June 16, 2021

Mr. Chris McHugh
US EPA Region 4
980 College St. Rd
Athens, Georgia 30605

Re: Water Testing
Work Order: 545783

Dear Mr. McHugh:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 27, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

Jake Crook
Project Manager

Chain of Custody: 05/26/21-02
Enclosures

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Case Narrative

Receipt Narrative
for
US EPA Region 4
SDG: 545783

June 16, 2021

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on May 27, 2021 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
545783001	21-0259-052621-01
545783002	21-0259-052621-06
545783003	21-0259-052621-07

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry.

Jake Crook
Project Manager

Chain of Custody and Supporting Documentation

S4S7 83

USEPA Region 4 COC (REGION COPY)

DateShipped:
CarrierName:
AirbillNo:

CHAIN OF CUSTODY RECORD

New Indy Containerboard
Project Number: 21-0259
Cooler #:

No: 05/26/21-02

Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
21-0259-052621-01		/ McHugh, Christopher	Comp.	AOX (15)	E (Ice + HNO3 pH<2) (1)	EFF001	05/26/2021 15:15	Field Sample
21-0259-052621-06		/ Litte, Derek	Grab	AOX (15)	E (Ice + HNO3 pH<2) (1)	Upstream Catawba	05/26/2021 10:20	Field Sample
21-0259-052621-07		/ Litte, Derek	Grab	AOX (15)	E (Ice + HNO3 pH<2) (1)	Downstream Catawba	05/26/2021 11:30	Field Sample

Special Instructions:	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	[illegible]	5/26 1732	[illegible]	5/27/21 930	

JC

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: EPA	**SDG/AR/COC/Work Order:** 545783
Received By: BE	**Date Received:** 6/27/21
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground (UPS) Field Services Courier Other 1Z A43 F97 01 9767 9766

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr **Classified as: Rad 1 Rad 2 Rad 3**
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 6
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR2-21 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 6/1/21 Page 1 of 1

GL-CHL-SR-001 Rev 7

Laboratory Certifications

List of current GEL Certifications as of 16 June 2021

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−21−19
Utah NELAP	SC000122021−35
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
US EPA Region 4
SDG #: 545783

Product: **Adsorbable Organic Halogens (AOX)**
Analytical Method: EPA 1650
Analytical Procedure: GL-GC-E-007 REV# 16
Analytical Batch: 2134549

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
545783001	21-0259-052621-01
545783002	21-0259-052621-06
545783003	21-0259-052621-07
1204835038	Method Blank (MB)
1204835039	Laboratory Control Sample (LCS)
1204835040	545783001(21-0259-052621-01) Sample Duplicate (DUP)
1204835041	545783001(21-0259-052621-01) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Adsorbable Organic Halogens	1204835041 (21-0259-052621-01MS)	77.2* (79%-124%)

Miscellaneous Information

Additional Comments
A pair of nitrate wash blanks is analyzed at the start of the batch. Although they are designated as ICB, they are performed for calculating purposes only. The value of the nitrate wash blanks are averaged and subtracted from all samples. Neither of these values should exceed 0.6 ug Cl. The PQL limit typically applied to ICB results does not apply in this application, since the results are used only to determine background concentrations and are subtracted from all calculated results.

Breakthrough effect

Breakthrough effect: If the value for a sample is greater than the reporting limit (10 ug/L), the result for the second slug should not be greater than 25% of the combined value of the first and second slug. Results which do not meet these criteria are designated with a "Fail" comment in the Breakthrough effect column on the Logbook page; however, the "fail" designation is not applicable for samples with a result of less than 10 ug/L.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

EPA4001 US EPA Region 4

Client SDG: 545783 GEL Work Order: 545783

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
J Value is estimated
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Kristen Mizzell **Name: Kristen Mizzell**

Date: 09 JUN 2021 **Title: Team Leader**

Sample Data Summary

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 9, 2021

Company :	US EPA Region 4
Address :	980 College St. Rd
	Athens, Georgia 30605
Contact:	Mr. Chris McHugh
Project:	Water Testing

Client Sample ID:	21-0259-052621-01	Project:	EPA400121
Sample ID:	545783001	Client ID:	EPA4001
Matrix:	Waste Water		
Collect Date:	26-MAY-21 15:15		
Receive Date:	27-MAY-21		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Halogen Analysis												
EPA 1650 AOX (Organic Halogen) "As Received"												
Adsorbable Organic Halogens		10.0	3.33	10.0	ug/L		1	RM3	06/03/21	1349	2134549	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1650	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 9, 2021

Company :	US EPA Region 4
Address :	980 College St. Rd
	Athens, Georgia 30605
Contact:	Mr. Chris McHugh
Project:	Water Testing

Client Sample ID:	21-0259-052621-06	Project:	EPA400121
Sample ID:	545783002	Client ID:	EPA4001
Matrix:	Waste Water		
Collect Date:	26-MAY-21 10:20		
Receive Date:	27-MAY-21		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Halogen Analysis												
EPA 1650 AOX (Organic Halogen) "As Received"												
Adsorbable Organic Halogens	J	9.12	3.33	10.0	ug/L		1	RM3	06/03/21	1529	2134549	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1650	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 9, 2021

Company :	US EPA Region 4
Address :	980 College St. Rd
	Athens, Georgia 30605
Contact:	Mr. Chris McHugh
Project:	Water Testing

Client Sample ID:	21-0259-052621-07	Project:	EPA400121
Sample ID:	545783003	Client ID:	EPA4001
Matrix:	Waste Water		
Collect Date:	26-MAY-21 11:30		
Receive Date:	27-MAY-21		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Halogen Analysis												
EPA 1650 AOX (Organic Halogen) "As Received"												
Adsorbable Organic Halogens	J	8.16	3.33	10.0	ug/L		1	RM3	06/03/21	1610	2134549	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1650	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: June 9, 2021

US EPA Region 4
980 College St. Rd
Athens, Georgia

Contact: **Mr. Chris McHugh**

Workorder: **545783**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Halogen Analysis										
Batch 2134549										
QC1204835040 545783001 DUP										
Adsorbable Organic Halogens		10.0	U	ND	ug/L	122 ^		(+/-10.0)	RM3	06/03/21 14:04
QC1204835039 LCS										
Adsorbable Organic Halogens	100			85.3	ug/L		85.3	(73%-120%)		06/03/21 11:34
QC1204835038 MB										
Adsorbable Organic Halogens			U	ND	ug/L					06/03/21 11:10
QC1204835041 545783001 MS										
Adsorbable Organic Halogens	100	10.0		87.3	ug/L		77.2 *	(79%-124%)		06/03/21 14:22

Notes:

The Qualifiers in this report are defined as follows:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J See case narrative for an explanation
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.

QC Summary

Workorder: **545783**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

d 5-day BOD--The 2:1 depletion requirement was not met for this sample

e 5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Instrument QC Data Summary

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Report Run On: 09-JUN-2021 14:49

GEL Laboratories LLC

Contract: EPA400121

SDG #: 545783

Halogen Analysis

Method: EPA 1650

Instrument: Mitsubishi AOX-200 TOX4 (TOX4)

Parmname: Adsorbable Organic Halogens Concentration Units:ug/L

Sample Type	Run Date	Data File	Result	Nominal	Recovery	Limits	Within Limits
ICV	**03-JUN-2021 11:04:00**	**2134549**	**103.59**	**100**	**104**	**(90%-110%)**	**Yes**
CCV	03-JUN-2021 12:41:00	2134549	99.38	100	99.4	(90%-110%)	Yes
CCV	03-JUN-2021 14:52:00	2134549	92.18	100	92.2	(90%-110%)	Yes
CCV	03-JUN-2021 16:32:00	2134549	98.9	100	98.9	(90%-110%)	Yes

Sample Type	Run Date	Data File	Result	Limits	Within Limits
ICB	**03-JUN-2021 10:09:00**	**2134549**	**0.5**	**10**	**Yes**
CCB	03-JUN-2021 12:52:00	2134549	0	10	Yes
CCB	03-JUN-2021 15:03:00	2134549	0	10	Yes
CCB	03-JUN-2021 16:43:00	2134549	0	10	Yes

Adsorbable Organic Halogens (AOX) Raw Data

Sample Average Report

Comment

System Parameter

Data ID	:	AOX2_06032021.001
Method Name	:	06032021_001_Method
Mode	:	AOX-2
Accessory	:	ASC-Column
Titration Current	:	1.000
End Point	:	303.84 mV
Gain-1	:	1.07
Titration F	:	120 %
Heater Temp.	:	950 °C

Titration Parameter

Parameter Type	:	HCl					
Start Sense	:	2.50	mV	Delay Time	:	15	sec
End Sense	:	0.75	mV	E1-Time	:	290	sec
Peak Sense	:	2.00	mV	E2-Time	:	900	sec
Parameter Type	:	Blank					
Start Sense	:	1.50	mV	Delay Time	:	240	sec
End Sense	:	0.75	mV	E1-Time	:	500	sec
Peak Sense	:	2.00	mV	E2-Time	:	600	sec
Parameter Type	:	Sample					
Start Sense	:	1.50	mV	Delay Time	:	240	sec
End Sense	:	0.75	mV	E1-Time	:	400	sec
Peak Sense	:	2.00	mV	E2-Time	:	900	sec

Calibration

Formula	:	Y = BX+C
Slope(A)	:	***.****
Slope(B)	:	1.0000
Intercept(C)	:	0.0000
r^	:	**.*****

Sample Average Data

Sample ID	Counts(µg)	Concentration	n	RSD	RSD(%)
ICV-500 ppm	10.725	1.04 g/l	1	****.**	***.**
1204835038	0.130	0.00 mg/l	1	****.**	***.**
1204835039	4.464	85.62 µg/l	2	****.**	***.**
545783001 20X		***.**	0	***.**	***.**
CCV	5.119	493.60 mg/l	4	25.12	5.09
545783001 5X		***.**	0	***.**	***.**
545783001	0.867	10.02 µg/l	1	****.**	***.**
1204835040	0.424	2.44 µg/l	1	****.**	***.**
1204835041	4.729	87.26 µg/l	1	****.**	***.**
545783002	0.968	13.87 µg/l	2	****.**	***.**

Sample Average Data

Sample ID	Counts(µg)	Concentration	n	RSD	RSD(%)
545783003	0.642	9.18 µg/l	2	****.**	***.**

Sample Report

Comment

System Parameter

Data ID	:	AOX2_06032021.001
Method Name	:	06032021_001_Method
Mode	:	AOX-2
Accessory	:	ASC-Column
Titration Current	:	1.000
End Point	:	303.84 mV
Gain-1	:	1.07
Titration F	:	120 %
Heater Temp.	:	950 °C

Titration Parameter

Parameter Type	:	HCl					
Start Sense	:	2.50	mV	Delay Time	:	15	sec
End Sense	:	0.75	mV	E1-Time	:	290	sec
Peak Sense	:	2.00	mV	E2-Time	:	900	sec
Parameter Type	:	Blank					
Start Sense	:	1.50	mV	Delay Time	:	240	sec
End Sense	:	0.75	mV	E1-Time	:	500	sec
Peak Sense	:	2.00	mV	E2-Time	:	600	sec
Parameter Type	:	Sample					
Start Sense	:	1.50	mV	Delay Time	:	240	sec
End Sense	:	0.75	mV	E1-Time	:	400	sec
Peak Sense	:	2.00	mV	E2-Time	:	900	sec

QC Cell Check Report

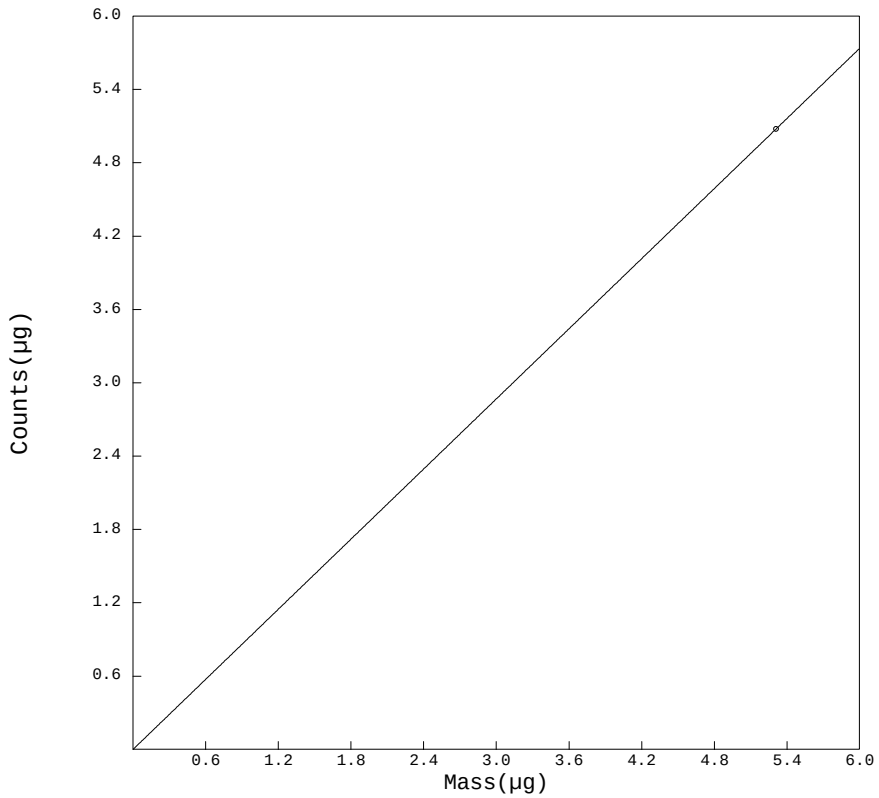
QC Cell Check Curve

Diagnostics Parameter

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method
Mode : AOX-2

Results

Formula : Y = BX+C
Slope(B) : 0.9561
Intercept(C) : 0.0000
r^ : **.*****



QC Cell Check Report

QC Cell Check All Data

Repeats	Mass(ug)	Concentration	Standard Volume	Counts(ug)
1	5.310	354.00 ug/ml	15.0 ul	5.077

Blank Report

Blank Results

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

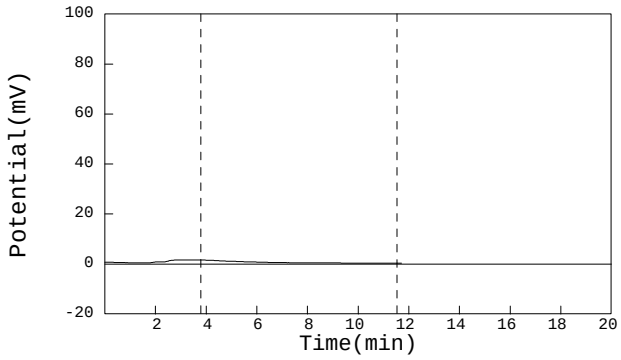
Reps.	Mode	Counts(µg)	Total Counts	$\bar{X}$	RSD	RSD(%)	P.No.	Date
1-1	AOX-2	-0.076 *					2	06/03/2021 09:56
1-2	AOX-2	0.208	0.208				2	06/03/2021 10:09
2-1	AOX-2	0.157					2	06/03/2021 10:22
2-2	AOX-2	0.107 *	0.157	0.183	***.**	***.**	2	06/03/2021 10:34

Blank Report

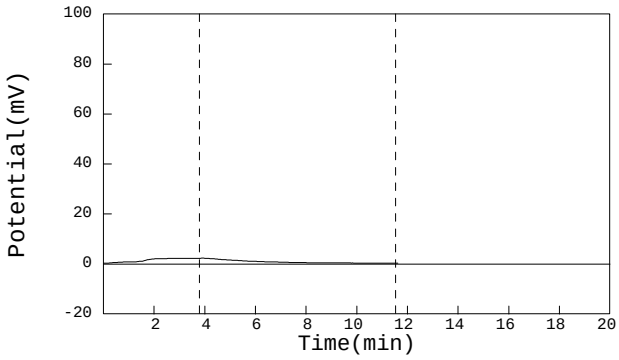
Blank Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

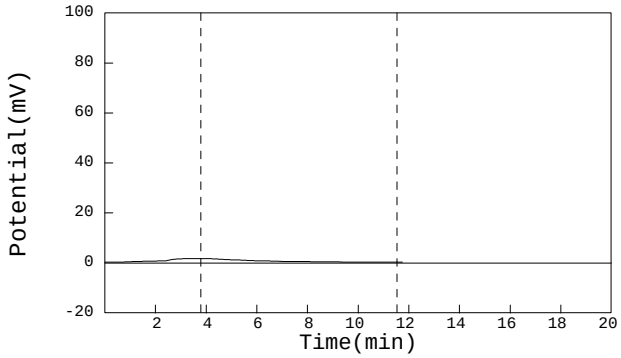
Reps. : 1 06/03/2021 09:56
Bl.Vol. : 0.0 µl
Counts(µg): -0.0760



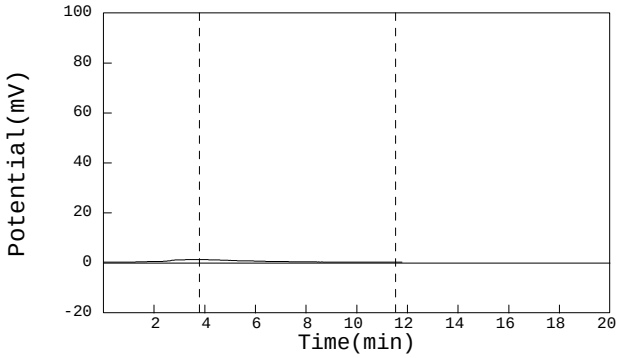
Reps. : 1 06/03/2021 10:09
Bl.Vol. : 0.0 µl
Counts(µg): 0.2080



Reps. : 2 06/03/2021 10:22
Bl.Vol. : 0.0 µl
Counts(µg): 0.1570



Reps. : 2 06/03/2021 10:34
Bl.Vol. : 0.0 µl
Counts(µg): 0.1070



Sample Report

Sample Average Data

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

Sample ID	Counts(µg)	Concentration	n	RSD	RSD(%)
ICV-500 ppm	10.725	1.04 g/l	1	****.**	***.**
1204835038	0.130	0.00 mg/l	1	****.**	***.**
1204835039	4.464	85.62 µg/l	2	****.**	***.**
545783001 20X		***.**	0	***.**	***.**
CCV	5.119	493.60 mg/l	4	25.12	5.09
545783001 5X		***.**	0	***.**	***.**
545783001	0.867	10.02 µg/l	1	****.**	***.**
1204835040	0.424	2.44 µg/l	1	****.**	***.**
1204835041	4.729	87.26 µg/l	1	****.**	***.**
545783002	0.968	13.87 µg/l	2	****.**	***.**
545783003	0.642	9.18 µg/l	2	****.**	***.**

Sample Report

Sample All Data

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method
Blank : 0.183 µg/1Column

Reps.	Sample ID	Sample Size	Dilution Rate	Counts(µg)	Total Counts	Concentration	P No.
1-1	ICV-500 ppm	10.00 µl	1.0000	5.382			4
1-2	ICV-500 ppm	10.00 µl	1.0000	5.343	10.725	1.04 g/l	4
n = 1	$\bar{X}$ = 1.04 g/l		RSD = ****.**		RSD(%) = ***.**		
1-1	1204835038	50.00 ml	1.0000	-0.247			4
1-2	1204835038	50.00 ml	1.0000	0.130	0.130	0.00 mg/l	4
n = 1	$\bar{X}$ = 0.00 mg/l		RSD = ****.**		RSD(%) = ***.**		
1-1	1204835039	50.00 ml	1.0000	4.447			4
1-2	1204835039	50.00 ml	1.0000	-0.124	4.447	85.28 µg/l	4
2-1	1204835039	50.00 ml	1.0000	4.481			4
2-2	1204835039	50.00 ml	1.0000	-0.106	4.481	85.96 µg/l	4
n = 2	$\bar{X}$ = 85.62 µg/l		RSD = ****.**		RSD(%) = ***.**		
1-1	545783001 20X	50.00 ml	1.0000	0.227		*	4
1-2	545783001 20X	50.00 ml	1.0000	-0.060	0.227	0.88 µg/l *	4
n = 0	$\bar{X}$ = ****.**		RSD = ****.**		RSD(%) = ***.**		
1-1	CCV	10.00 µl	1.0000	5.152			4
1-2	CCV	10.00 µl	1.0000	-0.152	5.152	496.90 mg/l	4
2-1	CCV	10.00 µl	1.0000	4.664		*	4
2-2	CCV	10.00 µl	1.0000	0.000E	4.664	448.10 mg/l *	4
3-1	CCV	10.00 µl	1.0000	4.792			4
3-2	CCV	10.00 µl	1.0000	-0.163	4.792	460.90 mg/l	4
4-1	CCV	10.00 µl	1.0000	5.128			4
4-2	CCV	10.00 µl	1.0000	-0.063	5.128	494.50 mg/l	4
5-1	CCV	10.00 µl	1.0000	5.404			4
5-2	CCV	10.00 µl	1.0000	-0.064	5.404	522.10 mg/l	4
n = 4	$\bar{X}$ = 493.60 mg/l		RSD = 25.12		RSD(%) = 5.09		
1-1	545783001 5X	50.00 ml	1.0000	0.388		*	4
1-2	545783001 5X	50.00 ml	1.0000	-0.060	0.388	4.10 µg/l *	4
n = 0	$\bar{X}$ = ****.**		RSD = ****.**		RSD(%) = ***.**		
1-1	545783001	50.00 ml	1.0000	0.640			4
1-2	545783001	50.00 ml	1.0000	0.227	0.867	10.02 µg/l	4
n = 1	$\bar{X}$ = 10.02 µg/l		RSD = ****.**		RSD(%) = ***.**		
1-1	1204835040	50.00 ml	1.0000	0.305			4
1-2	1204835040	50.00 ml	1.0000	0.119	0.424	2.44 µg/l	4
n = 1	$\bar{X}$ = 2.44 µg/l		RSD = ****.**		RSD(%) = ***.**		

Sample Report

Sample All Data

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method
Blank : 0.183 µg/1Column

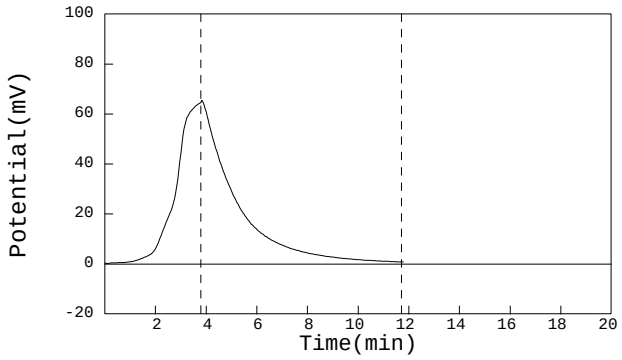
Reps.	Sample ID	Sample Size	Dilution Rate	Counts(µg)	Total Counts	Concentration	P No.
1-1	1204835041	50.00 ml	1.0000	4.491			4
1-2	1204835041	50.00 ml	1.0000	0.238	4.729	87.26 µg/l	4
n = 1	$\bar{X}$ = 87.26 µg/l		RSD = ****.**		RSD(%) = ***.**		
1-1	545783002	50.00 ml	1.0000	1.022			4
1-2	545783002	50.00 ml	1.0000	0.275	1.297	18.62 µg/l	4
2-1	545783002	50.00 ml	1.0000	0.639			4
2-2	545783002	50.00 ml	1.0000	-0.220	0.639	9.12 µg/l	4
n = 2	$\bar{X}$ = 13.87 µg/l		RSD = ****.**		RSD(%) = ***.**		
1-1	545783003	50.00 ml	1.0000	0.693			4
1-2	545783003	50.00 ml	1.0000	-0.029	0.693	10.20 µg/l	4
2-1	545783003	50.00 ml	1.0000	0.591			4
2-2	545783003	50.00 ml	1.0000	-0.071	0.591	8.16 µg/l	4
n = 2	$\bar{X}$ = 9.18 µg/l		RSD = ****.**		RSD(%) = ***.**		

Sample Report

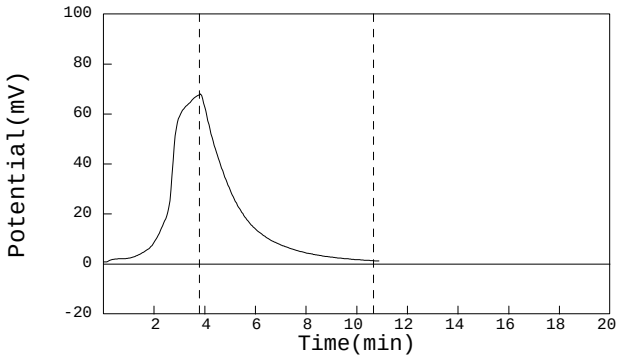
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

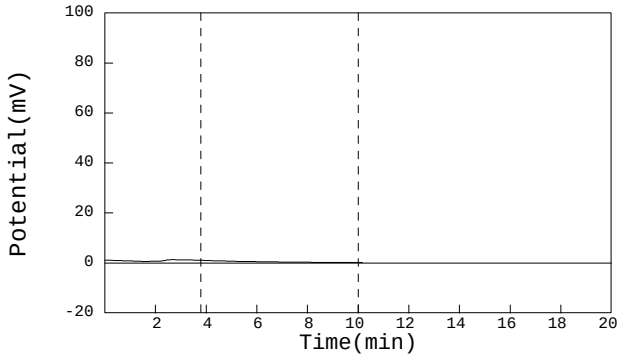
Reps. : 1-1 06/03/2021 10:47
Sample ID : ICV-500 ppm
Counts(µg): 5.382



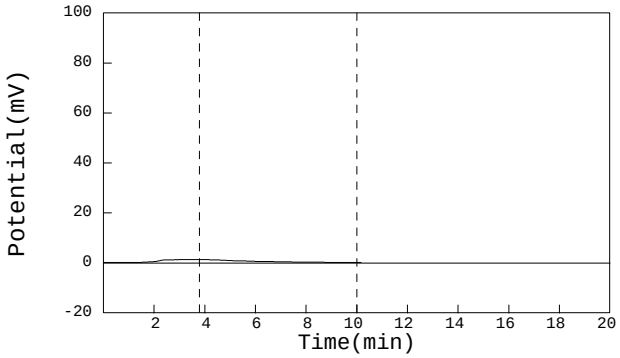
Reps. : 1-2 06/03/2021 10:59
Sample ID : ICV-500 ppm
Counts(µg): 5.343



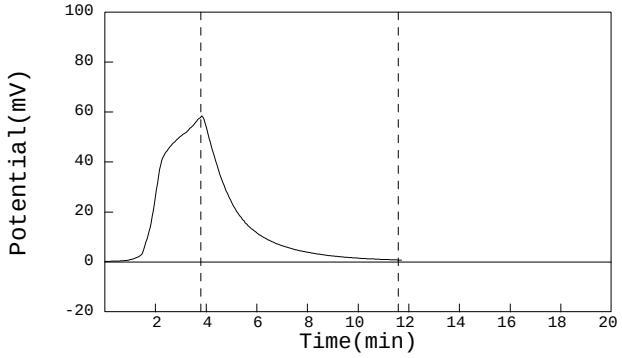
Reps. : 1-1 06/03/2021 11:10
Sample ID : 1204835038
Counts(µg): -0.247



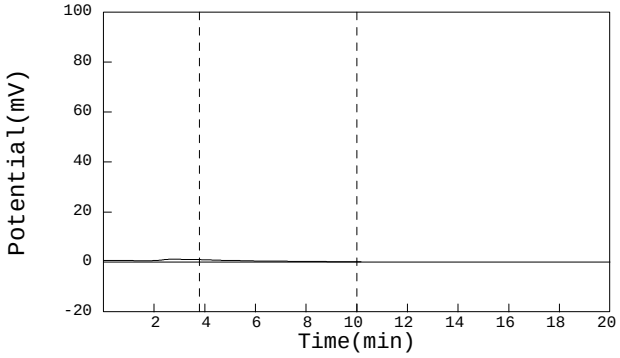
Reps. : 1-2 06/03/2021 11:22
Sample ID : 1204835038
Counts(µg): 0.130



Reps. : 1-1 06/03/2021 11:34
Sample ID : 1204835039
Counts(µg): 4.447



Reps. : 1-2 06/03/2021 11:45
Sample ID : 1204835039
Counts(µg): -0.124

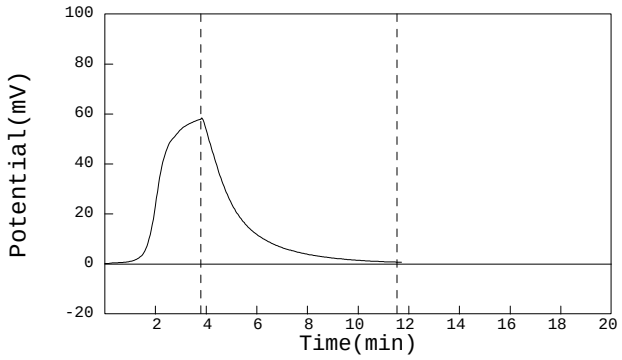


Sample Report

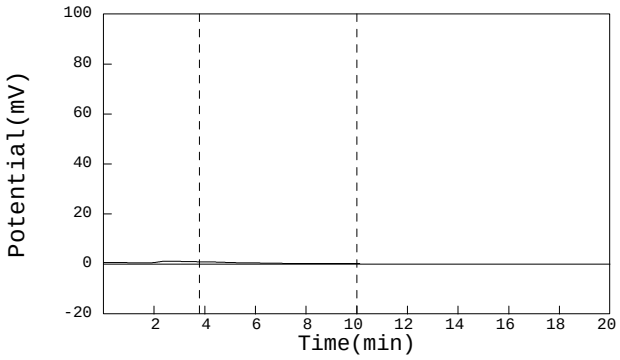
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

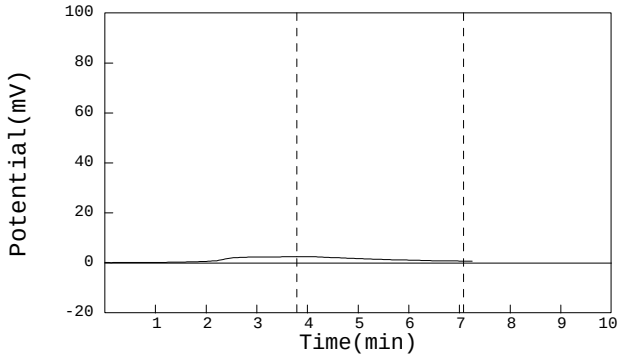
Reps. : 2-1 06/03/2021 11:58
Sample ID : 1204835039
Counts(µg): 4.481



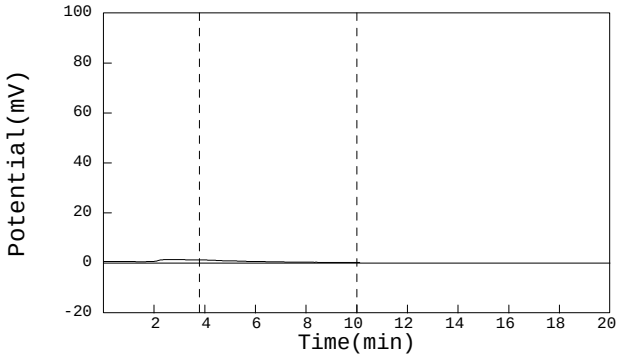
Reps. : 2-2 06/03/2021 12:09
Sample ID : 1204835039
Counts(µg): -0.106



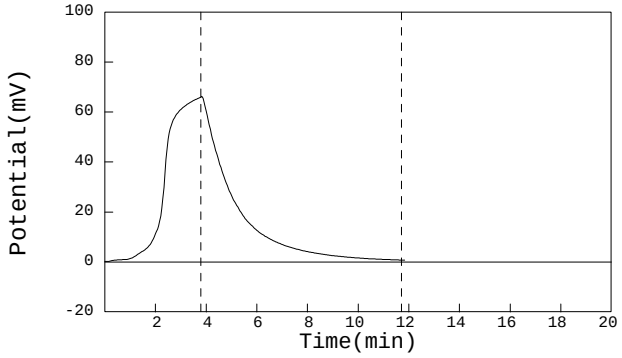
Reps. : 1-1 06/03/2021 12:17
Sample ID : 545783001 20X
Counts(µg): 0.227



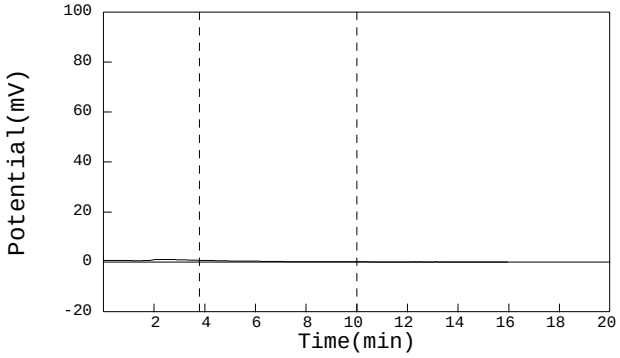
Reps. : 1-2 06/03/2021 12:28
Sample ID : 545783001 20X
Counts(µg): -0.060



Reps. : 1-1 06/03/2021 12:41
Sample ID : CCV
Counts(µg): 5.152



Reps. : 1-2 06/03/2021 12:52
Sample ID : CCV
Counts(µg): -0.152

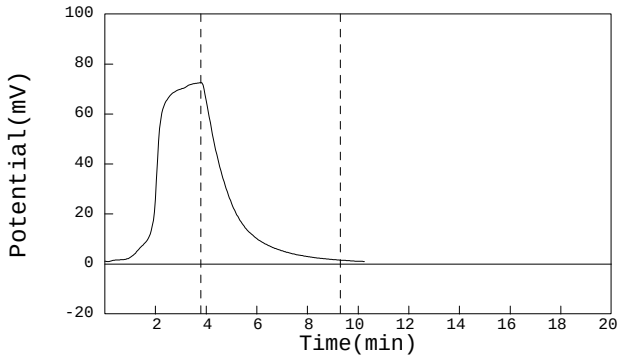


Sample Report

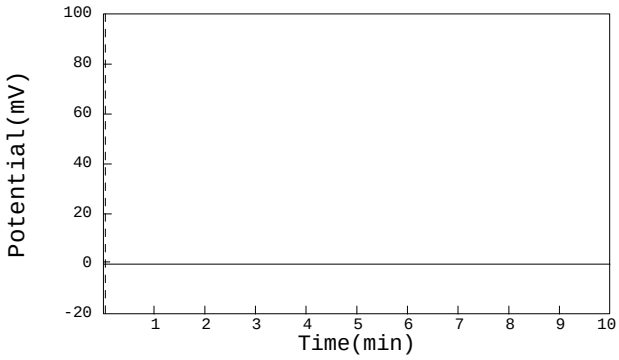
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

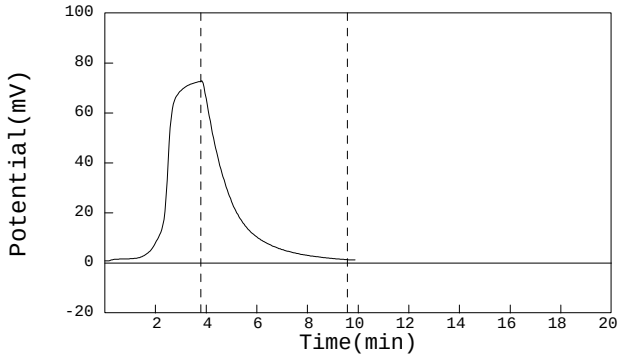
Reps. : 2-1 06/03/2021 14:40
Sample ID : CCV
Counts(µg): 4.664



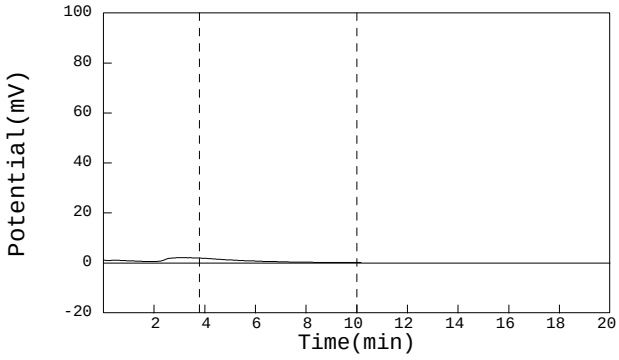
Reps. : 2-2 06/03/2021 14:41
Sample ID : CCV
Counts(µg): 0.000



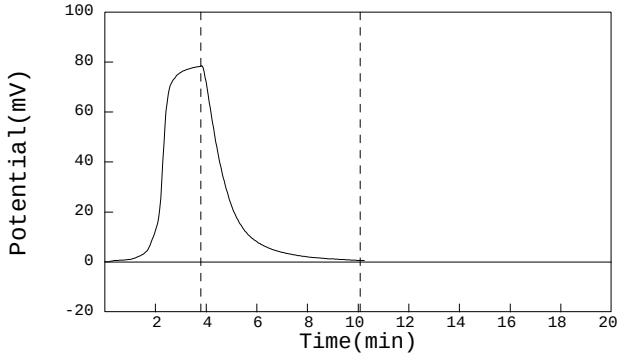
Reps. : 3-1 06/03/2021 14:52
Sample ID : CCV
Counts(µg): 4.792



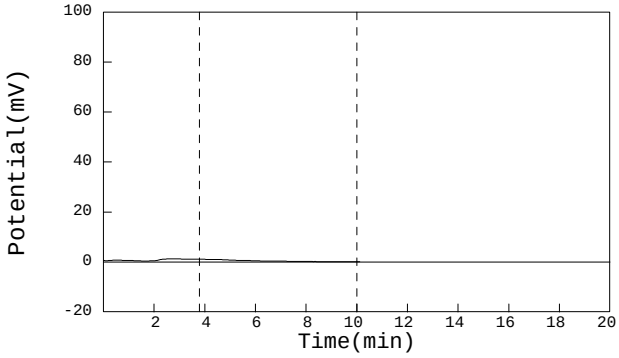
Reps. : 3-2 06/03/2021 15:03
Sample ID : CCV
Counts(µg): -0.163



Reps. : 4-1 06/03/2021 16:32
Sample ID : CCV
Counts(µg): 5.128



Reps. : 4-2 06/03/2021 16:43
Sample ID : CCV
Counts(µg): -0.063

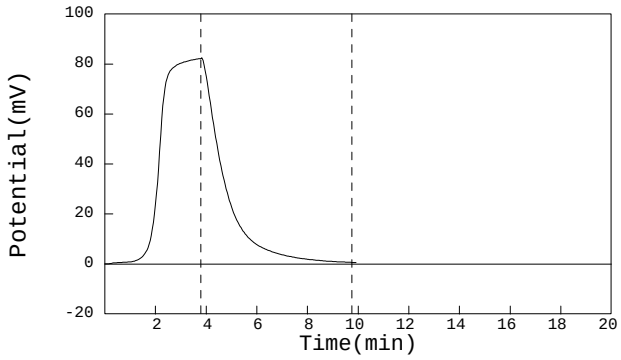


Sample Report

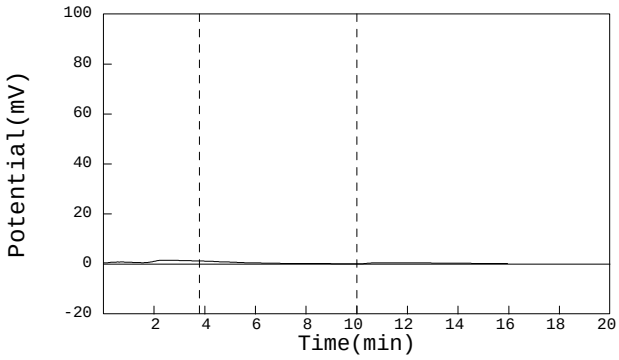
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

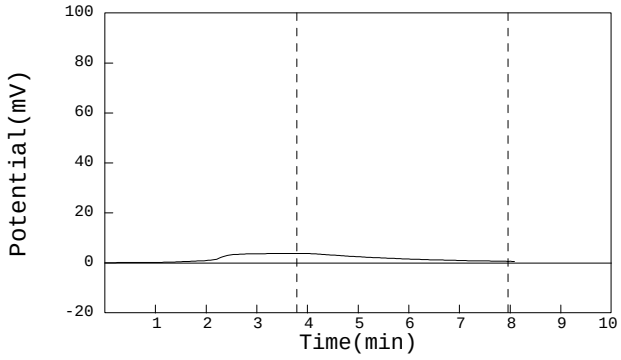
Reps. : 5-1 06/03/2021 16:54
Sample ID : CCV
Counts(µg): 5.404



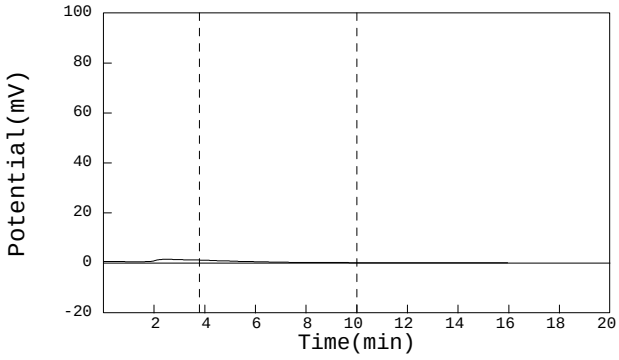
Reps. : 5-2 06/03/2021 17:05
Sample ID : CCV
Counts(µg): -0.064



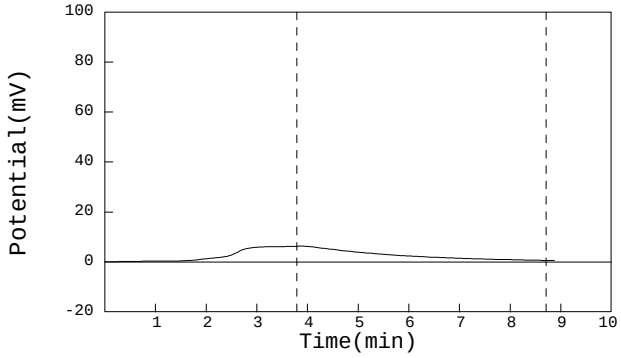
Reps. : 1-1 06/03/2021 13:13
Sample ID : 545783001 5X
Counts(µg): 0.388



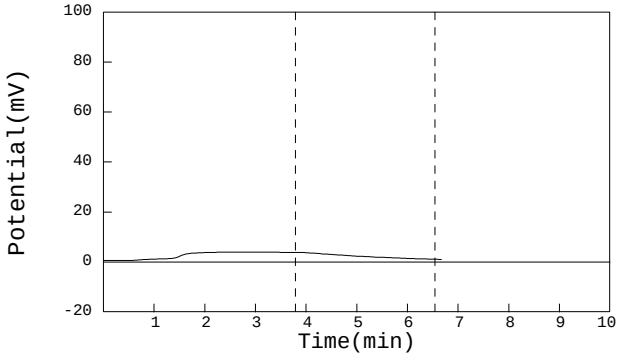
Reps. : 1-2 06/03/2021 13:24
Sample ID : 545783001 5X
Counts(µg): -0.060



Reps. : 1-1 06/03/2021 13:49
Sample ID : 545783001
Counts(µg): 0.640



Reps. : 1-2 06/03/2021 13:56
Sample ID : 545783001
Counts(µg): 0.227

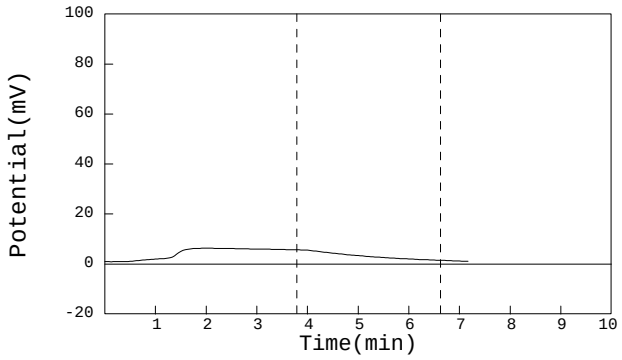


Sample Report

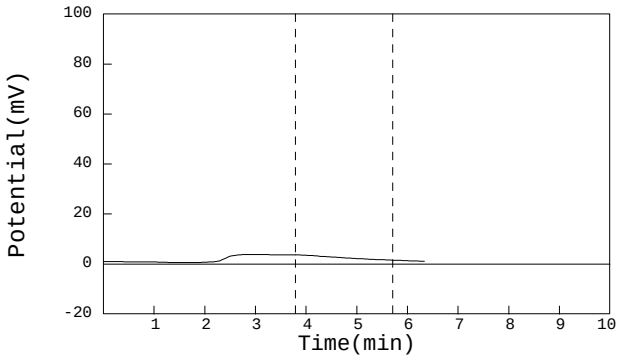
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

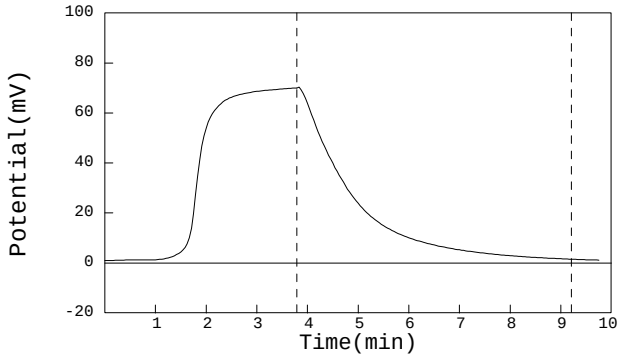
Reps. : 1-1 06/03/2021 14:04
Sample ID : 1204835040
Counts(µg): 0.305



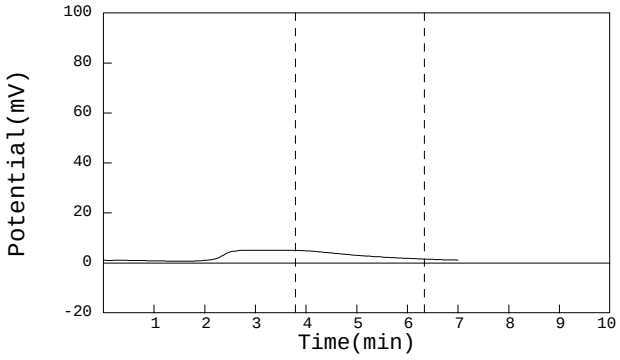
Reps. : 1-2 06/03/2021 14:11
Sample ID : 1204835040
Counts(µg): 0.119



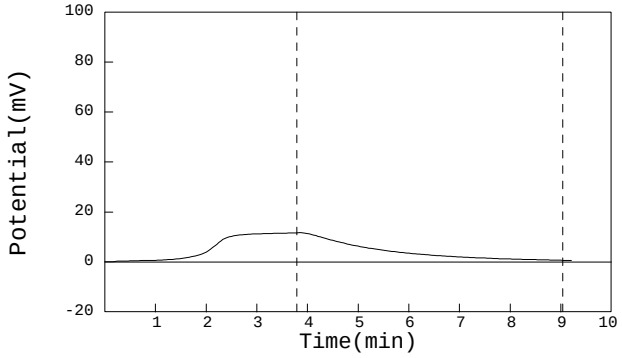
Reps. : 1-1 06/03/2021 14:22
Sample ID : 1204835041
Counts(µg): 4.491



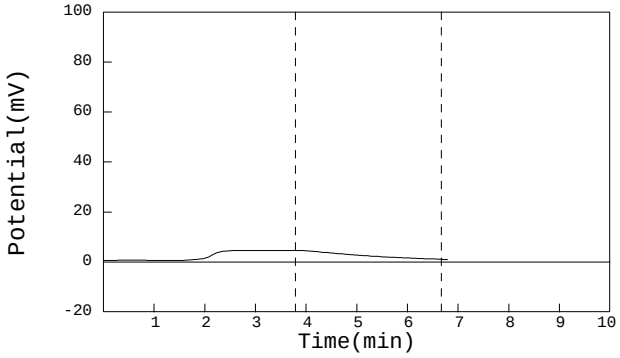
Reps. : 1-2 06/03/2021 14:29
Sample ID : 1204835041
Counts(µg): 0.238



Reps. : 1-1 06/03/2021 15:13
Sample ID : 545783002
Counts(µg): 1.022



Reps. : 1-2 06/03/2021 15:21
Sample ID : 545783002
Counts(µg): 0.275

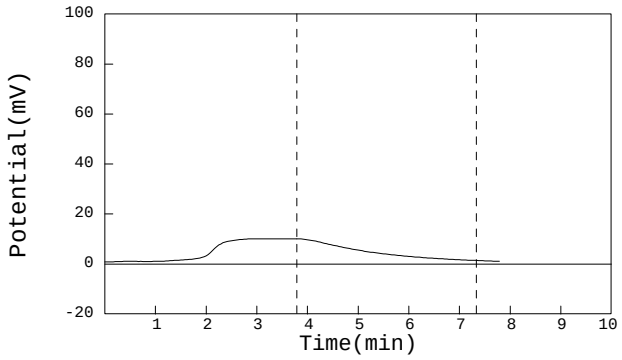


Sample Report

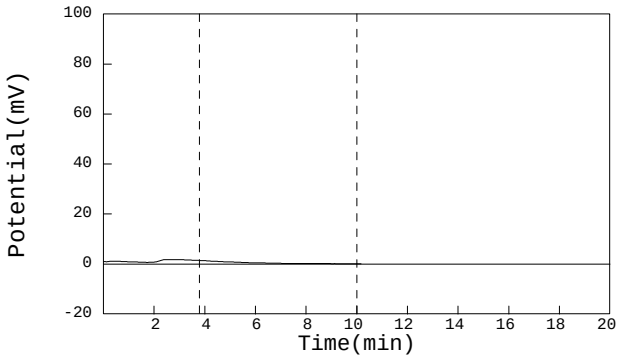
Sample Charts

Data ID : AOX2_06032021.001
Method Name : 06032021_001_Method

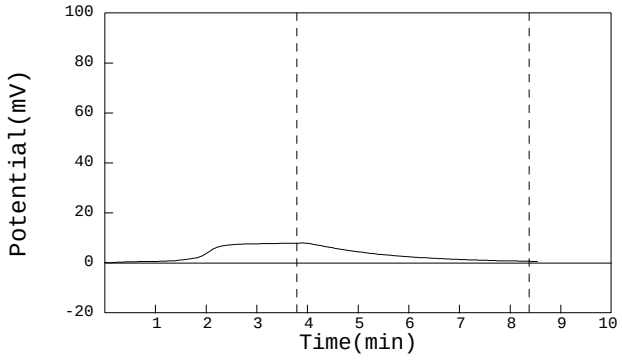
Reps. : 2-1 06/03/2021 15:29
Sample ID : 545783002
Counts(µg): 0.639



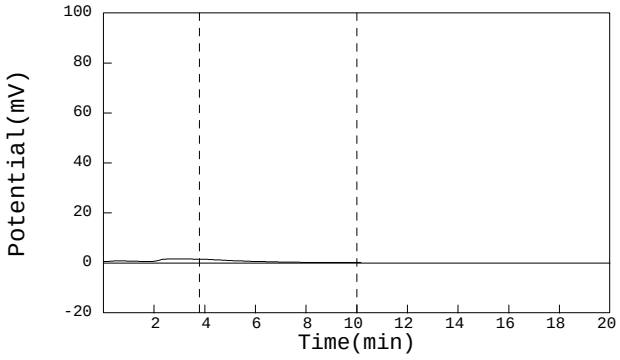
Reps. : 2-2 06/03/2021 15:40
Sample ID : 545783002
Counts(µg): -0.220



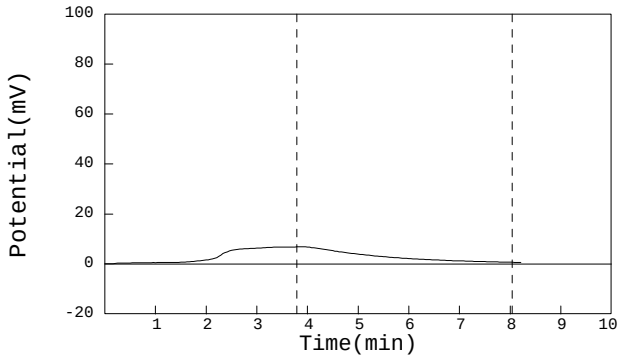
Reps. : 1-1 06/03/2021 15:50
Sample ID : 545783003
Counts(µg): 0.693



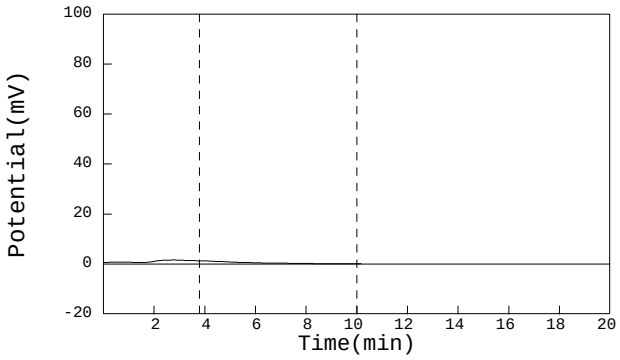
Reps. : 1-2 06/03/2021 16:01
Sample ID : 545783003
Counts(µg): -0.029



Reps. : 2-1 06/03/2021 16:10
Sample ID : 545783003
Counts(µg): 0.591



Reps. : 2-2 06/03/2021 16:21
Sample ID : 545783003
Counts(µg): -0.071



Analytical Logbook

Total Organic Halogen (TOX) and Adsorbable Organic Halides on Liquid Samples Using the Mitsubishi AOX−200 Analyzer

Batch ID: **2134549**
Analyst: **Ryan Monroe**
Method: **EPA 1650**
Lab SOP: **GL−GC−E−007 REV# 16**
Instrument: **Mitsubishi AOX−200 TOX4**

Type	Sample Id	Description	Serial Number	Nominal	Recovery	Rpd
	All	KNO3 wash	3296958−01			
CCV	12:41:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	99.38	
CCV	14:52:00	TOX Second Source Working Standard	UTX3274911−02	100 ug/L	92.18	
CCV	16:32:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	98.9	
DUP	1204835040					121.669
ICV	10:47:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	103.98	
ICV	10:59:00	TOX Second Source Working Standard	UTX3274911−02	100 ug/L	103.2	
ICV	11:04:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	103.59	
LCS	1204835039	100 ug/L TOX LCS Standard	3301086	100 ug/L	85.28	
MS	1204835041	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	77.24	

Sample ID	Run Date	Aliquot (mL)	Dilution	Blank Average (ug)	Slug 1 (ug)	Slug 2 (ug)	Break through Pass/Fail	Adsorbable Organic Halogens Initial Result (ug/L)	Adsorbable Organic Halogens Result (ug/L)
ICB	03−JUN−21 10:09	50	1	0.183	0.208	0.157	Fail	0.5	0.5
ICV	03−JUN−21 10:47	50	1	0.183	5.382			103.98	103.98
ICV	03−JUN−21 10:59	50	1	0.183	5.343			103.2	103.2
ICV	03−JUN−21 11:04	50	1	0.183	5.3625			103.59	103.59
1204835038 MB	03−JUN−21 11:10	50	1	0.183	−0.247	0.13	Pass	0	0
1204835039 LCS	03−JUN−21 11:34	50	1	0.183	4.447	−0.124	Pass	85.28	85.28
CCV	03−JUN−21 12:41	50	1	0.183	5.152			99.38	99.38
CCB	03−JUN−21 12:52	50	1	0.183	−0.152			0	0
545783001	03−JUN−21 13:49	50	1	0.183	0.64	0.227	Pass	10.02	10.02
1204835040 DUP (545783001)	03−JUN−21 14:04	50	1	0.183	0.305	0.119	Pass	2.44	2.44
1204835041 MS (545783001)	03−JUN−21 14:22	50	1	0.183	4.491	0.238	Pass	87.26	87.26
CCV	03−JUN−21 14:52	50	1	0.183	4.792			92.18	92.18
CCB	03−JUN−21 15:03	50	1	0.183	−0.163			0	0
545783002	03−JUN−21 15:13	50	1	0.183	1.022	0.275	Pass	18.62	18.62
545783002	03−JUN−21 15:29	50	1	0.183	0.639	−0.22	Pass	9.12	9.12
545783003	03−JUN−21 15:50	50	1	0.183	0.693	−0.029	Pass	10.2	10.2
545783003	03−JUN−21 16:10	50	1	0.183	0.591	−0.071	Pass	8.16	8.16
CCV	03−JUN−21 16:32	50	1	0.183	5.128			98.9	98.9

Analytical Logbook

Batch ID: **2134549**
Analyst: **Ryan Monroe**
Method: **EPA 1650**
Lab SOP: **GL−GC−E−007 REV# 16**
Instrument: **Mitsubishi AOX−200 TOX4**

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CCV	16:32:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	98.9	
DUP	1204835040					121.669
ICV	10:47:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	103.98	
ICV	10:59:00	TOX Second Source Working Standard	UTX3274911−02	100 ug/L	103.2	
ICV	11:04:00	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	103.59	
LCS	1204835039	100 ug/L TOX LCS Standard	3301086	100 ug/L	85.28	
MS	1204835041	TOX Liquid Matrix Spike	UTX3263266−01	100 ug/L	77.24	

Sample ID	Run Date	Aliquot (mL)	Dilution	Blank Average (ug)	Slug 1 (ug)	Slug 2 (ug)	Break through Pass/Fail	Adsorbable Organic Halogens Initial Result (ug/L)	Adsorbable Organic Halogens Result (ug/L)
CCB	03−JUN−21 16:43	50	1	0.183	−0.063			0	0

Comments:

TOX 1 Comb. Check: 5.077 ug/L

A pair of nitrate wash blanks is analyzed at the start of the batch. Although they are designated as ICB, they are performed for calculating purposes only. The value of the nitrate wash blanks are averaged and subtracted from all samples. Neither of these values should exceed 0.6 ug Cl. The PQL limit typically applied to ICB results does not apply in this application, since the results are used only to determine background concentrations and are subtracted from all calculated results.

Breakthrough effect: If the value for a sample is greater than the reporting limit (10 ug/L), the result for the second slug should not be greater than 25% of the combined value of the first and second slug. Results which do not meet these criteria are designated with a "Fail" comment in the Breakthrough effect column on the Logbook page; however, the "fail" designation is not applicable for samples with a result of less than 10 ug/L.

TOX 1 End Point 1: 303.84 mV

Carbon lot #: MC06455

Calculation: Initial result = [(Slug 1 − Blank Avg) + (Slug 2 − Blank Avg)] / Aliquot

Breakthrough Effect Percentage = (Slug 2 − Blank Avg) / [(Slug 1 − Blank Avg) + (Slug 2 − Blank Avg)] * 100