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Mr. Stuart Huskisson,
Inspector,
Environmental Protection Agency,
Office of Climate, Licensing & Resource Use,
Regional Inspectorate,
Inniscarra,
County Cork.



26/07/2010

D0438-01

Re: Notices in accordance with Regulation 18(3)(b) of the Waste Water Discharge

(Authorisation) Regulations 2007)

Dear Mr. Huskisson,

Your notices dated 31st. May and 1st. June last and previous correspondence regarding the following Waste Water Discharge Licence applications refer.

Reg No.	Agglomeration Name	Date of Application
D0437-01	Boherbue	22/06/2009
D0438-01	Bweeng	22/06/2009
D0439-01	Conna	22/06/2009
D0445-01	Glanworth	22/06/2009
D0450-01	Clondulane	22/06/2009

Attached find an assessment of the impact of the discharge in relation to the requirements of the Environmental Quality Objectives regulations (S.I. No. 272 of 2009 for Bweeng WWTP. CD – ROM also attached.

Yours truly,
Paddy O' Friel
Substitute Senior Engineer
Email: paddy.ofriel@corkcoco.ie



022- 30441.

Mobile 087/2700065



27 JUL 2010

CORK

BWEENG WWTP

UPSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 upstream ambient sampling results</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
Oxygenation conditions Table 9	River water body	Ambient sampling results
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6(95%ile)	1.25mg/L (mean) 2mg/L (95%ile)
Acidification Status Table 9	River Water Body	Ambient sampling results
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.0-7.3 (range)
Nutrient conditions Table 9	River Water body	Ambient sampling results
Total Ammonia (mg N/l)	Good status ≤0.065(mean) or ≤0.140(95%ile)	0.033mg/L (mean) 0.041mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.06mg/L (mean) 0.142mg/L (95%ile)
Specific pollutants Table 10	Inland surface waters AA-EQS	Ambient sampling results
Phenol	8	<0.1µg/L
Toulene	10	<0.28µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.1	<20µg/L
Copper (depending on water hardness)	30	<20µg/L
Cyanide	10	<5µg/L
Flouride	500	<100µg/L
Zinc (depending on water hardness)	100	<20µg/L
Priority Substances Table 11	Inland surface waters AA-EQS	Ambient sampling results
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20µg/L
Nickel and its compounds	20	<20µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	0.25	<20µg/L
Mercury and its compounds	0.05	<0.2 µg/L

Note the following:

- The black results are within the EQR/S.
- The red results break the EQR/S.
- The blue results may break the EQR/S.
- The results highlighted grey are at the limit of detection.

**UPSTREAM COMPARISON TABLE
(ACTUAL METAL RESULTS)**

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 upstream ambient sampling results</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	<1µg/L
Copper (depending on water hardness)	30	3.377µg/L
Zinc (depending on water hardness)	100	8.788µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Lead and its compounds	7.2	3µg/L
Nickel and its compounds	20	3.06µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Cadmium and its compounds (depending on water hardness)	0.25	<1µg/L however results were 0 ug/l-no breach of limit

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DOWNSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 Downstream ambient sampling results</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
Oxygenation conditions Table 9	River water body	Ambient sampling results
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6(95%ile)	1.25mg/L (mean) 1.85mg/L (95%ile)
Acidification Status Table 9	River Water Body	Ambient sampling results
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.1-7.4 (range)
Nutrient conditions Table 9	River Water body	Ambient sampling results
Total Ammonia (mg N/l)	Good status ≤0.065(mean) or ≤0.140(95%ile)	<0.045mg/L (mean) <0.0529mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.042mg/L (mean) 0.0585mg/L (95%ile)
Specific pollutants Table 10	Inland surface waters AA-EQS	Ambient sampling results
Phenol	8	<0.1µg/L
Toulene	10	<0.28µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.1	<20µg/L Chromium
Copper (depending on water hardness)	30	34.46µg/L*see table below
Cyanide	10	<5µg/L
Flouride	500	<100µg/L
Zinc (depending on water hardness)	100	20µg/L
Priority Substances Table 11	Inland surface waters AA-EQS	Ambient sampling results
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20µg/L
Nickel and its compounds	20	<20µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	0.25	<20µg/L
Mercury and its compounds	0.05	<0.2µg/L

Note the following:

- The black results are within the EQR/S.
- The red results break the EQR/S.
- The blue results may break the EQR/S.
- The results highlighted grey are at the limit of detection.

DOWNSTREAM COMPARISON TABLE (ACTUAL METAL RESULTS)

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 Downstream ambient sampling results</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	2.72µg/L
Copper (depending on water hardness)	30	*34.46µg/L on excel as 2 results of <1 recorded and excel excludes values- if results were divided by recording 0ug/l for 2 then value is 16.02 ug/l
Zinc (depending on water hardness)	100	11.47µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Lead and its compounds	7.2	4µg/L
Nickel and its compounds	20	3.15µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Cadmium and its compounds (depending on water hardness)	0.25	<1µg/L however results were 0ug/l- no breach of limit

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PREDICTED IMPACTS

MASS BALANCE EQUATIONS FOR BOD:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum BOD in Discharge.

Flow of River (95%ile) = 0.074m³/sec

Mean BOD in River (upstream) = 2mg/L

Max volume of discharge = 0.0027m³/sec – based on 990 PE at 238l/h/d

Max value for BOD in discharge = 16mg/L

$$C_{\text{final}} = \frac{(0.074 \times 2) + (0.0027 \times 16)}{(0.074 + 0.0027)}$$

$$C_{\text{final}} = 2.49\text{mg/l BOD}$$

This is in breach of the 1.5mg/L Mean EQS for BOD.

Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean BOD in Discharge.

Flow of River (Median) = 0.43m³/sec

Mean BOD in River (upstream) = 2mg/L

Normal volume of discharge = 0.0014m³/sec

Mean value for BOD in discharge = 8.25mg/L

$$C_{\text{final}} = \frac{(0.43 \times 2) + (0.0014 \times 8.25)}{(0.43 + 0.0014)}$$

$$C_{\text{final}} = 2.02\text{mg/l BOD}$$

This is in breach of the 1.5mg/L Mean EQS for BOD.

Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

MASS BALANCE EQUATIONS FOR AMMONIA:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Ammonia in Discharge.

Flow of River (95%ile) = 0.074m³/sec

Mean Ammonia in River (upstream) = 0.033mg/L

Max volume of discharge = 0.0027m³/sec

Max value for Ammonia in discharge = 1.5mg/L

$$C_{\text{final}} = \frac{(0.074 \times 0.033) + (0.0027 \times 1.5)}{(0.074 + 0.0027)}$$

$$C_{\text{final}} = 0.085\text{mg/l Ammonia}$$

This is not in breach of the 0.14mg/L 95%ile EQS for Ammonia

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Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Ammonia in Discharge.

Flow of River (Median) = 0.43m³/sec
Mean Ammonia in River (upstream) = 0.033mg/L
Normal volume of discharge = 0.0014m³/sec
Mean value for Ammonia in discharge = 0.65mg/L

$$C_{\text{final}} = \frac{(0.43 \times 0.033) + (0.0014 \times 0.65)}{(0.43 + 0.0014)}$$

$$C_{\text{final}} = 0.035\text{mg/l Ammonia}$$

This is not in breach of the 0.065mg/L mean EQS for Ammonia

Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

MASS BALANCE EQUATIONS FOR ORTHOPHOSPHATE:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Orthophosphate in Discharge.

Flow of River (95%ile) = 0.074m³/sec
Mean Orthophosphate in River (upstream) = 0.06mg/L
Max volume of discharge = 0.0027m³/sec
Max value for Orthophosphate in discharge = 2mg/L

$$C_{\text{final}} = \frac{(0.074 \times 0.06) + (0.0027 \times 2)}{(0.074 + 0.0027)}$$

$$C_{\text{final}} = 0.13\text{mg/l Orthophosphate}$$

This is in breach of the 0.075mg/L 95%ile EQS for Orthophosphate

Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Orthophosphate in Discharge.

Flow of River (Median) = 0.43m³/sec
Mean Orthophosphate in River (upstream) = 0.06mg/L
Normal volume of discharge = 0.0014m³/sec
Mean value for Orthophosphate in discharge = 1.23mg/L

$$C_{\text{final}} = \frac{(0.43 \times 0.06) + (0.0014 \times 1.23)}{(0.43 + 0.0014)}$$

$$C_{\text{final}} = 0.064\text{mg/l Orthophosphate}$$

This is in breach of the 0.035mg/L mean EQS for Orthophosphate

Please note that the effluent is discharged to a **percolation area** adjacent to the Cummen Stream.

Attachment E4 Bweeng Discharge Outlet Table E4

Sample Date	11/02/2009	10/03/2009	16/04/2009	07/05/2009	Average	Kg/Day	Kg/year
Sample	Effluent	Effluent	Effluent	Effluent			
Sample Code	GT269	GT397	GT692	GT631			
Flow M ³ /Day	*	*	*	*			
pH	7.3	6.7	7	7.2	23.25		
Temperature °C	*	*	*	*			
Cond 20°C	319	330	285	267	300.25		
SS mg/L	<1	4	3	3	3.333333333		
NH ₃ mg/L	0.09	0.21	1.5	0.8	0.65		
BOD mg/L	2	16	10	5	8.25		
COD mg/L	14	85	31	<21	43.33333333		
TN mg/L	10	6.8	6	9.16	7.99		
Nitrite mg/L	*	*	*	0.142	0.142		
Nitrate mg/L	*	*	*	1.328	1.328		
TP mg/L	2.7	1.5	0.9	1.21	1.5775		
O-PO4-P mg/L	2	1	0.9	1.02	1.23		
SO4 mg/L	*	*	*	<30	<30		
Phenols µg/L	*	*	*	<0.10	<0.10		
Atrazine µg/L	*	*	*	<0.01	<0.01		
Dichloromethane	*	*	*	<1	<1		
Simazine µg/L	*	*	*	<0.01	<0.01		
Toluene µg/L	*	*	*	<0.28	<0.28		
Tributyltin µg/L	*	*	*	not required	not required		
Xylenes µg/L	*	*	*	<1	<1		
Arsenic µg/L	*	*	*	<0.96	<0.96		
Chromium ug/L	<20	<20	<20	<20	<20		
Copper ug/L	10	23.2	10	27.59	17.6975		
Cyanide µg/L	*	*	*	<5	<5		
Fluoride µg/L	*	*	*	<100	<100		
Lead ug/L	<20	<20	<20	<20	<20		
Nickel ug/L	<20	<20	<20	<20	<20		
Zinc ug/L	10	10	10	28.13	14.5325		
Boron ug/L	<20	<20	<20	<20	<20		
Cadmium ug/L	<20	<20	<20	<20	<20		
Mercury µg/L	*	*	*	<0.2	<0.2		
Selenium µg/L	*	*	*	<0.74	<0.74		
Barium ug/L	<20	<20	<20	<20	<20		

HALF LOD 44.63625 50.13444444 38.36666667 36.066 35.57583333

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Attachment E4 Bweeng Downstream Table E4

Sample Date	11/02/2009	10/03/2009	16/04/2009	07/05/2009	Average
Sample	River	River	River	River	
Sample Code	GT271	GT399	GT694	GT633	
Flow M ³ /Day	*	*	*	*	
pH	7.2	7.1	7.2	7.4	7.225
Temperature °C	*	*	*	*	
Cond 20°C	142	141	127	130	135
SS mg/L	2	1	5.6	6	3.65
NH ₃ mg/L	0.025	0.025	0.05	0.05	0.0375
BOD mg/L	1	1	1	2	1.25
COD mg/L	7	5	16	<21	9.333333333
TN mg/L	2	1.8	1	2.59	1.8475
Nitrite mg/L	*	*	*	<0.10	<0.10
Nitrate mg/L	*	*	*	2.21	2.21
TP mg/L	0.06	0.06	0.06	0.025	0.05125
O-PO4-P mg/L	0.025	0.05	0.06	0.025	0.04
SO4 mg/L	*	*	*	<30	<30
Phenols µg/L	*	*	*	<0.10	<0.10
Atrazine µg/L	*	*	*	<0.01	<0.01
Dichloromethane µg/L	*	*	*	<1	<1
Simazine µg/L	*	*	*	<0.01	<0.01
Toluene µg/L	*	*	*	<0.28	<0.28
Tributyltin µg/L	*	*	*	not required	not required
Xylenes µg/L	*	*	*	<1	<1
Arsenic µg/L	*	*	*	<0.96	<0.96
Chromium ug/L	<20	<20	<20	<20	<20
Copper ug/L	*	10	<20	58.92	34.46
Cyanide µg/L	*	*	*	<5	<5
Fluoride µg/L	*	*	*	<100	<100
Lead ug/L	<20	<20	<20	<20	<20
Nickel ug/L	<20	<20	<20	<20	<20
Zinc ug/L	10	10	<20	30.66	16.88666667
Boron ug/L	10	10	34.9	10	22.45
Cadmium ug/L	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	<0.2	<0.2
Selenium µg/L	*	*	*	<0.74	<0.74
Barium ug/L	10	10	<20	40.435	20.145

HALF LOD FOR STATISTICAL PURPOSES

Attachment E4 Bweeng Upstream Table E4

Sample Date	11/02/2009	10/03/2009	16/04/2009	07/05/2009	
Sample	River	River	River	River	Average
Sample Code	GT270	GT398	GT693	GT632	
Flow M ³ /Day	*	*	*	*	*
pH	7.3	7	7.2	7.3	7.2
Temperature °C	*	*	*	*	*
Cond 20°C	134	132	118	117	125.25
SS mg/L	2	<2	5.4	3	3.466666667
NH ₃ mg/L	<0.05	<0.05	<0.05	<0.1	<0.05
BOD mg/L	1	1	1	2	1.25
COD mg/L	<5	17	22	<21	19.5
TN mg/L	3	1.7	1	2.32	2.005
Nitrite mg/L	*	*	*	<0.10	<0.10
Nitrate mg/L	*	*	*	2.38	2.38
TP mg/L	0.06	0.23	0.1	<0.05	0.13
O-PO ₄ -P mg/L	<0.05	0.16	<0.05	<0.05	0.16
SO ₄ mg/L	*	*	*	<30	<30
Phenols µg/L	*	*	*	<0.10	<0.10
Atrazine µg/L	*	*	*	<0.1	<0.1
Dichloromethane µg/L	*	*	*	<1	<1
Simazine µg/L	*	*	*	<0.1	<0.1
Toluene µg/L	*	*	*	<0.28	<0.28
Tributyltin µg/L	*	*	*	not required	not required
Xylenes µg/L	*	*	*	<1	<1
Arsenic µg/L	*	*	*	<0.96	<0.96
Chromium ug/L	<20	<20	<20	<20	<20
Copper ug/L	*	<20	<20	<20	<20
Cyanide µg/L	*	*	*	<5	<5
Fluoride µg/L	*	*	*	<100	<100
Lead ug/L	<20	<20	<20	<20	<20
Nickel ug/L	<20	<20	<20	<20	<20
Zinc ug/L	<20	<20	<20	<20	<20
Boron ug/L	<20	<20	<20	<20	<20
Cadmium ug/L	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	<0.2	<0.2
Selenium µg/L	*	*	*	<0.74	<0.74
Barium ug/L	10	10	<20	42.82	20.94

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County	Alan Costello	11/05/2009	Atrazine	1128/013/13	GT630 - Bweeng Inlet	<0.01	ug/L
County	Alan Costello	11/05/2009	Simazine	1128/013/13	GT630 - Bweeng Inlet	<0.01	ug/L
County	Alan Costello	11/05/2009	Toluene	1128/013/13	GT630 - Bweeng Inlet	<0.28	ug/L
County	Alan Costello	11/05/2009	Xylene (Total)	1128/013/13	GT630 - Bweeng Inlet	<1	ug/L
County	Alan Costello	11/05/2009	m- & p-Xylene	1128/013/13	GT630 - Bweeng Inlet	<0.73	ug/L
County	Alan Costello	11/05/2009	o-xylene	1128/013/13	GT630 - Bweeng Inlet	<0.35	ug/L
County	Alan Costello	11/05/2009	Dichloromethane	1128/013/13	GT630 - Bweeng Inlet	<1	ug/L
County	Alan Costello	11/05/2009	Arsenic	1128/013/13	GT630 - Bweeng Inlet		ug/L
County	Alan Costello	11/05/2009	Mercury	1128/013/13	GT630 - Bweeng Inlet	<0.2	ug/L
County	Alan Costello	11/05/2009	Selenium	1128/013/13	GT630 - Bweeng Inlet		ug/L
County	Alan Costello	11/05/2009	Cyanide	1128/013/13	GT630 - Bweeng Inlet		ug/L
County	Alan Costello	11/05/2009	Phenols (Total)	1128/013/13	GT630 - Bweeng Inlet	<0.10	ug/L
County	Alan Costello	11/05/2009	Atrazine	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.01	ug/L
County	Alan Costello	11/05/2009	Simazine	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.01	ug/L
County	Alan Costello	11/05/2009	Toluene	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.28	ug/L
County	Alan Costello	11/05/2009	Xylene (Total)	1128/013/14	GT631 - Bweeng STP (Effluent)	<1	ug/L
County	Alan Costello	11/05/2009	m- & p-Xylene	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.73	ug/L
County	Alan Costello	11/05/2009	o-xylene	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.35	ug/L
County	Alan Costello	11/05/2009	Dichloromethane	1128/013/14	GT631 - Bweeng STP (Effluent)	<1	ug/L
County	Alan Costello	11/05/2009	Arsenic	1128/013/14	GT631 - Bweeng STP (Effluent)		ug/L
County	Alan Costello	11/05/2009	Mercury	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.2	ug/L
County	Alan Costello	11/05/2009	Selenium	1128/013/14	GT631 - Bweeng STP (Effluent)		ug/L
County	Alan Costello	11/05/2009	Cyanide	1128/013/14	GT631 - Bweeng STP (Effluent)		ug/L
County	Alan Costello	11/05/2009	Phenols (Total)	1128/013/14	GT631 - Bweeng STP (Effluent)	<0.10	ug/L
County	Alan Costello	11/05/2009	Atrazine	1128/013/15	GT632 - Bweeng Upstream	<0.01	ug/L
County	Alan Costello	11/05/2009	Simazine	1128/013/15	GT632 - Bweeng Upstream	<0.01	ug/L
County	Alan Costello	11/05/2009	Toluene	1128/013/15	GT632 - Bweeng Upstream	<0.28	ug/L
County	Alan Costello	11/05/2009	Xylene (Total)	1128/013/15	GT632 - Bweeng Upstream	<1	ug/L
County	Alan Costello	11/05/2009	m- & p-Xylene	1128/013/15	GT632 - Bweeng Upstream	<0.73	ug/L
County	Alan Costello	11/05/2009	o-xylene	1128/013/15	GT632 - Bweeng Upstream	<0.35	ug/L
County	Alan Costello	11/05/2009	Dichloromethane	1128/013/15	GT632 - Bweeng Upstream	<1	ug/L
County	Alan Costello	11/05/2009	Arsenic	1128/013/15	GT632 - Bweeng Upstream		ug/L
County	Alan Costello	11/05/2009	Mercury	1128/013/15	GT632 - Bweeng Upstream	<0.2	ug/L
County	Alan Costello	11/05/2009	Selenium	1128/013/15	GT632 - Bweeng Upstream		ug/L
County	Alan Costello	11/05/2009	Cyanide	1128/013/15	GT632 - Bweeng Upstream		ug/L
County	Alan Costello	11/05/2009	Phenols (Total)	1128/013/15	GT632 - Bweeng Upstream	<0.10	ug/L
County	Alan Costello	11/05/2009	Atrazine	1128/013/16	GT633 - Bweeng Downstream	<0.01	ug/L
County	Alan Costello	11/05/2009	Simazine	1128/013/16	GT633 - Bweeng Downstream	<0.01	ug/L
County	Alan Costello	11/05/2009	Toluene	1128/013/16	GT633 - Bweeng Downstream	<0.28	ug/L
County	Alan Costello	11/05/2009	Xylene (Total)	1128/013/16	GT633 - Bweeng Downstream	<1	ug/L
County	Alan Costello	11/05/2009	m- & p-Xylene	1128/013/16	GT633 - Bweeng Downstream	<0.73	ug/L
County	Alan Costello	11/05/2009	o-xylene	1128/013/16	GT633 - Bweeng Downstream	<0.35	ug/L
County	Alan Costello	11/05/2009	Dichloromethane	1128/013/16	GT633 - Bweeng Downstream	<1	ug/L
County	Alan Costello	11/05/2009	Arsenic	1128/013/16	GT633 - Bweeng Downstream		ug/L
County	Alan Costello	11/05/2009	Mercury	1128/013/16	GT633 - Bweeng Downstream	<0.2	ug/L
County	Alan Costello	11/05/2009	Selenium	1128/013/16	GT633 - Bweeng Downstream		ug/L
County	Alan Costello	11/05/2009	Cyanide	1128/013/16	GT633 - Bweeng Downstream		ug/L
County	Alan Costello	11/05/2009	Phenols (Total)	1128/013/16	GT633 - Bweeng Downstream	<0.10	ug/L

D0438-01 Attachment E4 Tabulation of monitoring results for compliance purposes against SI 272 of 2009 for comparison purposes where results are below LOD for analytical method

Sample Date	11/02/2009	10/03/2009	16/04/2009	07/05/2009	Average	95% percentile
Sample	Upstream River	Upstream River	Upstream River	Upstream River		
Sample Code	GT270	GT398	GT693	GT632		
NH ₃ mg/L	0.032	0.022	0.038	0.0425	0.033625	0.041825
O-PO ₄ -P mg/L	0.04	0.16	0.04	0.000	0.06	0.142
Chromium ug/L	<1	<1	<1	<1	<1	n/a
Copper ug/L	<1	<1	3.377	<1	3.377	n/a
Lead ug/L	3	<1	<1	<1	3	n/a
Nickel ug/L	2.3	2.51	3.355	4.094	3.06475	n/a
Zinc ug/L	<1	<1	8.788	<1	8.788	n/a
Boron ug/L	<1	<1	<1	<1	<1	n/a
Cadmium ug/L	<1	<1	<1	<1	<1	n/a
Barium ug/L	6	7.88	5.835	42.82	15.63375	n/a

Sample Date	11/02/2009	10/03/2009	16/04/2009	07/05/2009	Average	95% percentile
Sample	Downstream River	Downstream River	Downstream River	Downstream River		
Sample Code	GT271	GT399	GT694	GT633		
NH ₃ mg/L	0.036	0.041	0.05	0.0535	0.045125	0.052975
O-PO ₄ -P mg/L	0.05	0.05	0.06	0.009	0.04225	0.0585
Chromium ug/L	<1	<1	2.72	<1	2.72	n/a
Copper ug/L	<1	<1	5.173	58.92	32.0465	n/a
Lead ug/L	4	<1	<1	<1	4	n/a
Nickel ug/L	2.7	2.716	3.484	3.716	3.154	n/a
Zinc ug/L	2	5.99	7.231	30.66	11.47025	n/a
Boron ug/L	14.3	<1	34.9	<1	24.6	n/a
Cadmium ug/L	<1	<1	<1	<1	<1	n/a
Barium ug/L	8	8.161	6.823	40.435	15.85475	n/a

<1 Note values of 0ug/l recorded as <1ug/l