

Digester gas holder mitigates potential storage risks

Digester-generated methane gas will significantly reduce power costs at the North Head sewage treatment plant operated by Sydney Water Corporation. Digester gas storage requires a system that eliminates odor and mitigates incendiary risk, according to **Thomas Mangione** of Siemens Water Technologies.

The Dystor® digester gas storage system installed at the upgraded North Head sewage treatment plant's new biosolids facility meets all design criteria required by Sydney Water Corporation, most importantly, to protect its new energy resource – methane gas produced from digested sludge.

North Head, located across the harbor from Sydney, New South Wales, Australia, is home to Sydney Harbour National Park, a tourist attraction that offers spectacular scenery. The area's remoteness nurtures a delicate and precious ecosystem that supports such rare and endangered species as the long-nosed bandicoot.

The second-largest sewage treatment plant owned and operated by Sydney Water Corporation (SWC), the North Head sewage treatment plant discharges approximately 330 million liters per day (ML/d) of primary treated effluent via a deep ocean outfall. The plant has to meet the highest of standards set by the Department of Environment and Climate Change because of its environmental predominance. These standards include having a low impact on the area, minimally disturbing the ecosystem and not affecting tourism.

SWC is currently upgrading the North Head facility so it can continue to meet these standards. As part of the upgrade, a new biosolids facility will send digester-generated methane gas to a 1,400-kW cogeneration unit. The engine

MBR system helps recycle water

The North Head sewage treatment plant's recycled water plant has saved up to 550 ML/year of drinking water since its 2005 commissioning. Siemens Water Technologies' membrane bioreactor (MBR) system, installed in this facility, treats water used for cooling, spray water, seal water, washdown water, polyelectrolyte batching, and odor scrubber make-up water.

will provide green power to the plant, which will significantly reduce the amount of energy pulled from the electricity grid.

"We'll use the green energy to reduce the amount of power we import from the grid to run equipment such as our large raw water sewage pumps," Ian Gabriel, a SWC plant manager, explained. "We estimate this will save Sydney Water approximately US\$422,000 per year and produce green energy credits that will contribute to SWC's target of being carbon-neutral by 2020," he added.

Selecting the gas holder

Digester gas storage is an essential component of any gas utilization program. North Head's gas-holder system had to be able to withstand burning embers from potential brush fires. It also had to meet a height requirement so that it would better blend into the surrounding environment. SWC painted the gas-holder's building green to make it less noticeable, similar to its other buildings and tanks.

The SWC contractor, United Group Infrastructure of North Sydney, recommended installing a Dystor gas-holder system from Siemens Water Technologies. The Dystor system was not the lowest priced of the competitors bidding this project, nor was it the one originally selected; however it was the only system that met all design criteria.

The dual-membrane separate storage unit is mounted directly on a concrete foundation ring, costs substantially less than a high-pressure gas storage sphere, and does not require the use of high-maintenance gas compressors. Design and installation was completed on schedule using local labor and supervised by Siemens Water Technologies personnel from the United States.



Three digesters and the gas-holder building can be seen in the upper right. Photo by SWC

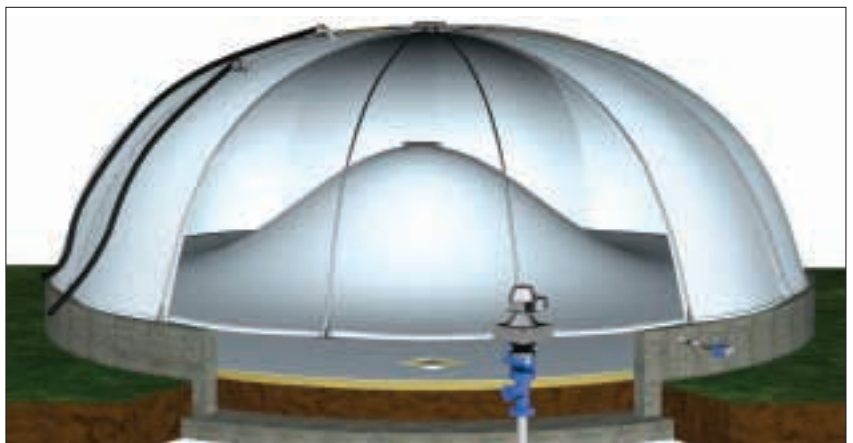
The membranes used in the dual-membrane Dystor system are polyester-based products, with PVC and PVDF coatings. These products withstand the harmful nature of digester gas constituents, but they are not fireproof. Rather, these membranes are typically fire-resistant, meaning they will not burn without a fire source.

The contractor suggested installing the gas storage unit inside a building to mitigate potential incendiary risk, which led to the imposed maximum height restriction. Siemens' Dystor dual-membrane gas-holder system meets the height requirement while still providing the 1,500 m³ of gas storage the designers

required.

Residents may also be pleased about the Dystor system's ability to contain odors. Emissions or odors cannot escape from the unit, as the system's membranes seal directly to the top of the digester wall. The new digesters are currently being commissioned and began producing biogas in June 2007.

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Inside of a Dystor separate storage gas-holder system. Photo by Siemens Water Technologies