

## Final Test Report

Report No: 300952 / 1

Client: **DEC Cork**

Sample **300952**

Location: **Blank for W0047 Groundwaters**

Licence No. (formerly ) Issued by:

Description: Industrial/IPPC process sample Flow:

Sampled: 14/05/2010 at by KM Sampled as: Grab sample Split sample: No

Received: 14/05/2010

Remarks: Trip Blank

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.54	pH units			Electrometry B3	Y
pH measured at:	19.9	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	< 5	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	< 1.0	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	< 10	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.044	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	< 0.010	mg/l P			Digest / Colorimetry B53	Y
Soluble Reactive P (Aquakem)	< 0.005	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	< 0.020	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	< 0.03	mg/l			Ion Chromatog. B8	Y
Chloride	< 0.25	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	< 0.25	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	< 0.25	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	< 0.08	mg/l as N			Calculated CALC	N
Total Nitrogen	< 1.00	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	< 0.50	mg/l C			Digestion / IR B17	Y
Sodium	< 1.00	mg/l			Ion Chromatography B9	Y
Magnesium	< 0.40	mg/l			Ion Chromatography B9	Y
Potassium	< 0.20	mg/l			Ion Chromatography B9	Y
Calcium	< 1.00	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	< 5	mg/l CaCO3			Titrimetry B6	N
Total Hardness (as CaCO3)	< 4.2	mg/l CaCO3			Calculated B9	Y
Iron (High range)	< 0.010	mg/l			ICP-MS ICP	S
Manganese (High range)	< 0.005	mg/l			ICP-MS ICP	S
Aluminium (High range)	< 0.010	mg/l			ICP-MS ICP	S

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Details of test methods, measurement uncertainty and interpretation of status flags on reverse of page.

Decimal zero's in BODs mg/l between 10 -100 are a function of the reporting algorithm and are not intended to imply enhanced measurement resolution.

# Environmental Protection Agency, Cork Regional Laboratory, Inniscarra, Co. Cork

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Specification Limits (where shown) refer to those values set out in Integrated Pollution Prevention & Control (IPPC) Licences for composite samples unless otherwise indicated. In the evaluation of its test methods the laboratory has set a maximum permissible Total Error of 20% including Measurement uncertainty and Bias (Appendix 4 of the laboratory's Quality Control Manual refers). Exceedence status flags indicate the following conditions in relation to this target and are presented for guidance only. Actual license conditions operable at the time of sampling must be referred to when assessing formal compliance with such limits.

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## Guide Values

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## Measurement Uncertainty (Last updated 03/10/08)

Procedures for estimation of Measurement Uncertainty are set out in the laboratory's Quality Control Manual. % Uncertainty = Expanded Uncertainty (95% confidence, k=2). The following table utilises the Nordic Committee for Food Analysis (NMKL) approach using pooled standard deviation values and is presented as a general guide. Calculation of measurement uncertainty in respect of individual samples should be referred to the laboratory.

Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
COD	B1	5.1	TOC	B17	7.0	Silicate (300)	B44	18.5
	B2	3.2	Ammonia	B19	6.8	Silicate (3000)		13.3
PH	B3	0.08	Nitrite	B29	6.7	Salinity	B47	1.6
Conductivity	B4	1.8	Phosphate		9.8	Ammonia	B48	4.8
BOD	B5	13.2	Ammonia		10.3	Nitrite	B48	6.8
Alkalinity	B6	1.5	Total Solids	B30	3.9	Phosphorus	B48	4.7
Susp. Solids	B7	7.2	TDS		3.7	Chloride	B48	3.3
SS (High TDS)	B7	8.2	Fluoride	B31	3.4	Phosphorus - Saline	B50	5.2
Fluoride	B8	7.5	Chloride		3.5	Ammonia - Saline	B50	14.4
Chloride		5.6	Bromide		5.2	Colour	B51	10.2
Nitrate		5.4	Sulphate		3.5	Turbidity	B52	1.3
Sulphate		5.2	Total N	B36	12.0			
Sodium	B9	4.7	Total P	B36	8.9			
Potassium		9.2	Total Cyanide	B37	8.5			
Calcium		5.4	Ammonia	B38	4.6			
Magnesium		9.4	Nitrite	B39	5.1			
Nitrate	B11	4.6	Saline MRP	B41	7.4			
Reactive P	B12	10.3	Saline NH <sub>4</sub>		8.3			
Reactive P	B13	11.0	Saline TON		13.4			
Ammonia	B15	10.7	Chloride	B42	6.9			

Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
Dust	A2	0.5 mg	Formaldehyde	A7	6.9	Phenol Index	A14	5.7
Inorganic acids in ambient air	A3	5.2 - 12.4	Acetaldehyde	A8	18.8			
			Ethanol		14.6			
			Methanol		20.2			
Organics (ATD-GCMS)	A4	8 - 17	Total Acids (as HCl)	A9	4.2			
Organics (Charcoal / CS <sub>2</sub> )	A5	14 - 24	Ammonia	A10	4.7			
F, Cl, Br, SO <sub>4</sub> in air emissions	A6	4.8 - 8.8	Bergerhoff Dustfall	A12	3.3			



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contd.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Accred
Cadmium (High range)	< 0.0001	mg/l			ICP-MS ICP	S
Chromium (High range)	0.008	mg/l			ICP-MS ICP	S
Mercury (Low range)	< 0.10	µg/l			ICP-MS ICP	S
Copper (High range)	< 0.005	mg/l			ICP-MS ICP	S
Nickel (High range)	0.034	mg/l			ICP-MS ICP	S
Lead (High range)	< 0.001	mg/l			ICP-MS ICP	S
Zinc (High range)	< 0.005	mg/l			ICP-MS ICP	S

**Comments:** TOC analysis was on a sample preserved by freezing. Metals analysis carried out by EPA Dublin.

Signed:



Peter Webster Regional Chemist

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Issue 7, Revised 06/02/09

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PH	B3	0.08	Nitrite	B29	6.7	Salinity	B47	1.6
Conductivity	B4	1.8	Phosphate		9.8	Ammonia	B48	4.8
BOD	B5	13.2	Ammonia		10.3	Nitrite	B48	6.8
Alkalinity	B6	1.5	Total Solids	B30	3.9	Phosphorus	B48	4.7
Susp. Solids	B7	7.2	TDS		3.7	Chloride	B48	3.3
SS (High TDS)	B7	8.2	Fluoride	B31	3.4	Phosphorus - Saline	B50	5.2
Fluoride	B8	7.5	Chloride		3.5	Ammonia - Saline	B50	14.4
Chloride		5.6	Bromide		5.2	Colour	B51	10.2
Nitrate		5.4	Sulphate		3.5	Turbidity	B52	1.3
Sulphate		5.2	Total N	B36	12.0			
Sodium	B9	4.7	Total P	B36	8.9			
Potassium		9.2	Total Cyanide	B37	8.5			
Calcium		5.4	Ammonia	B38	4.6			
Magnesium		9.4	Nitrite	B39	5.1			
Nitrate	B11	4.6	Saline MRP	B41	7.4			
Reactive P	B12	10.3	Saline NH <sub>4</sub>		8.3			
Reactive P	B13	11.0	Saline TON		13.4			
Ammonia	B15	10.7	Chloride	B42	6.9			

Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
Dust	A2	0.5 mg	Formaldehyde	A7	6.9	Phenol Index	A14	5.7
Inorganic acids in ambient air	A3	5.2 - 12.4	Acetaldehyde	A8	18.8			
			Ethanol		14.6			
			Methanol		20.2			
Organics (ATD-GCMS)	A4	8 - 17	Total Acids (as HCl)	A9	4.2			
Organics (Charcoal / CS <sub>2</sub> )	A5	14 - 24	Ammonia	A10	4.7			
F, Cl, Br, SO <sub>4</sub> in air emissions	A6	4.8 - 8.8	Bergerhoff Dustfall	A12	3.3			



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Client: **OEE Cork**  
 Sample **300953** Location: **Blank for W0047 Groundwaters**  
 Licence No. (formerly ) Issued by:  
 Description: Industrial/IPPC process sample Flow:  
 Sampled: 14/05/2010 at by KM Sampled as: Grab sample Split sample: No  
 Received: 14/05/2010  
 Remarks: Field Blank

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.34	pH units			Electrometry B3	Y
pH measured at:	20.0	°C			Thermometry B3	N
Conductivity @25C (Temp Comp) < 5		µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	< 1.0	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	< 10	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.040	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.015	mg/l P			Digest / Colorimetry B53	Y
Soluble Reactive P (Aquakem)	< 0.005	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	< 0.020	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	< 0.03	mg/l			Ion Chromatog. B8	Y
Chloride	< 0.25	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	< 0.25	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	< 0.25	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	< 0.08	mg/l as N			Calculated CALC	N
Total Nitrogen	< 1.00	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	< 0.50	mg/l C			Digestion / IR B17	Y
Sodium	< 1.00	mg/l			Ion Chromatography B9	Y
Magnesium	< 0.40	mg/l			Ion Chromatography B9	Y
Potassium	< 0.20	mg/l			Ion Chromatography B9	Y
Calcium	< 1.00	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	< 5	mg/l CaCO3			Titrimetry B6	N
Total Hardness (as CaCO3)	< 4.2	mg/l CaCO3			Calculated B9	Y
Iron (High range)	< 0.010	mg/l			ICP-MS ICP	S
Manganese (High range)	< 0.005	mg/l			ICP-MS ICP	S
Aluminium (High range)	< 0.010	mg/l			ICP-MS ICP	S

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BOD	B5	13.2	Ammonia		10.3	Nitrite	B48	6.8
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Chloride		5.6	Bromide		5.2	Colour	B51	10.2
Nitrate		5.4	Sulphate		3.5	Turbidity	B52	1.3
Sulphate		5.2	Total N	B36	12.0			
Sodium	B9	4.7	Total P	B36	8.9			
Potassium		9.2	Total Cyanide	B37	8.5			
Calcium		5.4	Ammonia	B38	4.6			
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Mercury (Low range)	< 0.10	µg/l			ICP-MS ICP	S
Copper (High range)	< 0.005	mg/l			ICP-MS ICP	S
Nickel (High range)	0.043	mg/l			ICP-MS ICP	S
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**Comments:** TOC analysis was on a sample preserved by freezing. Metals analysis carried out by EPA Dublin.

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Fluoride	B8	7.5	Chloride		3.5	Ammonia - Saline	B50	14.4
Chloride		5.6	Bromide		5.2	Colour	B51	10.2
Nitrate		5.4	Sulphate		3.5	Turbidity	B52	1.3
Sulphate		5.2	Total N	B36	12.0			
Sodium	B9	4.7	Total P	B36	8.9			
Potassium		9.2	Total Cyanide	B37	8.5			
Calcium		5.4	Ammonia	B38	4.6			
Magnesium		9.4	Nitrite	B39	5.1			
Nitrate	B11	4.6	Saline MRP	B41	7.4			
Reactive P	B12	10.3	Saline NH <sub>4</sub>		8.3			
Reactive P	B13	11.0	Saline TON		13.4			
Ammonia	B15	10.7	Chloride	B42	6.9			

Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
Dust	A2	0.5 mg	Formaldehyde	A7	6.9	Phenol Index	A14	5.7
Inorganic acids in ambient air	A3	5.2 - 12.4	Acetaldehyde	A8	18.8			
			Ethanol		14.6			
			Methanol		20.2			
Organics (ATD-GCMS)	A4	8 - 17	Total Acids (as HCl)	A9	4.2			
Organics (Charcoal / CS <sub>2</sub> )	A5	14 - 24	Ammonia	A10	4.7			
F, Cl, Br, SO <sub>4</sub> in air emissions	A6	4.8 - 8.8	Bergerhoff Dustfall	A12	3.3			



## Final Test Report

Report No: 300954 / 1

Client: **OEE Cork**  
 Sample **300954** Location: **Nephin, Kerdiffstown, EMW2**  
 Licence No. W0047-01 (formerly ) Issued by: Env. Protection Agency  
 Description: Industrial / IPPC Groundwater Flow:  
 Sampled: 14/05/2010 at 0920 by KM Sampled as: Grab sample Split sample: Yes  
 Received: 14/05/2010  
 Remarks: Depth 6.0m, SWL 1.4m, Purge Volume 110litres. Seal No. 142787 intact on arrival. Replaced with seal 142753.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.89	pH units			Electrometry B3	Y
pH measured at:	20.0	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	1090	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	2.3	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	18	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.429	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.139	mg/l P			Digest / Colorimetry B53	N
Soluble Reactive P (Aquakem)	0.117	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	0.069	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.06	mg/l			Ion Chromatog. B8	Y
Chloride	30.2	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	54.7	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	85.7	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	12.4	mg/l as N			Calculated CALC	N
Total Nitrogen	14.8	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	6.10	mg/l C			Digestion / IR B17	Y
Sodium	27.9	mg/l			Ion Chromatography B9	Y
Magnesium	17.5	mg/l			Ion Chromatography B9	Y
Potassium	3.65	mg/l			Ion Chromatography B9	Y
Calcium	199	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	476	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	568	mg/l CaCO3			Calculated B9	Y
Iron (High range)	0.252	mg/l			ICP-MS ICP	S
Manganese (High range)	0.256	mg/l			ICP-MS ICP	S
Aluminium (High range)	< 0.010	mg/l			ICP-MS ICP	S

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Details of test methods, measurement uncertainty and interpretation of status flags on reverse of page.

Decimal zero's in BODs mg/l between 10 -100 are a function of the reporting algorithm and are not intended to imply enhanced measurement resolution.

# Environmental Protection Agency, Cork Regional Laboratory, Inniscarra, Co. Cork

The following information is provided to assist in the interpretation of this test report. In the event of any query regarding this test report please contact Mr. Peter Webster (Regional Chemist) or Ms Éidín Christie (Quality Manager) at the numbers overleaf.

## Status Flags & Specification Limits

Specification Limits (where shown) refer to those values set out in Integrated Pollution Prevention & Control (IPPC) Licences for composite samples unless otherwise indicated. In the evaluation of its test methods the laboratory has set a maximum permissible Total Error of 20% including Measurement uncertainty and Bias (Appendix 4 of the laboratory's Quality Control Manual refers). Exceedence status flags indicate the following conditions in relation to this target and are presented for guidance only. Actual license conditions operable at the time of sampling must be referred to when assessing formal compliance with such limits.

No flag = Measured value less than the composite limit however values close to the license limit may still indicative of an exceedence when measurement uncertainty is applied..

- \* = Measured value exceeds composite limit but is less than the Total Error target of +20%. Values close to the composite limit may be in conformance when measurement uncertainty is applied.
- \*\* = Measured value exceeds the composite limit in the range of +20% to +50% and may constitute a non-compliance.
- \*\*\* = Measured value exceeds the composite limit by more than +50% and may merit enforcement action.

## Accreditation Criteria

The laboratory is accredited by the Irish National Accreditation Board for a range of water, wastewater and air analysis methods. The laboratory's Scope of Accreditation is available on request or may be found at [www.inab.ie/pdf/117T.pdf](http://www.inab.ie/pdf/117T.pdf). The Accred. Column on the results page indicates by "Y" and "N" whether accreditation is claimed or not claimed respectively for that result. Accreditation is not claimed for any sub-contracted parameters which are represented by "S". Parameters for which multiple methods are listed will have been analysed by one of the indicated methods. Analytical performance data is available on request.

## Guide Values

Measurements not fully compliant with documented test criteria but which otherwise meet acceptable general quality guidelines, e.g. dilutions analysed outside the timeframe set for the parameter, are reported as guide values for evaluation of significance by recipients however such values should not be used for compliance assessment. Values where in-house AQC criteria indicate unsatisfactory performance are not reported.

## Measurement Uncertainty (Last updated 03/10/08)

Procedures for estimation of Measurement Uncertainty are set out in the laboratory's Quality Control Manual. % Uncertainty = Expanded Uncertainty (95% confidence, k=2). The following table utilises the Nordic Committee for Food Analysis (NMKL) approach using pooled standard deviation values and is presented as a general guide. Calculation of measurement uncertainty in respect of individual samples should be referred to the laboratory.

Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
COD	B1	5.1	TOC	B17	7.0	Silicate (300)	B44	18.5
	B2	3.2	Ammonia	B19	6.8	Silicate (3000)		13.3
PH	B3	0.08	Nitrite	B29	6.7	Salinity	B47	1.6
Conductivity	B4	1.8	Phosphate		9.8	Ammonia	B48	4.8
BOD	B5	13.2	Ammonia		10.3	Nitrite	B48	6.8
Alkalinity	B6	1.5	Total Solids	B30	3.9	Phosphorus	B48	4.7
Susp. Solids	B7	7.2	TDS		3.7	Chloride	B48	3.3
SS (High TDS)	B7	8.2	Fluoride	B31	3.4	Phosphorus - Saline	B50	5.2
Fluoride	B8	7.5	Chloride		3.5	Ammonia - Saline	B50	14.4
Chloride		5.6	Bromide		5.2	Colour	B51	10.2
Nitrate		5.4	Sulphate		3.5	Turbidity	B52	1.3
Sulphate		5.2	Total N	B36	12.0			
Sodium	B9	4.7	Total P	B36	8.9			
Potassium		9.2	Total Cyanide	B37	8.5			
Calcium		5.4	Ammonia	B38	4.6			
Magnesium		9.4	Nitrite	B39	5.1			
Nitrate	B11	4.6	Saline MRP	B41	7.4			
Reactive P	B12	10.3	Saline NH <sub>4</sub>		8.3			
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**Final Test Report**

**Report No: 300954 / 1**

contd.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Accred
Cadmium (High range)	0.0001	mg/l			ICP-MS	ICP S
Chromium (High range)	< 0.005	mg/l			ICP-MS	ICP S
Mercury (Low range)	< 0.10	µg/l			ICP-MS	ICP S
Copper (High range)	0.006	mg/l			ICP-MS	ICP S
Nickel (High range)	0.017	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.051	mg/l			ICP-MS	ICP S

**Comments:** TOC analysis was on a sample preserved by freezing and was centrifuged prior to analysis. Metals analysis carried out by EPA Dublin. Total P on settled sample.

Signed:



Peter Webster Regional Chemist

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Issue 7, Revised 06/02/09



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