

3D TRASAR™ For Wastewater Enhances Refinery Wastewater Treatment Reliability, Improving Refinery Profit Margin



INTRODUCTION

The Canadian Oil Sands represents the third largest oil reserve in the world behind Saudi Arabia and Venezuela. Because of the availability and difficulties associated with producing these crudes they are offered at significant discounts, making them desirable to the refiner. They do, however, contain contaminants that challenge reliable control of the wastewater treatment plant.

BACKGROUND

With the goal of improving profit margin, a northern refiner was pursuing an increase in the percentage of heavy Canadian crude in the crude slate; the impact to wastewater however was significant as it struggled to maintain effluent quality. The wastewater treatment plant configuration consisted of primary treatment, API and IGF followed by secondary treatment, activated sludge. Although the primary treatment equipment was designed to handle the high solids loading characteristic of Canadian crude, the variability in influent loading challenged primary treatment control and ultimately compromised final effluent quality. In an effort to manage the variability,

the chemical treatment program was adjusted to maintain elevated dosages even though contaminant load did not warrant the higher dose. For the most part, this approach was successful, though excursions were still occurring at times of elevated influent loading as shown in figure 1.

SOLUTION

After a comprehensive mechanical, operational and chemical (MOC) audit was completed confirming the primary treatment's capability of performance, a revolutionary automation technology was implemented. The Nalco Water 3D TRASAR for Wastewater (3DTfWW) measures influent and effluent contaminant load and adjusts chemical treatment to maintain a specific effluent target. Historically, the challenge with on line monitoring in a refinery wastewater treatment system is reliability of the sensor due to the aggressive environment. The 3DTfWW contains sensor fouling monitoring with an automated cleaning and fouling prevention system and includes sophisticated logic to prevent chemical overfeed.

ANNUAL SAVINGS

WASTE

Reduced sludge generation by 600 tons per year with

\$48,000

annual disposal costs reduced

PROFITABILITY

315,000 bbl. additional opportunity crude processed with

\$630,000

in annual profit increases

VALUE DELIVERED

Profit Improved by

**\$678,000
ANNUALLY**

RESULTS

Implementation of 3DTfWW provided IGF effluent quality despite variable and high influent loading. See Figure 2.

Although there were occasions where total influent loading exceeded either the design of the primary treatment equipment or chemical feed system, improvements in control are documented in Table 1.

CONCLUSION

The Nalco Water 3D TRASAR for Wastewater improved wastewater treatment plant reliability resulting in a \$630,000 annual increase in profit as the refiner was able to maintain desired throughput of Canadian crude. In addition, wastewater treatment plant upsets were reduced, lowering sludge handling costs by \$48,000 per year.

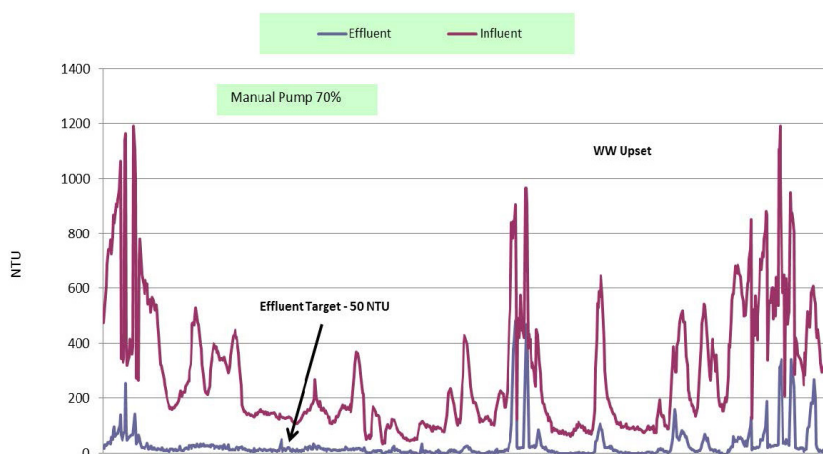


FIGURE 1: IGF PERFORMANCE WITH HIGH MANUAL FEED PROGRAM

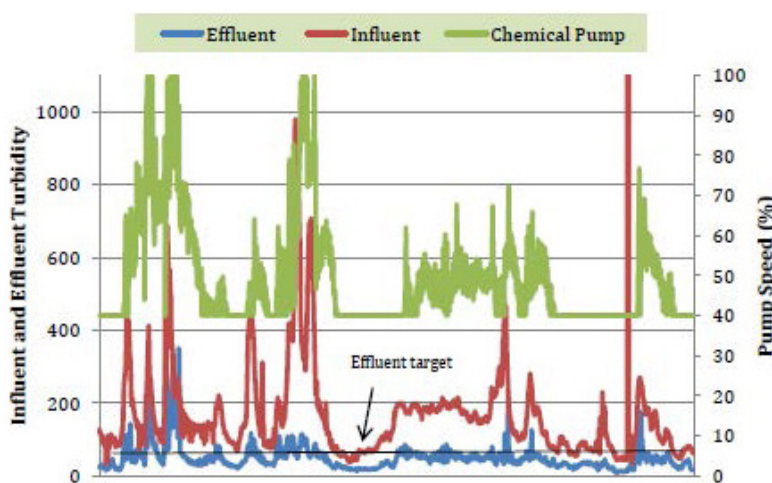


FIGURE 2: AUTOMATED CONTROL OF IGF CHEMICAL TREATMENT PROGRAM WITH RESPONSE TO LOAD CONDITIONS

PARAMETER	MONITORING	CONTROL
Average Influent Turbidity (NTU)	313+/- 264.1	194.6+/- 159.1
Average Effluent Turbidity (NTU)	35.8 +/- 109.2	46.8 +/- 32.4
Average Pump Output (%)	68.5	48.4

TABLE 1: COMPARISON OF RESULTS IN MONITORING AND CONTROL MODES OF IGF CHEMICAL TREATMENT PROGRAM

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