Optimal Groundwater Remediation Design and Reuse

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To cost-effectively restore contaminated sites to productive use requires integrated planning of cleanup and reuse. Ultimate reuse objectives should guide remediation decisions, instead of being dictated by pre-described remediation plans. This study links optimal groundwater remediation with reuse planning. A genetic algorithm optimizer that is integrated with a subsurface contaminant transport model (The Modular Groundwater Optimizer) is used to determine an optimal groundwater remediation design. The genetic algorithm objective is to find a low cost remediation plan within the time constraints. The remediation costs are then reduced by the expected reuse benefits. Reuse benefits are dependent on the time required for the remediation stage and on the endpoint of remediation. As more complete remediation is reached additional reuse options may become feasible. This approach will allow one to explore the trade-offs between increasing costs for more complete, and faster remediation versus the potential reuse benefits gained from implementing more profitable reuse options and from beginning reuse sooner. The case study shown is based on the Emmell's septic landfill on the National Priorities List.