Containment & Dewatering
WITH GEOTEXTILE CONTAINMENT TECHNOLOGY

MIRATECH® - where it all began!
A Division of Ten Cate Nicolon

The story begins in 1953 when a catastrophic flood struck the coast of Holland resulting in great loss of life. Dutch marine engineers sought new methods and materials to build structures for coastal defenses so this disaster would not be repeated. Nicolon B.V. responded by developing the first generation of geotextiles for reinforcement and erosion control to be used in the improved coastal structures. In 1991 Nicolon and Mirafi, the primary U.S. geotextile company, merged to form Ten Cate Nicolon. Miratech is a recently formed division of Ten Cate Nicolon that will focus on the marketing and support of the Geocontainment technology.

GEOCONTAINMENT DEVELOPMENT

In 1991 Ten Cate Nicolon joined forces with the U. S. Army Corp of Engineers under the “CPAR Program”. The objective of this program was for private industry and governmental agencies to consolidate resources and develop technology that would be beneficial for government funded construction projects. Ten Cate Nicolon and the COE over the next two years committed several million dollars for research and actual field application to prove the feasibility and benefits of Geocontainment technology by using specially developed high strength geotextiles with unique filtration and retention properties. Through the CPAR Program the technology for Containment and Dewatering was developed and proven to have immediate environmental and economic benefits for government and private industry.

how it works:

CONTAINMENT
High strength permeable geotextiles with uniquely designed retention properties are fabricated into Geocontainers® that can be filled with fine grain sludge, hazardous contaminated soils, or dredged waste materials. The geotextiles unique weave and fabrication creates small pores that confine the fine grains of the contained material.

DEWATERING
Excess water drains from the Geocontainer® through the small pores in the geotextiles resulting in effective dewatering and efficient volume reduction of the contained material. This volume reduction allows for the repeated filling of the Geocontainer®. In many cases the decanted water is of a quality that can be returned to native waterways or for reuse.

CONSOLIDATION
After the final cycle of filling and dewatering, the retained fine grain materials can continue to consolidate by desiccation because the residual water vapor escapes through the geotextile. This results in the most cost effective residue state for disposal.

THE PROOF
Over the past ten years hundreds of projects have been installed and their success documented. Papers on these projects have been published and awards presented for beneficial use of new technology. This information is available upon request.
Advantages:

- no permitting
- effective high volume containment
- efficient dewatering & volume reduction
- reduced disposal cost
- reduced fuel consumption
- reduced total overall operating cost

THE CHALLENGE

The industries’ paper mill retention ponds are filling to the maximum capacity with high water content sludge residue from the manufacturing process. To continue operations at most plants, additional retention ponds must be built or the sludge must be removed. The construction of additional retention ponds requires a lengthy environmental permitting process and conventional methods of sludge removal are time consuming and costly.

THE SOLUTION

Environmental consulting engineers have recommended large diameter Geotubes® for the containment and dewatering of these types of sludge residue. This option can be conducted on site without interruption of the manufacturing process. The containment is effective and dewatering and volume reduction is efficient. The dried residue can be burned or disposed in a landfill at a greatly reduced cost. When compared to all other methods of dewatering, the Geotube® method is the most cost effective.

THE RESULTS

Millions of gallons of sludge have been pumped into large diameter Geotubes®. The Geotubes® are pumped to capacity and dewatered repeatedly. The effective volume reduction of sludge has been as high as 66%. Since the initial introduction of Geotube® technology to this industry, programs of sludge residue management and control have yielded tremendous operational cost savings.
Advantages:

- effective high volume containment
- efficient dewatering & volume reduction
- on site dewatering
- no special equipment required
- cost effective

THE CHALLENGE

Most municipal sewage treatment plants become inefficient because their digesters and lagoons become filled with sewage sludge past the safe operating levels. Traditional methods of removing the sludge require the use of heavy equipment for dewatering before it can be removed from the site for disposal at a landfill.

THE SOLUTION

Large Geotubes® are now being recommended as containers into which the sludge can be pumped direct from the digesters and lagoons. The permeable geotextile which forms the Geotube® outer layer allows sludge to be dewatered very efficiently while containing the fine grain solids of the sludge. In most cases, the dewatered effluent is clear and safe enough to be returned to the plant. This methodology greatly reduces the volume of the sludge and the cost of disposal while allowing the continual operation of the digesters and lagoons.

THE RESULTS

Millions of gallons of sewage sludges are being removed from digesters and lagoons to be dewatered on site. This use of Geotube® technology is allowing operators to effectively control their cost of dewatering and disposal.
THE CHALLENGE

Power plants and other industrial installations have a problem with the natural sediment accumulating at or within their intake structure, severely impacting the flow of cooling water. Many times these sediments contain heavy metals and other contaminants. The plants must dredge away the sediments to increase the capacity of the critical cross section flow.

THE SOLUTION

To reduce the volume of disposed dredge materials and to contain any of the contaminants, large Geotubes™ are routinely specified by consulting engineers. The Geotubes™ allow for the dewatering of the dredged spoils on site while allowing at least a 50% volume reduction of material and maintaining safety and security at the facilities.

THE RESULTS

Incorporating the Geotube™ technology adds to the expediency of a project and provides an environmentally clean and cost effective way to handle dredge material. This all can be achieved without interruption of power generation and other industrial processes.

Advantages:

• custom site specific fabrication
• effective high volume containment
• efficient dewatering & volume reduction
• highly flexible containment
• cost effective

The Geotube is filled with contaminated dredge materials taken from the intake location.
THE CHALLENGE
Rivers, bays, harbors, marinas, ports, and dock facilities in the marine environment have been collecting contaminated sediments from industrial run-off for many years. Routine dredging is required to remove these contaminated sediments. The contaminated dredge materials most often must be disposed into local classified landfills. However, the volume of water generated in the dredging operation greatly increases the transportation and disposal costs.

THE SOLUTION
The U.S. Army Corps of Engineers are now specifying Geotubes® as the best management practice for dewatering contaminated marine dredge materials. The contaminated sediments can be removed by either hydraulic or mechanical dredging, then pumped directly into Geotubes® for containment and dewatering. Many times this can be accomplished at or very near the site by utilizing a dewatering basin where Geotubes® can be stacked several layers high to maximize space.

THE RESULTS
Hundreds of thousands of cubic yards of contaminated sediments have been successfully dredged, contained and dewatered from rivers, bays, harbors, marinas, ports, and dock facilities over the past decade. The Geotube® containment and dewatering process has been proven to be the most cost effective method utilized to date.

Advantages:
• custom site specific fabrication
• effective high volume containment
• efficient dewatering & volume reduction
• highly flexible containment
• cost effective

Contaminated dredge materials are pumped into large diameter Geotubes on the shore for dewatering.
PROJECT SPECIFIC TESTING:
Ten Cate Nicolon has worked with the U. S. Army Corp of Engineers, the Geosynthetic Research Institute and private consulting engineers to develop test methods that can be utilized to predict the performance of Geotubes®, Geobags®, and Geocontainers®. One such method is the HANGING BAG TEST (GRI GT-12). This test allows the engineer to determine the type of Geotextile which should be used to contain the fine grain materials but allowing the effective dewatering of site specific sludge.

DESIGN ASSISTANCE:
Ten Cate Nicolon used the Sofftwin™ computer design software to model the dimensions of the Geotube®, Geobag®, or Geocontainer® structures. Sofftwin™ also provides the expected filling volumes, and calculates the stresses that the structure will experience during the critical time of filling and dewatering.

CUSTOM FABRICATION:
Ten Cate Nicolon has been fabricating Geotextiles for over 25 years. The Geotubes®, Geobags®, or Geocontainers® can be custom fabricated to meet the requirements of each specific project. Ten Cate Nicolon has more than 100 types of Geotextiles from which Geotubes, Geobags, or Geocontainers can be fabricated. Also, Ten Cate Nicolon has fabricated structures with circumferences up to 120 ft. and lengths up to 1,000 ft.

INSTALLATION ASSISTANCE:
Ten Cate Nicolon has the largest staff of engineers, technicians, and sales personnel that can provide field installation assistance in the most challenging environments.

The Leader in Geocontainment Solutions
custom designed solutions
It is our continuing goal to derive corporate strength from what we believe is the only true measure of success: a synergy of products and people resulting in solutions that endure the test of time.