UTILITIES TURNING TO VEGETABLE OIL-BASED TRANSFORMER FLUIDS

Utilities and industry are making the switch from mineral oil to Envirotemp® FR3™ fluid.

By John Getley and Robert Wilson – Wilson Transformer Company (WTC)

FR3 fluid is a soy-based natural ester, with properties that make it very attractive for use in liquid filled transformers, such as –

- ***Enhanced Fire Safety***
  - A high fire point of 360ºC (mineral oil 165ºC). FR3 will not support a fire unless heated from an external source.
- ***Superior Environmental Profile***
  - Non toxic – Made from food grade vegetable fluid and food grade additives.
  - Rapid biodegradation – In both soil and aquatic environments, FR3 rapidly biodegrades to in excess of 99% (mineral oil 25%) in the presence of water, oxygen, organisms and heat. Inside sealed liquid filled transformers these parameters do not exist.
- ***Low Carbon Footprint***
- ***Enhanced Transformer Insulation Life***
  - Kraft based insulation ages at a significantly slower rate in FR3 filled transformers compared with mineral oil.
- ***The Reliability of Liquid Filled Transformers***

  Liquid filled transformers are very reliable due to the:
  - Self repairing characteristics of their insulating systems compared with solid insulation
  - Superior heat transfer compared with solid or gas insulation.

Increasingly, utilities and industry across the globe are reviewing their use of vegetable fluid filled transformers for new and retro-fill applications as part of their environmental commitment.

In the USA, ComEd, Alliant Energy and Xcel with purchases of over 20,000 distribution transformers annually have switched. Utilities in Brazil and Europe are also switching.

In Australia, WTC have supplied over 100 FR3 distribution transformers and over 10 FR3 power transformers.

During September 2008, WTC installed one of two FR3 filled 50MVA 132/11-11kV power transformers in EnergyAustralia's Sydney CBD City South Substation. This is one of the larger power transformers manufactured using FR3 fluid and has replaced an existing old transformer. The new transformer has been installed in the basement of the building to minimise fire risk. The performance of the 50MVA transformer is being monitored by EnergyAustralia and WTC in collaboration with the Centre for Power Transformers at Monash University. Parameters being monitored remotely via a DRMCC include:

- Winding temperatures with Fibre Optics
- Bushing health
- Dissolved gas
- Moisture in fluid and insulation.

Envirotemp FR3 fluid is FM Global Approved and UL Classified as a Less-Flammable fluid, making compliance with code and insurance requirements easier.

Envirotemp FR3 fluid is also a non-toxic and biodegradable resource, according to the OECD and the US EPA.

Using Envirotemp FR3 fluid in a new transformer installed in the basement of a Sydney CBD building.

COOPER Power Systems

Introducing a Superior Less Flammable Transformer Fluid

Envirotemp® FR3™

- Enhanced Fire Safety ☑
- Superior Environmental Profile ☑
- Enhanced Transformer Insulation Life ☑
- Enhanced Transformer Performance ☑

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