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MODELING AND MICROBIOLOGY OF A NEW ZEALAND DAIRY INDUSTRY ACTIVATED SLUDGE TREATMENT PLANT

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ABSTRACT

An extended aeration activated sludge plant treating dairy factory wastewater was studied. The effectiveness of organic and nutrient removal was investigated in conjunction with the causes of existing foaming and bulking problems.

Excellent removal efficiencies of 99.7% BOD5, 98.8 % COD, and 96.9% TKN were achieved thoughout the period studied. The removal of total phosphorus however, was only 33.8% and this may become an issue that requires attention in the future.

The dominant filamentous organisms in the sludge were identified as *Type 0914*, *Type 0092*, *Nocardia pinensis*, *Nocardia amarae*-like organisms, and *Nostocoida limicola III*.

It was determined that these organisms were the major cause of the bulking and foaming conditions at the Waste Treatment Plant, although the use of surfactants in the factories and nitrogen and iron deficiencies were probably also contributing.

All of the dominant filaments identified have been previously found to exist in large numbers in low food to organism ratio/high sludge age conditions. It was therefore recommended that the sludge age be reduced and the F/M ratio increased by increasing the amount of sludge wasted from the treatment plant.

Existing kinetic coefficients were used, together with the Activated Sludge SIMulation programme utilising Activated sludge Model No.1, to successfully model

the existing system. This model can now be used by treatment plant employees (with some training required) to predict the results of alterations to plant operation and/or configuration.

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