KH 9-17-10

Instrument Identification:	EPA#	SOP	FIA method
Phoenix 8000 carbon analyzer	EPA#786773	RSKSOP-265 rev.3	
Dohrmann 80 carbon analyzer	EPA#400340	RSKSOP-102 rev.5	
QuikChem Latchat #1 FIA	EPA#786079	RSKSOP-214 rev.4	10-115-01-1-A 10-116-11-1-A 10-107-06-2-D 10-115-01-1-C
QuikChem Latchat #2 FIA	EPA#785623	RSKSOP-214 rev.4	10-107-04-2-A 10-107-05-1-A 10-107-06-1-A
QuikChem Latchat #3 FIA	EPA#785622	RSKSOP-214 rev.4	10-117-07-1-B 10-116-10-1-C 10-116-11-1-A
Waters Capillary Electrophoresis	EPA#785231	RSKSOP-276	
Waters Capillary Electrophoresis	EPA#785232	RSKSOP-288	
Leco CR-412 carbon analyzer		RSKSOP-120 rev.3	
Orion 3-star conductivity meter		RSKSOP-215 rev.2	
Orion ion analyzer	EPA#400180	RSKSOP-215 rev.2	
Mettler DL21 titrator	EPA#785351	RSKSOP-214 rev.4	

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RH 9-17-10

Calculations

The Relative Percent Difference (RPD) is calculated based on the following:
RPD = 2(a – b)/ (a + b) (100%)

Where *a* = sample measurement
b = duplicate sample measurement

The Percent Recovery (% REC) is calculated based on the following:
% REC = m / n (100%)

Where *m* = sample measurement
n = True Value (a certified or known value)

Matrix spike samples are generated by adding a measured amount of standard to a measured amount of sample. The percent recovery is calculated by the formula:
% Recovery = [Spiked sample conc.] – [Native sample conc.] / [Spike concentration added] x 100

Caffeine Standard
2 mg/L carbon diluted from a 1000 mg/L caffeine standard prepared by dissolving 2.02 g. of caffeine in 1 liter of nanopure water.

$$\frac{2.02 \text{ g. caffeine}}{1 \text{Liter}} \times \frac{1 \text{mol.caffeine}}{194.1902 \text{g. caffeine}} \times \frac{8 \text{ mol. carbon}}{1 \text{ mol. caffeine}} \times \frac{12.0107 \text{ g. carbon}}{1 \text{ mol. Carbon}} \times \frac{1000 \text{ mg}}{1 \text{ g.}} = 999.5 \text{ mg/l}$$

Standard preparation:
$C_1 V_1 = C_2 V_2$

Note: all dilutions made with nanopure water from lab 123

200 mg/L – 40 ml stock standard diluted to 200 ml
100 mg/L – 20 ml stock standard diluted to 200 ml
50 mg/L – 10 ml stock standard diluted to 200 ml
20 mg/L – 4 ml stock standard diluted to 200 ml
10 mg/L – 2 ml stock standard diluted to 200 ml
5 mg/L – 1 ml stock standard diluted to 200 ml
2.5 mg/L – 0.5 ml stock standard diluted to 200 ml
1.0 mg/L – 10 ml 20 mg/L standard diluted to 200 ml
0.5 mg/L – 5 ml 20 mg/L standard diluted to 200 ml
0.25 mg/L – 5 ml 10 mg/L standard diluted to 200 ml
0.20 mg/L – 2 ml 20 mg/L standard diluted to 200 ml
0.10 mg/L – 1 ml 20 mg/L standard diluted to 200 ml

RH 9-17-10

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Work continued from Page_____

Acca Spec TOC Standard 1000mg/L
Lot # SC0067667 Exp 3/2012

Acca Spec TIC Standard 1000mg/L
Lot # SC0127524 Exp 5/2011

Acca Chemical Co Carbon Standard Inorganic
1000ppm Lot # 2910733 Exp 10/2010

Acca Spec Nitrate as Nitrogen 1000ppm
Lot # SC9287861 Exp 7/2011

Acca Spec Nitrate as Nitrogen 1000ppm
Lot # SC9280803 Exp 7/2011

Acca Spec Nitrate as Nitrogen 1000ppm
Lot # SC0208355 Exp 3/2012

Acca Spec Ammonia as ~~Nitrop~~ Nitrogen 1000ppm
Lot # SC9216082 Exp 6/2011

Acca Spec Ammonia as Nitrogen 1000ppm
Lot # SC0083775 Exp 12/2011

Acca Spec Phosphate as Phosphorus 1000ppm
Lot # SC9280804 Exp 7/2011

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PROJECT NO.

BOOK NO.

Accu Spec TOC standard 1000 mg/L
Lot # SC0312539 exp date 11/2012

Accu Spec TIC standard 1000 mg/L
Lot # ST10113023 exp date 1/2012

Ricci Chemical Co. Inorganic carbon standard
1000 mg/L Lot # 10162280 exp date 10/2011

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TITLE Rick Wilkin Pavillion WY

PROJECT NO. EPAGP216

BOOK NO. SS# 5763

Work continued from Page

10-13-10 9 samples preserved for NO_3 + NO_2 + NH_4 Latchat methods are referenced in the cover of this notebook standards were prepared on 9-17-10 from stock standards ref on pg. 1 using methods referenced in the cover of this notebook. RSKSOP 214 rev 5

10 13-10 KH

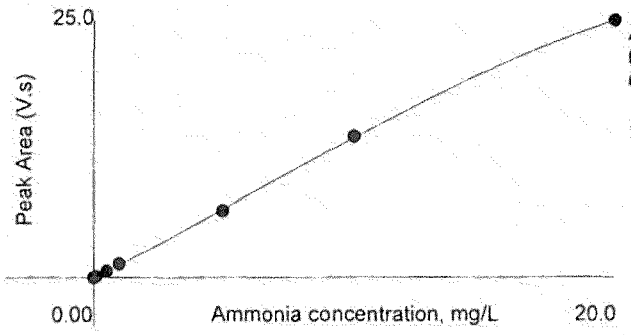
Author: Omnion User

Date : 10/13/2010

Table 1: Ammonia

	Known Conc. (mg/L)	Rep	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc. (mg/L)	Detection Date	Detection Time
1	20.0	1	25.0	3.10	0.0	0.1	20.0	10/13/2010	10:40:00 AM
2	10.0	1	13.7	1.71	0.0	-0.8	10.1	10/13/2010	10:40:55 AM
3	5.00	1	6.48	0.799	0.0	2.6	4.87	10/13/2010	10:41:50 AM
4	1.00	1	1.34	0.167	0.0	-6.1	1.06	10/13/2010	10:42:45 AM
5	0.500	1	0.633	0.0809	0.0	-1.6	0.508	10/13/2010	10:43:40 AM
6	(0.250)	(1)	(0.351)	(0.0441)					
7	0.100	1	0.109	0.0159	0.0	8.7	0.0917	10/13/2010	10:45:31 AM
8	0.00	1	-1.90e-3	-1.32e-3			2.76e-3	10/13/2010	10:46:26 AM

Figure 1: Ammonia



Area = - 1.13e-3 * Conc^3 + 0.0230 * Conc^2 + 1.24 * Conc - 6.07e-3 + 4.21e-4 * Area^3 - 0.0107 * Area^2 + 4.28e-3 * Area + 4.28e-3

Correlation Coefficient (r) = 0.99999

1/x weighting

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TITLE Ruk Wilkin Pavillion WY

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10-13-10 KH

PROJECT NO. EPAGP216

BOOK NO. SS# 5763

Author: Omnion User

Date : 10/13/2010

Original Run Filename: OM_10-13-2010_10-39-18AM.OMN created 10/13/2010 10:39:18 AM
Original Run Author's Signature: [Omnion User]
Current Run Filename: EPAGP216,5763,R. WILKIN,NO3+NO2,NH4,10-13-10,GPKH.omn last modified 10/13/2010 11:38:58 AM
Current Run Author's Signature: [Omnion User]
Description: Default New Run

Sample	Rep.	Channel 2 Nitrate+Nitrite (mg/L)	Channel 3 Ammonia (mg/L)
20 MG/L	1	20.0	20.0
10 MG/L	1	10.0	10.0
5 MG/L	1	5.00	5.00
1 MG/L	1	1.00	1.00
.5 MG/L	1	0.500	0.500
.25 MG/L	1	0.250	0.250
.1 MG/L	1	0.100	0.100
0 MG/L	1	0.00	0.00
BLANK	1	0.0107	4.28e-3
	2	0.0150	4.35e-3
	3	0.0149	4.06e-3
	Average:	0.0136	4.23e-3
	Calibration:	Table/Fig. 2	Table/Fig. 1
0.1 mg/L	1	0.0957	0.0874
	2	0.0954	0.0910
	Average:	0.0956	0.0892
1.0 mg/L	1	1.01	0.995
	2	0.994	1.03
	Average:	1.00	1.01
BLANK	1	0.0170	-0.0114
	2	0.0175	5.05e-3
	Average:	0.0172	-3.19e-3
ERA 46	1	3.12	5.19
RD 01	1	0.231	0.0874
RD 01 SPIKE 4.95X	1	5.20	4.50
EPAMW 01	1	0.150	4.61
EPAMW 02	1	0.379	1.95
LD 01	1	0.354	0.199
LD 01 DUP	1	0.337	0.164
RD 01 FIELD BLANK	1	0.422	-0.0102
TRIP BLANK	1	0.0177	-0.0120
EQ BLANK	1	0.265	6.43e-3
LD 02	1	0.0764	0.207
	2	0.0745	0.239
	3	0.0763	0.208
	Average:	0.0757	0.218
ERA 46	1	3.17	5.33
0.50 mg/L	1	0.495	0.475
	2	0.500	0.471
	Average:	0.498	0.473
5.0 mg/L	1	4.99	4.82
	2	4.99	4.55
	Average:	4.99	4.69
10.0 mg/L	1	9.67	9.72
20.0 mg/L	1	18.6	19.1
	2	18.5	19.7
	Average:	18.6	19.4
BLANK	1	-0.0110	0.0286
	2	0.0124	6.26e-3
	3	0.0135	6.81e-3
	4	0.0146	4.44e-3
	Average:	7.40e-3	0.0115

10-13-10 KH

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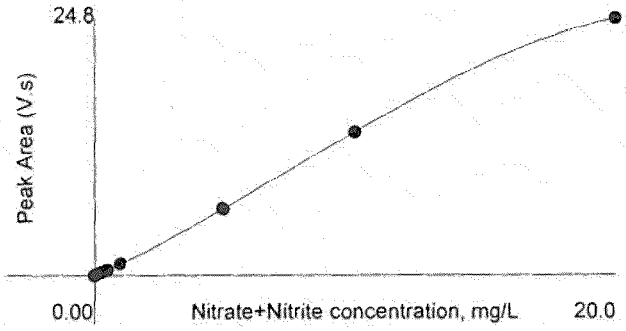
10-13-10 KH

Table 2: Nitrate+Nitrite

	Known Conc. (mg/L)	Rep	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc. (mg/L)	Detection Date	Detection Time
1	20.0	1	24.8	1.66	0.0	-5.5e-3	20.0	10/13/2010	10:40:00 AM
2	10.0	1	13.9	0.986	0.0	0.1	9.98	10/13/2010	10:40:55 AM
3	5.00	1	6.45	0.469	0.0	-0.1	5.03	10/13/2010	10:41:50 AM
4	1.00	1	1.13	0.0850	0.0	-1.9	1.01	10/13/2010	10:42:45 AM
5	0.500	1	0.515	0.0385	0.0	3.1	0.481	10/13/2010	10:43:40 AM
6	0.250	1	0.249	0.0184	0.0	0.8	0.246	10/13/2010	10:44:36 AM
7	0.100	1	0.0823	6.01e-3	0.0	4.4	0.0966	10/13/2010	10:45:31 AM
8	0.00	1	-0.0167	-7.79e-4			7.20e-3	10/13/2010	10:46:26 AM

Figure 2: Nitrate+Nitrite



Area = - 2.32e-3 * Conc^3 + 0.0545 * Conc^2 + 1.08 * Conc - 0.0223 = 8.72e-4 * Area^3 - 0.0256 * Area^2 + 0.0223 * Area + 0.0223

Correlation Coefficient (r) = 1.00000

1/x weighting

10-13-10 KH

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DATE 10-13-10

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EPAPAV0031406

10-13-10 9 samples filtered in the field for DC, DIC, DOC RSKSOP 102 rev. 5. Sample for DOC will be acidified to a pH of < 2 + sparged for 3 min using H_3PO_4 + UHP Nitrogen gas to remove the Inorganic carbon. Standards were prepared on 10-13-10 using stock standards + methods referenced in this notebook pg 1. DIC values will be calculated by subtracting the DOC values from the DC values

Calibration

ref std	Dohrmann reading	comment
100 mg/L	6.536 - 9.983	1ml injection
0 mg/L	0.108	
0.5 mg/L	0.687	
1.0 mg/L	1.181	
5.0 mg/L	5.296	
10.0 mg/L	10.08	
20.0 mg/L	20.25	
50.0 mg/L	48.27	
ERA 19 10X	4.137	calibration applied 3.915

$y = 0.0014x^2 + 0.9709x - 0.1252$

$R^2 = 1$

sample	DC/TC Dohrmann		mg/L	DOC/TOC Dohrmann		mg/L
MB	0.103		-0.025	0.114		-0.014
CCK STD	1.128	(97.2%)	0.972	0.607	93.0%	0.465
ERA 19 10X	4.200	10X	39.773	4.200	10X	39.773
mixed std 10mL/200	13.26	(108%)	12.995			
RD #1	2.735	10X	25.407	0.650	1X	0.506

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ID sample	DC/TC Dohrmann			mg/L	DOC/TOC Dohrmann			mg/L
RD Ø1 spK	12.27	10X	(98.6%)	119.985	10.45	1X	(97.9%)	10.174
EPAMW Ø1	3.750	10X		35.354	8.780	1X		8.507
EPAMW Ø2	3.701	10X		34.873	14.79	1X		14.541
LD Ø1	2.016	10X		18.378	0.713	1X		0.568
LD Ø1 Dup	1.959	10X		17.822	0.703	1X		0.558
LD Ø1 Dup LD	1.977	10X	(RPD=1.12)	17.997	0.715	1X	(RPD=2.13)	0.570
CHK STD	5.492	1X	(105%)	5.249	10.290	1X	(100%)	10.014
RD Ø1 Field BLK	0.251	1X		0.119	0.174	1X		0.044
Trip BLK	0.715	1X		0.570	0.192	1X		0.061
EQ BLK	0.339	1X		0.204	0.164	1X		0.034
LD Ø2	1.330	10X		11.686	2.790	1X		2.595
CHK STD	10.29	1X		10.014	5.490	1X		5.247
ERA 19	4.378	10X		41.522	4.378	10X		41.522
MB	0.103			-0.025	0.129			0.000
LD Ø2 rerun	1.335	10X		11.734	2.900	1X		2.702

NOTE. Samples RD Ø1 Field Blank, Trip BLK, EQ Blank, LD Ø1, LD Ø1 Dup, + ~~LD Ø2~~ were not filtered in the field + therefore will be reported as TC, TOC, + TIC. These samples were taken directly from house taps or were blanks.

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TITLE Kirk Wilkins Pavillion WY

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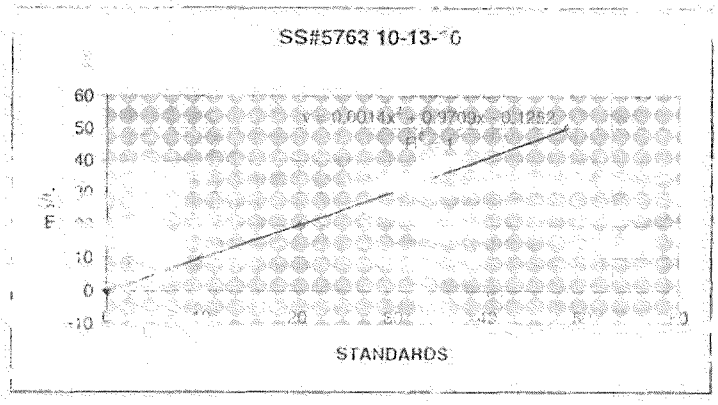
PROJECT NO. EPAGP216

BOOK NO. 5763



EPAGP216
SS#5763
R. WILKINS
Run 10-13-2010
BY: K. Hargrove

	Dohrmann readout	Sample	Dil	mg/L DC/TC	
	0.108	0	1		
	0.687	0.5	1		
	1.181	1	1		
	5.296	5	1		
	10.08	10	1		
	20.25	20	1		
	48.27	50	1		
	4.137	ERA 19 10X	1	3.915	
				0.000	
	0.103	METHOD BLANK	1	-0.025	
97.2%	1.128	1.00 mg/L std	1	0.972	
99.7%	4.200	ERA 19	10	39.773	
108%	13.26	MIXED STD 10/2	1	12.995	DIC/TIC
TC 1	2.735	RD 01	10	25.407	24.900
TC 95.6%	12.270	RD 01 SPIKE 9.90X	10	119.985	
TC 2	3.750	EPAMW01	10	35.354	26.846
TC 3	3.701	EPAMW02	10	34.873	20.332
TC 4	2.016	LD 01	10	18.378	17.810
TC 5	1.959	LD 01 DUP	10	17.822	17.264
TC RPD=1.12	1.977	LD 01 DUP LAB DUP	10	17.997	17.428
105%	5.492	5.00 mg/L	1	5.249	
TC 6	0.251	RD 01 FIELD BLK	1	0.119	0.075
TC 7	0.715	TRIP BLANK	1	0.570	0.508
TC 8	0.389	EQ BLANK	1	0.204	0.170
TC 9	1.330	LD 02	10	11.686	9.091
TC RPD=0	1.335	LD 02 RE-RUN	10	11.734	9.032
100%	10.29	10.0 mg/L	1	10.014	
104%	4.378	ERA 19	10	41.522	
	0.103	METHOD BLANK	1	-0.025	

EPAGP216
SS#5763
R. WILKINS
Run 10-13-2010
BY: K. Hargrove

	Dohrmann readout	Sample	Dil	mg/L DOC/TOC	
	0.108	0	1		
	0.687	0.5	1		
	1.181	1	1		
	5.296	5	1		
	10.08	10	1		
	20.25	20	1		
	48.27	50	1		
	4.137	ERA 19 10X	1	3.915	
				0.000	
	0.114	METHOD BLANK	1	-0.014	
	0.607	0.5 mg/L std	1	0.465	93.0%
	4.200	ERA 19	10	39.773	99.7%
			1	-0.125	
TOC	0.650	RD 01	1	0.506	
TOC	10.450	RD 01 SPIKE 9.90X	1	10.174	97.9%
DOC	8.780	EPAMW01	1	8.507	
DOC	14.790	EPAMW02	1	14.541	
TOC	0.713	LD 01	1	0.568	
TOC	0.703	LD 01 DUP	1	0.558	
TOC	0.715	LD 01 DUP LAB DUP	1	0.570	RPD=2.13
	10.290	10.0 mg/L	1	10.014	100%
TOC	0.174	RD 01 FIELD BLK	1	0.044	
TOC	0.192	TRIP BLANK	1	0.061	
TOC	0.164	EQ BLANK	1	0.034	
DOC	2.790	LD 02	1	2.595	
DOC	2.900	LD 02 RE-RUN	1	2.702	RPD=3.77
	5.490	5.00 mg/L	1	5.247	105%
	4.378	ERA 19	10	41.522	104%
	0.129	METHOD BLANK	1	0.000	

10-13-10 KA

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DATE 10-13-10

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