Case Study

BASIC CONCEPTS INC
Justrite Safety Group

their safety is essential.
Protecting people, property, and the planet.

How a Hydrostatic Pressure Test Proved the Effectiveness of an Innovative Secondary Containment System

Basic Concepts (BCI) PolySeam® Liner System Is Low-Maintenance and Leakproof

Background:

An electric utility installed a 60 mil HDPE liner and sump pump for secondary containment at a substation transformer pit. A few months later, a site inspector checked the pit's sump can. Surprisingly, it contained no water. With an impervious liner system, water should only be released via a drainage mechanism. The empty sump can indicated the water must be escaping through the liner itself.

While the routine inspection revealed the problem before an oil leak event occurred, the risk of the transformer discharging its entire 3,605-gallon contents into the leaking pit and, subsequently, into the local harbor created an urgency to resolve the problem. Environmental incidents of that magnitude attract large scale media attention. Cleanup costs and regulatory fines can run into the millions.

Objective:

The utility asked BCI to develop a secondary containment solution, but with a catch. They required a hydrostatic pressure test to make sure the containment met their engineering standards – and to avoid another liner failure. With thousands of dollars already spent, management was heavily eyeing the project. There was no room for error.

Developing a New Secondary Containment Solution

The initial suggestion was to switch from the existing HDPE liner to a BCI 40 oz. PVC geomembrane liner. After meetings with client engineers and contractors, as well as a site visit, an alternative solution emerged. Due to the number of cable and ground grid penetrations, as well as the slope of the pit, this situation was perfect for BCI's industrial coating applications.

Experts from BCI's secondary containment and industrial coatings solutions collaborated to develop an innovative design using an XR-5 liner and the PolySeam® System. The patented spray-on liner system eliminates the need for excessive cuts and joints around liner penetrations. PolySeam also serves as an alternative to traditional batten bar attachment and creates a flexible, yet durable, seal along HDPE and XR-5 liner seams.

PolySeam® Secondary Containment System Installation Process

Rain initially hampered progress on site, since a dry surface is preferred to install a new liner. Once the weather cooperated, contractors removed the sump can from the pit and used a hydrovac truck to remove the existing stone. They left the existing HDPE liner in place to become the base for the new XR-5 liner. This saved contractor time and costs, while avoiding the problem of working on damp ground.

The installation began by power washing the transformer pad and existing HDPE to create a clean surface. Once completed, installers vacuumed out the remaining liquid. BCI applied the PolySeam liner to seal the transformer pad first. They supplemented the area around the base of the pad with geotextile fabric and sprayed accordingly.

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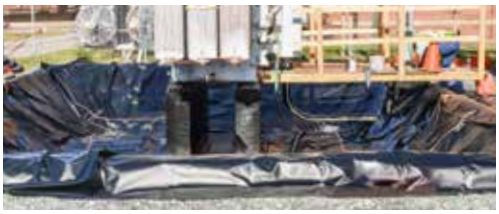
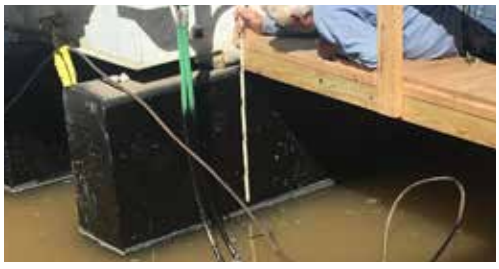
Sealing transformer pad with PolySeam.


XR-5 liner ready for PolySeam application.


PolySeam easily bonds and seals irregular surfaces.


Performing hydrostatic pressure test

Next, the team laid the XR-5 panels according to the pre-approved site drawing, hand welding the seams to provide a preliminary seal. BCI used their proprietary primer to ready the seams, followed by PolySeam to create a leak-proof joint.

After a 24-hour curing period, the pit was ready to receive the stone filler and the much-awaited hydrostatic pressure test.

Performing the Hydrostatic Pressure Test

Hydrostatic pressure tests are commonly performed to check components such as pipelines, boilers and other pressure vessels for strength and leaks. To pass the test, the pit could lose no more than 1 inch of water in a 24-hour period, after factoring in evaporation.

Once the pit was half filled with stone, the team added water up to an agreed height. They established a control box outside the pit to evaluate evaporation. They added water and measured the starting height. After 24 hours, they measured the height again. They found only ¼ inch of water loss taking evaporation into account. The success of the project even surpassed the utility operator's high standards.

Conclusion and Future Recommendations

BCI recommends the use of its VIPOR-100 SOWF system for drainage purposes for all transformer pits utilizing impervious liners. While many clients have automated sump pumps, there is a danger of pumping oil out of the sump and into a sewer system. The VIPOR-100 filters out clean water, but will shut off automatically upon detection of hydrocarbons thus keeping releases contained.

For further information call 1-813-659-3512 or visit us online at BasicConcepts.com

BCI is a portfolio company of Justrite Safety Group. Justrite Safety Group is a growing family of leading industrial safety companies. Together we protect workers, workplaces and the environment with a comprehensive range of industrial safety solutions. We cover every facet of the industrial safety landscape—from the storage, containment and clean-up of hazardous materials to safety identification, emergency showers, industrial matting, and motion safety.