

# You Get What You Pay For

**There** are others who are offering what is called Secondary Oil Containment using co-polymers.

They have made statements that their co-polymer works with both hydro carbons and biodegradable oils. This is statement is false. Copolymers which work on hydro carbons do not work with biodegradable oils. A separate type of co-polymer is required to work effectively with biodegradable oils. The molecular structure between hydro carbons and biodegradable oils is completely different therefore the molecular change that occurs with biodegradable oil versus that of a hydro carbon will be completely different. Beware, there are two entirely different co-polymers required, one to react with hydro carbons and the other to react with biodegradable oils. Testing can be manipulated to show that one co-polymer will react the same with both oils.

There are others that state that they offer full containment using co-polymers and that they design a system. Be aware, as the system offered is not an engineered system, nor has the system ever been exposed to a transformer failure.

Usage of a Geosynthetic Clay Liner [GCL] with coverage of 4" of stone will not remain a barrier. The GCL will not remain hydrated under 4" of stone. A GCL to remain hydrated must be buried at least three feet and in some cases even more to remain hydrated. GCL's contain sodium bentonite. Under periods of hydration and dehydration GCL's will desiccate and the cracks will not fill in after a period of time. The sodium bentonite which gives a high swell characteristic making it low in permeable value under a confining stress of typically 3 feet of cover soil will slowly alter to calcium bentonite. Calcium bentonite has very low swell characteristics, as such calcium bentonite is a very poor barrier and permeability characteristics are very high. The GCL will lose its ability to retain moisture and become a barrier. There are many papers written which support this fact.

Berms must be engineered to remain berms. If they are not engineered, failure occurs in a relatively short period of time [remember New Orleans with unengineered levees]. Snow, ice and rainfall will erode non-engineered berms. Once the berms have been eroded the fabric with the co-polymer becomes exposed. This fabric is manufactured of recycled carpet fibre made of nylon and whatever other waste may be in the carpet. There is no UV protection with this fabric. The fibre if not protected from UV rays will breakdown quickly, exposing the co-polymer, the co-polymer will breakdown also due to UV rays.

These berms are also a tripping hazard and prevent vehicles from getting close to the oil filled equipment for servicing.

There is now a new product being promoted again using a co-polymer as the containment vehicle. This product is excavated into the subsoil to a depth as much as 4 feet. The earthen walls are vertical in nature. There does not seem to be any discussion as to whether the soils would accept infiltration or the stability of the soils given a vertical wall. Inside the excavated area is filled with rip rap, this is supposed to be the area for containment. Along side the vertical wall is pro-

posed a vertical layer of pea stone, then a fabric which would have co-polymer. The bottom of the excavated area is sloped by 6" from the transformer pad to the vertical wall; the bottom of the excavated area is lined with a Geosynthetic Clay liner. The premise is to move the water to the vertical earthen walls and allow infiltration of the water into the soils.

If the soils will accept infiltration of water, given that there is a large diameter of stone against the slope with pea stone and a textile laden polymer one would have what is called lateral earth pressure, which is the pressure that soils exert in the horizontal plane. Horizontal earth pressure is assumed to be directly proportional to the vertical pressure at any given point in the soil profile. Active state occurs when a soil mass is allowed to relax or move outward to the point of reaching the limiting strength of the soil; that is, the soil is at failure condition in extension. This is common occurrence when soils are saturated.

If soils will not accept infiltration of water and as there is a barrier at the bottom of the excavated basin, the water will collect in the sides of the barrier as the bottom is sloped 6" from the transformer pad to the outer perimeter. The soils that do not accept infiltrations readily are typically clayey or a combination of slit and clayey soils. These soils have very poor shear strength and once saturated will reach failure at a very low force. There will be movement of the vertical wall into the excavated area containing rip rap due to the large void area.

There also is no means of support of the vertical pea stone other than the vertical earthen wall on one side and the fabric on the other. If not fully compacted, under ideal conditions this pea stone will migrate downwards due to gravity and water.

The vertically placed mat of co-polymer is not tied nor affixed to anything. It is merely placed in a vertical position with the rip rap on one side and the pea stone on the other side. As this co-polymer mat is not affixed, the mat will move in a downward motion due to gravity, water passage from rainfall and snow melt, freeze/thaw cycles [as the containment will move in these conditions]. How much a movement downwards is going to depend on the friction there may or not be from the pea stone and the rip rap. Over a short period of time one can expect severe movement downwards; the vertical earthen wall and the pea stone will also move as the fabric moves, as the only separator between the pea stone and the rip rap is the fabric.

As the fabric moves downwards, the side walls will migrate into the rip rap. This will continue until there becomes a blockage in the rip rap. So in effect the voids areas within the rip rap which are meant to be the containment area will fill up with soils and the side walls will continue to erode into the so-called containment area. The soil type, amount of rainfall/snowmelt will determine how quickly this occurs.

The cheap way to go, but is it really worth the risk!

**Remember, You Get What You Pay For!**