

## Application Note #11

### Xitech Total Fluids Approach

Traditional total fluids pump & treat approaches use a top-bottom fill pneumatic pump for recovering NAPL (i.e. Non Aqueous Phase Liquid) and groundwater. This mixture is pumped to an oil-water separator to remove the NAPL from the groundwater mixture. The water from the separator then goes through an air stripper to remove the bulk of the dissolved components in the groundwater. Finally, the water is sent through a carbon vessel to remove other contaminants from the groundwater before discharging the groundwater to sewer. This traditional approach of cleaning up soils saturated with NAPL has three significant draw backs. The first draw back of this approach occurs with the fixed inlet submersible pump. Fixed pump inlets create an opportunity for the pump to completely miss collecting any NAPL due the varying location of the water/NAPL interface. The second draw back of this approach occurs when there are high concentrations of iron or calcium in the groundwater. This situation creates considerable above ground maintenance and system down time of the air stripper. The third draw back of this approach occurs when the NAPL is highly viscous (i.e. very old diesel, bunker oil, or #6 oil). This situation requires large settling tanks to get the NAPL to separate from the groundwater.

The Xitech total fluids system approach differs by choosing to place a skimmer with a floating inlet at the water/NAPL interface to collect the NAPL only and a submersible pump several feet below the water/NAPL interface. This approach in most sites will eliminate the oil water separator and the air stripper. The only above ground equipment will be a holding tank for the NAPL and carbon vessels for treating the groundwater before discharge to sewer. It is very important that the depression pump be placed deep enough to eliminate the need for an air stripper to obtain maximum benefit of this approach. This approach will require an 8 inch diameter recovery well (see Figure 1), pressure transducer to control the depression pump, and custom well head assembly (obtain from Xitech) for supporting a dual pump system.

Please feel free to contact Xitech with any questions regarding the Xitech total fluids approach.

# Total Fluids System Using Xitech Skimmer And an Electric Depression Pump

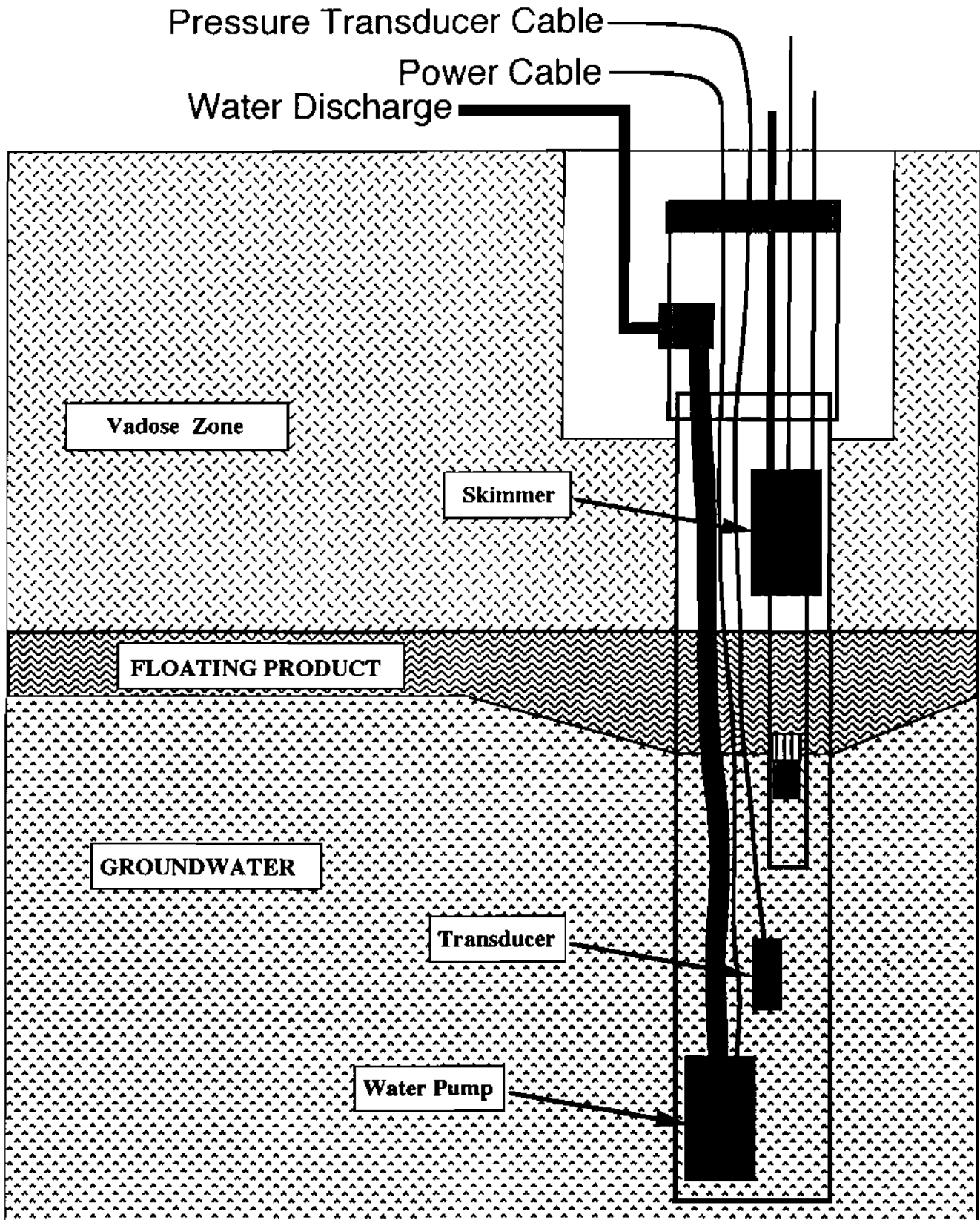


Figure 1

# **Xitech Multi Phase Approach**

Traditional multi phase pump & treat approaches use a rigid drop tube under very high vacuum (i.e. 20+ inches of mercury vacuum) to collect total fluids from extraction wells. This type of approach also applies a high vacuum in the recovery well to recover NAPL in the soils above static liquid levels. The total fluids mixture being recovered through the drop tube is being thoroughly emulsified as it travels back to the oil-water separator. The oil-water separator removes the NAPL and passed the lightly contaminated groundwater onto the air stripper to remove the bulk of the dissolved components in the groundwater. Finally, the water is sent through a carbon vessel to remove other contaminants from the groundwater before discharging the groundwater to sewer.

This traditional approach has five significant draw backs. The first draw back of this approach occurs with the fixed inlet stinger (i.e. drop tube). Fixed pump inlets create an opportunity for the stinger to completely miss collecting any NAPL due the varying location of the water/NAPL interface. The second draw back of this approach occurs when the totally emulsified total fluids mixture arrives at the oil-water separator. This mixture can take a very long time to separate. The third draw back of this approach occurs when there is high concentrations of iron or calcium in the groundwater. This situation creates considerable above ground maintenance and system down time of the air stripper. The fourth draw back occurs when the oil-water separator passes on large quantities of free product NAPL into the air stripper because the mixture did not have enough time to separate. This overloading creates very high maintenance and long system down times to correct. The fifth draw back of this approach occurs when the NAPL is highly viscous (i.e. very old diesel, bunker oil, or #6 oil). This mixture may never separate in the oil-water separator.

The Xitech multi phase approach differs by choosing to place a skimmer with a floating inlet at the water/NAPL interface to collect the NAPL only, a submersible pump several feet below the water/NAPL interface, and a low to medium vacuum applied to the vadose zone. This approach in most sites will eliminate the oil water separator and the air stripper. The only above ground equipment will be a holding tank for the NAPL, a smaller vacuum source (i.e. not a liquid ring pump), and carbon vessels for treating the groundwater before discharge to sewer. It is very important that the depression pump be placed deep enough to eliminate the need for an air stripper to obtain maximum benefit of this approach. This approach will require an 8 inch diameter recovery well (see Figure 1), pressure transducer to control the depression pump, and custom well head assembly (obtain from Xitech) for supporting a dual pump system and vacuum hook up.

Please feel free to contact Xitech with any questions regarding the Xitech total fluids approach.

# Multi-Phase System Using Xitech Skimmer, Electric Depression Pump, And Vacuum

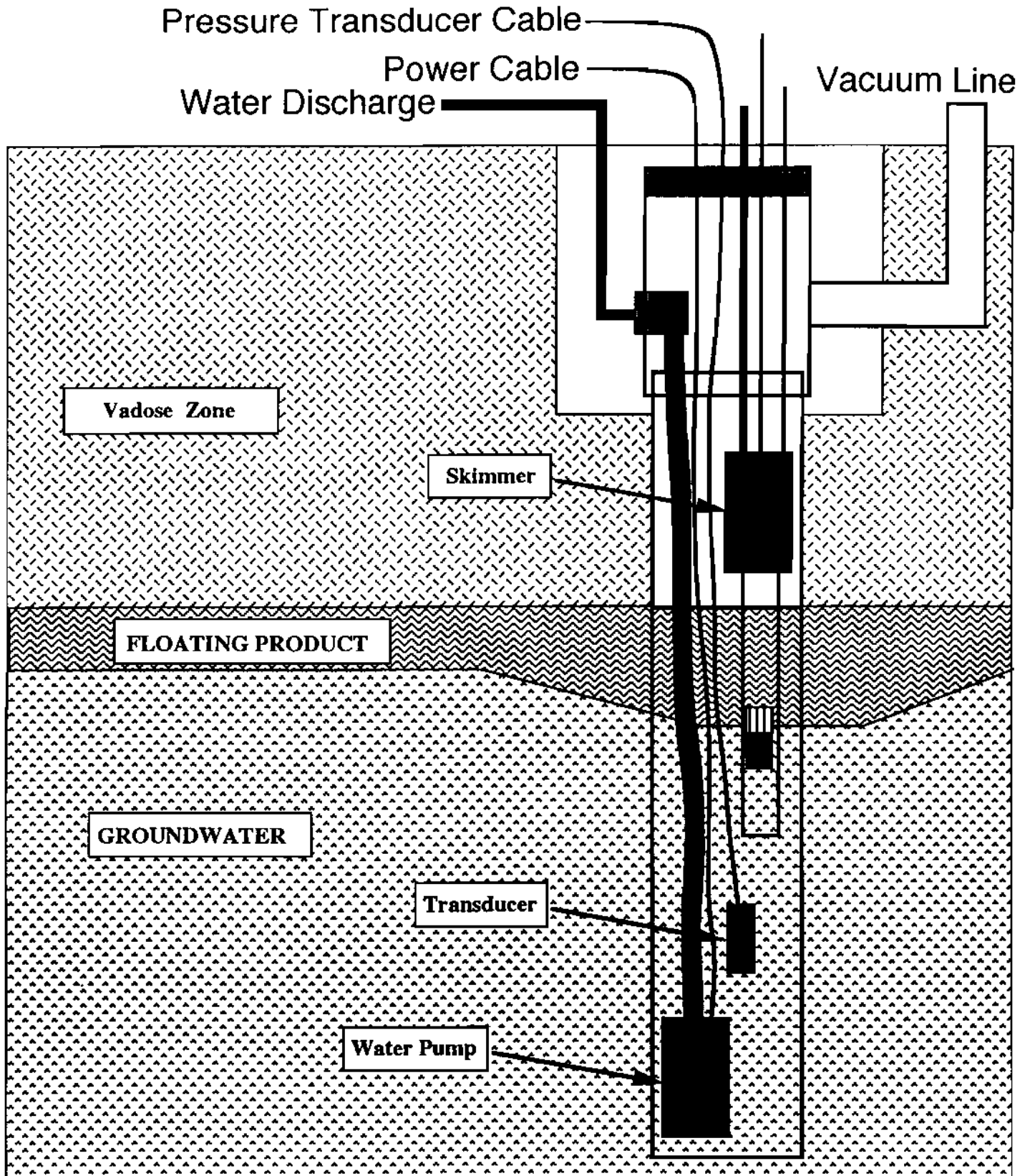


Figure 2