Remediation:
Oil Is Not Oil

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Reducing Costs of Spills *Through* Differentiation

While the default US environmental regulatory position treats most products equally ('oil is oil'), Envirotemp™ FR3™ fluid possesses a significantly improved environmental footprint. The greatest impact of classifying all oils as identical is higher than necessary costs incurred during construction in the form of containment (and fire mitigation systems), and more expensive remediation after spills occur. Current regulations do provide for differentiated treatment of FR3 fluid.

Compliance with the Spill Prevention, Control, and Countermeasure (SPCC) rule[1] requires thorough understanding of the US EPA regulations. To help, the US Department of Agriculture has published a step by step guide[2] to understanding and complying with these regulations at electrical substations.

Utilizing Envirotemp FR3 fluid in transformers will reduce the overall cost of complying with SPCC requirements.

Containment, when required, is as easy as building an earthen berm around the substation, eliminating the need for more expensive cement systems[3]. (Furthermore, FM Global recognizes that less flammable fluids such as FR3 fluid reduce long term liabilities, and allow its use to eliminate water deluge systems and reduce space separation distances, providing additional savings during project construction).

Remediation, the process used to repair the environment to pre-event condition, is also less expensive for FR3 fluid compared to traditional mineral oil.

For spills into waters, biological degradation (bio-remediation) is allowed[4]. FR3 fluid is proven non-toxic[5] and readily biodegradable[6] (equivalent to greater than 99% biodegradable). Implementing this solution is highly effective for FR3 fluid, and will reduce expenses when compared to any current mineral oil remediation process.

For soil spills, the transformer industry has for convenience assumed that most mineral oil spills should be remediated by excavating and incinerating (or sequestering) of the contaminated soil, replacing it with 'clean' soil, and then replanting indigenous plants.

In the case of FR3 fluid spills to soil, an equally effective remediation plan includes the use of bioremediation in lieu of the more common (and expensive) mineral oil process outlined above. Analysis of FR3 fluid confirms 100% bio-based content per ASTM D 6866.

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[1] Oil Pollution Prevention, 40CFR112

[2] Design Guide for Oil Spill Prevention and Control at Substations, Bulletin 1724E302, US Department of Agriculture, http://www.rurdev.usda.gov/SupportDocuments/UEP_Bulletin_1724E-302.pdf

[3] Bulletin 1724E302, Section 3.2.2, p.17

[4] Bulletin 1724E302, Section 8.4, p.81

[5] Fish, Acute Toxicity Test, OECD 203

[6] Ready Biodegradability, OPPTS 835.3110

Cargill recommends accelerating the bioremediation process by spreading active yeast over a spill site and adding water to activate the micro-organisms contained in the yeast. The micro-organisms will consume the FR3 fluid, thereby effectively removing it from the environment, achieving the same result as the traditional mineral oil remediation process, but at fraction of cost.

Long term risk assessment requires thorough understanding of current regulations. The use of FR3 fluid in transformers effectively mitigates long term liabilities by alleviating concerns over spill impacts, and future costs of remediation. For new construction projects, the substitution of earthen berms for cement or other costly containment methods provides immediate project savings. Spills, whether in water or on soil, should be bio-remediated, achieving results similar to more intrusive mineral oil remediation methods, but at a substantially reduced cost.

Figure1 – Aerobic Aquatic Biodegradation
EPA Test OPPTS 835.3100