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## General Approaches to LNAPL Free Product Remediation

The Xitech Product Recovery equipment was designed for the following remediation approaches:

**Vacuum Enhanced *Free Product Skimming* “BIO-VEPS”:** This technology combination is the most aggressive approach for recovering high volumes of free product without recovering any water. Please refer to Application Notes 2 and 7 for a more thorough explanation. This recovery approach is very simple. Apply a low vacuum (i.e. 10-30 inches of water vacuum) in the well to create a steady migration of LNAPLs into the well and place a skimmer pump at the water/product interface to recover the LNAPLs. This approach also provides a cost effective method for hydraulic containment of the free product and can be applied to all types of floating product.

***Free Product Skimming*:** This approach of recovering Free Product is a low cost approach to cleaning up your site. There is also much less maintenance to this approach. However, you are trading off lower equipment costs and maintenance costs for much slower product recovery. This approach is best utilized when depths to product are between 5 and 200 feet and when free product recovery rates are less than 25 gallons per hour. All Xitech controllers provide multiple choices of intermittent recovery rates, monitor the high level tank condition, and display total run time of each skimmer.

**Solar Powered *Free Product Skimming*:** This approach of recovery is good for remote locations where AC power is not available or too costly to bring to the recovery area. Xitech’s lowest cost approach to remote recovery would require the use of a 265 cubic foot bottle of nitrogen gas as our compressed gas source to run the skimmer; a Xitech skimmer controller to run the skimmer intermittently; and a deep cycle 12 volt battery and solar panel to provide DC power to operate the controller. Xitech also offers a completely integrated solar powered system for remote recovery called the REM2500ES Remote Solar Powered Station. This approach is best where higher recovery rates are expected and depths to product are between 5 and 100 feet.

**Mobile Solar Powered *Free Product Skimming*:** This approach of recovery is best for situations that require free product recovery of multiple wells or sites that are remote or in locations that are restricted from using normal recovery equipment. In this situation we have designed a road certified trailer recovery system which includes one ADJ Smart Skimmer, one 2500ES Controller with high level tank shutoff, one 230 gallon product tank with secondary containment, DC powered air compressor, 12 volt battery and solar panel, hose reel rigidly mounted, 150 feet of hose, and a rigid mounted housing for the skimmer.

**Hazardous Class I, Division 1 *Free Product Skimming*:** The Xitech 2550ES Pneumatic Skimmer is the safest pumping technology for this kind of site. The Xitech 2550ES is an explosion-proof Class I, Division 1 rated single skimmer controller and our only controller offered for this type of site.

# Selecting the Best LNAPL Recovery Approach for Your Site

There are always going to be many issues to consider before selecting a remediation approach for any site. The following examples will give you a general idea of how to select one of our approaches.

## **Example #1:**

If accelerated site closure is MORE important than capital costs, and there is no requirement to pump the groundwater on your site, then we would recommend the "Bio-VEPS" approach.

## **Example #2:**

If lower capital costs and lower operational costs are more important than time, and there is no requirement for removing groundwater on this site, then we would recommend skimming only approach.

## **Example #3:**

If your well is remote from AC power and/or is located near big confining obstacles (i.e. between to sets of rail road tracks), then we would recommend the solar power skimming approach.

## **Example #4:**

If your site has several wells that are in a heavy traffic area where trenching is not allowed (i.e. airport taxi way), then we would recommend the mobile solar powered skimming approach.

## **Example #5:**

If your site has a well that is in a hazardous area where only Class I technology is allowed (i.e. oil refineries or bulk fuel dispensing areas), then we would recommend our pneumatic skimmer and Class I Division 1 explosion-proof controller approach.