Environmental Engineering and Management Journal

June 2010, Vol.9, No. 6, 757-764
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

ECOLOGICAL RISK-BASED PERFORMANCE EVALUATION OF A WASTE STABILIZATION POND

Rouzbeh Abbassi, Faisal Khan*, Kelly Hawboldt

Department of Process Engineering, Faculty of Engineering & Applied Science, Memorial University, St. John's, NL, Canada

Abstract

Ecological Risk Assessment is the process of defining and quantifying risks to ecological entities and determining the acceptability of the predicted risk. The estimated risk of the effluent of treatment systems can be used to assess its performance. Waste stabilization ponds (WSPs) are widely used for treating the tailing water on mine sites. The objective of this study is to assess the risk of effluent from the specific WSP to ecosystem. The chemical concentrations in the freshwater pond and marine water in the vicinity of the WSP were calculated using pond data and fate and transport models (SESOIL and AT123D). Subsequently, estimated chemical concentrations are used in quantifying the ecological risk using ERA software developed at Memorial University for ecological risk assessment. The results of calculating risk shows that the chemical contaminants released from the WSP has a maximum effect on the polar bears as one of the ecological entities in the vicinity of the pond. Finally, uncertainty analysis is conducted to demonstrate the risk zone and the risk range.

Key words: ecological risk, performance, stabilization pond, uncertainty

Received: January, 2010; *Revised final:* May 2010; *Accepted:* June, 2010

*Author to whom all correspondence should be addressed: e-mail: Fikhan@mun.ca; Phone: (709) 7378939; Fax: (709)7374042