Applied NAPL Science Review
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Demystifying NAPL Science for the Remediation Manager

LNAPL Thickness Revitalized

Announcements

H2A is pleased to announce the release of Volume 1, Issue 1 of the new scientific ejournal *Applied NAPL Science Review*, which will provide technical insight into the science behind the characterization and remediation of Light and Dense Non-Aqueous Phase Liquids (NAPLs).

This ejournal will provide a technical overview in plain English of NAPL science in action. Here are a few highlights:

- Diagnostic Gauge Plots and Hydrostratigraphs
- NAPL Conceptual Site Models (CSMs)
- LNAPL Transmissivity
- NAPL Source Removal vs. Controls
- Pilot Testing and Technical Impracticability
- Keys to Remedy Selection: Saturation Reduction vs. Compositional Change
- NAPL Mobility, Migration, Modeling and Recoverability
- NAPL Remedy Metrics, Decision Points and End Points
- NAPL Remedy Optimization
- Decline Curve Analysis to Estimate Expected Ultimate Recovery (EUR)

Coming Up

The next newsletter will explain Diagnostic Gauge Plots.

Related Links

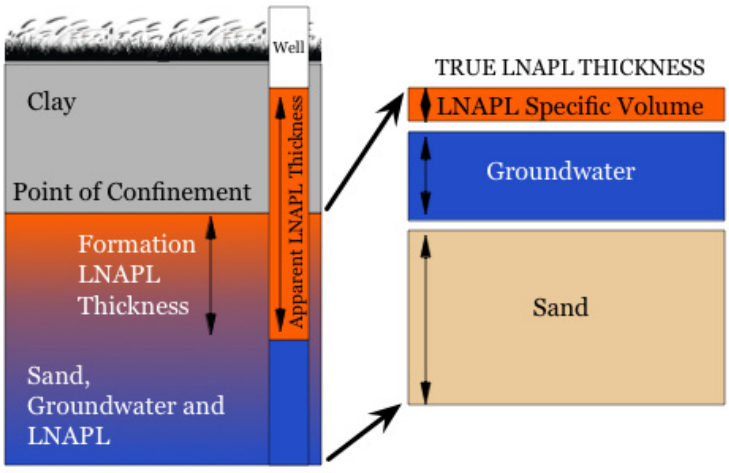
API LNAPL Resources

EPA NAPL Guidance

USGS LNAPL Facts

How useful is LNAPL Thickness? You may be surprised at the answer.

Light Non-Aqueous Phase Liquid (LNAPL) Thickness has come and gone and come again as an inexpensive yet surprisingly sophisticated LNAPL Conceptual Site Model (LCSM) tool. But what exactly do we mean when we say "LNAPL Thickness"?



Subsurface cutaway of a sand aquifer with groundwater and LNAPL confined by a clay layer. Note formation LNAPL thickness, exaggerated apparent LNAPL thickness in the well, and the "true" LNAPL thickness breakdown on the right.

At least three different meanings for LNAPL Thickness exist:

1. Apparent LNAPL Thickness
2. Formation LNAPL Thickness
3. Specific Volume (sometimes called True LNAPL Thickness)

Multiphase modelers also deal with LNAPL Recoverable Volume, which is just the Specific Volume minus any residual LNAPL. But residual LNAPL is a complex issue, so we'll save LNAPL Recoverable Volume for a future newsletter.

Each of these values provides critical information about the LCSM, and consequently each one of them must be understood to have a complete picture of the complex multiphase fluid dynamic forces that control the distribution, migration and recoverability of LNAPL.

Apparent LNAPL Thickness, which is simply the gauged LNAPL thickness in wells, can be used to create Diagnostic Gauge Plots and Hydrostratigraphs to determine if LNAPL is unconfined, confined or perched. If unconfined, then the apparent LNAPL thickness is a good approximation of the formation LNAPL thickness, and can be used as a direct input in multiphase models. Confined and perched LNAPL typically exaggerate Apparent LNAPL Thickness, resulting in substantial overestimates of the volume of LNAPL present in the formation. That exaggeration can result in excessive remediation overdesign costs or even unnecessary remediation.

Formation LNAPL thickness, or mobile LNAPL saturation curve height, is a critical multiphase model input and/or calibration parameter. Much of the exaggeration that occurs when models are based solely on apparent LNAPL thickness can be avoided if the mobile LNAPL saturation curve height is used instead. The predictive model will be much more accurate, leading to better, more cost-effective remediation decisions.

Specific volume, or "True LNAPL Thickness", is the calculated thickness of LNAPL in the formation if the soil and groundwater were removed, leaving only LNAPL. This volume of LNAPL can be expressed as a thickness when reported in units of "cubic feet of LNAPL per square foot of area", which reduces down mathematically to "feet of LNAPL thickness." This "thickness" is a universally comparable LNAPL amount that can then be directly compared to and ranked against every other site's LNAPL specific volume.

Next time we will delve into Diagnostic Gauge Plots to show how important they are to a sound, comprehensive LNAPL Conceptual Site Model.

Until then, feel free to call or email us with any questions about how LNAPL thickness can be used in modern day LNAPL science to minimize your site remediation costs.

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