

# Airport Support



## ALBANY INTL. PROTECTS LOCAL WATERWAYS FROM FUEL FACILITY EXPANSION RUNOFF USING ABSORPTION FILTER MEDIA

*By Judy I. Shane*

In a concentrated effort to mitigate the effects of increased storm water runoff resulting from a major upgrade to its bulk fuel facility, Albany Intl. Airport recently installed a high-capacity storm water pretreatment system. Completed in the summer of 2007, the installation exceeds State Pollutant Discharge Elimination System (SPDES) requirements for storm water treatment. The new addition features Smart Sponge technology, innovative passive absorption filtration media developed by AbTech Industries.

Albany Intl., located in Colonie, N.Y., about 6 miles north of Albany and 136 miles north of New York City, serves as the major air center for the capital region, northeastern New York and western New England. The airport is operated by the Albany County Airport Authority (ACAA) under a 40-year lease with Albany County.

It handles an average of 110 commercial arrivals and departures each day, as

well as 1,000 tower operations. Albany Intl.'s terminal is designed to accommodate 1.5 million enplanements annually. Improving and maintaining safety, plus meeting the needs of air travelers and carriers well into the 21st century, are the main focuses of the airport's capital plan.

"Designing a high-capacity storm water pretreatment system that would meet or exceed the SPDES guidelines was an essential component of the fuel facility upgrade," said Dennis Eryou, Ph.D., P.E., a private practice engineer with 25 years experience in aviation fueling systems and environmental issues who served as ACAA's project engineer for the upgrade.

### FUEL FACILITY UPGRADE

The airport's bulk fuel refueling and storage facility upgrade included the installation of three major components: a new 200,000-gal jet fuel tank with high-volume jet fuel loading and unloading pumps; a dedicated tanker

truck unloading lane; and a refueler staging area.

The increased storage and loading capabilities allowed for fueling services to continue in adverse conditions (i.e., if the original fuel farm had to be taken offline for scheduled or emergency maintenance or if winter weather conditions caused short-term interruptions of airport fuel supplies trucked from the Port of Albany). Adding the specialized tanker unloading lane freed the existing two lanes to be dedicated to tanker fueling, increasing the facility's throughput. The new refueler staging area can act as a secondary containment location in the event of a pipe or tank rupture while the refuelers are staged there.

### DESIGN CHALLENGES

One of the major design challenges for the storm water pretreatment system was meeting or exceeding the existing SPDES permit standards for

discharging large volumes of processed storm water into Shaker Creek, a sensitive receptor leading to a downstream drinking water intake in Albany County.

"The new tank dike and refueler staging area increased the annual volume of storm water processed by a factor of four," Eryou said. "This required a complete redesign of the bulk fuel facility storm water management system."

It came as no surprise that the ACAA implemented a highly innovative solution to protect the environment, as Albany Intl. Airport has a history of being environmentally proactive and seeking cost-effective solutions to storm water pollution. The airport is widely known for its aircraft deicing mitigation system, which uses microorganisms to digest propylene glycol. The process produces methane gas, which is reused as fuel to heat the incoming fluid and speed its processing. The gas is also used to heat the treatment facility.

The basic design of the storm water pretreatment system includes

trench-drain catch basins in the refueling areas; these channel the flow of runoff through pipes to a storm water lift station. The lift station then pumps the runoff to a vault that houses a bank of Smart Sponge absorption filters, which effectively treat the runoff before it is discharged into surface waterways. Clean Water Solutions supplied the Smart Sponge filtration system, and project contractor FP Mechanical, Cohoes, N.Y., installed it.

Eryou said that the traditional filter media used to absorb hydrocarbons from storm water for pretreatment is activated charcoal. This was not suitable for high flow because of its high cost and flow resistance. More recent scientific developments, such as the proprietary polymer technology, paved the way to low-cost, high flow rate absorption filter media.

"These Smart Sponge absorption filters can not only be used to polish the effluent from an oil-water separator but also can be used to replace the

oil-water separator in cases where the influent is relatively clean, thereby producing a superior effluent quality at a much lower capital cost," Eryou said.

## ABSORPTION VS. ADSORPTION

Storm water absorption filtration systems have a wide application in municipal storm water systems. AbTech's Smart Sponge technology is currently deployed in 36 states and has proven effective in removing pollutants from flowing or pooled water, encapsulating contaminants so they cannot be released back into the environment—even under high pressure.

"Absorption filter media is preferred over adsorption filter media," Eryou said. "When absorption media is saturated, the fuel cannot be removed by squeezing and is therefore suitable for disposing into landfills or waste-to-energy incineration."

The filters at Albany Intl. are typically saturated at about 250 percent



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of their dry media weight at the time of installation. They are chemically selective, absorbing hydrocarbons and encapsulating fuel from the storm water. The absorption is permanent, and the saturated product does not leach or leak contaminants; rather, it transforms

pollutants into solid wastes with low disposal costs. The result is a recyclable product that provides a complete, closed-loop solution for hydrocarbon removal.

In addition, the filters are easy to maintain and replace. The bank of

filters in the airport's pretreatment system can be accessed through double aluminum doors, via which they can be easily pulled out and weighed. Eryou said that, under normal conditions, the filters are checked quarterly for a saturation-level assessment.

One disadvantage of passive absorption systems, according to Eryou, is that they can be overpowered by a large fuel spill. Once they become thoroughly saturated, additional fuel can pass directly through them. In designing the airport's storm water pretreatment system, Eryou added an oil stop switch in the storm water lift station to handle such an occurrence.

"Most of the storm water runoff from the aircraft refueling areas is clean enough to be processed by the Smart Sponge filters without oil separators, but we needed to be able to handle a fuel spill incident," Eryou said. "Passive absorption systems are also impacted by silt in the influent, and suitable precautions, including dropout basins



**Activated charcoal, a traditional filter media, was too costly and flow resistant for use at Albany Intl.**



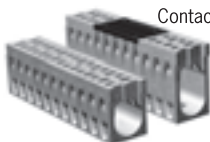
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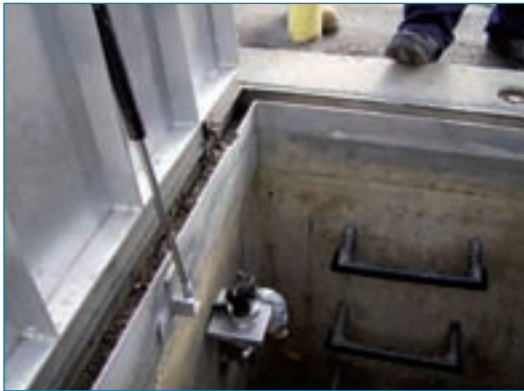
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reservoirs so they are free of bacteria and oil-based chemicals that can make people sick," he said.

Other airports in the Northeast that use similar filtration systems to protect the environment include Newark Liberty Intl. Airport and Westchester County Airport. Newark deployed the Smart Sponge technology in several locations, including its bulk fuel facility, and Westchester installed it in critical storm drains surrounding the airport. **SWS**

Judy I. Shane is a writer, trainer and communication strategist for Shane Communication. Shane can be reached at 310.379.1111 or by e-mail at judyshane@aol.com.

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**Absorption filter media will treat airport runoff before it is discharged into local waterways.**

or weirs, are present upstream of the filter media to minimize silt loading."

The completed storm water pretreatment system processes 250 gal per minute of storm water with no bypass, ensuring that the entire flow is filtered and the effluent quality meets SPDES permit discharge requirements.

"It was important for us to understand the needs of the Albany County Airport and help them achieve their goals for a system upgrade that would expand its capacity as well as protect the environment and the community," said Rodolfo Manzone, Ph.D., executive vice president and chief technology officer for AbTech.

The U.S. Environmental Protection Agency has included Smart Sponge technology as a best management practice under the federal environmental guidelines that apply to local and state governments.

Glenn Rink, president and CEO of AbTech, said that the majority of his customers are municipalities. "Currently, Smart Sponge technology is being used by hundreds of communities across the country and is helping clean up beaches, lakes, streams, and

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