

Technical Bulletin

PetroFix for Spill Response at Residential Heating Oil Sites

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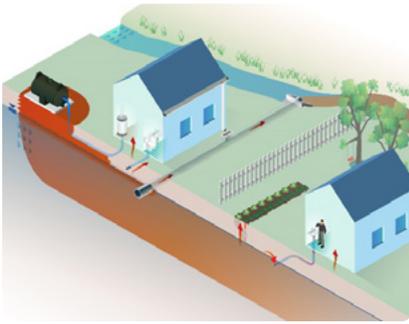


Figure 1
Unmitigated heating oil spills can impact homes in the form of vapors or in the form of migrating groundwater plumes.



Figure 2
Common remedies for a spill include excavation and the extraction of product, water, and/or vapors although contaminated groundwater may remain and migrate

Common examples of response actions following a heating oil spill include excavation of impacted soils, high-vacuum extraction of pooled heating oil, use of absorbent material on basement or garage surfaces, and subsequent soil and groundwater sampling. Depending on the severity of the spill and the geology of the area spilled oils may migrate quickly to and begin spreading across the water table, potentially forming a groundwater plume. The residual contaminant left after the initial emergency response may not attenuate rapidly enough to prevent impact to receptors. PetroFix's blend of colloidal activated carbon and biostimulating electron acceptors is a simple, long-term solution to mitigate this environmental risk when used as part of emergency response activities.

PetroFix as a Pre-Emptive Spill Response Remedy

The colloidal activated carbon of PetroFix is always “on” and can adsorb contaminants over long periods of time. The benefit of longevity is that PetroFix can be injected, sprayed, or placed strategically to prevent the movement of dissolved phase contamination. For example, PetroFix can be injected as a subsurface barrier to prevent the movement of a plume past property boundaries or to receptors. Another example would be to spray the base and sidewalls of an excavation with PetroFix to help treat residual contamination after an initial emergency response that included excavation [See Figure 3](#). PetroFix has been used pre-emptively at heating oil spills as a pre-emptive *in situ* barrier to reduce migration to critical receptors (i.e. property lines or residences) soon after a spill was discovered. In these applications, PetroFix is an excellent supplemental technology for excavation or mechanical removal of the spilled mass.

PetroFix as a Remedial Remedy

When heating oil spills require remediation, PetroFix can be applied in conjunction with other activities to increase surety, minimize future risk and avoid further remedial costs. Examples include spraying PetroFix into open excavations to help capture and remediate residual dissolved heating oil contamination, flooding into granular fill that may have been used in the excavation and injections into the subsurface to treat source areas or plumes, or as barriers as mentioned in the previous section.

Please note that PetroFix is designed for waters impacted by spilled heating oil and not for direct remediation of mobile LNAPL from the spill itself.



Figure 3

PetroFix can be applied in tandem with other remedial activities to help prevent the movement of groundwater contaminants or to address residual contaminants. PetroFix is commonly applied in excavations, utility corridors, or injected into strategic grids and barriers.

Safety

PetroFix is a two-part product, the main part consisting of micron-sized particles of activated carbon suspended in a slightly basic (pH 8-9) aqueous solution. The second part of the product, 'EA blend', is a dry blend of electron acceptors comprising sulfate and nitrate salts that stimulate petroleum degradation by native soil bacteria. The EA blend consists of food-grade ingredients.

Both parts of the product are non-hazardous, non-corrosive, and safe to use around infrastructure of all kinds. The risk of contact for underground infrastructure with PetroFix solutions is equal to that of rain or municipal water. Specifically, waterproofing coatings and other plastic/non-metallic materials and sealants are not adversely affected by contact with PetroFix.

When PetroFix remedial fluid is co-applied with the standard electron acceptor salt package certain groundwater parameters such as sodium, nitrate, or sulfate may temporarily exceed secondary drinking water standards for the area. These parameters are much less hazardous than the hydrocarbons they are engineered to treat and will decrease to background levels once more. However, if there is a concern it is possible to remove them from the injection process. Otherwise, it is advised to include it because the electron acceptors help to stimulate beneficial biodegradation of hydrocarbon and will eventually attenuate to below background concentrations.

The expected degradation and daughter products following a PetroFix treatment are identical to what is expected to be present on the site under naturally occurring biodegradation conditions. Supplementing electron acceptors and emplacing activated carbon simply supports these processes and does not significantly alter degradation pathways

'Ink-Like' Appearance

PetroFix is an 'ink-like' product, designed to coat the subsurface in a thin layer of activated carbon. If not properly handled the activated carbon in PetroFix can stain surface features such as sidewalks, grass, etc. If spilled on any horizontal surfaces the discoloration can be greatly minimized if it is vacuumed away quickly and high-pressured sprayed for cleaning. PetroFix may be expected to discolor any potable waters used in a home or for irrigation, however this is temporary as the activated carbon in the water will adhere to the subsurface and settle-out.

Application Rules-Of-Thumb

We recommend some rules-of-thumb to consider in the absence of site data to optimize contaminant targeting and minimize movement of PetroFix off-site. Please check any local requirements that might change this guidance and the user is responsible for any accidental contact with PetroFix with a water body or water source.

1. Inject PetroFix >20' (6m) from any active potable or industrial water well.
2. Apply PetroFix >50' (15m) from any surface water such as a river, stream, or pond. While the colloidal carbon of PetroFix has been shown to not affect aquatic life any discoloration might cause concern by casual observers;
3. Take caution when injecting near subsurface utilities. While PetroFix can help prevent contamination from moving through gravel pack around subsurface utilities the same conduit could channel PetroFix beyond the target area if injected at high enough volumes;

Only spray PetroFix into excavations or ground cuts to avoid accidental application to the site surface.