

The MAKRO ORGANICS water treatment process at Mount Grace Dam

Supervision by Stellenbosch University

Date 01-10-2009

2 tons of cow dung was loaded into the dam. The dam was left untreated for a few weeks. The dam sediment layer becomes anaerobic with an explosion of micro-organisms increasing the BOD (Biological Oxygen Demand) and the water body is rapidly depleted of DO (Dissolved Oxygen).

Date 23-10-2009

A few weeks after the cow dung was dropped into the dam MAKRO ORGANICS Water Cure Treatment was applied. At that point in time the DO was very low at the bottom of the dam where the dung was decomposing. Ammonia production was high, as the anaerobic bacteria struggle and compete for oxygen. E-coli cultivations are at a dangerous level. The Algae has begun to bloom and bad odours are evident.

Date 25-10-2009

Two days following this treatment the 2nd set of analysis was taken. The DO increases dramatically and immediately the capacity for the nitrifying bacteria increases. Digestion of organic matter by micro-organisms would under normal circumstances use up all the oxygen (decreasing DO) and produce ammonia and methane. The algae along the sides of the dam have begun to flocculate and dissolve. There are bubbles along the edges of the dam.

The MAKRO ORGANICS Water Cure releases and facilitates the cultivation of positive, digestive micro-organisms oxidizing the an-aerobic state. As you can see in the analysis, the DO increases in the under layer dramatically and the good digestive micro-organism colonies explode and now the dung bio-mass, that would have become a problem, now becomes a breeding ground for the right digestive organisms. For the 1st few days the bacterial life at the bottom layer will rapidly cultivate healthy bacteria and digestive micro-organisms reducing the ammonia and nitrite production. Once the Ammonia and nitrite have peaked as seen on this analysis they decrease rapidly to a neutral state as seen on the 3rd analysis.

After the 2 week period the 3rd set of samples were taken. The DO reached an all-time high at the bottom of the dam (8.2 ppm). The nitrogen cycle is complete and cycling at an optimal level. The ammonia, nitrite and nitrates are all within optimal parameters. The E Coli produced from the cow dung has reduced from 1300 to 400 and the BOD is at pristine water quality measurements.

The MAKRO ORGANICS Water Cure Treatment has brought this dam back to an ecologically balanced state within 2 weeks of dumping 2 tons of cow dung into it. What would have become a totally eutrophic water body with algal blooms has been restored into healthy ecologically balanced water. The water body will continue to heal itself with the MAKRO ORGANICS Water Cure Treatment.

The water volume is approximately 10 000 000 litres.

Let the earth heal itself

Water Quality Report
OWS Project



1st, 2nd & 3rd Sampling
Water Analysis Data

Commissioned by Louis Rosseau

2009/12/01



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Disclaimer

The data presented in this report are strictly the values measured at the respective water analysis facilities, and does not in any way represent the opinion of the Water Quality Division of Stellenbosch University, Bemlab, or Scientific Services about the successrate of the water treatments performed by the OWS group.

Analytical Service Providers

1. Water samples collected and report compiled by Kora Holm (Stellenbosch University).
2. COD and BOD data obtained from Scientific Services (Cape Town Municipality).
3. pH, NH₄-N, NO₃-N, NO₂-N, TSS and *E. coli* data obtained from Bemlab (Somerset West).

A handwritten signature in blue ink, appearing to read 'D. Brink', written over a dotted line.

Signed: Prof Danie Brink

A handwritten date '11/8/10' in blue ink, written over a dotted line.

Date

Table 1: Dam Characteristics Before treatment.

Date	23/10/2009
Time	16h00
Depth	1 m
Secchi disk reading	30 cm
Wind	Mild breeze
Cloud cover	0/8
Rain	-
Additional Notes	Many underwater plants (grasses)

Parameter	Surface	Bottom
pH	6.95	7.5
Temperature (°C)	25.5	19.5
Dissolved Oxygen (mg/L)	7.8	2.5
Dissolved Oxygen (% Sat)	95	28
Total Suspended Solids (mg/L)	1.0	4.5
Ammonia (mg/L NH ₄ -N)	1.45	8.88
Nitrate (mg/L NO ₃ -N)	0.11	2.60
Nitrite (mg/L NO ₂ -N)	0.10	0.15
COD (mg/L)	115	117
BOD (mg/L)	12	9
<i>E. coli</i> (per 100 ml)	85	890

Table 2: Dam Characteristics 2 days After Treatment.

Date	27/10/2009
Time	13h00
Depth	1 m
Secchi disk reading	30 cm
Wind	Very strong
Cloud cover	4/8
Rain	-
Additional Notes	Many underwater plants (grasses)

Parameter	Surface	Bottom
pH	7.2	6.9
Temperature (°C)	20.5	19.5
Dissolved Oxygen (mg/L)	8.9	7.5
Dissolved Oxygen (% Sat)	98	85
Total Suspended Solids (mg/L)	10	20
Ammonia (mg/L NH ₄ -N)	14	13
Nitrate (mg/L NO ₃ -N)	8.66	16.84
Nitrite (mg/L NO ₂ -N)	0.40	0.59
COD (mg/L)	118	118
BOD (mg/L)	12	10
<i>E. coli</i> (per 100 ml)	100	1300

Table 3: Dam Characteristics 2 weeks After Treatment.

Date	14/11/2009
Time	16h30
Depth	1 m
Secchi disk reading	30 cm
Wind	Extremely strong
Cloud cover	0/8
Rain	-
Additional Notes	Many underwater plants (grasses)

Parameter	Surface	Bottom
pH	7.0	6.8
Temperature (°C)	18.7	18.5
Dissolved Oxygen (mg/L)	9.3	8.2
Dissolved Oxygen (% Sat)	102	89
Total Suspended Solids (mg/L)	13	23
Ammonia (mg/L NH ₄ -N)	0.28	0.25
Nitrate (mg/L NO ₃ -N)	1.25	0.31
Nitrite (mg/L NO ₂ -N)	0.06	0.06
COD (mg/L)	147	147
BOD (mg/L)	1	2
<i>E. coli</i> (per 100 ml)	270	400

Table 4: Summary of Dam Characteristics Over Monitoring Period (23/10/2009 - 14/11/2009).

Parameter	Date	Surface Measurement	Bottom Measurement
pH	23/10/2009	6.95	7.5
	27/10/2009	7.2	6.9
	14/11/2009	7.0	6.8
Temperature (°C)	23/10/2009	25.5	19.5
	27/10/2009	20.5	19.5
	14/11/2009	18.7	18.5
Dissolved Oxygen (mg/L)	23/10/2009	7.8	2.5
	27/10/2009	8.9	7.5
	14/11/2009	9.3	8.2
Dissolved Oxygen (% Sat)	23/10/2009	95	28
	27/10/2009	98	85
	14/11/2009	102	89

Parameter	Date	Surface Measurement	Bottom Measurement
Total Suspended Solids (mg/L)	23/10/2009	1.0	4.5
	27/10/2009	10	20
	14/11/2009	13	23
Ammonia (mg/L NH ₄ -N)	23/10/2009	1.45	8.88
	27/10/2009	14	13
	14/11/2009	0.28	0.25
Nitrate (mg/L NO ₃ -N)	23/10/2009	0.11	2.60
	27/10/2009	8.66	16.84
	14/11/2009	1.25	0.31
Nitrite (mg/L NO ₂ -N)	23/10/2009	0.10	0.15
	27/10/2009	0.40	0.59
	14/11/2009	0.06	0.06
COD (mg/L)	23/10/2009	115	117
	27/10/2009	118	118
	14/11/2009	147	147

Parameter	Date	Surface Measurement	Bottom Measurement
BOD (mg/L)	23/10/2009	12	9
	27/10/2009	12	10
	14/11/2009	1	2
<i>E. coli</i> (per 100 ml)	23/10/2009	85	890
	27/10/2009	100	1300
	14/11/2009	270	400