A Devil of a Site

2017 NGWA Groundwater Summit, Nashville, TN

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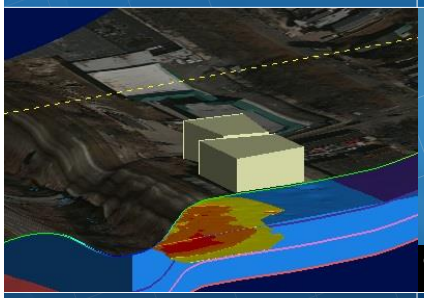

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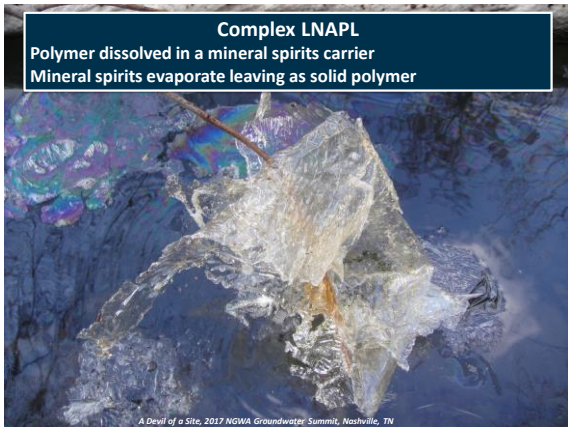
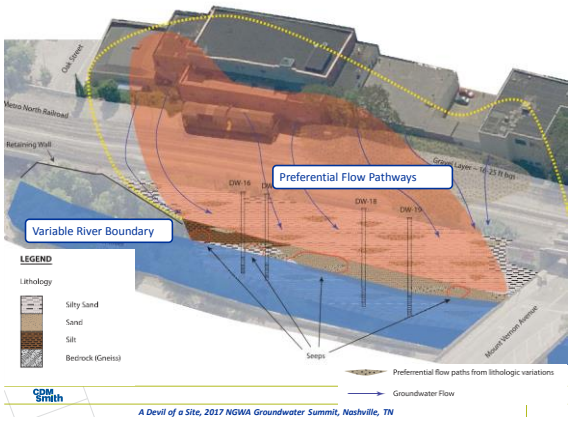
Complex LNAPL

Polymer dissolved in a mineral spirits carrier

Mineral spirits evaporate leaving as solid polymer





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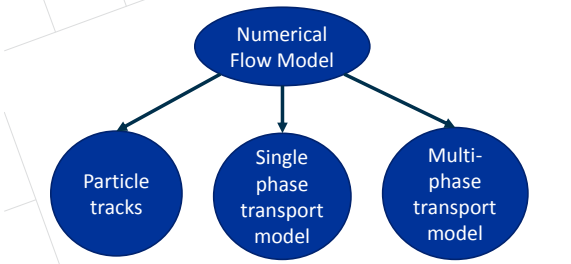

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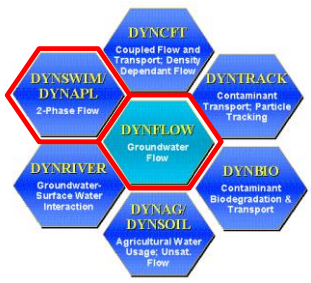
DYNFLOW

Finite-Element Numerical Model Code Suite



For more information n the DYNFLOW Code Suite visit www.dynsystem.com

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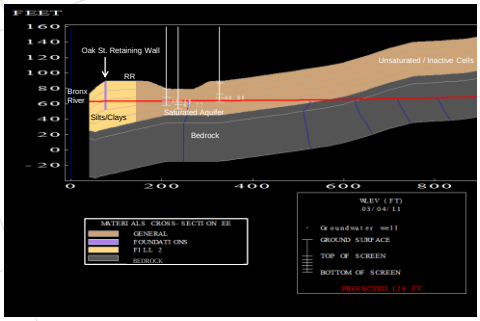
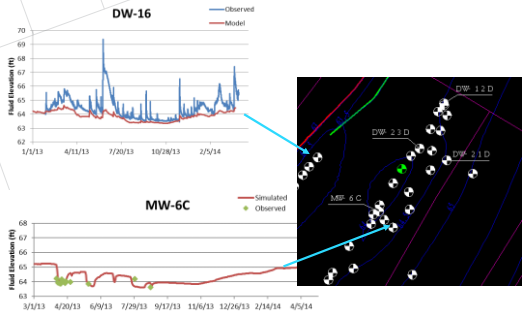
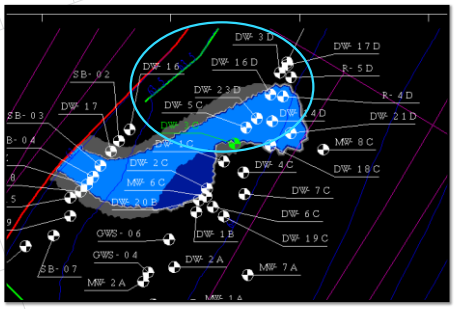
Dynflow Model Cross-Section



Numeric Flow Calibration



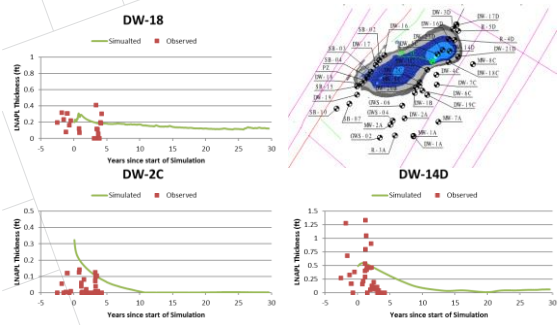
LNAPL Starting Plume – Uncertainties



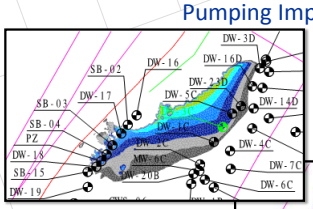
Model Input Parameters for LNAPL

- Pore entry pressure required for LNAPL to replace water in the pores
- Density relative to water
- Viscosity relative to water
- Residual saturation

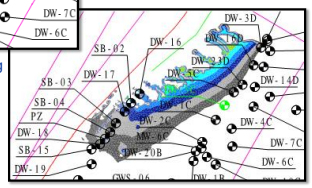
LNAPL Calibration



Pumping Impacts

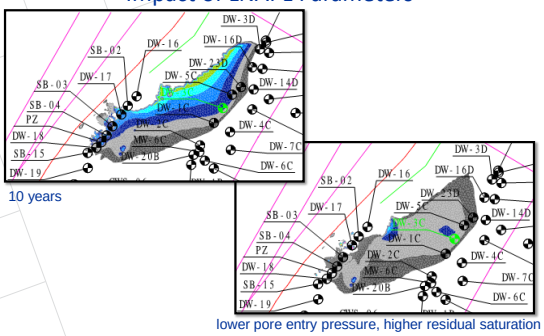


10 years – average current pumping



10 years – no pumping

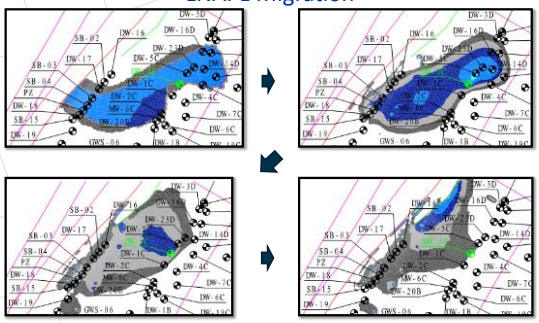
Impact of LNAPL Parameters



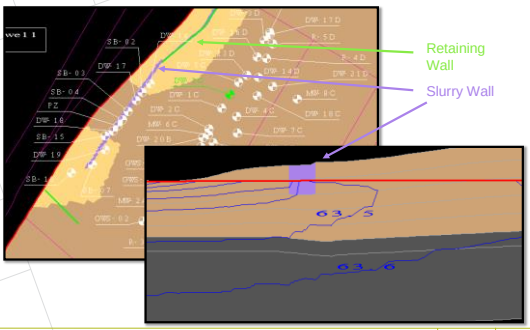
10 years

lower pore entry pressure, higher residual saturation

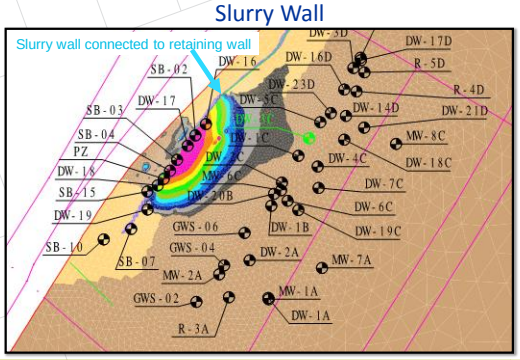
LNAPL Migration



Slurry Wall Simulations



Slurry Wall



Selected Remedy

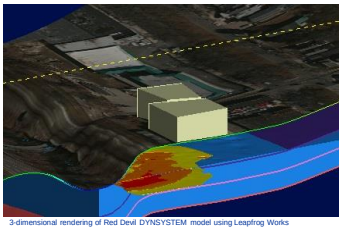
- Slurry wall construction would be costly and have large impact to local ecology
  - Model simulations show the slurry wall should be connected to retaining wall
  - Requires removal of trees
  - Requires fill placement in the river
- Selected remedy includes
  - Continue pumping at source to limit movement of LNAPL
  - Continue periodic removal of LNAPL through bailing of wells and collection of material using booms placed in river

Conclusions

- Multi-phase transport modeling simulated complex movement of LNAPL
- Model did not include all complexities at the site but was sufficient to evaluate the proposed slurry wall

Acknowledgements

- New York State Department of Environmental Conservation
- CDM Smith project team based in the Edison, New Jersey and various New York offices



3-dimensional rendering of Red Devil DYNSYSTEM model using Leapfrog Works

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