



UNIVERSITY OF REGINA

**AN INTELLIGENT DECISION SUPPORT SYSTEM
FOR
MANAGEMENT OF PETROLEUM-CONTAMINATED SITES**

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Regina, Saskatchewan
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**AN INTELLIGENT DECISION SUPPORT SYSTEM
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MANAGEMENT OF PETROLEUM-CONTAMINATED SITES**

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ABSTRACT

Groundwater and soil contamination resulted from LNAPLs (light nonaqueous phase liquids) spills and leakage in petroleum industry is currently one of the major environmental concerns in North America. Numerous site remediation technologies have been developed and implemented in the last two decades. They are classified as ex-situ and in-situ remediation techniques. One of the problems associated with ex-situ remediation is the cost of operation. In recent years, in-situ techniques have acquired popularity. However, the selection of the optimal techniques is difficult and insufficient expertise in the process may result in large inflation of expenses. This study presents an expert system (ES) for the management of petroleum contaminated sites in which a variety of artificial intelligence (AI) techniques were used to construct a support tool for site remediation decision-making. This paper presents the knowledge engineering processes of knowledge acquisition, conceptual design, and system implementation. The results from some case studies indicate that the expert system can generate cost-effective remediation alternatives to assist decision-makers.

Keywords: expert system, selection of remediation, petroleum contamination, fuzzy set