



# ROGUE

**PUMP COMPANY®**  
A LIMITED LIABILITY COMPANY

**CASE STUDY:** Municipal DAF Aeration  
**LOCATION:** Marine- Shipboard  
**PROJECT:** DAF Wastewater System Aeration  
**GOAL:** Removal of TSS  
**WORD KEYS:** DAF aeration, TSS removal

## FACILITY BACKGROUND

The Royal Caribbean Cruise Line Rhapsody of the Sea services the Australian market departing from the Port of Sydney. The ship alternated with the Port of Seattle in the USA during the summer Alaska in-side passage season. She is in the Vision class of cruise ship and carries 2435 passengers and 765 crew. As with any small city, RCCL strives to reduce effluent discharge. It was found that operation of the DAF could be improved significantly with the application of a new aeration technology- regenerative turbines.



## SOLUTION DESIGN

The old aeration system needed addressing to better achieve the desired treatment results. The old pump was a centrifugal design producing mostly non-functional large bubbles. And being made of cast iron the pump was heavily corroded in the environment of salt water and hot high humidity. RPC determined that the DAF was best suited to replacing the existing aeration system with a new AISI 316 stainless steel Rogue **MAX RGT™** regenerative turbine pump- a DAF upgrade was the answer. The DAF upgrade process entailed replacing the existing pump directly with the new Rogue **MAX RGT™**. The pump(s) was positioned directly adjacent to the DAF. RCCL policy requires redundancy of these types of mechanical systems and the compact layout design of the pumps allowed them to fit neatly in the cramped space available. The aeration piping system recycled effluent water through the pumps and would efficiently achieve complete and consistent air saturation it in a single pass.



## FINAL RESULTS

RPC had the pump delivered on time half way around the globe from the factory in Washington state USA. A hired maintenance crew had the Rogue **MAX RGT™** pump installed and leak-proof in short order. The new DAF upgrade produced great results right at start-up. The Rogue **MAX RGT™** pump produced very fine 20-30 micron bubbles. These micro bubbles captured the large portion of insoluble solids and effectively floated them to the surface. Significantly the DAF upgrade required less chemistry than prior.

## PAY-OFF

RCCL continues to utilize Rogue regenerative turbine pumps on the wastewater treatment system. The ship's crew is now spending far less time repairing and replacing the aeration system.

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