

Containerized Desalination System O&M Costs

RODI Systems Corp., Aztec, New Mexico, USA

Summary: This document describes the costs typically associated with operating and maintaining a PureBox™ seawater reverse osmosis (SWRO) desalination system. Note that although these costs are estimates based upon years of experience, actual costs can vary widely due to local conditions.

INTRODUCTION

The professionals at RODI Systems Corp. specialize in the design and construction of membrane-based water treatment systems. RODI has built its reputation around treatment of challenging feed waters such as oil field produced water, seawater, and contaminated brackish groundwater. The majority of the treatment systems designed and built by RODI have been portable, either trailer-mounted or built inside a general purpose, dry cargo shipping container.

RODI has sixteen years of experience in supporting clients in the operation of desalination systems. This document describes the costs typically associated with the operation and maintenance of RODI Systems' PureBox™ desalination systems.

O&M COSTS

The tables that are listed on the following pages illustrate the frequency of system maintenance and the estimated costs associated with those maintenance activities. For more information on the cost of owning a system, please refer to RODI Systems *PureBox™ Desal Cost Estimating Tool*. This is an Excel spreadsheet designed to help a prospective system owner determine the total cost of system ownership. Here is some additional explanation of system O&M costs:

Energy - Energy is one of the largest cost factors in operating a SWRO unit. The PureBox™ DLX units from RODI Systems are some of the most energy efficient desalination systems available. Energy consumption for these units will vary from 3.0 to 4.5 kWh per cubic meter of RO product depending upon the system size.

Labor - Even though the PureBox™ units are highly automated, labor is still necessary for routine operating and maintenance activities. Highly skilled labor is not necessary since RODI Systems can train any operator who meets basic qualifications. In general, the SWRO lead operator should be well

versed in the operation of mechanical and electrical equipment. They should be capable of following instructions to perform simple troubleshooting tasks, routine test procedures, and periodic membrane cleaning activities.

Membrane Replacement - Modern RO membrane elements are designed for long life but they do need to be replaced periodically. Replacement interval is highly variable depending upon local operating conditions. Typical membrane life is three to five years although there are documented cases of membranes lasting well over ten years.

Consumables - Operation of the SWRO requires the use of certain consumable items including filter aid injected into the feed stream to improve prefilter performance, scale inhibitor to prevent fouling of the RO membrane, filter cartridges, and membrane cleaning chemicals.

Spare Parts - While RODI uses high quality components in constructing its PureBox™ units, various parts of the SWRO are apt to wear or fail over time and spare replacement will be necessary.

Capital Amortization - The final cost factor is the amortization of the capital investment. RODI's SWRO systems have demonstrated lifetimes in excess of ten years. Our first SWRO is still operating after sixteen years of service.

TYPICAL O&M ACTIVITIES

The tables on the following pages list the operation and maintenance activities for some of our most popular size plants.

System Monitoring - Any SWRO system requires the operator to check and record various critical operating parameters on a daily basis. This data is invaluable when it becomes necessary to troubleshoot system performance. The PureBox™ DLX units have automatic data logging which minimizes this task.

Housekeeping - This covers the day-to-day tasks necessary to keep the system clean and orderly thus prolonging the life of the system and facilitating maintenance activities.

Filter Changes - The PureBox™ systems have several filtration steps utilizing disposable media (cartridges and bags). These need to be changed periodically.

Instrument Calibration - Successful operation requires dependable data. Instruments on the PureBox™ systems should be calibrated on a monthly basis.

Membrane Cleaning - The surface of the membrane used in the PureBox™ units will become fouled over

time with suspended solids, organic material, and biofilm. The membrane is cleaned periodically with a chemical cleaning process. Actual cleaning interval is a function of the feed water quality.

Membrane Replacement - Typical membrane life is three to five years.

Component Repair - Man hours should be budgeted for the non-scheduled repair or replacement of worn components.

For more information on operating and maintenance costs, please do not hesitate to contact us.

PureBox™ Desal – 5,000 GPD System¹			
Maintenance Item	Frequency	Man Hours Required/Year	Materials Cost/Year²
Monitor system operating parameters	Once per day	200	-
Housekeeping	Once per day	200	\$500
Change filter bags and cartridges	Once per week	50	\$450
Calibrate instrumentation	Once per month	40	\$50
Membrane cleaning	Quarterly	40	\$350
Membrane replacement	Every three to five years	20	\$640 ³
Unscheduled component repair and replacement	As needed	100	\$2,000
¹ Does not include necessary maintenance for inlet works or product distribution system. ² US\$. ³ \$3,200 over five years.			

PureBox™ Desal – 20,000 GPD System¹			
Maintenance Item	Frequency	Man Hours Required/Year	Materials Cost/Year²
Monitor system operating parameters	Once per day	200	-
Housekeeping	Once per day	200	\$500
Change filter bags and cartridges	Once per week	50	\$1,500
Calibrate instrumentation	Once per month	40	\$50
Membrane cleaning	Quarterly	40	\$750
Membrane replacement	Every three to five years	20	\$960 ³
Unscheduled component repair and replacement	As needed	100	\$4,000
¹ Does not include necessary maintenance for inlet works or product distribution system. ² US\$. ³ \$4,800 over five years.			

PureBox™ Desal – 100,000 GPD System¹			
Maintenance Item	Frequency	Man Hours Required/Year	Materials Cost/Year²
Monitor system operating parameters	Once per day	200	-
Housekeeping	Once per day	300	\$500
Change filter bags and cartridges	Once per week	50	\$5,500
Calibrate instrumentation	Once per month	40	\$50
Membrane cleaning	Quarterly	80	\$5,000
Membrane replacement	Every three to five years	40	\$4,800 ³
Unscheduled component repair and replacement	As needed	100	\$8,000
¹ Does not include necessary maintenance for inlet works or product distribution system. ² US\$. ³ \$24,000 over five years.			

505-334-5865 ph 505-334-5867 fax
www.rodissystems.com
email: info@rodissystems.com
936 Highway 516 Aztec, NM 87410

