Bentofix® Carbofol® Secutex® - Landfill Szeged - Hungary

Expansion of a regional non-hazardous waste landfill

- **Project Name**
  Landfill Szeged, Phase II, Segment 1, Szeged, Hungary
- **Designer/Consultant**
  GEON system Kft., Miskolc, Hungary
- **Product**
  Bentofix® NSP 4900
  Carbofol® 406 s/s HDPE, 2.5 mm
  Secutex® R 1201

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The Landfill Szeged is located north of Szeged in Hungary at the border to Serbia and Romania. It is easily accessible due to the near motorway M43. Phase I of the Szeged regional landfill, which was constructed in 2007, had an insufficient capacity and required a second Phase.

Challenge

One of the main challenges was that the landfill was continuously operating during the construction, which made the construction process somewhat more complicated. One essential reason for the use of geosynthetics was the reduced traffic volume on site with efficient geosynthetics that replace voluminous mineral layers.

The project included the construction of the landfill sealing system, a leachate drainage system, a stormwater drainage system, and an access road.

Soil mechanics tests on the subsoil revealed clayey soil layers with adequate bearing capacity and a hydraulic permeability in the range of k = 10-10 m/s and k = 6 x 10-9 m/s.

Solution

The construction of the first segment of Phase II was based on the model of Phase I, using earth dams and field levelling, built alongside Phase I in such a way that the two phases could be combined to form a single depot.

After the humus removal, the extension area was backfilled with compacted soil of suitable bearing capacity up to +1m (79.50mBf). This backfill ensured that the facility was safely placed above the maximum groundwater level.
The structure of the landfill base sealing system was as follows (from top to bottom):

- 200g/m2 needle-punched filter nonwoven (not yet installed, will be installed during operation)
- 30cm gravel drainage layer (16/32mm)
- 1200 g/m² PP protection nonwoven
- 2.5mm thick HDPE geomembrane
- geosynthetic clay liner (GCL)
- geoelectric monitoring system
- 2 layers of each 25cm thick compacted clay liner (CCL) with k ≤ 1 x 10-9 m/s
- soil backfill
- subsoil

The compacted clay layer was constructed in a total layer thickness of 50cm on the bottom plane of the deposit, in compaction layers of up to 25cm. Accredited tests verified the suitability of the clay sealing (k < 10-9 m/s).

A geophysical monitoring system has been installed on the surface of the CCL. The anomalies detected in the electric field can be used to locate, with centimetre accuracy, possible failure points of the HDPE geomembrane liner, allowing their subsequent repair. The sensor electrodes of the geophysical monitoring system are arranged in a 5m x 5m grid. The geoelectrical leak detection surveys are mandatory in landfill constructions in Hungary.

The geosynthetic clay liner (GCL) Bentofix® NSP was installed directly on top of the geological barrier to improve its performance, followed by the installation of the HDPE Carbofol® geomembrane. Secutex® PP nonwoven protection geotextiles (1200g/m2) over the geomembrane protect the HDPE liner against possible indentations or damages (during installation and in the long term) caused by the drainage gravel.

The responsible construction company installed a 30cm thick 16/32mm graded gravel leachate layer on the Secutex® R 1201 geotextile PP protection layer. The leachate in the leachate collection system is collected by a PE drainage pipe network and discharged from the landfill area into an HDPE lined basin. The leachate is later treated in a wastewater treatment facility near the landfill.

Before the waste dumping starts, the gravel leachate layer is separated from the waste by a 200g/m2 geotextile filter layer. This geotextile will be installed by the landfill operator during the filling phase of the landfill.

The general constructor has chosen Naue to supply the geosynthetic products for the sealing of this landfill.

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