Sub No. 16

Atlantic Shellfish Ltd.

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Administration,
Environmental Licensing Programme,
Office of Climate, Licensing and Resource Use,
Environmental Protection Agency,
Headquarters,
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford
Ireland.

18th March 2010

Dear Sirs,

Midleton WWTP Waste Water Discharge Licence Application D0056-01

Thank you for posting on the web the Inspector's further question for Cork County Council together with their reply of 8th March.

As I have much more information at my disposal on Midleton WWTP than she may have time to collect for herself, I hope I may be allowed to comment on the reply the County Council has given to her.

It seems to me that even if they are not taking chemical analyses of the storm overflows (which might not be readily expected of them), it must be quite easy to reach the figure she has asked for by simply subtracting what is measured as arriving to be treated in the WWTP, from the expected daily load arising in the town.

The daily load given to yourselves in the latest County Council estimate, based on planning permissions, as had been asked for, was 16,642 PE. To this, the DOEHLG NUWS Vol. 2 Part A entitled Methodology, No. 4 Flow and Load Assessment, Section 5 (2004) suggests 16% should be added to the domestic/residential loading as the normal increase due to the commercial loading of the town. This takes the daily waste load to 19,305 PE or 1,158kg BOD, without adding anything for any industrial load.

I enclose the influent results for November and December 2009 and January 2010, converting the COD figures in the ratio COD:BOD given in the reports of 2:1 and entering the resulting BOD estimates and their PE equivalents in a table for these 3 months alongside the storm overflow

figures that I am given monthly. You will see that the waste loads being treated in the WWTP decline to just a fraction of the town's current loading, as the daily storm overflows increase in size, and I have added a column to give you what the Inspector was looking for - an estimate of the daily PE and mass load (kg BOD) of the untreated waste water lost from the agglomeration. I have added a further column showing this loss of mass load, expressed as a percentage of the town's expected mass load or PE.

I have also used the County Council's own published figures of the monthly average daily loadings, which are calculated by the Plant Operator, EPS, and published in the Monthly Reports. You will see that the same broad correlation exists between the shortfall in loadings which could be expected at the plant and the volume lost in storm overflows and that the mass load lost has generally been over 40% of the load that would be expected from the town. With the quite enormous overflows of this last November and January, the average daily loss of untreated sewage has been as much as three quarters of all the sewage that the town produces.

As I have advised you in the past, on top of the storm overflows, about 3,500m3/day more than would be expected from the sum of the treated effluent from the WWTP and the industrial flow (the only two recognised flows to the p/s), are pumped out from the final pumphouse at Ballinacurra 1 to Rathcoursey Point – and these daily volumes are quite clearly, also, untreated and they may contain much of the lost sewage load. They are also discharged very close to both the North Channel and Rostellan oyster areas.

I have included in both tables the contemporaneous contamination by norovirus of the oysters in the North Channel receiving waters. As you know the oyster fishery was closed down in October 2002 because of continual reports of illness by customers, due to norovirus, which comes only from human sewage. The virus can survive for up to 6 weeks in the oyster tissue and is very difficult to remove by UV depuration. Levels from May to September 2009 are mainly low to medium, as is often found in summer due to lower levels of gastro-intestinal infections in the population and the high levels of virucidal, natural UV, but the winter levels, during the principal oyster-selling season, are extremely high and are preventing the fishery from re-opening. As you can see from the tables, this is also the time when storm overflows in Midleton are at their highest and the mass load of sewage escaping untreated, has reached monthly average daily levels of over 70% of what would be hoped would go through the plant and on 8 days between November 2009 and January 2010, that percentage had reached 80% and above, with the plant to all intents and purposes by-passed.

The Shellfish Industry is taking heart from the great scientific leaps forward in the estimation of norovirus contamination and in the fact that norovirus is now a recognised factor to be taken into account in establishing Shellfish Water Pollution Reduction Programmes and that the requirements of the European Communities (Quality of Shellfish Waters) Regulations, 2006 (as amended) have been fully integrated into the licensing programme you are at present undertaking for waste water discharges.

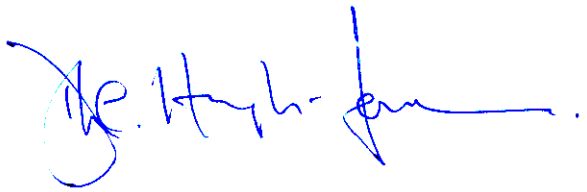
Further, we understand that, in accordance with the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007), "*the EPA is not allowed to grant an authorisation for a waste water discharge, which, in the opinion of the EPA, would.... exclude or compromise..... the achievement of environmental quality standards established under national Regulations in relation to designated..... shellfish waters*" – such as those now designated in the North Channel and at Rostellan.

I hope very much that you will agree with the above methodology of arriving at the answers to the questions you were seeking and that these very high figures for untreated waste in the water lost in storm overflows and at Rathcoursey, on an almost continuous basis over the winter, will prevent the Midleton discharges from being granted any authorisation by you.

I do hope also that you will continue to press the questions in your Inspector's letter of 18th August 2009 to J.B. Barry and Partners, on behalf of the County Council, to which you do not appear to have been given satisfactory replies. They were searching questions and need replies.

With best wishes,

Yours sincerely,



D. Ll. Hugh-Jones

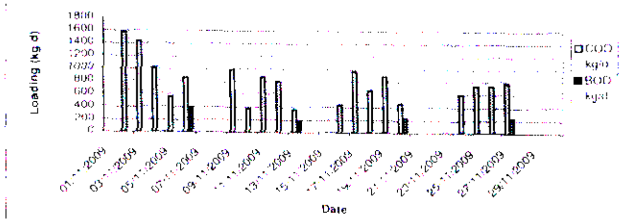
clearly much is being lost in storm overflows.

Monthly Report - Midleton November 2009 Influent

INFLUENT ANALYSIS

Date	[illegible]	[illegible]	[illegible]	Daily flow [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
01-Nov-09		5837	879	602	7318	94																					
02-Nov-09		6126	920	503	7549	97	2083	1570	785		1283			208.0		170.0	7.42	7									
03-Nov-09		5958	892	569	7549	97	4950	1434	747		1147			190		152	7.62	5.6									
04-Nov-09		6227	939	485	7651	98	2417	1010	585		1255			132		164		4.5									
05-Nov-09		6030	894	447	7371	95	4608	553	377		560		13	75.0		76.0		7					1.75	1			
06-Nov-09		6013	907	602	7522	97	6644.0	657	399	2	496	72		114.0	53	66.0	7.5	6.5				9.7			11	1,100,000	1,100,000,000
07-Nov-09		5206	931	557	6694	88																					
08-Nov-09		4520	821	401	5742	74																					
09-Nov-09		6030	882	579	7491	96	2175	981	441		764			131.0		102.0		11.8									
10-Nov-09		5076	877	601	6554	84	3117	374	187		315			57.0		48.0	7.48	5.6									
11-Nov-09		6027	879	603	7509	97	7196	863	422		721			115.0		96.0		10.6									
12-Nov-09		5998	884	601	7483	96	6658	793	297		599	91	11	106.0		80.0		5.6				12.1	1.5	1			
13-Nov-09		6214	922	602	7738	100	2837.3	364	170	2	604	71		47.0	22.0	78.0	7.32	4.4				9.2			10	460,000	460,000
14-Nov-09		6068	900	601	7569	97																					
15-Nov-09		5816	860	602	7278	94																					
16-Nov-09		6038	890	603	7531	97	2266	452	226		361			60.0		48.0	7.3	3.1									
17-Nov-09		6100	898	601	7599	98	2642	965	482		332			127.0		70.0	7.2	4.2									
18-Nov-09		6442	1291	601	8334	107	2558	667	224		767			80.0		92.0	7.4	4.2									
19-Nov-09		6242	1259	602	8103	104	2272	875	332		762	39	25	108.0		94.0	7.38	3.2				4.8	3.1	2.8			
20-Nov-09		7391	1428	602	9421	121	3925.4	471	236	2	207	94		50.0	25.0	22.0	7.31	2.7				10			10	2,400,000	240,000,000
21-Nov-09		7046	1341	549	8936	115																					
22-Nov-09		6061	1187	549	7797	100																					
23-Nov-09		6538	1295	601	8434	108																					
24-Nov-09		6612	1308	607	8527	110	5642	605	303		512			71.0		68.0	7.4	5									
25-Nov-09		6901	1319	821	9041	116	6125	741	371		479			82.0		52.0		5.1									
26-Nov-09		6705	1284	557	8546	110	6115	755	368		855	65	10	86.0		100.0		6.2				7.6	2.1	0.8			
27-Nov-09		6707	1316	602	8625	111	4025.0	785	242	2	397	105		91.0	28.0	46.0		6.1				12.2			10	460,000	210,000
28-Nov-09		7084	1395	593	9072	117																					
29-Nov-09		6915	1191	513	7719	99																					
30-Nov-09		6711	1305	430	8446	109																					
AVERAGE		6145.5	1069.8	579.6	7838.3	101	4358.0	795	261		663	77	17	101.6	32.0	85.053	7.4018	5.7211				6.1708	2.1125	1.4	8.2	1105000	502,500

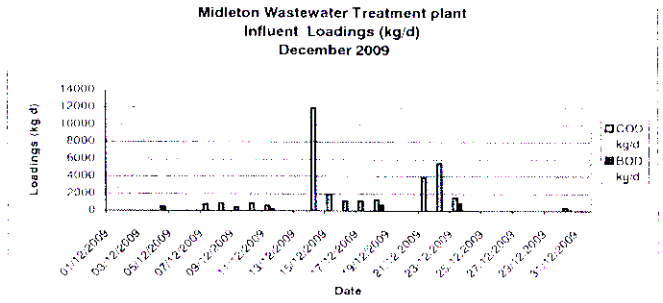
Midleton Wastewater Treatment plant
Influent Loadings
November 2009



Monthly Report Midleton December 2009 - Influent

INFLUENT ANALYSIS

Date																								
01-Dec-09	Tue	6550	1295	513.39	8358	107																		
02-Dec-09	Wed	6941	1345	429.91	8716	112																		
03-Dec-09	Thu	6663	1302	605.85	8571	110																		
04-Dec-09	Fr	7157	1377	860.31	9394	121	7829		470		385	123	18		50	41	7.5					13.1	1.80		10	1,100,000	460,000
05-Dec-09	Sat	6734	1302	868.06	8904	115																					
06-Dec-09	Sun	1343	1216	860.89	3420	44																					
07-Dec-09	Mon	6866	1281	828.85	8976	115	6973	826	413		341			92.0		38.0	7.2	8.4									
08-Dec-09	Tue	6906	1290	729.30	8925	115	7503	901	421		589			102		66.0	7.4	6.6									
09-Dec-09	Wed	6810	1312	577.09	8699	112	5842	461	221		383			53.0		44.0	7.5	4.4									
10-Dec-09	Thu	6613	1290	443.73	8347	107	7133	868	424		634	85	18	104.00		76.0	7.3	11.1				10	2.20	1.35			
11-Dec-09	Fr	6486	1350	456.11	8292	107	4264	630	257	2	381	98		76.0	31	46.0		8.6				11.8			10	1,100,000	460,000
12-Dec-09	Sat	6855	1388	435.10	8678	112																					
13-Dec-09	Sun	5721	1179	422.67	7323	94																					
14-Dec-09	Mon	6934	881	411.03	8226	100	19192	11909	5985		8094			1455.0		984.0	7.6	198.7									
15-Dec-09	Tue	6858	871	358.31	8087	104	18573	1965	982		1375			243		170.0	7.3	7.2									
16-Dec-09	Wed	6906	908	400.73	8215	106	10112	1142	571		427			139.0		92.0	7.6	7.2									
17-Dec-09	Th	6942	915	377.11	8234	106	9522	1186	593		692	86	17	144		84.0		10.5				11	2.1	1.45			
18-Dec-09	Fri	7062	903	386.03	8345	107	11405	1285	684	2	1018	114		154.0	82.0	122.0		9.0				13.7			10	2,400,000	2,400,000
19-Dec-09	Sat	7306	919	394.37	8619	111																					
20-Dec-09	Sun	6503	819	382.05	7704	99																					
21-Dec-09	Mon	6572	854	357.88	7784	100	21320	3827	1911		1336			491.0		346.0	7.5	10.5									
22-Dec-09	Tue	6022	871	381.41	7274	94	17975	5499	1759		3434	196	23	756		472.0	7.5	15.8				27.2	3.2	2.2			
23-Dec-09	Wed	6466	869	460.70	7796	100	14942	1544	897	2	686	73		198	115.0	88.0	7.5	13.7				29			14	4,600,000	1,100,000,000
24-Dec-09	Thu	6402	858	376.57	7637	98																					
25-Dec-09	Fri	6334	976	514.34	7824	101																					
26-Dec-09	Sat	6124	852	600.69	7577	97																					
27-Dec-09	Sun	6820	916	399.66	8136	105																					
28-Dec-09	Mon	6015	821	475.34	7311	94																					
29-Dec-09	Tue	6421	861	650.44	7932	102																					
30-Dec-09	Wed	3506	872	687.85	5086	65	1942	360	117	3	415	44		71	23.0	82	7.34	6.6				8.6	1.2	0.55	10	460,000	460,000,000
31-Dec-09	Thu	7050	943	859.92	8853	114																					
Average		6383	1059	532	7975	103	8080	2316	485	2	1333	121	16	293	60	176	7	23				15	2	1	11	1932000	976000



Midleton January 2010 - Influent

INFLUENT ANALYSIS

Date	Day	Ballick 1 Daily Flow m³	Ballick 2 Daily Flow m³	Dwyer's road daily flow (m3/d)	Q m3/d	Q as % Design Flow	PF	COD kg/d	BOD kg/d	COD : BOD	SS kg/d	TN kg/d	TP kg/d	COD mg/l	BOD mg/l	SS mg/l	pH	NH3 mg/l	NO3 mg/l	TON mg N/l	TKN mg/l	TN mg/l	TP mg/l	OP mg/l	OFG mg/l	Total Coliform /100ml	Faecal Coliform /100ml
01-Jan-10		7050	943	858.94	8851.94	114																					
02-Jan-10		6219	839	581.43	7639.43	98																					
03-Jan-10		6704	899	654.79	8257.79	106																					
04-Jan-10		5801	815	472.86	7088.86	91																					
05-Jan-10		6411	858	418.58	7687.58	99	7708	661	321		536			86		70	7.6	7.3									
06-Jan-10		6551	869	438.10	7858.1	101	5767	692	216		251			88		32	7.5	8.1									
07-Jan-10		6553	869	413.80	7835.8	101	11233	1348	674		298	104	17	172		38	7.49	7.9				13.3	2.15	1.7			
08-Jan-10		6660	872	414.82	7946.82	102	10066.0	1494	604	2	540	137	17	188	76	68	7.5	12.1				17	2.14		10	2,400,000	2,400,000
09-Jan-10		6771	876	400.40	8047.4	103																					
10-Jan-10		6279	874	545.87	7698.87	99																					
11-Jan-10		5676	859	555.83	7090.83	91		0																			
12-Jan-10		5904	889	709.09	7502.09	96		0																			
13-Jan-10		6512	967	642.27	8121.27	104		0																			
14-Jan-10		5643	890	822.16	7355.16	95	7274	633	417		382	41	13	86		52	7.5	0.4				6	1.70	0.16			
15-Jan-10		6418	936	860.44	8214.44	106	2464.3	534	148	4	312	59		65	18	38	7.5	3				7			10	240,000	240,000
16-Jan-10		6787	972	860.74	8619.74	111																					
17-Jan-10		7084	1019	744.94	8847.94	114																					
18-Jan-10		5515	784	481.27	6780.27	87	2217	278	129		196			41		20	7.3	1.0									
19-Jan-10		6546	951	790.57	8287.57	107	7723	928	464		497			112		60	7.45	6.6									
20-Jan-10		5921	927	750.19	7598.19	98	[illegible]	3913	1357		2781			515		366	7.49	6									
21-Jan-10		6353	946	859.93	8158.93	105	[illegible]	1363	622		816	335	18	167		100	7.4	6.4				15.3	2.25	1.35			
22-Jan-10		2895	941	859.09	4695.09	60	4147.3	408	249	2	319	56		87	53	68	7.5	5.1				12			10	1,100,000	240,000
23-Jan-10		6317	918	543.05	7778.05	100																					
24-Jan-10		6964	1024	464.35	8452.35	109																					
25-Jan-10		6620	973	418.35	8011.35	103	6408	769	325		144			96		18	7.4	6.7									
26-Jan-10		7249	934	425.84	8608.84	111	6150	732	366		172			85		20	7.47	8.3									
27-Jan-10		7250	664	414.97	8328.97	107	14525	13743	6872		8970			1650		1077		15									
28-Jan-10		7601	1	419.03	8021.03	103	2283	634	317		225	116	12	79		28		5.1				14.5	1.55	0.85			
29-Jan-10		6821	0	431.66	7252.66	93	2901.1	399	174	2	580	70		95	24	80		5.0				9.7			10	460000	240,000
30-Jan-10		7407	0	427.61	7834.61	101																					
31-Jan-10		7370	0	417.41	7787.41	100																					
Average		6446.839	784.1613	583.82	7814.819	100.4992		1501.44	293.6805	2.5044929	1060.174	88.57416	15.42943	223.25	42.8	133.4375	7.5	6.475		#DIV/0!	#DIV/0!	11.8375	1.958	1.0025	10	1E+06	760000

Legend: External Analysis Results Weekend Bank Holiday

Midleton WWTP influent load and storm overflows in November and December 2009

Date	Storm overflows from Bailick 1 & 2 (m3)	Influent BOD & SS from EPS Reports using external and on-site lab. results			Estimate of daily waste of 19,305 PE or 1,158kg BOD left untreated after subtraction of the quantity treated in the WWTP		% of daily load which has not passed through the WWTP	Norovirus found in oysters/g by Marine Inst. in detectable virus genome copies	
		Population equivalent (PE) (design 10,000)	BOD *Figs in italics calculated 2:1 from COD's*	SS (kg/day)	PE	BOD (kg)		G I	G II
Nov-09 av.		**6,451**	**387**	**664**					
01.11.09	5,558								
02.11.09	3,308	13,083	*785*	1,283	6,222	373	32%		
03.11.09	2,783	11,950	*717*	1,147	7,355	441	38%		
04.11.09	2,142	8,417	*505*	1,255	10,888	653	56%		
05.11.09	1,829	4,608	*277*	560	14,697	882	76%		
06.11.09	1,998	6,640	399	496	12,665	760	66%		
09.11.09	1,584	8,175	*491*	764	11,130	668	58%		
10.11.09	3,967	3,117	*187*	315	16,188	971	84%		
11.11.09	2,138	7,192	*432*	721	12,113	727	63%		
12.11.09	6,620	6,608	*397*	599	12,697	762	66%		
13.11.09	4,603	2,837	170	604	16,468	988	85%		
14.11.09	7,299								
15.11.09	4,304								
16.11.09	8,843	3,766	*226*	361	15,539	932	80%		
17.11.09	6,880	8,042	*483*	532	11,263	676	58%		
18.11.09	6,446	5,558	*334*	767	13,747	825	71%	nd	6,010
19.11.09	9,063	7,292	*438*	762	12,013	721	62%		
20.11.09	21,773	3,925	236	207	15,380	923	80%		
21.11.09	14,447								
22.11.09	13,316								
23.11.09	8,710								
24.11.09	7,187	5,042	*303*	512	14,263	856	74%		
25.11.09	7,609	6,175	*371*	470	13,130	788	68%		
26.11.09	5,038	6,125	*368*	855	13,180	791	68%		
27.11.09	4,442	4,025	242	397	15,280	917	79%		
28.11.09	4,228								
29.11.09	3,699								

KEY

Figures in blue are not shown in EPS Monthly Report but are calculated at 60g BOD/ head/day

Figures in italics are BOD converted from COD at the ratio 2:1

Design load of WWTP 10,000 PE (1993)

Cork CC present estimate of PE based on planning permissions 16,642 PE (not incl. commercial or industrial)

DoEHLG average estimate for commercial load is 16% of population load.

Thus expected daily load is now 19,305 PE

Date	Storm overflows from Bailick 1 & 2 (m3)	Influent BOD & SS from EPS Reports using external and on-site lab. results			Estimate of daily waste of 19,305 PE or 1,158kg BOD left untreated after subtraction of the quantity treated in the WWTP		% of daily load which has not passed through the WWTP	Norovirus found in oysters/g by Marine Inst. in detectable virus genome copies	
		Population equivalent (PE) (design 10,000)	BOD *Figs in italics calculated 2:1 from COD's*	SS (kg/day)	PE	BOD (kg)		G I	G II
30.11.09	2,567								
Dec-09 av.		**18,604**	**1,173**	**1,347**					
01.12.09	2,252								
02.12.09	7,317								
03.12.09	4,424								
04.12.09	3,064	7,829	470	385	11,476	689	59%		
05.12.09	5,119								
06.12.09	7,902								
07.12.09	9,769	6,883	*413*	341	12,422	745	64%		
08.12.09	3,573	7,508	*451*	589	11,797	708	61%		
09.12.09	4,293	3,842	*231*	383	15,463	928	80%		
10.12.09	3,240	7,233	*434*	634	12,072	724	63%		
11.12.09	2,396	4,284	257	381	15,021	901	78%		
12.12.09	2,396								
13.12.09	2,138								
14.12.09	1,525	99,742	*5,985*	8,094					
15.12.09	1,037	16,375	*983*	1,375	2,930	176	15%		
16.12.09	641	9,517	*571*	427	9,788	587	51%	Pos<LOQ	2,000
17.12.09	650	9,883	*593*	692	9,422	565	49%		
18.12.09	484	11,405	684	1,018	7,900	474	41%		
21.12.09	214	31,850	*1,911*	1,136					
22.12.09	216	45,825	*2,950*	3,434					
23.12.09	572	14,942	1,544	897	4,363	262	23%		
29.12.09	2,108								
30.12.09	3,524	1,942	117	415	17,363	1,042	90%		
31.12.09	17,386								
Jan-10 av.		**14,606**	**877**	**1,060**					
01.01.10	5,092								
02.01.10	3,620								
03.01.10	3,263								

Colour code:

- less than a third of daily load is treated
- less than half the daily load is treated
- less than two thirds of daily load is treated
- storm overflows at more than originally estimated for the whole year.

Norovirus contamination

High level of contamination is above 1,000 dvgc/g (detectable virus genome copies/g)

Date	Storm overflows from Bailick 1 & 2 (m3)	Influent BOD & SS from EPS Reports using external and on-site lab. results			Estimate of daily waste of 19,305 PE or 1,158kg BOD left untreated after subtraction of the quantity treated in the WWTP		% of daily load which has not passed through the WWTP	Norovirus found in oysters/g by Marine Inst. in detectable virus genome copies	
		Population equivalent (PE) (design 10,000)	BOD *Figs in italics calculated 2:1 from COD's*	SS (kg/day)	PE	BOD (kg)		G I	G II
04.01.10	2,925								
05.01.10	2,167	5,508	*331*	538	13,797	828	71%		
06.01.10	1,386	5,767	*346*	251	13,538	812	70%		
07.01.10	1,357	11,233	*674*	298	8,072	484	42%		
08.01.10	648	10,066	604	540	9,239	554	48%		
11.01.10	1,598								
12.01.10	2,398								
13.01.10	14,935								
14.01.10	4,889	5,274	*317*	382	14,031	842	73%	5,790	4,210
15.01.10	7,040	2,464	148	312	16,841	1,010	87%		
16.01.10	11,446								
17.01.10	8,078								
18.01.10	4,324	2,317	*139*	136	16,988	1,019	88%		
19.01.10	4,833	7,733	*464*	497	11,572	694	60%		
20.01.10	8,161	32,608	*1,957*	2,781					
21.01.10	5,276	11,358	*682*	816	7,947	477	41%		
22.01.10	14,555	4,147	249	319	15,158	909	79%		
23.01.10	6,282								
24.01.10	5,072								
25.01.10	3,690	6,408	*385*	144	12,897	774	67%		
26.01.10	2,351	6,100	*366*	172	13,205	792	68%		
27.01.10	1,267	114,525	*6,872*	8,970					
28.01.10	851	5,283	*317*	225	14,022	841	73%		
29.01.10	999	2,901	174	580	16,404	984	85%		

Estimates of average daily mass load and PE lost in storm overflows etc. from Midleton WWTP each month during the last 12 months.

The average daily loadings receved by the plant are taken from the calculations in the Monthly Reports produced by the Plant Operator, EPS.

The expected BOD loading is taken from the latest estimate of population provided to the EPA for the WWDL application for Midleton (D0056-01), increased by 16% as suggested in the NUWS Vol.2 Part A entitled Methodology, No. 4 Flow and Load Assessment, Sec.5 issued by DOEHLG (2004)

Month	Average daily loading treated through the WWTP (EPS figs.)			Expected daily BOD load (kg)	Shortfall - lost in storm water overflows etc. (kg)	Equivalent PE of lost waste water	% town waste lost in overflows (untreated)	Total volume of storm overflows (m3)	Norovirus found in oysters/g by the Marine Inst. in detectable virus genome copies	
	PE	BOD (kg)	SS (kg)						G I	G II
Feb-09	9,304	558	703	1,158	600	10,000	52%	66,294	High	High
Mar-09	15,195	912	1,084	1,158	246	4,100	21%	6,032	High	High
Apr-09	11,239	674	944	1,158	484	8,067	42%	13,086	High	High
May-09	10,647	639	953	1,158	519	8,650	45%	4,489	Low	Medium
Jun-09	10,811	649	1,902	1,158	509	8,483	44%	3,274	nd	nd
Jul-09	15,604	936	1,456	1,158	222	3,700	19%	13,338	nd	Low
Aug-09	9,390	563	1,440	1,158	595	9,917	51%	12,155	nd	117 dvgc
Sep-09	10,960	658	888	1,158	500	8,333	43%	12,384	nd	578 dvgc
Oct-09	10,286	617	1,901	1,158	541	9,017	47%	9,313	3,830 dvgc	2,210 dvgc
Nov-09	4,358	261	663	1,158	897	14,950	77%	176,528	nd	6,010 dvgc
Dec-09	8,080	485	1,333	1,158	673	11,217	58%	89,584	Pos<LOQ	2,000 dvgc
Jan-10	4,895	294	1,060	1,158	864	14,400	75%	132,419	5,790 dvgc	4,210 dvgc

Norovirus contamination

Medium level 100-1,000 dvgc (detectable virus genome copies)

High level >1,000 dvgc

dvgc are expressed as per gm of oyster hepatopancreas.