

Application of Ultrafiltration and Nanofiltration Treatment for the Closure of E- Stage Bleaching Plant Effluent

Shukla *Sudheer Kumar, Vivek Kumar, and Bansal M. C.

ABSTRACT

Pulp and paper industry is facing a major problem on account of increasing scarcity of water and stringent discharge norms introduced by Central Pollution Control Board (CPCB) in the form of CREP (Corporate Responsibility for Environmental Protection). Large proportion of water being discharged presently will have to be recycled back into the system at the appropriate intake points with/without treatment. Membrane filtration technology, particularly Ultrafiltration and Nanofiltration are being adopted increasingly in the paper mills for closing of process water streams. E- Stage bleaching effluent is very well suited for ultrafiltration process, because of its comparatively small volume and high molecular weight substances in it. In the present study, extraction stage (E- stage) bleach plant effluent was treated in the Ultrafiltration (UF) and Nanofiltration (NF) from the point of view of system closure. Concentrate of each stage is recycled back and permeate of ultrafiltration is fed to nanofiltration. Spiral wound polysulphone membranes were used for the purpose. The total membrane area was 2.51 m². Molecular weight cut-off (MWCO) were 1000 Dalton and 300 Dalton, for UF and NF respectively. Inlet pressure was 200 psi for each membrane. Variation in inlet pressure and its relation with flow rate was also stabilized. Significant removal of COD, TDS, Color, AOX and Heavy Metals (Fe, Cu, Co, Cr, Ni, and Zn) was observed. The color removal is very high and permeate from nanofiltration can be recycled back in the system at appropriate point.

Key Words: Membrane Filtration; Paper Mill Effluent; System Closure, Bleaching plant Effluent