

Application of Bioremediation to Petroleum-Contaminated Soils

A. Worsztynowicz, D. Rzychon, M. Adamski, S. Iwaszenko

Institute for Ecology of Industrial Areas

Katowice, Poland

M.A. Heitkamp

Westinghouse Savannah River Company

Aiken, South Carolina, USA

Due to environmental stressors and evolution, microbes are able to inhabit and prosper in harsh and seemingly inhospitable environments. One such environment is the Czechowice Oil Refinery sludge lagoon, which contains decades of materials from crude oil waste remaining. These waste materials consist of both aliphatic and aromatic (PAHs) hydrocarbons at extremely low pH (2.5). Microorganisms living in this unique environment have developed the ability to degrade petroleum hydrocarbons. These microbial strains could be extremely useful in remediating petroleum contaminated soils. The key to bioremediation is accelerating the naturally occurring biodegradation process. First, the limiting factors (i.e., oxygen, nutrients, etc.) must be identified and provided to the system. Then, the site must be monitored to ensure that optimal conditions for biodegradation are maintained under a variety of conditions. This presentation will summarize work conducted at the Czechowice Oil Refinery biopile as well as the design, construction, start-up and operation of a small, mobile bioreactor intended for use in remediating limited volumes of contaminated soils or investigatively derived wastes.