ANNEXURE - II

DETAILED EXPERIMENTAL PROCEDURE

CHEMICAL PRECIPITATION FOR CHROMIUM REMOVAL

One litre of spent chrome tan liquor is taken in a container. Alkali such as lime or sodium hydroxide or ammonium hydroxide is added to the effluent with continuous stirring and the dosage of alkali addition is gradually increased. The precipitate is allowed to stand overnight for separation of clear liquor and liquor is then filtered through slow sand filter. The filtrates obtained after the alkali treatment are analysed for their contents such as TS, TDS, TSS, VSS, BOD, COD, Chromium etc. The chromium content in the filtrate is analysed by atomic absorption spectrophotometer. The amount of alkali required and the optimum pH to remove maximum chromium is noted.

BIO-CHEMICAL TREATMENT OF EFFLUENTS

The physico - chemically treated effluent is used for the biological digestion. The reactor is a wide mouthed glass bottle of 5 litre capacity. Necessary tubes are connected to facilitate addition of influent, for removing treated effluent and settled solids and for gas transfer. The gas collection apparatus consisted of a glass bottle of 500 ml capacity and another levelling bottle of 1 litre capacity for the water displaced from the gas bottle. The reaction is carried out in the air tight container for effective anaerobic digestion and at room temperature. Cowdung is used as the seed material and is taken in the digester after bacterial growth. About 2 lt of the effluent is added to the digester and allowed to stand till gas evolution is noticed. Then influent is added in terms of BOD load and this varying organic load is introduced into the reactor at varying interval of time such as 12, 18 and
24 hrs. The pH of the contents in the reactor is adjusted to around 7.0 which is necessary for anaerobic biological growth. Calculated amount of diammonium phosphate and urea are added to the feed solution to maintain the BOD:N:P ratio at 100:2.5:0.5. The contents in the digester is given a thorough mixing by using magnetic stirrer. The digestion is carried out until stabilized condition is achieved as represented by sludge growth and the effluent BOD remaining constant. The samples of treated effluents withdrawn at different loading rates and at different interval of time such as 12, 18 and 24 hrs are analysed for their contents.

In the case of aerobic digestion, the culture of aerobic heterotrophs is introduced into the effluent containing organic material and compressed air is passed continuously into the system. The varying organic load is supplied into the system at different time interval as in the case anaerobic process and digested effluent are withdrawn at different interval of time and analysed. Necessary nutrients are added to maintain BOD:N:P ratio at 100:5:1 and pH of the contents in the reactor is maintained around 7 which is necessary for effective aerobic digestion.