

INTERNATIONAL **WATER POWER** AND DAM CONSTRUCTION



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Compliance and containment

Karen Allan, General Manager at GEI Works in the US, gives an overview of the company's barriers and booms that can be used within the hydroelectric dam construction and water treatment sectors

Above: GEI Works Type 3 Turbidity Barriers prepped for deployment at a hydroelectric dam project



Above: GEI Works' Type 3 Turbidity curtain with 100ft depth skirts were used to protect the basin during shoreline construction activity at the Red Rock Dam in Iowa

Right: Pickwick Dam, TN – GEI Works' Type 2 Turbidity curtain creates a protected perimeter, while a submersible curtain protects intakes from the bottom-up (inner curtain depicted is approximately 15ft from the bottom, and 7ft from the surface)



THE FEDERAL CLEAN WATER Act and National Pollutant Discharge Elimination System (NPDES) Regulations require construction companies doing work on or around water bodies to utilize floating barriers and other best

management practice tools to control construction impacts to waterways on a jobsite. GEI Works, a US-based manufacturer located in Florida, specialises in construction compliance and containment products with 20 years of combined experience in the field.

More than just products though, GEI Works says it has a solutions-focused approach to ensure that project goals, environmental factors, budgets and timelines are discussed.

"Factors such as wind, waves, and current greatly affect the success of an intended job," Kirk Wards, VP of Sales states. "Too often a request comes in for a product that will not produce the intended results. It is a priority for us to ensure that the conditions on site will support the project goals with a proposed solution."

This becomes even more important when protecting downstream outflows, or water intakes. GEI Works has been involved in numerous large hydroelectric dam and water treatment facility projects over the years.

"Working on hydroelectric dams and water treatment facilities lends a specific set of challenges that are reviewed to ensure the right solution is put in place," says Craig Benevides, Operations Manager for GEI Works. "Often we are talking about very deep turbidity curtains needed for work in which conditions may require some of our strongest barriers to withstand high velocity conditions and elevation changes if sluiceways will be open at any point in the construction, or for protection of intakes on site."

These projects require products that can transfer force loads upwards of tens of thousands of pounds on the system, while safely maintaining the job perimeter against turbidity, debris or spills. GEI Works' manufactured Type 3 curtain with 100ft depth skirts were selected for a construction project on the Red Rock Dam in Iowa to meet site requirements.

Components, design and anchoring were key factors in ensuring performance, with recommendations guiding anchor selection, system design and quantity. Each 100ft section of Type 3 Turbidity Permeable curtain utilised cabling and metal plates to ensure loads were transferred evenly along the barrier. Reefing lines, which act similarly to the pull on a mini-blind, allowed for much greater ease in deployment, and depth control across multiple elevations on the lakebed. Despite significant current, 40lb super hooker anchors held the barrier in place throughout construction. The job was successfully completed with 500 linear feet of barrier in varying sections up to 100ft depth.

Intake protection

In addition to ensuring proper load-bearing transfer and anchoring, GEI Works has produced a less familiar product to protect intakes at various sites.

Right: Dewatering Tubes providing passive gravity-assisted dewatering at a treatment plant outside of Lincoln in California. The tube on the right had been drying for a couple weeks and the one on the left was just put into operation a few days prior to the photo. The dried solids were then utilised for fertiliser



GEI's submersible curtain works in unique situations for powerplant customers. Intakes located at the bottom of a water body pull significant water flow in a vacuum-like manner, along the bottom under the water. Silt and turbidity moving on the bottom of the water column can travel into the intakes, despite surface barriers. To protect the intakes from suctioning fines from construction disturbances directly into their systems, submersible barriers are a good solution.

Pictured below left are the supplied submersible barriers for construction activity at the Pickwick Dam in Tennessee, where intakes were pulling turbidity from dredge activity from the bottom. Despite being compliant with barriers around the perimeter of the water-based construction, additional protection was required.

GEI's submersible barriers are unique from their floating counterparts in that they are meant to be secured to the bottom and protect upwards into the water column, and not at the surface. On the Pickwick Dam project, submersible curtain, weighted with three times the ballast and moored by underwater divers, was installed in a square around each large intake, far enough back to ensure the barrier wasn't affected when water was drawn, but close enough to provide a barrier at the bottom. A surface curtain was then anchored at the top to direct flow and provide additional protection in the upper water column. An absorbent boom for hydrocarbon and sheen was also attached to the surface barrier around the intakes. This successful project has been duplicated several times with other installations across the country.

Often, dredge or construction activity at these sites also require NPDES permitted dewatering needs. With GEI Works dewatering tubes or bags, compliant dewatering activities can take place on-site.

We also provide pond liners for treatment ponds, or baffling systems for treatment trains. Waste Water Treatment Baffles are used in municipal waste water treatment plants to control and improve water quality. Baffle Barriers are constructed with flow past, under or flow through capabilities, specifically to help channel water for knockdown or treatment.

All materials of GEI's baffle systems are marine grade quality and designed for long period exposure to the environmental site conditions specific to each installation, such as:

- Basin dimensions
- Side slope ratio
- Maximum flow
- Water temperature
- Water pH
- Type and number of aerators available

Fouling

GEI Works' PermaBoom, Underwater Debris Screens or Standard Containment Boom can all help protect intakes from fouling due to algal and invasive plant blooms, or floating debris and plastics, depending on the application.

PermaBoom is a robust floating boom made from



impact resistant hard shell floats and heavy duty belting material, and is known for its long-term use in calm, protected conditions. This boom is produced utilising mechanically fastened materials that are long-lasting and easily maintained. Other barrier products provide protection while still allowing some water flow.

Marine fouling due to invasive plants, algal blooms or floating trash can cause damage and down time at a water treatment facility. Debris booms have many applications in traditional hydroelectric generation, including protecting surface mounted hydrokinetic devices and intake screens. Additionally, products like removable trash baskets, nets, and vacuums can all be used to clean up materials contained by a boom or barrier. They can be easily recovered by the storm water or public works departments to keep intake screens free from debris. ●

Middle: Custom Baffles were used at a West Virginia treatment facility to create sediment knockdown channels

Above: PermaBoom with a trash collection box at a water treatment facility