































						Marine inger
Rasic Pri	ncinle Van	Oord BWW	19			
Table Chlo	orination –	De-chlorina	tion			
Disinfection/Chlo	orination		Dechlorination			
Sodium Hypochle	orite 10 - 15%		Sodium Bisulphit	e 38-40%		
Dosing	Tank content	Expected	Dosing	Tank content	Expected	
ltr	m^3	concentration	ltr	m^3	concentration	
1.00	25		0.625	25		
2.00	50		1.250	50		
3.00	75		1.875	75		
4.00	100		2.500	100		
5.00	125		3.125	125		
6.00	150		3.750	150		
7.00	175		4.375	175		
8.00	200		5.000	200		
9.00	225	approx, 4 mg/ltr	5.625	225	< 0.2 mg/ltr	
10.00	250		6.250	250	0	
11.00	275		6.875	275		
12.00	300		7.500	300		
13.00	325		8.125	325		
14.00	350		8.750	350		
15.00	375		9.375	375		
16.00	400		10.000	400		
17.00	425		10.625	425		
	450		11.250	450		



• A re-check of the chlorine contents will be carried out manually and when the result of the analyses is still above the allowed value of 0.2 mg per liter more neutralizing agent will be added until a chlorine concentration value is measured below 0.2 mg per liter. Guidance for additional neutralizing agent is: adding 20% of the original amount at a time.

16

8

• Hereafter the ballast pump will be started manually to start the deballasting process.

Dredging and Marine Contractors







and based testing					Van	Oord Marine ingen		
Summary of Results								
DRINKING WATER	Con	trol		Treated				
salinity 0.2 – 0.3 PSU	Inta	ake		Discha				
natural plankton	Average	min.	max.	Average	min.	max.		
total bacteria [counts/mL]	5.8+E4	4.2+E4	7.0+E4	1.5+E4	1.1+E4	1.8+E4		
Heterotrophic bacteria [cfu/mL]	6,967	6,500	7,900	2,447	40	6,900		
<i>E. coli</i> [cfu/mL]	< 1	<1	10	< 1	< 1	2.0		
Enterococci [cfu/100 mL]	< 1	< 1	8	< 1	<1	30		
microplankton 10-50 µm [counts/mL]	na	-	-	0	0	0		

	phytoplankton 10-50 µm [counts/mL]	0	0	0	0	0	0	
	plankton >50 μm [counts/m³]	0	0	0	0	0	0	
Dre	dging and Marine Contractors						20	0



an Steen Shipboa	rd resul	ts				Van Oord Marine ingenui
Summary of Res	sults					
Jan Steen Water Maker						
salinity 0.3 PSU (32 PSU)	Intake			Disch		
natural plankton	Average	min.	max.	Average	min.	max.
total bacteria [counts/mL]	1.5 +E5			0.9+E5		
tota bacteria seawater	1.5+E7					
<i>E. coli</i> [cfu/mL]	<1	<1	<1	<1	<1	<1
Enterococci [cfu/100 mL]	<1	<1	<1	<1	<1	<1
	•			٥		

micropiankton 10-50 µm [cour	U			U			
phytoplankton 10-50 µm [coui	148*			0			
plankton >50 µm [counts/m ³]	0	0	0	0	0	0	
* number in intake se	eawater						
Dredging and Marine Contracto	ors						
							22



Summary of Resu	ults					
Batam Water Boat	Con	trol		Tre	ated	
salinity 0.3 PSU	Intake			Disc	Discharge	
natural plankton	Average	min.	max.	Average	min.	max.
total bacteria [counts/mL]	1.3+E4	0.9+E4	2.1+E4	0.3+E4	0.07+E4	0.8+E4
Heterotrophic bacteria [cfu/ml	2,367	200	5,200	1,377	530	2,000
Vibrio cholerae per 100 mL	<1	<1	<1	<1	<1	<1
<i>E. coli</i> [cfu/mL]	13	4	24	<1	<1	<1
Enterococci [cfu/100 mL]	<1	<1	8	<1	<1	30
microplankton 10-50 µm [cour	0	0	0.01	0		
phytoplankton 10-50 µm [cou	0	0	0	0.4	0	0.8
plankton >50 µm [counts/m³]	13.7	9	18	0.2	0	0.5

Compari	ison Va							
		in Oord E	BWMS	and a Van	Oord preferred B	WMS		
Ballast capacit	y I		200	cub. M.	Investment	Euro	96,000	
Ballast operat	last operations (in & out)		4 annually		Installation 50%	Euro	48,000	
Remaining ecc	onomical lif	fe of vessel	10 years		Annual operational cost	Euro	2,300	
Drinking water	r		4 Euro/cub.m.		Energy consumption		5 kW	
					Pump rate		50 c	ub.m./
Van Oord BWI	MS				VO preferred BWMS 50 cu	b.m./hr		
Capital expend	diture in Eu	uro	25,000		Capital expenditure Euro		144,000	
Operational co	ost per ope	eration			Operational cost per oper	ation		
	C	hemicals	52			M&R	460	
	W	Vater	800			Energy	14	
	Τ	otal Euro	1, <mark>477</mark>			Total Euro	4,074	
	blorite 1(0-15%	1.75	Euro/ltr				
Sodium hypoc	amonite 1.							







