

Advanced FLOCMaster Technology Delivers Reductions in the Total Cost of Operation at a Soil Cleaning Plant in Europe

NALCO

An Ecolab Company

CASE STUDY - MINING

CH-1191

INTRODUCTION

With an ever-increasing focus on the improvement of environmental quality, reuse and recycling of non-renewable materials, and the restoration of soils and industrial sites that have been subject to historical pollution, local and regional legislation across Europe is driving major initiatives around environmental improvement. The cleaning of polluted soil is one of the many ways in which residual pollution is removed as waste, allowing the soil and its components to be recycled and used across a wide range of applications.

BACKGROUND

A major construction, engineering, and infrastructure company headquartered in northern Europe operates a number of soil cleaning plants in the region. The company makes a very strong commitment to Corporate Social Responsibility (CSR), balancing the complementary needs and opportunities for society, the economy, and the environment. Its soil cleaning operations are a clear indicator of its commitment to sustainability, through the economical restoration of polluted land back into use, and the production of soils and sands which can be recycled into primary construction and other applications.

CUSTOMER IMPACT

Overall annualized reduction in fresh water demand of over 1.4 m Gallons (6200 m³) (60%)

Reduced annual sludge volume by 5,731,960 lbs (2,600 tonnes)

Improvements in the efficiency of the treatment and application reduced the volume of consumables by 25,352 lbs (11500 kg) (18%) per year

All data verified by the customer

eROI™

ECONOMIC RESULTS



Reduction in water costs of over \$8,274 (€6200) per year



The elimination of large volumes of sludge delivered a reduction of \$104,101 (€78000) per year in disposal costs

Reduction in the annual cost of treatment consumables of \$40,039.19 (€30000)

Overall annualised reduction in the Total Cost of Operation of \$152,148 (> €114000)

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

One of the company's soil cleaning plants operating in northern Europe processes around 60 tonnes per hour of polluted soil. Plant operations are highly dynamic due to the constantly changing variety of materials that are extracted for cleaning. These can range from sands, dredged materials, organic solids, and many others. The total treatment program has to be robust but also flexible. Once the materials have been collected and mechanically processed and separated, they are dewatered using a belt press system. The company was seeking to improve dewatering performance in order to reduce waste materials volumes, water consumption, and overall cost.

CURRENT SITUATION

The soil cleaning plant consists of a system of hydro-cyclone filters, lamella separators, and then a set of parallel belt presses which process the sludge as it is received from the separators.

The belt presses are the dewatering units that are more susceptible to variations in performance as a result of changes in the quality of the incoming sludge. Dosing of treatment to the belt press is based only upon visual observation and manual adjustment. The dosing system is a traditional static 'Tee' system, which feeds treatment ahead of the dewatering system.

GOALS

The customer set very clear Key Performance Indicators (KPIs) for the improvements desired, and these included:

- Reduction in the Total Cost of Operation (TCO)
- Reduction in fresh water demand
- Reduction in waste volume and disposal costs
- Reduction in treatment consumables
- Improved overall sustainability performance
- Automation of sludge dewatering treatment

Management at the plant invited specialist experienced staff from Nalco to visit the plant and to make recommendations concerning any areas for improvement. Nalco staff conducted a full Mechanical, Operational and Chemical (MOC) assessment of the plant operation, paying particular attention to the upstream cleaning stages, and the operation of the belt press.

ACTION PLAN

The results of the Nalco assessment clearly identified areas for improvement in the operation of the belt presses. Nalco was able to propose the latest FLOCMaster technology in order to improve dewatering performance.

The FLOCMaster technology consists of a unique make-up station which delivers an active polymer solution at a higher solution strength than previously possible for the chemistry required, an innovative and advanced sludge-polymer solution mixing system and an automation component that optimises the dosage of polymer solution.

Management on site accepted the Nalco proposal, and the new application technology was installed on one of the belt presses. The mixer was installed in-line ahead of the belt press sludge inlet.

RESULTS

As a result of the introduction of advanced Nalco FLOCMaster technology, the Nalco sludge dewatering program was able to deliver a much-improved overall unit performance. Sludge dry solids increased by 6%; the consumption of water needed for treatment makeup and application was reduced; the amount of treatment consumables required was reduced considerably; and major savings were delivered through reduction in the volume of waste sludge

to be disposed of. Together this delivered the following quantified improvements, which were verified by the management on site:

- Reduction in the Total Cost of Operation (TCO) by over \$152,148 (€114000) per year
- Reduction in fresh water demand of 6280 m³ per year (60%, saving \$8,274 (€6280))
- Reduction in the associated wastewater volume
- Reduction in sludge volume for disposal of 5,731,960 lbs (2600 tonnes) per year (saving \$104,101 (€78000))
- Reduction in treatment consumables of 25,352 lbs (11,500 kg) (18%) per year (saving \$40,039 (€30000))
- Improved overall sustainability performance

CONCLUSION

This innovative problem-solving approach to sludge treatment and disposal helped management at the site achieve cost reductions, as well as improvements in overall



operational efficiency. As a result of using the new Nalco FLOCMaster technology for dewatering optimisation, the sustainability performance of the soil cleaning plant was improved, in particular through reduced demand for treatment consumables and clean water resources, and reduction in the volume of waste sludge for disposal.

The combination of Nalco on-site Essential Expertise, and the application of market-leading innovative technology, elevated site and production profitability and identified other areas for continuous performance improvement.

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