

An extreme test: Year 10

By Frank Konvalinka

Ten years ago, the founders of the PVC Geomembrane Institute (PGI) set out to test materials that were in actual field use. They wanted to exhumate numerous samples for testing on a periodic basis without ruining the integrity of the installed primary liner. The Minnesota Department of Natural Resources (DNR) became a partner, and at a DNR settling basin in the town of Hibbing the long-term durability study was initiated.

The ongoing project's main objective is to investigate the 30-year durability of PVC geomembranes and PVC chemical fusion and hot wedge welded seams. Three 30-mil geomembranes, provided by three different manufacturers, were placed at the bottom of a double-lined basin at a reclamation site in October 1995. The weather extremes and the harsh winters with freeze/thaw provided an excellent place to really test the materials. The settling basin contains mine drainage that has been neutralized with magnesium hydroxide. The PVC test strips—originally 6 x 50 ft., but shorter now after exhumations and sample cuttings—are buried below a sand cover at the bottom of the basin. East test strip contains a single seam that runs the entire length at the centerline of the strip. Two of the samples have chemical seams and the other has a 1.5-in. single-wedge welded seam.

Geomembrane samples were collected after years two, four and five in the basin. This past August, the 10-year samples were retrieved. Samples are being tested at the PGI's laboratory at the University of Illinois at Urbana-Champaign, and results will be posted in the October PGI newsletter. (See author bio for Web address.) More sample-cutting is planned for the 15, 20, 25 and 30 year marks. Tests are conducted using in situ and desiccated specimens and include tensile properties, tear resistance, low temperature/brittleness temperature, dimensional stability, water extraction and volatile loss. A technical paper describing the findings after four years can be found at the PGI's Web site. The paper is titled "Long-Term Durability of PVC Geomembrane Material and Seams."



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About the PGI

The PVC Geomembrane Institute (PGI) was founded in 1988. The organization and its membership aid engineers in specifying PVC geomembranes for environmental applications including (but not limited to) landfills, industrial waste ponds, canals, mining and wetland treatment containment.

The institute's membership is comprised of key manufacturers, fabricators and installers. Since 1998 it has been based out of the University of Illinois at Urbana-Champaign (UIUC).

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