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Methods and Systems for In Situ Temporary Containment of Soils for Remediation or Other Treatments

Soil contamination is a worldwide problem, whether it is from heavy hydrocarbon spills, industrial activity or agricultural chemicals, and there are many different strategies for treatment. One thing of utmost importance, no matter what treatment strategy is utilized, is the prevention of downward and outward migration of pollutants at treatment sites. Whereas successful engineered solutions to horizontal contaminant transport exist, this is not the case with vertical containment of contaminants, which is poorly understood. This results in limitations to complete isolation of contaminants and reduces the effectiveness of soil and groundwater remediation.

Researchers at Arizona State University in conjunction with collaborators at Chevron have developed a method and system for temporal isolation of defined volumes of shallow soil. This system can be used for the in situ containment of soil for contaminant removal, remediation, resource extraction, emergency responses to surface spills and more. A major advantage to this technology is its ability to shield deep soil strata, groundwater and potentially drinking water resources from further contamination during manipulation and treatment of shallow soils. The need for costly soil displacement is eliminated by creating a continuous impermeable horizontal and vertical containment barrier around soil that is both easy to install and easy to remove.

This system overcomes a fundamental challenge in soil containment and requires less manpower than existing technologies while remaining cost-effective and less damaging to the surrounding environments. This has the potential to be an essential supporting technology for novel soil remediation treatments of near surface contamination

Potential Applications:

- Contaminant removal / Soil Remediation / Resource extraction
 - o Organic contaminants, such as residual heavy hydrocarbons
 - o Inorganic contaminants, such as heavy metals and radionuclides

- Emergency responses to surface spills
- Other applications requiring manipulation of soils in place for a limited period of time

Benefits and Advantages

- Deep soil strata, groundwater and potentially drinking water resources can be shielded from contamination during manipulation and treatment of shallow soils
- Compatible with a wide range of remediation agents
- Easy and inexpensive to install and remove
- Does not require the removal or transport of soils off-site, which is very expensive
- Formation of a robust and complete horizontal and vertical containment barrier around the soil without soil excavation

For more information about the inventor(s) and their research, please see [Dr. Haldens directory webpage](#)