Centra-flo™ Gravity Sand Filter Pilot Testing at Union Sanitary District Alvarado Wastewater Treatment Plant Union City, CA

June 15, 1993 thru August 15, 1993

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Introduction

Through arrangements made with the Union Sanitary District, Fremont, CA, a Model CF-12 Centra-flo Gravity Sand Filter was tested at the Alvarado Wastewater Treatment Plant in Union City, CA. The facility is a 25 MGD conventional activated sludge plant. The treatment plant is operating a 250,000 GPD pilot plant to determine the feasibility of a full scale water reclamation plant. This pilot plant recieves it's influent water from the secondary clarifier at the Alvarado Treatment Plant. The solids flowing to the pilot plant can sometimes flucuate due to the main facilities lack of areation capacity resulting in

The flow within the pilot plant to the filter comes from the secondary clarifier effluent trough to a chemical mixing chamber and then directly to the filter. Several different chemicals and different combinations were added at different times during the test period. The filter effluent was discharged to a holding basin. The filter was to be tested and evaluated against the existing conventional backwash filters. The two existing filters were labeled Filt #1 and Filt #2. Filt #1 is a triple media unit while Filt #2 is a single media unit. The Centra-flo was also compared to the Eimco Rotoco (upflow) unit which was receiving influent from the same chemical mixing chamber as Filt #1 , Filt #2 and the Centra-flo.

Test Objectives

The primary goal of the test for APT and Union Sanitary District was to determine the Centra-flo's capability to reduce effluent turbidity to 2 Ntu or less in order to meet the requirements of California's Title 22. Title 22 stipulates that reclaimed water "shall not exceed an average operating turbidity of 2 turbidity units and does not exceed 5 turbidity units more than 5 percent of the time during any 24-hour period."

A Hach Model 1700 turbidimeter with a strip chart recorder was installed on the filter effluent line to allow continuous readout of the filters performance. Flow meters were installed to measure influent flow rate. The test procedure to accomplish a comprehensive evaluation was put in place by Mr. Joe Ernest of USD. Several others involved in the testing were also included in the setup and operation of the 60 day test.

Test Performance

The Centra-flo test was conducted from June 15, 1994 to August 15, 1994. During the 60 day test the Centra-flo was operated 24 hours a day without any shutdown or lost operational time.

USD recorded information on 85 occasions during the test period. The following data shows the results of the testing. Several charts prepared by Union Sanitary District are attached for comparision of the the Centra-flo Effluent vs Influent TSS; Centra-flo effluent vs Filt #1 at startup; the Centra-flo Effluent vs Filt #1 at 33 gpm.

All laboratory testing was completed by Union Sanitary District staff. Average influent TSS was 13.125 with a high of 30. Average effluent TSS was 2 with a low of 1 and a high of 4. The average removal was 84.76%. Average influent turbidity was 6.34 Ntu with an average effluent of 1.34 Ntu with the data removed where performance was deteriorated by equipment failure or loss of chemicals.

Considerations

The Centra-flo utilizes a high quality multi-grade silica sand. The mixture for this particular test was 13.33% 8-12, 53.33% 12-20, and 33.33% 16-30. This media mixture is typical. The mixture can be tightened up substantially utilizing a finer grade media, thus ensuring even better performance and lower TSS and NTU readings, if required.

Another consideration is the diameter of the filter. Being only 4' diameter the fastest moving, dirtiest sand in the filter is only 15" from the face of the filtrate nozzle. In a larger filter, for example a CF-25, this 15" dimension becomes approximately 24"., aprroximately 50% more filtration area available. This greater distance will ensure better performance.

Conclusion

Based on the pilot unit test conducted, the Centra-flo Gravity Sand Filter will reduce the influent TSS and Turbidity by an average of 85%. The Centra-flo has proven it's capability to exceed the requirements of Title 22 of the California Code of Regulations by consistantly reducing the effluent quality below 2 NTU.

Applied Process Technology would like to thank Mr. Joe Ernest, Mr. David Livingston, Mr. Mich Berklick for their assistance and support during the test period.

Respectfully,

APPLIED PROCESS TECHNOLOGY, INC.

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attachments