

## Oil Technics: Biological Cleaning Trial

### Overview

#### Oil discharges reduced by 95%!

Unlike traditional cleaning chemicals, biological degreasers clean and also digest unwanted oil emulsions.

Oily water effluent captured within a separator can be further bioremediated by use of our Bio Tubes, which digest up to 6 kg of oil per week for 6 – 8 months!

This strategy cleaning was tested at a busy five-island Petrol Station in the Netherlands. The operator had oil discharges averaging 500ppm and wanted to see these discharges reduced to meet European Standard 858:

- Class 1 – 5mg/litre
- Class 2 – 100mg/litre.

This report shows how, over a period of 5 – 7 months, this objective was achieved.

### Objectives

The Petrol Station retailer engaged an Independent company to observe the trial and to analyse, on a two monthly basis, the results obtained.

The operator set the following objectives:

#### Did the use of biological chemicals:

- change the pH of the effluent water?
- alter the Oxygen demand of the effluent water?
- improve the cleanliness of his forecourt?

#### Were biological cleaning chemicals able to:

- digest oil throughout the carbon chain from C10 to C40?
- reduce total oil discharged to the European standard of 20ppm (from a 3 year historical average of 500ppm)?

### Specialist Cleaning Products

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## Products used

In month one, the operator ceased using his traditional alkaline cleaning chemicals.

These were replaced with:

- **Forecourt Bio** - an enzyme based cleaner used at a dilution of 1:20 to clean pumps, islands and areas adjacent to the diesel pumps.
- **OT8** - a biological oil stain remover used neat to remove oil stains across the forecourt.
- **Bio Tubes** - biological product that floats within the separator absorbing and digesting free oil. One Bio Tube was placed in the second chamber and two Bio Tubes were placed in the third chamber.

## Results Obtained

Over the seven months, the following results were obtained:

	Month 1	Month 3	Month 5	Month 7
<b>1. Water sample pH</b>	<b>4.9</b>	<b>2.6</b>	<b>6.6</b>	<b>6.7</b>
<b>2. Oxygen Demand</b>				
i. BOD mg/litre	290	7950	225	165
ii. COD mg/litre	477	250	662	258
iii. BOD/COD	<b>0.61</b>	<b>31.8</b>	<b>0.34</b>	<b>0.64</b>
<b>3. Mineral oil fraction mg/litre</b>				
i. C10 – C12	38.00	390.00	3.90	0.85
ii. C12 – C14	99.00	570.00	5.80	0.84
iii. C14 – c20	250.00	1500.00	36.00	8.60
iv. C20 – C26	110.00	710.00	34.00	6.80
v. C26 – C34	17.00	110.00	2.90	1.80
vi. C34 – C40	0.02	12.00	2.20	0.16
<b>4. Total oil C10 – C40</b>	<b>514.02</b>	<b>3292.00</b>	<b>84.80</b>	<b>19.05</b>
<b>5. Target mg/litre</b>	<20.00	<20.00	<20.00	<20.00



### **Q1. Did a change of pH occur?**

Starting at a pH of 4.9, within 3 months the pH had reduced to 2.6.

After investigation it was discovered that a night shift operator in Month 3 had emptied battery acid into the separator, producing the reading of 2.6!

From Month 4 to Month 7 the pH remained steady at 6.6.

### **Q2. Did the oxygen demand change?**

In Month 3, the Forecourt Manager was so delighted with the biological oil stain remover OT8 that he used it to remove oil stains from the entire forecourt (5000m<sup>2</sup>).

This resulted in a large excess of surface oil being discharged to the separator in Month 3. By the end of Month 7 Oxygen demand was unchanged at 0.64.

Under normal circumstances, the separator should have been emptied and cleaned. However, it was decided for the excess oil to remain within the separator to test fully the effect of biological cleaning.

### **Q3. Did the bacteria digest across the carbon chain?**

The results showed a dramatic reduction from Month 3 to Month 7 across the carbon chain (see above table).

### **Q4. Was a reduction in total oil discharge obtained?**

In Month 1 effluent oil discharges were 514 mg/litre.

In Month 3, following the total site clean up using OT8, oil discharges were 3292 mg/litre!

By Month 7, this was reduced to 19 mg/litre using the combination of Bio Tubes within the separator and the continued use of Forecourt Bio.



## Conclusion

### Cleaning of Pumps and Islands

Forecourt Bio, used at a 1:20 dilution, proved very effective in cleaning pumps and islands.

Operators noted that when applied to surface diesel spills, the area contaminated was restored to its original surface condition.

They also commented that the more frequently they used Forecourt Bio to clean diesel spills, the less they needed to use – confirming that biological cleaning continues to remain effective long after application.

### Forecourt Oil Stains

OT8, our Biological Oil Stain Remover, was very effective in removing oil stains across the forecourt.

Our recommendation to the operator was that OT8 should be used regularly for individual oil stains and every six months for general forecourt cleaning (after which the separator should be emptied and cleaned).

### Separators

The Bio Tubes placed within the separator worked very effectively.

In Month 3 the separator has excessive oil content and high oil discharge, as described in Q1 above.

By Month 7, these discharges had been reduced from 3292 to 19 mg/litre - **a reduction of 95%**.

Our recommendation to the operator was that three Bio Tubes should be replaced six monthly, after each routine complete emptying and cleaning of the separator.