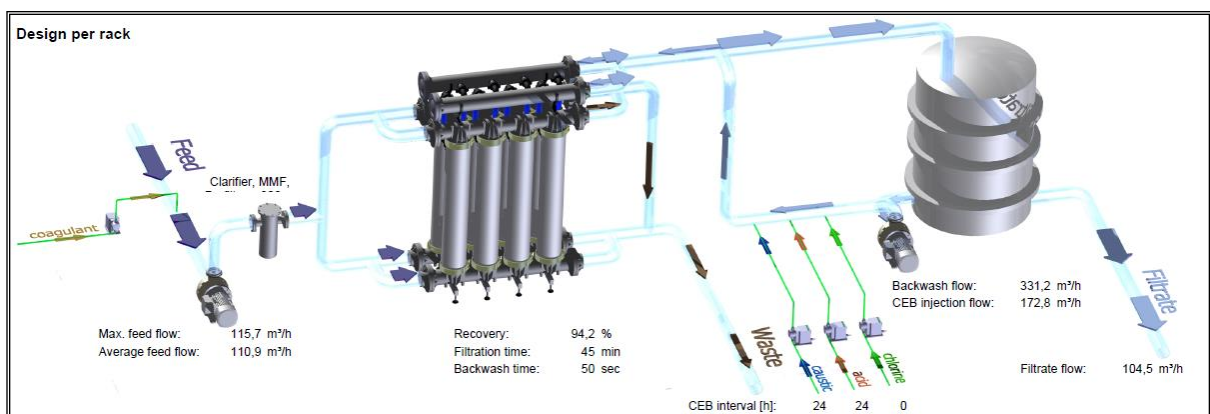


# Bukit Barun Stage 5 Potable Water Plant Extension – Ultrafiltration Membrane Pilot System (10MLD)

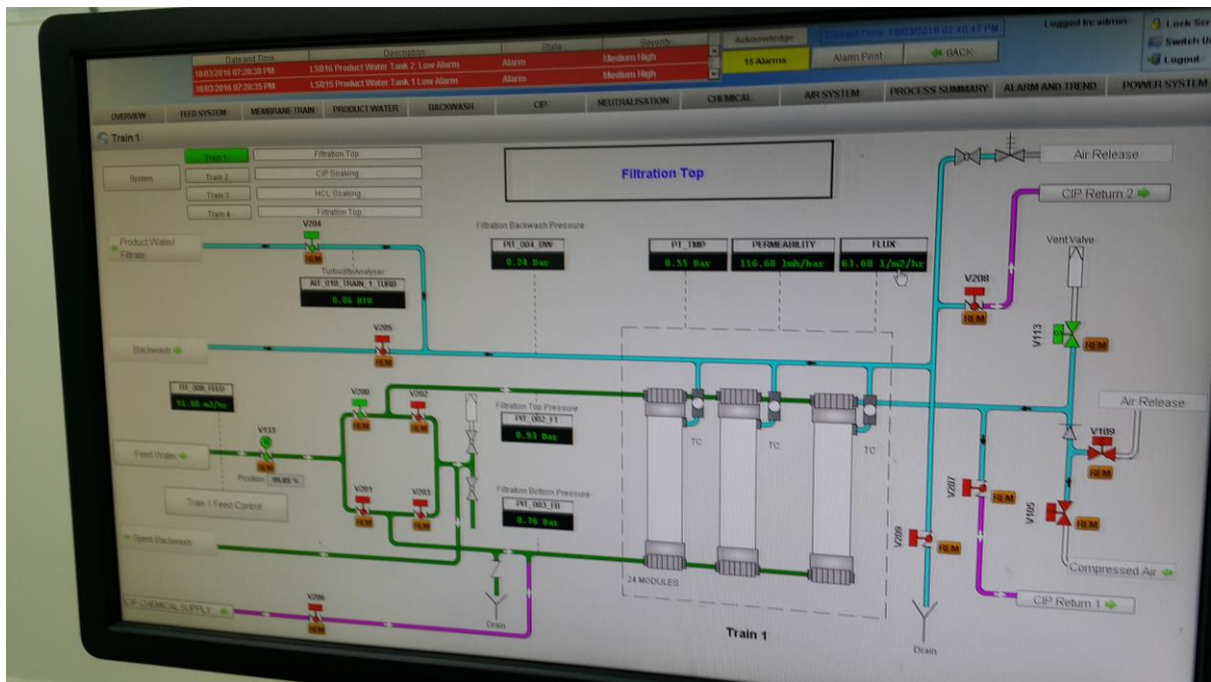


## Background

Brunei Darussalam is well known as oil-rich country in South East Asia, and even for the whole world. Bukit Barun is considered as “Water Town” of Brunei where majority of potable water from river sources are processed and supplied from here. Due to its nature of river water colour has become a concern for the existing water treatment facilities. In year 2013, the Public Works Department (JKR) has initiated a pilot project using membrane technology to polish treated water from existing Bukit Barun Stage 5 Plant, with capacity of 10 MLD (million litre per day)



# Process



- Intake water:** Existing Stage 5 WTP's Clarified or Filtered Water
- Plant Capacity:** 10 MLD (4x2.5MLD)
- Technology:** Inside / Out Polymeric Ultrafiltration Membranes with bottom / top feed and backwash/CEB system (complete with fully automatic Air Integrity Test system)



## Results

The Ultrafiltration Membrane System was successfully commissioned on September 2014. Throughout the four quarters of plant operation, the UF system design / selection adequacy is reviewed in details as the followings:

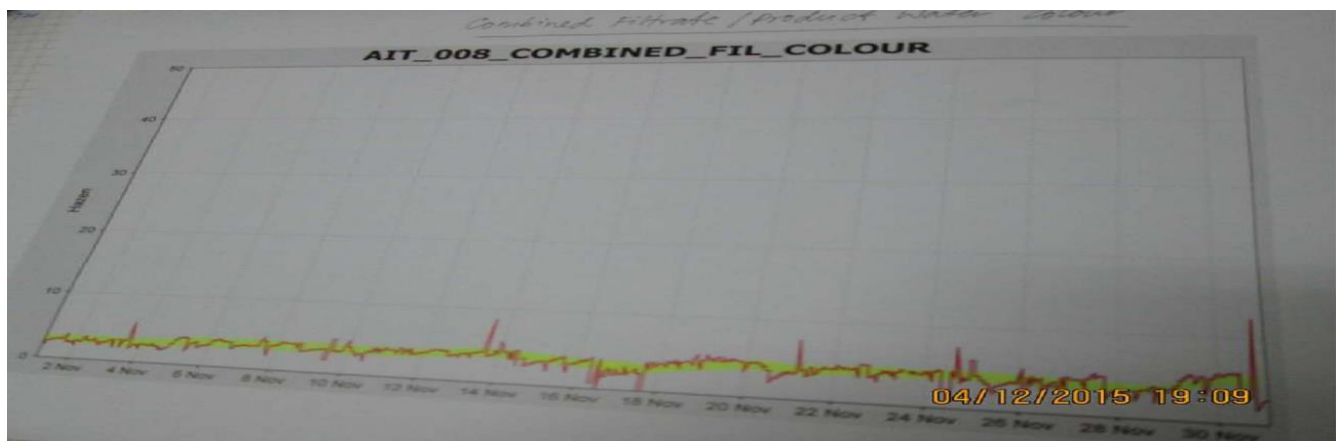
### ***Operating data e.g. flux, flow (feed, filtrate averaged over 24 hours period) and pressure***

Feed and filtrate of flow of each train of UF membranes were seen stable and meeting the designed figures. However due to very high turbidity and colour spikes of raw feed, the flux of membranes were seen dropping quite significantly. Reduction of flux (sign of membrane fouling) would cause higher feed pressure to drive the same amount of water out of membranes, which contributes to higher trans-membrane pressure across the membranes. As a result permeability of membranes dropped faster than expected.

Despite raw feed variance that much higher than design range, the UF permeate quality is rather consistent. High levels of colour were recorded almost at all time with extreme case up to **606 Hazen! The high removal rate of colour up to 99% is observed at extreme case, suggested that UF is suitable technology to reduce the colour**

### ***Water quality data e.g. pH, temperature, turbidity***

Based on the observation, water quality was never an issue, concluding that UF membranes are capable to deliver very clean water consistently. From the performance UF is even suitable to filter / polish the treated waste water in order to achieve water sustainability.



**As conclusion, the pilot test using Inge UF technology is successful and it could be extended to other potable water plant expansion in Brunei. Specific configuration could be modelled in accordance with relevant feed conditions and goal to produce an ideal plant with long operating life and the lowest operating costs.**