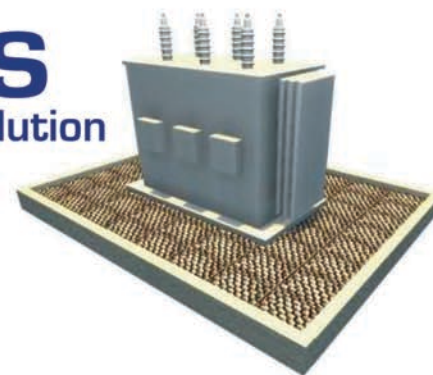


The SorbWeb™ Plus

Secondary Oil Containment System Solution



Technical Note: 002 Conformance to Fire Code Regulations

By Scott Lucas

SorbWeb™ Plus is a passive system designed for the containment of hydrocarbons, yet when hydrocarbons are not present, water in the form of rain or snow melt freely passes through the system. Once installed, the system is designed to hold 110% of the capacity of oil present in the container, is designed to handle a rainfall event of the past twenty-five year average and any water deluge system that may be present. **SorbWeb™ Plus** is designed to last the life of the transformer.

SorbWeb™ Plus is a multi-layer containment system using various geosynthetics to contain any hydrocarbon which may be spilled. At the heart of system is a geosynthetic, which is known as a “*Smart Fabric*.” This “*Smart Fabric*” consists of two designed geotextiles which have a co-polymer in the center of the two geotextiles. The sandwiched co-polymer is interlocked together forming a continuous mat. The “*Smart Fabric*” when not subjected to hydrocarbons allows water to pass through the system into the subsoil, or a drainage system can be built moving the water to a low-lying area. However, when hydrocarbons come into contact with the “*Smart Fabric*” the co-polymer will congeal and seal, not permitting any hydrocarbon from leaving the containment area.

SorbWeb™ Plus has been designed such that there is a layer of fire quenching stones on top of the system. This layer of fire quenching stone is at a depth of 30 cm to 65 cm, dependant upon design. The fire quenching stone is 19mm to 38 mm in diameter. This gives a void area of 30% to 40%. This is the area that the spilled oil will be contained.

Having a void area of 30% to 40% any burning oil will enter the void and is immediately quenched due to the lack of oxygen. Once the oil fire is quenched the temperature also dramatically reduces.

Tests have been performed using geosynthetics and fire quenching stones with burning oil to determine the effectiveness of the fire quenching stone. These tests were carried out by Hydro One Inc. in 2004 and updated in 2007. The article, which was developed from this testing is called “**Transformer Oil Spill Containment: Oil Burn Fire Test Report – Phase I and Phase II Fire Testing**”. Karel Heimlich of Skytech Canada Inc. of Toronto, Canada prepared this article for John Monczka, Environmental Planner for Hydro One Inc., Toronto, Canada.

This report showed conclusively that the fire quenching stones between 19 mm to 38 mm immediately quenched the fire from the burning oil. Through various probes in the layer of the fire quenching stone it showed a dramatic decrease in temperature from when the oil was on fire to when it was quenched. In fact, within a few millimeters the temperature drop was well below that of the geosynthetic melting point.

SorbWeb™ Plus is designed using impermeable geosynthetics around the perimeter of the system to contain hydrocarbons not allowing them to leave the containment area. The impermeable geosynthetics are typically 5 cm to 10 cm from the surface. This gives a free board height of 5 cm to 10 cm.

It was demonstrated by the “**Oil Burn Fire Test Report**” that the burning oil was quenched extremely close to the

surface of the fire quenching stone. It was also shown that the temperature of the quenched oil was about 100 degrees Celsius, well below the melting point of the impermeable geosynthetic at a height 1 cm and lower.

It can therefore be shown that when covered with a noncombustible material of 5 cm to 10 cm that the geosynthetic geomembrane will not fail when the secondary containment is exposed to fire.

The “*Smart Fabric*” has further protection layers than that of the geosynthetic geomembrane. There will be in addition to the 30 to 65 cm layer of fire quenching stone there is a 5cm layer of sand which does not support combustion and a layer of Roxul, which is used as an absorbent layer for the oil. Roxul being manufactured of basalt stone also does not support combustion.

By the design of the system and the testing which has been performed by Skytech Canada Inc. for Hydro One Inc., it can be stated that burning oil will have no affect on the geosynthetic contained within the **SorbWeb™ Plus** system. There is sufficient noncombustible material covering the geosynthetics such that the geomembrane will not fail.

