



# Well Design For Product ONLY Recovery

## Application Note #3

Historically, Free Product recovery wells have been designed with Total Fluids recovery in mind. The recent implementation of the RBCA regulations (Risk Based Recovery) has given the Environmental Consultant the opportunity to focus on recovering ONLY the Free Product (LNAPL or DNAPL) on many sites. The historical problem with Free Product ONLY recovery is very low production rates, and limited range of influence. The purpose of this Application Note is to present some new ideas that may increase LNAPL production rates.

### **I. Change Well Annulus Material**

Changing the well annulus material to medium size pea gravel would provide better conductivity between the formation and the well casing, thus increasing the LNAPL migration rate into the well. This can be accomplished because the removal rate of LNAPL out of a well is much lower than water removal, thus the migration of suspended solids into the well are greatly reduced or eliminated. Also, the sands currently being used as well annulus fill material have lower conductivity than other materials for LNAPL. This design resembles a French drain approach except we are using a vertical conduit instead of a horizontal trench.

### **II. Reduce The Well Boring Diameter**

Reducing the well boring diameter will make it easier to develop and lowers drilling costs. LNAPL flow rates into the well are very low thus the migration of suspended solids into the well are greatly reduced or eliminated.

### **III. Increase Well Casing Slot Size**

Typical slotted zones are usually 10 thousandths wide for holding back the #1 and #2 course sands. When medium sized pea gravel is placed in the well annulus then wider slots like 50 thousandths could be used to lower the resistance of the well screen.

### **IV. Use Continuous Wire Wrap Well Casing For High Viscosity Products**

The typical slotted well casing material used for most Free Product recovery is Schedule 40 PVC pipe with 10 or 20 slot size. The wall thickness of the casing (1/4" wide) and the small slot height create a high surface tension barrier for the Free Product to migrate through. A better choice would be continuous wire wrap (stainless steel or PVC) with 50 thousandths slot width to lower the surface tension barrier.

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