

## Description of NAPL FLUTE system

### The system once emplaced:

This system consists of an impermeable flexible liner and an exterior covering on the liner which reacts with pure product (e.g., NAPL and DNAPL) to form a bright dye stain on a white background. The liner/cover system can be emplaced via several push rod methods. The pressurized liner forces the reactive cover tightly against the hole wall. The reactive cover is recovered from the hole by inverting/peeling the liner from the hole. In this manner, the cover does not touch the hole wall anywhere else as it is removed. The cover can then be examined for the presence and extent of layers, and even globules, of NAPL in the subsurface. This technique of installation and removal of the reactive covering through the interior of push rods provides a relatively inexpensive method for mapping of NAPLs and DNAPLs in the source region.

### The installation technique

This liner installation method can be applied to the many driven casing “drilling” methods. The same trick is employed regardless of the casing diameter to allow the casing to be withdrawn without excessive drag of the liner on the casing. As the casing/rods are withdrawn, the liner is dilated against the hole wall at high pressure to support the hole wall against collapse and to seal the hole against vertical flow.

### Experience:

This installation technique was first developed for the installation of color reactive liners for the mapping of NAPL layers in sediments. The technique has been employed at both commercial and Federal sites including: Savannah River Site, SC; Cape Canaveral, FL; Paducah, KY; Ft. Meade and Elkton, MD; WV; NJ; PA; CA, AL, KY, IA, NM.

### Procedure:

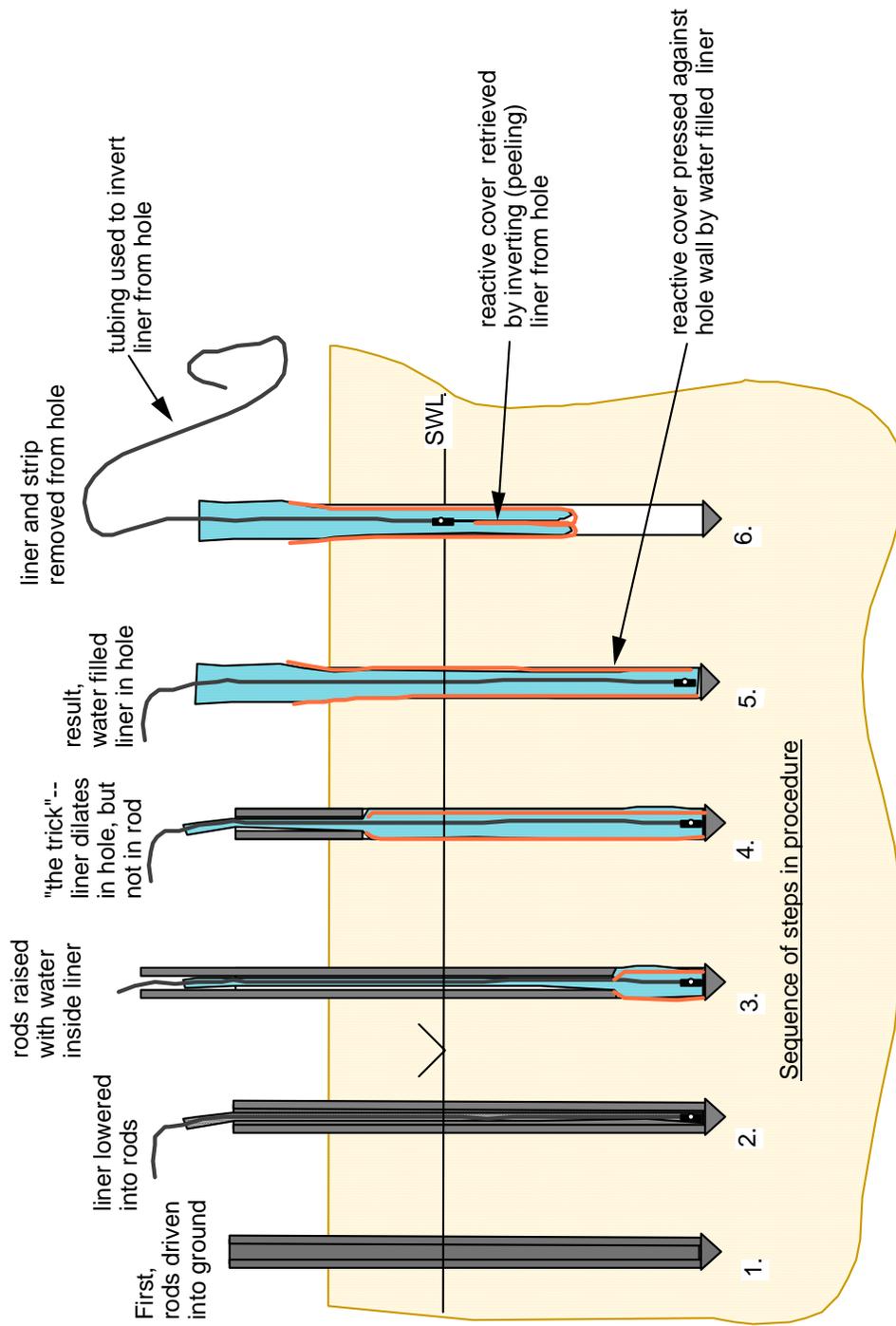
The procedure is illustrated in the attached drawing. The rods are pushed to the full depth of interest. The liner with its reactive covering is inserted into the interior hole in the rods to the full depth. The rods are then filled with water. The rods are raised by one rod section to expose the hole wall. The liner is pressurized with a charge of water to hold the hole open and to anchor the liner in the hole. More water is added to the interior of the liner as the rods are pulled. Once the rods are fully removed, the hole is supported and sealed by the water filled liner. The covering is pressed against the hole wall for an hour, or so, and then the liner is inverted (peeled inside out) from the hole. The covering is therefore interior to the inverted liner. The covering is then peeled from the interior of the liner to reveal the stained map of the distribution of NAPLs in the subsurface.

For information on this technique, call toll free 888-333-2433.

*Flexible Liner Underground Technologies, Ltd.  
Santa Fe, NM 87501*

Note: This technique is a proprietary method devised by Flexible Liner Underground Technologies, Ltd. Co. of Santa Fe, NM. One patent is held and several patents are pending on the method and hardware for several kinds of applications.

**NAPL FLUTE** method of installing color reactive liners in a punched hole <sup>patented</sup>



This technique allows mapping of NAPL/DNAPL layers in punched holes

For details,  
phone: 888-333-2433

Note: This technique is a proprietary method devised by Flexible Liner Underground Technologies, Ltd. Co. of Santa Fe, NM. One patent is held and several patents are pending on the method and hardware for several kinds of applications.

Liner dilating as rod is withdrawn



Stains on covers from direct push holes



Stains on cover in 3" cored hole



Note: This technique is a proprietary method devised by Flexible Liner Underground Technologies, Ltd. Co. of Santa Fe, NM. One patent is held and several patents are pending on the method and hardware for several kinds of applications.