



Featured Technical Topic Summary **FGI Monthly Members Meeting** **Friday, October 6, 2023**



TOPIC: Electrical Leak Location Surveys with Flexible Geomembranes

Each month Tim Stark introduces a new technical topic for discussion and possible action. This month's topic is: **"Electrical Leak Location Surveys with Flexible Geomembranes"**. This topic generated significant discussion with the main "take-aways" being listed below:

1. Electrical Leak Location Surveys with Flexible Geomembranes

Electrical Leak Location Surveys (ELLSs) can be performed with flexible geomembranes, i.e., non-HDPE geomembranes; if an HDPE geomembrane is used, we recommend a white color surface to reduce wrinkling, which is discussed below

In fact, it is easier to "leak locate" flexible geomembranes because most materials typically exhibit a greater amount of intimate contact with the subgrade, i.e., they lay flat, and exhibit smaller wrinkles that do not have to be removed as HDPE geomembranes do.

In general, it is difficult to perform a ELLS with wrinkles greater than 3 inches high because they cannot be "walked out" and there is no intimate contact with the subgrade. On more flexible materials, wrinkles can typically be pushed down or walked out allowing for proper testing.

ELLSs are independent of geomembrane polymer type, the main limitations are wrinkles and the geomembrane being a good insulator.

However, ELLSs cannot be performed on two types of geomembranes; conductive geomembranes and EPDM geomembranes because of the large amount of carbon black.

New developments in ELLSs:

Conductive geotextiles are entering the marketplace so water or a wire does not have to be introduced between the primary geomembrane and the secondary geomembrane in a double geomembrane system.

Conductive geotextiles consist of a 3 mil thick conductive film that is needle-punched into a nonwoven geotextile; the conductive polyethylene film can also be used as a substrate for polyurea spray applied liners. This includes pipe supports for tanks, sumps or irregular vertical wall facings.

Conductive geotextiles heat-bonded to a geonet are now being manufactured to create a conductive leak detection zone between two geomembranes – a resulting bottom liner system could consist of the following:

30 mil thick primary GM

Conductive geosynthetic drainage composite, and
30 mil thick secondary GM

This is a significant development/advancement because water does not have to be introduced between the primary and secondary geomembranes; this is important because sometimes the water used is processed or contaminated, which introduces contamination below the primary geomembrane and the water can remain between the geomembranes for extended periods of time making it difficult to accurately monitor for leaks. .

Conductive geotextiles also allow testing of pipe boots, which is important because it is difficult to weld around pipe boots. A conductive GT is placed around the pipe below the geomembrane skirt and a portion of the geotextile is extended from below the geomembrane along the pipe so it can be connected to the electrical circuit. After leak testing, the GT is tucked below the top of the GM and the GM is then clamped to the pipe.

Alternatively, a strip of conductive GT can be extended up to the anchor trench instead of out of the pipe boot as described above – Conductive GTs come in rolls 300 ft long and in small strips that can be run to a nearby anchor trench where the electrical circuit can be completed.

Greater concern about pipe boots than welding and testing of the geomembrane skirt and other welds, is clamping the GM to the pipe. Considerable discussion occurred about the limitations of using a Neoprene gasket and a steel band to seal the GM to the pipe. Some of the problems that develop are:

- A wrinkle in the GM under the clamp can allow leakage;
- Clamp corrodes and eventually fails;
- Gasket becomes brittle and leaks.

This is a problem because the GM and pipe boot do not leak but the pipe clamp leaks resulting in a problem; some possible remedies include:
Use Max Adapter product to seal GM to the pipe.

Use concrete collars in which pipe extends through concrete and use embedment strip in concrete to weld geomembrane to concrete collar – this would be a good detail to include on the FGI website. FGI would be interested in conducting further testing of conductive geotextiles for electrical leak testing pipe boots and areas of mechanical attachment of the liner.

Sealing geomembranes to pipes will be a Future Technical Topic