

Advanced Membrane Solution from GE Allows Norway Fishmeal Processor to Protect the Environment and Turn Wastestream to Revenue

Challenge

Bodø Sildoljefabrikk, a Norwegian Fishmeal processor in Bodø Norway was facing plant closure due to new Norwegian regulations reducing the fish quota to the process in order to meet sustainable marine environment regulations.

Bodø Sildoljefabrikk had several major challenges facing them:

- The Norwegian fishing regulations reduced the fish quota catch to 50,000 tons per year in 2005 down from 128,000 tons annually in previous years.
- Limited on the amount of fish intake each season, they needed to find new ways to make more salable products and meet the sustainable marine environment regulations.
- Rising oil prices were driving record high-energy cost on evaporation. At the time they invested in the GE advanced membrane solution they were paying US\$26 or 169 NOK/kg and since the plant was installed oil cost has risen to US\$71 or 460 NOK/kg.
- With a reduction of raw material they need to find new ways to produce more fishmeal. They turned to other fish processors and started buying trimming or fish scrap. (Fish waste left over from the filet process)
- Located in the town of Bodø just across the harbor the community was pressuring them to reduce the bad smell coming from the plant.

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Figure 1: GE Advance Membrane Separation Solution

Solution

GE Water & Process Technologies food technologists worked together with Bodø Sildoljefabrikk to identify the streams to be processed and define the constituents' relative values.

Separating the desirable from the undesirable components to produce a salable product. Separation and fractionation was achieved by using an Advance Membrane Solution.

Bodø installed a 7,925 gpm (30 m³/h) Advance Membrane Separation Solution. (Figure 1)

Results

- The Advance Membrane Solution (AMS) provided Bodø with the ability to take 50,000 tons a year of waste from their neighbors and process it into fishmeal. By doing this they are eliminating 50,000 tons a year of marine waste and by-products into the ocean and landfills. Processing this waste has resulted in an additional 100 days of operation and US\$1.5 million or 10 million NOK in revenue.
 - The AMS is providing them with a valuable tool to meet the sustainability of the marine environment (50,000 tons per year of fish catch) and optimizing their resources to improve their revenue and profitability. With evaporation greater than 30% of the fishmeal was out of specification and could not be sold. Our AMS solution resulted in 100% of the fishmeal being processed to be Grade A Meal which translates into an annual revenue increase of US\$350,000 or 2.2 M NOK.
 - The AMS has eliminated the use of the evaporator and therefore greatly eliminating the fish odor coming off the evaporators. With the advance membrane solution the odor stays in solution. We achieved energy savings of 54% as compared to TVR evaporators. Equal to US\$600,000 per year.
 - Approximately 65% reduction in the TMA chemical, which is the primary contributor to odor. Resulting in an improved environment for the town of Bodø Norway
 - Bodø has plans to install a Reverse Osmosis system to recover the permeate from the GE AMS solution and produce 11,412,120 gallons (43,200 m³) of water annually. They will become water positive as a result of installing the GE AMS solution
- Environmental impact resulting in a reduction of 57,500 tons of fish trimmings and viscera into the ocean annually.