

Incorporating Innovative Technologies into your Remediation

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Working With LSRPs

In a brownfields scenario LSRP's should.....

- Communicate early and often with the developer and design engineer.
- Design the remediation around the development as much as possible.
- Be flexible. Offer options.

Innovative Technologies

The most common innovative technologies include:

- Chemical oxidation (hydrogen peroxide/Fentons Reagent, persulfate, permanganate, percarbonate, ozone)
- Bioremediation (biostimulation or bioaugmentation)
- Thermal technologies
- Chemical reduction (e.g., zero valent iron)

Innovative Technologies

In general....

- Chemical oxidation, thermal and chemical reduction are more aggressive approaches.
- Bioremediation is typically a longer term approach.

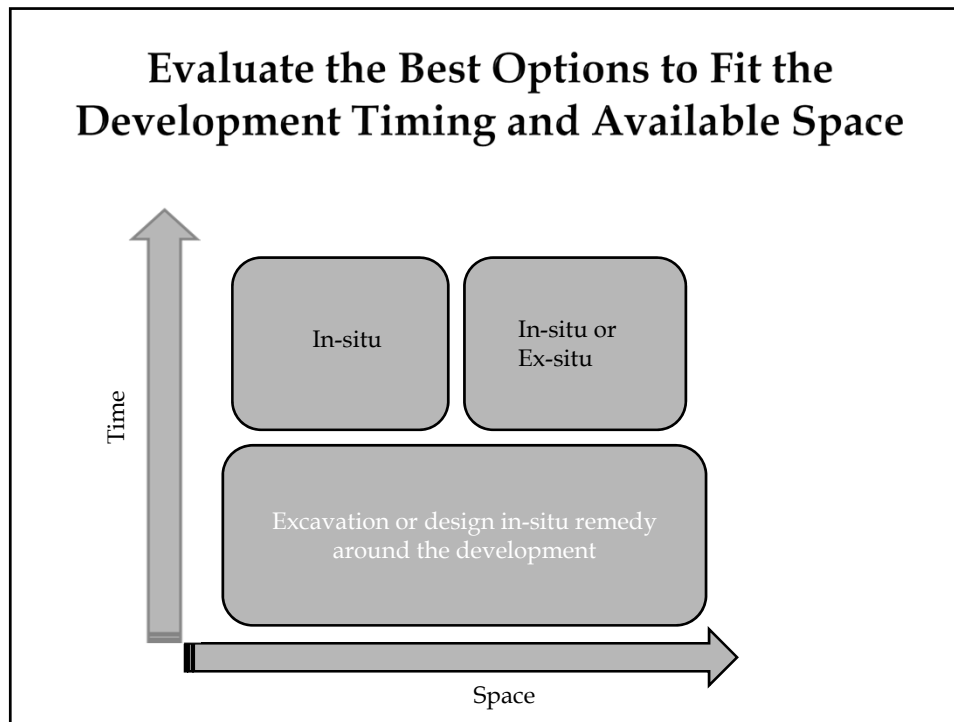
Innovative Technologies

Innovative technologies can be applied in-situ or ex-situ

- In-situ (e.g., injections, soil blending, treatment walls, thermal)
- Ex-situ (e.g., land farming)

Innovative Technologies

- Combining technologies is becoming more prevalent.
- Excavation and disposal always offers the most certainty and should be considered as part of any innovative technology approach, e.g., hot spot removal.



Take Advantage of Compliance Attainment Options

For remedial actions you can use all four compliance attainment options

- Arithmetic Mean
- 95 UCL
- Spatially Weighted Average (SWA)
- 75%/10x

Case Study

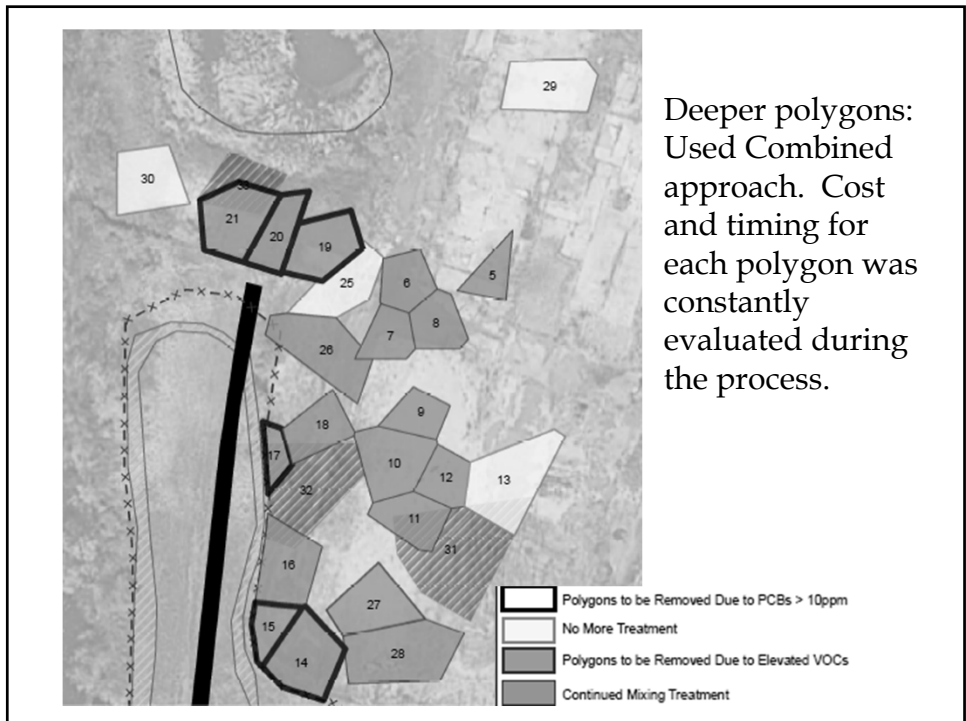
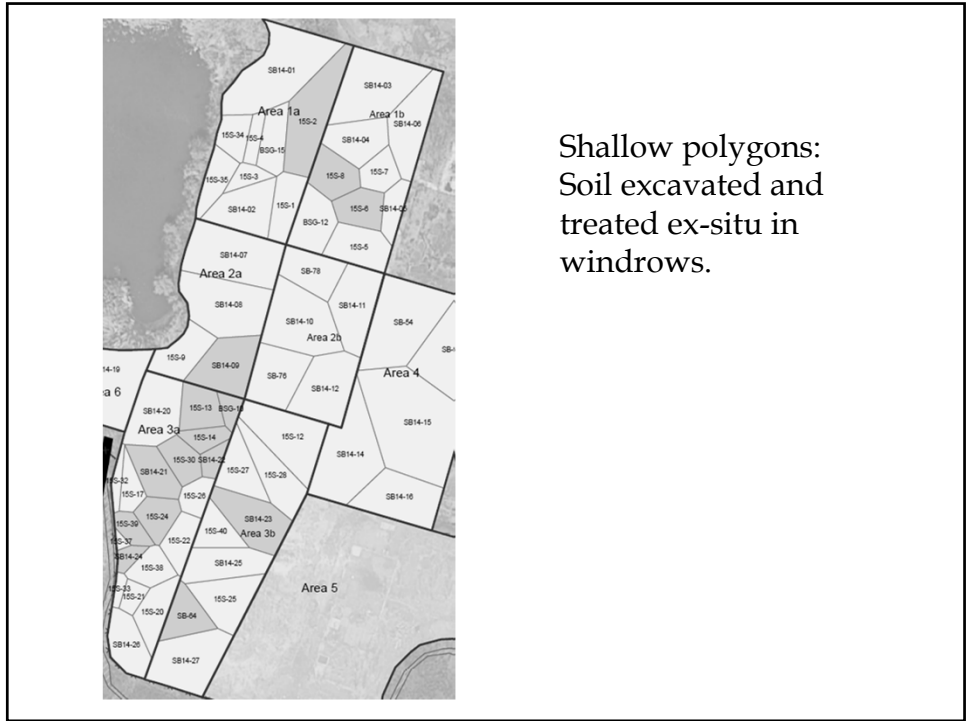
Site Background

- 19 acre former chemical manufacturing site in northern NJ.
- Constituents of concern are VOCs and PCBs.
- Site buildings were demolished in 2002.
- Falls into the category of lots of open space and sufficient time to use various remedial options.

Case Study

Approach

- Used combination of in-situ and ex-situ soil treatment and excavation and disposal.
 - Shallow soils excavated and treated ex-situ on-site.
 - Deeper soils remediated with combination of in-situ and ex-situ treatment and excavation/disposal.
 - Hot spot VOC and PCB soils excavated and disposed off-site.
- Utilized SWA to determine areas requiring remediation and evaluate compliance attainment.



Ex-situ soil windrows



Soil windrow treatment



Soil Windrows



Soil blending attachment



**In-situ soil blending with
bioaugmentation amendment**



Excavated Shallow Polygons



Excavated Deep Polygon

