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How Shasun, a major Pharmaceutical manufacturer, maximises the investment in it's operation critical Biological Wastewater Treatment Plant and improves it's security at the same time.

Overview

At the Dudley Shasun facility we have a 7500 m3 biological treatment plant that can treat up to 36 tonnes of waste COD per day. Part of this capacity is utilised to treat up to 15 tankers per day of third party aqueous waste. The waste is very varied, covering everything from leachates at only 2000ppm COD to industrial waste at up to 500,000ppm COD. The Strathkelvin respirometer forms a central part of the testing procedure that determines how much of any material the Bio-plant can safely treat.



Shasun Bio-plant, Cramlington

The effluent-screening programme is vital to both the Shasun production facility and the Bio-plant. Any toxic event would take months to fully recover from so it must be avoided at all cost. In addition we are closely regulated by the Environment Agency and Northumbrian Water so all offsite effluent has to be kept within tight consents. The Strathkelvin Respirometer is the key to quickly and confidently assessing all potential waste effluent to ensure it will not harm our treatment facility.

Specific Application

The respirometers have two main functions in the Dudley lab: pre-acceptance testing and tanker testing.

Pre-Acceptance Testing

All potential waste streams are put through a suite of tests to determine suitability and cost of treatment. The respirometer tests for two key items: toxicity and biodegradability. For low COD effluent a zero inhibition result is sufficient but if the COD is high we need to see an increase in respiration proportional to concentration. This indicates good biodegradability, which is essential to prevent accumulation and off-site consent issues. With experience it is possible to confidently assess the extent of biodegradability in any given sample just by looking at the increase in respiration rates. Longer-term toxicity can be assessed by aerating samples overnight and re-testing after 24 hours.

Tanker Testing

Every single tanker that arrives is tested with the respirometer before it is allowed to discharge. With a little experience this can be done in less than 10 minutes. This maintains a high level of security without compromising turn-around time. The graphs produced are compared against the pre-acceptance results to ensure the effluent is as described. The other required tests are completed whilst the respirometer is running to keep analysis time down to a minimum.



Shasun's Laboratory showing their two Strathtox respirometers.

Cost Reduction Programme for Shasun Effluent

Before we had the respirometer it was very difficult to make confident decisions about which effluent could be safely treated at the Bio-plant. Inevitably we had to err on the side of caution and refuse many potential effluent streams that then went for expensive off-site disposal. Now that we can effectively test them we have been able to treat many wastewaters in-house and dramatically reduce disposal costs. This is a far superior environmental and financial means of dealing with aqueous waste.

Conclusion

The first respirometer we purchased paid for itself within 3 months by increasing the quantity of waste we can process internally. This has reduced the amount of waste stored on site and eliminated a considerable amount of tanker traffic. It also forms the basis of our commercial screening programme and maximises the throughput of a previously underused Biological treatment facility.

The rapid nature of the testing has enabled us to have far more security than we thought possible in the limited time available during tanker turnaround. The ability to cheaply do 5 plus full tests per hour has transformed our effluent-screening programme.

C. Goodman

Biological Treatment Plant Manager