

ABSTRACT

ENGINEERING APPRAISAL OF IRON AND MANGANESE REMOVAL PLANTS IN TRINIDAD

By

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In Trinidad, 24% of the water distributed by the Water and Sewerage Authority (WASA) comes from groundwater. Of the water distributed by WASA, 7% has iron and manganese in excess of permissible limits set by WHO guidelines. The wells located in the south and central regions of the island have excess iron and manganese. WASA has built 11 iron and manganese removal plants in these areas. An engineering appraisal was undertaken to determine the effectiveness of treatment plants. The plants that did not meet the standards had their unit processes like coagulation, flocculation, and sedimentation(pre-treatment) and filtration systematically analysed to determine the reason(s) for their non-compliance. The shortcomings of the plants were identified and were mainly due to inefficient pre-treatment and filtration processes.

In order to improve the efficiency of these plants laboratory investigations were undertaken. The process of coagulation, flocculation and sedimentation were revisited using newer chemicals by conducting bench scale jar tests. The chemicals such as polyamines, Polyaluminium chloride (PAC) and polyacrylamide were used to determine the optimal treatment. The recommendations of these laboratory investigations were, then, implemented at the plants as field trials to determine their effectiveness. The field trials were evaluated using such parameters as treated water quality and duration of filter run to benchmark their performance against the original treatment. The costs of the modified treatments were then assessed taking into account chemical, labour and power costs.

This investigation also serves to as a model to conduct the engineering appraisal of the treatment plants and also to determine the optimal technology for future propagation.

Key words: David Benny; Iron and manganese removal; Appraisals of treatment plants jar tests; filter runs.