BIOREMEDIATION TECHNIQUES FOR THE CLEANUP OF A PETROLEUM WASTE LAGOON

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ABSTRACT: The remediation strategies that were applied at the oil refinery waste lagoon in Czechowice, Poland were designed, managed and implemented under the direction of the Westinghouse Savannah River Company (WSRC). WSRC was assisted in the demonstration by the Institute for Ecology of Industrial Areas (IETU). This collaboration between IETU and WSRC provided the basis for international technology transfer of new and innovative remediation technologies that can now be applied in Poland and the Eastern European Region as well.

The Czechowice Oil Refinery Project brought together several proven techniques and remediation tools used by WSRC to remove contaminants from the environment. The strategies employed included in situ bioremediation, using the natural cleansing capacity of the environment to degrade the hydrocarbon pollutants. A risk-based approach guided the final selection and remedial design. This approach provided a plan that took into account the intended future use of the site and emphasized the natural cleansing methods whenever possible. More aggressive techniques could be taken for sites that are to be developed for future uses that would involve higher potential exposure risks.

A treatability study of the lagoon's waste and soil was undertaken to determine the physical and chemical parameters necessary to maintain a healthy microbial community that sustained a high biodegradation rate of the contaminants of concern. The study, along with the characterization data, provided information to the remediation team to design and deploy a bioremediation system capable of producing the stimulus necessary to maintain the biological activity needed to degrade the contaminants to less toxic levels.