



Case Study

application | Pulp & Paper Lagoon
location | Iron Mountain, MI
product | Mirafi® HP665

job owner | Niagara Paper Company
engineer | Gale-Tec Engineering, Inc.
RMT, Inc.
contractor | Bacco Construction

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

Niagara Paper Company was required to close a series of 200 ft. wide by 1000 ft. long primary sludge lagoons by the local regulatory agency. The closure was required to comply with environmental regulations. The sludge derived from a pulp and paper mill operation, and was so soft that one could not walk over it. The closure was to consist of a high-strength geotextile or geogrid, granular fill, a 20-mil PVC liner and then a final cover.

THE DESIGN

A high-strength geotextile and a geogrid test fill, placed back to back, was ordered by the company. The company contacted TenCate to implement the geotextile test fill cap. The purpose for the test fills was to visually identify which product would work the best.

TenCate chose a special “biaxial” geotextile developed for sludge caps, Mirafi® HP665. A “biaxial” geogrid commonly used for road base course reinforcement was also tested. Biaxial refers to near equal strength in both the machine and cross machine roll dimensions.

THE CONSTRUCTION

Mirafi® HP665 was sewn together in a panel 45 ft. wide by the width of the sludge lagoon (approximately 200 ft.). The prayer seam consisted of two rows of stitching made with a Union Special 2200 B sewing machine. A Terrysyn bonded polyester thread was used in both the needle and the looper. The geogrid

was overlapped 3 feet at each panel location.

The geogrid and geotextile performed “equally” as long as the ground was stable and no deformation occurred during granular soil filling. When ground deformation did occur, two performance differences were observed:

1. The geotextile, as a result of its ability to be sewn together, acted more like a snowshoe, spreading the load out, while the geogrid simply sunk into the sludge.



Mirafi® HP665 prevented sludge from flowing up through the geotextile, the geogrid did allow the contaminated mud to soak through into the overlaying fill.



When ground displacement did occur, the geogrid stretched with the deformation of the sludge and split apart.

2. The geotextile prevented sludge from flowing up and, contaminating the fill while the geogrid allowed the contaminated mud to come up through the geogrid into the overlying fill.

When ground displacement did occur (approximately 2 ft. mud wave) the geotextile's modulus (stress-strainproperty) was such that the geotextile stretched with the deformation of the sludge resulting in a tensioned membrane effect. The stiffness of the geogrid caused it to kink and split apart, an unacceptable performance result.

THE PERFORMANCE

The conclusion of the test fill study was that the Mirafi® HP665 developed working loads at a more appropriate strain for this sludge cap than the geogrid. Mirafi® HP665 provided uniform load distribution while the grid kinked and split apart. Mirafi® HP665 prevented the movement of the contaminated sludge up into the free-draining granular fill which was to serve as a gas venting layer while the geogrid could not stop mud flow.



When ground displacement did occur, the geotextile stretched with the deformation of the sludge in a tensioned membrane effect.



The Mirafi® HP665 provides for uniform load distribution, prevents movement of the contaminated sludge into the granular fill, and has more appropriate strain for this sludge cap than the geogrid. The geogrid could not stop mud flow.

TenCate™ Geosynthetics North America assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate™ Geosynthetics North America disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

Mirafi® is a registered trademark of Nicolon Corporation.

© 2010 TenCate Geosynthetics North America

03.10

365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400
Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com

