

# Out with Odor

*Nuisance odor effectively treated using shell-based biofiltration system*

By Brendan K. Naples & Ian Phillips

**B**ord na Móna Environmental Products U.S., Inc. employed a pilot unit of its unique, shell-based MÓNASHELL biological air treatment system at a central Florida master pump station in an attempt to minimize complaint-eliciting fugitive odor and hydrogen sulfide (H<sub>2</sub>S) problems.

## ARTICLE SUMMARY

**Challenge:** Built in a once rural area without odor control, a Florida pump station now is surrounded by inhabitants, resulting in odor complaints.

**Solution:** A shell-based biological air treatment system was installed to capture and treat problem odor on site.

**Conclusion:** Compound removal and odor threshold tests have yielded strong results, and the pump station's owner has not received any odor complaints since commissioning the unit.

Odor emissions have become a primary focus for operators across the country as decades of growth have placed housing and commercial developments closer to wastewater collection and treatment systems (odor sources). In an era in which neighbors have become increasingly intolerant to odor and municipal budgets have shrunk, many operators seek effective odor control solutions that not only treat the full range of odor compounds but also require minimal operation and maintenance costs.

Bord na Móna's patented, shell-based technology, MÓNASHELL, represents a radical and innovative breakthrough in the treatment of odor and volatile organic compound (VOC) emissions. The system utilizes a naturally occurring shell media and

is designed to deliver significant, environmentally responsible benefits for wastewater pumping stations, wastewater treatment works, sludge handling, municipal solid waste and composting centers, as well as various industrial facilities requiring H<sub>2</sub>S, odor and VOC removal. The technology, since its inception in the early 1990s, has been employed in more than 500 installations worldwide.

The sulfide-laden, odorous airstream is treated biologically in the liquid phase by recirculating water within the unit, allowing contact between selected microorganisms and odorous compounds. The bacteria reside on the shell media, which contain high levels of CaCO<sub>3</sub> and neutralize acid byproducts of sulfide oxidation. The physical, structural and chemical properties of the media allow for smaller filters and higher efficiencies. The byproducts of the system are harmless, clean and free of odor.

The shell media have an adsorption capability and a chemical affinity for sulfur compounds. The physical shape, size and rigidity render it highly effective as a scrubber packing in its own right. In addition, the pH buffering and slow-release nature of the media render it ideal for pH control. Bord na Móna has installed this technology on a large range of applications for more than 10 years, resulting in a well-established, proven process technology.

### Sunshine State Dilemma

Some of the country's largest and most high-profile utilities exist in Florida, where there are frequent odor challenges due to high temperatures and septic conditions and many collection systems being adjacent to large housing developments, corporate offices and tourist destinations with thousands of visitors everyday. An odor problem arose at a master pump station adjacent to a new housing development within a central Florida utility's jurisdiction, where odor complaints from neighbors required action.

The pump station, which contains a maximum of 3,000 cu ft of odorous headspace at low water level, was originally built without odor control, most likely because there was no one around to be affected by odor emissions. As in so many regions across the country, however, Florida's growth-based economy has spurred



Odor complaints increased substantially at this central Florida utility, prompting officials to install a biological air treatment system. One day after installation, the system was achieving a 99% removal efficiency of H<sub>2</sub>S.

## PRODUCTS IN ACTION



The MÓNASHELL uses naturally occurring shell media to biologically treat odorous airstreams.

substantial development in this once rural area. Where orange groves once stood, there are now gated communities complete with four-bedroom homes and swimming pools. Where bottomland forests covered the landscape are now shopping plazas and gas stations; and to connect all of the new developments are ever-widening roads and highways. The result: This once-remote pump station and associated fugitive odor are nearly surrounded by inhabitants. Operators act quickly to maintain a good neighbor policy and avoid environmental regulatory fines due to sewage odor.

The timing was right. Bord na Móna had approached a prominent Florida utility to pilot its technology, and the county agreed to participate in a pilot study utilizing a 500-cfm MÓNASHELL unit in order to evaluate the technology and to capture and effectively treat problem fugitive odors at the site.

### Odor Control Installation & Results

The fully operational, modular unit was shipped to central Florida on a flatbed and installed in late September 2009. The county had prepared the site by establishing a water supply, electric and drain, which accommodated the biofilter, fan and irrigation sumps.

Installation was simple: A one-day time period was required to place the biofilter and connect the water, electricity and drain. The grounds crew also ran a 15-ft duct from the wet well to the MÓNASHELL.



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inlet. Because only two small drives (e.g., fan and pump) are required and no chemical or nutrient dosing systems are needed, installation is a relatively painless process.

Bord na Móna staff commissioned the unit on Oct. 1 by inoculating the filter bed, setting airflow and completing a system check. Inoculation consists of a one-time dry blend dose of microbial H<sub>2</sub>S oxidizers. Twenty-four hours after inoculation, the system was achieving >99% removal efficiency of average inlet H<sub>2</sub>S levels of 41 ppm, with maximum levels of 90 ppm. In addition, the system achieved up to 95% reduction of difficult-to-treat organic sulfides (e.g., methyl mercaptans and dimethyl sulfide) just days after inoculation. As of Nov. 10, 2009, field tests indicated inlet H<sub>2</sub>S levels of 40 ppm being reduced to 0.009 ppm.

Reduction of air contaminants is but one important aspect of air quality analysis at any emission source. Human perception of air quality is another. Odor threshold, the point at which an odor is no longer perceptible to a human test panel, can be quantitatively analyzed using a standardized protocol (ASTM E679-04). This analysis was

performed in November 2009 on the central Florida installation, and odor was found to have been reduced by more than 99%. Continued testing of the unit will be performed throughout the remainder of the pilot study to document treatment performance over time. [www](#)

Brendan K. Naples is product manager for Clean Air Solutions U.S. Naples can be reached at [naplesb@bnm-us.com](mailto:naplesb@bnm-us.com). Ian Phillips is global manager for Clean Air Solutions Global. Phillips can be reached at [ian.phillips@bnm.ie](mailto:ian.phillips@bnm.ie).

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