

# Power

## BACKGROUND

As the population grows, so does the demand for more electric power capacity. This increase in demand has spurred the need for new generating stations and innovative methods of generating electricity and operating existing power plants. Geosynthetic materials provide solutions to various concerns associated with these types of applications such as groundwater contamination. Geosynthetics have long been used in evaporation, cooling and brine ponds, but are also being used to line pumped storage ponds.



[GSE HDPE Geomembranes used as pond liners for Power Plants]

## CASE HISTORIES

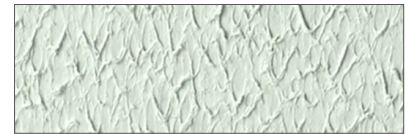
GSE has been lining ponds in power plant applications for over 30 years. One of GSE's earlier projects was for a Steam Electric Generating Station in Colorado. This installation consisted of 8 containment ponds ranging in size from less than an acre to over 20 acres. The containment ponds are used to store intermediate quality water, for fly ash recovery and as brine ponds. The ponds are still being used to this day.

The customer removed some small portions of the geomembrane and asked us to test them to see how well it was holding up after years of outdoor exposure. The ensuing forensic investigation showed that the material still retained much of the physical properties that it had at the time it was manufactured<sup>1</sup>.

A more recent site where GSE geosynthetic materials have been used successfully in a power plant application is the Casa Grande Site in Arizona. This particular installation was a double lined system utilizing GSE 60 mil HDPE geomembrane, GSE HyperNet drainage net and a geosynthetic clay liner. The material was used in each of three 28 acre evaporation ponds for a total footprint of over 84 acres. The GSE HyperNet was installed between the primary and secondary geomembranes for a leak detection layer. GSE HDPE was chosen because of its high chemical resistance and its proven track record in exposed applications.



**GSE HDPE Geomembranes**



**GSE White Textured Geomembrane**

## POWER PLANT APPLICATION

Man-made reservoirs are required for Power Plants to store water during periods of low energy consumption. This stored water can be used during peak energy demand cycles and does not require the use of natural water sources to provide power.

## PUMPED STORAGE POND

Building new power plants is costly. As an alternative to building new power plants, some energy companies are looking to innovative methods to better utilize the full capacity of existing ones. While many generating stations operate at or near capacity during the day when demand is greatest, the same plants have excess generating capacity at night.



[Pumped Storage Ponds]

Power generators are using pumped storage ponds to store the excess nighttime capacity so that it may be used during the day when demand is greater. The pumped storage pond idea has been around for over 30 years, but relied on an available water source such as a dammed river or natural reservoir. Damming of rivers is increasingly coming under scrutiny due to environmental concerns associated with flooding naturally existing vegetation. By utilizing geosynthetics in constructing manmade reservoirs, they can be constructed in areas that lessen the impact on the environment.

To accomplish this task two large ponds are constructed; one at a higher elevation relative to the first. During the night, water is pumped from the lower elevation pond to the higher elevation pond. During the day, the water from the higher elevation pond flows back to the lower elevation pond through a turbine creating hydroelectric energy. Both of these

ponds are typically double lined with HDPE geomembrane. A geonet layer is installed between the two geomembrane layers to provide a leak detection system.

## SOLUTIONS

GSE is the world leader in manufacturing geosynthetic materials that are used in a variety of applications from landfills to leach pads to storage ponds. GSE's product line consists of HDPE and LLDPE geomembranes, geonets, geocomposites, geotextiles and geosynthetic clay liners (GCL). GSE polyethylene geomembranes are available with smooth or textured surface on either or both sides.



[Hydro Power Plant Application]

## GSE INNOVATIVE PRODUCTS PROVIDES SUPERIOR PROTECTION

For superior protection and leak detection, GSE Leak Location is utilized for either the secondary liner or for both layers of geomembrane. GSE Leak Location allows for the entire surface area to be spark-tested after installation including side slopes. Spark testing provides an extra measure of security against material leaching to the surrounding earth and ground water supply assuring that no environmental contamination can occur. For assured long-term containment and environmental protection, the surface can be spark-tested again either annually or at some

other predetermined interval to assure the installation remains leak-free<sup>2</sup>.

In addition to black surfaced geomembrane; white surfaced geomembrane is also available. GSE White surfaced geomembrane speeds installation by reducing the amount of heat gain and therefore wrinkling of the geomembrane during installation<sup>3</sup>. Laboratory UV testing indicates this material can have a service life of up to 50 years depending on environmental factors such as elevation and latitude.

## ENGINEERING SUPPORT

The GSE Engineering Support Staff is comprised of multidisciplinary product professionals to support you across a range of project requirements. This includes knowledge in geomembrane, geosynthetic clay liners, geonet, geocomposite, nonwoven geotextile and concrete protection products and application solutions. Rely on our technical staff to help you solve your project issues.

## CUSTOM FABRICATION

The GSE Custom Fabrication Group builds products to your exact specifications. We have extensive experience in prefabricated polyethylene products and components. A few examples of our custom fabricated products are Aqua Tanks, Quick Containment, concrete protection liners, boots, sumps, pads, pipes, daily covers, temporary containment, containment boom and other products to fulfill your fabrication needs.

<sup>1</sup>Refer to the GSE Forensic Study Case History for more information.

<sup>2</sup>Refer to the application sheet for GSE White Surfaced Geomembranes for more information.

<sup>4</sup>Refer to the application sheet for GSE Leak Location Geomembranes for more information.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

**[ DURABILITY RUNS DEEP ]** For more information on this product and others, please visit us at [GSEworld.com](http://GSEworld.com), call 800.435.2008 or contact your local sales office.

