

Distillery

AnMBR

PROJECT DETAILS

Location:	Glenmorangie Distillery. Tain, Scotland
OEM:	Aquabio Ltd.
Application:	AnMBR
Capacity:	467 m ³ /day (expanded to 600 m ³ /day)
COD feed:	Average 30,000 mg COD/L
Membrane:	8 mm, PVDF, backwashable



PROJECT OVERVIEW

The Glenmorangie Distillery, owned by Paris-based Louis Vuitton Moët Hennessy (LVMH), commissioned a state-of-the-art waste-to-energy anaerobic digestion plant at its whisky distillation site in Tain, Scotland. Operating continuously and producing approximately **4 to 5 million liters of whisky spirit per year**, the distillery required a robust solution capable of treating high-strength wastewater while supporting long-term sustainability and energy recovery objectives.

The project was regarded as a flagship initiative for both the LVMH Group and the UK distillery sector. Glenmorangie selected Aquabio Ltd. to design and construct an advanced AnMBR LE™ plant that could deliver **exceptional effluent quality, recover valuable energy as biogas, and provide reliable performance for current and future production requirements.**

THE CHALLENGE

Whisky production generates highly concentrated organic wastewater with variable characteristics, requiring careful flow management, process stability, and consistent treatment performance. Glenmorangie needed a solution that could accommodate a peak AnMBR treatment volume of 467 m³/day, with capacity for future expansion to 600 m³/day, and manage a design COD load of 14,527 kg/day.

Beyond regulatory compliance, the distillery wanted to **reduce operational costs by using recovered biogas as low-cost energy for the whisky-making process.** The treatment plant therefore had to combine high COD and BOD removal, flexibility under variable operating conditions, and a high degree of automation with remote monitoring.

THE BERGHOF MEMBRANES SOLUTION

Aquabio delivered a turnkey mechanical and electrical solution commissioned in Autumn 2016. The plant includes inlet works, screening, balance and divert tanks, an anaerobic bioreactor, a low-energy tubular ultrafiltration system, and a biogas energy management system with a biogas boiler. The system is **fully automated** and equipped for **remote monitoring**, enabling **stable operation and efficient process control.**

The distillery effluent is pretreated using a 0.25 mm wedge wire rotary drum before passing through a monitoring tank fitted with probes for pH, ORP, and temperature. In-spec wastewater is directed to two 150 m³ equalization tanks, while out-of-spec streams are diverted to a 140 m³ tank and gradually blended back into the process to protect downstream anaerobic treatment.

Feedwater is heated to 35–40 °C before entering a 2,100 m³ anaerobic reactor. Waste heat from the distillery supports both reactor and feedstock heating. The reactor mixed liquor is jet-mixed, and the generated biogas is cleaned and combusted in a biogas boiler. Biological sludge is treated in a sidestream tubular UF system comprising four loops of seven 10-inch, 4 m Berghof membrane modules, allowing membrane loops to be brought online or offline according to influent flow.



THE RESULT

The AnMBR plant achieved the project's overall performance targets, **removing more than 95 % of influent COD** and at least **98 % of BOD**. It generates approximately **8,000 Nm³ of biogas per day**, producing around 2,500 kg/h of steam and **covering approximately 20 % of the energy demand of the whisky-making process**. Treated UF permeate is **safely discharged** into the Dornoch Firth under license, while the nutrient-rich residual solid stream is **reused locally as fertilizer** for grassland fields.

Parameters	Required Effluent
Capacity	467 m ³ /day (expanded to 600 m ³ /day)
Design COD load	14,527 kg/day
COD removal	≥ 95 %
BOD removal	≥ 98 %
Biogas generation	8,000 Nm ³ /day
Steam generation	2,500 kg/h (F + A)



Customer Benefits

- Reliable treatment of high-strength distillery wastewater with COD removal above 95% and BOD removal above 98%.
- Recovery of renewable energy from biogas, reducing external energy demand and supporting low-cost steam generation.
- Operational flexibility through sidestream tubular UF loops that can be adjusted according to influent flow.
- Improved process stability through equalization, divert handling, automated controls, and remote monitoring.
- Reduced environmental impact through licensed discharge of treated permeate and beneficial reuse of nutrient-rich residual solids in local agriculture.
- A future-ready treatment platform designed to support production growth from 467 m³/day to 600 m³/day.



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Membranes

Think outside the box

ABOUT BERGHOF MEMBRANES

Berghof Membrane Technology GmbH, part of the Berghof Group, is your leading manufacturer of tubular UF membrane solutions for the filtration and separation of process streams and wastewater in a variety of industries including dairy, landfills, food & beverage, chemical, pharmaceutical and oil & gas.

We at Berghof Membranes continuously “think outside the box” by not only offering tubular UF membrane modules, but we also deliver engineered filtration systems and support services to our OEM partners. From lab-scale testing, to piloting, to engineering design, to commissioning, to remote monitoring and analysis, to replace parts – we’re more than just a membrane supplier.

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