

## Ask Tom! Column

### New Challenges: Lining Wastewater Pond with Steel Plate

Guest article by Paul Windham, VP, Fisher Tank Company

Fisher Tank Company of Chester, PA and Lexington, SC, has been building aboveground steel water storage tanks for over 40 years. But when a good customer says, “how about building an in-ground storage tank?,” a good contractor listens. And that’s exactly what happened when DSM Chemicals, Inc. of Augusta, GA, called on Fisher to line a 14’ deep x 260’ diameter wastewater treatment pond near the Savannah River with steel plate.



Like many wastewater treatment ponds around the country, the pond had early on shown signs of ageing. The walls and bottom of the 1 S acre lagoon, lined with one-inch thick gunite over an HDPE plastic liner, had gradually weakened. Rather than risk a leak, DSM management had switched to aboveground steel storage tanks 10 years before. As production at the company increased, DSM decided to build a new facility to recycle caprolactum from used carpeting. That’s when management realized its 10-year-old above ground storage tanks lacked the capacity to handle the additional load from the new recycling facility.

A new storage tank was not a good option. Cost was one deterrent: a new tank would have cost anywhere from \$1 to 1.5 million. Time was another: no one wanted to delay the opening of the new recycling plant. Once again, the on-site pond was placed on a front burner. The old pond had several things going for it. It was, first of all, big enough to do the job: it had a capacity of 10 million gallons. Moreover, all the ancillary pumps, piping and processing equipment were already there. By using the existing impoundment instead of building a new tank, management estimated it could save as much as \$1 million.

But cost and time were only two considerations. Management of the environmentally conscious company wanted assurances that the pond could perform safely, without risk of leaks. Accordingly, they insisted on lining the walls and bottom of the earthen impoundment with steel plate.

This was the safest way to go. Gunite has a history of cracking and, over a period of time, could leak. For that reason, chemicals and oils are never stored in concrete. Steel, of course, is non-porous; it will contain anything from water to nuclear reactors. Since management would not tolerate any leaching of the product into the soil, steel was the most secure option.

To perform the work in the tight timeframe mandated, Fisher, which had erected DSM’s existing aboveground steel wastewater tanks, mobilized two 10-man crews to work two 10-hour shifts. “What we did here,” explained Windham, “is similar to what they do with nuclear



waste landfills. The original HDPE liner and gunite covering were left in place. Where there were holes, cracks or voids, a suitable fill was used to cover them.”

Once the bottom and walls were prepared, it was time to move the steel plates to the site. Employing rubber-tired rough terrain cranes, Fisher Tank personnel began lowering the heavy 8-foot by 20-foot carbon steel plates into the excavation and positioning them on the floor and walls of the embankment. Because of the pond’s large size and the gradual slope of the sides, forming of the steel plates was unnecessary; they could be laid in place as is.

Since specs called for a liner that was 100% steel to guard against any possible leakage, Fisher Tank personnel employed continuous welding along the seams: using the automatic submerged arc welding process, workers joined the plates along the long seams; the short seams were welded with the manual shielded-arc process. Plates were lap welded from topside. After the welding was completed, vacuum box testing of all welds was performed to ensure that the lining was leak-proof. Fisher Tank personnel conducted the test in much the same way they test conventional aboveground steel tank bottoms in compliance with APT-650.

Finally, the plates were sandblasted and the entire steel liner was coated with an anti-corrosion epoxy. As a further precaution against the corrosive effect of the wastewater, management of the chemical company also directed Fisher Tank to apply a steel covering to piping and other accessories inside the tank -- anything that would come in contact with the waste. For this purpose, special pieces were designed and fabricated at Fisher’s Lexington, SC shop.



The success of the project validated management’s decision to use the old impoundment. Since completion of the work, DSM has experienced neither leaks nor liner problems, according to a company spokesman. With the steel-lined lagoon on-line, DSM almost doubled its treatment capacity.

“When we only used the two tanks, “ Dan Skedsvold, DSM Chemicals’ senior environmental specialist, pointed out, “we had six million gallons of aeration capacity. Converting the impoundment increased this by 4.5-million gallons, bringing the total at the site to over 10 million gallons. The new facility, like the other two

tanks, handles about 850,000 gallons of water each day. Wastewater has a residence time of only one day throughout the plant before we discharge it into the river, absolutely clean.”

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**Welcome to Ask Tom!**, a monthly column by our resident water treatment guru, Tom Keenan of National Environmental Services Agency (NESA). Tom addresses the issues that bug you the most. And Tom knows!! With 35 years experience in providing environmental support services to public and private sector clients on a wide range of environmental issues.

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Guest articles for the **Ask Tom!** Column are always welcome, for more information please contact Tom Keenan directly at his email address: [info@nesa.ie](mailto:info@nesa.ie)

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