

## Final Test Report

Report No: 300955 / 1

Client: **OEE CORK**

Sample **300955** Location: **Nepin, Kerdiffstown, EMW3**

Licence No. W0047-01 (formerly ) Issued by: Env. Protection Agency

Description: Industrial / IPPC Groundwater Flow:

Sampled: 14/05/2010 at 0850 by KM Sampled as: Grab sample Split sample: Yes

Received: 14/05/2010

Remarks: Depth 17.5m, SWL 7.75m, Purge Volume 320litres. Seal No.142741 intact on arrival.  
Replaced with seal 142762.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.78	pH units			Electrometry B3	Y
pH measured at:	19.8	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	2510	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	11.0	mg/l			Electrometry B5	N
Chemical Oxygen Demand	167	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	80.1	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.049	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	0.05	mg/l			Ion Chromatog. B8	Y
Chloride	178	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	< 0.25	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	54.2	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	< 0.07	mg/l as N			Calculated CALC	N
Total Nitrogen	86.5	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	65.8	mg/l C			Digestion / IR B17	Y
Sodium	183	mg/l			Ion Chromatography B9	Y
Magnesium	70.1	mg/l			Ion Chromatography B9	Y
Potassium	50.3	mg/l			Ion Chromatography B9	Y
Calcium	217	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	1200	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	831	mg/l CaCO3			Calculated B9	Y
Iron (High range)	3.08	mg/l			ICP-MS ICP	S
Manganese (High range)	2.54	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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## 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		18.8			
			Ethanol	A8	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)	0.0003	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)	0.007	mg/l			ICP-MS	ICP S
Nickel (High range)	0.087	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.083	mg/l			ICP-MS	ICP S

**Comments:** BOD reported as a non-accredited result due to over dilution of sample. TOC sample preserved by freezing and centrifuged prior to analysis. Metals analysis carried out by EPA Dublin. NH4 repeat result is on filtered sample.

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			



## Final Test Report

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Sample **300956**

Location: **Nephin, Kerdiffstown, EMW4**

Licence No. W0047-01 (formerly ) Issued by: Env. Protection Agency

Description: Industrial / IPPC Groundwater Flow:

Sampled: 14/05/2010 at 0755 by KM Sampled as: Grab sample Split sample: Yes

Received: 14/05/2010

Remarks: Depth 7.0m, SWL 3.25m, Purge Volume 90litres. Seal No. 142759 intact on arrival. Replaced with seal 142783.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.79	pH units			Electrometry B3	Y
pH measured at:	19.8	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	1620	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	3.0	mg/l			Electrometry B5	N
Chemical Oxygen Demand	48	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	19.9	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.104	mg/l P			Digest / Colorimetry B53	Y
Soluble Reactive P (Aquakem)	0.056	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	0.064	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.06	mg/l			Ion Chromatog. B8	Y
Chloride	65.5	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	69.1	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	130	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	15.7	mg/l as N			Calculated CALC	N
Total Nitrogen	28.7	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	18.3	mg/l C			Digestion / IR B17	Y
Sodium	64.6	mg/l			Ion Chromatography B9	Y
Magnesium	31.5	mg/l			Ion Chromatography B9	N
Potassium	20.8	mg/l			Ion Chromatography B9	N
Calcium	138	mg/l			Ion Chromatography B9	N
Alkalinity - total (as CaCO3)	676	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	475	mg/l CaCO3			Calculated B9	Y
Iron (High range)	0.017	mg/l			ICP-MS ICP	S
Manganese (High range)	2.01	mg/l			ICP-MS ICP	S
Aluminium (High range)	< 0.010	mg/l			ICP-MS ICP	S

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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			
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Reactive P	B12	10.3	Saline NH <sub>4</sub>		8.3			
Reactive P	B13	11.0	Saline TON		13.4			
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			Methanol		20.2			
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Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Accred
Cadmium (High range)	0.0006	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)	0.012	mg/l			ICP-MS	ICP S
Nickel (High range)	0.046	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.052	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. BOD reported as a non-accredited result due to over dilution of sample. MEq check shows imbalance in Anion : Cation ratio. A recheck of Alkalinity at validation stage (9/8/10) yielded lower results however changes in sample composition may have occurred. Original value retained. the measured value for Total N is lower than the sum of Ammonia / TON. The difference exceeds expected measurement uncertainty and results should be interpreted with caution.

Signed:



Peter Webster Regional Chemist

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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			



## Final Test Report

Report No: 300957 / 1

Client: **OEE CORK**

Sample **300957**

Location: **Nepin, Kerdiffstown, EMW5**

Licence No. W0047-01 (formerly ) Issued by: Env. Protection Agency

Description: Industrial / IPPC Groundwater Flow:

Sampled: 14/05/2010 at 0945 by KM Sampled as: Grab sample Split sample: Yes

Received: 14/05/2010

Remarks: Depth 6.0m, SWL 1.355m, Purge Volume 110 litres. Seal No. 142751 intact on arrival.  
Replaced with seal 142754.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.12	pH units			Electrometry B3	Y
pH measured at:	19.8	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	597	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	1.4	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	< 10	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.073	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.130	mg/l P			Digest / Colorimetry B53	Y
Soluble Reactive P (Aquakem)	0.008	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	< 0.020	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.12	mg/l			Ion Chromatog. B8	Y
Chloride	15.0	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	1.46	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	16.5	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	0.35	mg/l as N			Calculated CALC	N
Total Nitrogen	< 2.00	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	2.81	mg/l C			Digestion / IR B17	Y
Sodium	14.3	mg/l			Ion Chromatography B9	Y
Magnesium	8.50	mg/l			Ion Chromatography B9	Y
Potassium	1.45	mg/l			Ion Chromatography B9	Y
Calcium	123	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	333	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	342	mg/l CaCO3			Calculated B9	Y
Iron (High range)	< 0.010	mg/l			ICP-MS ICP	S
Manganese (High range)	0.108	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.

Issue 7, Revised 06/02/09

# 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.

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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.

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..

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## Accreditation Criteria

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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			
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**Final Test Report**

**Report No: 300957 / 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)	0.007	mg/l			ICP-MS	ICP S
Nickel (High range)	0.019	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.046	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.

Signed:



Peter Webster Regional Chemist

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