

CHAPTER 6

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6.1 Conclusions

During the pre-commissioning period, plant operators will decide whether the WWTP is able to function well. The pre-commissioning was carried out for 2 months to collect enough data to determine whether the plant is able to treat wastewater loading from the various incoming sources. These sources are the CUF and CUF customers, which consists of discharge from water filters, water demineralisation packages, boilers, cooling towers, waste from Acetic Acid Plant (BPPA), Vinyl Chloride Monomer Plant (VCM), Ammonia Syngas Plant (ASGP) and the CUF plant whereby the waste consist of plant run-off and storm water run-off.

During the pre-commissioning period, main source of wastewater contributors were also identified for each parameter. NH_3 was contributed mainly by the VCM and ASGP; P was contributed by CUF and ASGP; O&G was by ASGP; TSS by VCM; COD by VCM and BPPA. The DO levels were in the range of 3 to 4 mg/L in Aeration Tank A and Aeration Tank B. This show that the aeration system is working well and providing sufficient O_2 for the growth of microorganism in the aeration tanks. The pH reading which were in the range of 8 to 9 in these tanks also show that the pH is within the required range (pH 7 to 9) for microorganism growth.

The COD reading in the final discharge was fluctuating between the DOE Standard B specifications of 100 mg/L during the 1st month of observation. The readings obtained were between the range of 60 to 125 mg/L. The COD reading in the 2nd month was fluctuating as high as 350 to 450 mg/L. Achieving these type of high COD reading and fluctuating readings in the final discharge, the plant operators had decided to extend the retention period of the Off-Spec tank longer. This is to further dilute the incoming

wastewater before entering the aeration system. Finally the plant operators had decided to go ahead with the commissioning period of 8 days to handover the plant to the client.

Based on the results obtained from the Performance Test, the quantity and the quality of the treated effluent at the Final Discharge meets Standard B Discharge Limits.

In conclusion, an integrated approach of building one WWTP for treating a few industries can be successful with proper implementation and plant design. The results show that 4 different type of industry (CUF, ASGP, BPPA and VCM) can share one common WWTP. In doing so these industries have saved the cost of building 4 different types of WWTP. This type of practice leads to better wastewater management. In the twenty-first century, the effective management of all wastewater will become a critical issue, especially as the world's demand of material continues to increase. Thus, instead of providing one WWTP for the protection of the environment, an integrated system can and will play a vital role in wastewater management and sustainability in the future.

6.2 Recommendations

To continue operating the plant according to the design specification, the following recommendations are suggested: -

1. CUF Effluent Treatment Plant did not continuously comply with the Arsenic limit. It is not clear whether this is due to Arsenic in the CUF or customer effluents, Cooling Water Blowdown, digester supernatant or due to sampling and analytical error. To resolve this issue, the client should carry out a detailed analytical campaign to identify the source and then resolve this.

2. The high variation of pH and chemical loading inhibits the growth of biomass in the Aeration Tanks (A and B). The dampening of these variations depends on the availability of dilution factor and buffer capacity (i.e. empty volume of Off Spec Sump)

of the plant. Close monitoring of the incoming waste is required such that Off-Spec waste is diverted into the Off Spec Sump and fed into the biological treatment tanks in a controlled and diluted manner; and

3. Thirdly, the BOD from the incoming effluent streams is low. With a low BOD, there is insufficient biodegradable matter to support the biomass at the design level, thus causing MLSS concentration in the Aeration Tanks to be below design concentration. Therefore, to ensure the long-term viability of the biomass it will be necessary to provide supplementary biodegradable feed for the plant.