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AMDEL INTERNAL QUALITY ASSURANCE REVIEW Cont..

Amdel QA/QC Compliance Assessment

	Compliance
Surrogates performed on all appropriate GC analyses and meet acceptance limits (70% - 130% recovery*).	Please see body of report
Matrix Spikes performed once per process batch and at least 1 in 20 samples (Results meet acceptance limits - 70% - 130% recovery* or 80% - 120% recovery* for inorganics in water.)	Please see body of report
Laboratory Control samples performed once per process batch and at least 1 in 20 samples (Results meet acceptance limits - 70% - 130% recovery* in soil or 70%-130%/90-110% recovery* for waters.)	Yes
Laboratory Duplicate samples performed once per process batch and at least 1 in 10 samples	Yes
Laboratory duplicates meet acceptance criteria < 4 PQL - +/- 2 PQL 4-10 PQL - 25-50 or 50% RPD > 10 PQL - 10-30 or 30% RPD	Please see body of report
Method Blanks performed once per process batch and at least 1 in 20 samples (Results not detected at the PQL).	Yes

N/A = Not Applicable.

* Phenols 50% - 130% recovery
* SVOCs 60% - 130% recovery
* Phenoxy Acid Herbicides 60% - 140% recovery

QA/QC Appendix

Please refer to the following pages for the QA/QC data.
For further information on samples or non-conformance in QC protocols please see notations in the body of the report plus comments on the following page.

Additional Comments

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AMDEL STANDARD LABORATORY QUALIFIER CODES.

Job NO. 4E1940

Qualifier Codes	Description
*	PQLs are raised due to matrix interference.
@	PQLs are raised due to insufficient sample provided for analysis.
$	The mass imbalance indicates the presence of other ions not measured as part of this procedure.
nd	< PQL
--	Not applicable
LNR	The sample was listed on the COC, but not received.
IS	Insufficient sample was supplied to conduct this analysis.
AN	The analysis indicates the presences of an analyte that has been 'tentatively' identified, and the associated numerical value represents it's approximate concentration.
A	Sample results are reported on an 'as received' basis (not moisture corrected).
B	The sample was not received in a suitable timeframe to allow completion within the recommended holding time.
C	This sample was received with headspace.
D	This sample was received with the incorrect preservation for this analysis.
E	The raw data indicates the absence of 0.055g of Copper Sulphate in the sample.
F	This sample contained significant amounts of solids and was therefore analysed by settling and decanting the aqueous phase to avoid including the solid in the analysis portion.
G	This test was performed outside the recommended holding time.
H	This sample contained significant material > 5mm which was removed prior to analysis.
ISD	Insufficient sample was supplied to conduct duplicate analyses.
ISM	Insufficient sample was supplied to conduct matrix spike analyses.
W	The spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
J	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause.
K	The matrix spike concentration is less than five times the background concentration in the sample, and therfore the spike recovery can not be determined.
L	The surrogate recovery is outside of the recommended acceptance criteria, due to matrix interference.
M	The surrogate recovery is outside of the recommended acceptance criteria. Insufficent sample remains to perform re-analysis.
N	Results are expressed in mg/L (ppm) due to the high concentration of the analyte.
O	The results reported are 'recoverable organics' for this fraction, as the chromatogram and peak shape indicates the presence of a significant concentration of polar compounds.
P	The concentration reported is mainly due to a single peak.
Q	This samples contains volatile halogenated oxygenated or other compounds that are included and quantitated as part of TPH C6-9.
R	Theoretically the total result should be greater or equal to the dissolved concentration. However the difference reported is within the uncertainty of the individual tests.
S	The mass imbalance was equal to or less than 0.2 milli-equivalents.
T	During Kjeldahl digestion, nitrate (> 10mg/L) can oxidise ammonia resulting in a negative TKN interference, which may have occurred for this sample.
U	Theoretically the TKN result should be greater or equal to ammonia concentration. However the difference reported is within the uncertainty of the individual tests.
V	This sample contained significant amounts of sediment which was included in the analysis portion as requested.
SUR	Surrogate recoveries could not be determined due to the dilution required to quantify the analyte.

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Job Number : 4E1940

QAQC : Laboratory Control Sample(s)

Analyte	Level	Level Detected			Recovery Details		
		Result1	Result2	Result3	Rec 1 (%)	Rec 2 (%)	Rec 3 (%)
E2670 Suspended Solids in Water							
Suspended Solids	75	70			93%		
E2550 Nitrate as N in Water							
Nitrate as N	1.0	1.03			103%		
E2560 Nitrite as N in Water							
Nitrite as N	1.0	1.02			102%		
E2770 Kjeldahl Nitrogen in Water							
Kjeldahl Nitrogen	1.0	1.0			107%		
E2330 Ammonia as N in Water							
Ammonia as N	1.0	1.03			103%		
E2640 Total Phosphorus in Water							
Phosphorus	0.4	0.43			108%		
E2630 Dissolved Phosphorus in Water							
Dissolved Phosphorus	1.0	1.01			101%		

PQL = Practical Quantitation Limit
-- = Not Applicable
nd = < PQL

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Laboratory Duplicate(s)

Analyte	Dupl A	Dupl B	Average	RPD (%)	Dupl A	Dupl B	Average	RPD (%)
E2560 Nitrite as N in Water (E149492)								
Nitrite as N	0.03	0.03	0.03	0%				
E2770 Kjeldahl Nitrogen in Water (E149492)								
Kjeldahl Nitrogen	1.0	1.2	1.2	18%				
E2330 Ammonia as N in Water (E149492)								
Ammonia as N	0.10	0.10	0.10	0%				
E2640 Total Phosphorus in Water (E149492)								
Phosphorus	0.22	0.24	0.23	8%				
E2630 Dissolved Phosphorus in Water (E149492)								
Dissolved Phosphorus	0.12	0.12	0.12	0%				

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

QAQC : Method Blank(s)

ANALYTE	Sample ID PQL	Blank1	Blank2	Blank3	Blank4	Blank5
E2670 Suspended Solids in Water						
Suspended Solids	1	nd				
E2550 Nitrate as N in Water						
Nitrate as N	0.01	nd				
E2560 Nitrite as N in Water						
Nitrite as N	0.01	nd				
E2770 Kjeldahl Nitrogen in Water						
Kjeldahl Nitrogen	0.1	nd				
E2330 Ammonia as N in Water						
Ammonia as N	0.01	nd				
E2640 Total Phosphorus in Water						
Phosphorus	0.02	nd				
E2630 Dissolved Phosphorus in Water						
Dissolved Phosphorus	0.01	nd				

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-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Matrix Spike(s)

Analyte	Spike Level	Level Detected		Recovery Details			
		Spike 1	Spike 2	Rec 1 (%)	Rec 2 (%)	Average (%)	RPD (%)
E4970 Total Recoverable Metals in Waters (E149492)							
Conducted under NATA accreditation 1645							
Arsenic	0.100	W		W			
Chromium	0.100	< 0.104		104%			
Copper	0.100	< 0.097		97%			
Lead	0.100	< 0.093		93%			
Zinc	0.100	0.11		106%			
E49501 Total Recoverable Mercury in Water (E149492)							
Mercury	0.0010	0.00100		100%			

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

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Job Number : 4E1940

QAQC : Laboratory Control Sample(s)

Analyte	Level	Level Detected			Recovery Details		
		Result1	Result2	Result3	Rec 1 (%)	Rec 2 (%)	Rec 3 (%)
E4970 Total Recoverable Metals in Waters							
Conducted under NATA accreditation 1645							
Arsenic	0.100	0.111			111%		
Chromium	0.100	0.120			120%		
Copper	0.100	0.114			114%		
Lead	0.100	0.098			98%		
Zinc	0.100	0.11			108%		
E49501 Total Recoverable Mercury in Water							
Mercury	0.0010	0.00102			100%		
E2530 Total Hardness							
Total Hardness as CaCO3	66.2	62			94%		
E2523 Grease & Oil (Hexane)							
Grease & Oil	50	49			97%		

PQL = Practical Quantitation Limit
-- = Not Applicable
nd = < PQL

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

Job Number : 4E1940

QAQC : Laboratory Duplicate(s)

Analyte	Dupl A	Dupl B	Average	RPD (%)	Dupl A	Dupl B	Average	RPD (%)
E4970 Total Recoverable Metals in Waters (E149492)								
Conducted under NATA accreditation 1645								
Arsenic	<0.005	<0.005	0.005	0%				
Chromium	<0.005	<0.005	0.005	0%				
Copper	<0.005	<0.005	0.005	0%				
Lead	<0.005	<0.005	0.005	0%				
Zinc	0.01	0.01	0.01	0%				
E49501 Total Recoverable Mercury in Water (E149492)								
Mercury	nd	nd						
E2530 Total Hardness (E149492)								
Total Hardness as CaCO3	68	68	68	0%				
E2395 Chlorophyll-a in Water (E149492)								
Chlorophyll-a	nd	nd						

PQL = Practical Quantitation Limit
nd = <PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

QAQC : Method Blank(s)

ANALYTE	Sample ID PQL	Blank1	Blank2	Blank3	Blank4	Blank5
E4970 Total Recoverable Metals in Waters						
Conducted under NATA accreditation 1645						
Arsenic	0.002	nd				
Chromium	0.005	nd				
Copper	0.005	nd				
Lead	0.002	nd				
Zinc	0.01	nd				
E49501 Total Recoverable Mercury in Water						
Mercury	0.00005	nd				
E2530 Total Hardness						
Total Hardness as CaCO3	0.5	nd				
E2523 Grease & Oil (Hexane)						
Grease & Oil	5	nd				
E2395 Chlorophyll-a in Water						
Chlorophyll-a	0.005	nd				

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(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Laboratory Control Sample(s)

Analyte	Level	Level Detected			Recovery Details		
		Result1	Result2	Result3	Rec 1 (%)	Rec 2 (%)	Rec 3 (%)
E0140 Phenols By GC/MS In Water (ug/L)							
Phenol	100	100			104%		
2-Chlorophenol	100	90			90%		
2-Methylphenol							
3-Methylphenol & 4-Methylpheno							
2-Nitrophenol							
2.4-Dimethylphenol							
2.4-Dichlorophenol							
2.6-Dichlorophenol							
4-Chloro-3-methylphenol	100	130			129%		
2.4.5-Trichlorophenol							
2.4.6-Trichlorophenol							
2.4-Dinitrophenol							
4-Nitrophenol	100	120			119%		
2.3.4.6-Tetrachlorophenol							
4.6-Dinitro-2-methylphenol							
Pentachlorophenol	100	70			73%		
4.6-Dinitro-2-sec-butylphenol							

PQL = Practical Quantitation Limit
-- = Not Applicable
nd = < PQL

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

Job Number : 4E1940

QAQC : Laboratory Duplicate(s)

Analyte	Dupl A	Dupl B	Average	RPD (%)	Dupl A	Dupl B	Average	RPD (%)
E0140 Phenols By GC/MS In Water (ug/L) (E149492)								
Phenol	ISD	nd						
2-Chlorophenol	ISD	nd						
2-Methylphenol	ISD	nd						
3-Methylphenol & 4-Methylphen	ISD	nd						
2-Nitrophenol	ISD	nd						
2.4-Dimethylphenol	ISD	nd						
2.4-Dichlorophenol	ISD	nd						
2.6-Dichlorophenol	ISD	nd						
4-Chloro-3-methylphenol	ISD	nd						
2.4.5-Trichlorophenol	ISD	nd						
2.4.6-Trichlorophenol	ISD	nd						
2.4-Dinitrophenol	ISD	nd						
4-Nitrophenol	ISD	nd						
2.3.4.6-Tetrachlorophenol	ISD	nd						
4.6-Dinitro-2-methylphenol	ISD	nd						
Pentachlorophenol	ISD	nd						
4.6-Dinitro-2-sec-butylphenol	ISD	nd						

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

QAQC : Method Blank(s)

ANALYTE	Sample ID PQL	Blank1	Blank2	Blank3	Blank4	Blank5
E0140 Phenols By GC/MS In Water (ug/L)						
Phenol	5	nd				
2-Chlorophenol	5	nd				
2-Methylphenol	5	nd				
3-Methylphenol & 4-Methylpheno	5	nd				
2-Nitrophenol	5	nd				
2.4-Dimethylphenol	5	nd				
2.4-Dichlorophenol	5	nd				
2.6-Dichlorophenol	5	nd				
4-Chloro-3-methylphenol	5	nd				
2.4.5-Trichlorophenol	5	nd				
2.4.6-Trichlorophenol	5	nd				
2.4-Dinitrophenol	50	nd				
4-Nitrophenol	10	nd				
2.3.4.6-Tetrachlorophenol	5	nd				
4.6-Dinitro-2-methylphenol	20	nd				
Pentachlorophenol	10	nd				
4.6-Dinitro-2-sec-butylphenol	20	nd				

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-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Matrix Spike(s)

Analyte	Spike Level	Level Detected		Recovery Details			
		Spike 1	Spike 2	Rec 1 (%)	Rec 2 (%)	Average (%)	RPD (%)
E0080 OC Pesticides in Water (ug/L) (E149497)							
HCB	10	8		79%			
a-BHC	10	9		85%			
g-BHC	10	8		84%			
Heptachlor	10	8		84%			
Aldrin	10	8		79%			
b-BHC	10	8		79%			
d-BHC	10	9		87%			
Oxychlordane	10	8		79%			
Heptachlor epoxide	10	8		79%			
Endosulfan 1	10	8		79%			
Chlordane-Trans	10	8		80%			
Chlordane-Cis	10	8		80%			
trans-Nonachlor	10	8		79%			
DDE	20	16		81%			
Dieldrin	10	8		82%			
Endrin	10	8		84%			
DDD	20	16		80%			
Endosulfan 2	10	8		82%			
DDT	20	21		104%			
Endosulfan sulfate	10	9		89%			
Methoxychlor	10	9		93%			

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

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Job Number : 4E1940

QAQC : Laboratory Control Sample(s)

Analyte	Level	Level Detected			Recovery Details		
		Result1	Result2	Result3	Rec 1 (%)	Rec 2 (%)	Rec 3 (%)
E0080 OC Pesticides in Water (ug/L)							
HCB	10	9			92%		
a-BHC	10	10			103%		
g-BHC	10	10			102%		
Heptachlor	10	10			104%		
Aldrin	10	10			100%		
b-BHC	10	9			93%		
d-BHC	10	11			106%		
Oxychlordane	10	10			96%		
Heptachlor epoxide	10	10			97%		
Endosulfan 1	10	10			98%		
Chlordane-Trans	10	10			101%		
Chlordane-Cis	10	10			101%		
trans-Nonachlor	10	10			98%		
DDE	20	20			98%		
Dieldrin	10	10			102%		
Endrin	10	10			102%		
DDD	20	19			95%		
Endosulfan 2	10	10			99%		
DDT	20	23			114%		
Endosulfan sulfate	10	11			109%		
Methoxychlor	10	11			111%		

PQL = Practical Quantitation Limit
-- = Not Applicable
nd = < PQL

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Laboratory Duplicate(s)

Analyte	Dupl A	Dupl B	Average	RPD (%)	Dupl A	Dupl B	Average	RPD (%)
E0080 OC Pesticides in Water (ug/L) (E149492)								
HCB	nd	nd						
a-BHC	nd	nd						
g-BHC	nd	nd						
Heptachlor	nd	nd						
Aldrin	nd	nd						
b-BHC	nd	nd						
d-BHC	nd	nd						
Oxychlordane	nd	nd						
Heptachlor epoxide	nd	nd						
Endosulfan 1	nd	nd						
Chlordane-Trans	nd	nd						
Chlordane-Cis	nd	nd						
trans-Nonachlor	nd	nd						
DDE	nd	nd						
Dieldrin	nd	nd						
Endrin	nd	nd						
DDD	nd	nd						
Endosulfan 2	nd	nd						
DDT	nd	nd						
Endosulfan sulfate	nd	nd						
Methoxychlor	nd	nd						

PQL = Practical Quantitation Limit
nd = <PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

QAQC : Method Blank(s)

ANALYTE	Sample ID PQL	Blank1	Blank2	Blank3	Blank4	Blank5
E0080 OC Pesticides in Water (ug/L)						
HCB	1	nd				
a-BHC	1	nd				
g-BHC	1	nd				
Heptachlor	1	nd				
Aldrin	1	nd				
b-BHC	1	nd				
d-BHC	1	nd				
Oxychlordane	1	nd				
Heptachlor epoxide	1	nd				
Endosulfan 1	1	nd				
Chlordane-Trans	1	nd				
Chlordane-Cis	1	nd				
trans-Nonachlor	1	nd				
DDE	1	nd				
Dieldrin	1	nd				
Endrin	1	nd				
DDD	1	nd				
Endosulfan 2	1	nd				
DDT	1	nd				
Endosulfan sulfate	1	nd				
Methoxychlor	1	nd				

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Matrix Spike(s)

Analyte	Spike Level	Level Detected		Recovery Details			
		Spike 1	Spike 2	Rec 1 (%)	Rec 2 (%)	Average (%)	RPD (%)
E0090 OP Pesticides in Water (ug/L) (E149499)							
Dichlorvos	100	100		102%			
Mevinphos	100	90		90%			
Ethoprop	100	90		90%			
Phorate	100	90		90%			
Demeton-s-methyl	100	90		92%			
Diazinon	100	90		91%			
Disulfoton	100	90		90%			
Ronnel	100	90		91%			
Chlorpyrifos methyl	100	90		92%			
Chlorpyrifos	100	90		93%			
Merphos	100						
Parathion methyl	100	90		93%			
Fenthion	100	90		92%			
Malathion	100	90		92%			
Fenitrothion	100	90		93%			
Prothiofos	100	90		93%			
Stirophos	100	100		96%			
Ethion	100	90		93%			
Bolstar	100	90		94%			
Fensulfothion	100	90		94%			
Azinphos methyl	100	90		93%			
Coumaphos	100	90		94%			

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.

QAQC : Laboratory Control Sample(s)

Analyte	Level	Level Detected			Recovery Details		
		Result1	Result2	Result3	Rec 1 (%)	Rec 2 (%)	Rec 3 (%)
E0090 OP Pesticides in Water (ug/L)							
Dichlorvos	100	90			90%		
Mevinphos	100	90			91%		
Ethoprop	100	90			91%		
Phorate	100	90			92%		
Demeton-s-methyl	100	90			90%		
Diazinon	100	90			92%		
Disulfoton	100	90			91%		
Ronnel	100	90			91%		
Chlorpyrifos methyl	100	90			92%		
Chlorpyrifos	100	90			92%		
Merphos							
Parathion methyl	100	90			92%		
Fenthion	100	90			91%		
Malathion	100	90			91%		
Fenitrothion	100	90			92%		
Prothiofos	100	90			92%		
Stirophos	100	90			92%		
Ethion	100	90			92%		
Bolstar	100	90			92%		
Fensulfothion	100	90			86%		
Azinphos methyl	100	90			90%		
Coumaphos	100	90			92%		

PQL = Practical Quantitation Limit
-- = Not Applicable
nd = < PQL

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

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Job Number : 4E1940

QAQC : Laboratory Duplicate(s)

Analyte	Dupl A	Dupl B	Average	RPD (%)	Dupl A	Dupl B	Average	RPD (%)
E0090 OP Pesticides in Water (ug/L) (E149492)								
Dichlorvos	nd	nd						
Mevinphos	nd	nd						
Ethoprop	nd	nd						
Phorate	nd	nd						
Demeton-s-methyl	nd	nd						
Diazinon	nd	nd						
Disulfoton	nd	nd						
Ronnel	nd	nd						
Chlorpyrifos methyl	nd	nd						
Chlorpyrifos	nd	nd						
Merphos	nd	nd						
Parathion methyl	nd	nd						
Fenthion	nd	nd						
Malathion	nd	nd						
Fenitrothion	nd	nd						
Prothiofos	nd	nd						
Stirophos	nd	nd						
Ethion	nd	nd						
Bolstar	nd	nd						
Fensulfothion	nd	nd						
Azinphos methyl	nd	nd						
Coumaphos	nd	nd						

PQL = Practical Quantitation Limit
nd = < PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

The number in brackets after the method header identifies the sample tested.