

Dispatch Maturation Ponds – Case Study - 2005

Congested Maturation/Holding Pond with years of buildup of stabilized sludge.



The sludge was not breaking down as fast as expected so analysis of the effluent was taken, the results were: Total Dissolved Solids 1672; Magnesium 177 and Ammonia 250, very difficult sludge to biodegrade.



The senior consulting engineer confirmed that the bioaugmentation had reduced the sludge by 80% email below:

Johan Barnard

From: "Johan Barnard" <envirotan@telkomsa.net>
To: <marcusn@bcj.co.za>
Sent: 06 April 2005 9:22
Subject: Re: Bio-augmentation Process

Hi Marcus,

I've had a meeting with Vernon Ludwig and Lohmann Beams regarding the progress at Despatch sewage works. The following points were highlighted:

The sludge ponds are not the same as oxidation ponds. I.e. the sludge ponds are loaded with sludge in a dead end mode, compared to oxidation ponds, which is continuously loaded with raw sewage water in a flow through mode. I.e. the ammonia problem is continuously solved. By adding the Avantu material to the oxidation pond, an overloading problem can be rectified relatively quickly, whereas the sludge ponds may take significantly longer.

The contents of the sludge ponds is partially digested secondary sludge (activated sludge blowdown). Overloaded pit latrines contain raw sewage sludge which have a higher energy value and is more digestible. I.e. also a time and percentage breakdown factor.

We agreed that the best way to get rid of the excess water in the sludge ponds would be to return it slowly to the inlet of the works. It will tend to generate extra sludge, but obviously less than the original amount. My estimation is that you may be left with 10% (dry weight) of the sludge in the ponds and you may generate about 10% extra new sludge by returning it to the inlet. I.e. 80% of the original sludge have been removed by the process. If you start the recycling of the water as soon as possible at a rate of about 10% of raw incoming sewage water, the contents of the sludge ponds will be empty at the required time. The water volume of the pond is estimated at 13 Ml (120 x 60 x 1.8). If the inflow to the works is say 3.5 ML per day it will take about 37 days to empty one pond. (13 / 3.5 / 0.1).

Marcus I know that the above argument does not fit the original plans, but under the circumstances of time restrictions, it is dangerous to wait to long for results that may not materialise, i.e. compliance to DWAF river standards.

The wet slurry left in the ponds after the water has been drawn off must also be removed after drying (which may take a long time in case of rain). This sludge can be dried on a temporary sludge drying bed as follows: Pack the bricks on level land cover it with shade cloth and top it with a thin layer of sand (say 25 mm). Pack big cement blocks around the outside. The bricks and cloth could always be re-used after the exercise.

Hope this helps.

Regards,
Johan

----- Original Message -----

Analysis of the effluent during the biodegradation process

**NELSON MANDELA METROPOLITAN MUNICIPALITY
INFRASTRUCTURE & ENGINEERING
SUPPORT SERVICES
SCIENTIFIC SERVICES
CERTIFICATE OF ANALYSIS**

CERTIFICATE NO:	PARTICULARS OF SAMPLE: Digested Sludge	DATE RECEIVED
P 1401	SUBMITTED BY: M. S. W. van der Vyver	24-05-2005
	Ames Coast Africa, P. O. Box 1286, Port Elizabeth, 6005 Fax No: 041 286-1710	DATE OF REPORT
		24-05-2005
ALL SAMPLES MUST ANALYSED ACCORDING TO APPROVED "STANDARD METHOD"		
CHEMICAL RESULTS IN METALS/TRACE AND OTHERS (unless otherwise stated)		
Laboratory Number	1411	
Sample Identification		
TOTAL DISSOLVED SOLIDS @ 180°C	1672	
CARBONATE ALKALINITY as CaCO ₃	0	
MAGNESIUM as CaCl ₂	177	
PHOSPHORUS (TOTAL)	25	
TOTAL DISSOLVED ORGANIC CARBON	*	
COMMENTS:		
* report unable to analyse		
<small>This report relates only to samples supplied to the SCIENTIFIC SERVICES and does not relate to similar samples. This report may not be reproduced, stored in a retrieval system or used in any way without the written approval of the Manager Scientific Services. Although SCIENTIFIC SERVICES will endeavour to perform analyses correctly, neither SCIENTIFIC SERVICES nor its members shall be liable for loss or damage sustained directly or indirectly by the user in reliance on the results of any analysis or their interpretation. Results not quoted within 10 working days of the issuing of the report will result in the disposal of the original samples, unless SCIENTIFIC SERVICES are advised to the contrary.</small>		
MANAGER SCIENTIFIC SERVICES		(PAGE 1 OF 1)

**CONTRACT No 5308 /A (5) - REFURBISHMENT OF THE DESPATCH WASTEWATER RECLAMATION WORKS
SLUDGE HANDLING AND DISPOSAL USING BIO-AUGMENTATION PROCESS**

TEST	DWAF LIMIT	SAMPLE TAKEN ON	SAMPLE TAKEN ON	SAMPLE TAKEN ON	SAMPLE TAKEN ON	SAMPLE TAKEN ON
		14/02/05	21/02/05	23/02/05	28/02/05	09/03/05
		Orbal Sludge Lagoon	Orbal Sludge Lagoon	Ames Coast Sludge Lagoon	Orbal Sludge Lagoon	Orbal Sludge Lagoon
COD (unfiltered)	75mg/liter	596, 547, 636, 676	706, 626, 583, 719	-	430, 871, 482, 931	1340, 486, 679, 660
OA (PVP) (unfiltered) (Permanganate Value)	1mg/liter	49, 43, 46, 58	52, 50, 34, 50	-	31, 82, 30, 83	60, 40, 51, 44
Ammonia	10mg/liter	171, 220, 254, 329	257, 219, 265, 309	-	133, 148, 122, 123	225, 189, 225, 210
Nitrate plus Nitrite	15mg/liter	0.7, 0.5, 7.5, 9.6	0.7, 1.0, 0.8, 0.8	-	0.7, 0.6, 0.2, 0.6	0.5, 0.5, 0.5, 0.5
pH	5.5 to 9.5	7.7, 7.8, 7.8, 7.8	7.5, 7.8, 7.5, 7.6	-	7.6, 7.7, 7.7, 7.5	7.5, 7.4, 7.5, 7.4
E.coli	1000					5100
Faecal coliforms / 100ml						17000

The Biodegradation Process Over Eight Weeks



