



EVALUATION OF GEOSYNTHETIC CLAY LINERS OVERLAIN BY GEOMEMBRANE IN LANDFILL FINAL COVERS

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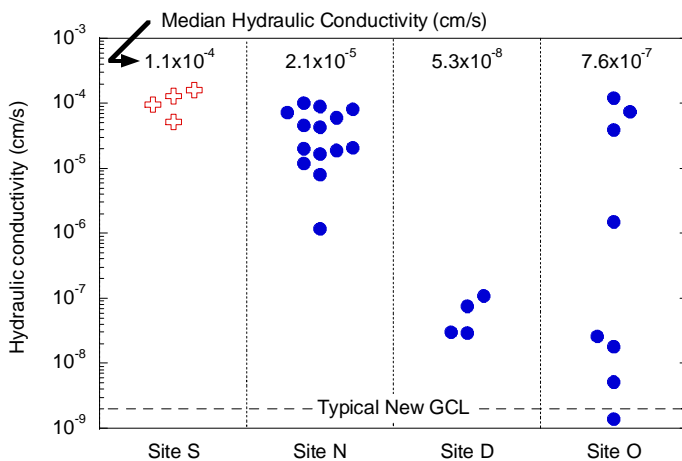
Introduction

Geosynthetic Clay Liner (GCL):

- Factory-made hydraulic barrier
- Composed of clay (Na Bentonite) sandwiched between 2 carrier geotextiles
- Advantages:
 - Easy to install (simply unroll on site)
 - Potentially very low hydraulic conductivity (k)
- Disadvantages:
 - Sensitive to chemical interactions
 - Ion exchange can alter properties
- Commonly deployed in MSW landfill final covers

Background

- Hydraulic conductivities of exhumed GCLs by Meer and Benson (2007) put into question in-situ GCL performance:



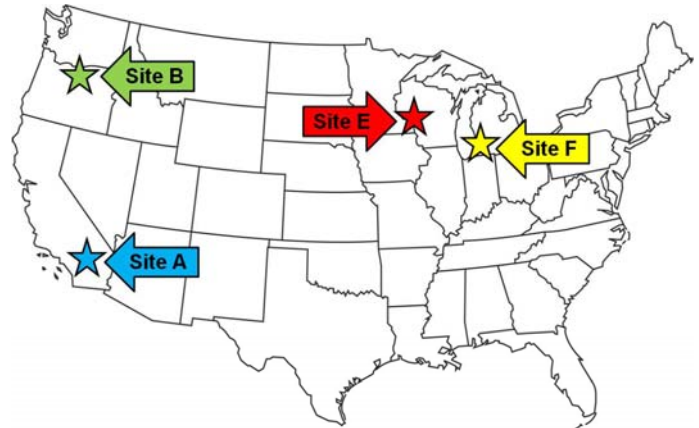
- Exhumed GCLs show dramatic increases in hydraulic conductivity
- Site S GCL overlain by HDPE geomembrane, however similar liners have shown superior performance in large scale lysimeters experiments

Research Objective

Quantify hydraulic performance of GCLs deployed in final covers overlain by GM

Sample Exhumation

Samples exhumed from 4 sites across USA:



Digging sampling pit



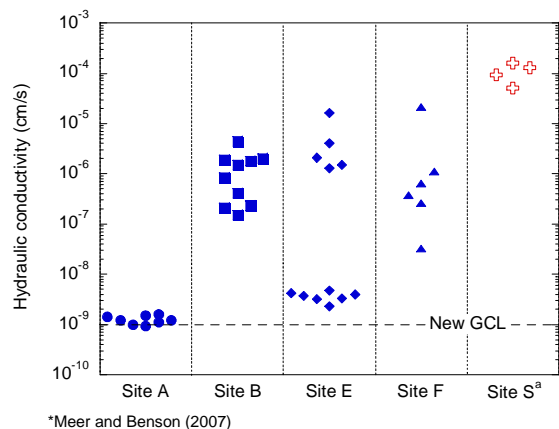
Removing GM



Sampling GCL

Results

Exhumed GCL hydraulic conductivities when permeated with 0.01 M CaCl₂ solution:



- Dramatic increases observed in some GCLs
- Near total ion exchange observed in all GCLs

Future Work

Ascertain factors driving large increases in hydraulic conductivity of composite cover GCLs