

Lining (HDPE)

**(PX150) 1.5 mm Textured HDPE, Syntex® (GNP C2) Nonwoven Geotextile
Landfill, Taupo, New Zealand**

Client: Taupo District Council



The Taupo landfill located off Broadlands Road, 5 minutes out of Taupo, was to have an extension to its existing landfill cell. Taupo District Council wanted to extend this landfill by a further 23,000 m², which could take in excess of 250,000 m³ of refuse. The existing landfill had HDPE liner underneath its refuse from the previous stage. Due to the high permeable sandy soils, Opus International called for the new cell to be fully contained so as to prevent leachates contaminating the ground water. To contain leachates, Opus designed a system involving a Geosynthetic Clay Liner (GCL), overlaid with a 1.5 mm double sided textured HDPE liner, protecting the FML was a Syntex GNP C2 (280 gsm)

nonwoven geotextile. A 300 mm thick layer of crushed concrete placed on top of the geotextile to act as a drainage layer allowing leachates to drain to the collector pipes for disposal off the site.

Permathene was contracted to supply and install the whole lining system. The civil contractor prepared the base and Permathene installed the lining system in a four week period. Due to the environmental impacts of landfills, stringent testing regimes were put in place. The GCL was installed before the HDPE sheets were lapped and joined using a twin track, hot wedge-welding machine. The double seam gives extra security against leakage and also provides a sealed tube between the two seams that was finally pressure tested to ensure that the adequate seal was achieved. The fusion welds were tested for peel and shear strength using a field tensiometer. Any minor welding required to fit the lining around structures or repair patches was done using extrusion welding techniques and every weld was spark tested to check their integrity.

As HDPE has a relatively high thermal expansion coefficient, it tends to expand and wrinkle up a little in the middle of the day, contracting to a smoother flatter appearance at night. Due to these characteristics, it is important that the final fixing of the liner is undertaken while the liner is in its coolest state. For this reason, cutting and patch repair work was done very early in the mornings. It is extremely important that the lining should not be smoothed out and fixed during the heat of the day, as it will contract overnight and tear away from its fixings.

This project was completed in the stipulated time. It started in February 2004 which was expected to be the best weather window but unfortunately it turned out to be the worst summer on record, experiencing unseasonably bad weather conditions. Permathene worked closely together with contractor, consultants and council engineers to complete the job on time and within budget.

New and improved lining materials are entering the market all the time and as such it can be a little difficult to keep up with geosynthetic technology. The success of a plastic lining project depends greatly on the correct choice of material and correct installation procedures. It is therefore important that a specialist installation contractor is engaged to install the lining system.

Note: Permathene has just completed Stage 2B as at August 2008.

Anaerobic Lagoon Liner & Cover (HDPE)

(P150) 1.5 mm Smooth HDPE

Meat processing plant, Invercargill, New Zealand

Client: South Pacific Meats

In November of 2004, Permathene Ltd was contracted to supply and install a geomembrane liner and floating cover at the newly commissioned South Pacific Meats Lamb Plant at Awaroa, just outside of Invercargill.

Due to the nature of its operation the plant needed a containment pond with a floating cover for the processing of effluent.

The principal design was supplied by Peter Swan Consulting in conjunction with MWH Dunedin, Permathene Ltd being the successful bidder for the supply and installation of the specified geomembrane.



In addition to the fact that no excavating was allowed, the wetland terrain made this project exceptionally challenging, During preparation of the site, underground drains pumped water from the area to be lined and bund walls were formed. This made the site inaccessible to vehicles and a road had to be built to allow access to the area and enable installation of the liner to commence.

A total of 20,000m² of HDPE 1.5 mm smooth membrane was used for the liner and cover. The design called for effluent to be pumped into the lagoon through 16 inlet pipes. In order to seal these penetrations the pipes were encased in concrete and the lining membrane was then welded to HDPE profiles that had been pre-cast into the concrete. Due to the extreme length of the slope, HDPE sleeves were also manufactured and fitted to each pipe in order to ensure that each penetration would remain completely moisture proof.

Once installation of the liner was completed construction of the floating cover began. The cover was fabricated with gas collection pipes attached and 200 m of 160 mm drainage coil to direct rainwater for removal into a sump.

All on-site panel seams were lapped and joined using twin track, hot wedge welding machines, all seams being pressure tested as well as peel and shear tested with a field tensiometer, as per international GRI installation specifications. Any patching or detail work was extrusion welded, every extrusion weld being spark tested to ensure its integrity.

Irrigation Pond

(P150) HDPE

Waitoa, New Zealand

Client: Badge Consultants

As part of the upgrade of the Inghams Chicken Plant in Waitoa, Badge Constructions (the head contractor) commissioned the excavation of an irrigation pond for the storage of 6400m³ of water.

Permathene Ltd was awarded the lining contract for this project and commenced installation mid-April.

The material specified for the lining of this pond was 1.5mm Smooth HDPE membrane.

A total of 4,446m² was used on the job and the work was completed in 6 days.

The 7m wide panels were fusion welded together on site and all welds and seams were subjected to rigorous testing as per international specifications.

The pipe penetrations had been poorly designed and could not be sealed as specified without the risk of leaking. Permathene Ltd's crew spent considerable time extrusion welding special sleeves to seal these penetrations.

