



6/18/2015

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Reference: Quarterly Engineering Support Analysis

The data received was from when the new membrane were installed in March 2015 to first part of June 2015.

### **GENERAL OBSERVATIONS**

- The RO inlet pressure has steadily decreased from ~180 PSIG to 130 PSIG.
- The flow rates increased around the 1<sup>st</sup> of May and held steady until the ~18<sup>th</sup> of May where they decreased and are holding steady.
- The RO permeate conductivity is increasing from around ~4 to ~13 at the end of May.
- % reclaim is stable at ~70%
- RO permeate pressure is stable at ~24 PSIG
- The system's HPP's pressure seems to repeatedly steadily trend downward for ~7 days at a time and then jumps back up and the HPP's RPM does not follow that trend pattern.

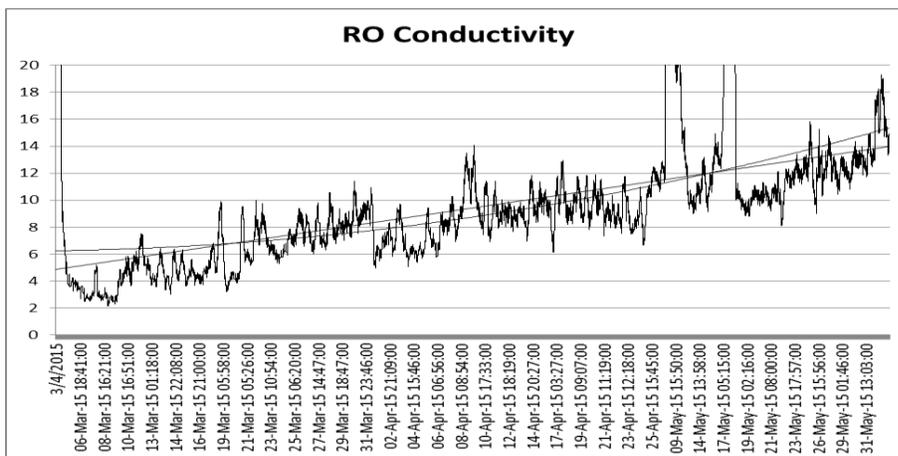
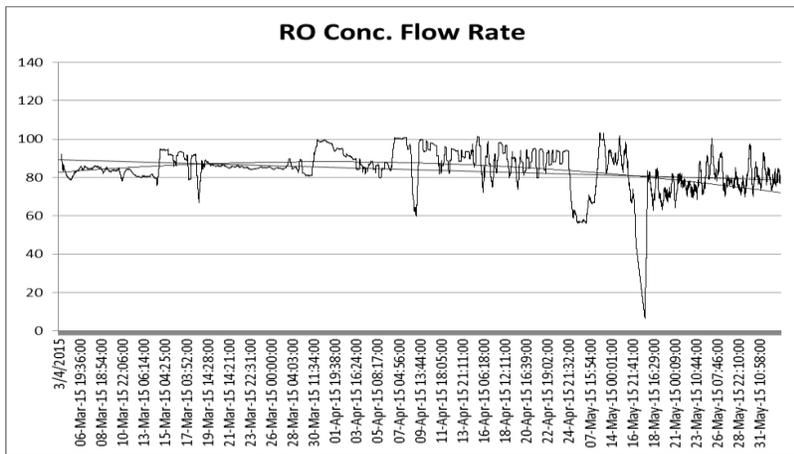
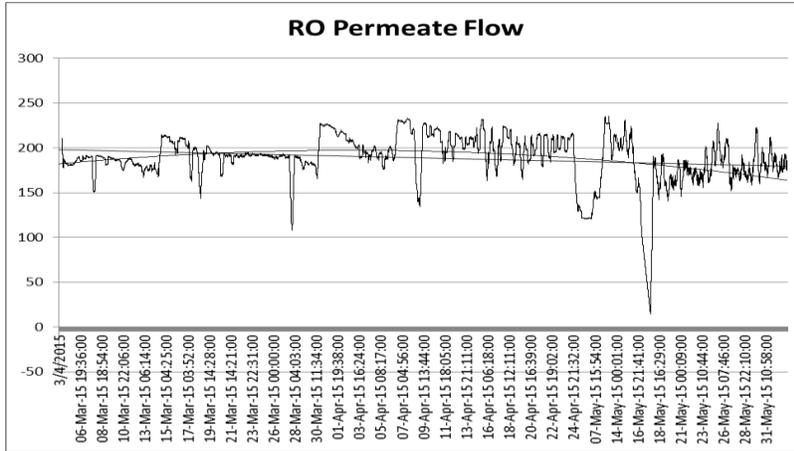
### **ANALYSIS**

The pressure is decreasing, the flow rate is increasing, and the permeate quality is decreasing. Things that could cause this are:

- Increase in water temperature.
- The membrane's pores are getting eaten which is normally caused by Chlorine or Chloramines.

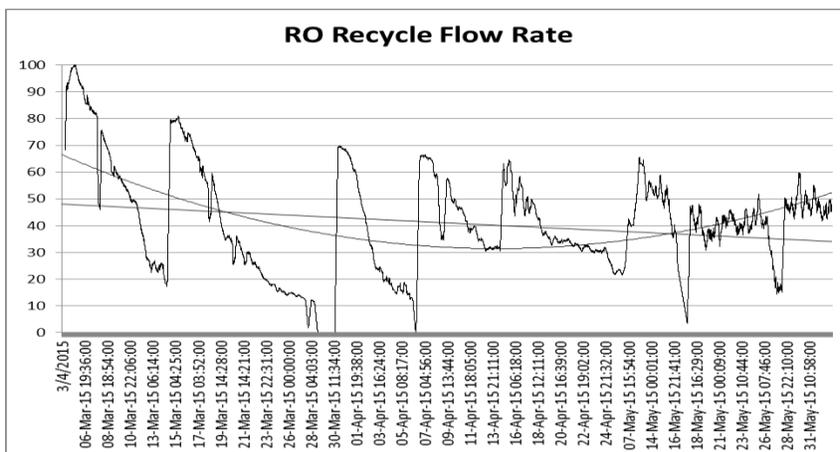
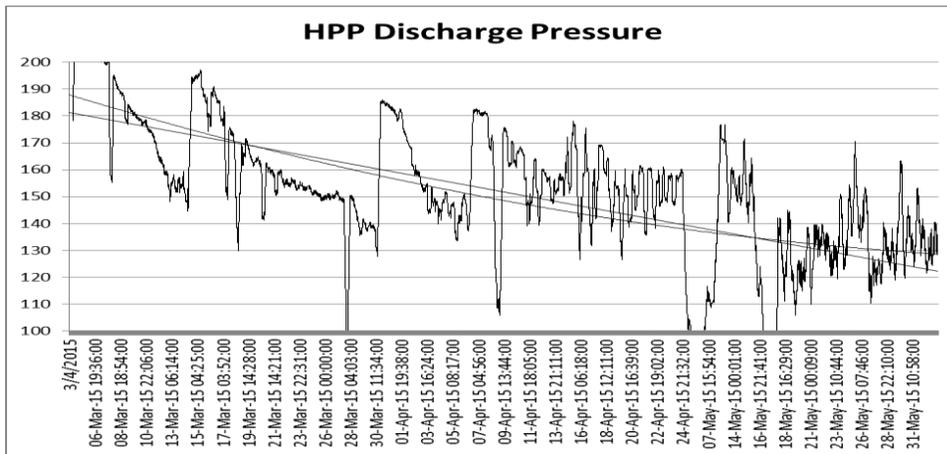
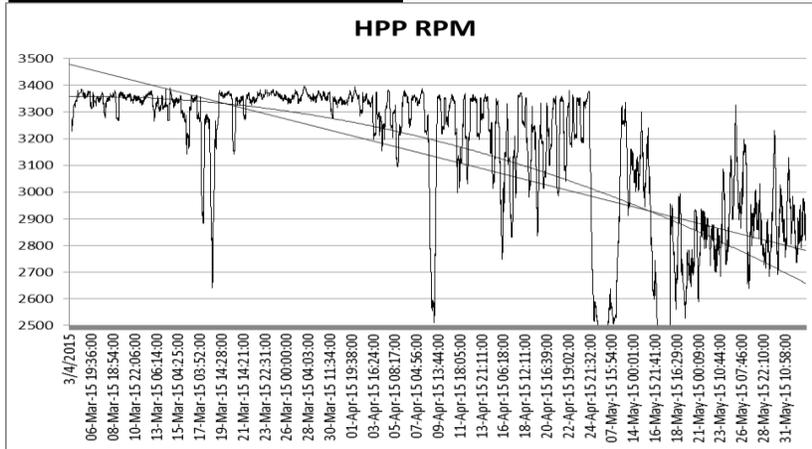
The autopsy reports from the last membrane autopsy noted Bromination which is caused by Chlorine, Chloramines, or Bromine that is in the feed water.

**GRAPHS**



**Impurities Removed,  
Quality Service Added.**

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## RECOMMENDATION

My recommendation is to check the concentrate for Total Chlorine. If none is found then check for Bromine. Your chemical supplier should know if there is Bromine in the feed water. Chlorine, Chloramines, and Bromine should be easily removed with your Sodium Metabisulfite chemical injection.

## OTHER OBSERVATIONS

Since the pressures are not increasing this leads me to believe that the membrane are not getting a large amount of scale build-up. Additionally, the equipment was designed to operate at 85% reclaim where the system is operating at 70% reclaim so the membrane are not being pushed very hard. Operating this way may be because of past experience and the current antiscalant chemical may not be able to control the scale build-up if the reclaim was increased. If you wish to try, I would guess that increasing the reclaim to 75% would be okay, especially now that we are working together and monitoring the system.

The biggest unknowns are the feed water temperature and conductivity.

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