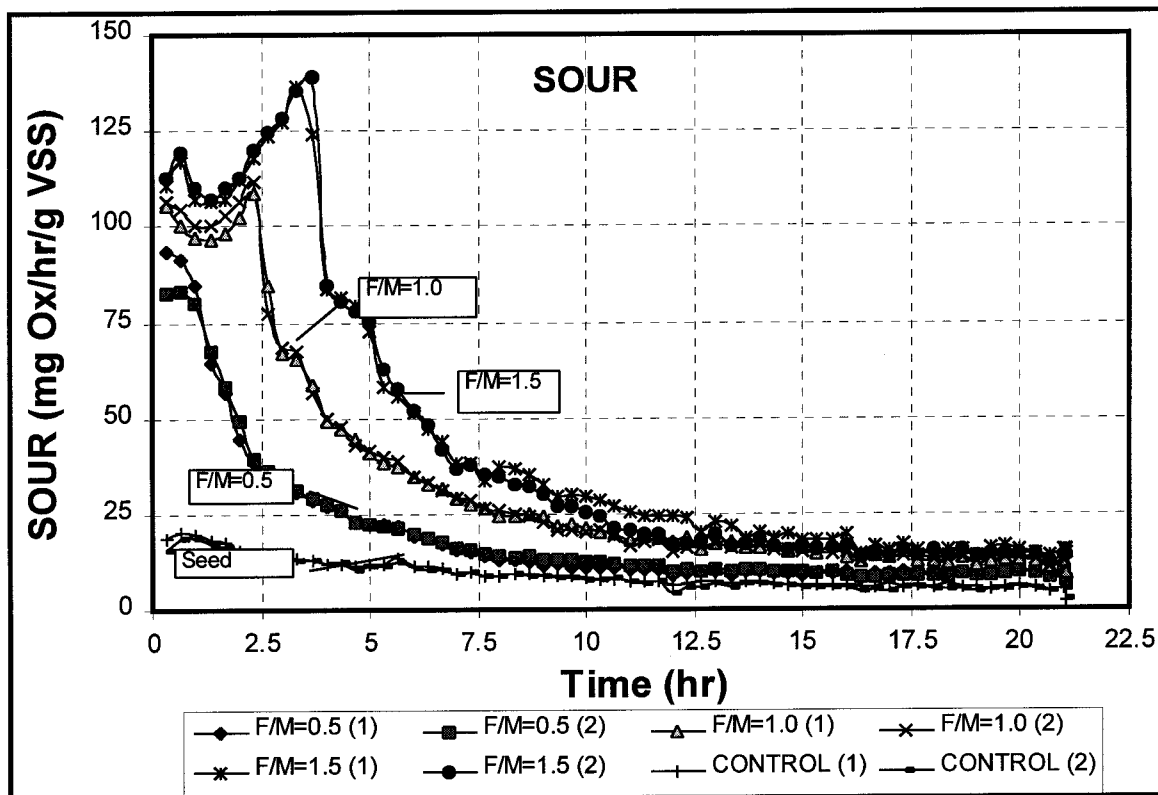


Pulp Mill Wastewater



A pulp mill was interested in evaluating the impact of increasing organic loading rates on the performance of their activated sludge systems. In this case, the wastewater and biomass concentrations were varied to give food-to-microorganism (F/M) ratios of 0.5:1, 1:1, and 1.5:1. Test temperature was 35°C. Specific oxygen uptake rate (SOUR = OUR/M) curves show a high rate of oxidation of readily biodegradable organic constituents. One peak occurs within one hour of test initiation. A second peak occurs between one and four hours of contact for the 1:1 and 1.5:1 F/M ratios. This reaction occurs at the low F/M test conditions but is superimposed on the first high-rate peak of oxygen uptake. At the higher F/M ratios, insufficient organisms are present initially to oxidize the wastewater at maximum rates but grow rapidly to complete the OUR reactions within four hours. The oxidation of readily biodegradable organic constituents is followed by a long tail of slowly degrading constituents. In this case, the SOUR curve for the 0.5:1 F/M ratio represents the basic fingerprint for this plant. The SOUR curves for the 1:1 and 1.5:1 F/M ratio indicate that the activated sludge process would require several hours more contact time to allow complete oxidation of the organic constituents of the wastewater. The fact that the OUR does not reach endogenous rates after 20 hours of contact indicates that the oxidation of organic wastewater constituents had not been completed.