

# **Field Verification of Salinity Models Proposed for Developing Risk Based Salt Criteria in Soil**

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In 2002-2003 MDH Engineered Solutions (MDH) completed a study for Alberta Environment (AENV) to recommend computer codes for application to saline groundwater contamination problems. Following an extensive evaluation process, three codes were recommended: CHEMFLO, UNSATCHEM, and VS2DTI.

In 2003-2004 MDH were commissioned to verify the application of CHEMFLO, UNSATCHEM, and VS2DTI at a number of typical field sites, chosen in consultation with the Soil Salinity Working Group of the Petroleum Technology Alliance of Canada (PTAC).

The four sites chosen were:

(A) A field trial site where heavy oil sludge was applied as a soil amendment in 1986; (B) A field trial site where land spreading of various drilling muds took place in 1988; (C) A site where a pipeline break was documented in 1998; and  
(D) A documented road salt storage site established in 1980 or earlier.

At each site, significant amounts of high-quality historic data were available to develop and calibrate a numerical model. Additional data was gathered in 2003. Two site investigation studies (Site A and Site B) were carried out by MDH together with studies by ReLI Remediation at Site C and Envirotech Engineering at Site D. The additional data obtained in 2003 was generally used to verify model predictions based on the historic data at each site.

The saline transport model verification study is considered to have met its primary objective. CHEMFLO, UNSATCHEM and VS2DTI have been verified and shown to be useful tools in the quantitative evaluation of a wide range of salt contaminated sites in both saturated and unsaturated systems.

Final Report