

## The Svärtsjö project: environmental dredging and dewatering of pulp-and-paper sludges.

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The two Svärtsjö lakes near the city of Hultsfred (Sweden) have been contaminated in the past by pulp originating from a paper mill upstream the Pauliström. The pulp, which is highly organic and polluted with mercury, has settled down in both lakes, where it causes a serious threat to the marine fauna and flora. For this reason the Swedish EPA decided to remove about 300000 m<sup>3</sup> of sediments in the course of 2006. The sediments have to be dewatered, and stored in a final HDPE lined landfill area in the vicinity of the lakes.

The remote location of the lakes, combined with the environmental aspect of the dredging imposes quite some boundary conditions on the dredging operations:

- The dredger has to be completely dismountable and transportable over road as the nearest port is located at 200 km distance.
- In order to guarantee very accurate and low turbidity dredging, the positioning of the dredger has to be done based on an anchoring system at the shore of the lakes.

For this particular project a new dredger was designed and constructed, as shown in the picture below. It is based on 7 connectable and transportable pontoons. Positioning of the dredger in the lakes is based on four anchoring points along the shore, and a set of four GPS

controlled winches with which a desired area can be dredged automatically.

At a rate of about 300 m<sup>3</sup> per hour the dredger pumps the sediments via a 2 km long floating pipe system to the final storage area. Onshore, organic flocculant is injected controlled by continuous measurement of dry matter content flow in the pipe. Then the sediments are dewatered in geotubes, and the filtrate is treated in a biological water treatment unit.

The geotubes are installed directly in the final landfill. First they serve as dewatering media, later, during the final storage of the sediments they reinforce the sediments in order to maintain stability and control differential settlements. In addition they allow to stack the dewatered sediments upwards and in a sloped area.

The presentation will outline and illustrate the whole project and in particular the challenges that were undertaken in synchronizing the dredging operations, sediment dewatering, and water treatment plant. The particularities of the landfill site, having both the function of temporary dewatering field as well as final storage area, will be illustrated.



Picture of the environmental dredge at work at the Svartsjö lakes.



Aerial view on the landfill site with the filled geotubes.