soil posed a significant problem. Removal of the formaldehyde saturated rail ballast, along with rail line reconstruction, would have resulted in significant downtime for a regularly used rail line immediately next to the site of the spill.

## Products Used

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**Submerged, fixed-film bioreactor, Microcat<sup>®</sup> - XR Formaldehyde-degrading bacteria and nutrients**

## Procedures Used

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An in-situ spray/leach extraction system, including an aerated submerged fixed-film bioreactor, was set up to extract formaldehyde from the rail ballast without affecting the continuing operation of the rail line. Captured leachate containing formaldehyde was pumped to an above ground tank aerated bioreactor inoculated with non-indigenous, naturally-occurring, specialized microbial strains adapted for formaldehyde degradation. Proprietary nutrients were added to enhance microbial growth and enhance removal rates. Biologically-treated water was recirculated over the contaminated ballast areas as an extraction agent.

## Results

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Leachate data was taken twice a day and plotted separately in Figures 1 and 2. Formaldehyde concentrations dropped from 1700 ppm to undetectable in the rail ballast over a period of two to three weeks without affecting scheduled train runs.

## Conclusions

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Using this insitu method a significant cost savings over alternate physical disposal and/or chemical destruction methods was realized.

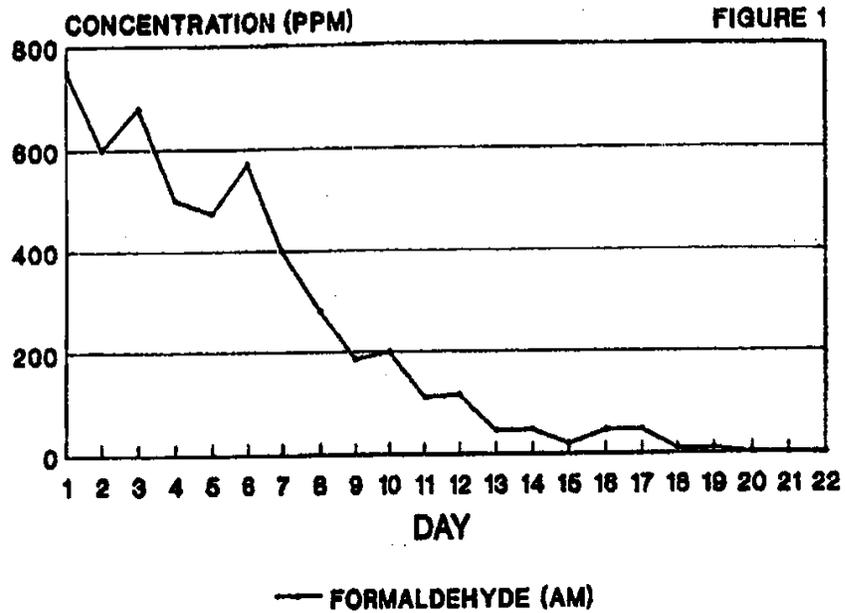
\* Based on prior experience of Bioscience, Inc. founder as denoted in Form 254 of Bioscience, Inc. Qualifications Statement

***Microcat® is a registered trademark of Bioscience, Inc.***

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# IN-SITU BIORECLAMATION OF FORMALDEHYDE-SATURATED RAILROAD BALLAST



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