

Backwash and Solids/Oil Management

RSL Membranes™ have a unique backwashing system. High pressure pulse air is used to backwash the membrane at the end of the filtration cycle. The filtration cycle varies from 2 hrs to 30 hrs depending on the quality of water. The air backwash is 28 seconds. Over the course of a day assuming 12 air backwashes per day based on the shortest filtration cycle, the total backwash time is approximately 5 minutes. The air backwash reduces the significant volumes of backwash and sludge waters that occurs with other solid separation technology.

The air backwash causes the RSL powder to be removed from the surface of the membrane tube and the evacuation of the contents of the housing.

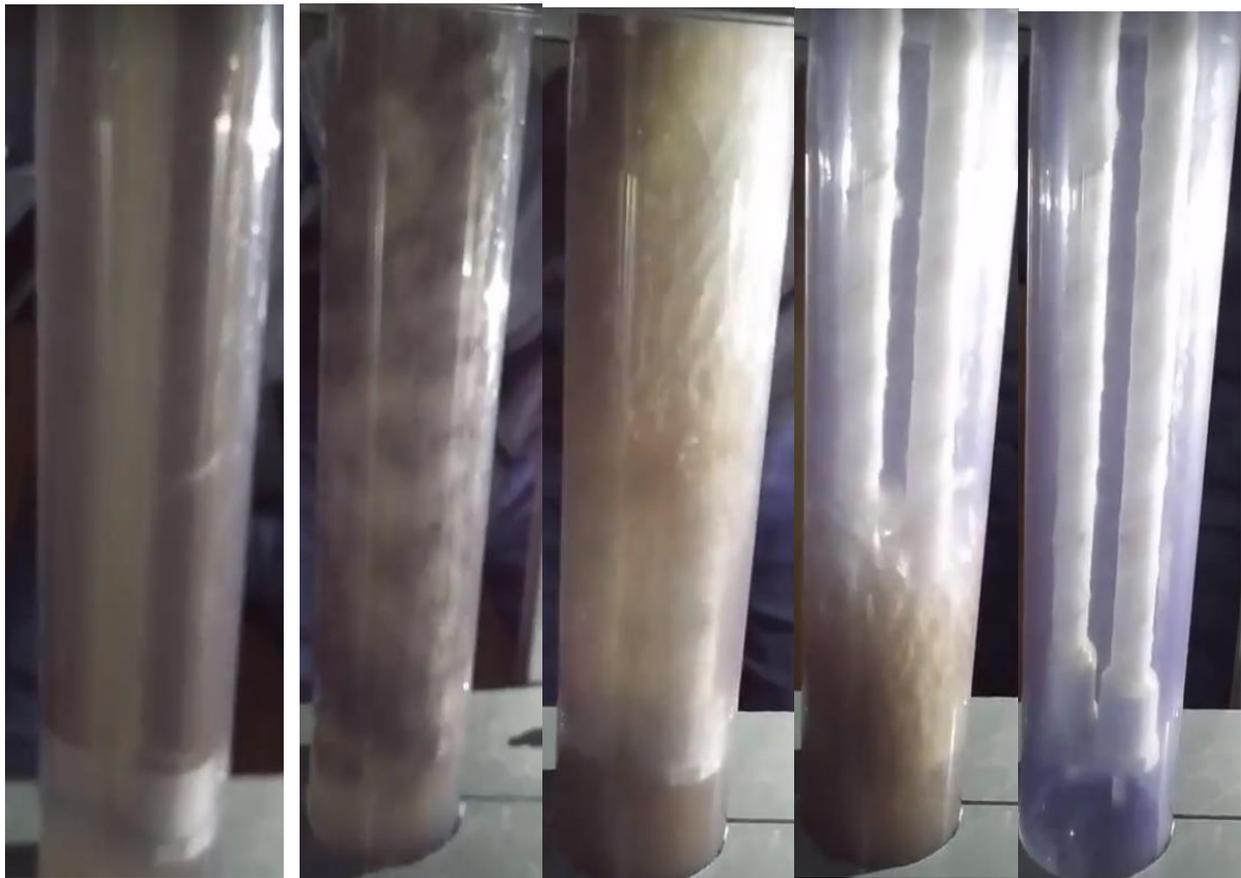


Figure 1 shows a test unit with two tubes that are similar in length to the commercial **RSL Membranes™**. The time lapsed photo is over 1.5 seconds. The membranes are polymeric and the far left shows the two membranes filtering water. The filtration feed is shut down and an air pulse is added from the top of the housing into the inside of the tubes. As you can see from left to right the contents of the housing are in turbulence from the air pulse. The far right photo shows the contents of the housing and the **RSL™ Powder** on the tubes have been completely discharged from the housing.

The **RSL Membrane™** operates in a dead-end filtration mode where the solids and/or oil being separated concentrate in the housing.

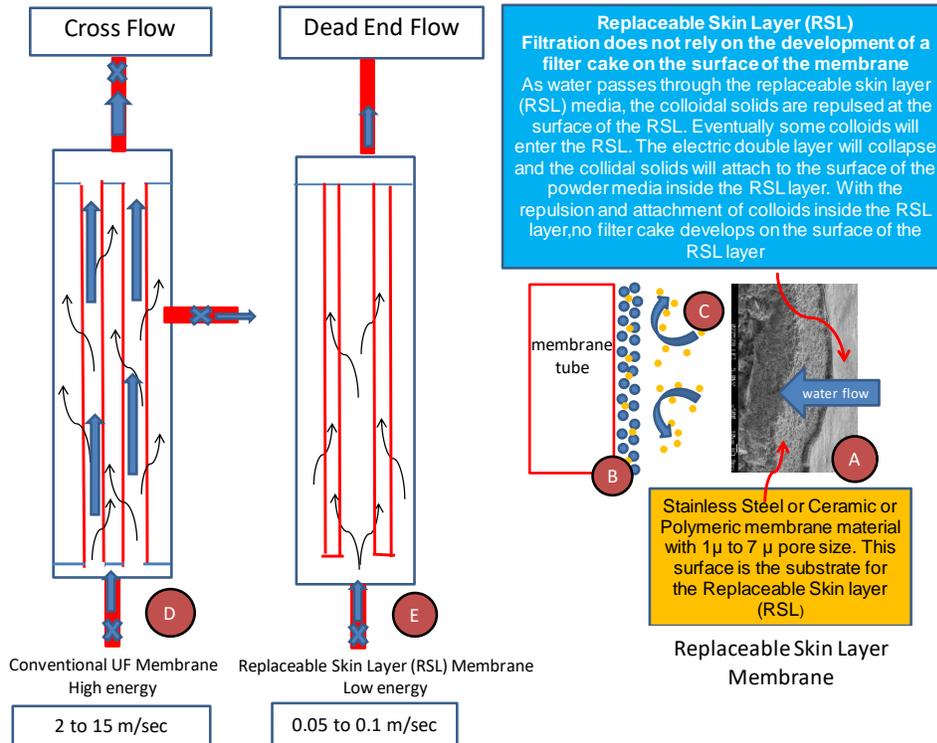


Figure 1 shows the dead-end and cross flow filtrations concept



Figure 2 shows the collection of oil that is separated in the housing. In this case the oil is a heavy oil and the system was operated at 70^o C to allow a lower viscosity oil to be separated. The concentration of oil can impair the solids separation however a method has been

developed to remove oil from the housing on a continuous basis if volumes warrant this added

feature. If not the concentrated contents of the housing are dumped during the air backwash into a sludge tank. The powder aids further solid settling in the sludge tank creating more concentrated solid layer at the bottom of the sludge tank. The concentrate solids are removed from the bottom of the tank and the supernatant is sent back to the raw water feed tank. The contents of the raw water feed tank are pumped to the **RSL Membranes™**.

Future Research

At the present time, the use of air for back wash has performed well. Nevertheless, there is a need to use less air. Research is planned to assess the use of other gases such as CO₂ and steam as a solvent to remove organic build up on the membrane tubes.