

## Final Test Report

Report No: 300958 / 1

Client: **OEE CORK**

Sample **300958**

Location: **Nephin, Kerdiffstown, EMW6**

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

Description: Industrial / IPPC Groundwater Flow:

Sampled: 14/05/2010 at 0810 by KM Sampled as: Grab sample Split sample: Yes

Received: 14/05/2010

Remarks: Depth 7.3m, SWL 4.73m, Purge Volume 70 litres. Seal No. 142760 intact on arrival.  
Replaced with seal 142752.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.47	pH units			Electrometry B3	Y
pH measured at:	19.9	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	1490	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	2.6	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	< 10	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.061	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	< 0.010	mg/l P			Digest / Colorimetry B53	Y
Soluble Reactive P (Aquakem)	0.006	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	0.074	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.33	mg/l			Ion Chromatog. B8	Y
Chloride	271	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	0.27	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	74.0	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	0.14	mg/l as N			Calculated CALC	N
Total Nitrogen	< 1.00	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	4.20	mg/l C			Digestion / IR B17	Y
Sodium	177	mg/l			Ion Chromatography B9	N
Magnesium	24.1	mg/l			Ion Chromatography B9	Y
Potassium	10.7	mg/l			Ion Chromatography B9	Y
Calcium	96.0	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	320	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	339	mg/l CaCO3			Calculated B9	Y
Iron (High range)	0.011	mg/l			ICP-MS ICP	S
Manganese (High range)	0.240	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	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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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)	0.006	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)	0.025	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.035	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. TN reported as a non-accredited result as sample was not preserved.

Signed:



Peter Webster Regional Chemist

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Issue 7, Revised 06/02/09



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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			
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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Parameter	Method	% Uncert	Parameter	Method	% Uncert	Parameter	Method	% Uncert
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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: 300959 / 1

Client: **OEE CORK**

Sample **300959** Location: **Nephin, Kerdiffstown, EMW7**

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

Description: Industrial / IPPC Groundwater Flow:

Sampled: 14/05/2010 at 0720 by KM Sampled as: Grab sample Split sample: Yes

Received: 14/05/2010

Remarks: Depth 6.0m, SWL 1.48m, Purge Volume 110 litres. Seal No. 142758 intact on arrival. Replaced with seal 142784.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.95	pH units			Electrometry B3	Y
pH measured at:	19.7	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	1830	µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	1.4	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	35	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	1.82	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)	0.055	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.09	mg/l			Ion Chromatog. B8	Y
Chloride	125	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	2.39	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	390	mg/l			Ion Chromatography B8	Y
T.O.N. (Calculated as N)	0.60	mg/l as N			Calculated CALC	N
Total Nitrogen	4.28	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	13.0	mg/l C			Digestion / IR B17	Y
Sodium	106	mg/l			Ion Chromatography B9	Y
Magnesium	38.4	mg/l			Ion Chromatography B9	Y
Potassium	11.1	mg/l			Ion Chromatography B9	Y
Calcium	248	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	525	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	777	mg/l CaCO3			Calculated B9	Y
Iron (High range)	3.68	mg/l			ICP-MS ICP	S
Manganese (High range)	2.48	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			
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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contd.

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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)	0.018	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. NH4 repeat result is on filtered sample.

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		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>x</sub> in air emissions	A6	4.8 - 8.8	Bergerhoff Dustfall	A12	3.3			



## Final Test Report

Report No: 300960 / 1

Client: **OEE CORK**  
 Sample **300960** Location: **Nephin, Kerdiffstown, EMW8**  
 Licence No. W0047-01 (formerly ) Issued by: Env. Protection Agency  
 Description: Industrial / IPPC Groundwater Flow:  
 Sampled: 14/05/2010 at 0650 by KM Sampled as: Grab sample Split sample: Yes  
 Received: 14/05/2010  
 Remarks: Depth 5.0m, SWL 3.05m, Purge Volume 50 litres. Seal No. 142757 intact on arrival.  
 Replaced with seal 142781.

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.04	pH units			Electrometry B3	Y
pH measured at:	19.6	°C			Thermometry B3	N
Conductivity @25C (Temp Comp) 726		µS/cm			Electrometry B4	Y
BOD5 (No inhibition)	1.1	mg/l			Electrometry B5	Y
Chemical Oxygen Demand	< 10	mg/l O2			Digest / Colorimetry B1,B2	Y
Ammonia - Total (as N)	0.146	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	4.55	mg/l P			Digest / Colorimetry B53	N
Soluble Reactive P (Aquakem)	0.062	mg/l P			Colorimetry (Aquakem) B48	Y
Nitrite (as N)	< 0.020	mg/l N			Colorimetry (Aquakem) B48	Y
Fluoride	0.09	mg/l			Ion Chromatog. B8	Y
Chloride	5.70	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	< 0.25	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	18.2	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)	2.36	mg/l C			Digestion / IR B17	Y
Sodium	3.85	mg/l			Ion Chromatography B9	Y
Magnesium	7.95	mg/l			Ion Chromatography B9	Y
Potassium	0.54	mg/l			Ion Chromatography B9	Y
Calcium	132	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	401	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	362	mg/l CaCO3			Calculated B9	Y
Iron (High range)	0.546	mg/l			ICP-MS ICP	S
Manganese (High range)	0.813	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.

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

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## Accreditation Criteria

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## 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			
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**Final Test Report**

**Report No: 300960 / 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)	0.011	mg/l			ICP-MS	ICP S
Lead (High range)	< 0.001	mg/l			ICP-MS	ICP S
Zinc (High range)	0.044	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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Issue 7, Revised 06/02/09



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