ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLD0180
Instrument: S2 Buret
Calibration: UNASSIGNED

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Initial Cal Blank	SLD0180-ICB1		NA	04/04/23 15:00
Initial Cal Check	SLD0180-ICV1		NA	04/04/23 15:00
Low Cal Check	SLD0180-LCV1		NA	04/04/23 15:00
Blank	BLC0751-BLK1		Solid	04/04/23 15:00
LCS	BLC0751-BS1		Solid	04/04/23 15:00
Calibration Blank	SLD0180-CCB1		NA	04/04/23 15:00
Calibration Check	SLD0180-CCV1		NA	04/04/23 15:00
SED-27G:0-10	23C0619-16		Solid	04/04/23 15:00
Calibration Blank	SLD0180-CCB2		NA	04/04/23 15:00
Calibration Check	SLD0180-CCV2		NA	04/04/23 15:00

SULFIDE BENCHSHEET (TITRATION) **SLD0180**

			Date	Analyst
EPA 376.1		*Distillation*	3/28/23 16:38	CDE
If distilled, specify Procedure:	**PSEP**	*Finish*	4/4/23 15:00	CDE
Buret used for titrations:	S2			

CalibrationData *ZnOAc:* K008611

1. Standardization of sodium thiosulfate titrant

Thiosulfate ID: **L002861**

Bi-iodate ID: **L003502**

Stock bi-iodate = **0.8134** *grams to* 1000 *mL*

Normality = **0.025**

	Titration of bi-iodate with thiosulfate			
mL bi-iodate =	3.00	3.00	3.00	
mL thiosulfate =	3.07	3.08	3.06	*nthio*
*Normality thiosulfate = (mL bi-iodate*normbio) / mL thiosulfate =*	0.024	0.024	0.025	**0.024**

2. Normality of Iodine Soln

Iodine ID: **L002862**

	Titration of Iodine with thiosulfate			
mL iodine =	3.00	3.00	3.00	
mL thiosulfate =	3.12	3.10	3.11	*ni*
*Normality iodine = (mL thiosulfate*nthio) / mL iodine=*	0.025	0.025	0.025	**0.025**

3. Standardization (Sulfide Stock Solution)

Stock ID = **L002834**

Approx conc in 60ml

g Na2S = 0.4745 *mg /mL =* 1.056

	Titration of standard with thiosulfate			
mL Standard =	1.00	1.00	1.00	
mL iodine =	3.00	3.00	3.00	
mL thiosulfate =	0.98	0.99	0.99	*stkconc (mg/mL)*
*Sulfide (mg/mL) = {[(mL iodine*ni)-(mL thio *nthio)]*16} / mL standard =*	0.834	0.830	0.830	**0.831**

4. Verification Standard: L003965

Add 1.0 *mL Stock to* 50 *mL DI water* ***CV =*** **16.6** ***mg/L sulfide***

5. LCV Standard: L003964

Add 0.1 *mL Stock to* 50 *mL DI water* ***DQL =*** **1.0** ***mg/L sulfide*** confirm 1.0

6. Distillation Standard: L002834, Titrated standard: L003966

Add 1.0 *mL Stock to* 100 *mL DI water* ***Dist Chk =*** **8.3** ***mg/L sulfide***

SAMPLE DATA

Calculation: mg/L = [((mL I X N I) - (mL thio X N thio)) X 16,000] / mL sample

	DISTILL DATA		TITRATION DATA						
SAMPLE ID	Sample Volume (mL)	Trap Volume (mL)	Sample Volume (mL)	IODINE ADDED (mL)	Thiosulfate TITRANT (mL)	CONC (mg S/L)	Concentration If distilled (mg S/L wet)		
SLD0180-ICB1			50.0	3.0	3.08	0.2			
SLD0180-ICV1			50.0	3.0	1.02	16.4			*98.43%*
SLD0180-LCV1			50.0	3.0	2.95	1.3			*125.24%*
BLC0751-BLK1	100.0	100	50.0	3.0	3.12	-0.1	-0.1		
BLC0751-BS1	100.0	100	50.0	3.0	2.04	8.4	8.4	101%	*100.78%*
23C0538-01	5.183	100	50.0	3.0	2.63	3.8	72.5		
BLC0751-DUP1	5.132	100	50.0	3.0	2.90	1.6	32.0	*RPD =*	*78.3%*
BLC0751-MS1	5.062	100	50.0	3.0	1.62	11.7	230.4	*%Rec =*	*96.1%*
Spike = 1.0	*mL stk to*	100.00	*mL sample =*			8.2	*mg/L*		
23C0538-02	5.149	100.0	50.0	3.0	2.25	6.7	130.7		
23C0538-03	5.114	100.0	50.0	3.0	2.55	4.4	85.7		
23C0538-04	5.015	100.0	50.0	3.0	2.57	4.2	84.3		
23C0538-08	5.054	100.0	50.0	3.0	2.24	6.8	134.7		
23C0618-09	5.130	100.0	50.0	3.0	2.22	7.0	135.8		
SLD0180-CCB1			50.0	3.0	3.07	0.3		ND	
SLD0180-CCV1			50.0	3.0	1.00	16.5			*99.37%*
23C0538-12	5.541	100.0	50.0	3.0	1.93	9.2	166.7		
23C0619-16	5.129	100.0	50.0	3.0	2.75	2.8	54.9		
23C0538-01RE	5.183	100	50.0	3.0	2.68	3.4	64.9		
BLC0751-DUP1	5.132	100	50.0	3.0	2.95	1.3	24.4	*RPD =*	*91.5%*
SLD0180-CCB2			50.0	3.0	3.08	0.2			
SLD0180-CCV2			50.0	3.0	1.00	16.5			*99.37%*

INSTRUMENT BLANKS
EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: S2 Buret
Calibration: UNASSIGNED
Sequence: SLD0180
Date Analyzed: 04/04/23 15:00

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SLD0180-CCB1	Sulfide	0.300	1	1.00	mg/L	
SLD0180-CCB2	Sulfide	0.200	1	1.00	mg/L	
SLD0180-ICB1	Sulfide	0.200	1	1.00	mg/L	

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: S2 Buret
Calibration: UNASSIGNED
Control Limt: +/- 10.00%
Sequence: SLD0180

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SLD0180-CCV1	Sulfide	16.620	16.5	99.3	mg/L	EPA 9034
SLD0180-CCV2	Sulfide	16.620	16.5	99.3	mg/L	EPA 9034
SLD0180-ICV1	Sulfide	16.620	16.4	98.7	mg/L	EPA 9034

* Values outside of QC limits

LOW-CONCENTRATION CALIBRATION VERIFICATION

EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: UNASSIGNED
Laboratory ID: SLD0180-LCV1
Sequence: SLD0180
Standard ID: L003964

ANALYTE	EXPECTED (mg/L)	FOUND (mg/L)	% DRIFT	QC LIMIT
Sulfide	1.6620	1.30	-21.8	

* Values outside of QC limits

HOLDING TIME SUMMARY

Analysis: EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-27G:0-10 23C0619-16	03/23/23 10:17	03/24/23 16:25	03/28/23 16:36	5	7	04/04/23 15:00			

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

EPA 9034

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument: S2 Buret

Analyte	MDL	RL	Units
Sulfide	20.0	20.0	mg/kg

Analytical Standard Record

Standard ID: E007844 **Printed: 1/12/2023 12:49:51PM**

Description:	Sodium sulfide nonahydrate (98+%)	Expires:	31-Dec-2079
Standard Type:	Reagent	Prepared:	22-Dec-2016
Solvent:	NA	Prepared By:	Casey English
Final Volume (mls):	500	Department:	Conventionals
Vials:	1	Last Edit:	20-Sep-2017 17:17 by CDE
Vendor:	ACROS Organics	Lot #:	B0142157
Vendor Catalog #:	152580		

Comments

Analyte	CAS Number	Concentration	Units
Sulfide	18496-25-8	133500	mg/Kg
Soluble Sulfide	18496-25-8	133500	mg/Kg
Sodium sulfide nonahydrate	1313-84-4	1000000	mg/Kg

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-27G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23C0619-16 A	SDG:	23C0619
Sampled:	03/23/23 10:17	Prepared:	03/29/23 09:52	File ID:	
% Solids:	64.47	Preparation:	No Prep Wet Chem	Analyzed:	03/29/23 09:55
Batch:	BLC0766	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	64.47	1	0.04	0.04	

PREPARATION BATCH SUMMARY

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0766 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-27G:0-10	23C0619-16		03/29/23 09:52	
Blank	BLC0766-BLK1		03/29/23 09:52	

TOTAL SOLIDS/VOLATILE SOLIDS (TS / TVS) BENCHSHEET for Solid samples

Method: PSEP 1986, SM2540, EPA 160.1

(dry at 104 (12-24 hr) then combust at 550 (30 min))

Batch:	BLC0766
Date:	3/29/2023 9:55
Analyst:	UW

Instrumentation

Drying Ovens:	12	**Analytical Balance:**	BAL2
Muffle Furnace:	2		

Batch drying time

record times as mm/dd/yy hh:mm

date/time in oven:	3/29/2023 11:11	
date/time out:	3/30/2023 8:40	
elapsed hrs =	21.5	OK

TS (%) calculated as:
Final dry wt (g) = (Dry Wt - Tare Wt)
TS = (Final Dry Wt)/ (grams Sample-Tare)

Oven Temps, °C	
Start Temp	106
Dry Cycle 1	104
Dry Cycle 2	
Dry Cycle 3	

TVS (mg/kg dry wt) calculated as:
Final ash wt (g) = (min ash wt - tare wt)
TVS (mg/kg) = [(Dry wt-Ash wt)/ (dry weight)] *1,000,000
if ash wt > dry wt, "Chk for Err"
if dry wt-ash wt < 0.001 g, "< (1/dry wt)*1,000,000

Balance Calibration Check

Record weights to 4 places

Cal Weight ID:		CV-02	CV-02	CV-02	CV-02	CV-02		CV-02	CV-02	CV-02	
Date & Time:		3/29/23 10:09	3/29/23 10:45	3/30/23 9:12							
Cal Wt (g):	10.0000	10.0000	10.0000	10.0000							
		Cal OK!	Cal OK!	Cal OK!							

Sample ID	Dish #	Tare Wt. (g)	Dish & Sample (g)	Dry Wt 104C (grams) 1	2	3	dry Wt (g)	TS (%)	Notes	ASH WT 550C (grams) 1	2	3	Ash Wt (g)	TVS (mg/kg)	(%)	Notes
BLC0766-BLK1	24	0.8376	0.0000	0.8376			0.0000	0.00%								
23C0619-01	25	0.7672	8.8956	7.1508			6.3836	78.53%								
23C0619-02	26	0.7748	9.9217	7.3497			6.5749	71.88%								
BLC0766-DUP1	27	0.7801	9.7108	7.5477			6.7676	75.78%	RPD=5.3							
BLC0766-DUP2	28	0.7850	9.0251	6.9373			6.1523	74.66%	RSD=2.7							
23C0619-03	29	0.7987	6.8589	4.8637			4.0650	67.08%								
23C0619-04	30	0.7754	8.2821	6.2025			5.4271	72.30%								
23C0619-05	31	0.7998	7.8400	5.7692			4.9694	70.59%								
23C0619-06	32	0.8336	7.3458	5.7711			4.9375	75.82%								
23C0619-07	33	0.8055	8.5715	6.9435			6.1380	79.04%								
23C0619-08	34	0.7942	6.7344	4.3702			3.5760	60.20%								
23C0619-09	35	0.8186	7.9085	6.2039			5.3853	75.96%								
23C0619-10	36	0.7910	7.5846	5.7347			4.9437	72.77%								
23C0619-11	37	0.8018	8.9982	7.0079			6.2061	75.72%								
23C0619-12	38	0.8000	9.2434	6.6188			5.8188	68.92%								
23C0619-13	39	0.7871	7.6686	5.7916			5.0045	72.72%								
23C0619-14	40	0.8191	8.5724	5.8353			5.0162	64.70%								
23C0619-15	41	0.7918	8.3689	6.3180			5.5262	72.93%								
23C0619-16	42	0.8062	8.5953	5.8279			5.0217	64.47%								
23C0619-17	43	0.8247	8.2204	6.2389			5.4142	73.21%								

Form I

METHOD BLANK DATA SHEET

SM 2540 G-11

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0766
Laboratory ID: BLC0766-BLK1
Prepared: 03/29/23 09:52
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 03/29/23 09:55
Sequence:
Calibration:
Instrument: BAL2

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	ND	1	0.04	0.04	U

HOLDING TIME SUMMARY

Analysis: SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-07C:1-3 23C0619-02	03/22/23 07:29	03/24/23 16:25	03/29/23 09:52	7	28	03/29/23 09:55	7	28	
SED-27G:0-10 23C0619-16	03/23/23 10:17	03/24/23 16:25	03/29/23 09:52	5	28	03/29/23 09:55	6	28	
Duplicate BLC0766-DUP1	03/22/23 07:29	03/24/23 16:25	03/29/23 09:52	7	28	03/29/23 09:55	7	28	
Duplicate BLC0766-DUP2	03/22/23 07:29	03/24/23 16:25	03/29/23 09:52	7	28	03/29/23 09:55	7	28	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids	0.04	0.04	%

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 4500-NH3 H-11

SED-27G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23C0619-16 A	SDG:	23C0619
Sampled:	03/23/23 10:17	Prepared:	03/27/23 15:05	File ID:	032823 NH3A-025
% Solids:	64.47	Preparation:	No Prep Wet Chem	Analyzed:	03/28/23 13:29
Batch:	BLC0709	Sequence:	SLD0023	Initial/Final:	4.23 g Wet / 40 g
Instrument:	LACHAT1			Calibration:	UNASSIGNED

CAS NO.	Analyte	Concentration ng/kg NH3-N dry	Dilution Factor	MDL	MRL	Q
7664-41-7	Ammonia-N	5.63	1	0.59	0.59	

PREPARATION BATCH SUMMARY

SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0709 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-27G:0-10	23C0619-16	032823 NH3A-025	03/27/23 15:05	
Blank	BLC0709-BLK1	032823 NH3A-011	03/27/23 15:05	
LCS	BLC0709-BS1	032823 NH3A-012	03/27/23 15:05	
MRL Check	BLC0709-MRL1	032823 NH3A-010	03/27/23 15:05	

Analytical Resources, LLC
Analytical Chemists and Consultants

Method: ***Ammonia-N, SM 4500-NH3 H-97 Solid*** Analyst: RMS

Batch ID: BLC0709 Prep Date, Time: 3/27/2023 15:05

Revision Date & # : ***0*** ***6/29/2016*** Balance ID: BAL5

Sample Preparation Log

Reagents, Equipment

Notes

Revision: ***0*** ***6/29/2016***

Lab Number	Sample Amount (g/mL)	Final Volume (mL)	Spike 1 ID	Spike 1 Volume (µL)	Spike 2 ID	Spike 2 Volume (µL)
23C0538-01	4.23	40				
23C0538-02	4.2	40				
23C0538-03	4.41	40				
23C0538-04	4.46	40				
23C0538-08	4.27	40				
23C0538-12	4.16	40				
23C0618-09	4.2	40				
23C0619-16	4.23	40				
BLC0709-BLK1	4	40				
BLC0709-BS1	4	40	K006560	400		
23C0538-01-DUP1	4.06	40				
BLC0709-MRL1	4	40	L003218	80		
BLC0709-MS1	4.01	40	K010908	400		
23C0538-01-MSD1	4.42	40	K010908	400		

Form I

METHOD BLANK DATA SHEET

SM 4500-NH3 H-11

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0709
Laboratory ID: BLC0709-BLK1
Prepared: 03/27/23 15:05
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 03/28/23 13:08
Sequence: SLD0023
Calibration: N/A
Instrument: LACHAT1

CAS NO.	Analyte	Concentration (mg/kg NH3-N wet)	Dilution Factor	MDL	MRL	Q
7664-41-7	Ammonia-N	ND	1	0.40	0.40	U

LCS / LCS DUPLICATE RECOVERY

SM 4500-NH3 H-11

Laboratory:	Analytical Resources, LLC	SDG:	23C0619
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	03/28/23 13:09
Batch:	BLC0709	Laboratory ID:	BLC0709-BS1
Preparation:	No Prep Wet Chem	Sequence Name:	LCS
Initial/Final:	4 g / 40 g		

COMPOUND	SPIKE ADDED (mg/kg NH3-N	LCS CONCENTRATION (mg/kg NH3-N wet)	Q	LCS % REC. #	QC LIMITS REC.
Ammonia-N	100	97.2	D	97.2	90 - 110

* Indicates values outside of QC limits

ANALYSIS BATCH (SEQUENCE) SUMMARY

SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLD0023
Instrument: LACHAT1
Calibration: UNASSIGNED

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Cal Standard	SLD0023-CAL1	032823 NH3A-001	NA	03/28/23 12:52
Cal Standard	SLD0023-CAL2	032823 NH3A-002	NA	03/28/23 12:53
Cal Standard	SLD0023-CAL3	032823 NH3A-003	NA	03/28/23 12:54
Cal Standard	SLD0023-CAL4	032823 NH3A-004	NA	03/28/23 12:55
Cal Standard	SLD0023-CAL5	032823 NH3A-005	NA	03/28/23 12:56
Cal Standard	SLD0023-CAL6	032823 NH3A-006	NA	03/28/23 12:58
Cal Standard	SLD0023-CAL7	032823 NH3A-007	NA	03/28/23 12:59
Initial Cal Check	SLD0023-ICV1	032823 NH3A-008	NA	03/28/23 13:00
Initial Cal Blank	SLD0023-ICB1	032823 NH3A-009	NA	03/28/23 13:04
MRL Check	BLC0709-MRL1	032823 NH3A-010	Solid	03/28/23 13:07
Blank	BLC0709-BLK1	032823 NH3A-011	Solid	03/28/23 13:08
LCS	BLC0709-BS1	032823 NH3A-012	Solid	03/28/23 13:09
Calibration Check	SLD0023-CCV1	032823 NH3A-020	NA	03/28/23 13:19
Calibration Blank	SLD0023-CCB1	032823 NH3A-021	NA	03/28/23 13:22
SED-27G:0-10	23C0619-16	032823 NH3A-025	Solid	03/28/23 13:29
Calibration Check	SLD0023-CCV2	032823 NH3A-028	NA	03/28/23 13:35
Calibration Blank	SLD0023-CCB2	032823 NH3A-029	NA	03/28/23 13:39

Author: RMS Date : 3/28/2023

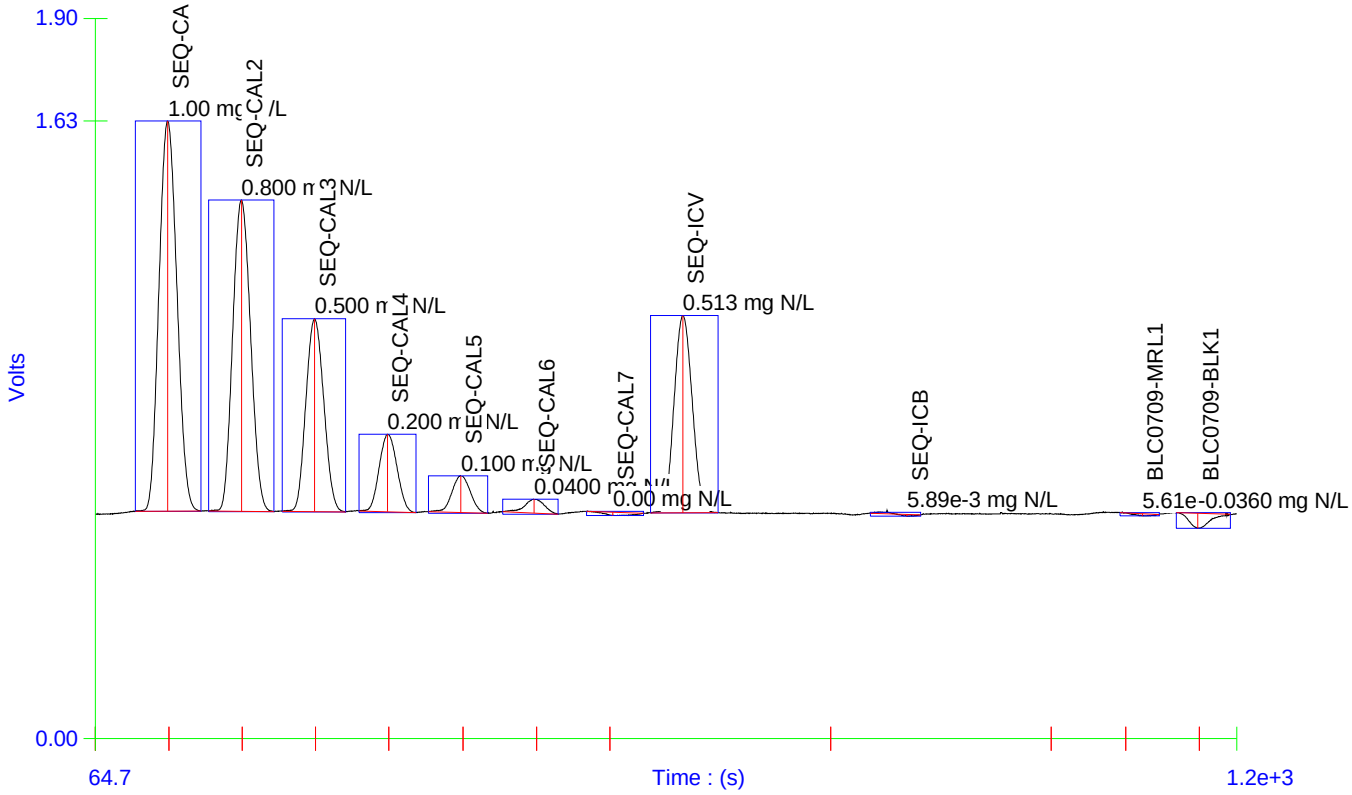
Original Run Filename: OM_3-28-2023_12-51-11PM.OMN Created: 3/28/2023 12:51:11 PM
Original Run Author's Signature: [RMS]
Current Run Filename: 032823 NH3A.omn Last Modified: 3/28/2023 1:49:54 PM
Current Run Author's Signature: [RMS]
Description: Default New Run

Sample	Rep.	Cup No.	Channel 1 NH3			Detection Time	MDF
			Conc. (mg N/L)	Area (V.s)	Height (V)		
SEQ-CAL1	1	S1	1.00	20.3	1.03	3/28/2023@12:52:18 PM	
SEQ-CAL2	1	S2	0.800	16.2	0.820	3/28/2023@12:53:28 PM	
SEQ-CAL3	1	S3	0.500	10.0	0.508	3/28/2023@12:54:38 PM	
SEQ-CAL4	1	S4	0.200	4.01	0.204	3/28/2023@12:55:49 PM	
SEQ-CAL5	1	S5	0.100	1.95	0.0965	3/28/2023@12:56:59 PM	
SEQ-CAL6	1	S6	0.0400	0.789	0.0364	3/28/2023@12:58:10 PM	
SEQ-CAL7	1	S7	0.00	-0.257	-8.79e-3	3/28/2023@12:59:21 PM	
SEQ-ICV	1	8	0.513	10.4	0.520	3/28/2023@1:00:31 PM	
Known Conc:			0.500				
Calibration:			Table/Fig. : 1				
SEQ-ICB	1	9	5.89e-3	-8.39e-3	-4.67e-3	3/28/2023@1:04:02 PM	
Known Conc:			0.00				
BLC0709-MRL1	1	10	5.61e-4	-0.117	-5.82e-3	3/28/2023@1:07:34 PM	
BLC0709-BLK1	1	11	-0.0360	-0.864	-0.0395	3/28/2023@1:08:45 PM	
BLC0709-BS1	1	12	0.486	9.80	0.495	3/28/2023@1:09:55 PM	20.00
23C0538-01	1	13	0.676	13.7	0.695	3/28/2023@1:11:06 PM	
BLC0709-DUP1	1	14	0.876	17.8	0.899	3/28/2023@1:12:16 PM	
BLC0709-MS1	1	15	0.605	12.2	0.618	3/28/2023@1:13:26 PM	20.00
BLC0709-MSD1	1	16	0.569	11.5	0.583	3/28/2023@1:14:38 PM	20.00
23C0538-02	1	17	0.906	18.4	0.931	3/28/2023@1:15:49 PM	
23C0538-03	1	18	0.778	15.8	0.799	3/28/2023@1:16:59 PM	
23C0538-04	1	19	0.310	6.22	0.314	3/28/2023@1:18:10 PM	
SEQ-CCV	1	8	0.514	10.4	0.521	3/28/2023@1:19:21 PM	
Known Conc:			0.500				
SEQ-CCB	1	9	0.0146	0.170	9.71e-3	3/28/2023@1:22:52 PM	
Known Conc:			0.00				
23C0538-08	1	20	0.254	5.06	0.257	3/28/2023@1:26:24 PM	
23C0538-12	1	21	0.501	10.1	0.514	3/28/2023@1:27:35 PM	
23C0618-09	1	22	0.722	14.6	0.741	3/28/2023@1:28:47 PM	
23C0619-16	1	23	0.384	7.72	0.391	3/28/2023@1:29:57 PM	
23C0538-01RE1	1	13	0.683	13.8	0.701	3/28/2023@1:31:08 PM	
BLC0709-DUP2	1	14	0.885	18.0	0.902	3/28/2023@1:32:18 PM	
SEQ-CCV	1	8	0.515	10.4	0.524	3/28/2023@1:35:50 PM	
Known Conc:			0.500				
SEQ-CCB	1	9	-5.73e-3	-0.246	-0.0100	3/28/2023@1:39:21 PM	
Known Conc:			0.00				

Author: RMS

Date : 3/28/2023

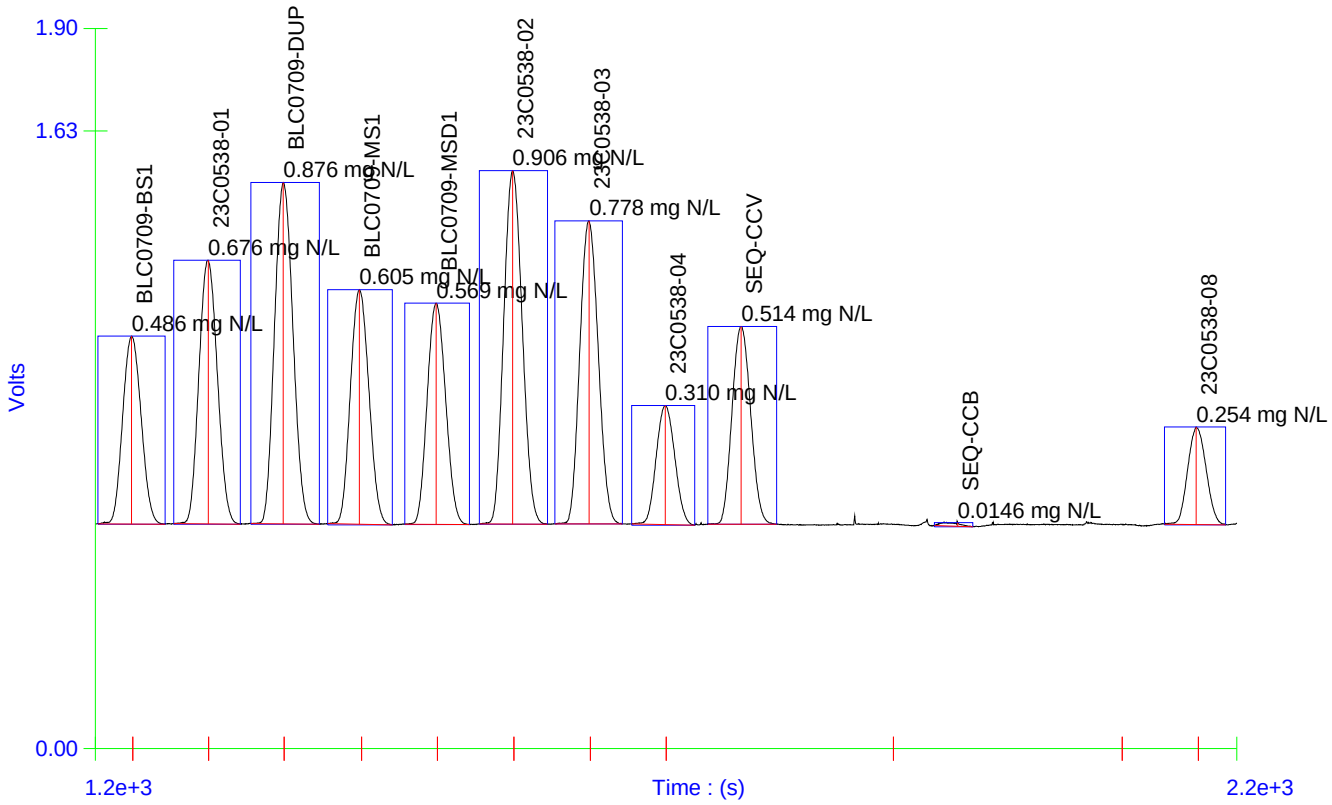
Channel 1 - Set: 1 / 3



Author: RMS

Date : 3/28/2023

Channel 1 - Set: 2 / 3



Author: RMS Date : 3/28/2023

Channel 1 - Set: 3 / 3

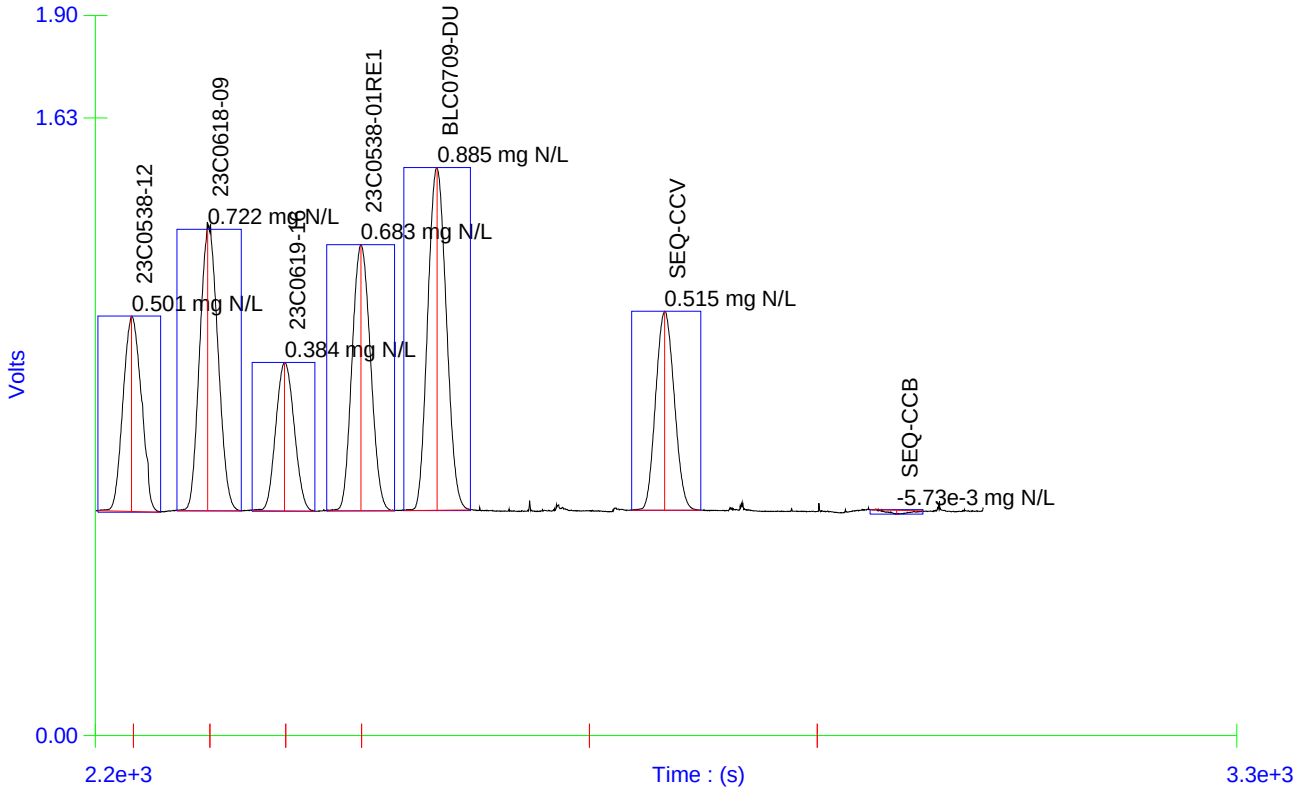
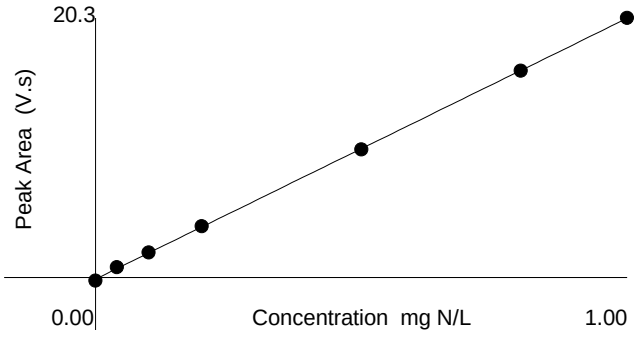


Table : 1 (NH3)

	Known Conc. (mg N/L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg N/L)	Detection Date	Detection Time
1	1.00	1	20.3	1.03	0.0	-0.1	1.00	3/28/2023	12:52:18 PM
2	0.800	1	16.2	0.820	0.0	0.1	0.799	3/28/2023	12:53:28 PM
3	0.500	1	10.0	0.508	0.0	0.5	0.497	3/28/2023	12:54:38 PM
4	0.200	1	4.01	0.204	0.0	-1.2	0.202	3/28/2023	12:55:49 PM
5	0.100	1	1.95	0.0965	0.0	-1.6	0.101	3/28/2023	12:56:59 PM
6	0.0400	1	0.789	0.0364	0.0	-14.4	0.0449	3/28/2023	12:58:10 PM
7	0.00	1	-0.257	-8.79e-3			-6.25e-3	3/28/2023	12:59:21 PM

Figure : 1 (NH3)



Area = 20.4 * Conc - 0.128
Conc = 0.0489 * Area + 6.30e-3
Correlation Coefficient (r) = 0.99996

Weighting : None

INSTRUMENT BLANKS
SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
Client: Friedman & Bruya Inc.
Instrument ID: LACHAT1
Sequence: SLD0023

SDG: 23C0619
Project: Port of Friday Harbor
Calibration: UNASSIGNED
Date Analyzed: 03/28/23 13:04

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SLD0023-ICB1	Ammonia-N	0.006	0.04	0.04	mg/L NH3-N	
SLD0023-CCB1	Ammonia-N	0.01	0.04	0.04	mg/L NH3-N	
SLD0023-CCB2	Ammonia-N	-0.006	0.04	0.04	mg/L NH3-N	

INITIAL AND CONTINUING CALIBRATION CHECK

SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: LACHAT1
Calibration: UNASSIGNED
Control Limt: +/- 10.00%
Sequence: SLD0023

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SLD0023-ICV1	Ammonia-N	0.50000	0.51	103	mg/L NH3-N	SM 4500-NH3 H-11
SLD0023-CCV1	Ammonia-N	0.50000	0.51	103	mg/L NH3-N	SM 4500-NH3 H-11
SLD0023-CCV2	Ammonia-N	0.50000	0.52	103	mg/L NH3-N	SM 4500-NH3 H-11

* Values outside of QC limits

HOLDING TIME SUMMARY

Analysis: SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-27G:0-10 23C0619-16	03/23/23 10:17	03/24/23 16:25	03/27/23 15:05	4	7	03/28/23 13:29	1	7	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

SM 4500-NH3 H-11

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument: LACHAT1

Analyte	MDL	RL	Units
Ammonia-N	0.40	0.40	mg/kg NH3-N

Fisher Scientific

1 Reagent Lane
Fair Lawn, NJ 07410
201.796.7100 tel
201.796.1329 fax

Certificate of Analysis

Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2008 standard by SAI Global Certificate Number CERT - 0090918

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Certain products (USP/FCC/NF/EP/BP/JP grades) are sold for use in food, drug, or medical device manufacturing. Fisher does not claim regulatory coverage under 21 CFR nor maintain DMF's with the FDA. The following are the actual analytical results obtained:

Catalog Number	**A649**	**Quality Test / Release Date**	**9/20/2017**
Lot Number	**174327**		
Description	**AMMONIUM CHLORIDE, USP/FCC**		
Country of Origin	**United States**	*** Suggested Retest Date**	**Sep-2020**
Chemical Origin	**Inorganic**		
BSE/TSE Comment	No animal products are used as starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product.		

USP Grade

Result name	Units	Specifications	Test Value
APPEARANCE		REPORT	White crystalline powder
ASSAY	%	Inclusive Between 99.5 - 100.5	99.7
HEAVY METALS (as Pb)	%	<= 0.001	<0.0010
IDENTIFICATION (ALL LISTED)	PASS/FAIL	= PASS TEST	PASS TEST
IGNITION RESIDUE	%	<= 0.1	<0.01
LIMIT OF THIOCYANATE	PASS/FAIL	= PASS TEST	PASS TEST
LOSS ON DRYING	%	<= 0.5	0.03
PH OF A 5% SOLUTION		Inclusive Between 4.6 - 6.0	4.7
RESIDUAL SOLVENTS	Meets Requirements	= MEETS REQUIREMENTS	MEETS REQUIREMENTS

FCC Grade

Result name	Units	Specifications	Test Value
APPEARANCE		REPORT	White crystalline powder
ASSAY	%	>= 99.0	99.7
IDENTIFICATION (ALL LISTED)	PASS/FAIL	= PASS TEST	PASS TEST
LEAD (Pb)	MG/KG	<= 4	<4.0
LOSS ON DRYING PER FCC	%	<= 0.5	0.03

Residual Solvents	No Class 1, Class 2, or Class 3 solvents are used in the manufacturing, processing, or subsequent handling of this product.



Teresa Bailey-Wyche

Quality Assurance Specialist - Certificate of Analysis Fair Lawn

Note: The data listed is valid for all package sizes of this lot of this product, expressed as a extension of this catalog number listed above. If there are any questions with this certificate, please call Chemical Services at (800) 227-6701.
*Based on suggested storage condition.

ERA A Waters Company J002956

Certified Reference Material

▪ Certificate of Analysis ▪

Product: 1000 mg/L Ammonia as N
Catalog Number: 045-125mL, 985-500mL
Lot No. 091120m
Starting Material: Ammonium Chloride (NH_4Cl)
Matrix: 18 megohm deionized water
Density: 0.9997 ± 0.0016 g/ml at 19.2 °C and 756 mm Hg
Verification Method: Ion Selective Electrode (ISE)
Certificate Issue Date: November 5, 2020
Expiration Date: November 3, 2022
Revision Number: Original

CERTIFICATION

Parameter	Certified Value[1]	Uncertainty[2]	NIST Traceability	
	mg/L	%	SRM Number[3]	Recovery %
Ammonia as N (NH_3-N)	1000	1.43	194a	99.5

16341 Table Mountain Pkwy ▪ Golden, CO 80403 ▪ 800.372.0122 ▪ 303.431.8454 ▪ fax 303.421.0159 ▪ www.eraqc.com

ERA
A Waters Company

Certified Reference Material

▪ Certificate of Analysis ▪

Product:	1000 mg/L Ammonia as N
Catalog Number:	045-125mL, 985-500mL
Lot No.	591021m
Starting Material:	Ammonium Chloride (NH_4Cl)
Matrix:	18 megohm deionized water
Density:	0.9998 ± 0.0003 g/mL 22.3 °C and 747 mm Hg
Verification Method:	Ion Selective Electrode (ISE)
Certificate Issue Date:	November 23, 2021
Expiration Date:	October 29, 2023
Revision Number:	Original

CERTIFICATION

Parameter	Certified Value[1]	Uncertainty[2]	NIST Traceability	
	mg/L	%	SRM Number[3]	Recovery %
Ammonia as N (NH_3-N)	1000	0.827	194a	99.8

16341 Table Mountain Pkwy ▪ Golden, CO 80403 ▪ 800.372.0122 ▪ 303.431.8454 ▪ fax 303.421.0159 ▪ www.eraqc.com

▪ Certificate of Analysis ▪

1. The **Certified Value** is the actual gravimetric/volumetric "made-to" concentration confirmed by ERA analytical verification. The certified value is monitored and the purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

2. The **Uncertainty** represents an expanded uncertainty and approximates a 95% confidence interval. The uncertainty is based on the characterization, homogeneity and stability characteristics of the product, multiplied by a coverage factor (k=2). The uncertainty applies to the product as supplied and does not take into account any required or optional dilution and/or preparations the laboratory may perform while using this product. The formula used to calculate the expanded uncertainty is:
$U_{expanded} = k * SQRT((U_{char}^2) + (U_{homogen}^2) + (U_{LTS}^2) + (U_{STS}^2) + (U_{RSS}^2))$

Where:

$U_{expanded}$ = Expanded uncertainty.
k = Coverage factor.
U_{char} = Combined standard uncertainty of the manufacturing and/or analytical verification assessment.
$U_{homogen}$ = Standard uncertainty of the homogeneity assessment.
U_{LTS} = Standard uncertainty associated with long-term stability.
U_{STS} = Standard uncertainty associated with short-term (transport) stability.
U_{RSS} = Standard uncertainty associated with repeated sampling of the product (where permitted by product use instructions).

3. Where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed. **Analytical Traceability Recovery (%)** = [(% recovery ERA certified reference material)/(% recovery NIST SRM)]*100
The traceability data shown were compiled by analyzing this ERA certified reference material and/or it's associated stock solution(s) against the applicable NIST SRMs.

4. **Metrological Traceability.** This certified reference material is metrologically traceable to NIST mass reference materials through an unbroken chain of comparisons.

5. **Storage:** 20-25°C

6. **Intended Use:** This standard is intended to be used to calibrate your analytical process and/or as a quality control check of the entire process for the analytes/matrix included in the standard.

7. **Minimum Sample Size:** ERA suggests that when subsampling this product prior to analysis, you use a minimum sample size of at least 1 mL. Using a smaller sample size may invalidate the assigned value and/or uncertainty shown.

8. **Repeat Sampling:** Repeated Sampling of this product is permitted, provided minimum sample sizes and storage instructions are adhered to.

9. **Safety:** ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Safety Data Sheets (SDS) for all ERA products are available through our website: www.eraqc.com

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or send an email to info@eraqc.com.

Certifying Officer
Brian Miller

Brian Miller

Quality Officer
Matthew Seebeck

ISO 17034:2016
ACCREDITED
Reference Material Producer
CERT #1539.03

ISO/IEC 17025:2017
ACCREDITED
Chemical Testing Laboratory
CERT #1539.01

16341 Table Mountain Pkwy ▪ Golden, CO 80403 ▪ 800.372.0122 ▪ 303.431.8454 ▪ fax 303.421.0159 ▪ www.eraqc.com

PREPARATION BATCH SUMMARY

ASTM D2216

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0566 Batch Matrix: Solid
Preparation: No Prep-Organics

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-08C:0-1	23C0619-03		03/22/23 05:59	
SED-09C:0-1	23C0619-05		03/22/23 05:59	
SED-09C:1-3	23C0619-06		03/22/23 05:59	
SED-12C:0-1	23C0619-07		03/22/23 05:59	
SED-26C:0-1	23C0619-08		03/22/23 05:59	
SED-25C:0-1	23C0619-10		03/22/23 05:59	
SED-10C:0-1	23C0619-12		03/22/23 05:59	
SED-10C:1-3	23C0619-13		03/22/23 05:59	
SED-11C:0-1	23C0619-14		03/22/23 05:59	
SED-11C:1-3	23C0619-15		03/22/23 05:59	

HOLDING TIME SUMMARY

Analysis: ASTM D2216

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-08C:0-1 23C0619-03	03/22/23 08:07	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-09C:0-1 23C0619-05	03/22/23 08:33	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-09C:1-3 23C0619-06	03/22/23 08:33	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-12C:0-1 23C0619-07	03/22/23 09:25	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-26C:0-1 23C0619-08	03/22/23 10:38	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-25C:0-1 23C0619-10	03/22/23 11:19	03/24/23 16:25	03/22/23 05:59	-1	28	04/01/23 08:31	10	28	
SED-10C:0-1 23C0619-12	03/23/23 08:17	03/24/23 16:25	03/22/23 05:59	-2	28	04/01/23 08:31	9	28	
SED-10C:1-3 23C0619-13	03/23/23 08:17	03/24/23 16:25	03/22/23 05:59	-2	28	04/01/23 08:31	9	28	
SED-11C:0-1 23C0619-14	03/23/23 08:42	03/24/23 16:25	03/22/23 05:59	-2	28	04/01/23 08:31	9	28	
SED-11C:1-3 23C0619-15	03/23/23 08:42	03/24/23 16:25	03/22/23 05:59	-2	28	04/01/23 08:31	9	28	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

ASTM D2216

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids		0.01	%

Form I
INORGANIC ANALYSIS DATA SHEET
PSEP 1986

SED-27G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23C0619-16 B	SDG:	23C0619
Sampled:	03/23/23 10:17	Prepared:	03/29/23 09:54	File ID:	
% Solids:	64.47	Preparation:	No Prep Wet Chem	Analyzed:	03/29/23 09:55
Batch:	BLC0769	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids, Sulfide	63.22	1	0.04	0.04	

PREPARATION BATCH SUMMARY

PSEP 1986

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0769 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-27G:0-10	23C0619-16		03/29/23 09:54	
Blank	BLC0769-BLK1		03/29/23 09:54	

TOTAL SOLIDS/VOLATILE SOLIDS (TS / TVS) BENCHSHEET for Solid samples **TSPR**

Method: PSEP 1986, SM2540, EPA 160.1

(dry at 104 (12-24 hr) then combust at 550 (30 min))

Batch:	BLC0769
Date:	3/29/2023 9:55
Analyst:	UW

Instrumentation				
Drying Ovens:	12	**Analytical Balance:**	BAL2	
Muffle Furnace:	2			

Batch drying time				**Oven Temps, °C**	
record times as mm/dd/yy hh:mm		TS (%) calculated as:		Start Temp	106
date/time in oven:	3/29/2023 11:11	Final dry wt (g) = (Dry Wt - Tare Wt)		Dry Cycle 1	104
date/time out:	3/30/2023 8:40	TS = (Final Dry Wt)/ (grams Sample-Tare)		Dry Cycle 2	
elapsed hrs =	21.5	OK		Dry Cycle 3	

TVS (mg/kg dry wt) calculated as:
Final ash wt (g) = (min ash wt - tare wt)
TVS (mg/kg) = [(Dry wt-Ash wt)/ (dry weight)] *1,000,000
if ash wt > dry wt, "Chk for Err"
if dry wt-ash wt < 0.001 g, "< (1/dry wt)*1,000,000

Balance Calibration Check

Record weights to 4 places										
Cal Weight ID:	CV-02	CV-02	CV-02	CV-02	CV-02		CV-02	CV-02	CV-02	
Date & Time:	3/29/23 10:15	3/29/23 11:08	3/30/23 9:20							
Cal Wt (g):	10.0000	10.0000	10.0000	10.0000						
		Cal OK!	Cal OK!	Cal OK!						

Sample ID	**Dish #**	**Tare Wt. (g)**	**Dish & Sample (g)**	**Dry Wt 104C (grams) 1**	**2**	**3**	**dry Wt (g)**	**TS (%)**	**Notes**	**ASH WT 550C (grams) 1**	**2**	**3**	**Ash Wt (g)**	**TVS (mg/kg)**	**(%)**	**Notes**
BLC0769-BLK1	44	0.7929	0.0000	0.7928			-0.0001	0.01%								
23C0618-09	45	0.7889	8.1061	4.6055			3.8166	52.16%								
BLC0769-DUP1	46	0.7923	6.9510	4.0273			3.2350	52.53%	RPD=0.7							
23C0619-16	47	0.7997	8.1241	5.4300			4.6303	63.22%								

TOTAL SOLIDS BENCHSHEET

Method: PSEP 1986

(dry at 103-105 C)

Instrumentation

Batch:	BLC0685
Date:	3/27/2023 9:23
Analyst:	YL
Drying Oven:	15
Analytical Balance:	B46462614

Batch drying time					
Record times as mm/dd/yy hh:mm			**Oven Temp, C**	**TS (%) calculated as:**	**Oven Temps, °C**
Date/time in oven:	3/27/2023 13:15		104	Final dry wt (g) = (Dry Wt - Tare Wt)	Start Temp: 104
Date/time out:	3/28/2023 9:34		100	TS = (Final Dry Wt X 100)/ (sample & dish -dish tare)	End Temp: 100
Elapsed hrs:	20.3				

SAMPLE ID	Dish Tare Wt (g)	Dish with Sample (g)	Dry Wt (g)	Solids Wt (g)	TS (%)	Sample Decanted
23C0618-01	0.8400	11.4700	8.1700	7.33	**68.96%**	No
23C0618-03	0.8100	11.4700	6.9500	6.14	**57.60%**	Yes
23C0618-04	0.8300	12.5800	7.9700	7.14	**60.77%**	Yes
23C0618-11	0.7900	11.4313	8.1900	7.40	**69.54%**	Yes
23C0618-12	0.8200	12.8900	8.0800	7.26	**60.15%**	Yes
23C0618-13	0.8100	11.9500	8.4500	7.64	**68.58%**	No
23C0619-01	0.7800	12.1600	10.3500	9.57	**84.09%**	No
23C0619-02	0.8200	11.9200	9.2700	8.45	**76.13%**	Yes
23C0619-03	0.8200	11.9000	8.6000	7.78	**70.22%**	No
23C0619-04	0.8200	12.0200	9.1300	8.31	**74.20%**	Yes
23C0619-05	0.8200	11.9200	8.6600	7.84	**70.63%**	No
23C0619-06	0.8200	11.2200	8.8700	8.05	**77.40%**	Yes
23C0619-08	0.7900	12.7600	8.3100	7.52	**62.82%**	Yes
23C0619-09	0.7800	12.2500	9.7100	8.93	**77.86%**	Yes
23C0619-10	0.7800	11.8600	9.3200	8.54	**77.08%**	No
23C0619-11	0.8400	12.0000	9.8100	8.97	**80.38%**	No
23C0619-12	0.8100	12.7700	10.3400	9.53	**79.68%**	No
23C0619-13	0.7900	11.6400	9.5800	8.79	**81.01%**	No

TOTAL SOLIDS BENCHSHEET

Method: PSEP 1986

(dry at 103-105 C)

Batch:	BLC0685
Date:	3/27/2023 9:23
Analyst:	VL
Drying Oven:	#15
Analytical Balance:	B146462614

Instrumentation

Batch drying time

Record times as mm/dd/yy hh:mm

			Oven Temp, C
Date/time in oven:	03/27/23	13.15	104
Date/time out:	03/28/23	09:34	101
Elapsed hrs:	0.0		

TS (%) calculated as:

Final dry wt (g) = (Dry Wt - Tare Wt)

TS = (Final Dry Wt X 100)/ (sample & dish -dish tare)

Oven Temps, °C	
Start Temp:	104
End Temp:	100

SAMPLE ID	Dish Tare Wt (g)	Dish with Sample (g)	Dry Wt (g)	Solids Wt (g)	TS (%)	Sample Decanted
23C0618-01 B	0.84	11.47	8.17			No
23C0618-03 B	0.81	11.47	6.95			No yes
23C0618-04 B	0.83	12.58	7.97			No yes
23C0618-11 A	0.79	11.43	8.19			No yes
23C0618-12	0.82	12.39	8.08			No yes
23C0618-13	0.81	11.95	8.45			No
23C0619-01	0.78	12.16	10.35			No
23C0619-02	0.82	11.92	9.27			No yes
23C0619-03	0.82	11.90	8.60			No
23C0619-04	0.82	12.02	9.13			No yes
23C0619-05	0.82	11.92	8.66			No
23C0619-06	0.82	11.22	8.87			No yes
23C0619-08	0.79	12.76	8.31			No yes
23C0619-09	0.78	12.25	9.71			No yes
23C0619-10	0.78	11.86	9.32			No
23C0619-11	0.84	12.00	9.81			No
23C0619-12	0.81	12.77	10.34			No yes
23C0619-13 A	0.79	11.64	9.58			No

T/S only

no copies

Form I

METHOD BLANK DATA SHEET

PSEP 1986

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLC0769
Laboratory ID: BLC0769-BLK1
Prepared: 03/29/23 09:54
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 03/29/23 09:55
Sequence:
Calibration:
Instrument: BAL2

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids, Sulfide	ND	1	0.04	0.04	U

HOLDING TIME SUMMARY

Analysis: PSEP 1986

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-27G:0-10 23C0619-16	03/23/23 10:17	03/24/23 16:25	03/29/23 09:54	5	28	03/29/23 09:55	6	28	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

PSEP 1986

Laboratory: Analytical Resources, LLC
SDG: 23C0619
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids, Sulfide	0.04	0.04	%

Analytical Resources, LLC
Analytical Chemists and Consultants

18 July 2024

Michael Erdahl
Friedman & Bruya Inc.
5500 4th Ave S
Seattle, WA 98108

RE: Port of Friday Harbor (303373)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23E0148	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC



Susan Dunnihoo For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Cert# 100006-012

23E0148

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303373	D-221

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon										Notes
SED-07G:0-10		3/20/2023	1002	sediment	1	x										
SED-11G:0-10		3/20/2023	924	sediment	1	x										
SED-14G:0-10		3/20/2023	1011	sediment	1	x										
SED-15G:0-10		3/20/2023	1242	sediment	1	x										
SED-03G:0-10		3/20/2023	1315	sediment	1	x										
SED-01G:0-10		3/20/2023	1445	sediment	1	x										
SED-01C:0-1		3/20/2023	1151	sediment	1	x										
SED-05C:0-1		3/21/2023	1244	sediment	1	x										
SED-05G:0-10		3/21/2023	1310	sediment	1	x										
SED-03C:0-1		3/21/2023	1442	sediment	1	x										
SED-14C:0-1		3/21/2023	1553	sediment	1	x										
SED-14C:1-3		3/21/2023	1553	sediment	1	x										
SED-DUPC		3/21/2023	1200	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:		Matthew Daniels	ARCLC	5/5/23	1420
Relinquished by:					
Received by:					

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman and Bruya

Project Name: 303373

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 23E0148

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1420 — 3.6°C

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 30049208

Cooler Accepted by: MP Date: 05/05/23 Time: 1420

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: PIB Date: 5/5/23 Time: 14:49 Labels checked by: PIB

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303373	**Reported:**
Seattle, WA 98108	Project Manager: Michael Erdahl	07/18/2024 15:35

ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Sample ID	Matrix	Date Sampled	Date Received
23E0148-01	SED-07G:0-10	Solid	03/20/23 10:02	05/05/23 14:20
23E0148-02	SED-11G:0-10	Solid	03/20/23 09:24	05/05/23 14:20
23E0148-03	SED-14G:0-10	Solid	03/20/23 10:11	05/05/23 14:20
23E0148-04	SED-15G:0-10	Solid	03/20/23 12:42	05/05/23 14:20
23E0148-05	SED-03G:0-10	Solid	03/20/23 13:15	05/05/23 14:20
23E0148-06	SED-01G:0-10	Solid	03/20/23 14:45	05/05/23 14:20
23E0148-07	SED-01C:0-1	Solid	03/20/23 11:51	05/05/23 14:20
23E0148-08	SED-05C:0-1	Solid	03/21/23 12:44	05/05/23 14:20
23E0148-09	SED-05G:0-10	Solid	03/21/23 13:10	05/05/23 14:20
23E0148-10	SED-03C:0-1	Solid	03/21/23 14:42	05/05/23 14:20
23E0148-11	SED-14C:0-1	Solid	03/21/23 15:53	05/05/23 14:20
23E0148-12	SED-14C:1-3	Solid	03/21/23 15:53	05/05/23 14:20
23E0148-13	SED-DUPC	Solid	03/21/23 12:00	05/05/23 14:20

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303373	**Reported:**
Seattle WA, 98108	Project Manager: Michael Erdahl	18-Jul-2024 15:35

Case Narrative

Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Work Order: 23E0148

Sample receipt

Samples as listed on the preceding page(s) were pulled from frozen archive at Friedman & Bruya and logged under ARI work order 23E0148. For details regarding sample receipt, please refer to the original Cooler Receipt Forms.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times for samples stored frozen.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

In batch BLE0200, one sample was run in triplicate. reported as the original sample, DUP1 and DUP2. The relative percent difference (RPD) were outside advisory control limits. The matrix spike (MS) percent recovery was out of control low. The matrix spike duplicate (MSD) percent recovery was within advisory control limits. The MS/MSD RPD was outside advisory limits. Outliers are attributed to a non-homogeneous sample.

QUALIFIERS AND NOTES

Qualifier	Definition
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-07G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-01 A	SDG:	23E0148
Sampled:	03/20/23 10:02	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-013
% Solids:	73.61	Preparation:	No Prep Wet Chem	Analyzed:	05/06/23 21:19
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.2853 g Wet / 0.2853 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.37	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-11G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-02 A	SDG:	23E0148
Sampled:	03/20/23 09:24	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-025
% Solids:	72.27	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 03:23
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5952 g Wet / 0.5952 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.26	1	0.02	0.02	

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Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-14G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-03 A	SDG:	23E0148
Sampled:	03/20/23 10:11	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-026
% Solids:	54.58	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 03:54
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.608 g Wet / 0.608 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.20	1	0.02	0.02	

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Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-15G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-04 A	SDG:	23E0148
Sampled:	03/20/23 12:42	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-029
% Solids:	61.15	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 05:25
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5388 g Wet / 0.5388 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.12	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-03G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-05 A	SDG:	23E0148
Sampled:	03/20/23 13:15	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-030
% Solids:	45.94	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 05:56
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.6576 g Wet / 0.6576 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.39	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-01G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-06 A	SDG:	23E0148
Sampled:	03/20/23 14:45	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-031
% Solids:	53.25	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 06:26
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.6862 g Wet / 0.6862 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.85	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-01C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-07 A	SDG:	23E0148
Sampled:	03/20/23 11:51	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-032
% Solids:	55.22	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 06:56
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.6237 g Wet / 0.6237 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.72	1	0.02	0.02	

Analytical Resources, LLC
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Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-05C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-08 A	SDG:	23E0148
Sampled:	03/21/23 12:44	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-033
% Solids:	54.83	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 07:27
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.516 g Wet / 0.516 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.00	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-05G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-09 A	SDG:	23E0148
Sampled:	03/21/23 13:10	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-034
% Solids:	51.94	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 07:57
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5311 g Wet / 0.5311 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.12	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-03C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-10 A	SDG:	23E0148
Sampled:	03/21/23 14:42	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-035
% Solids:	55.48	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 08:28
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.533 g Wet / 0.533 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.52	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-14C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-11 A	SDG:	23E0148
Sampled:	03/21/23 15:53	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-036
% Solids:	68.13	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 08:58
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.544 g Wet / 0.544 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.74	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-14C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-12 A	SDG:	23E0148
Sampled:	03/21/23 15:53	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-037
% Solids:	67.96	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 09:28
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5084 g Wet / 0.5084 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.66	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-DUPC

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-13 A	SDG:	23E0148
Sampled:	03/21/23 12:00	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-038
% Solids:	65.16	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 09:59
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5245 g Wet / 0.5245 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.65	1	0.02	0.02	

PREPARATION BATCH SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC SDG: 23E0148

Client: Friedman & Bruya Inc. Project: Port of Friday Harbor

Batch: BLE0200 Batch Matrix: Solid Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-07G:0-10	23E0148-01	eData_05092023@1825-	05/06/23 12:06	
SED-11G:0-10	23E0148-02	eData_05092023@1825-	05/06/23 12:06	
SED-14G:0-10	23E0148-03	eData_05092023@1825-	05/06/23 12:06	
SED-15G:0-10	23E0148-04	eData_05092023@1825-	05/06/23 12:06	
SED-03G:0-10	23E0148-05	eData_05092023@1825-	05/06/23 12:06	
SED-01G:0-10	23E0148-06	eData_05092023@1825-	05/06/23 12:06	
SED-01C:0-1	23E0148-07	eData_05092023@1825-	05/06/23 12:06	
SED-05C:0-1	23E0148-08	eData_05092023@1825-	05/06/23 12:06	
SED-05G:0-10	23E0148-09	eData_05092023@1825-	05/06/23 12:06	
SED-03C:0-1	23E0148-10	eData_05092023@1825-	05/06/23 12:06	
SED-14C:0-1	23E0148-11	eData_05092023@1825-	05/06/23 12:06	
SED-14C:1-3	23E0148-12	eData_05092023@1825-	05/06/23 12:06	
SED-DUPC	23E0148-13	eData_05092023@1825-	05/06/23 12:06	
Blank	BLE0200-BLK1	eData_05092023@1825-	05/06/23 12:06	
LCS	BLE0200-BS1	eData_05092023@1825-	05/06/23 12:06	
SED-07G:0-10	BLE0200-DUP1	eData_05092023@1825-	05/06/23 12:06	
SED-07G:0-10	BLE0200-DUP2	eData_05092023@1825-	05/06/23 12:06	
MRL Check	BLE0200-MRL1	eData_05092023@1825-	05/06/23 12:06	
SED-07G:0-10	BLE0200-MS1	eData_05092023@1825-	05/06/23 12:06	
SED-07G:0-10	BLE0200-MSD1	eData_05092023@1825-	05/06/23 12:06	
Reference	BLE0200-SRM1	eData_05092023@1825-	05/06/23 12:06	

Form I

METHOD BLANK DATA SHEET

EPA 9060A m

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0200
Laboratory ID: BLE0200-BLK1
Prepared: 05/06/23 12:06
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/06/23 18:17
Sequence: SLE0117
Calibration: FD00070
Instrument: TOC Cube

CAS NO.	Analyte	Concentration (% wet)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	ND	1	0.02	0.02	U

LCS / LCS DUPLICATE RECOVERY

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0148
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/06/23 19:17
Batch:	BLE0200	Laboratory ID:	BLE0200-BS1
Preparation:	No Prep Wet Chem	Sequence Name:	LCS
Initial/Final:	0.0212 g / 0.0212 g		

COMPOUND	SPIKE ADDED (% wet)	LCS CONCENTRATION (% wet)	Q	LCS % REC. #	QC LIMITS REC.
Total Organic Carbon	44.4	44.3		99.6	80 - 120

* Indicates values outside of QC limits

SED-07G:0-10

DUPLICATES

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0200-DUP1
Batch: BLE0200
Lab Source ID: 23E0148-01
Preparation: No Prep Wet Chem
Initial/Final: 0.2913 g / 0.2913 g
Source Sample Name: SED-07G:0-10
% Solids: 73.61

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Organic Carbon	20	1.37	1.07	24.6	*

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

SED-07G:0-10

DUPLICATES

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0200-DUP2
Batch: BLE0200
Lab Source ID: 23E0148-01
Preparation: No Prep Wet Chem
Initial/Final: 0.2676 g / 0.2676 g
Source Sample Name: SED-07G:0-10
% Solids: 73.61

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Organic Carbon	20	1.37	1.06	25.0	*

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

MS / MS DUPLICATE RECOVERY
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0148
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/06/23 23:51
Batch:	BLE0200	Laboratory ID:	BLE0200-MS1
Preparation:	No Prep Wet Chem	Sequence Name:	Matrix Spike
Initial/Final:	0.1835 g / 0.1835 g	Source Sample:	SED-07G:0-10

COMPOUND	SPIKE ADDED (% dry)	SAMPLE CONCENTRATION (% dry)	Q	MS CONCENTRATION (% dry)	Q	MS % REC. #		QC LIMITS REC.
Total Organic Carbon	2.53	1.37		3.25	*	74.6	*	75 - 125

* Values outside of QC limits

MS / MS DUPLICATE RECOVERY
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0148
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/07/23 00:21
Batch:	BLE0200	Laboratory ID:	BLE0200-MSD1
Preparation:	No Prep Wet Chem	Sequence Name:	Matrix Spike Dup
Initial/Final:	0.2942 g / 0.2942 g	Source Sample:	SED-07G:0-10

COMPOUND	SPIKE ADDED (% dry)	MSD CONCENTRATION (% dry)	Q	MSD % REC. #	% RPD #		QC LIMITS RPD	QC LIMITS REC.
Total Organic Carbon	1.54	2.65	*	83.2	20.6	*	20	75 - 125

* Values outside of QC limits

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SKD0371
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Cal Standard	SKD0371-CAL1	CubeData_04272022@1136-001	NA	04/26/22 12:30
Cal Standard	SKD0371-CAL2	CubeData_04272022@1136-002	NA	04/26/22 13:00
Cal Standard	SKD0371-CAL3	CubeData_04272022@1136-003	NA	04/26/22 13:30
Cal Standard	SKD0371-CAL4	CubeData_04272022@1136-004	NA	04/26/22 14:00
Cal Standard	SKD0371-CAL5	CubeData_04272022@1136-005	NA	04/26/22 14:30
Cal Standard	SKD0371-CAL6	CubeData_04272022@1136-006	NA	04/26/22 15:00
Cal Standard	SKD0371-CAL7	CubeData_04272022@1136-007	NA	04/26/22 15:30
Cal Standard	SKD0371-CAL8	CubeData_04272022@1136-008	NA	04/26/22 16:00
Cal Standard	SKD0371-CAL9	CubeData_04272022@1136-009	NA	04/26/22 16:30
Cal Standard	SKD0371-CALA	CubeData_04272022@1136-010	NA	04/26/22 17:00
Cal Standard	SKD0371-CALB	CubeData_04272022@1136-011	NA	04/26/22 17:30
Cal Standard	SKD0371-CALC	CubeData_04272022@1136-012	NA	04/26/22 18:00
Cal Standard	SKD0371-CALD	CubeData_04272022@1136-013	NA	04/26/22 18:30
Cal Standard	SKD0371-CALE	CubeData_04272022@1136-014	NA	04/26/22 19:00
Cal Standard	SKD0371-CALF	CubeData_04272022@1136-015	NA	04/26/22 19:31
Cal Standard	SKD0371-CALG	CubeData_04272022@1136-016	NA	04/26/22 20:01
Cal Standard	SKD0371-CALH	CubeData_04272022@1136-017	NA	04/26/22 20:31
Cal Standard	SKD0371-CALI	CubeData_04272022@1136-018	NA	04/26/22 21:01
Cal Standard	SKD0371-CALJ	CubeData_04272022@1136-019	NA	04/26/22 21:31
Cal Standard	SKD0371-CALK	CubeData_04272022@1136-020	NA	04/26/22 22:01
Initial Cal Check	SKD0371-ICV1	CubeData_04272022@1136-027	NA	04/27/22 02:03
Initial Cal Blank	SKD0371-ICB1	CubeData_04272022@1136-028	NA	04/27/22 02:33
Cal Standard	SKD0371-CALL	CubeData_04272022@1136-021	NA	04/27/22 11:08
Cal Standard	SKD0371-CALM	CubeData_04272022@1136-022	NA	04/27/22 11:08
Cal Standard	SKD0371-CALN	CubeData_04272022@1136-023	NA	04/27/22 11:09
Cal Standard	SKD0371-CALO	CubeData_04272022@1136-024	NA	04/27/22 11:09

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLE0117
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Initial Cal Check	SLE0117-ICV1	CubeData_05092023@1825-003	NA	05/06/23 16:16
Initial Cal Blank	SLE0117-ICB1	CubeData_05092023@1825-004	NA	05/06/23 16:47
MRL Check	BLE0200-MRL1	CubeData_05092023@1825-005	Solid	05/06/23 17:17
Blank	BLE0200-BLK1	CubeData_05092023@1825-007	Solid	05/06/23 18:17
LCS	BLE0200-BS1	CubeData_05092023@1825-009	Solid	05/06/23 19:17
Reference	BLE0200-SRM1	CubeData_05092023@1825-011	Solid	05/06/23 20:18
SED-07G:0-10	23E0148-01	CubeData_05092023@1825-013	Solid	05/06/23 21:19
SED-07G:0-10	BLE0200-DUP1	CubeData_05092023@1825-014	Solid	05/06/23 21:49
Calibration Check	SLE0117-CCV1	CubeData_05092023@1825-015	NA	05/06/23 22:20
Calibration Blank	SLE0117-CCB1	CubeData_05092023@1825-016	NA	05/06/23 22:50
SED-07G:0-10	BLE0200-DUP2	CubeData_05092023@1825-017	Solid	05/06/23 23:20
SED-07G:0-10	BLE0200-MS1	CubeData_05092023@1825-018	Solid	05/06/23 23:51
SED-07G:0-10	BLE0200-MSD1	CubeData_05092023@1825-019	Solid	05/07/23 00:21
SED-11G:0-10	23E0148-02	CubeData_05092023@1825-025	Solid	05/07/23 03:23
SED-14G:0-10	23E0148-03	CubeData_05092023@1825-026	Solid	05/07/23 03:54
Calibration Check	SLE0117-CCV2	CubeData_05092023@1825-027	NA	05/07/23 04:24
Calibration Blank	SLE0117-CCB2	CubeData_05092023@1825-028	NA	05/07/23 04:55
SED-15G:0-10	23E0148-04	CubeData_05092023@1825-029	Solid	05/07/23 05:25
SED-03G:0-10	23E0148-05	CubeData_05092023@1825-030	Solid	05/07/23 05:56
SED-01G:0-10	23E0148-06	CubeData_05092023@1825-031	Solid	05/07/23 06:26
SED-01C:0-1	23E0148-07	CubeData_05092023@1825-032	Solid	05/07/23 06:56
SED-05C:0-1	23E0148-08	CubeData_05092023@1825-033	Solid	05/07/23 07:27
SED-05G:0-10	23E0148-09	CubeData_05092023@1825-034	Solid	05/07/23 07:57
SED-03C:0-1	23E0148-10	CubeData_05092023@1825-035	Solid	05/07/23 08:28
SED-14C:0-1	23E0148-11	CubeData_05092023@1825-036	Solid	05/07/23 08:58
SED-14C:1-3	23E0148-12	CubeData_05092023@1825-037	Solid	05/07/23 09:28
SED-DUPC	23E0148-13	CubeData_05092023@1825-038	Solid	05/07/23 09:59
Calibration Check	SLE0117-CCV3	CubeData_05092023@1825-039	NA	05/07/23 10:29
Calibration Blank	SLE0117-CCB3	CubeData_05092023@1825-040	NA	05/07/23 11:00

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

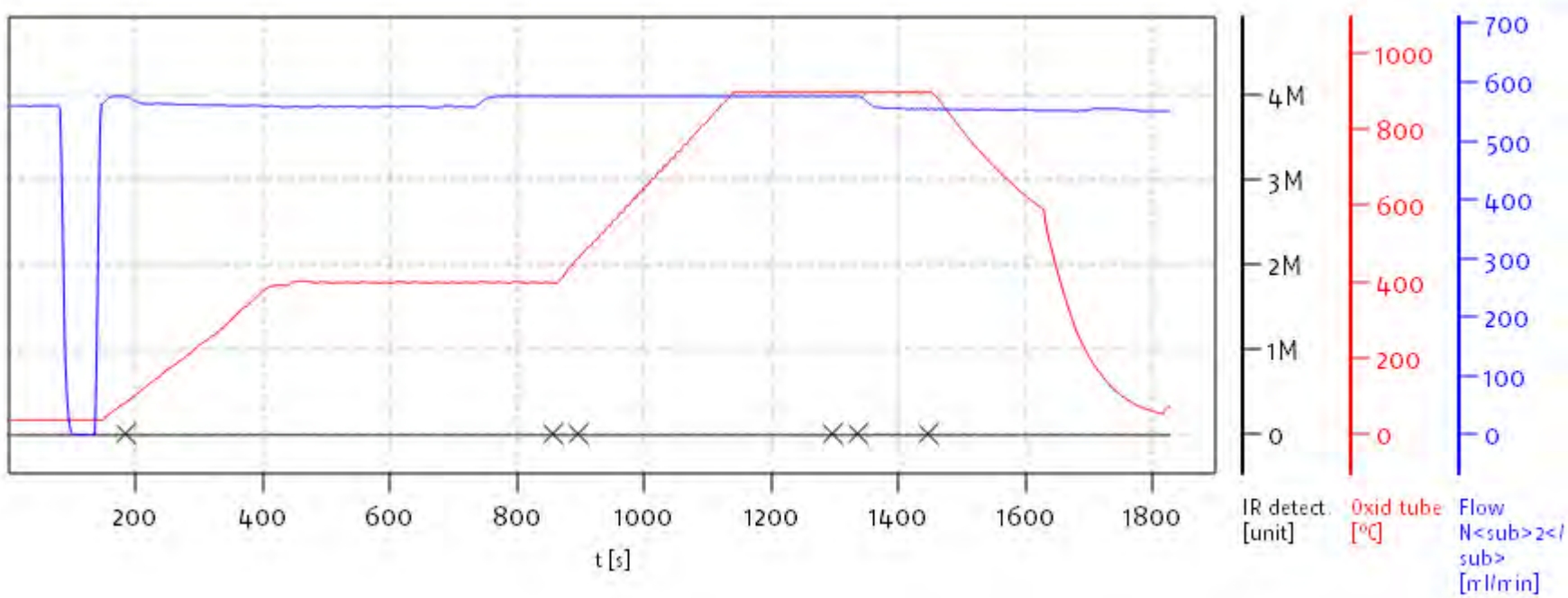
Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLE0117
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Calibration Check	SLE0117-CCV4	CubeData_05092023@1825-050	NA	05/07/23 16:34
Calibration Blank	SLE0117-CCB4	CubeData_05092023@1825-051	NA	05/07/23 17:05
Calibration Check	SLE0117-CCV5	CubeData_05092023@1825-062	NA	05/07/23 22:38
Calibration Blank	SLE0117-CCB5	CubeData_05092023@1825-063	NA	05/07/23 23:09
Calibration Check	SLE0117-CCV6	CubeData_05092023@1825-073	NA	05/08/23 04:13
Calibration Blank	SLE0117-CCB6	CubeData_05092023@1825-074	NA	05/08/23 04:43

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		CARBON	5/6/2023 2:45 PM	bl	0.000	12 258	0.000	0.000	3 247	4 370	0.000	0.000	1.0000	1.0000



Name:

Access: soliTOC superuser

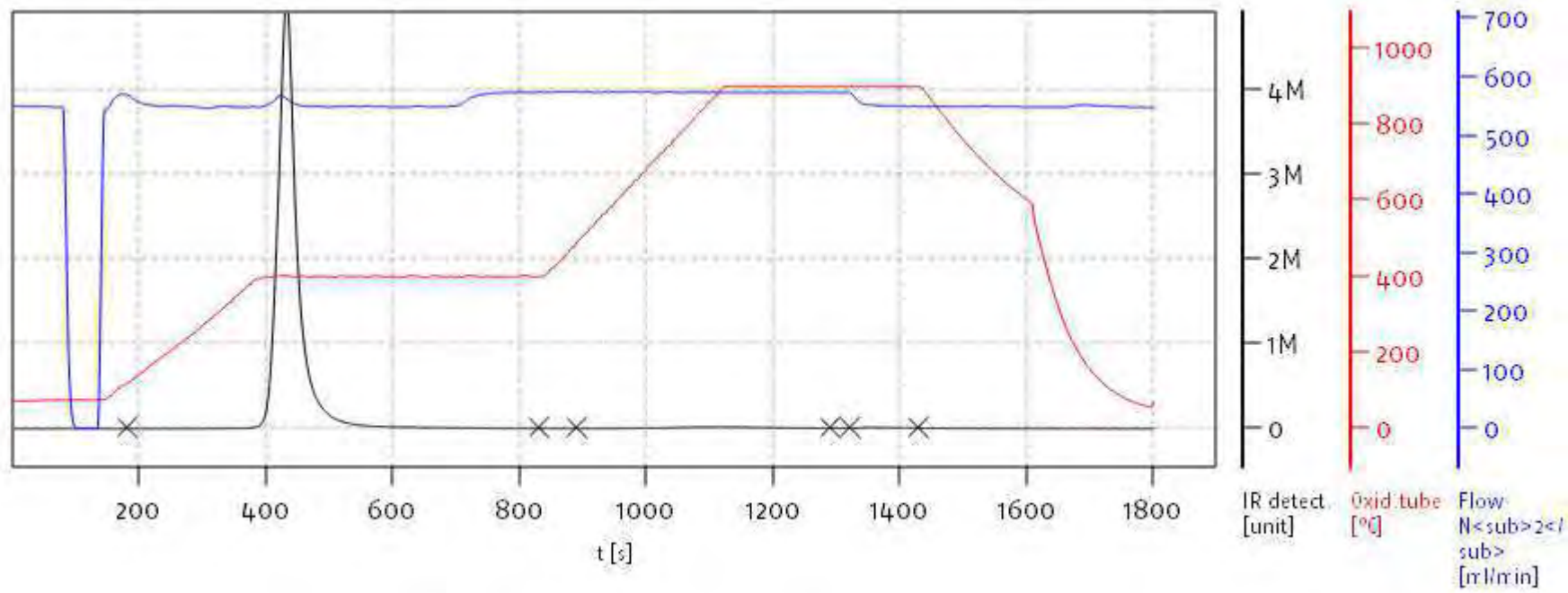
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
2	2	Dfactor	22.80		CARBON	5/6/2023 3:15 PM	bl	44.530	6 800 200	45.312	0.085	38 981	141 651	44.446	0.782	0.9664	1.0000



Name:

Access: soliTOC superuser

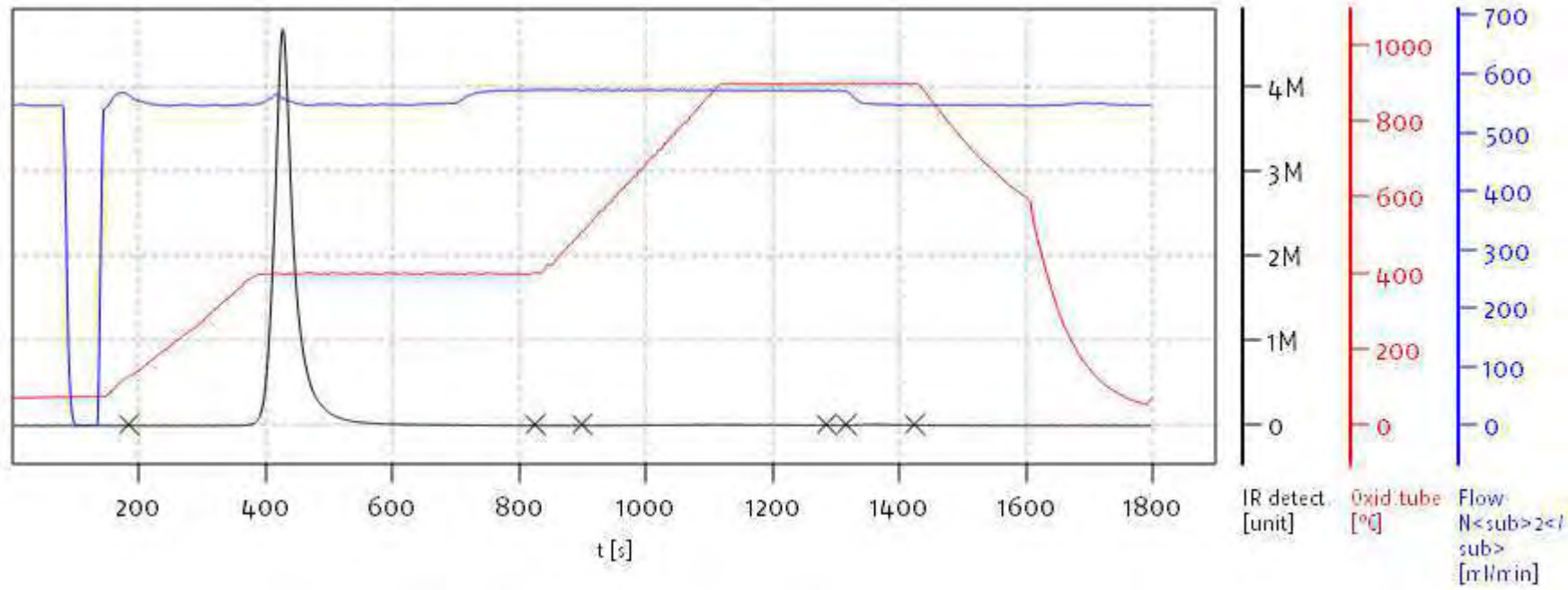
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
3	3	Dfactor	22.40		CARBON	5/6/2023 3:46 PM	bl	44.534	6 602 640	45.064	0.089	39 349	103 249	44.446	0.530	0.9780	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

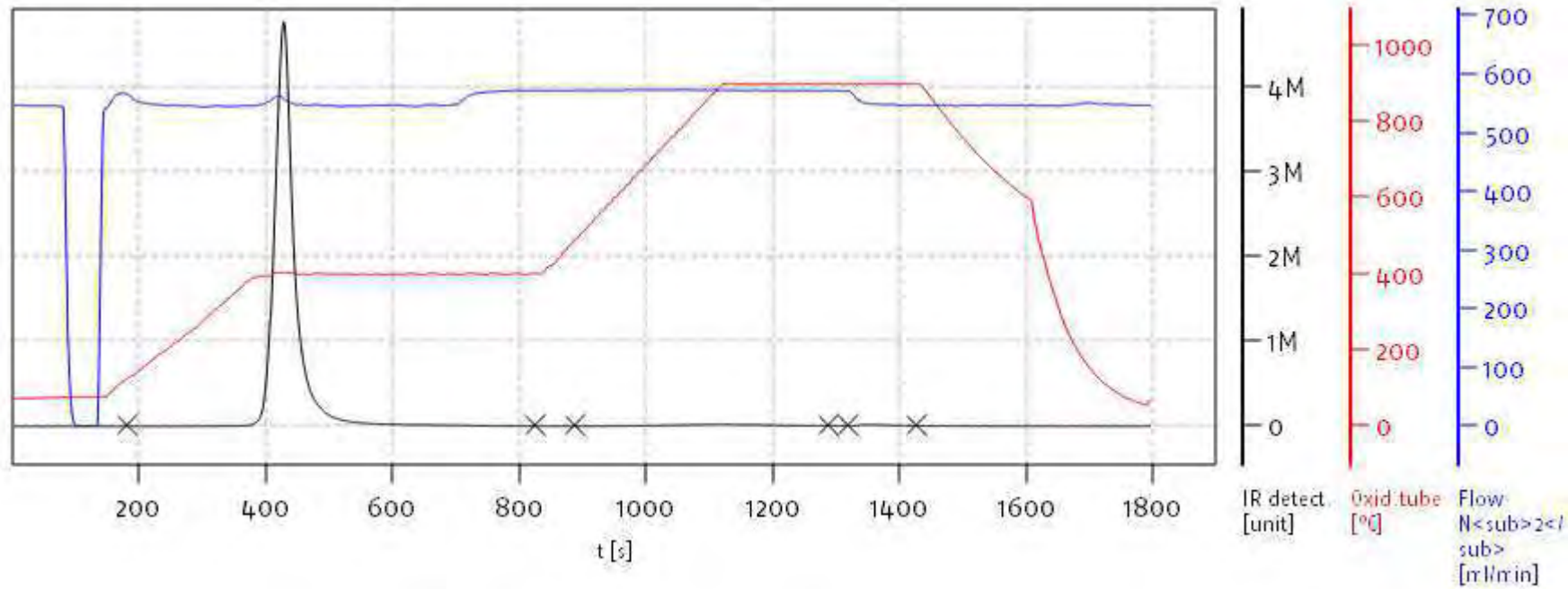
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
4	4	SLE0117-ICV1	22.60		CARBON	5/6/2023 4:16 PM	bl	43.663	6 561 740	44.606	0.144	47 553	164 093	43.519	0.942	0.9722	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

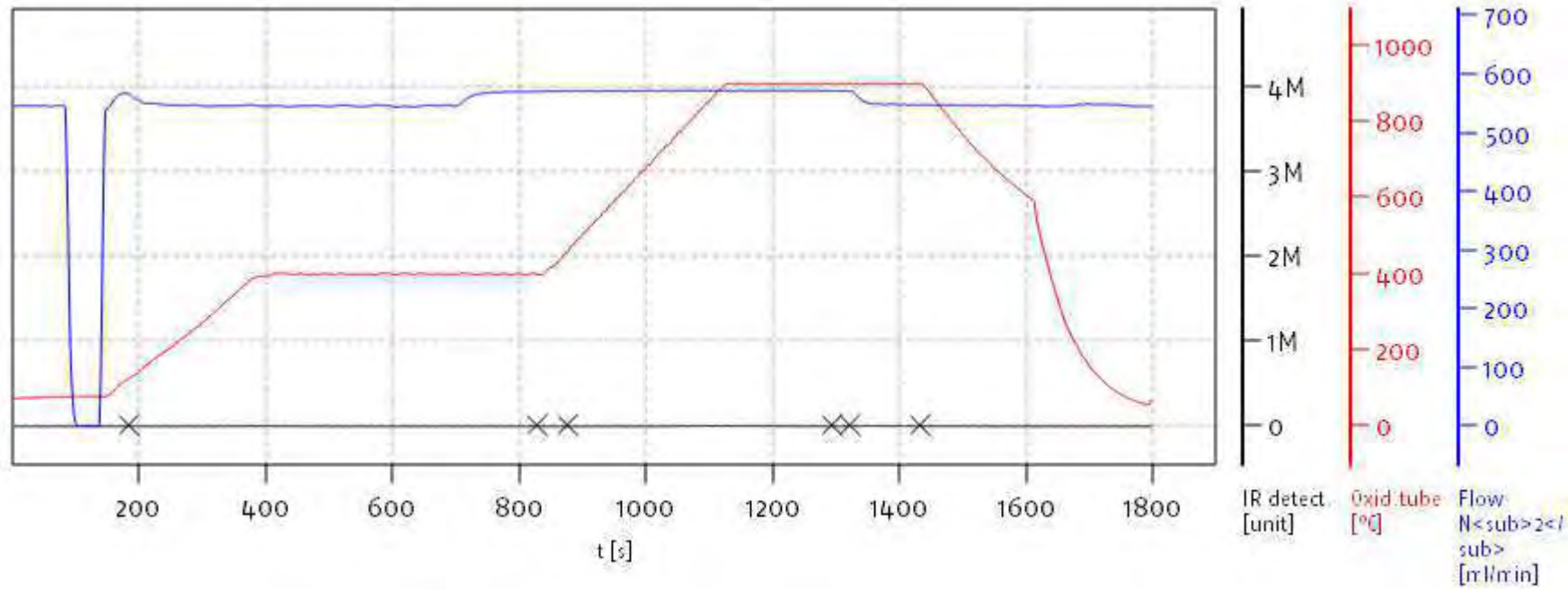
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
5	5	SLE0117-ICB1	524.90		CARBON	5/6/2023 4:47 PM	bl	0.000	10 594	0.001	0.000	12 025	29 347	0.000	0.001	0.9722	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

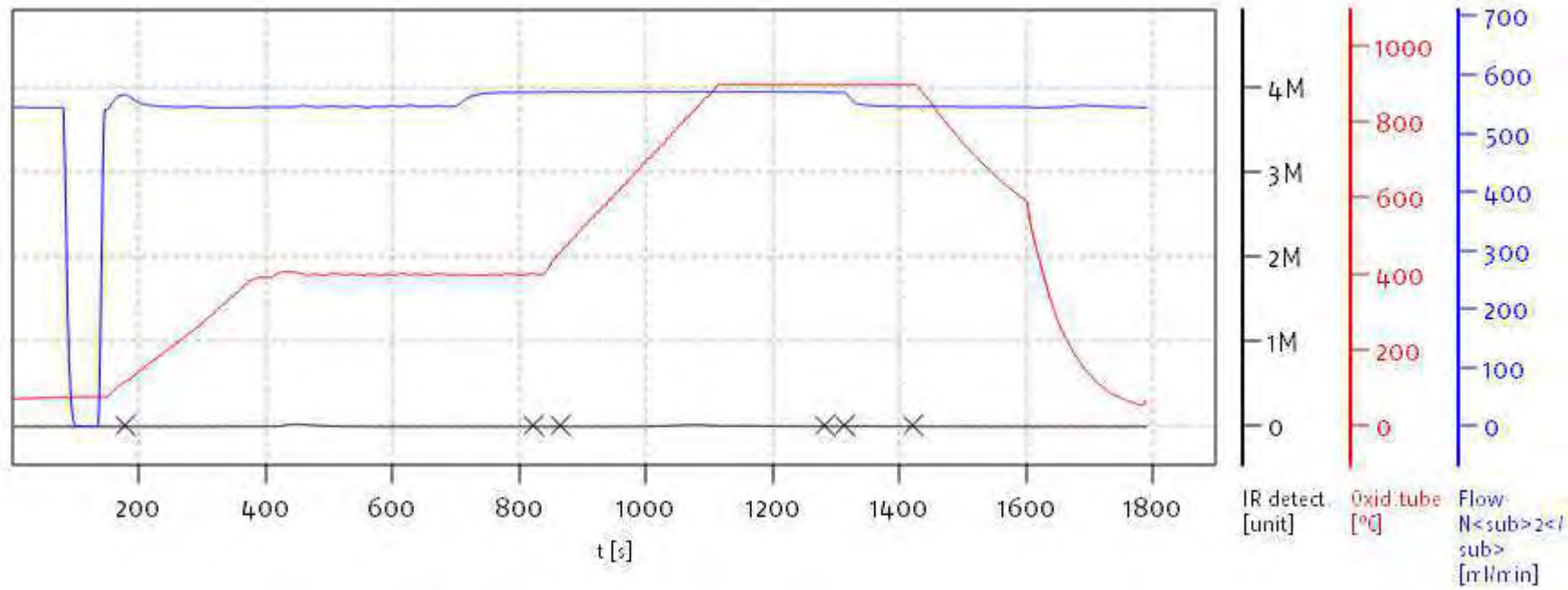
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
6	6	BLE0200-MRL1	524.10		CARBON	5/6/2023 5:17 PM	bl	0.014	74 661	0.034	0.000	12 743	93 689	0.014	0.020	0.9722	1.0000



Name:

Access: soliTOC superuser

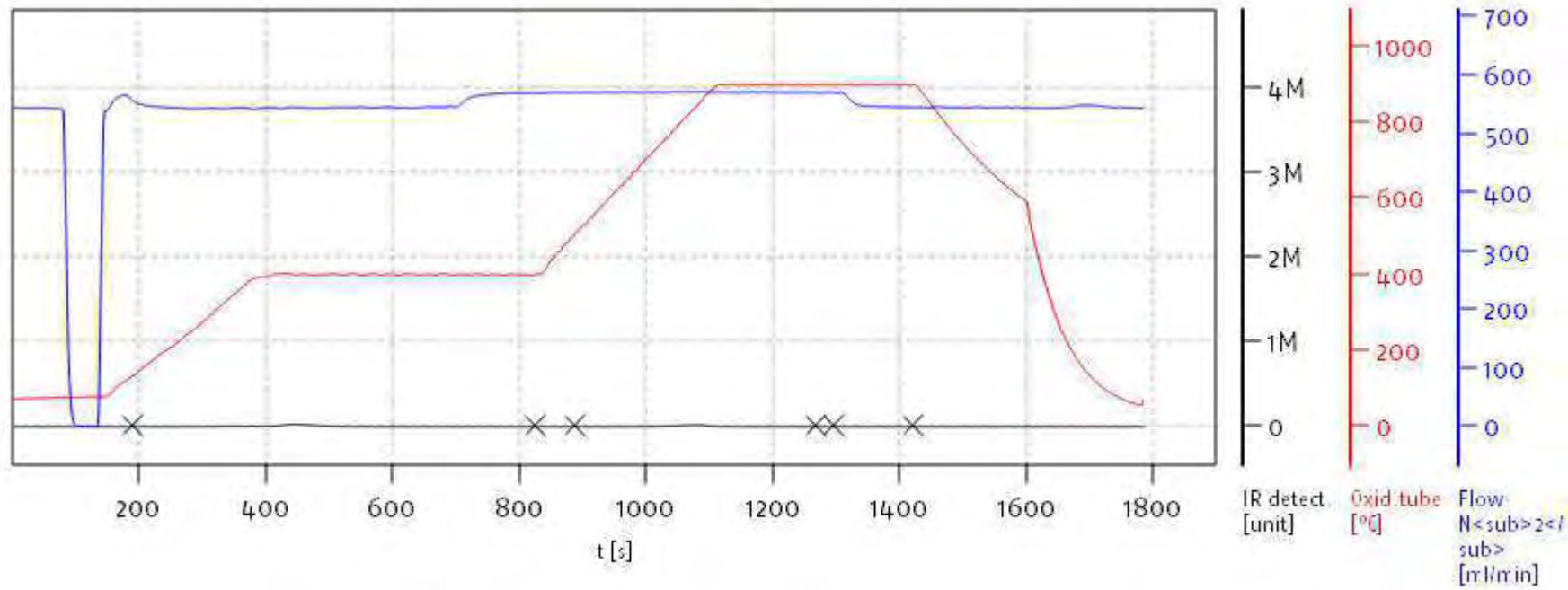
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

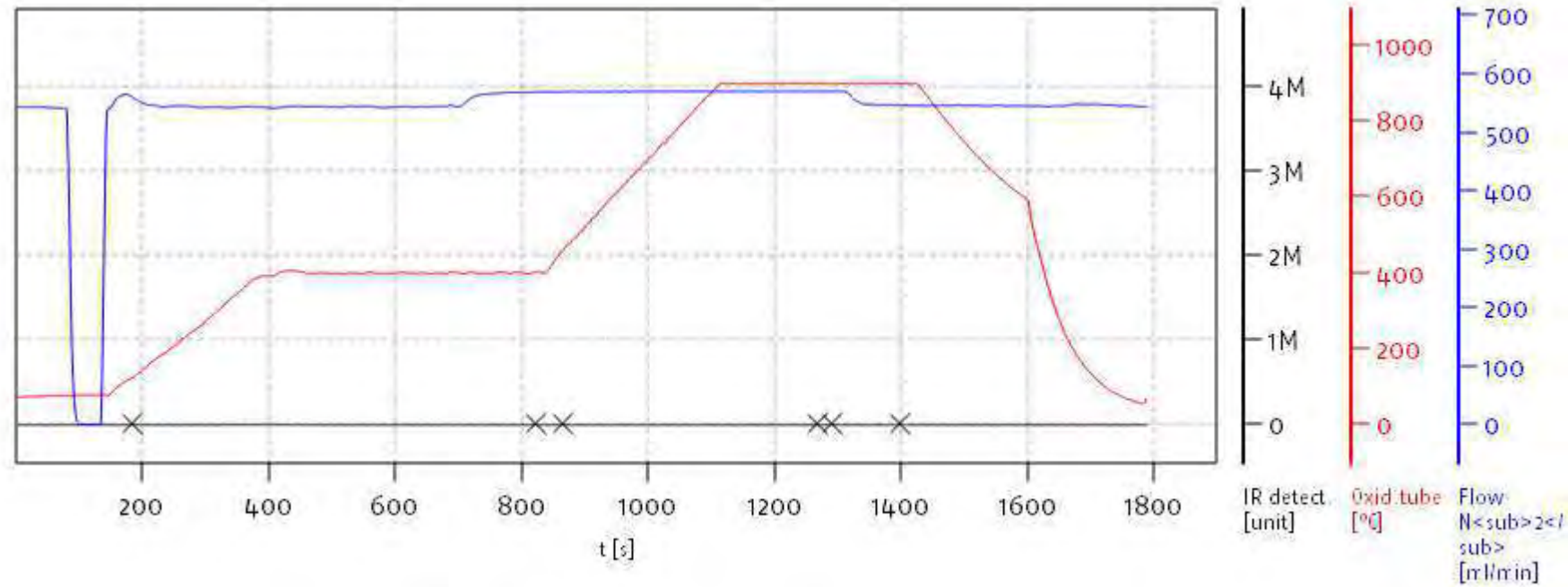
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
7	7	BLE0201-MRL1	543.30		CARBON	5/6/2023 5:47 PM	bl,C2u	0.014	78 359	0.019	0.000	967	43 353	0.014	0.005	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
8	8	BLE0200-BLK1	562.90		CARBON	5/6/2023 6:17 PM	bl,C3u,C2u	0.000	8 729	0.000	0.000	1 028	1 149	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

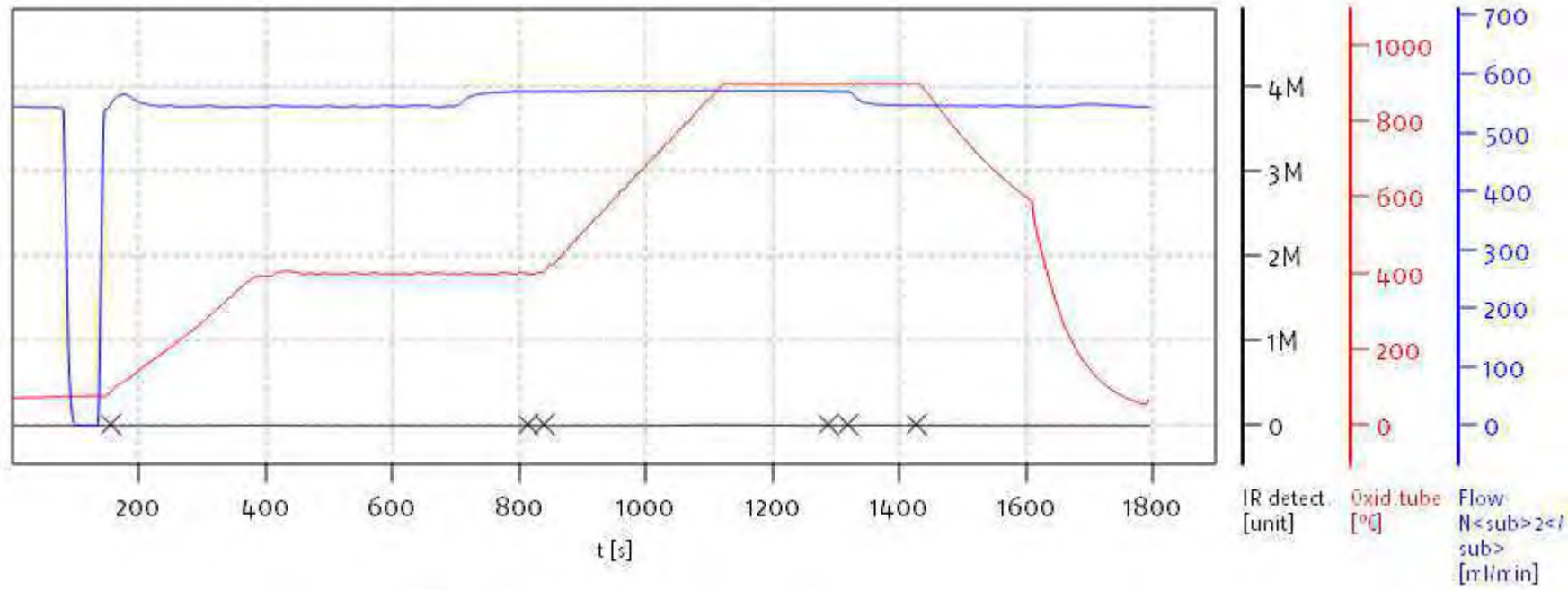
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
9	9	BLE0201-BLK1	550.40		CARBON	5/6/2023 6:47 PM	bl	0.000	22 024	0.010	0.000	19 854	61 208	0.000	0.010	0.9722	1.0000



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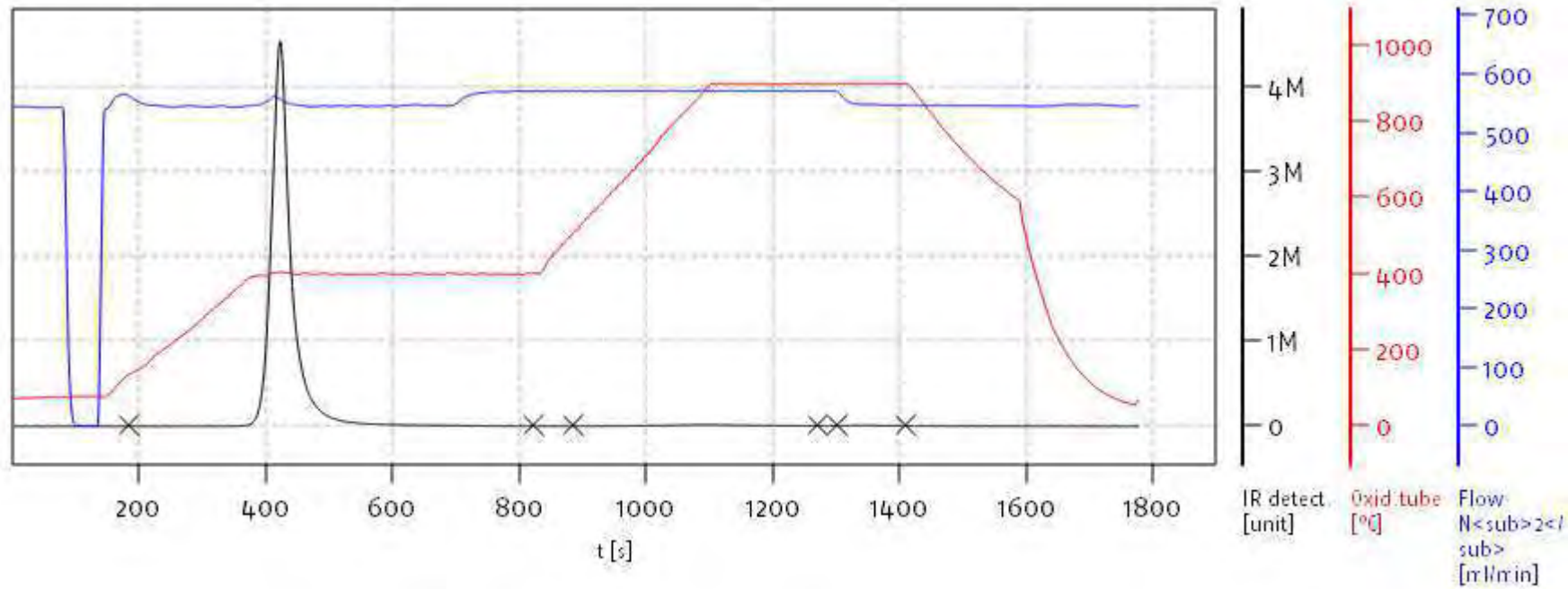
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
10	10	BLE0200-BS1	21.20		CARBON	5/6/2023 7:17 PM	bl	44.286	6 259 360	44.994	0.039	31 930	123 467	44.247	0.708	0.9722	1.0000



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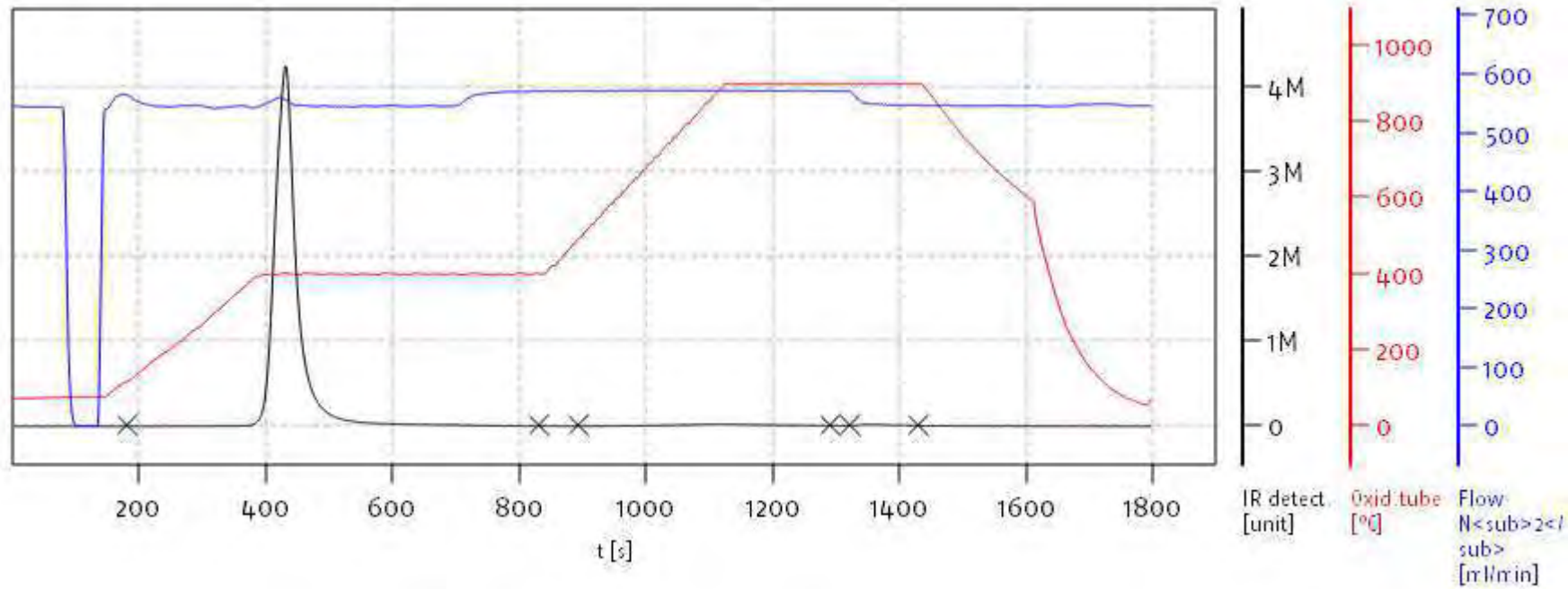
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
11	11	BLE0201-BS1	22.40		CARBON	5/6/2023 7:48 PM	bl	43.541	6 474 990	44.674	0.216	57 813	190 372	43.325	1.132	0.9722	1.0000



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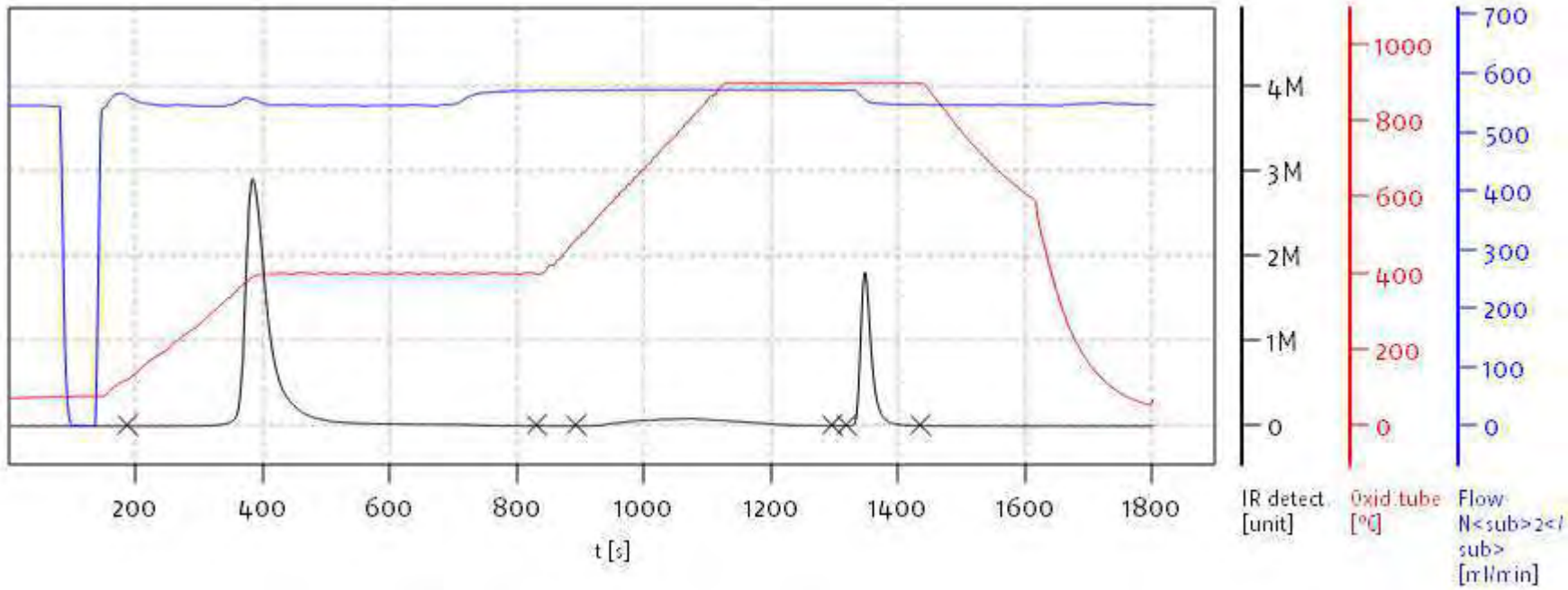
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Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
12	12	BLE0200-SRM1	310.20		CARBON	5/6/2023 8:18 PM	bl	2.994	4 819 070	3.310	0.668	1 365 840	661 114	2.325	0.317	0.9722	1.0000



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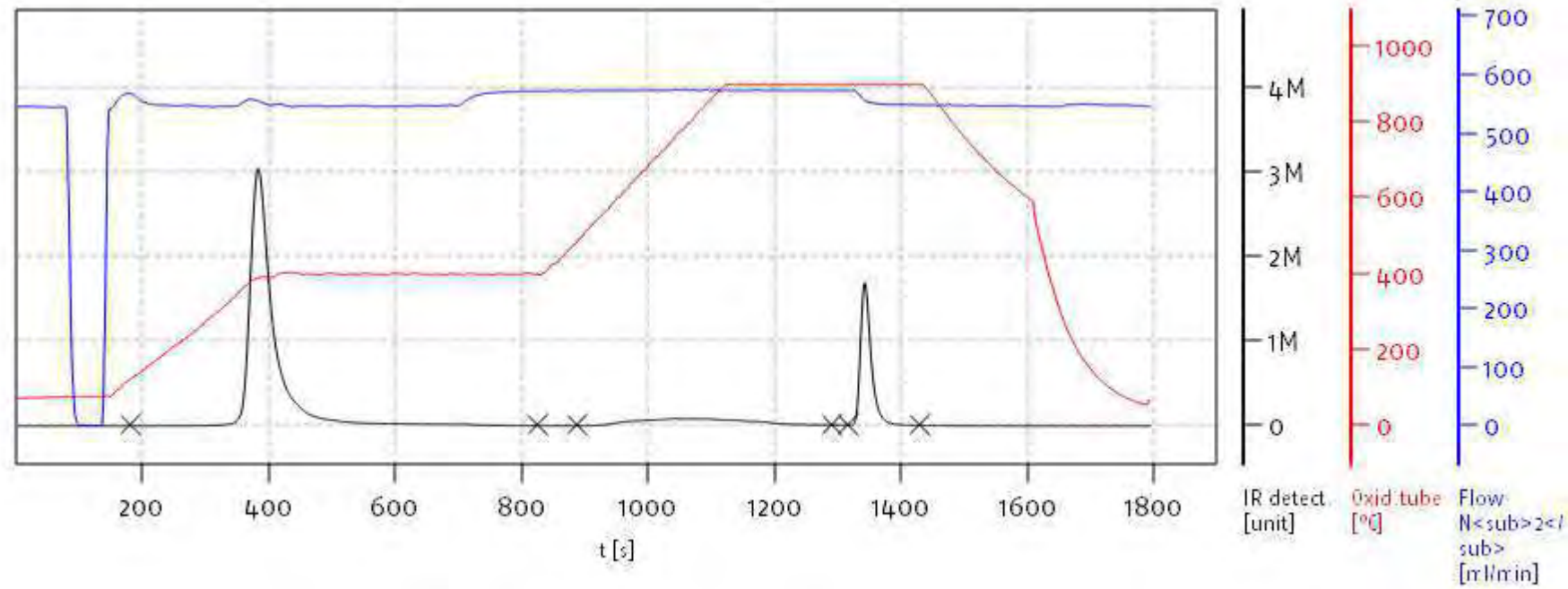
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
13	13	BLE0201-SRM1	310.50		CARBON	5/6/2023 8:49 PM	bl	2.983	4 908 180	3.328	0.616	1 263 010	718 756	2.366	0.345	0.9722	1.0000



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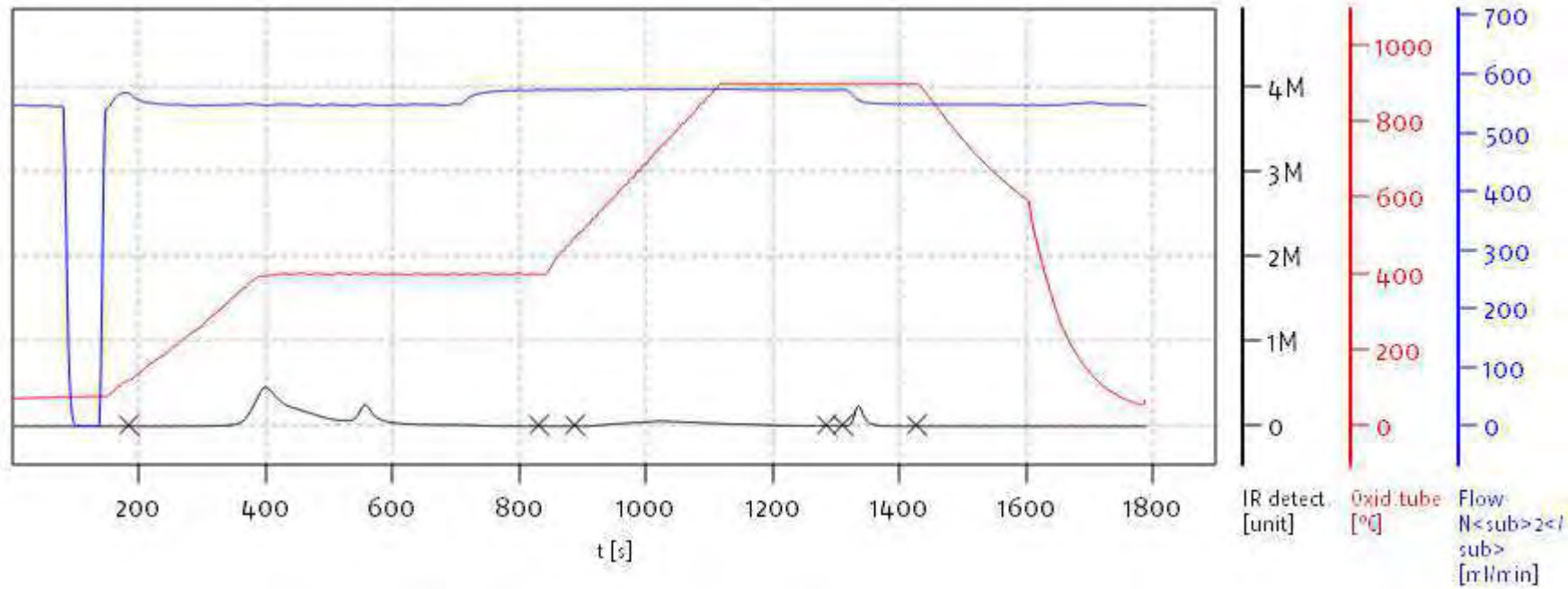
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
14	14	23E0148-01	285.30		CARBON	5/6/2023 9:19 PM	bl	1.005	1 784 560	1.210	0.077	168 929	405 785	0.927	0.206	0.9722	1.0000



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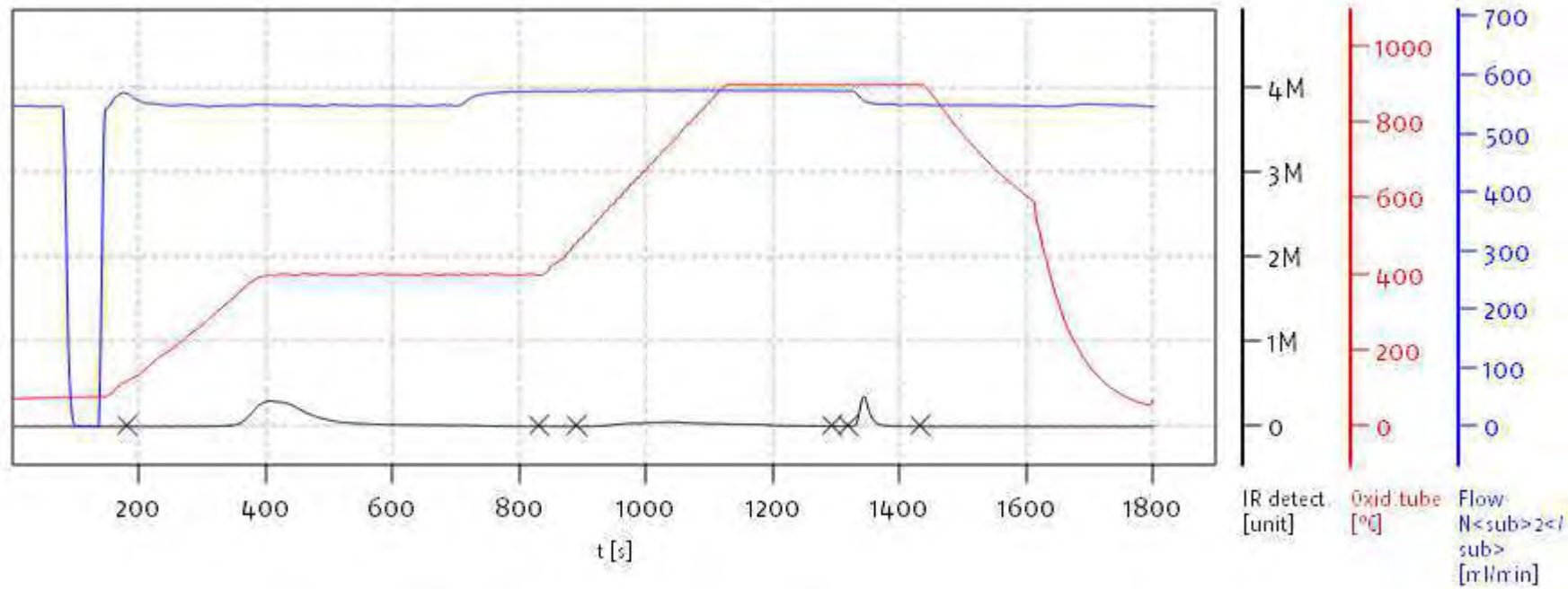
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
15	15	BLE0200-DUP1	291.30		CARBON	5/6/2023 9:49 PM	bl	0.785	1 318 750	0.977	0.117	246 587	387 873	0.668	0.192	0.9722	1.0000



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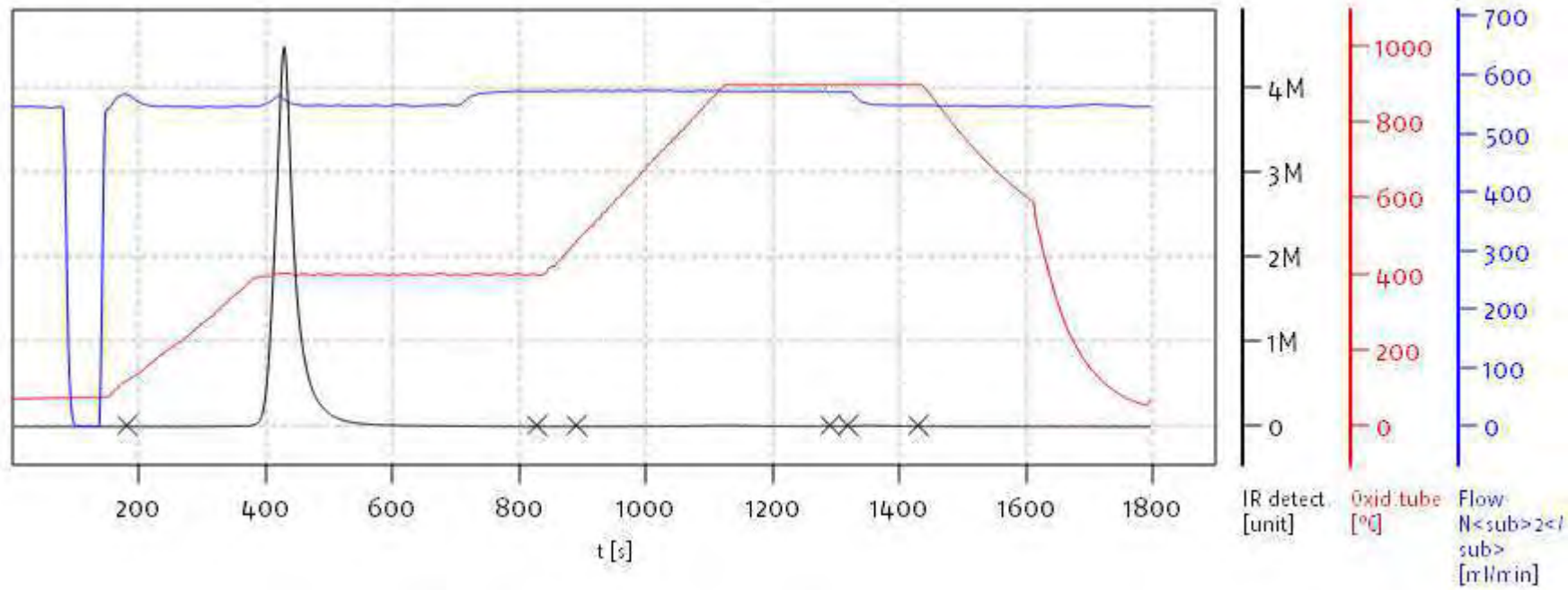
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
16	16	SLE0117-CCV1	21.00		CARBON	5/6/2023 10:20 PM	bl	44.801	6 274 040	45.243	0.028	30 290	86 446	44.773	0.442	0.9722	1.0000



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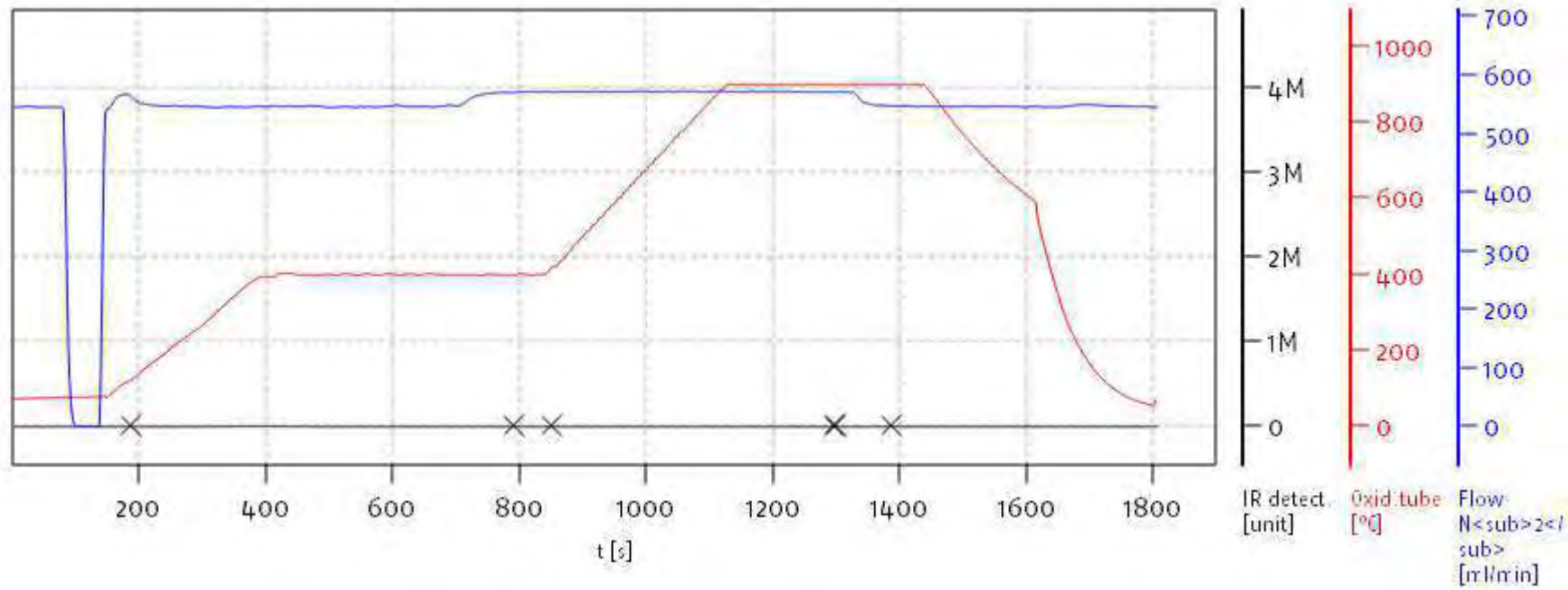
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elementar
EXCELLENCE IN ELEMENTS

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
17	17	SLE0117-CCB1	501.90		CARBON	5/6/2023 10:50 PM	bl,C3u,C2u	0.000	17 046	0.000	0.000	625	257	0.000	0.000	0.9722	1.0000



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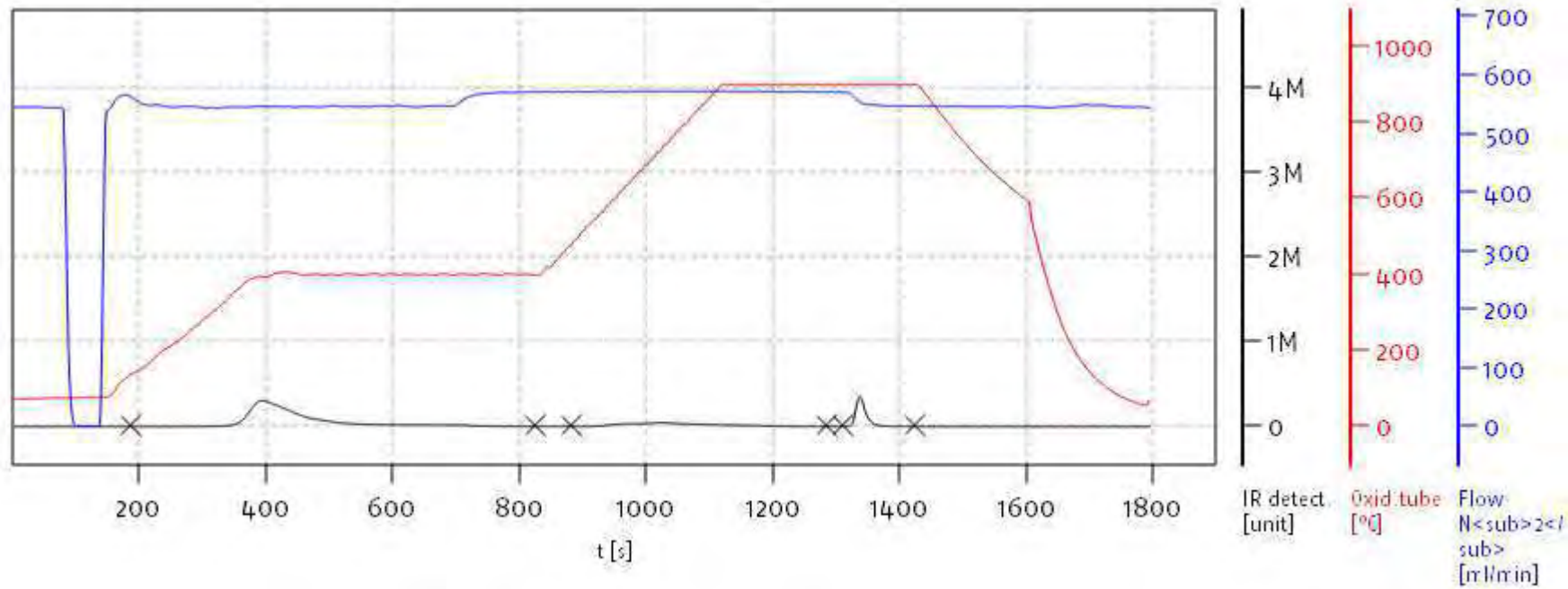
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
18	18	BLE0200-DUP2	267.60		CARBON	5/6/2023 11:20 PM	bl	0.782	1 190 600	0.928	0.127	246 593	278 516	0.655	0.146	0.9722	1.0000



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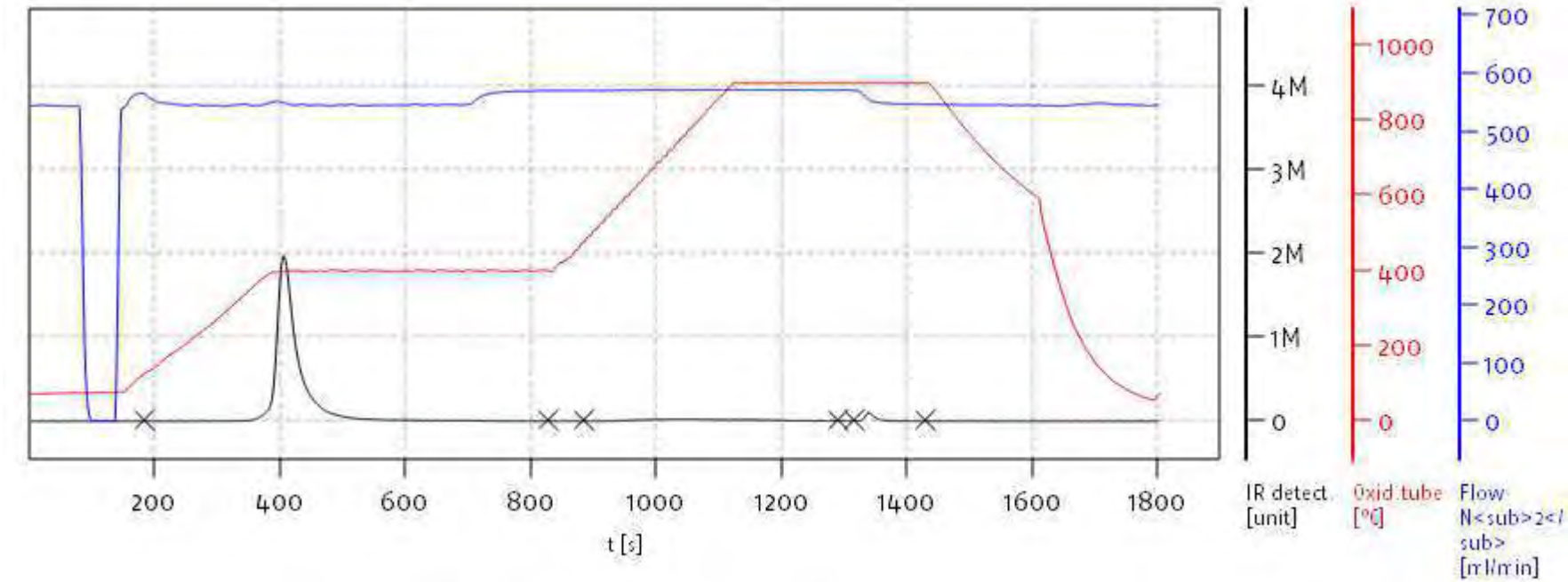
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EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
19	19	BLE0200-MS1	183.50	0.0077	CARBON	5/6/2023 11:51 PM	bl	2.396	2 896 250	2.537	0.042	76 403	193 907	2.354	0.141	0.9722	1.0000



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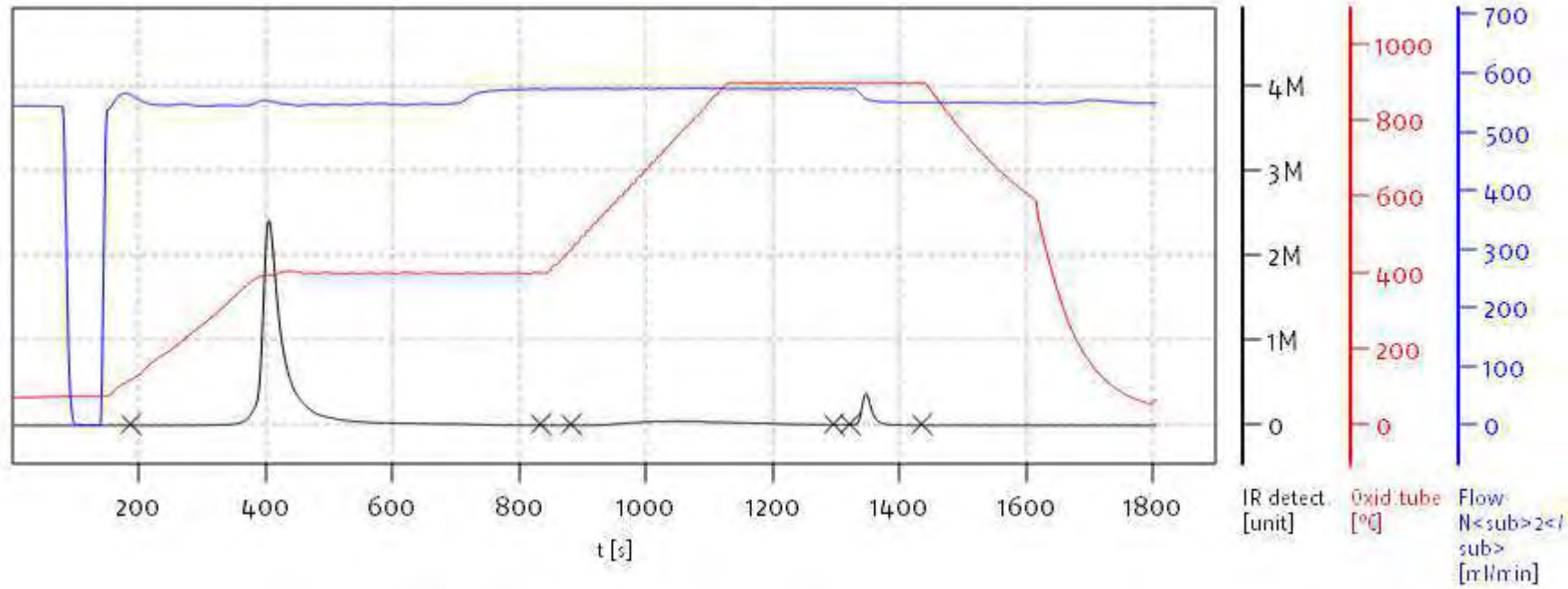
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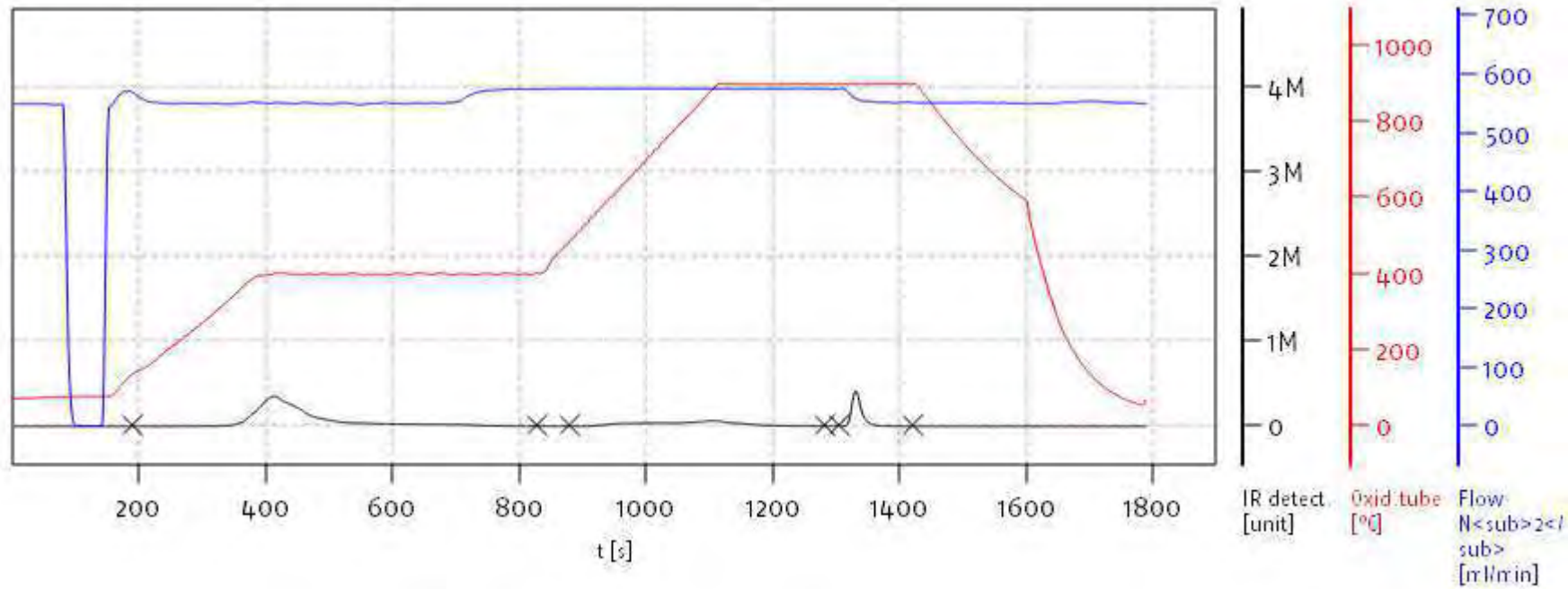
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
20	20	BLE0200-MSD1	294.20	0.0075	CARBON	5/7/2023 12:21 AM	bl	1.948	3 587 200	2.150	0.126	266 242	411 825	1.821	0.203	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
21	21	23E0152-08	266.50		CARBON	5/7/2023 12:51 AM	bl	0.894	1 346 000	1.114	0.149	283 072	404 515	0.745	0.220	0.9722	1.0000



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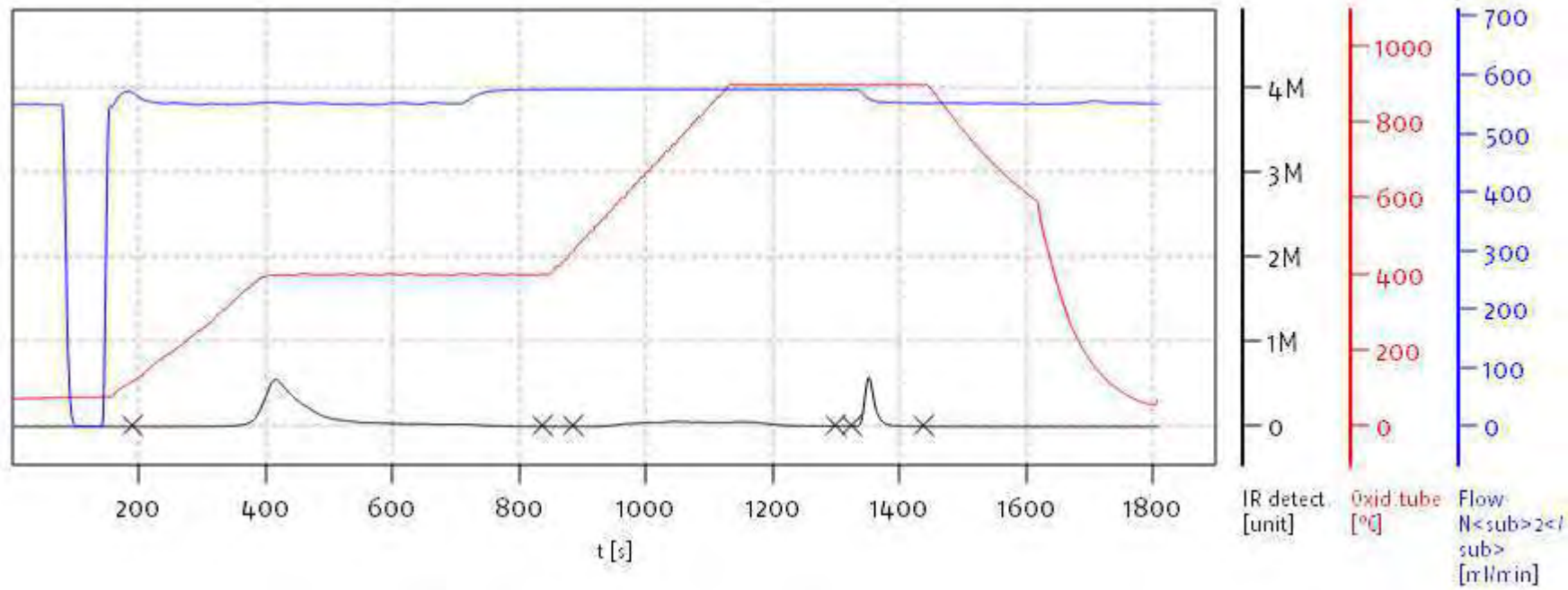
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
22	22	BLE0201-DUP1	351.70		CARBON	5/7/2023 1:22 AM	bl	0.919	1 784 460	1.129	0.167	406 343	501 954	0.752	0.209	0.9722	1.0000



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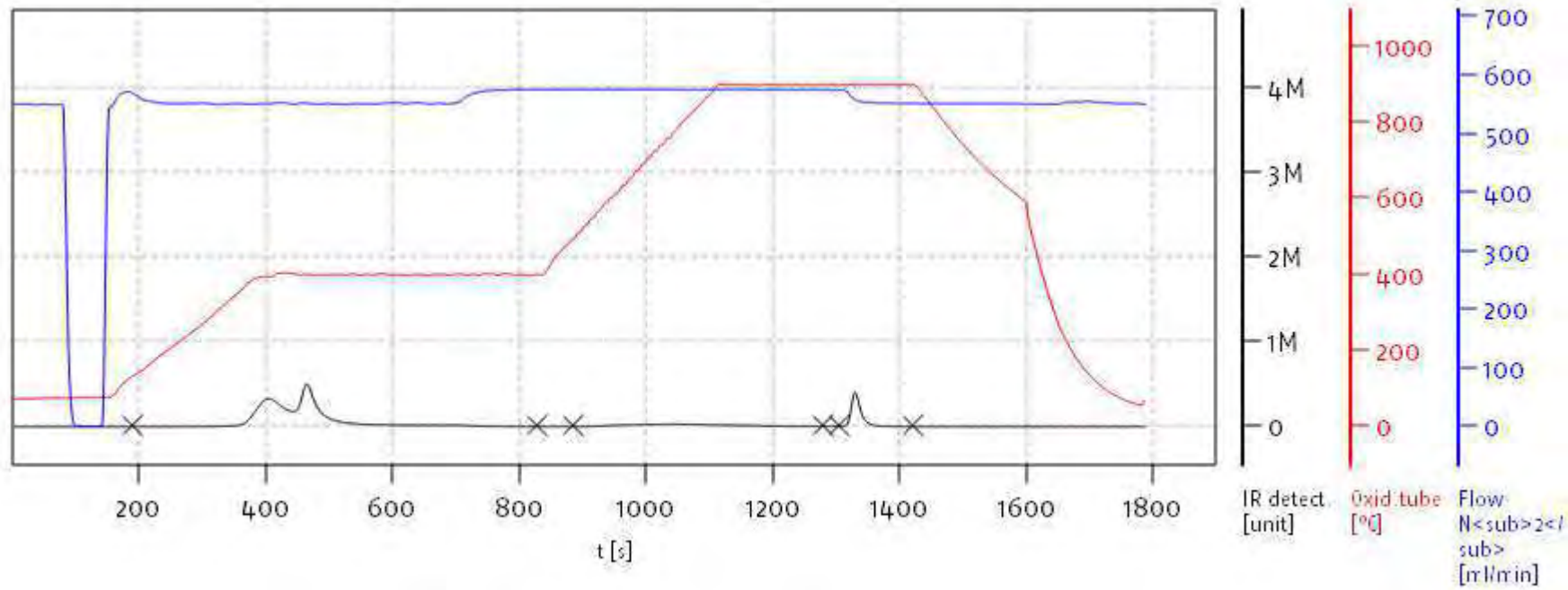
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
23	23	BLE0201-DUP2	202.90		CARBON	5/7/2023 1:52 AM	bl	1.271	1 489 950	1.421	0.186	270 172	222 226	1.085	0.149	0.9722	1.0000



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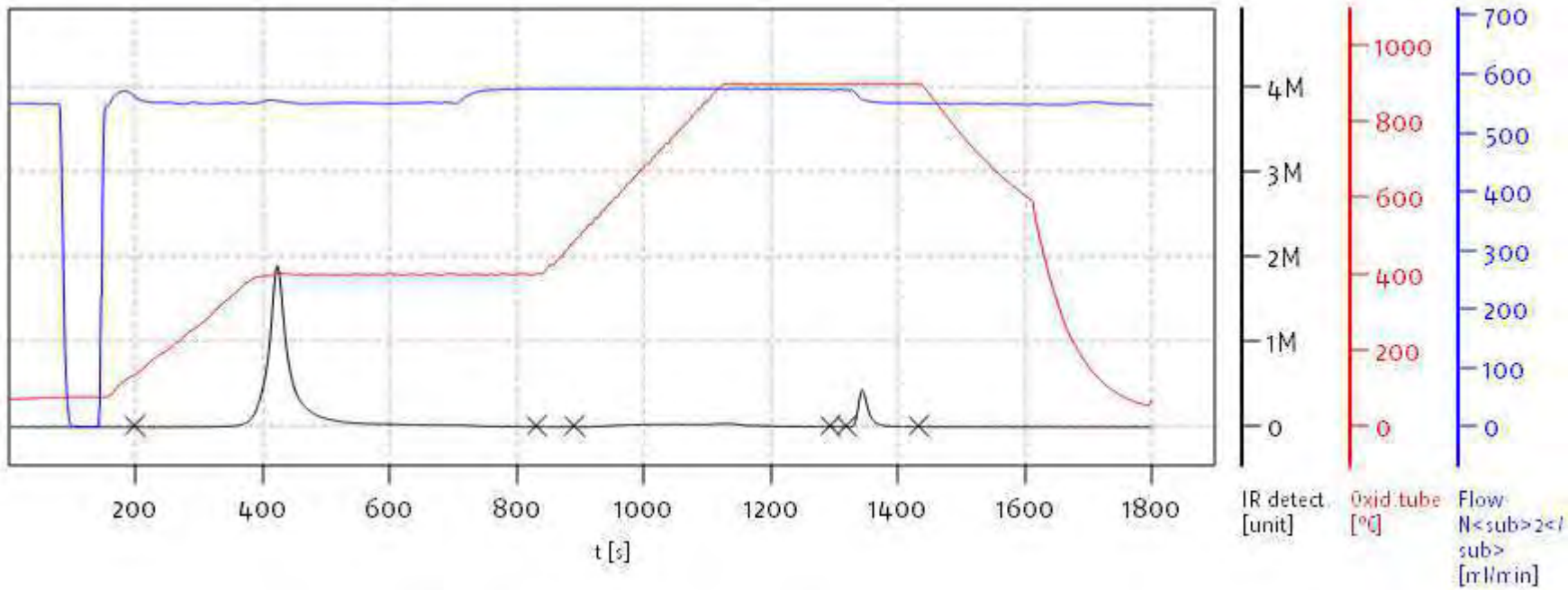
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
24	24	BLE0201-MS1	179.30	0.0070	CARBON	5/7/2023 2:23 AM	bl	2.766	3 029 890	2.996	0.245	310 847	292 951	2.521	0.230	0.9722	1.0000



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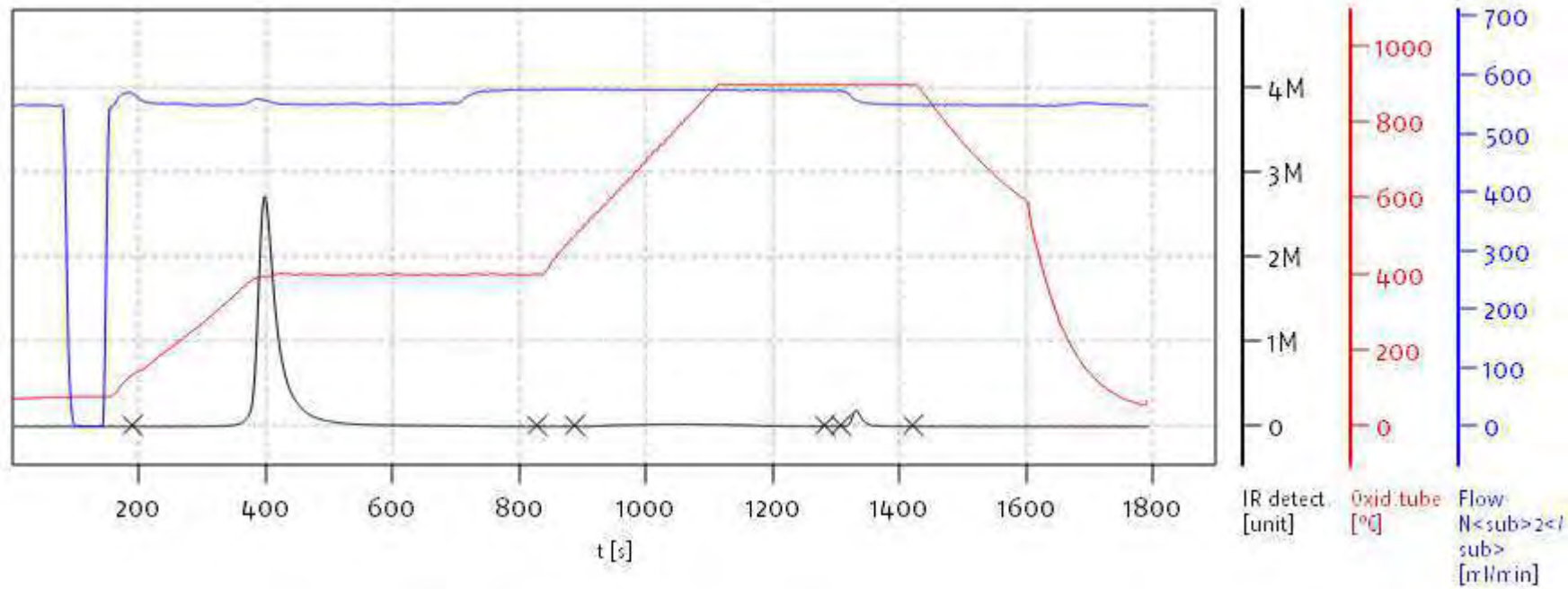
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
25	25	BLE0201-MSD1	243.60	0.0078	CARBON	5/7/2023 2:53 AM	bl	2.440	3 863 150	2.563	0.070	136 707	219 110	2.370	0.122	0.9722	1.0000



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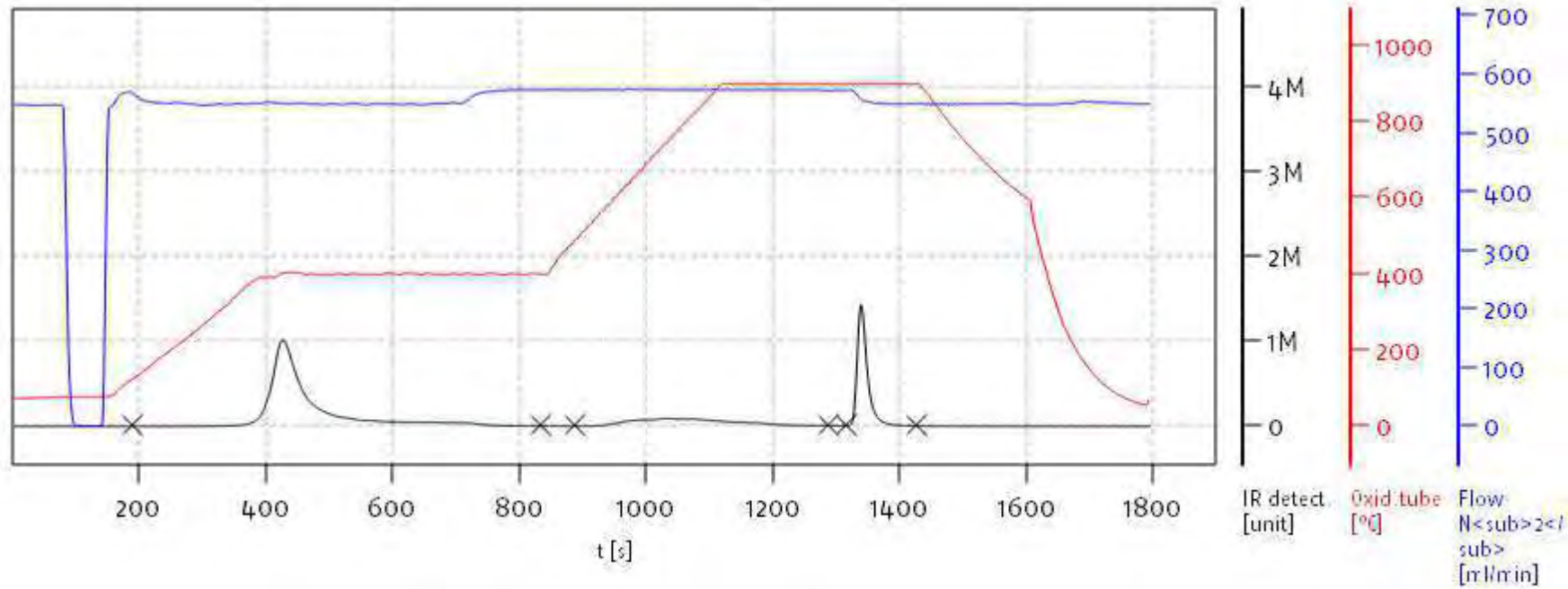
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
26	26	23E0148-02	595.20		CARBON	5/7/2023 3:23 AM	bl	0.914	2 620 610	1.082	0.258	1 016 960	672 750	0.656	0.168	0.9722	1.0000



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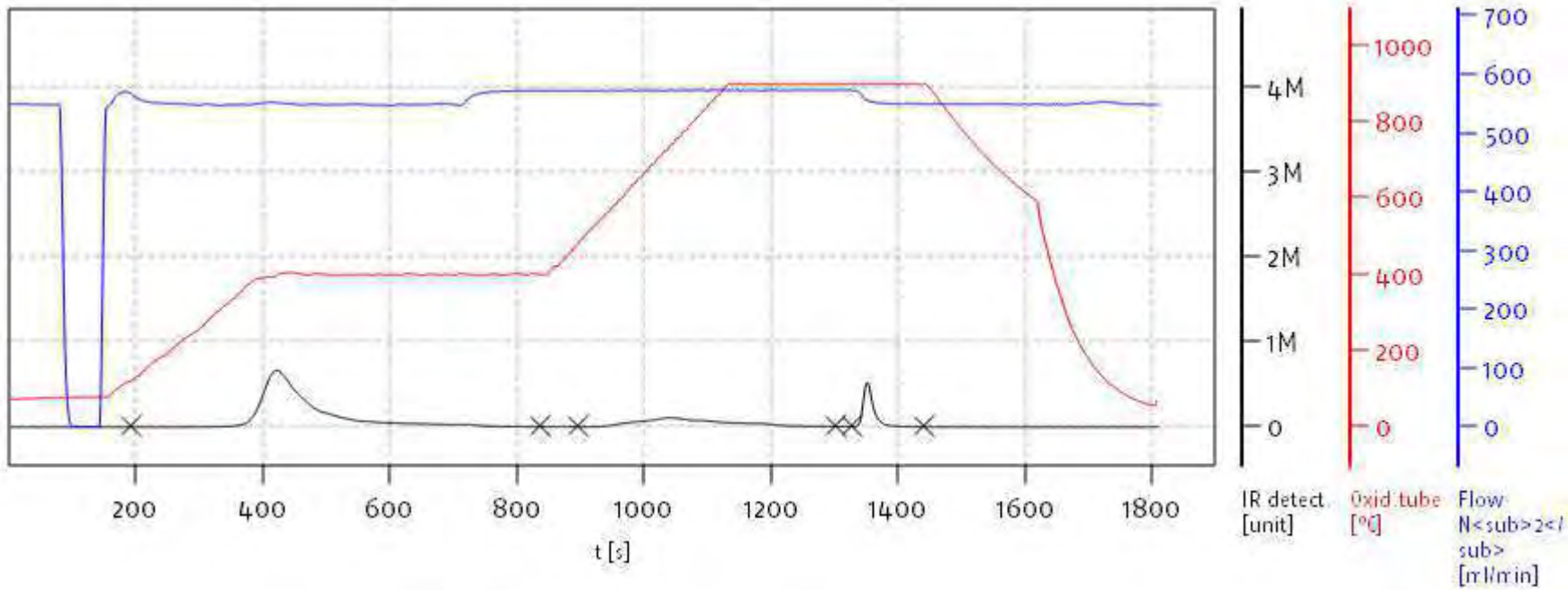
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
27	27	23E0148-03	608.00		CARBON	5/7/2023 3:54 AM	bl	0.654	2 311 200	0.819	0.088	373 235	674 968	0.566	0.165	0.9722	1.0000



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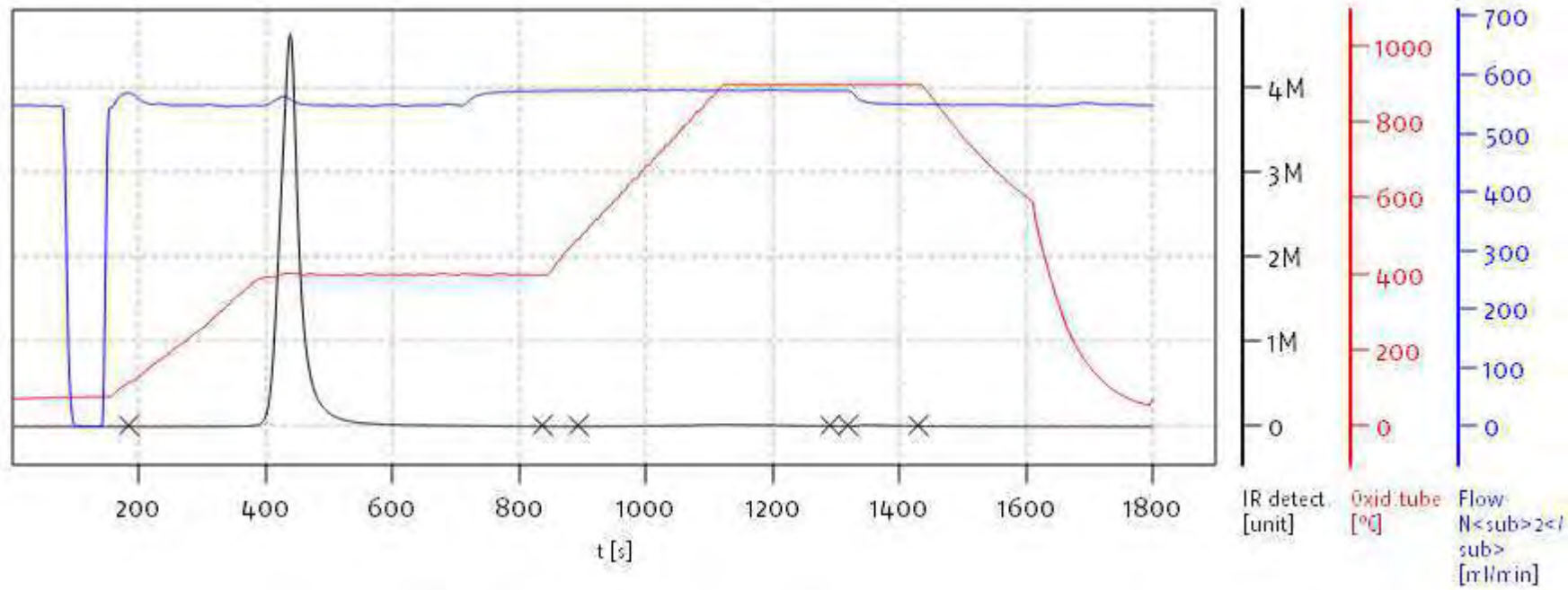
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
28	28	SLE0117-CCV2	22.00		CARBON	5/7/2023 4:24 AM	bl	43.829	6 414 480	44.870	0.130	45 056	174 400	43.699	1.040	0.9722	1.0000



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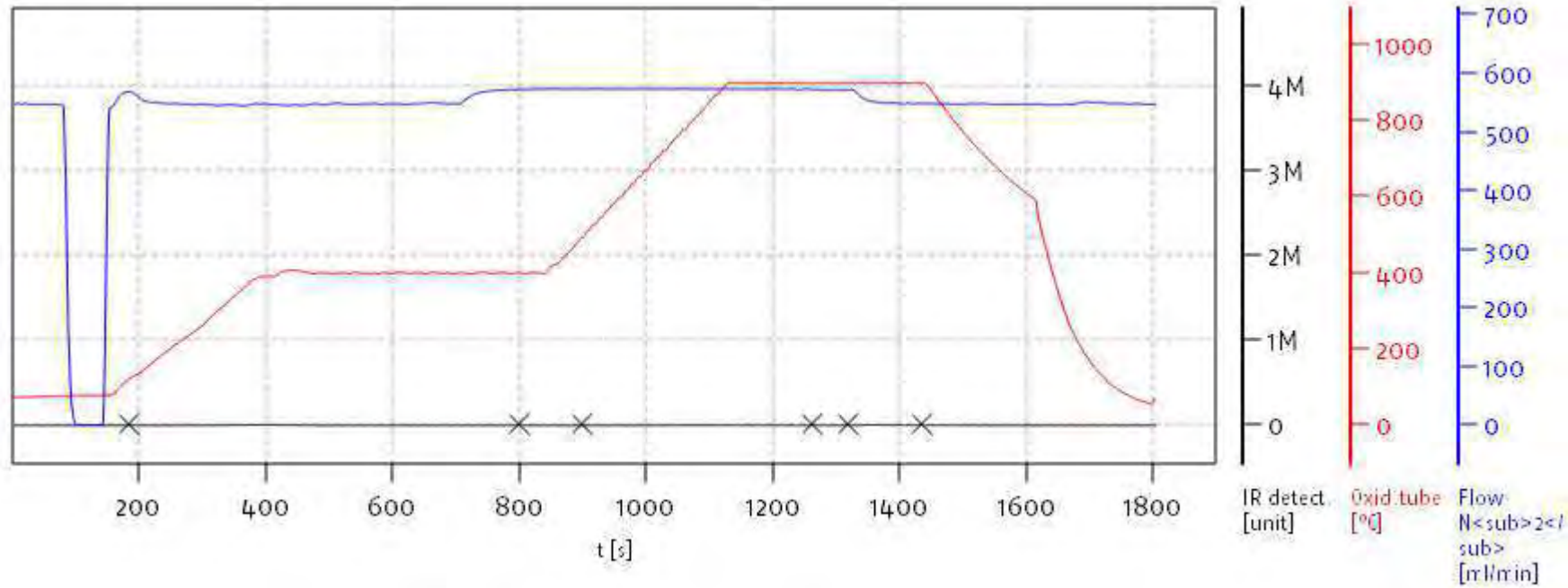
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
29	29	SLE0117-CCB2	534.90		CARBON	5/7/2023 4:55 AM	bl	0.000	26 059	0.000	0.000	13 453	10 454	0.000	0.000	0.9722	1.0000



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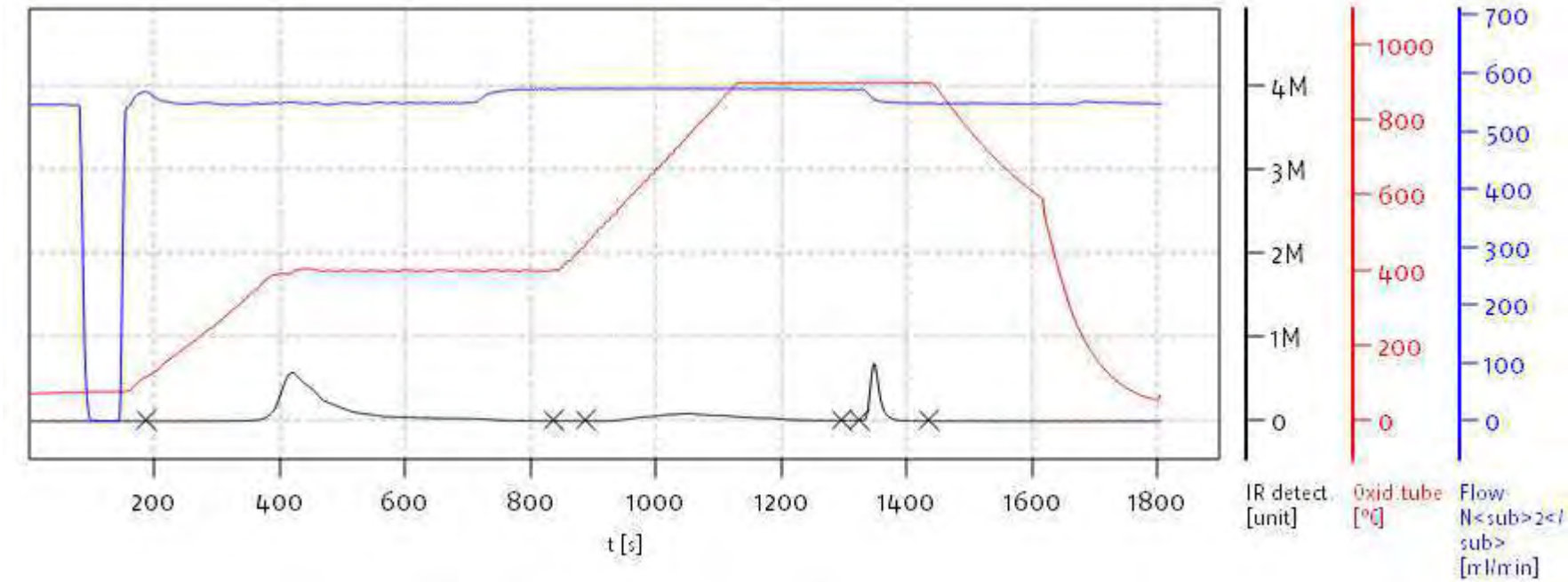
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
30	30	23E0148-04	538.80		CARBON	5/7/2023 5:25 AM	bl	0.686	2 031 590	0.858	0.126	466 289	622 251	0.560	0.171	0.9722	1.0000



Name:

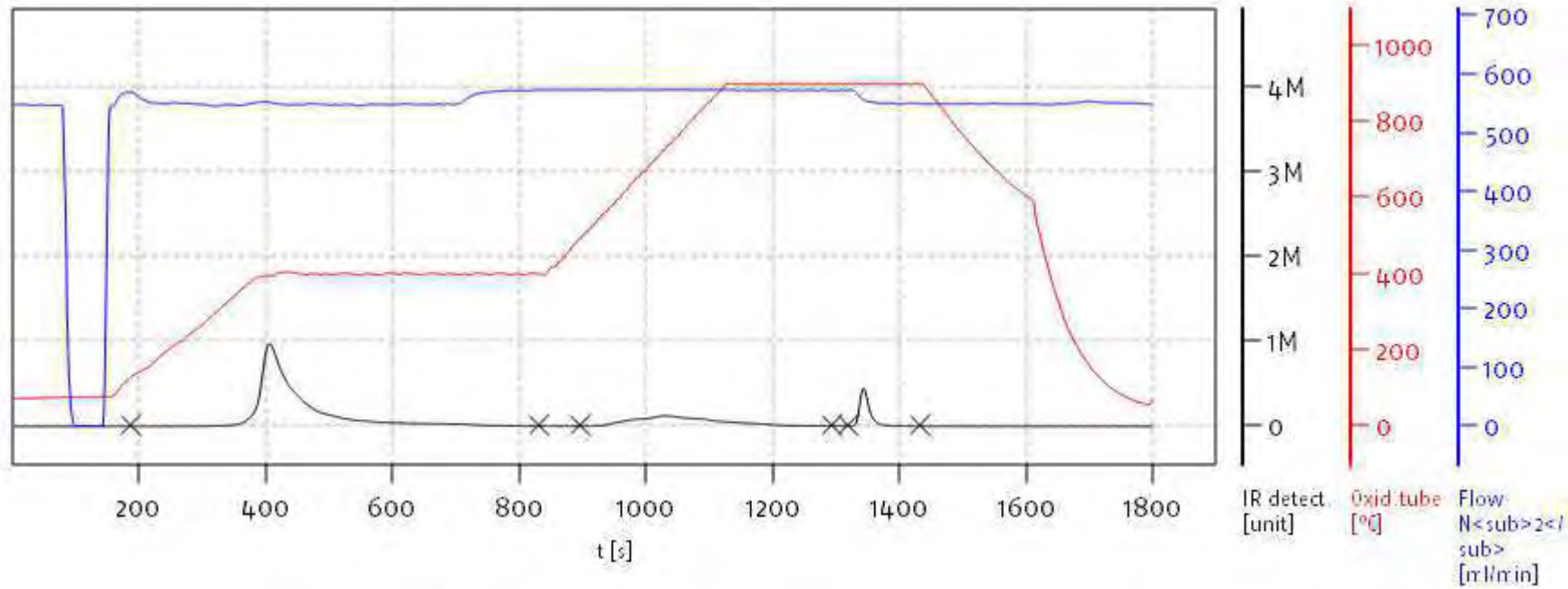
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Date: Tue May 9 14:33:55 2023

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Serial No: 0300.181017
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Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
31	31	23E0148-05	657.60		CARBON	5/7/2023 5:56 AM	bl	0.637	2 523 280	0.803	0.066	304 977	731 593	0.571	0.166	0.9722	1.0000



Name:

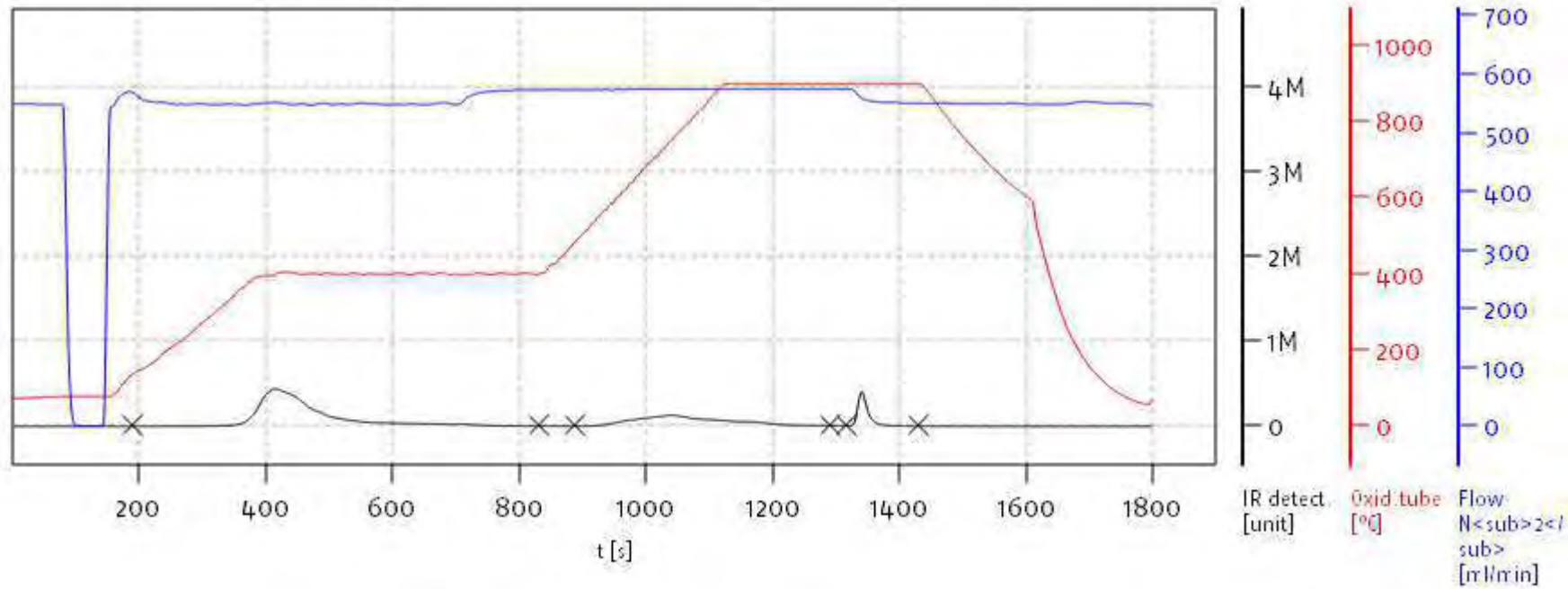
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
32	32	23E0148-06	686.20		CARBON	5/7/2023 6:26 AM	bl	0.454	1 822 130	0.633	0.060	291 884	823 256	0.394	0.180	0.9722	1.0000



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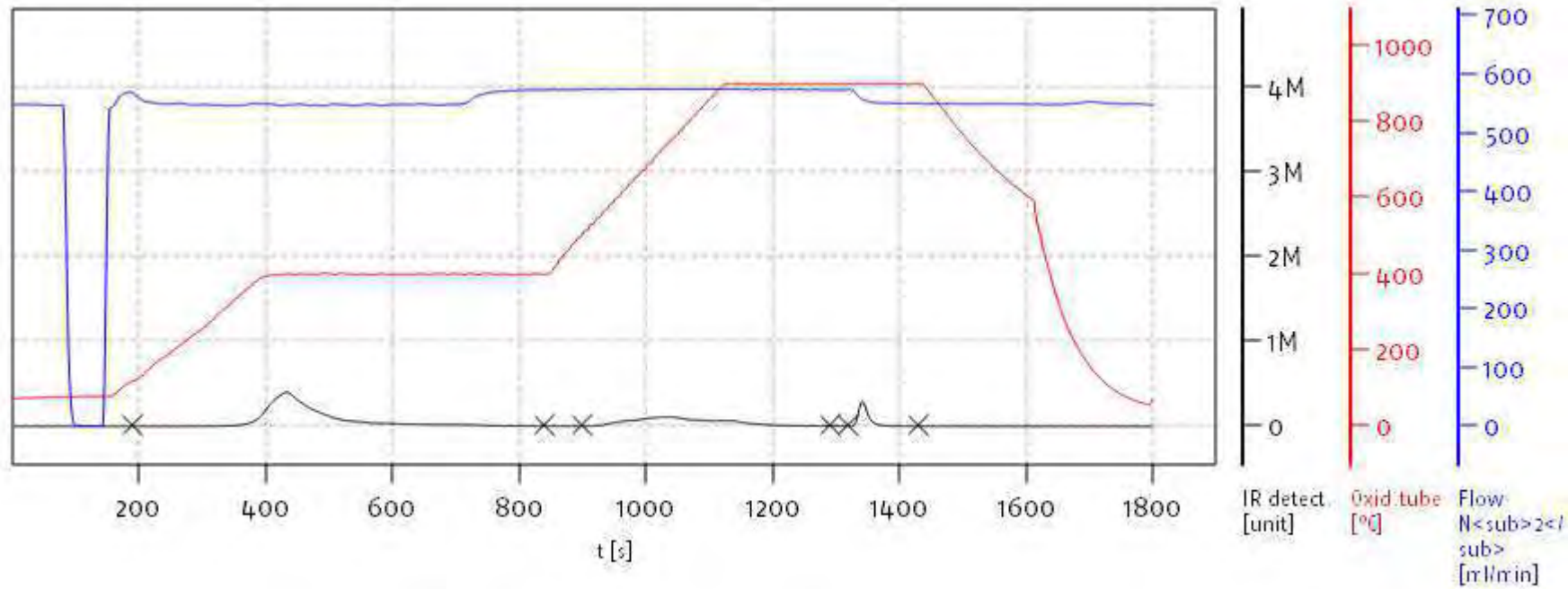
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
33	33	23E0148-07	623.70		CARBON	5/7/2023 6:56 AM	bl	0.395	1 485 620	0.562	0.043	200 102	697 398	0.352	0.167	0.9722	1.0000



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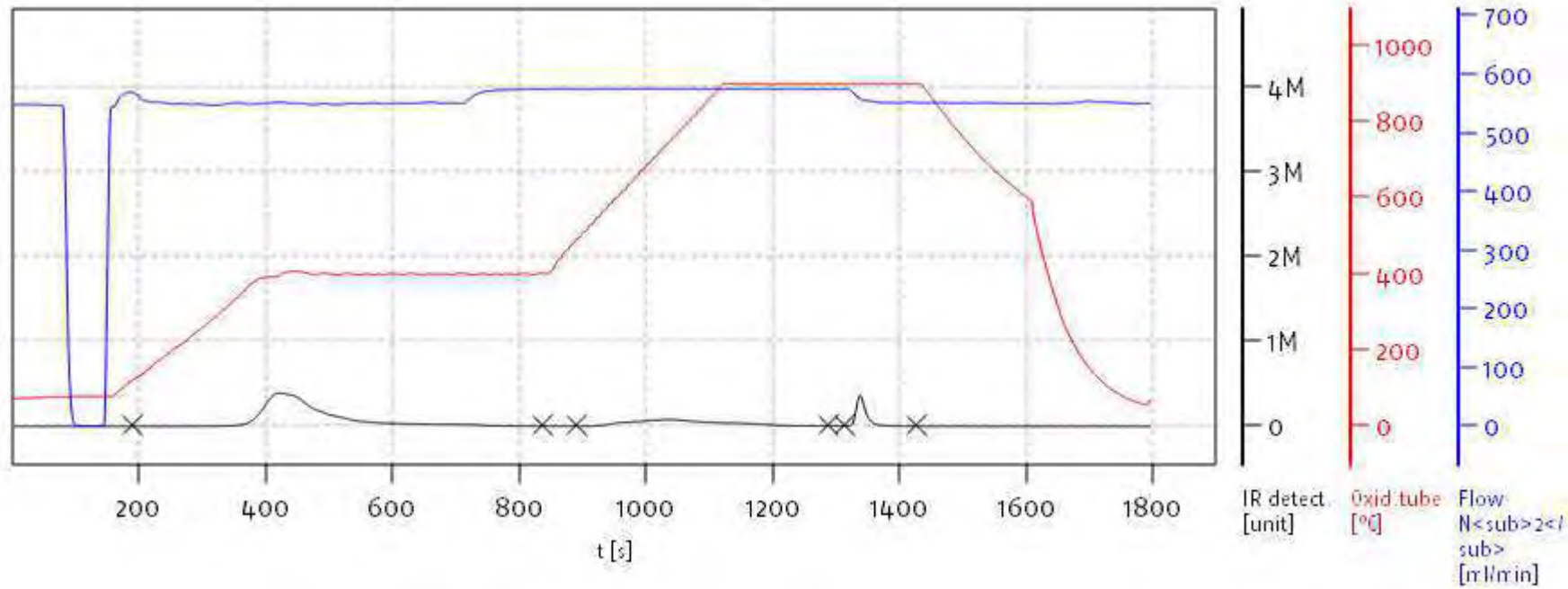
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
34	34	23E0148-08	516.00		CARBON	5/7/2023 7:27 AM	bl	0.549	1 676 190	0.699	0.068	251 611	526 270	0.481	0.150	0.9722	1.0000



Name:

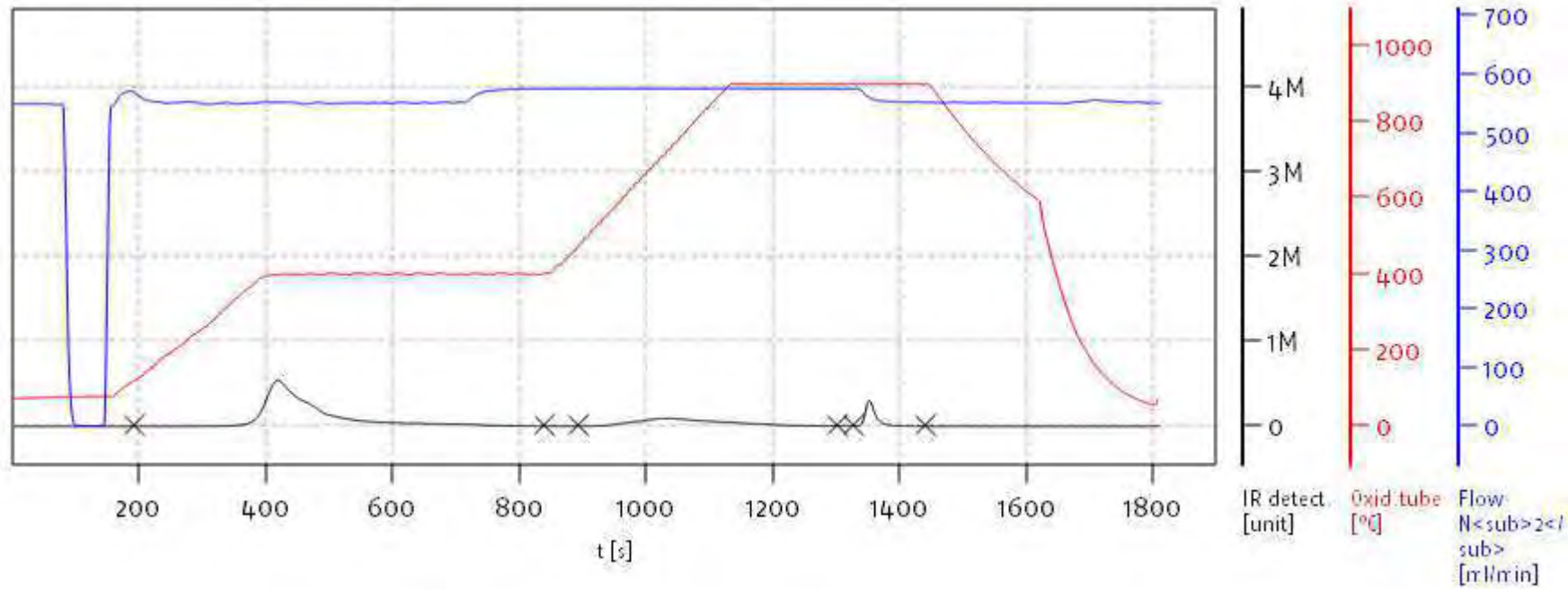
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
35	35	23E0148-09	531.10		CARBON	5/7/2023 7:57 AM	bl	0.584	1 890 380	0.746	0.056	217 460	584 529	0.528	0.163	0.9722	1.0000



Name:

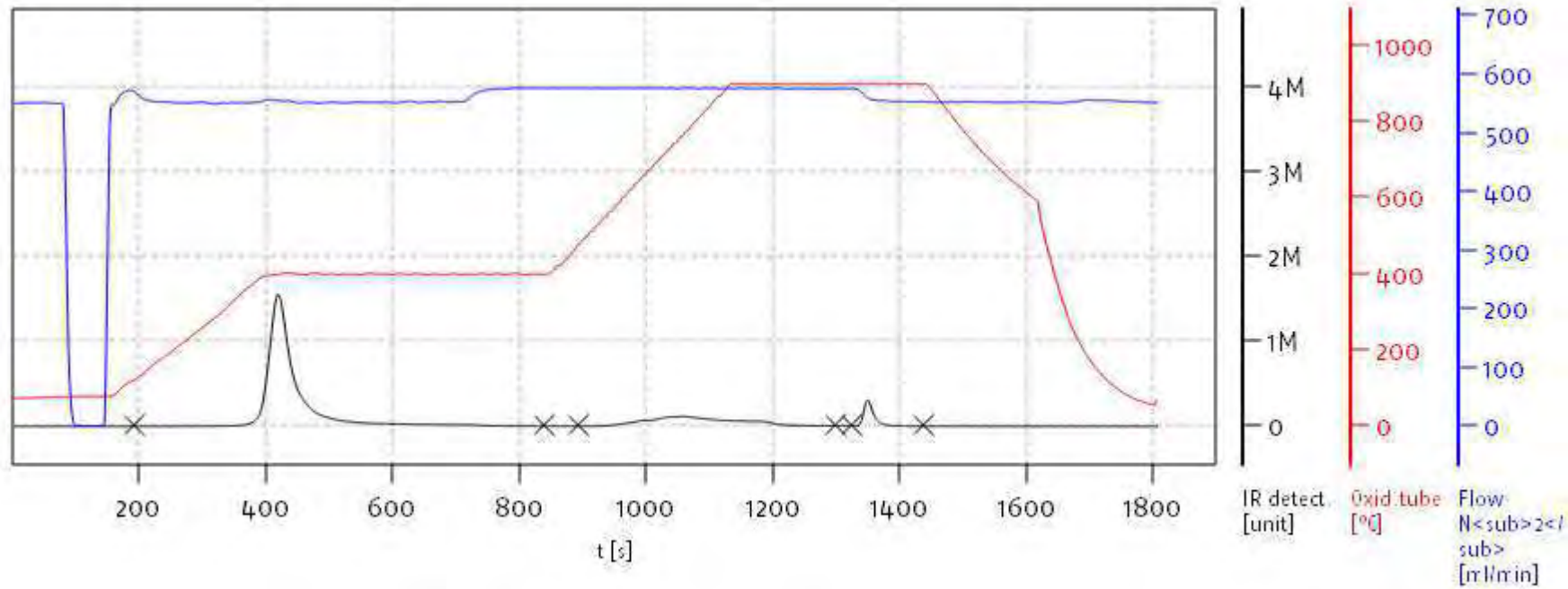
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
36	36	23E0148-10	533.00		CARBON	5/7/2023 8:28 AM	bl	0.845	2 821 580	1.055	0.055	217 501	749 382	0.789	0.210	0.9722	1.0000



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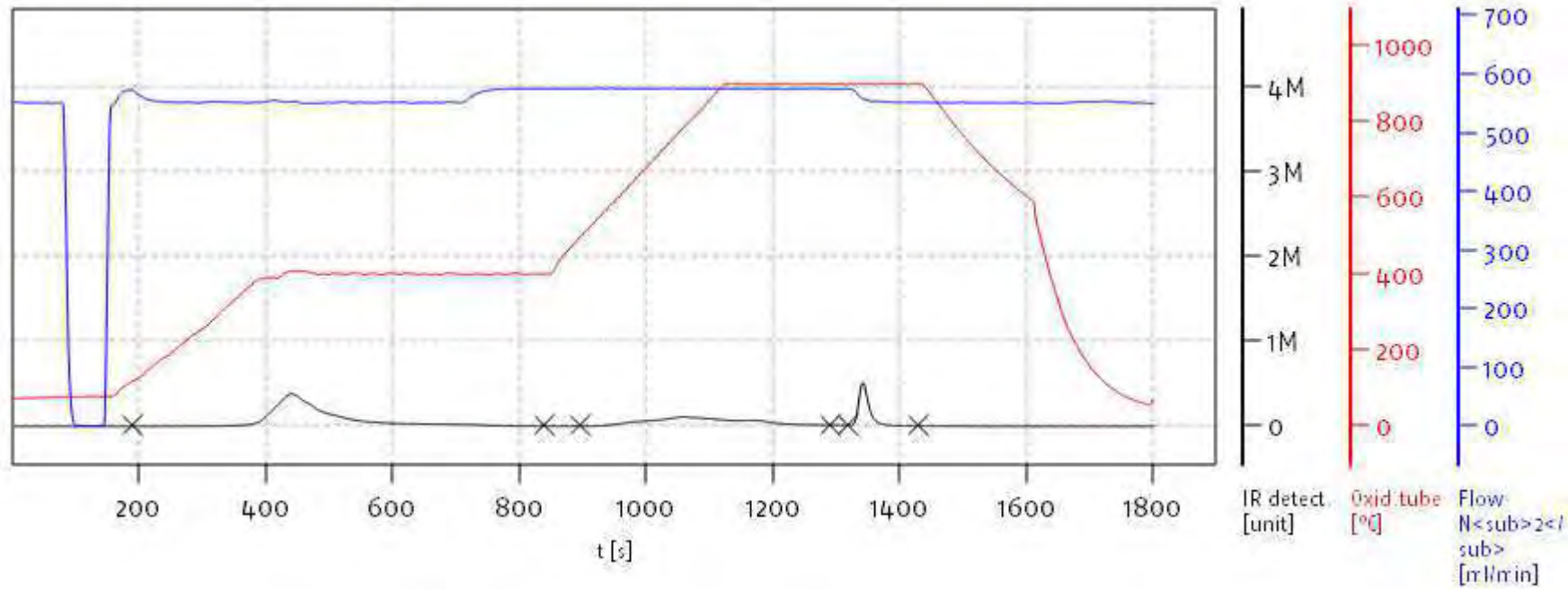
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
37	37	23E0148-11	544.00		CARBON	5/7/2023 8:58 AM	bl	0.504	1 486 110	0.720	0.100	379 025	786 211	0.404	0.216	0.9722	1.0000



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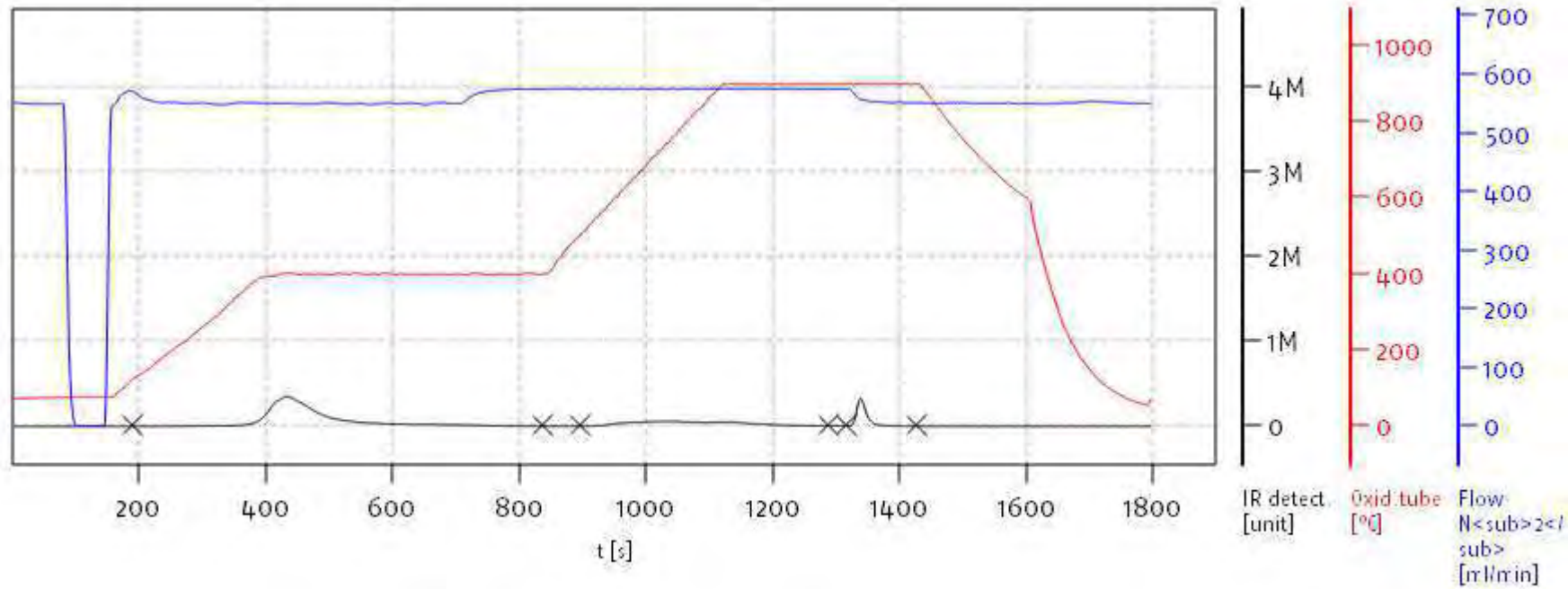
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Soli TOC Cube, Carbon
Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
38	38	23E0148-12	508.40		CARBON	5/7/2023 9:28 AM	bl	0.450	1 335 390	0.588	0.062	230 616	481 513	0.387	0.139	0.9722	1.0000



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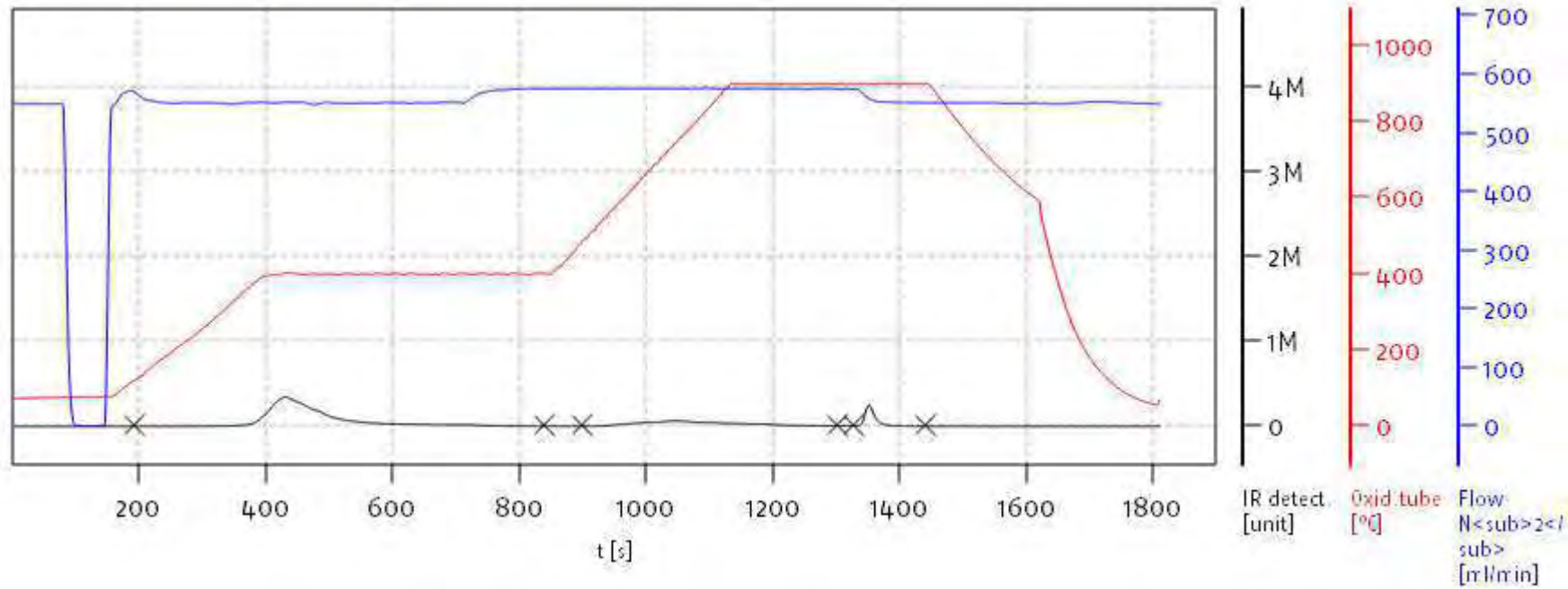
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
39	39	23E0148-13	524.50		CARBON	5/7/2023 9:59 AM	bl	0.425	1 352 130	0.545	0.045	179 292	431 464	0.380	0.120	0.9722	1.0000



Name:

Access: soliTOC superuser

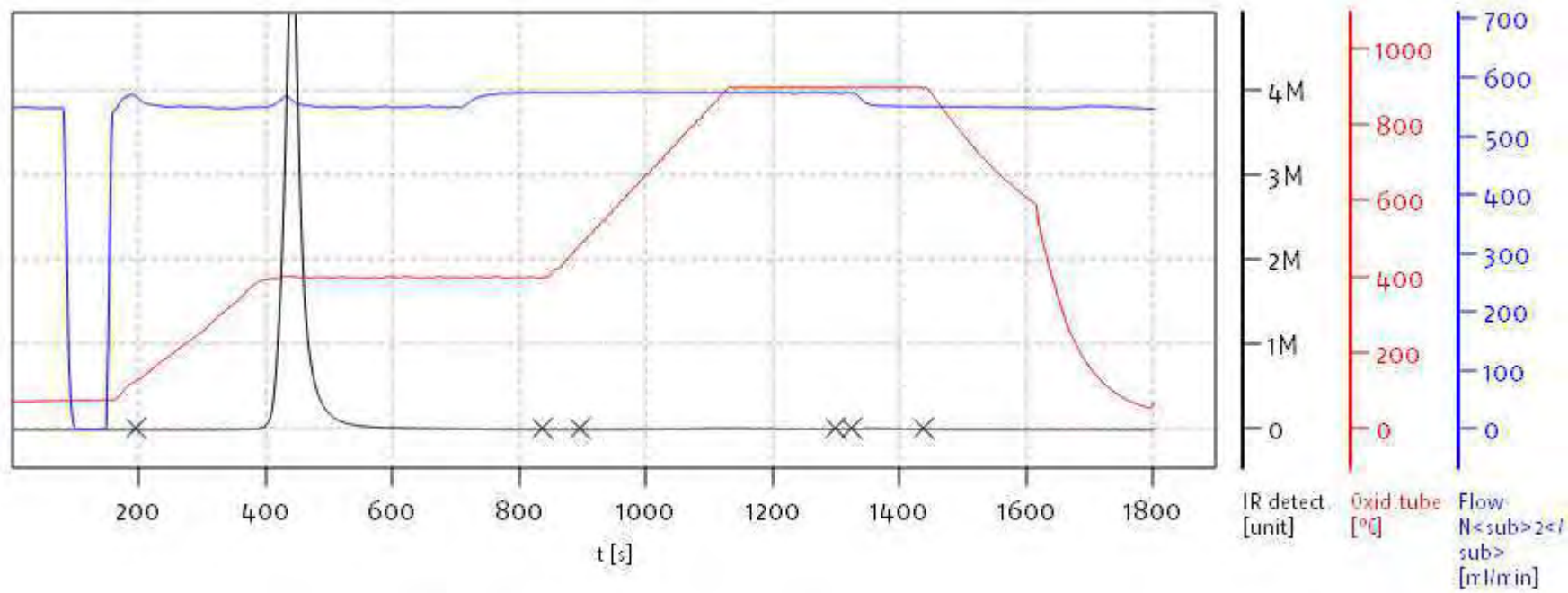
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
40	40	SLE0117-CCV3	23.10		CARBON	5/7/2023 10:29 AM	bl	44.772	6 894 140	45.253	0.029	30 898	98 318	44.743	0.481	0.9722	1.0000



Name:

Access: soliTOC superuser

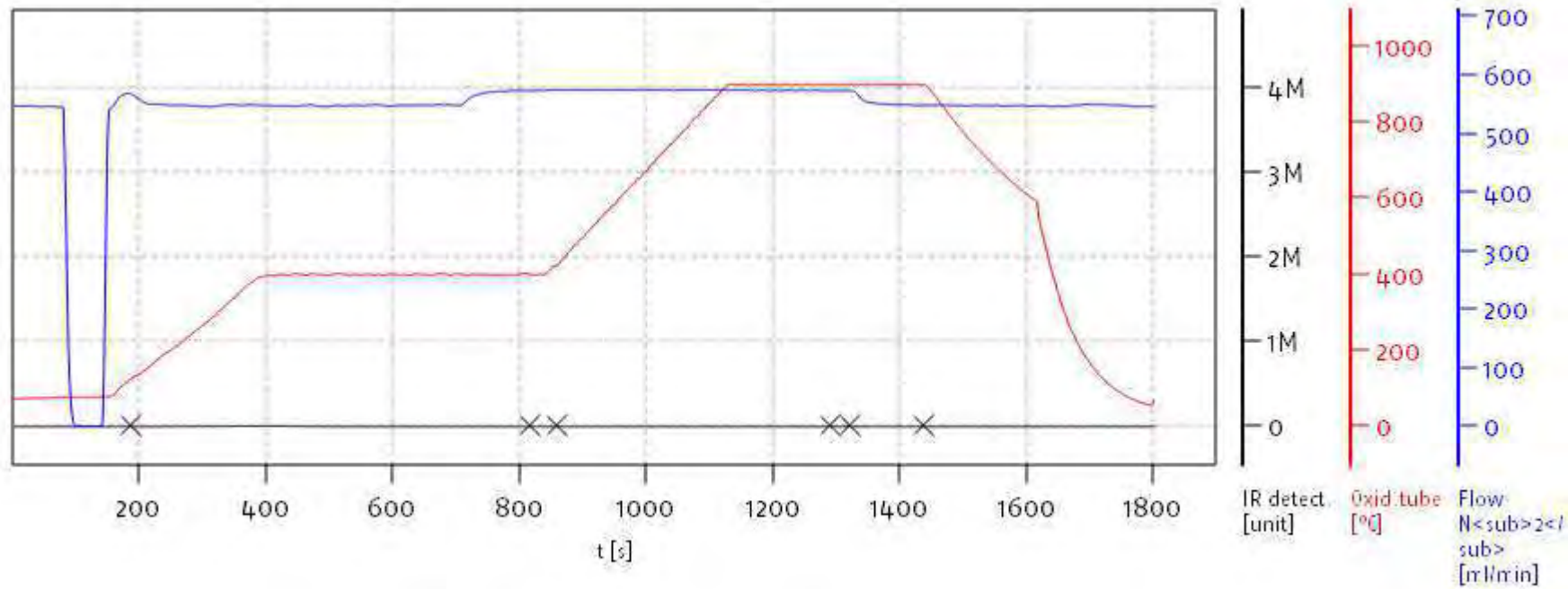
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Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
41	41	SLE0117-CCB3	521.50		CARBON	5/7/2023 11:00 AM	bl,C2u	0.003	36 851	0.003	0.000	2 251	2 615	0.003	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

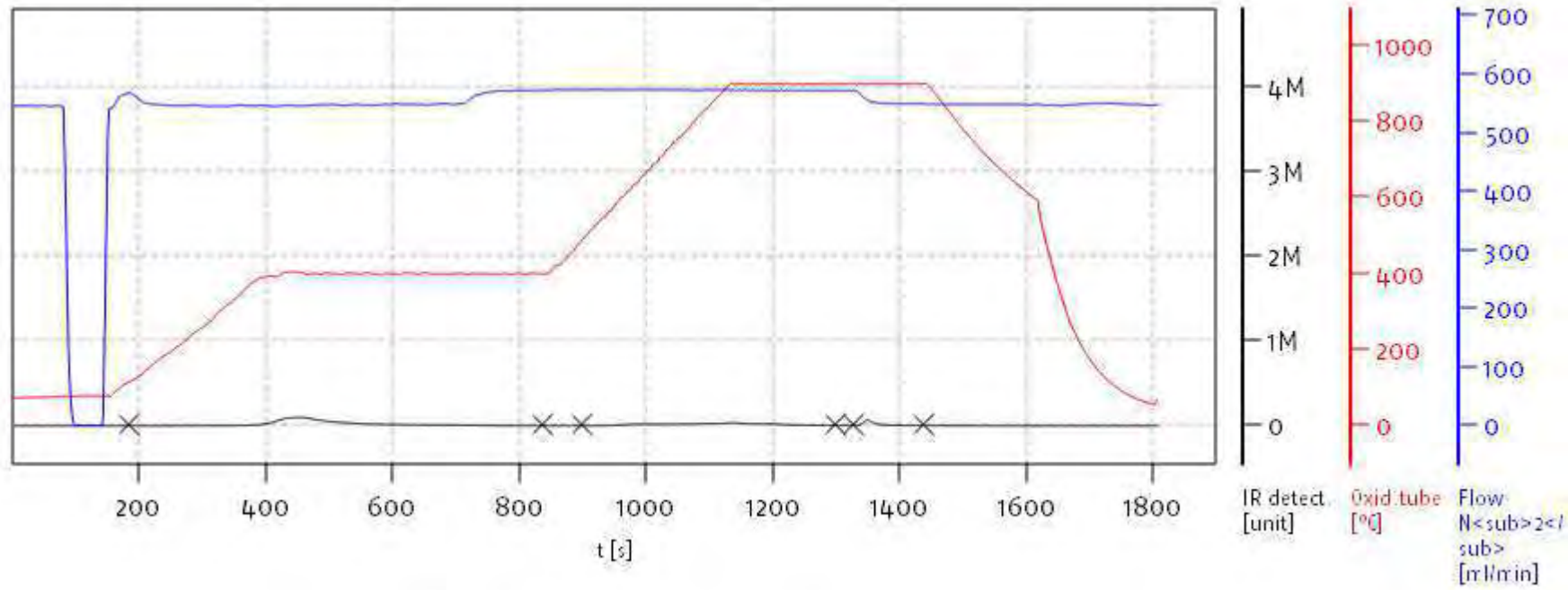
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
42	42	23E0152-01	561.60		CARBON	5/7/2023 11:30 AM	bl	0.127	461 802	0.186	0.010	63 842	240 874	0.117	0.059	0.9722	1.0000



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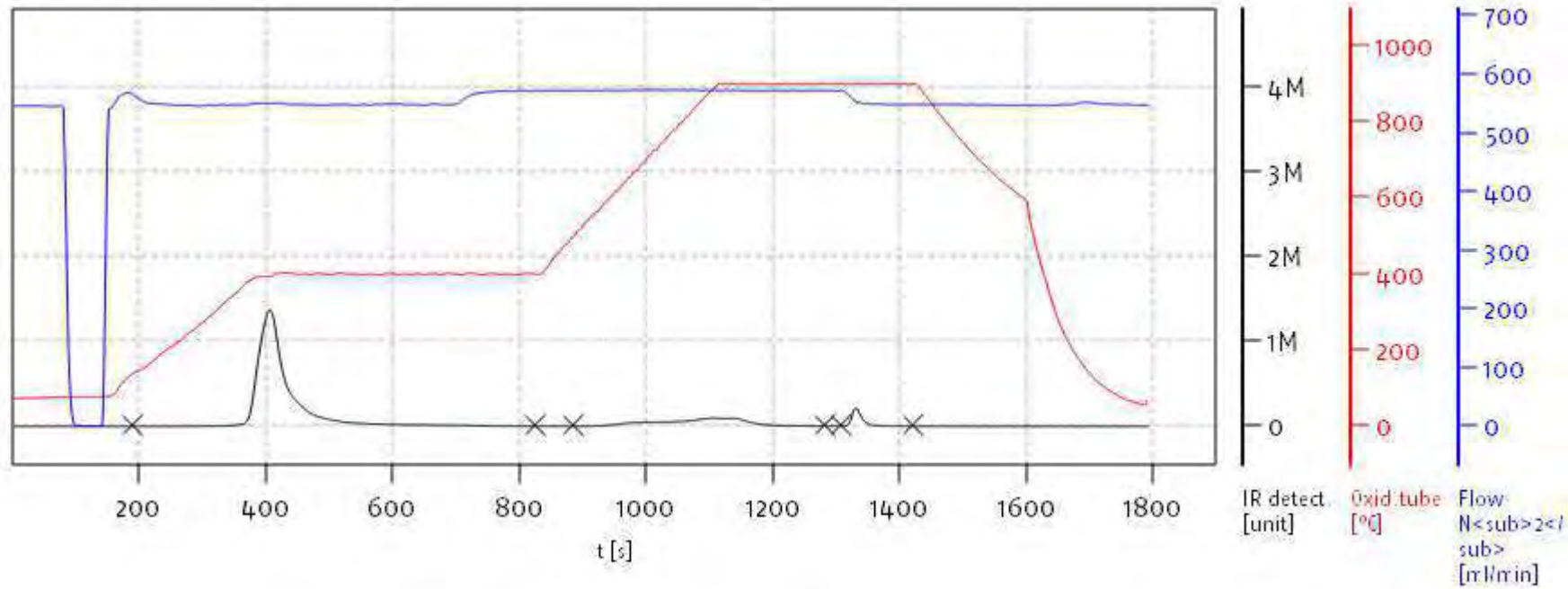
elementar
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Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
43	43	23E0152-02	658.50		CARBON	5/7/2023 12:01 PM	bl	0.653	2 753 860	0.784	0.030	152 505	583 668	0.623	0.131	0.9722	1.0000



Name:

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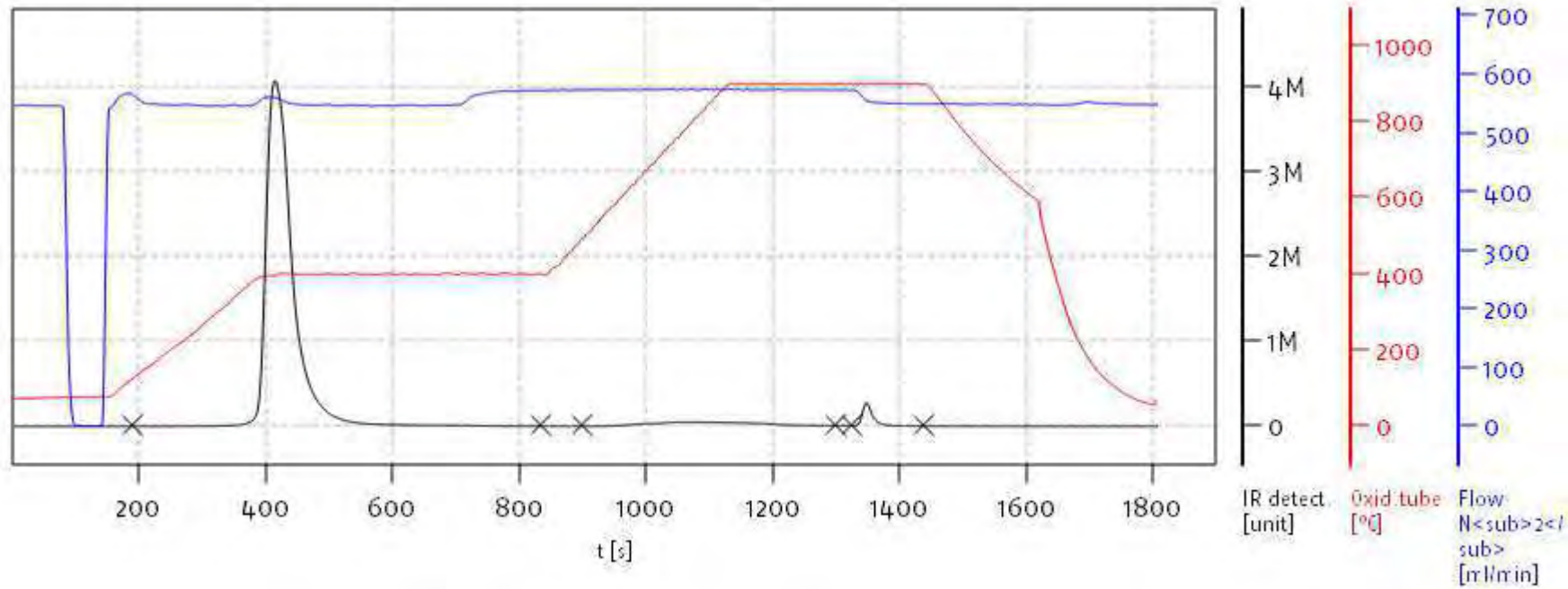
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
44	44	23E0152-03	568.90		CARBON	5/7/2023 12:31 PM	bl	1.990	7 365 020	2.094	0.049	205 724	408 888	1.941	0.104	0.9722	1.0000



Name:

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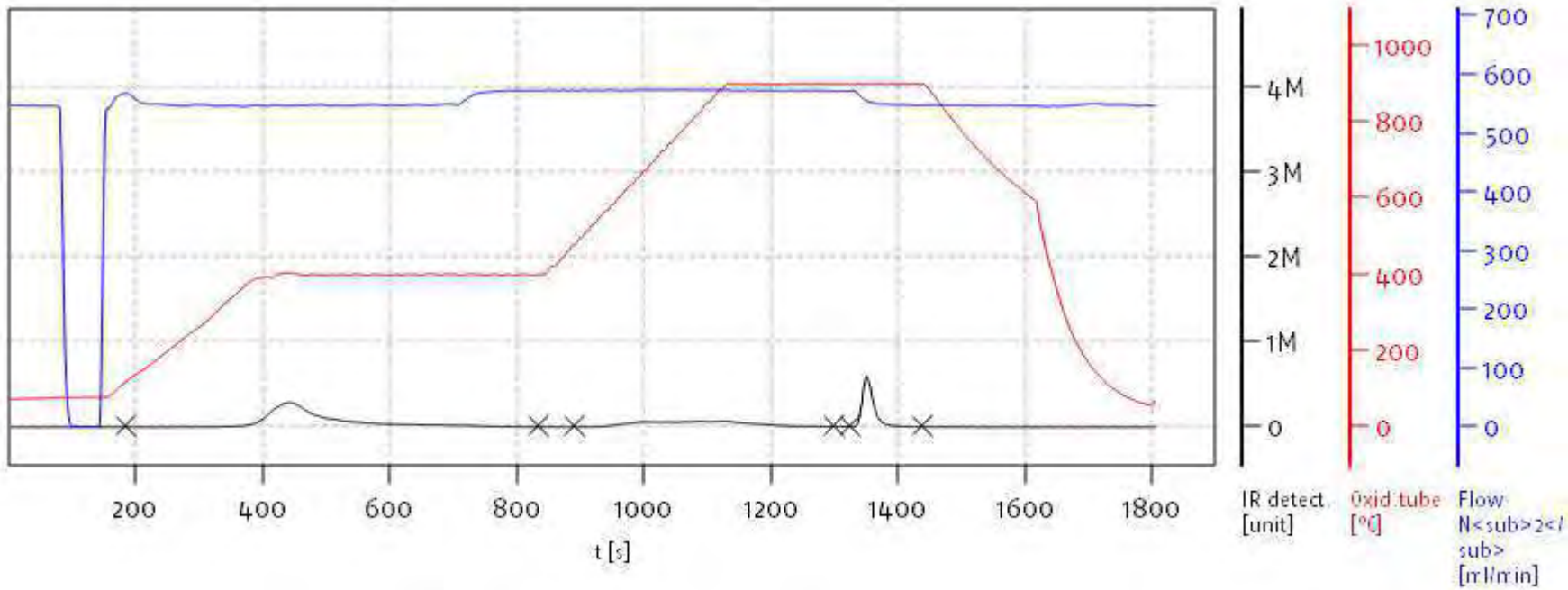
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
45	45	23E0152-04	629.50		CARBON	5/7/2023 1:02 PM	bl	0.388	1 196 600	0.518	0.108	466 755	554 972	0.280	0.130	0.9722	1.0000



Name:

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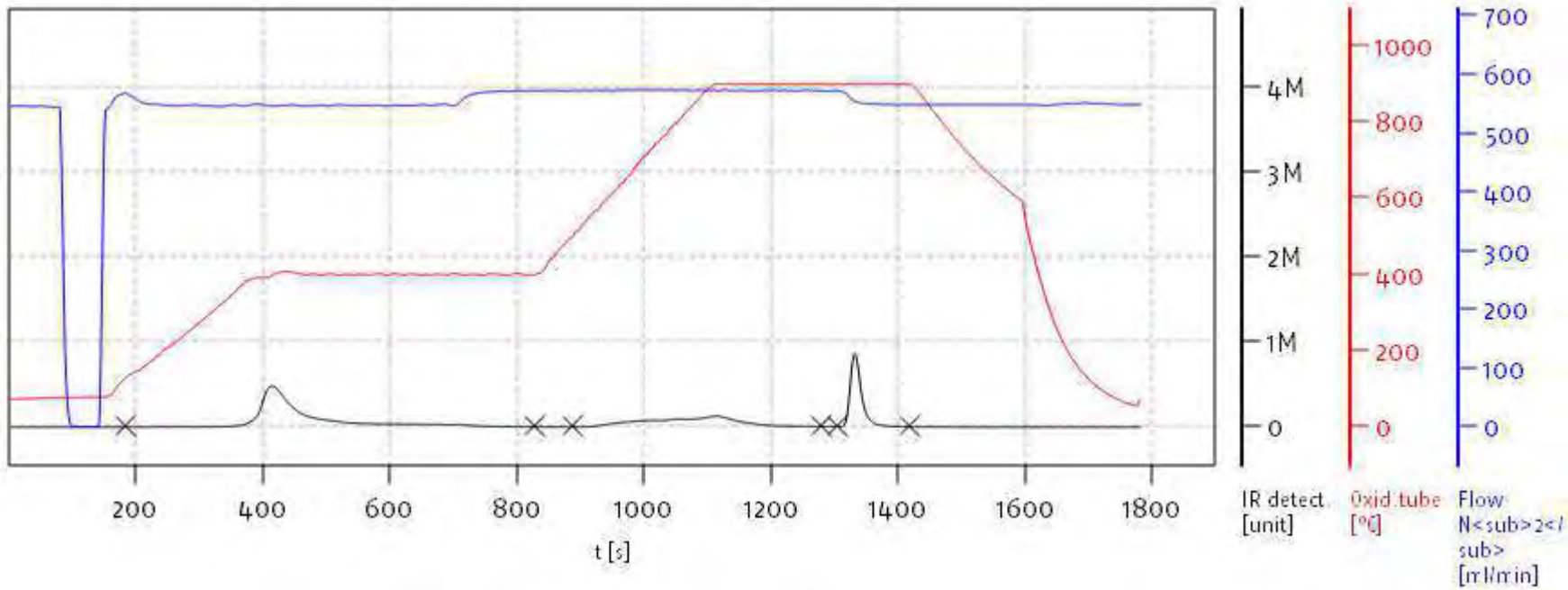
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
46	46	23E0152-05	332.70		CARBON	5/7/2023 1:32 PM	bl	0.949	1 452 620	1.303	0.303	678 718	787 674	0.645	0.354	0.9722	1.0000



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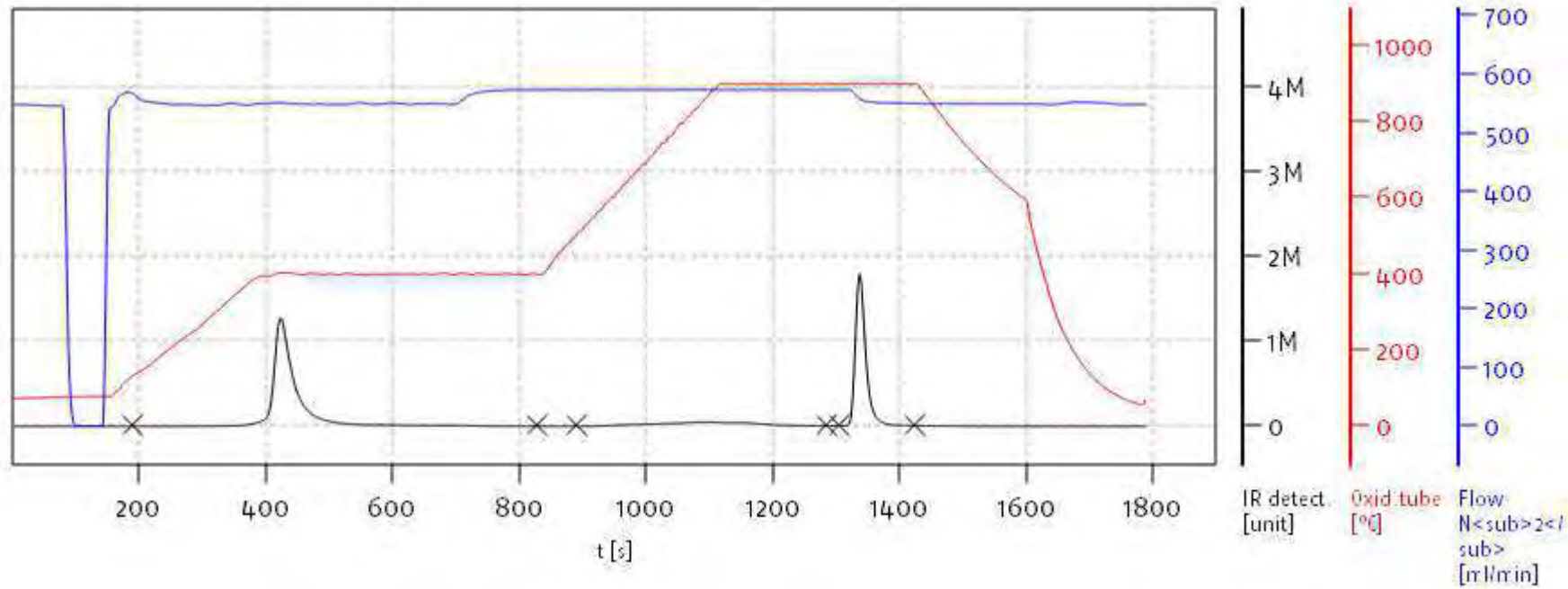
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
47	47	23E0152-06	355.40		CARBON	5/7/2023 2:02 PM	bl	1.340	1 882 930	1.486	0.554	1 297 340	362 409	0.786	0.146	0.9722	1.0000



Name:

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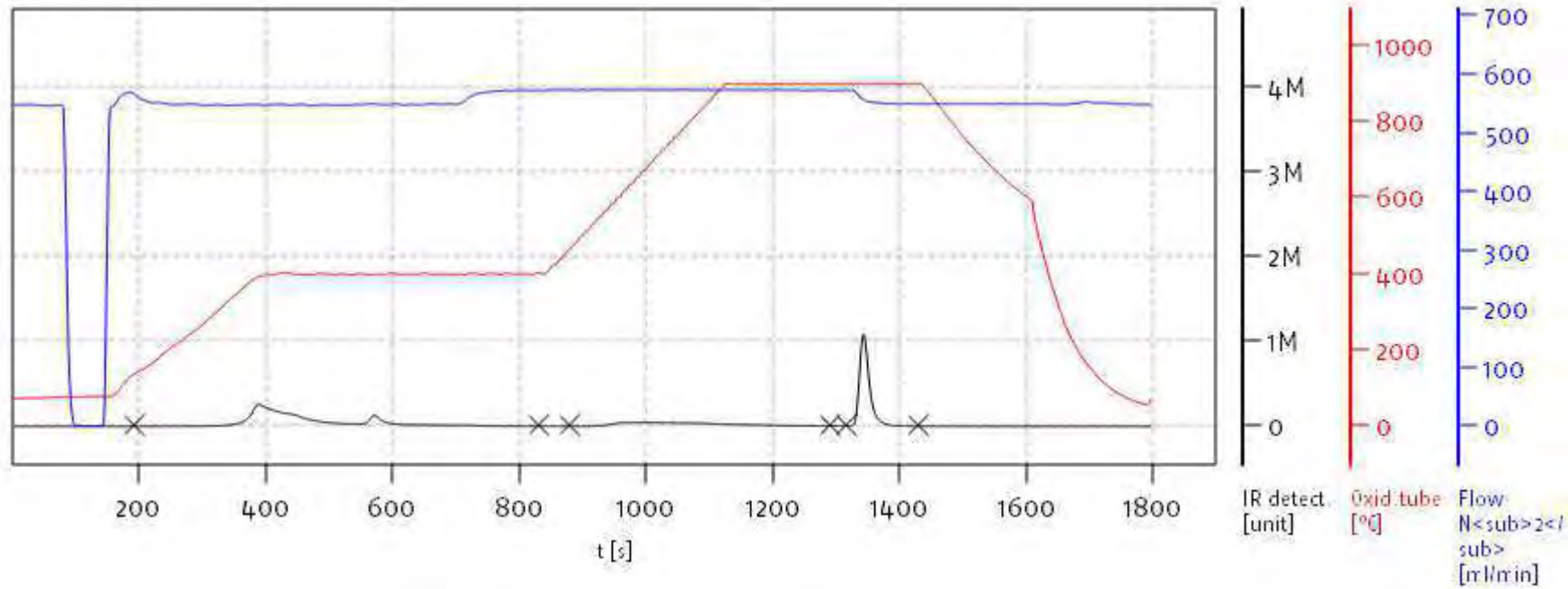
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
48	48	23E0152-07	252.60		CARBON	5/7/2023 2:32 PM	bl	1.029	1 013 240	1.232	0.441	746 387	357 184	0.588	0.203	0.9722	1.0000



Name:

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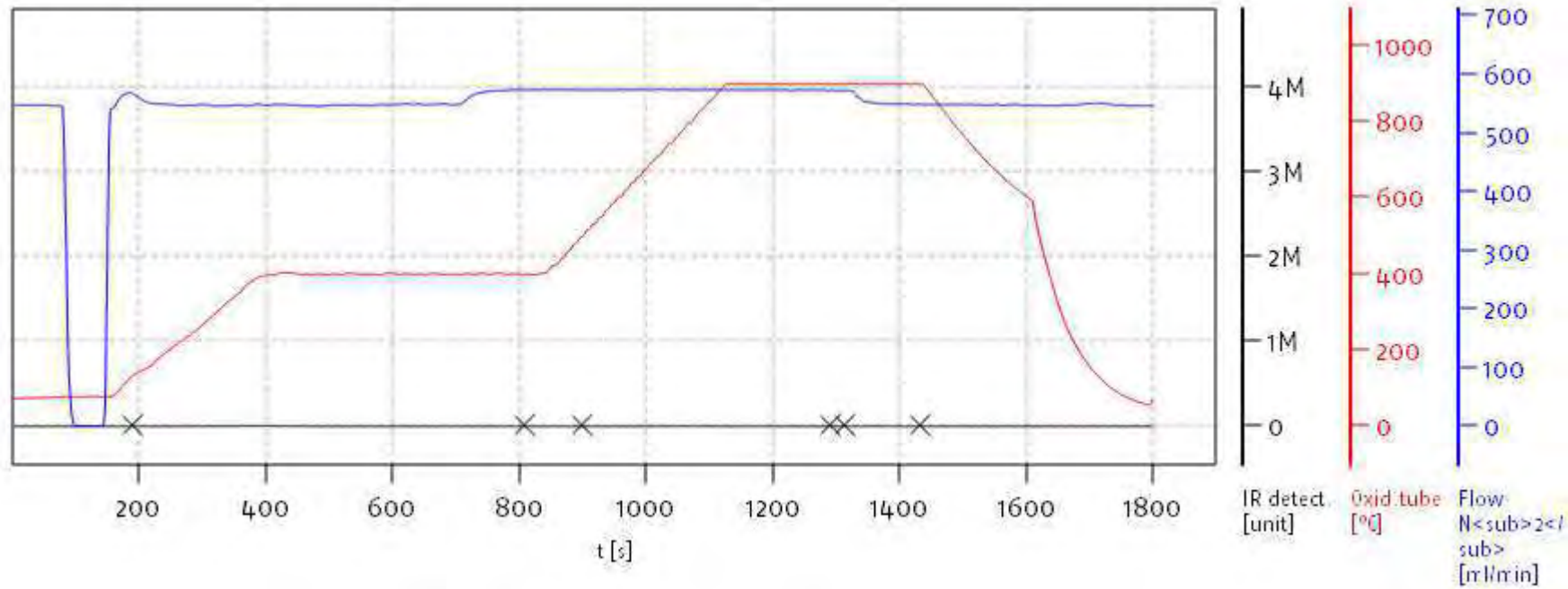
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
49	49	BLANK	1.00		CARBON	5/7/2023 3:03 PM	bl	0.000	19 746	0.000	0.000	3 210	7 915	0.000	0.000	0.9722	1.0000



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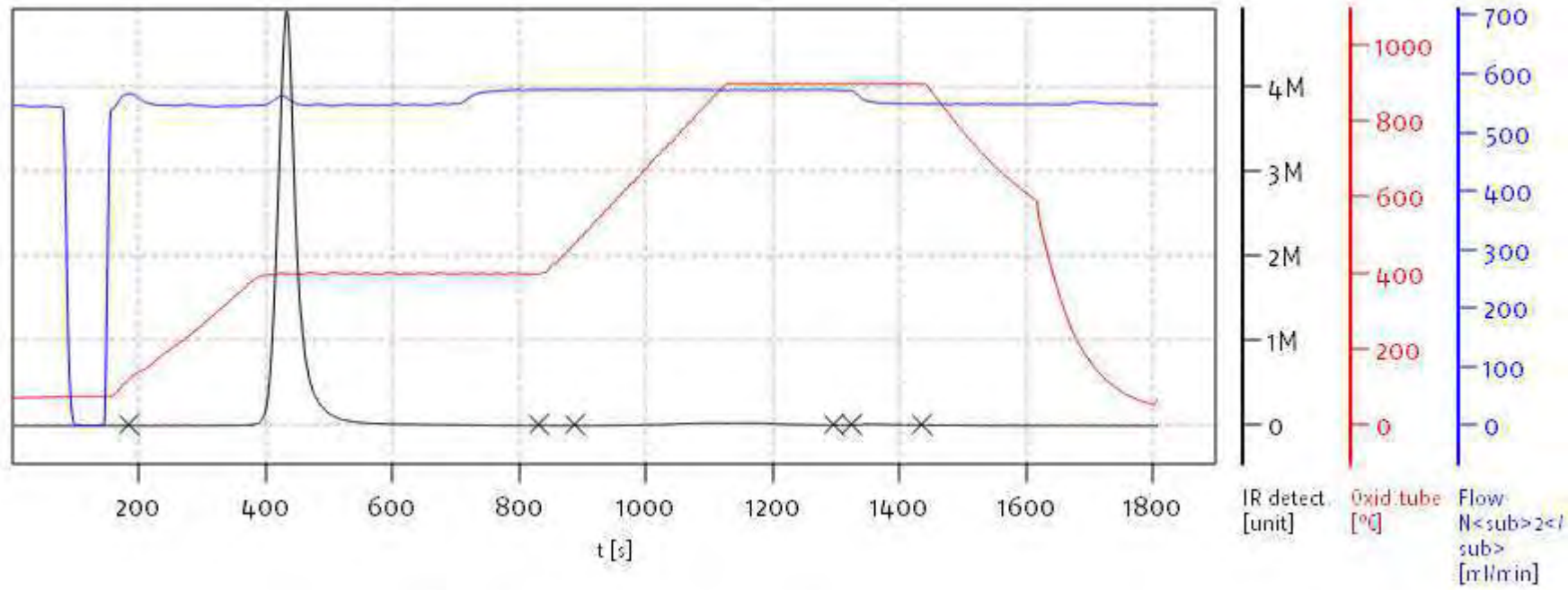
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
50	50	Dfactor	21.90		CARBON	5/7/2023 3:33 PM	bl	44.617	6 602 010	46.278	0.171	50 724	261 516	44.446	1.661	0.9562	1.0000



Name:

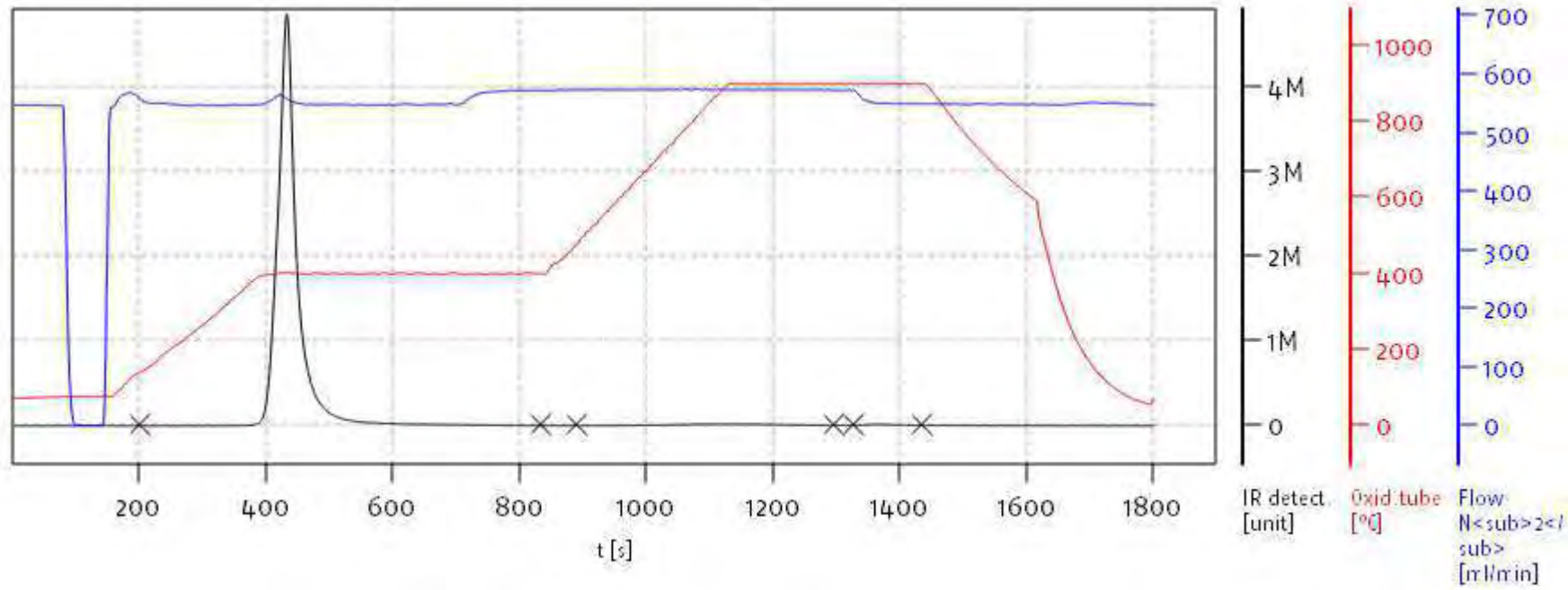
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
51	51	Dfactor	22.20		CARBON	5/7/2023 4:04 PM	bl	44.534	6 440 570	45.442	0.089	39 271	156 669	44.446	0.907	0.9937	1.0000



Name:

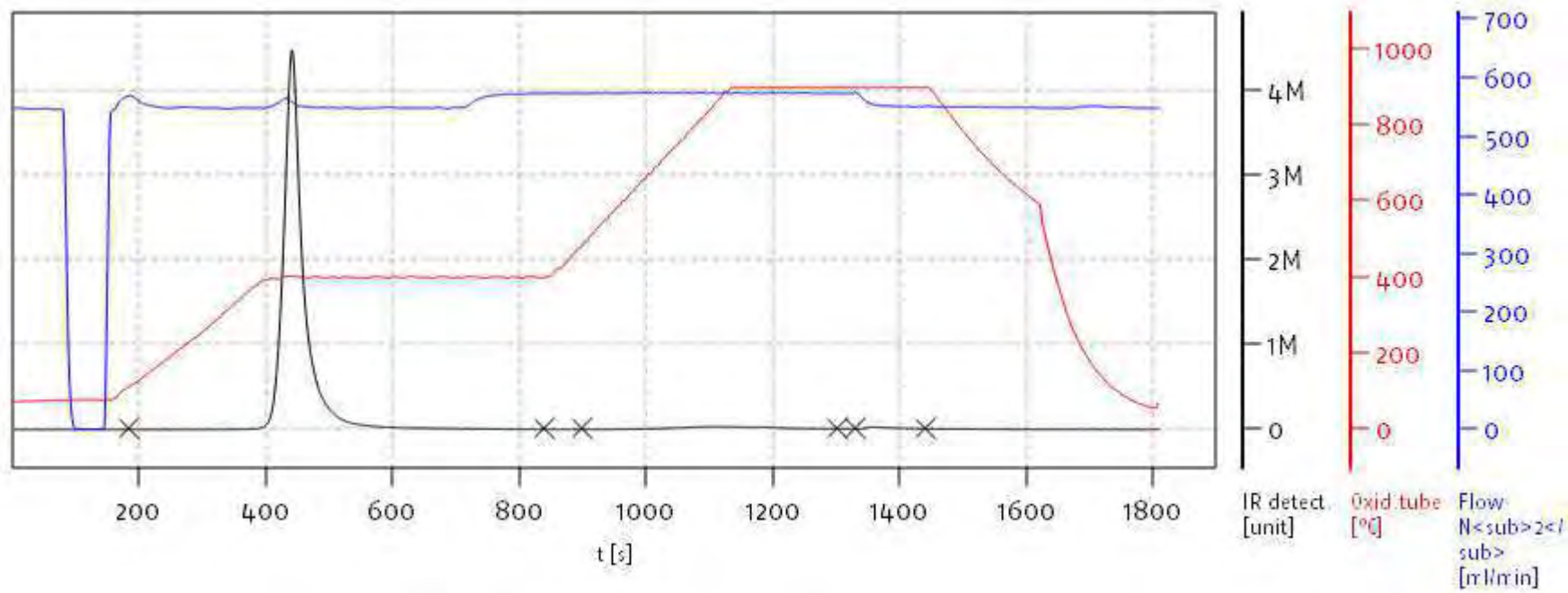
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
52	52	SLE0117-CCV4	21.20		CARBON	5/7/2023 4:34 PM	bl	43.721	6 119 690	45.436	0.341	73 291	261 463	43.380	1.715	0.9750	1.0000



Name:

Access: soliTOC superuser

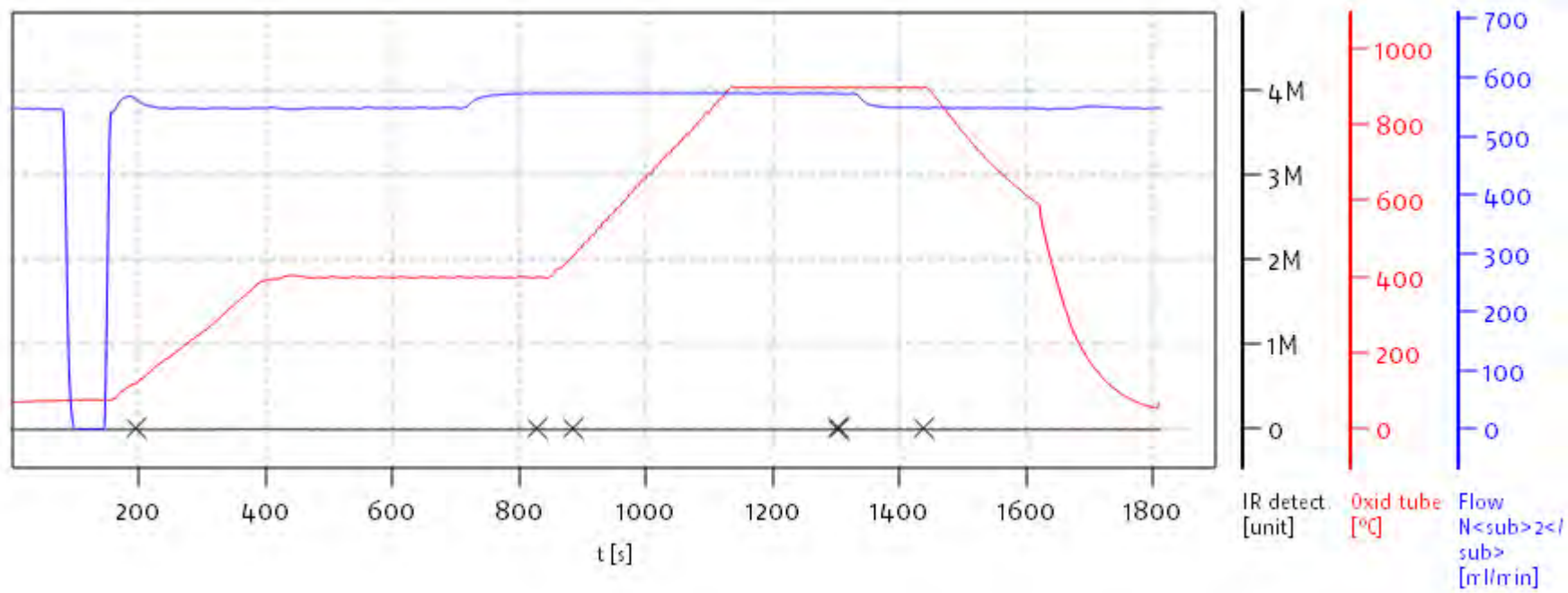
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
53	53	SLE0117-CCB4	502.50		CARBON	5/7/2023 5:05 PM	bl,C3u,C2u	0.000	13 138	0.000	0.000	1 211	32	0.000	0.000	0.9750	1.0000



Name:

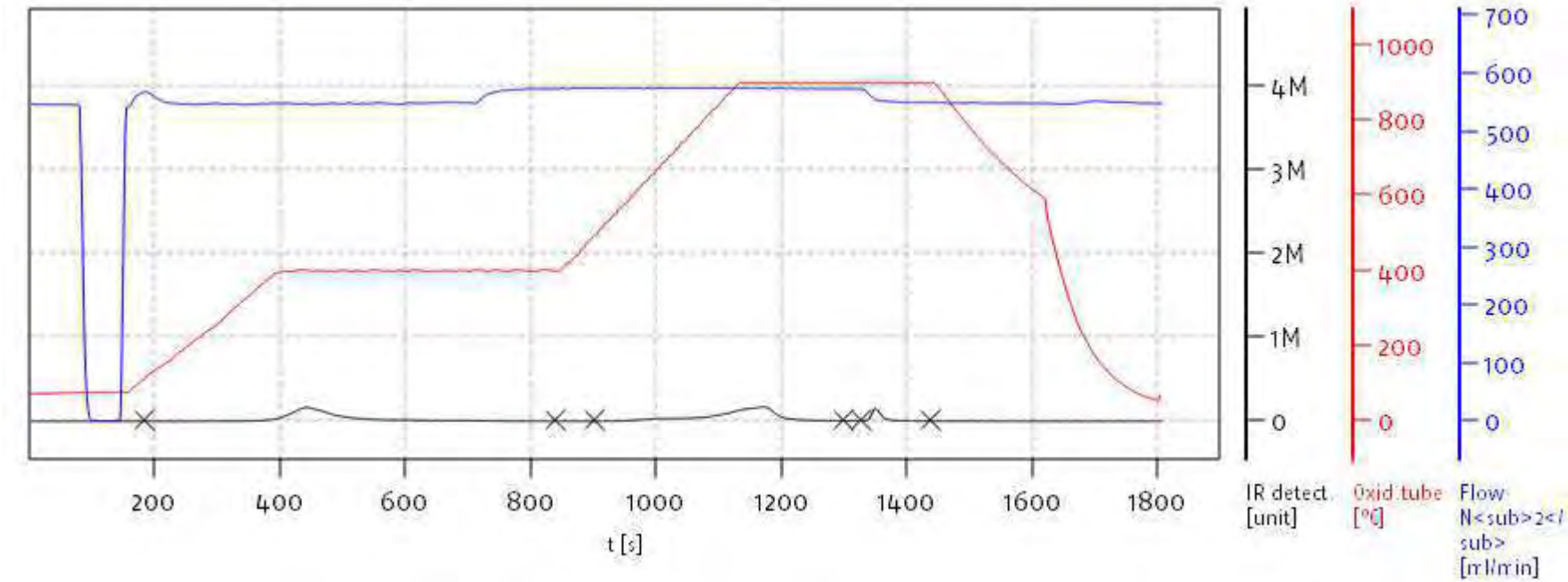
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
54	54	23E0152-09	311.90		CARBON	5/7/2023 5:35 PM	bl	0.320	597 497	0.669	0.044	114 774	728 690	0.276	0.348	0.9750	1.0000



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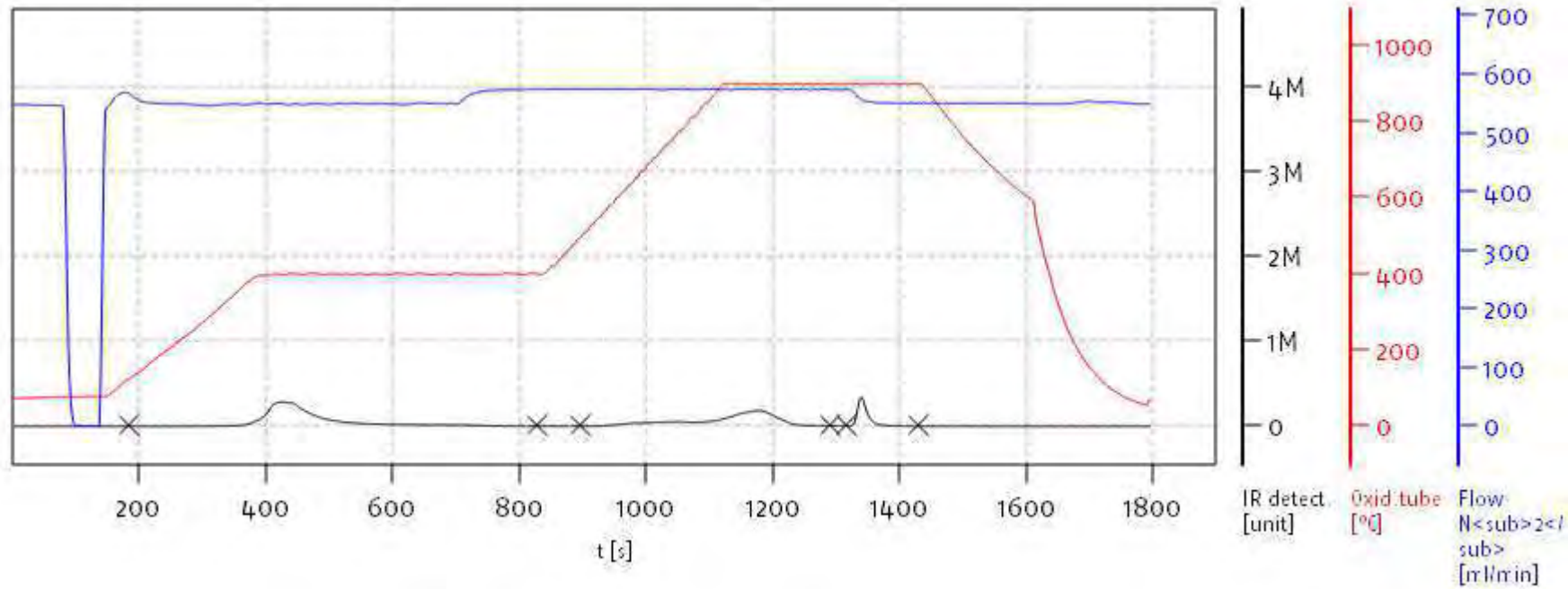
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Date: Tue May 9 14:33:55 2023

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
55	55	23E0152-10	528.40		CARBON	5/7/2023 6:06 PM	bl	0.369	1 096 750	0.618	0.064	243 528	875 143	0.306	0.249	0.9750	1.0000



Name:

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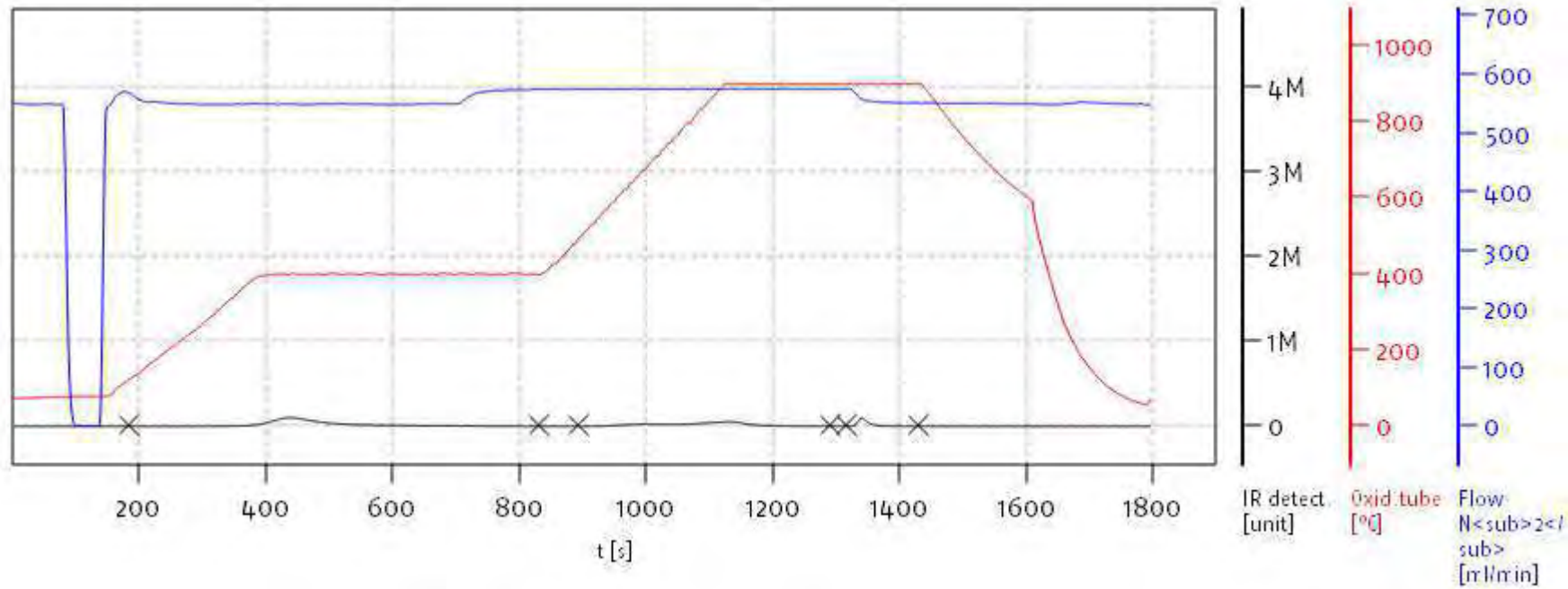
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
56	56	23E0152-11	474.20		CARBON	5/7/2023 6:36 PM	bl	0.142	423 766	0.224	0.015	73 714	277 093	0.126	0.082	0.9750	1.0000



Name:

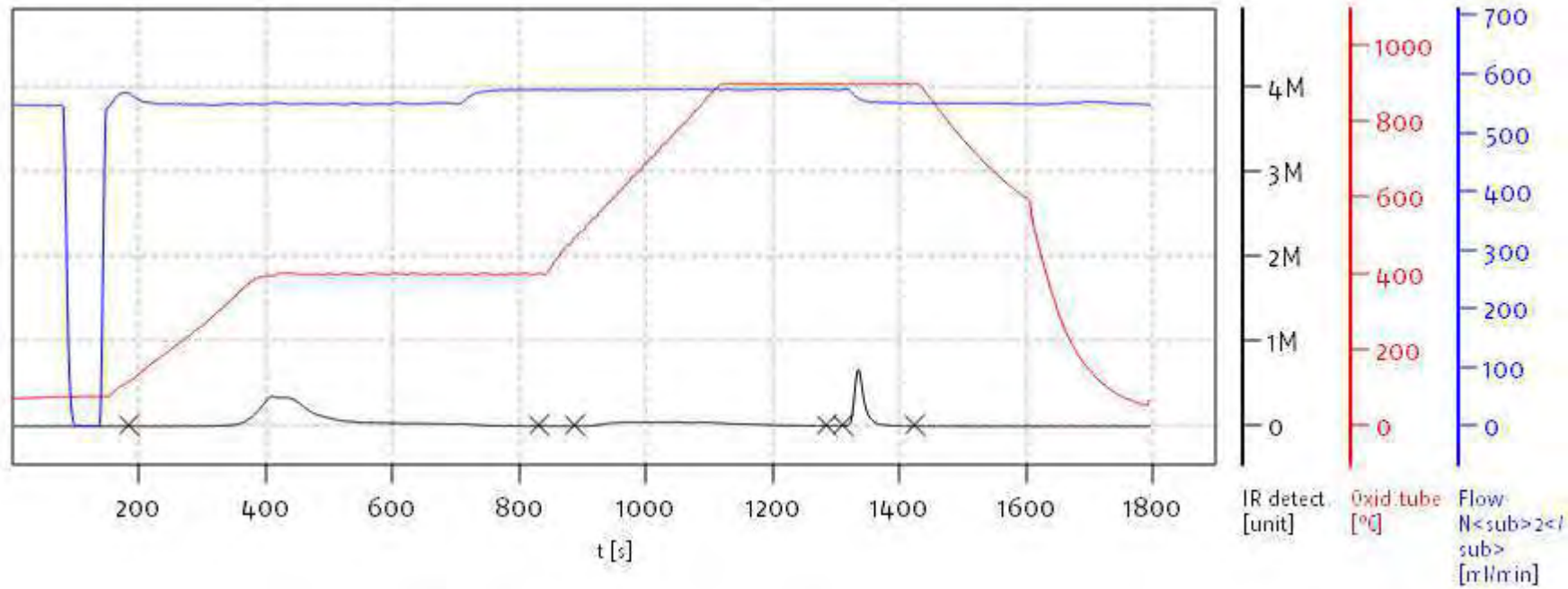
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Date: Tue May 9 14:33:55 2023

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
57	57	23E0152-12	544.80		CARBON	5/7/2023 7:06 PM	bl	0.548	1 561 810	0.667	0.123	459 114	443 760	0.425	0.119	0.9750	1.0000



Name:

Access: soliTOC superuser

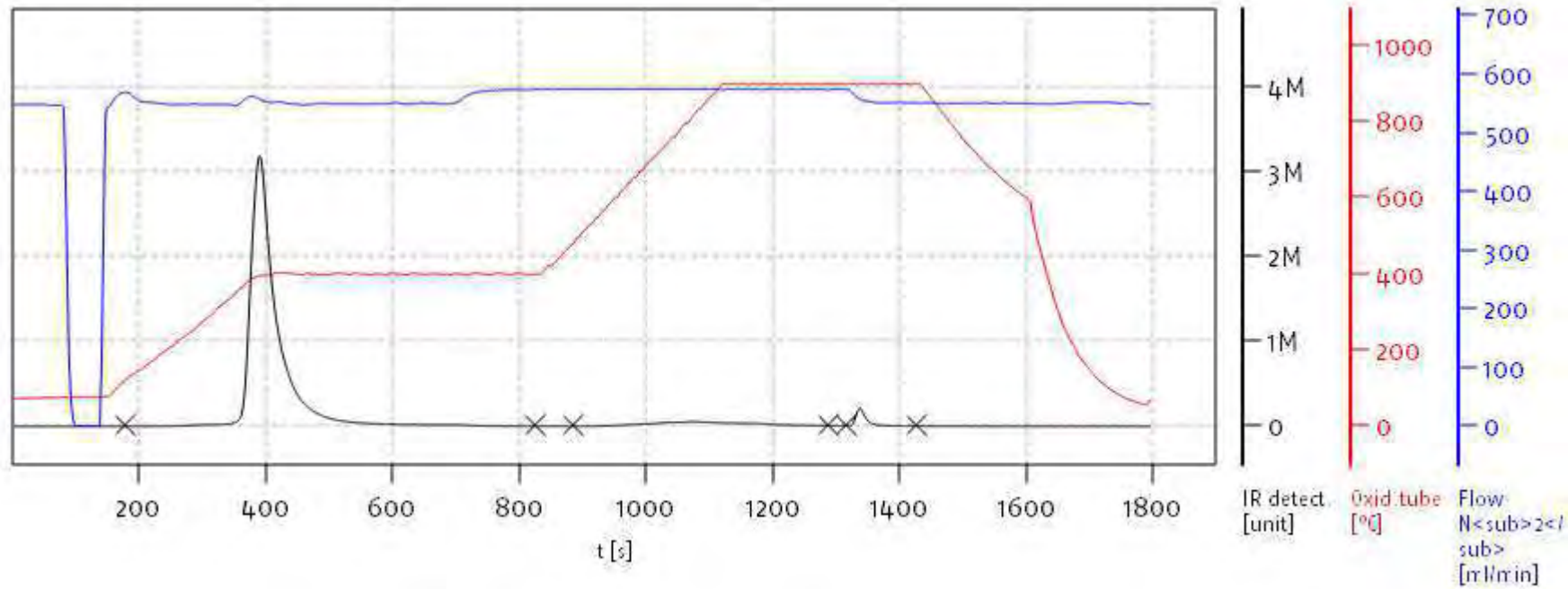
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
58	58	23E0152-13	509.80		CARBON	5/7/2023 7:37 PM	bl	1.712	5 668 710	1.824	0.041	162 027	398 133	1.670	0.113	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

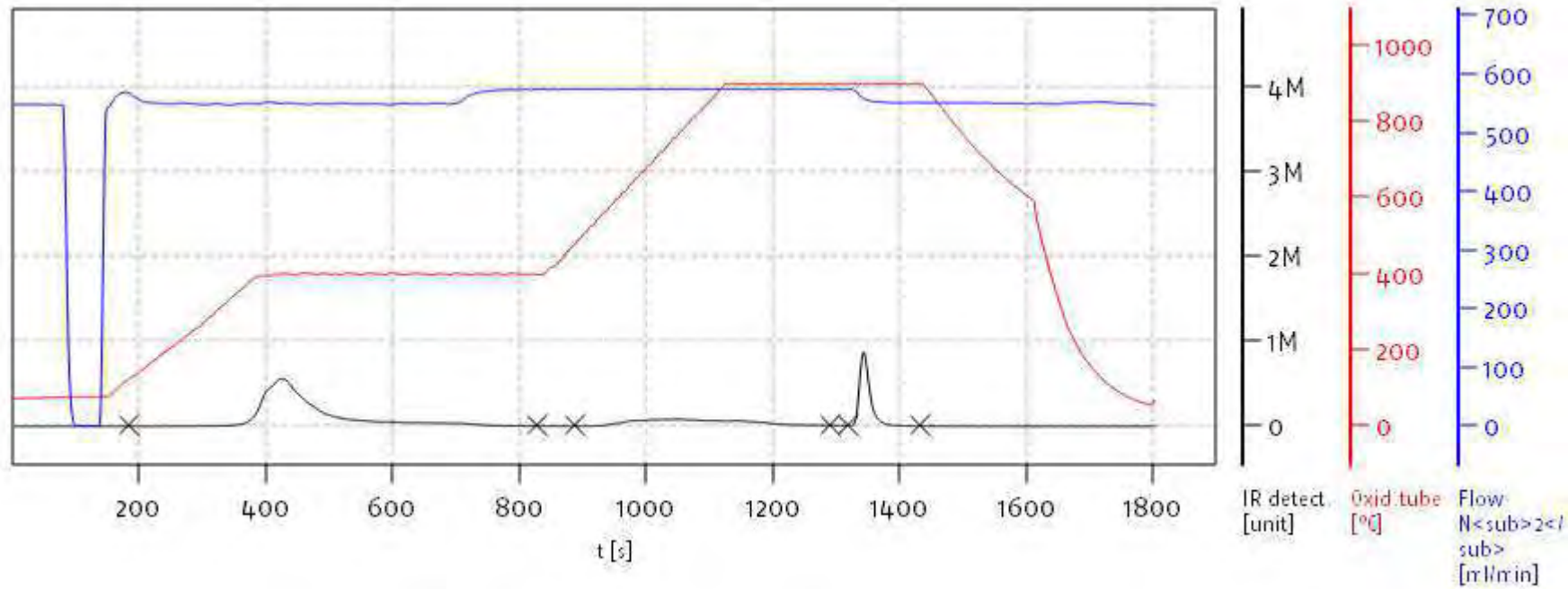
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
59	59	23E0152-14	557.80		CARBON	5/7/2023 8:07 PM	bl	0.738	2 127 070	0.924	0.170	637 583	696 921	0.568	0.186	0.9750	1.0000



Name:

Access: soliTOC superuser

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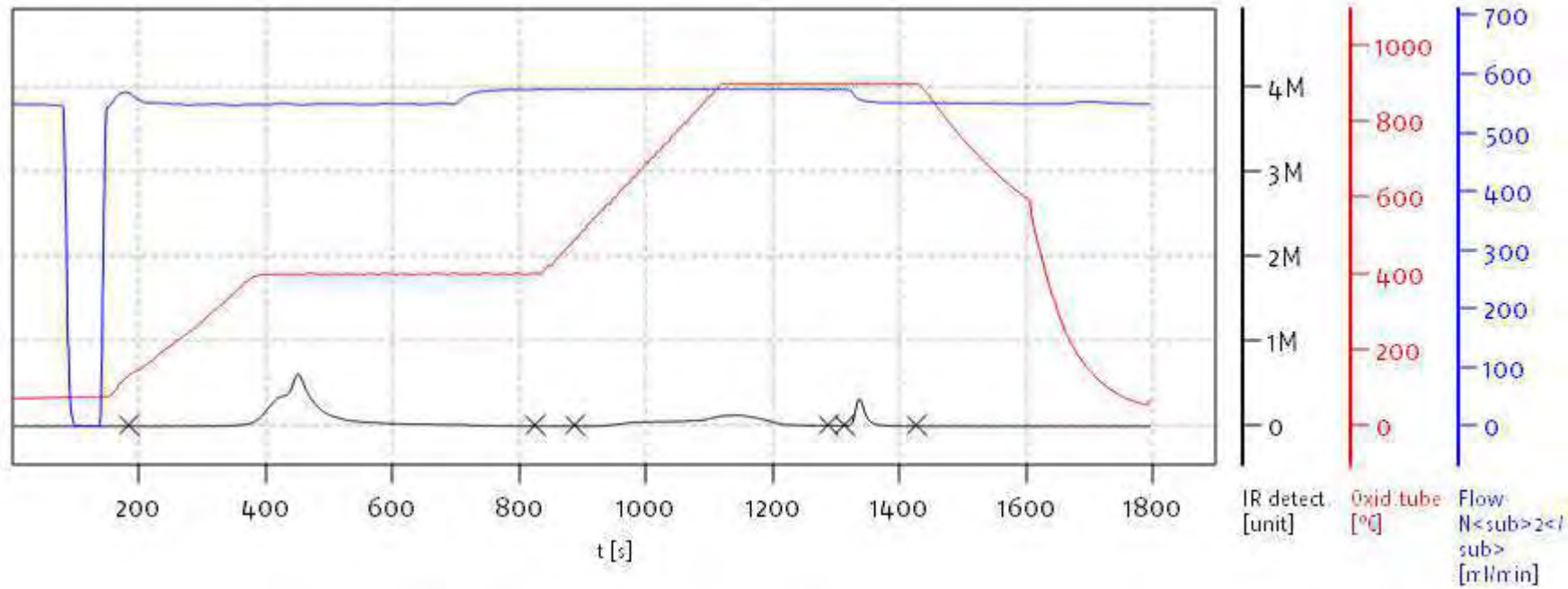
elementar
EXCELLENCE IN ELEMENTS

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Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
60	60	23E0152-15	578.60		CARBON	5/7/2023 8:38 PM	bl	0.510	1 770 670	0.709	0.055	231 354	773 011	0.455	0.200	0.9750	1.0000



Name:

Access: soliTOC superuser

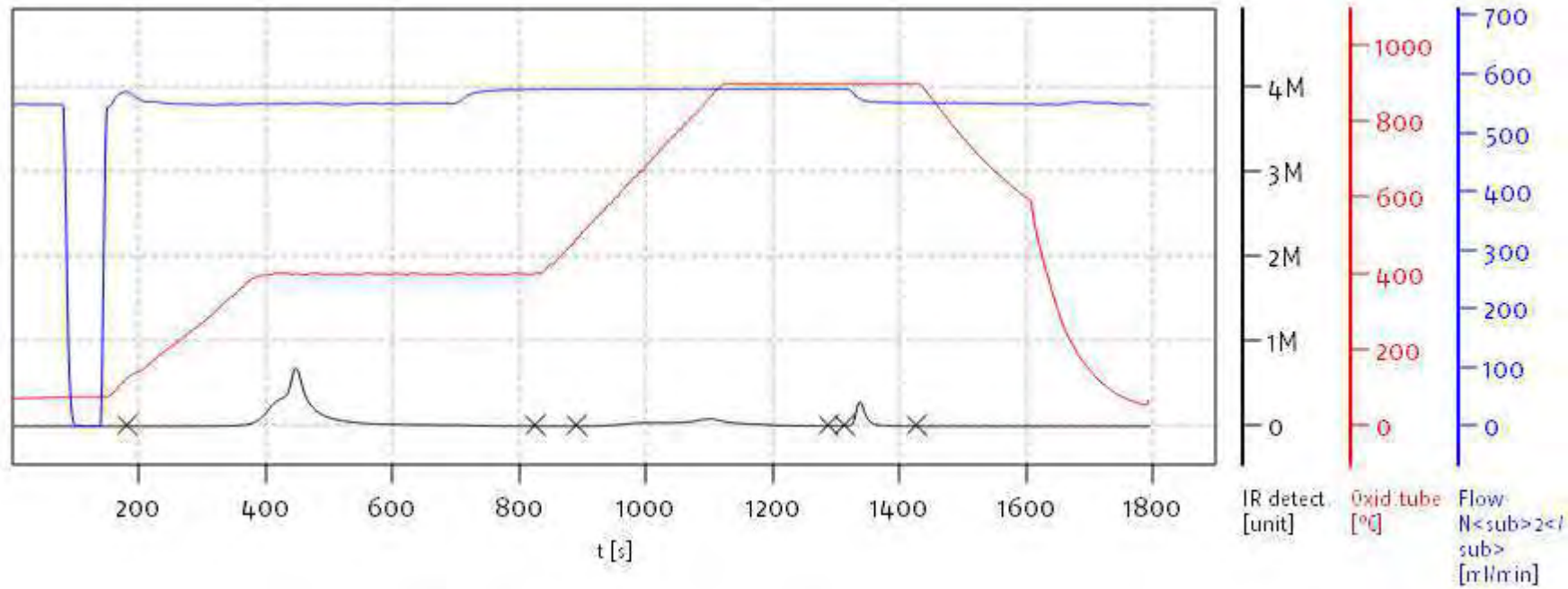
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elementar
EXCELLENCE IN ELEMENTS

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
61	61	23E0152-16	461.80		CARBON	5/7/2023 9:08 PM	bl	0.565	1 574 710	0.706	0.059	202 770	447 305	0.506	0.141	0.9750	1.0000



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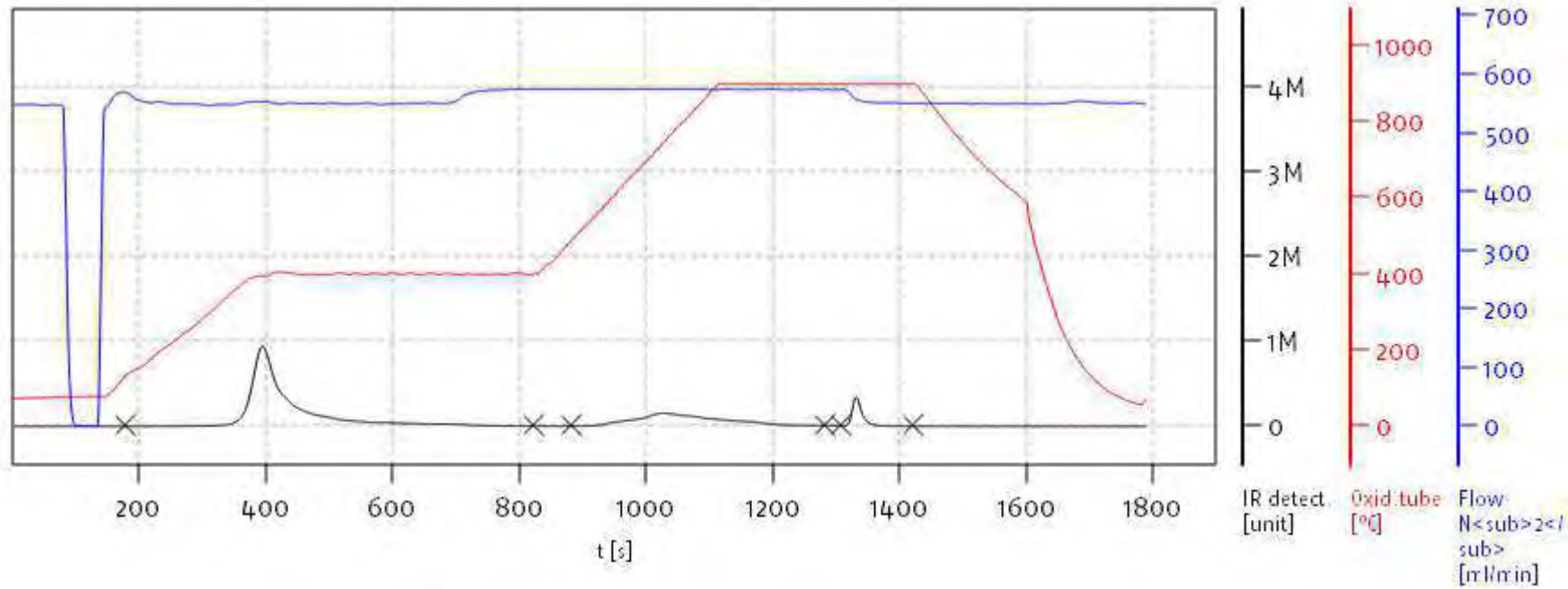
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
62	62	23E0156-01	561.80		CARBON	5/7/2023 9:38 PM	bl	0.694	2 390 790	0.942	0.059	239 481	925 976	0.635	0.248	0.9750	1.0000



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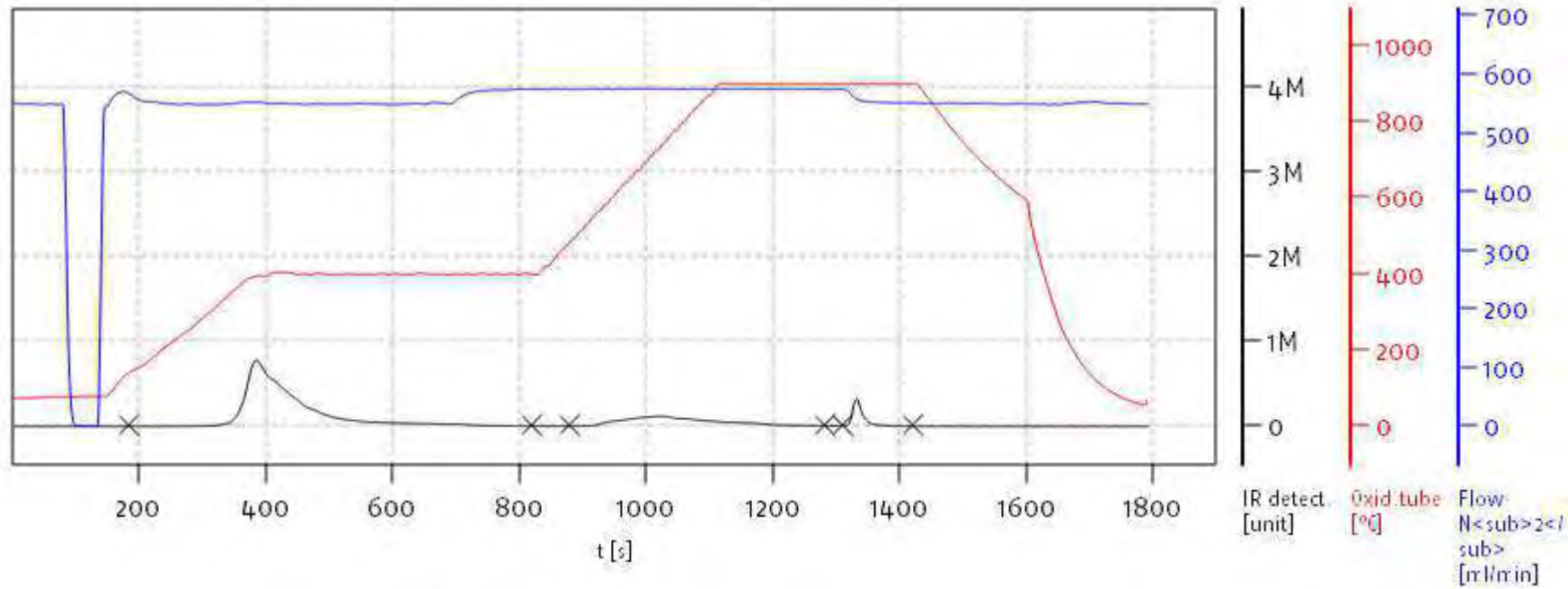
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
63	63	23E0156-02	594.40		CARBON	5/7/2023 10:08 PM	bl	0.721	2 652 250	0.914	0.054	234 598	768 791	0.667	0.193	0.9750	1.0000



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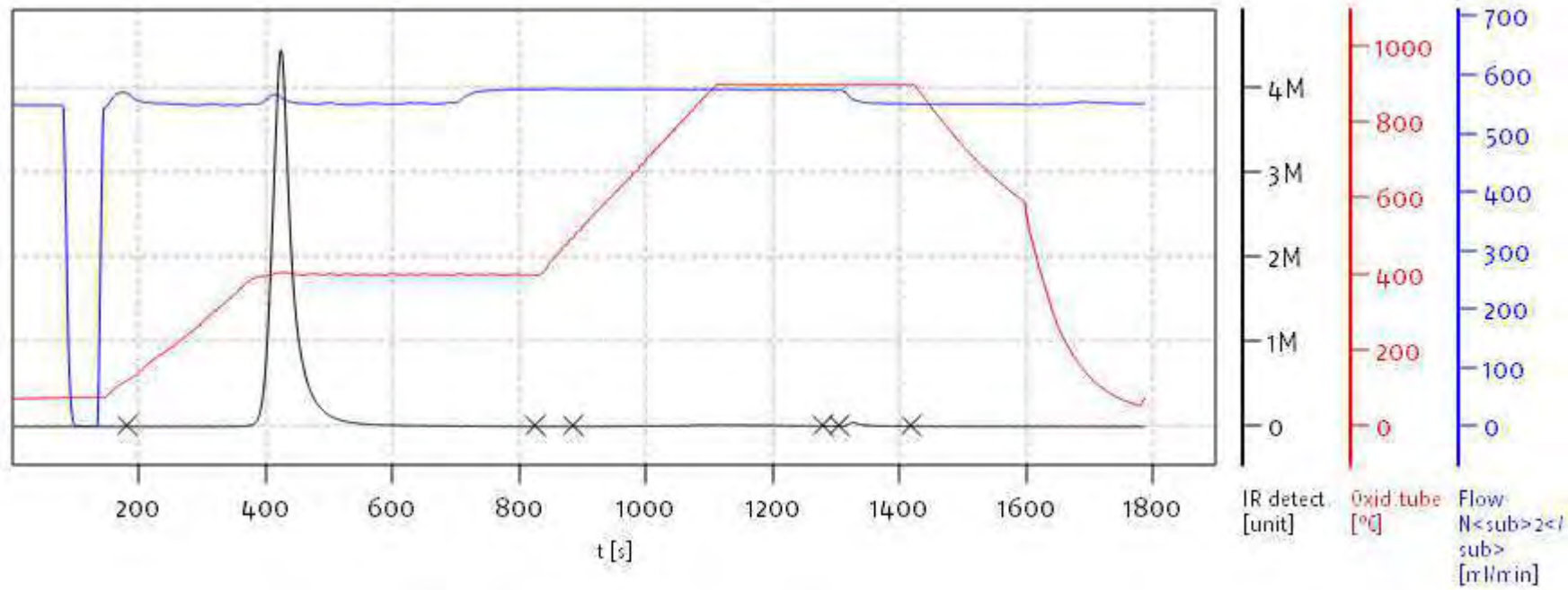
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
64	64	SLE0117-CCV5	21.80		CARBON	5/7/2023 10:38 PM	bl	43.547	6 283 530	44.394	0.228	58 573	145 749	43.320	0.847	0.9750	1.0000



Name:

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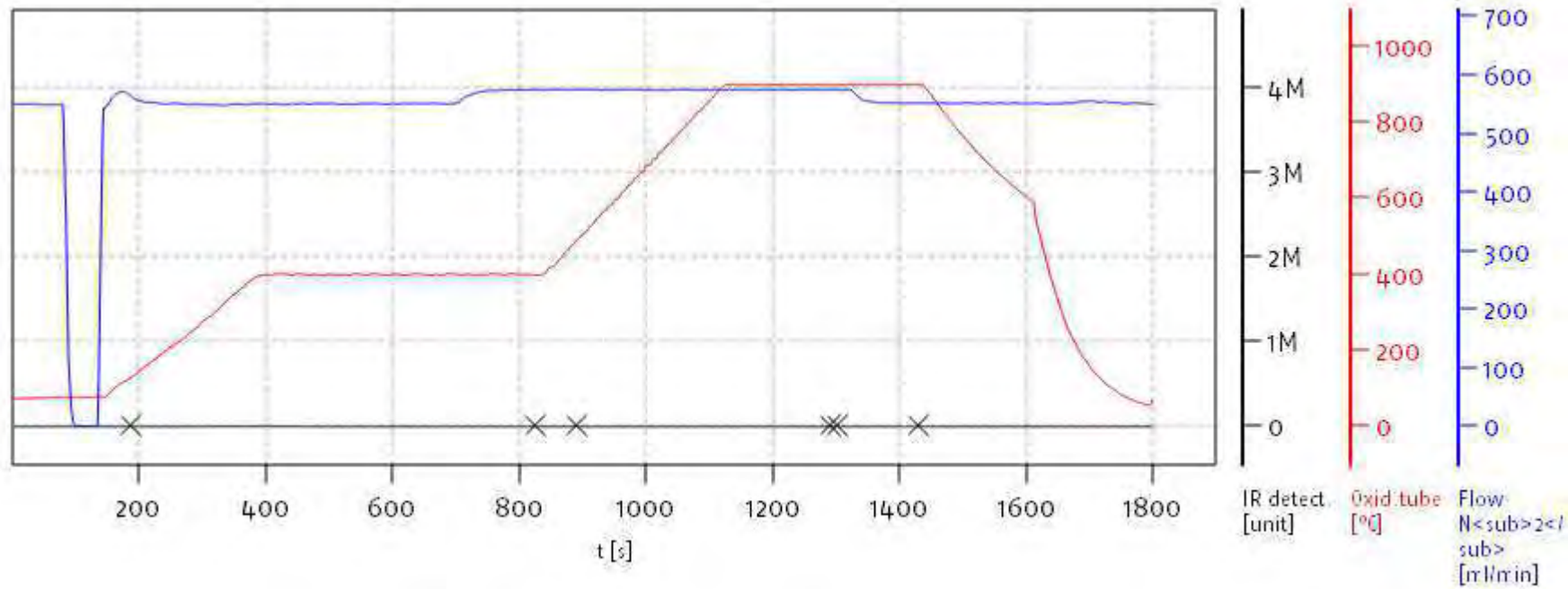
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
65	65	SLE0117-CCB5	557.50		CARBON	5/7/2023 11:09 PM	bl,C3u,C2u	0.000	10 898	0.000	0.000	555	18	0.000	0.000	0.9750	1.0000



Name:

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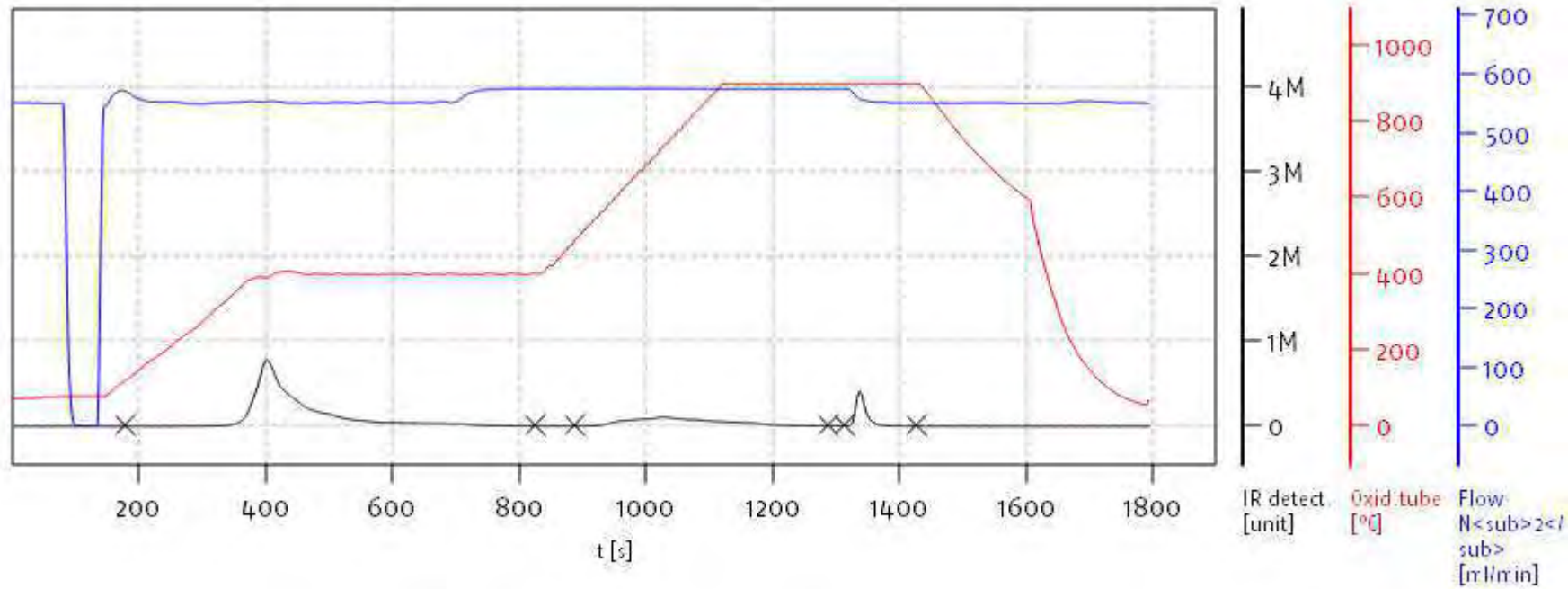
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
66	66	23E0156-03	515.90		CARBON	5/7/2023 11:39 PM	bl	0.762	2 359 810	0.960	0.079	290 105	687 602	0.683	0.198	0.9750	1.0000



Name:

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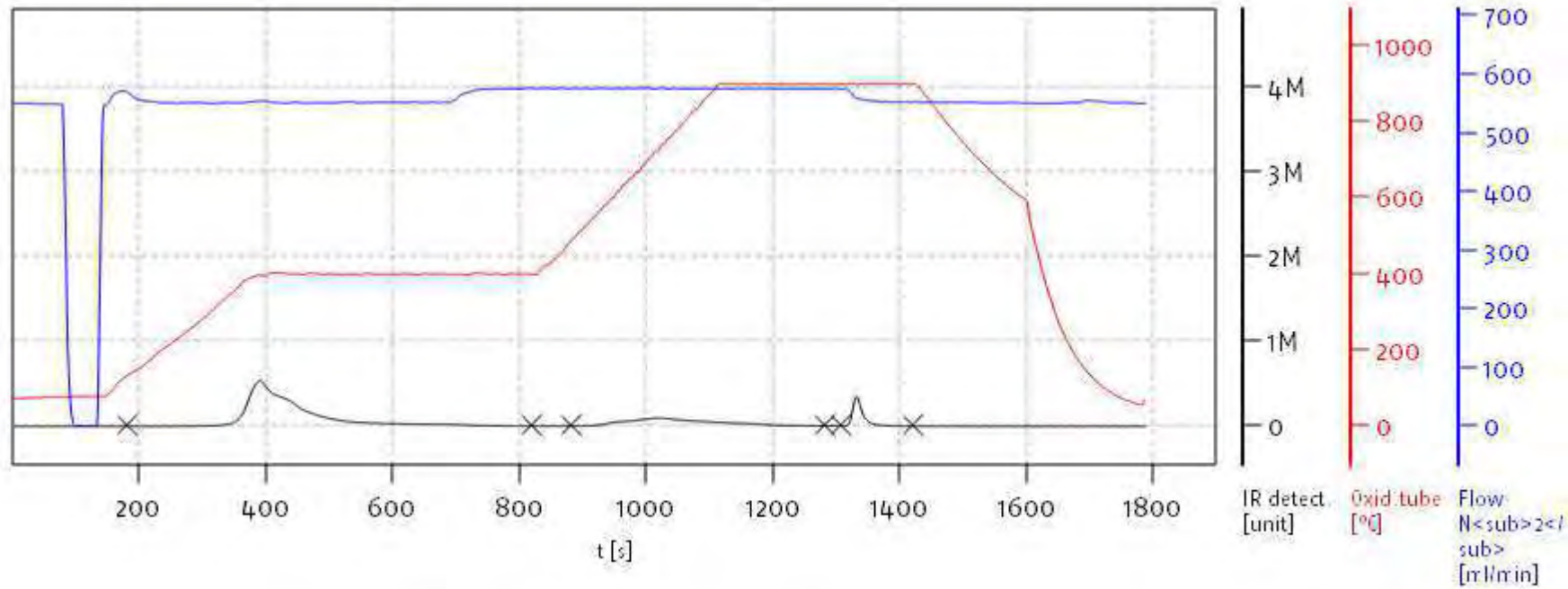
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elementar
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
67	67	23E0156-04	529.20		CARBON	5/8/2023 12:09 AM	bl	0.599	1 898 900	0.770	0.065	250 346	610 345	0.534	0.171	0.9750	1.0000



Name:

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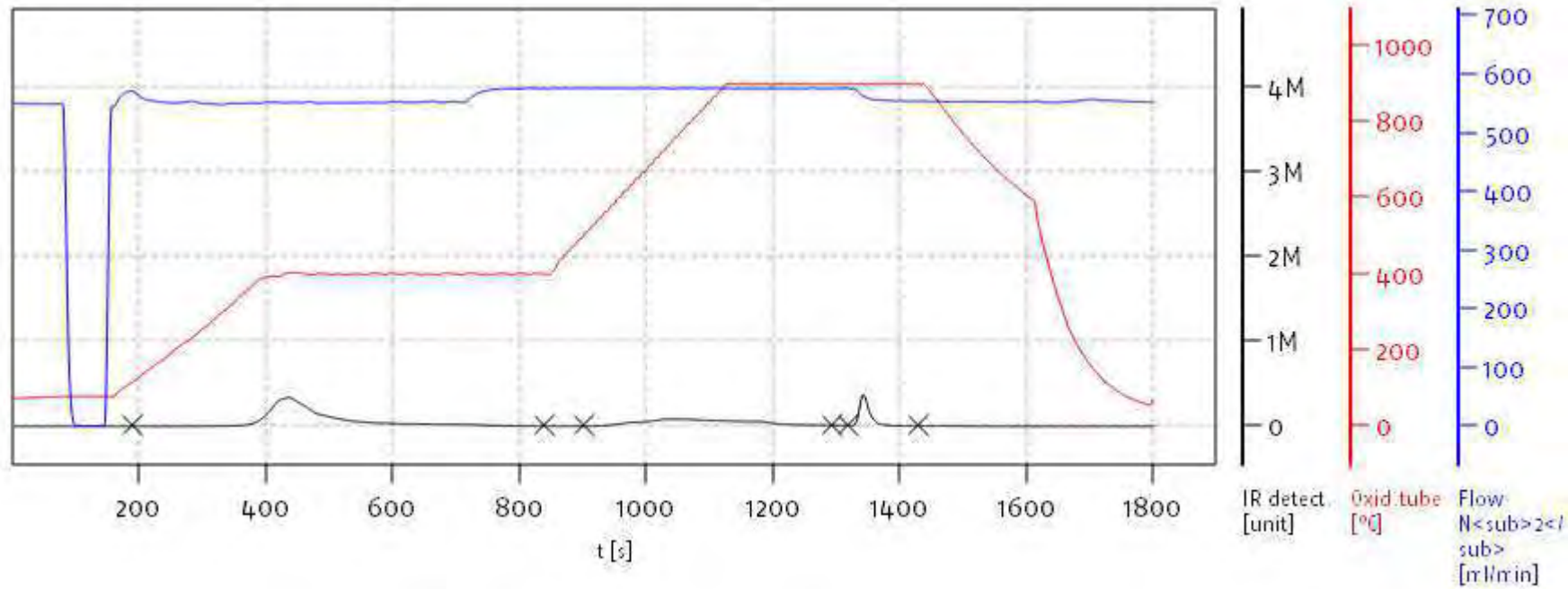
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
68	68	23E0156-05	587.40		CARBON	5/8/2023 12:40 AM	bl	0.402	1 335 240	0.572	0.066	276 098	671 509	0.336	0.170	0.9750	1.0000



Name:

Access: soliTOC superuser

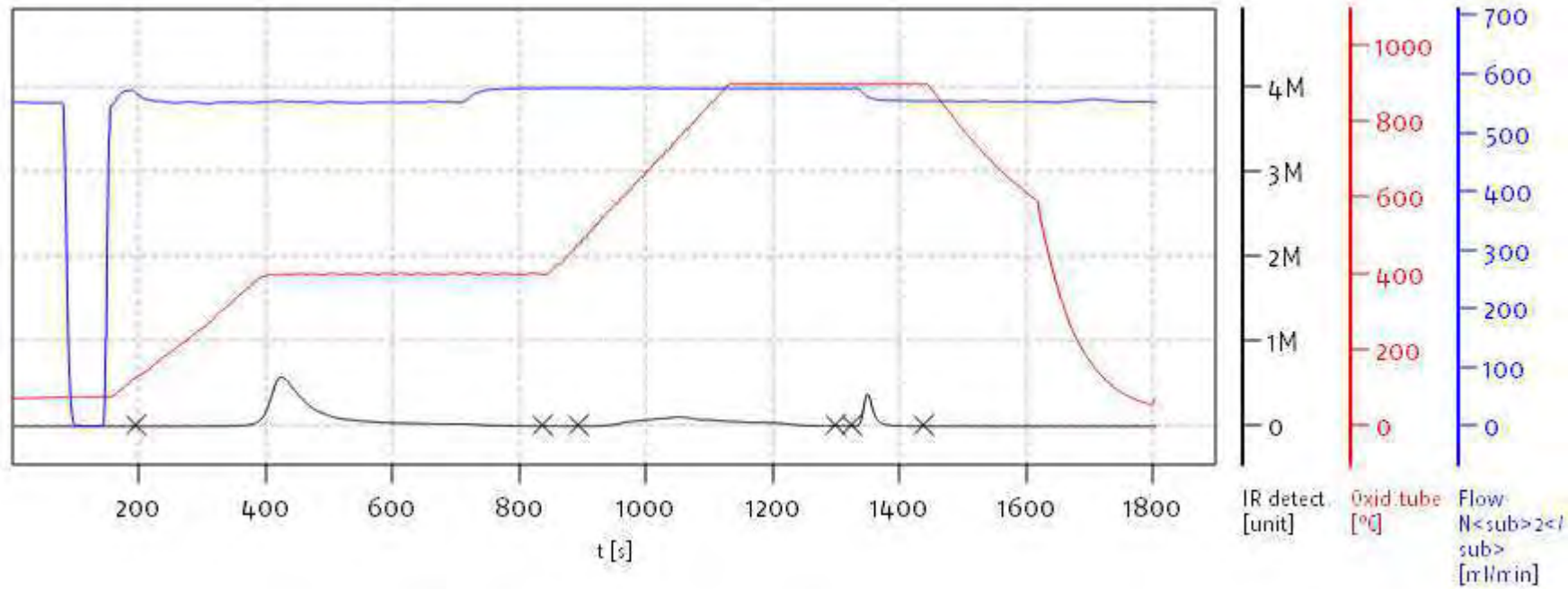
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elementar
EXCELLENCE IN ELEMENTS

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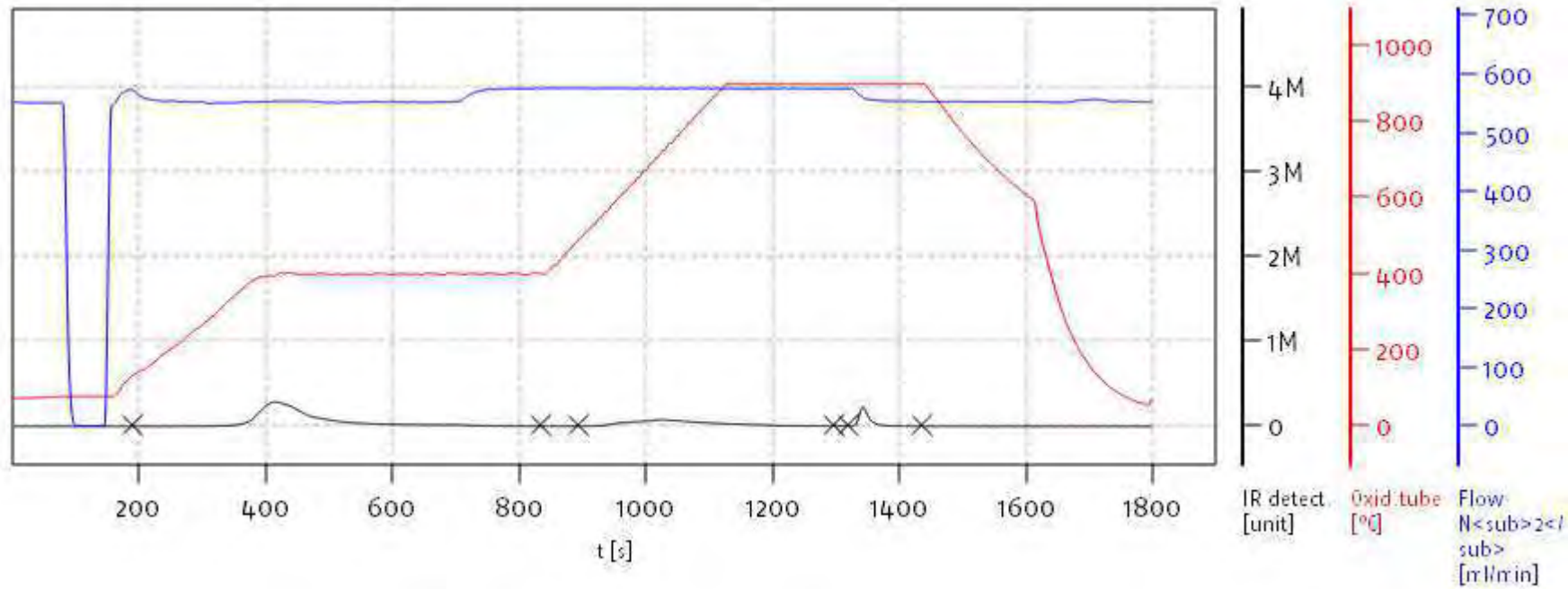
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
69	69	23E0156-06	591.80		CARBON	5/8/2023 1:10 AM	bl	0.515	1 801 930	0.698	0.062	264 380	725 340	0.453	0.183	0.9750	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
70	70	23E0156-07	626.70		CARBON	5/8/2023 1:41 AM	bl	0.303	1 147 840	0.409	0.033	159 116	458 289	0.270	0.107	0.9750	1.0000



Name:

Access: soliTOC superuser

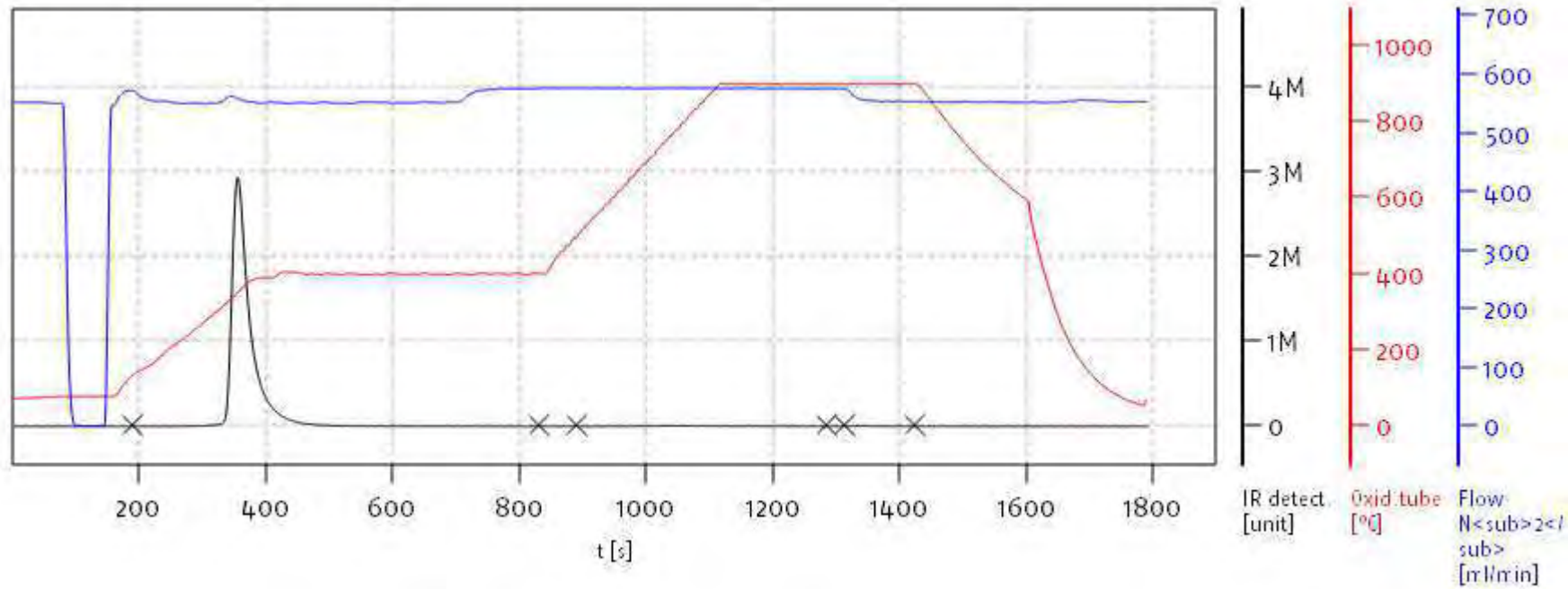
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

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Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
71	71	23C0164-01	91.50		CARBON	5/8/2023 2:11 AM	bl	5.982	3 653 180	5.999	0.000	9 575	36 592	5.982	0.017	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

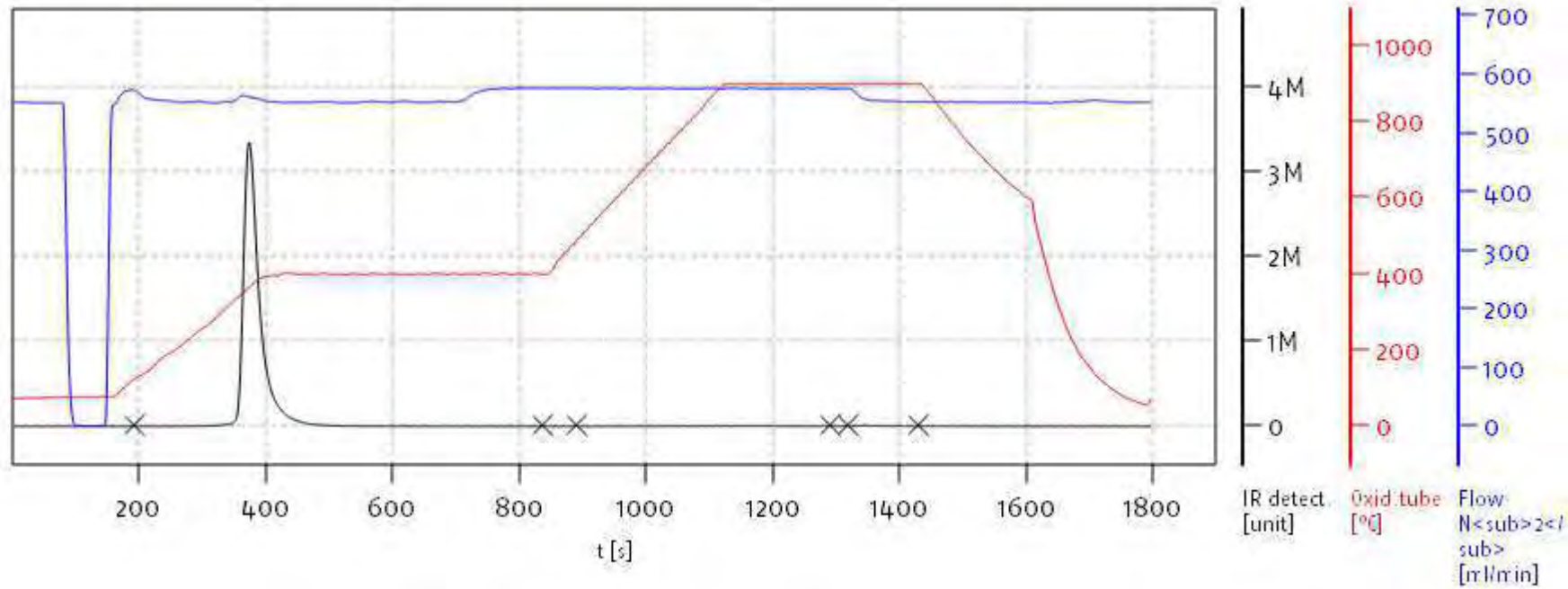
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
72	72	23C0164-02	135.50		CARBON	5/8/2023 2:41 AM	bl	4.151	3 752 700	4.153	0.000	17 691	28 703	4.151	0.002	0.9750	1.0000



Name:

Access: soliTOC superuser

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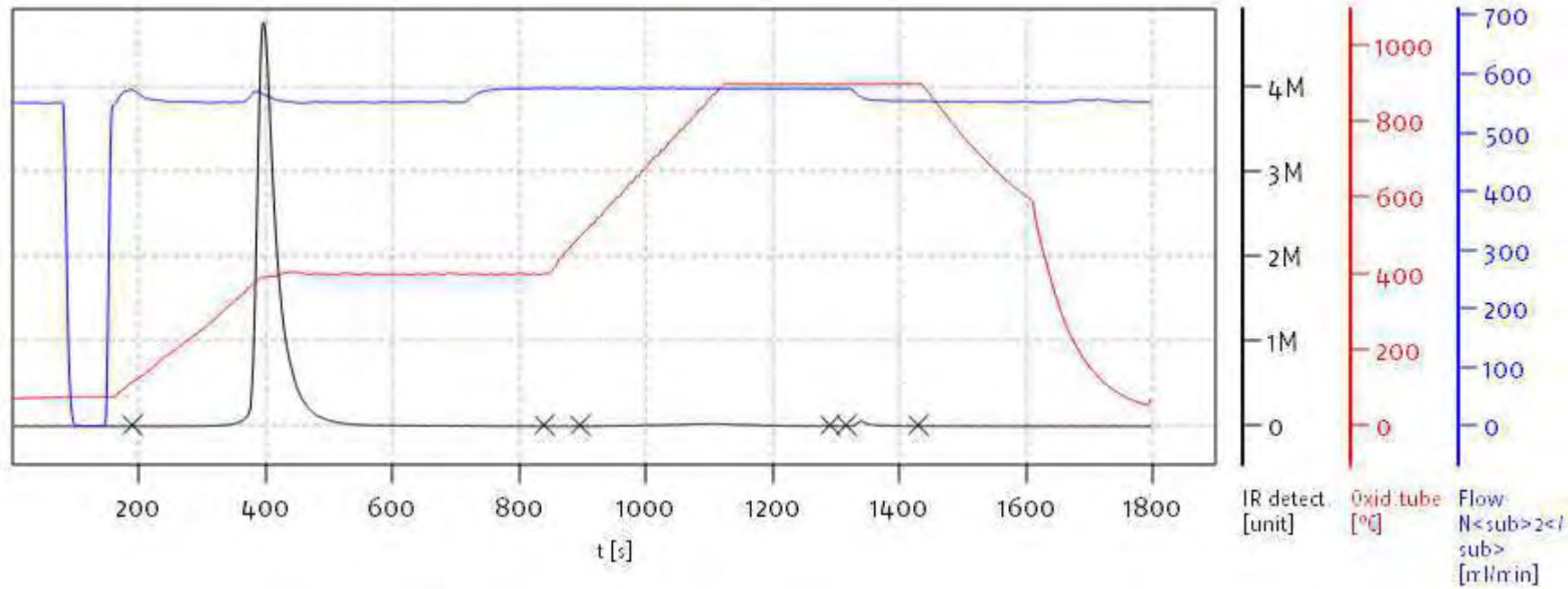
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
73	73	23C0673-01	228.00		CARBON	5/8/2023 3:12 AM	bl	4.391	6 625 970	4.493	0.022	58 727	177 663	4.369	0.103	0.9750	1.0000



Name:

Access: soliTOC superuser

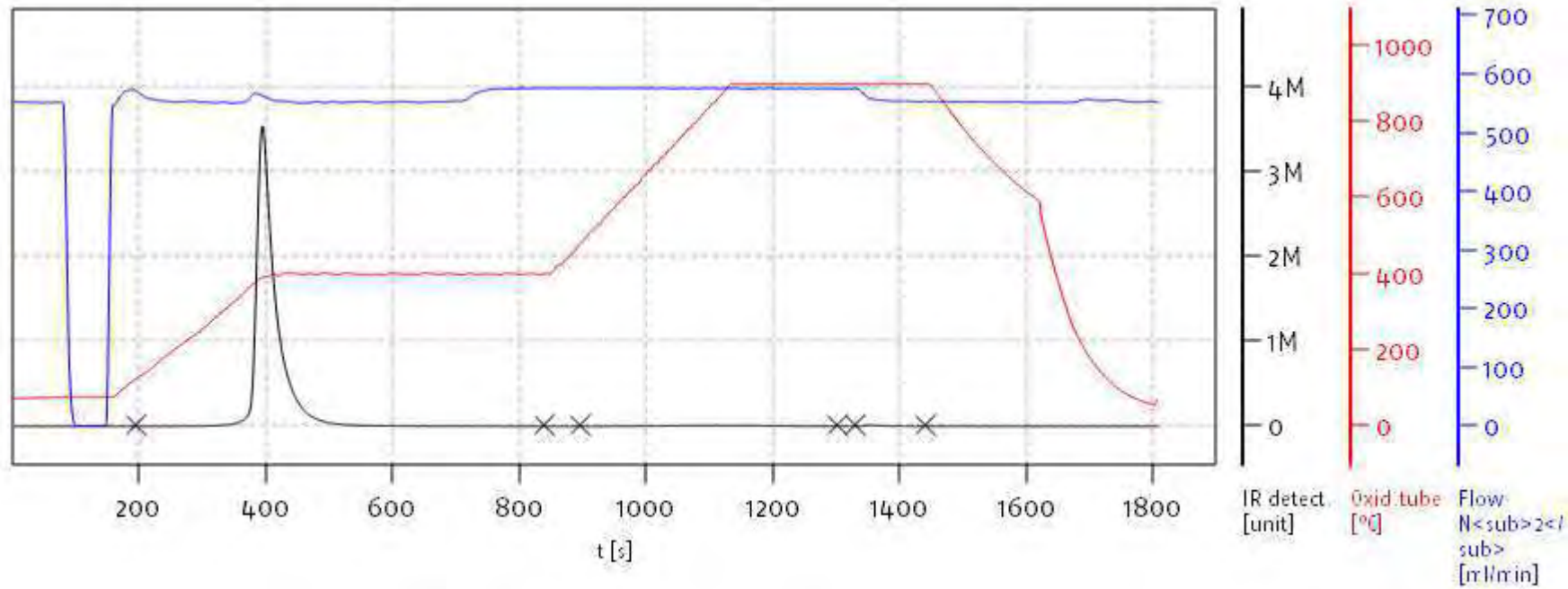
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
74	74	23C0673-02	156.50		CARBON	5/8/2023 3:42 AM	bl	4.428	4 617 720	4.474	0.000	18 796	73 169	4.428	0.046	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

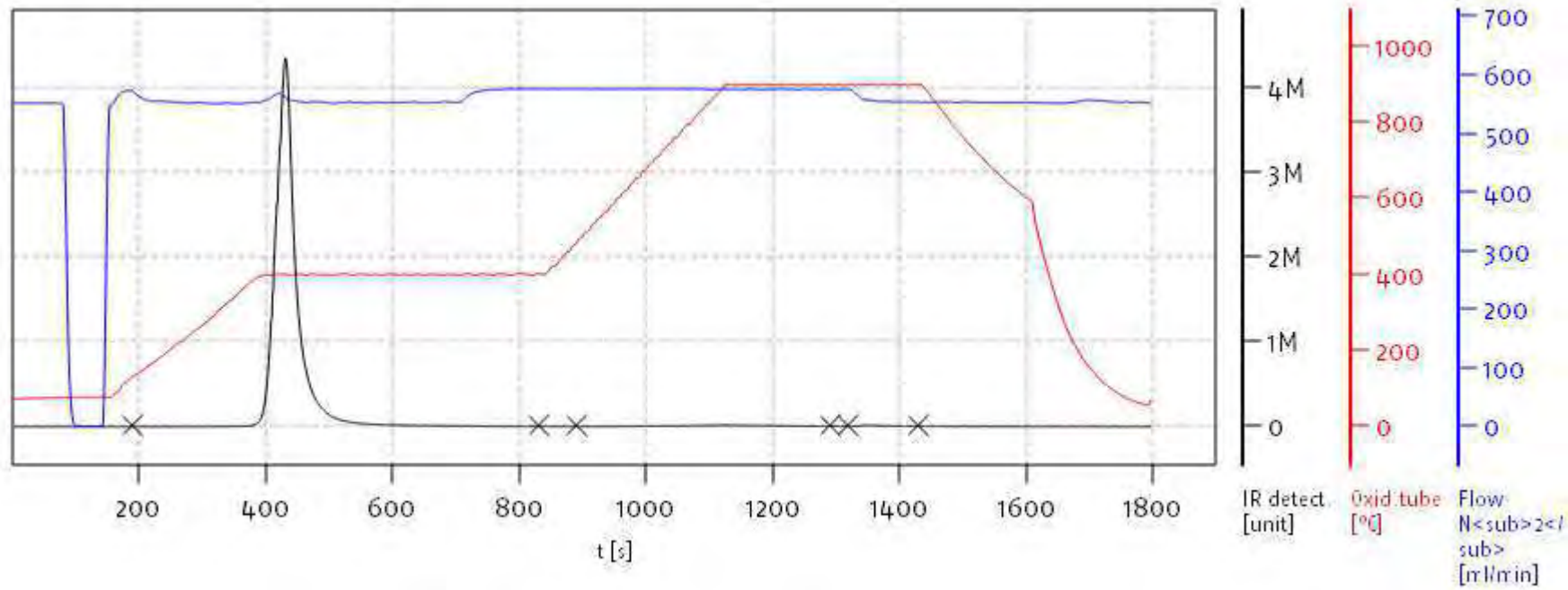
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
75	75	SLE0117-CCV6	21.20		CARBON	5/8/2023 4:13 AM	bl	43.463	6 122 490	44.164	0.064	35 240	122 595	43.399	0.701	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

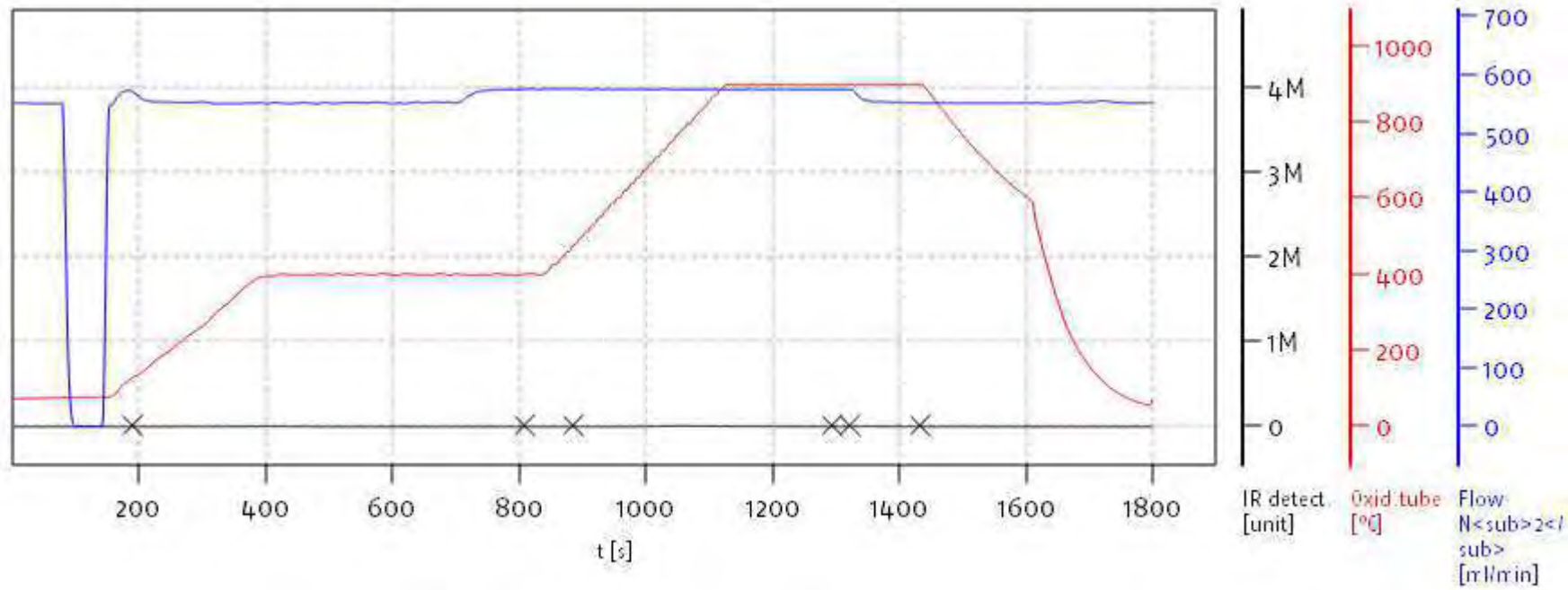
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
76	76	SLE0117-CCB6	533.90		CARBON	5/8/2023 4:43 AM	bl	0.000	16 528	0.005	0.000	8 189	44 397	0.000	0.005	0.9750	1.0000



Name:

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elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Inorganic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
% Soot	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0148
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Calibration:	FD00070	Instrument:	TOC Cube
Calibration Date:	04/26/2022 11:29		

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Inorganic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
% Soot	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Inorganic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
% Soot	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Inorganic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
% Soot	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408

INITIAL CALIBRATION DATA

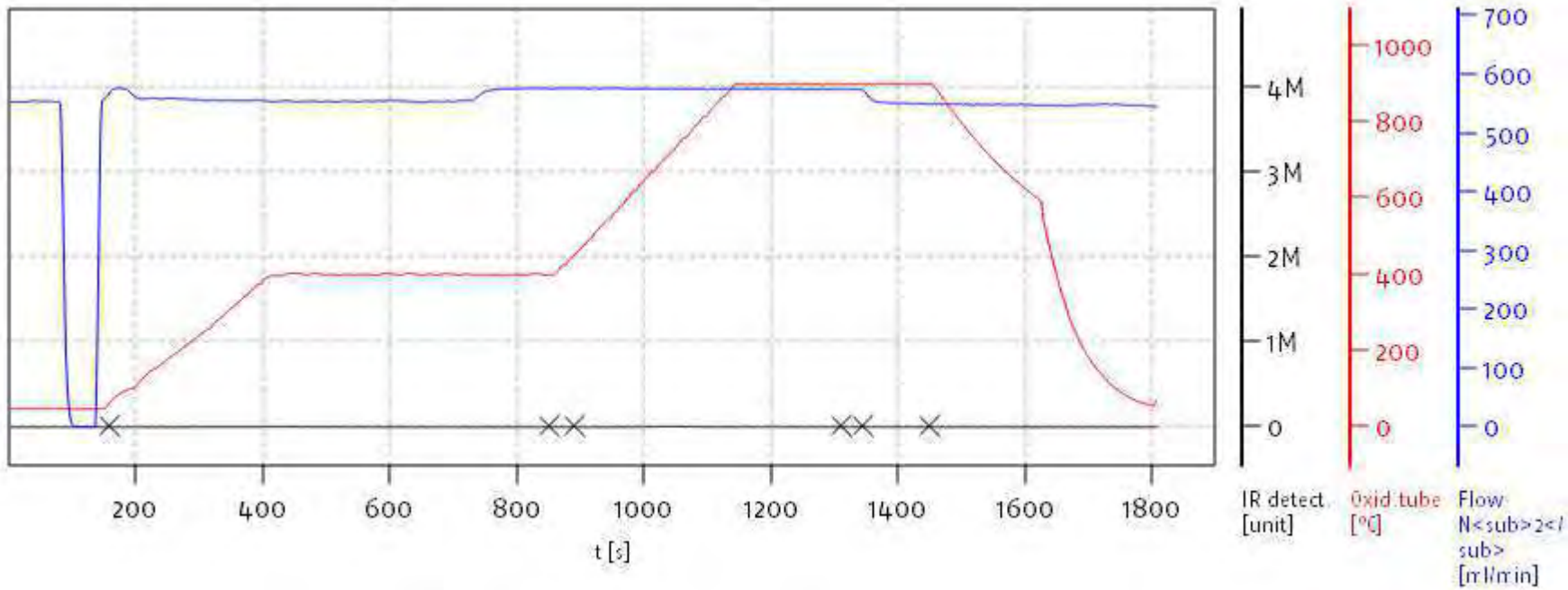
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0148
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Calibration:	FD00070	Instrument:	TOC Cube
Calibration Date:	04/26/2022 11:29		

COMPOUND	Mean RF	RF RSD	Linear COD	Quad COD	COD Limit	Q
Total Organic Carbon	1424064	15.9	0.9988			
Total Carbon	1424064	15.9	0.9988			
Total Inorganic Carbon	1424064	15.9	0.9988			
% Soot	1424064	15.9	0.9988			

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		1.00	CARBON	4/26/2022 11:29 AM	0.000	0.000	0.000	bl	29 049	30 612	3 899	1.0000	1.0000



Name:

Access: soliTOC superuser

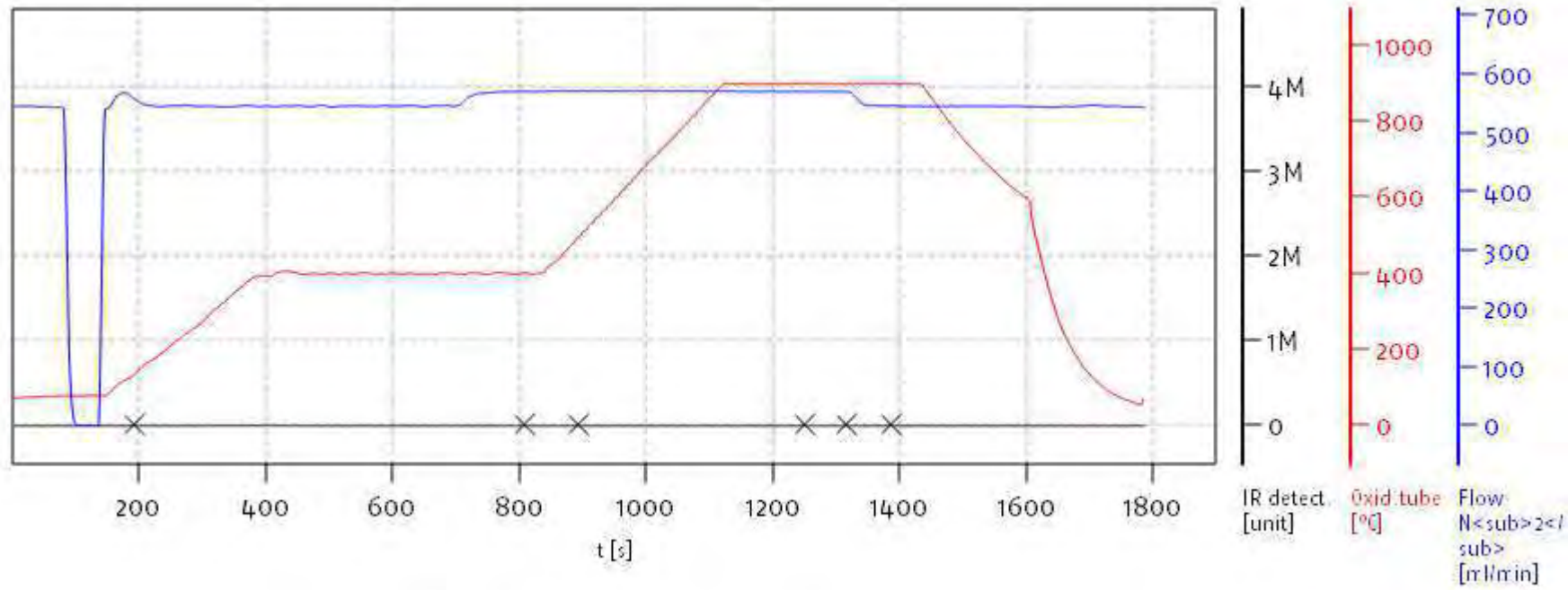
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
2	2	BLANK	1.00		1.00	CARBON	4/26/2022 12:00 PM	0.000	0.000	0.000	bl	11 115	60	8	1.0000	1.0000



Name:

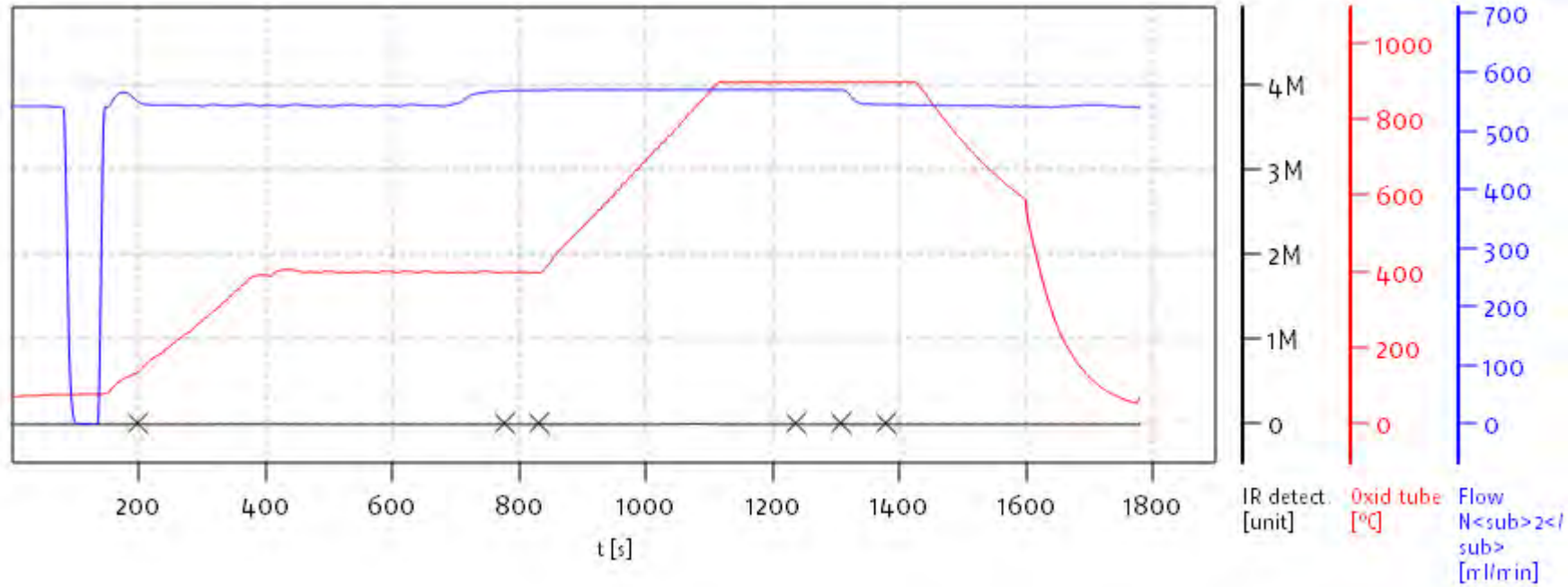
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
3	3	SEQ-CAL1	200.00	0.0027	1.00	CARBON	4/26/2022 12:30 PM	0.010	0.008	0.018	bl,C1u,C2u	7 294	11 739	22	1.0000	0.7425



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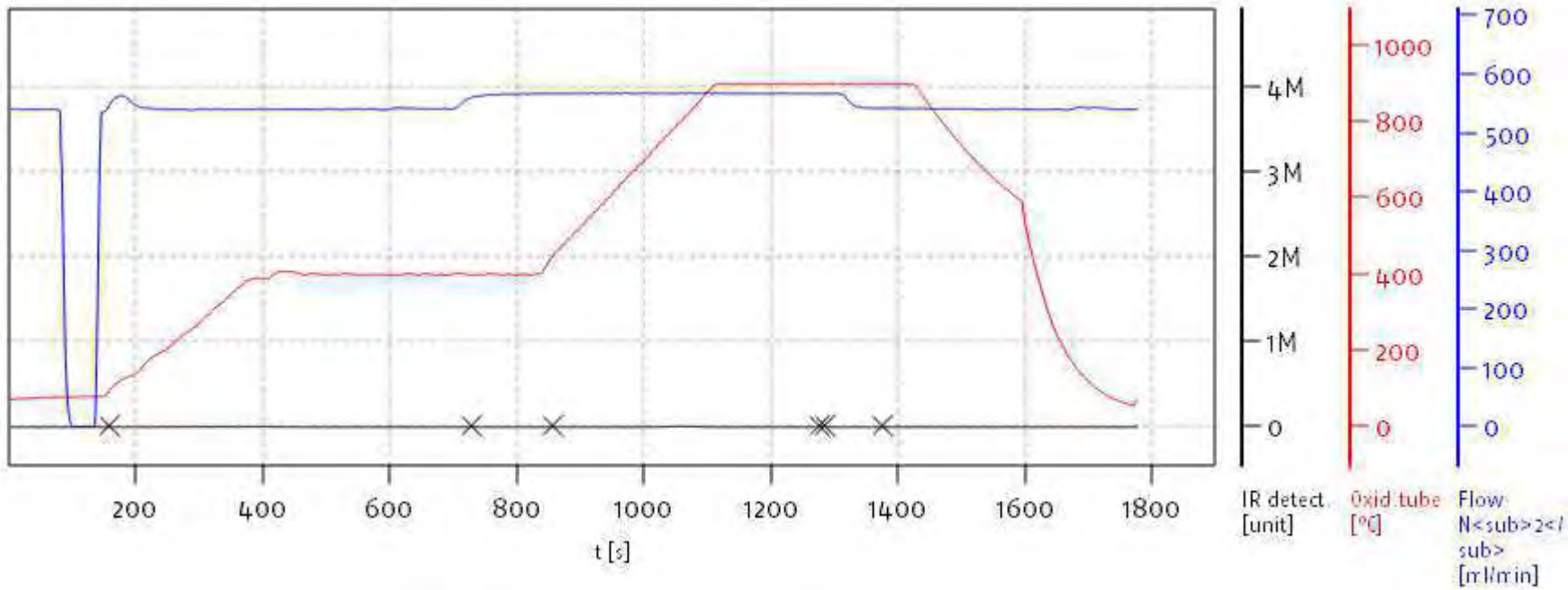
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
4	4	SEQ-CAL2	200.00	0.0049	1.00	CARBON	4/26/2022 1:00 PM	0.023	0.015	0.038	bl,C2u	23 296	19 107	47	1.0000	0.8936



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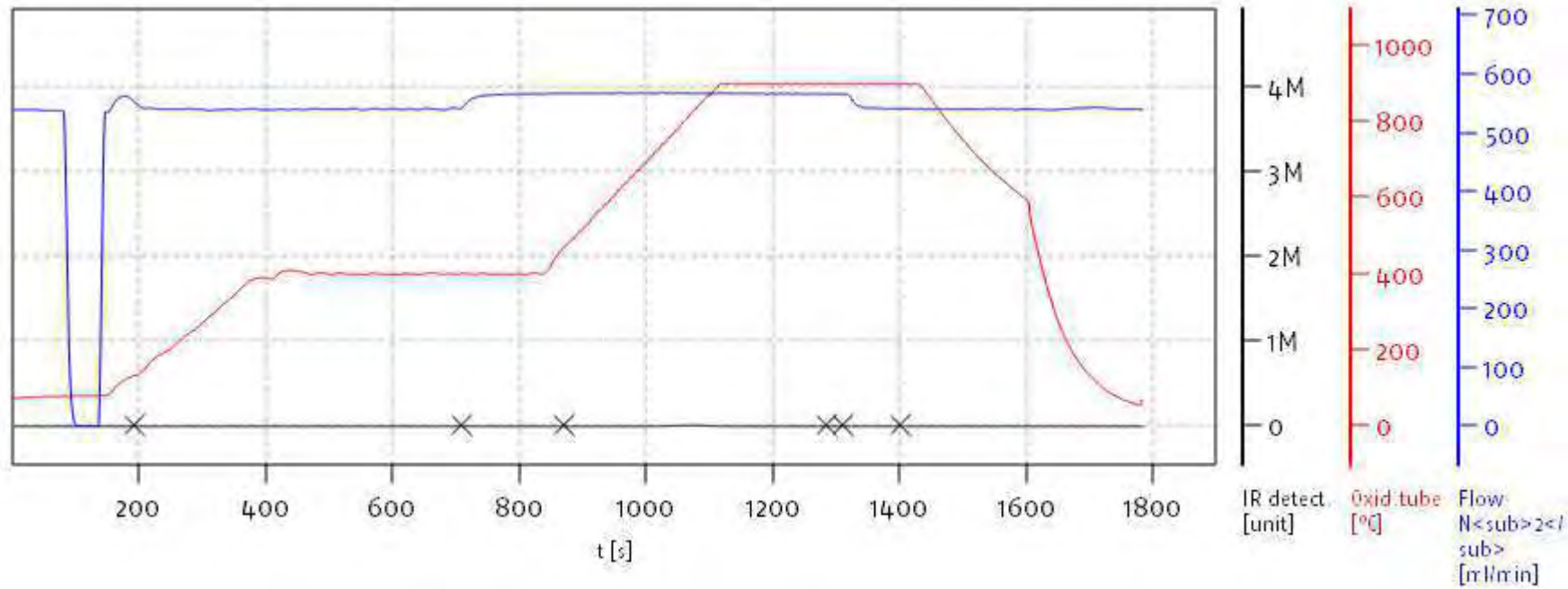
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
5	5	SEQ-CAL3	200.00	0.0071	1.00	CARBON	4/26/2022 1:30 PM	0.006	0.022	0.028	bl,C1u,C2u	2 319	27 530	170	1.0000	0.9343



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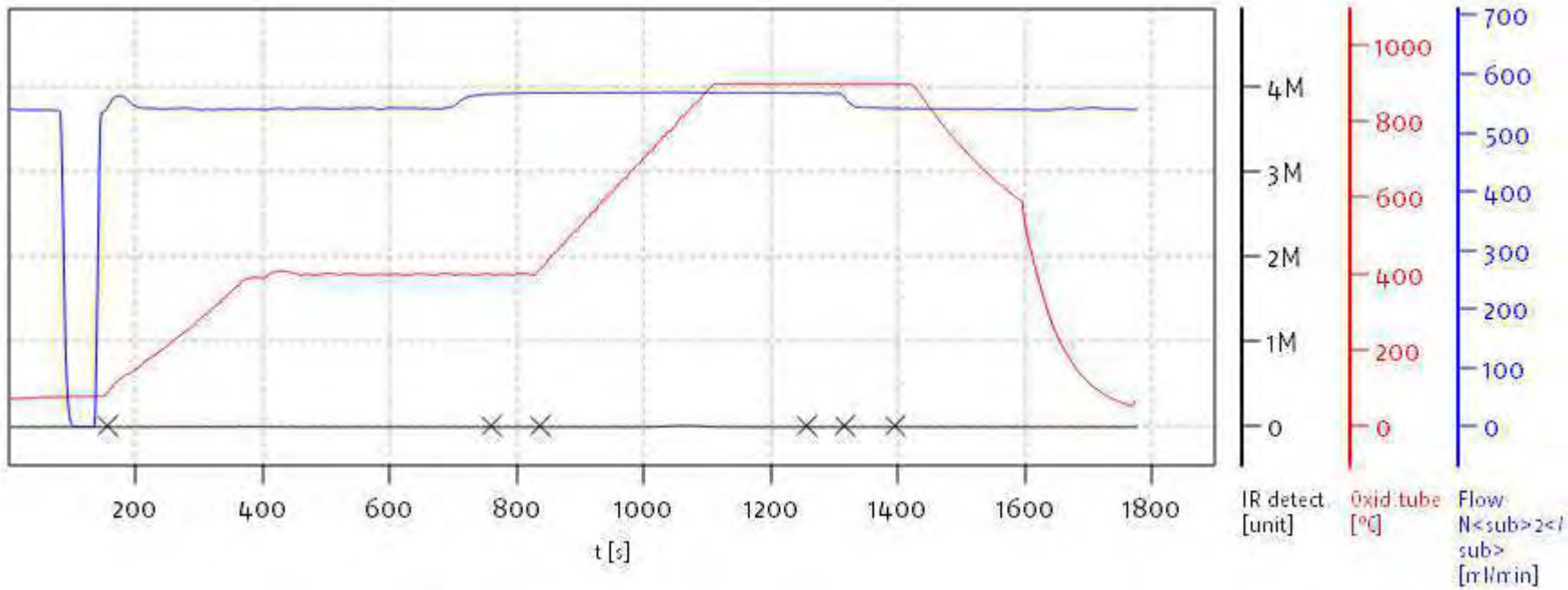
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
6	6	SEQ-CAL4	200.00	0.0098	1.00	CARBON	4/26/2022 2:00 PM	0.020	0.030	0.050	bl,C2u	19 746	38 017	109	1.0000	0.9461



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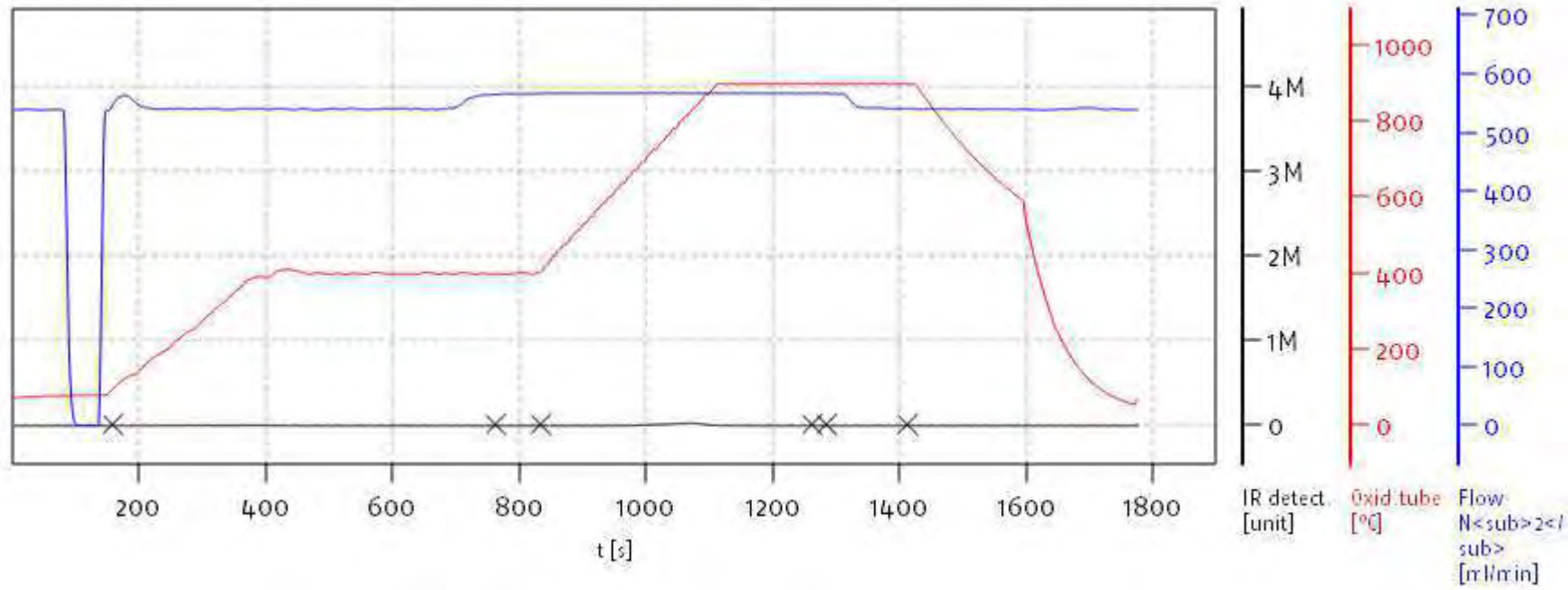
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
7	7	SEQ-CAL5	200.00	0.0148	1.00	CARBON	4/26/2022 2:30 PM	0.021	0.045	0.066	bl,C2u	20 951	92 945	236	1.0000	0.5975



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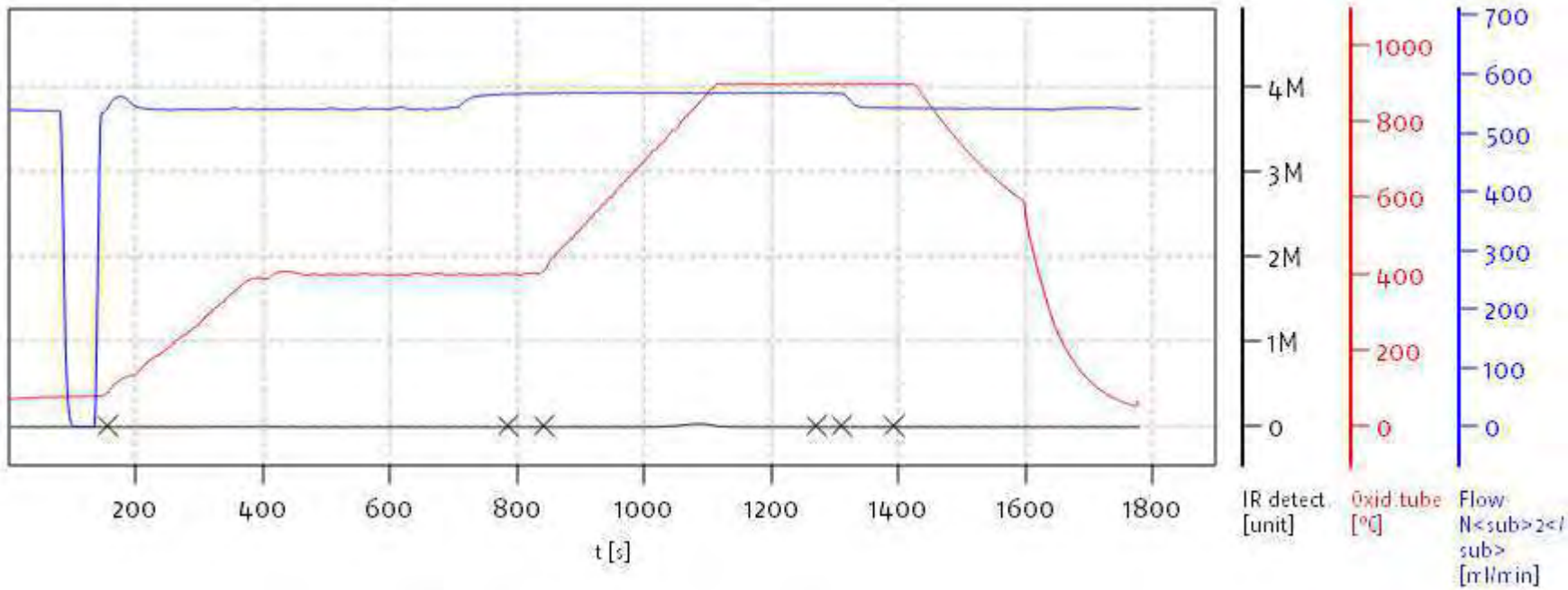
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
8	8	SEQ-CAL6	200.00	0.0196	1.00	CARBON	4/26/2022 3:00 PM	0.012	0.061	0.073	bl,C2u	10 118	82 297	59	1.0000	0.9144



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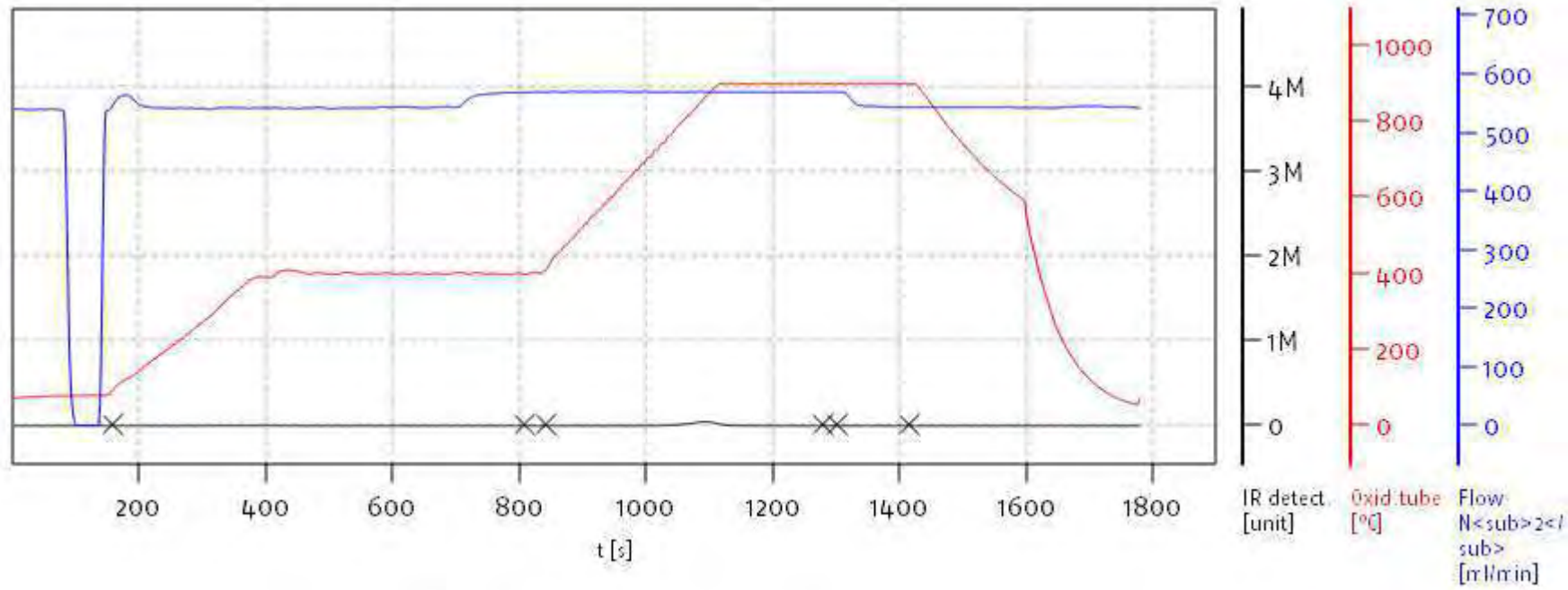
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
9	9	SEQ-CAL7	200.00	0.0247	1.00	CARBON	4/26/2022 3:30 PM	0.013	0.075	0.088	bl,C2u	10 555	101 530	292	1.0000	0.9173



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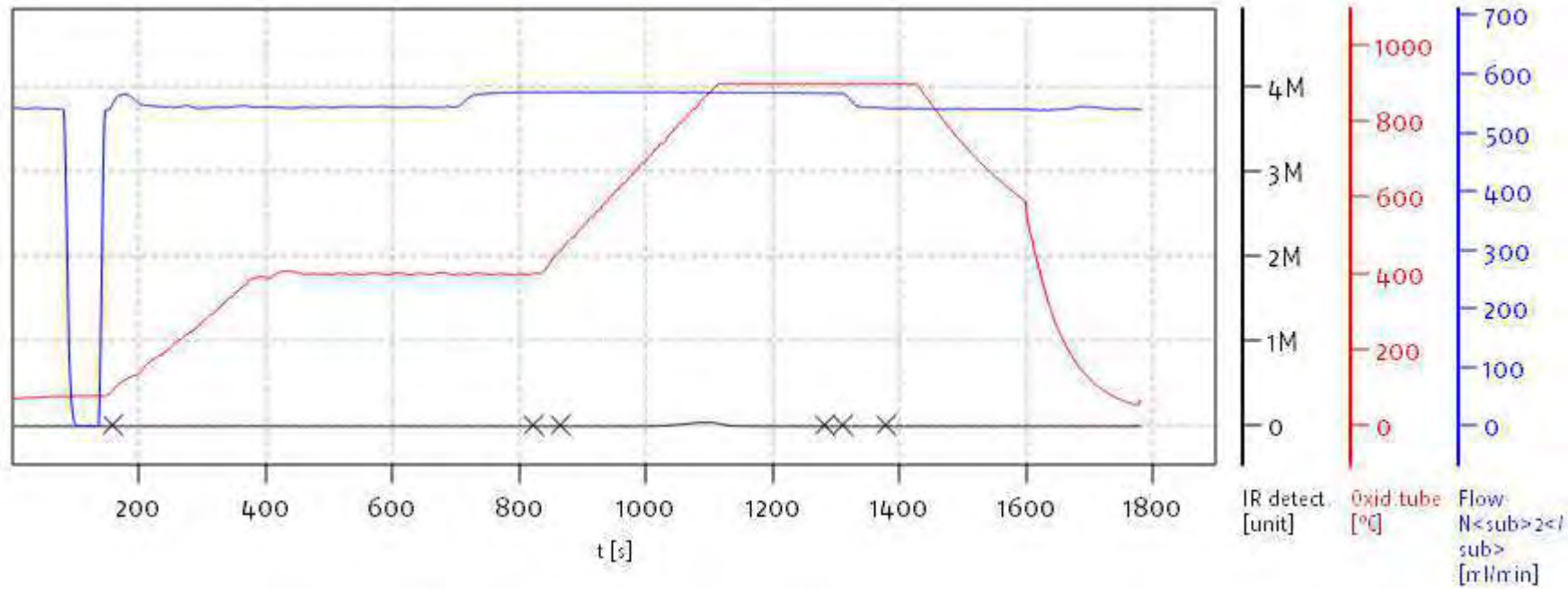
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
10	10	SEQ-CAL8	200.00	0.0298	1.00	CARBON	4/26/2022 4:00 PM	0.009	0.091	0.100	bl,C1u,C2u	6 668	120 822	116	1.0000	0.9312



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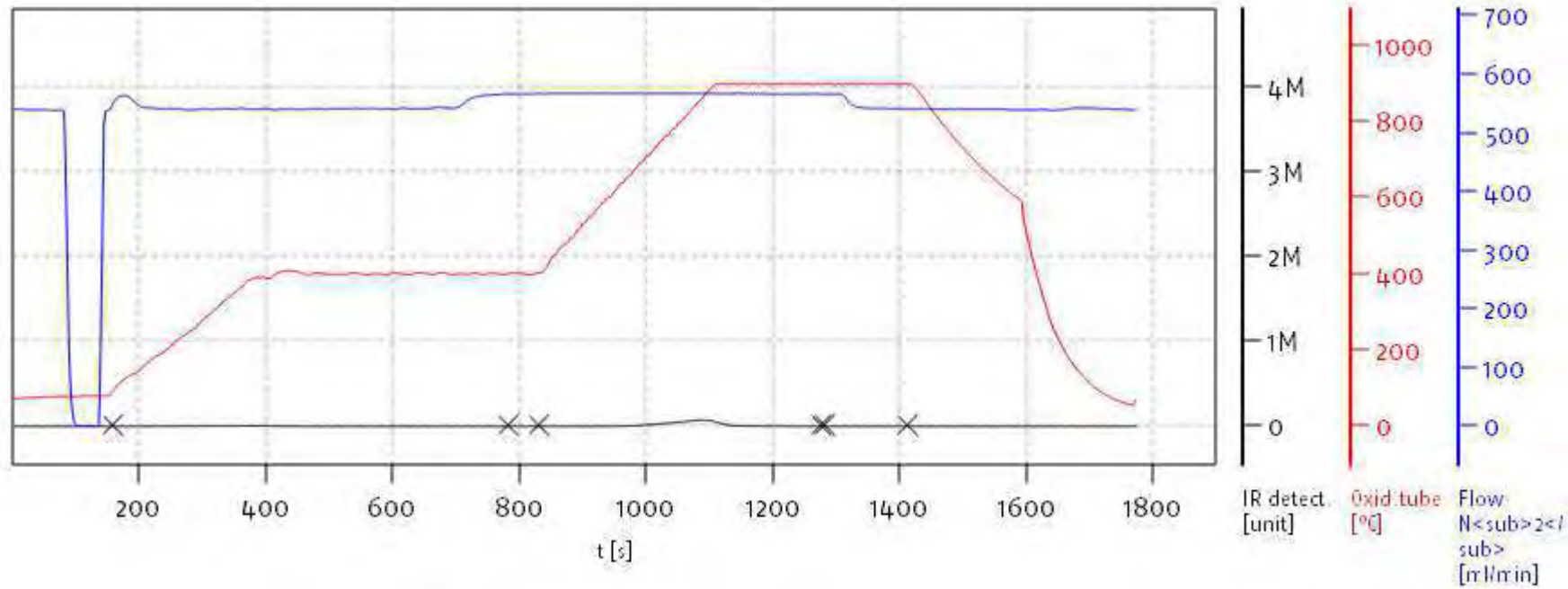
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
11	11	SEQ-CAL9	200.00	0.0402	1.00	CARBON	4/26/2022 4:30 PM	0.031	0.120	0.151	bl,C2u	32 999	260 234	1 044	1.0000	0.5792



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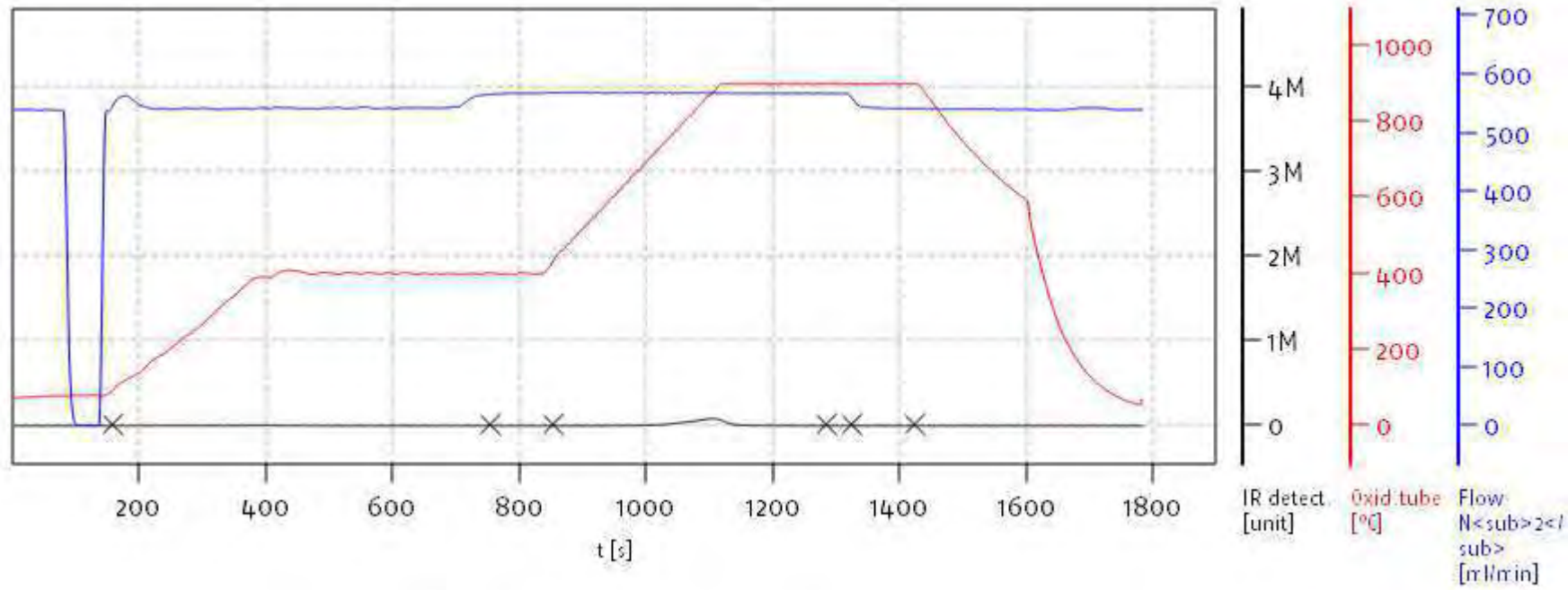
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
12	12	SEQ-CALA	200.00	0.0500	1.00	CARBON	4/26/2022 5:00 PM	0.021	0.151	0.172	bl,C2u	20 147	233 779	913	1.0000	0.8099



Name:

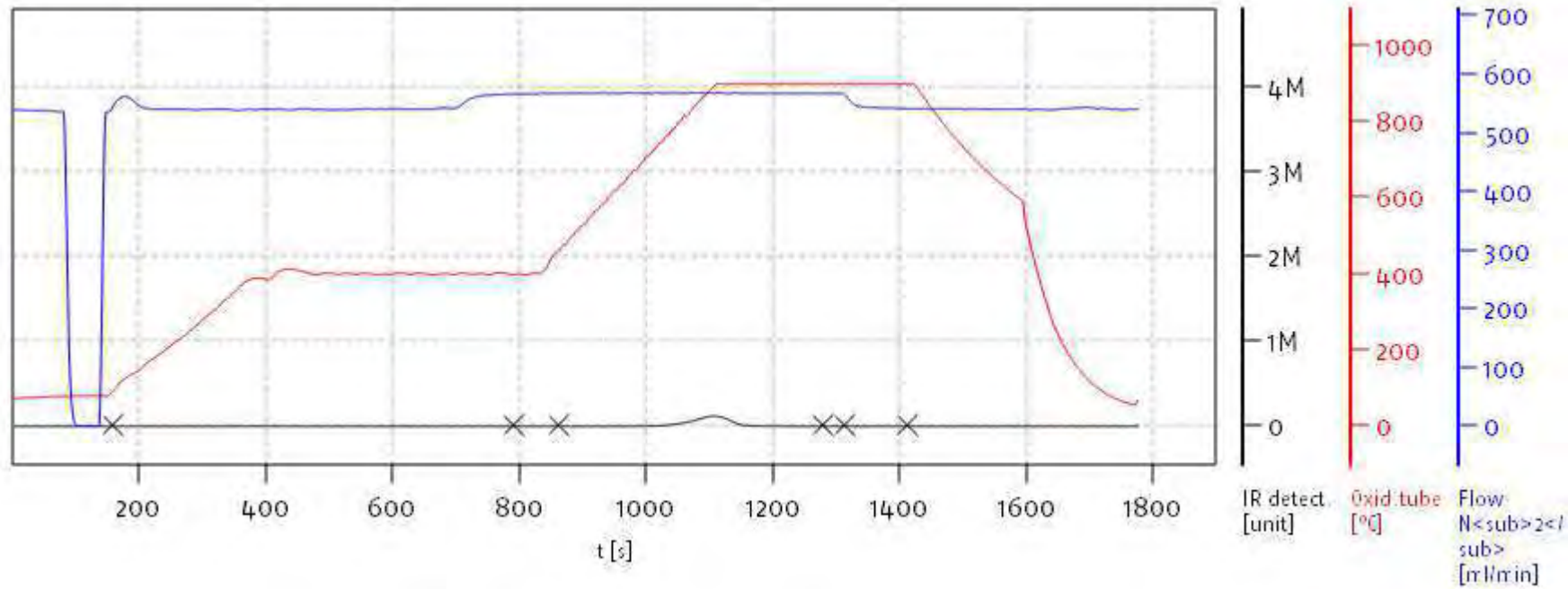
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
13	13	SEQ-CALB	200.00	0.0040	1.00	CARBON	4/26/2022 5:30 PM	0.010	0.258	0.268	bl,C1u,C2u	7 070	323 151	663	1.0000	1.0048



Name:

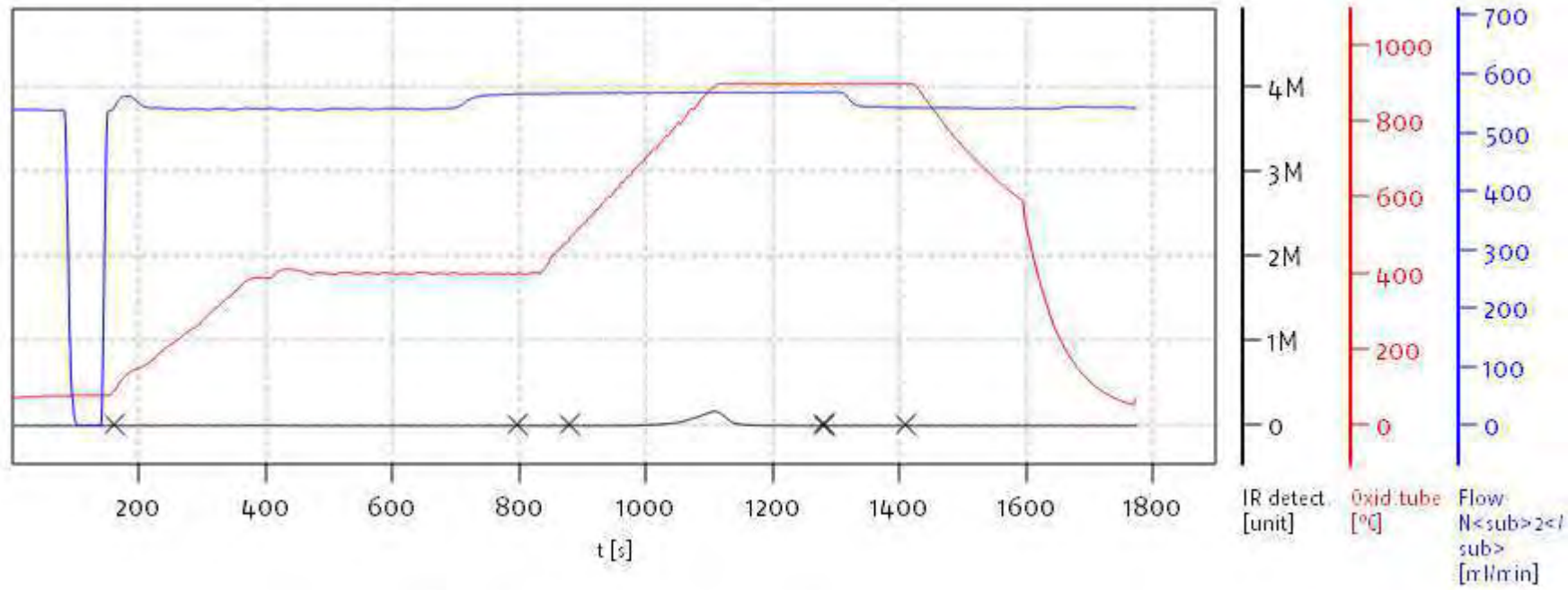
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Date: Wed Apr 27 11:07:12 2022

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Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
14	14	SEQ-CALC	200.00	0.0048	1.00	CARBON	4/26/2022 6:00 PM	0.015	0.324	0.339	bl,C2u	13 785	411 879	575	1.0000	0.9917



Name:

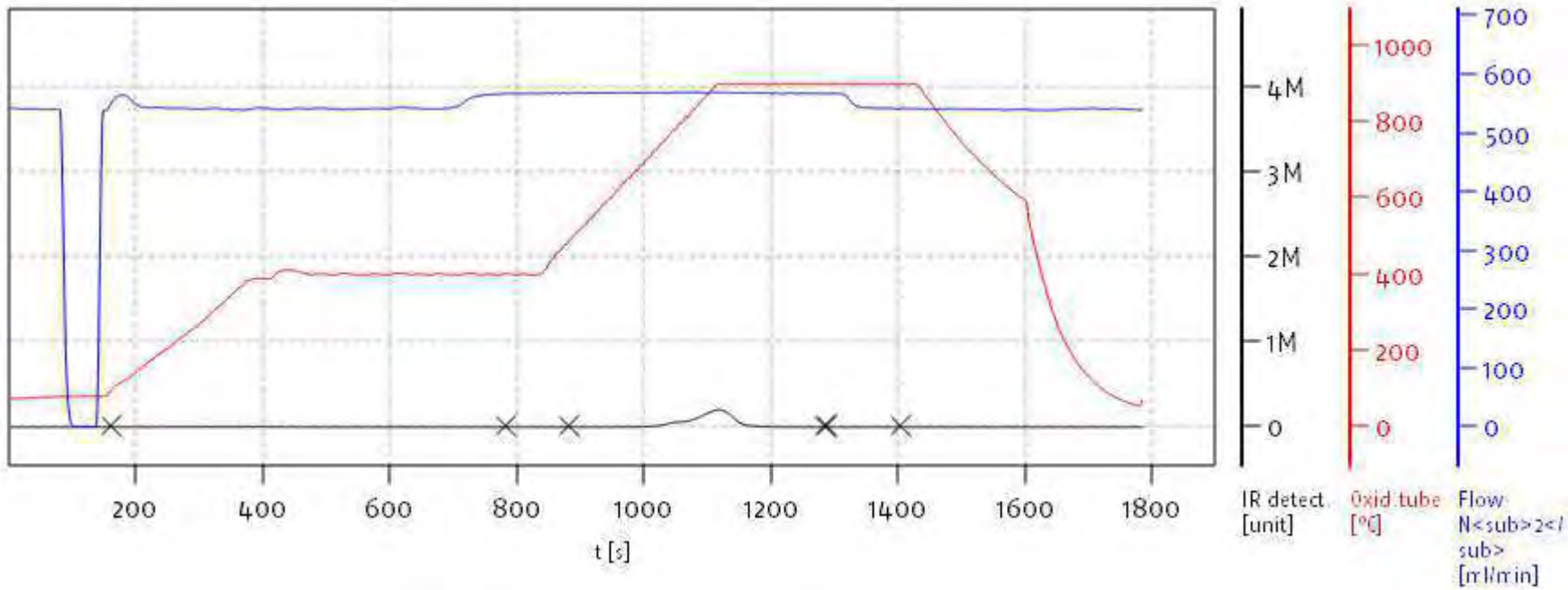
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Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
15	15	SEQ-CALD	200.00	0.0069	1.00	CARBON	4/26/2022 6:30 PM	0.019	0.444	0.463	bl,C2u	18 465	553 540	263	1.0000	1.0129



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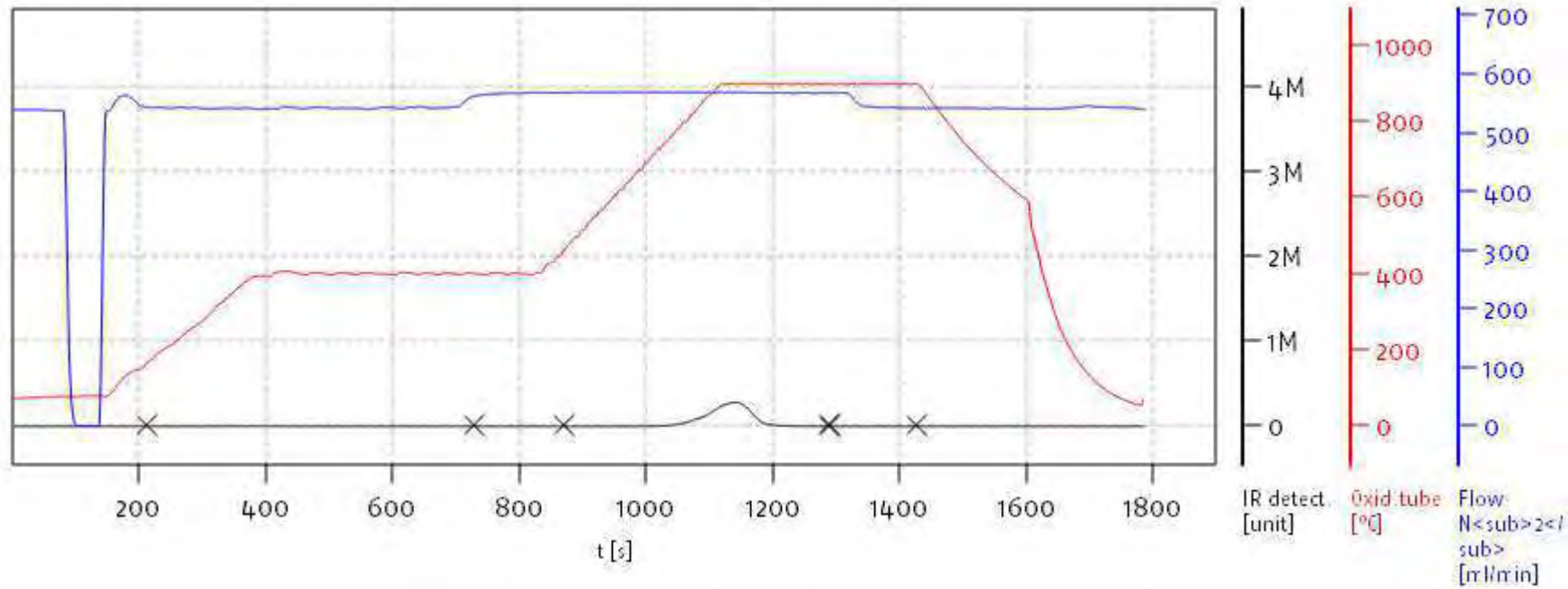
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Date: Wed Apr 27 11:07:12 2022

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Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
16	16	SEQ-CALE	200.00	0.0101	1.00	CARBON	4/26/2022 7:00 PM	0.009	0.600	0.609	bl,C1u,C2u	5 485	839 878	536	1.0000	0.9036



Name:

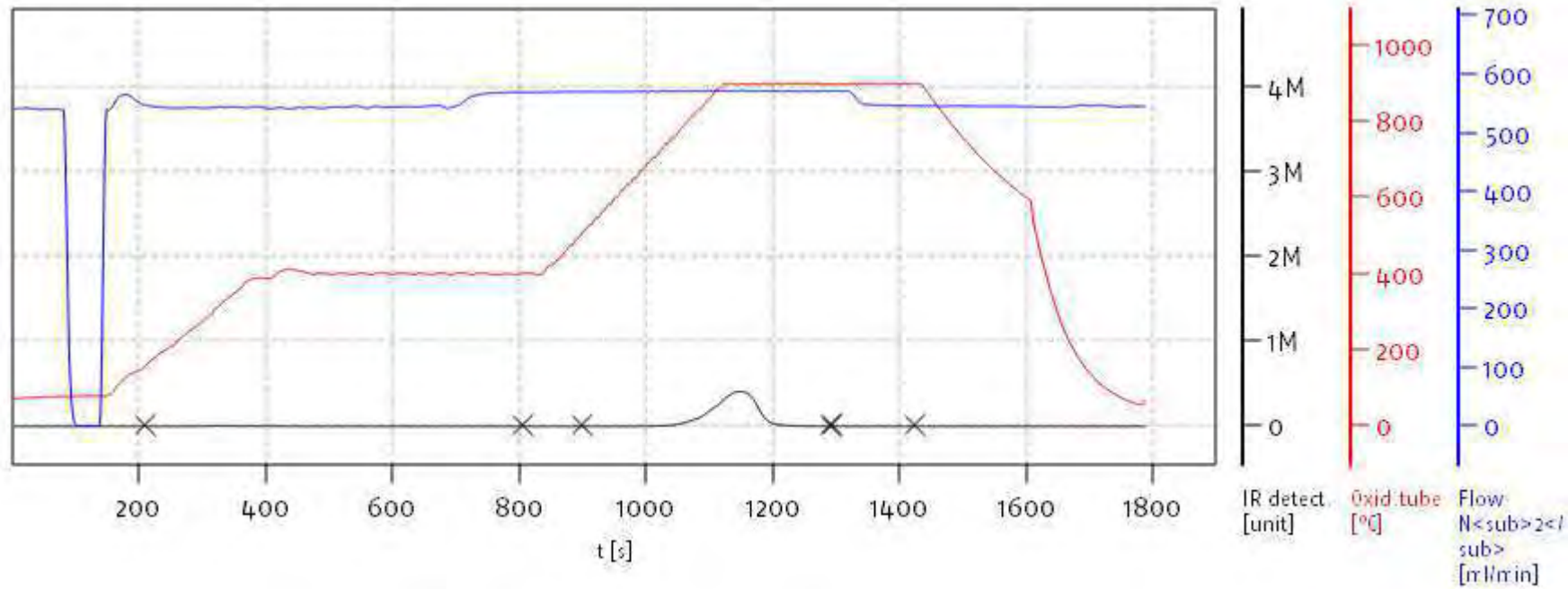
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Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
17	17	SEQ-CALF	200.00	0.0149	1.00	CARBON	4/26/2022 7:31 PM	0.019	0.906	0.925	bl,C2u	17 439	1 236 200	814	1.0000	0.9279



Name:

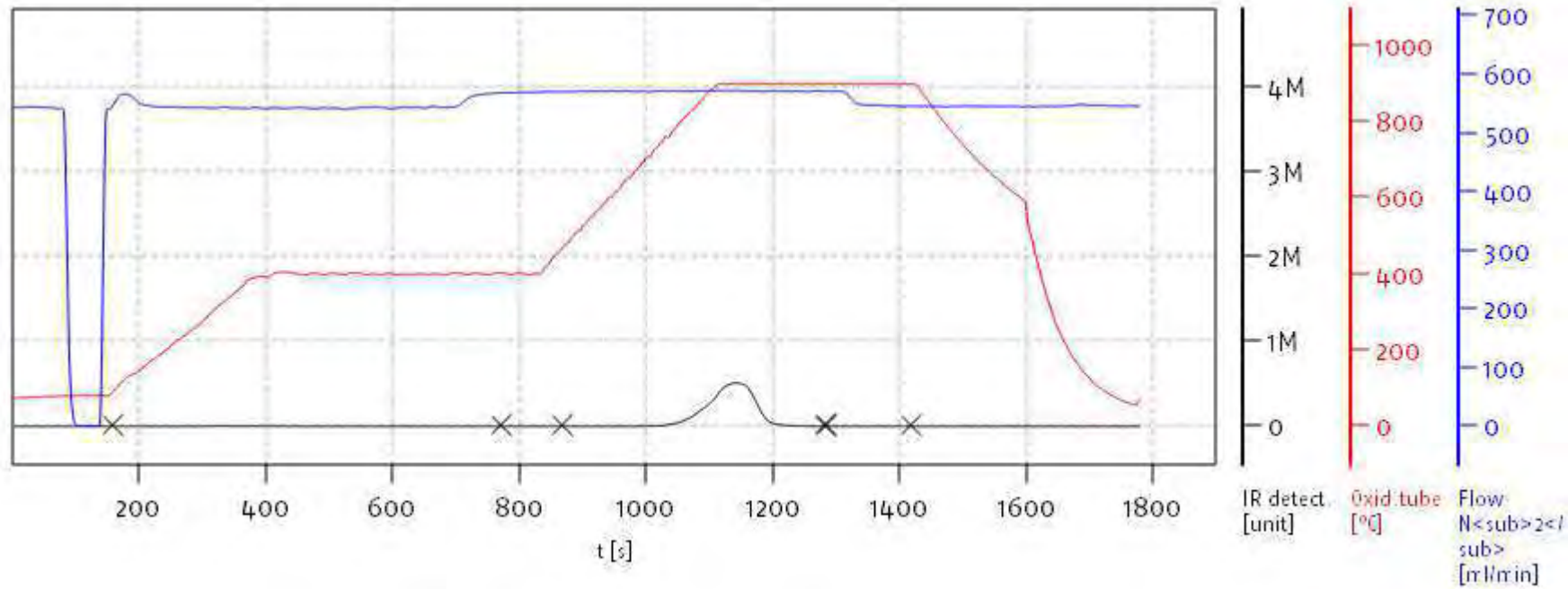
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Date: Wed Apr 27 11:07:12 2022

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
18	18	SEQ-CALG	200.00	0.0198	1.00	CARBON	4/26/2022 8:01 PM	0.015	1.206	1.221	bl,C2u	12 557	1 639 190	1 295	1.0000	0.9320



Name:

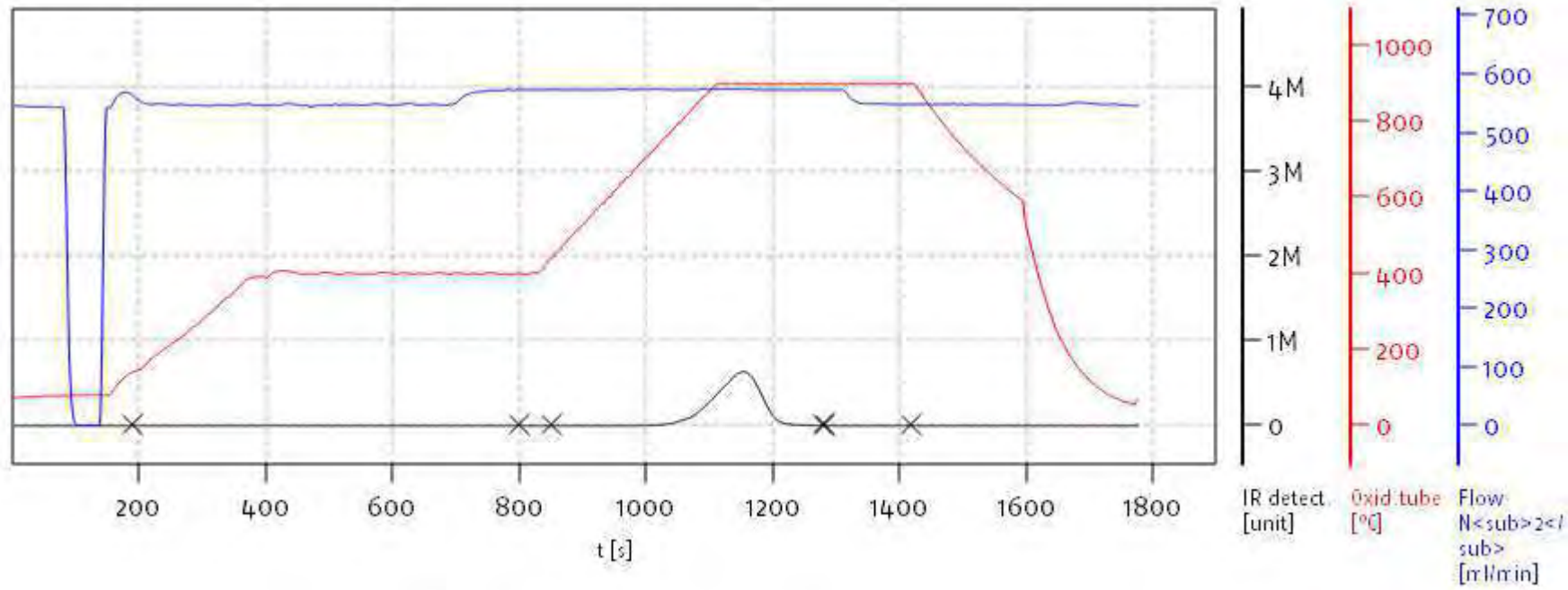
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
19	19	SEQ-CALH	200.00	0.0250	1.00	CARBON	4/26/2022 8:31 PM	0.009	1.524	1.533	bl,C1u,C2u	4 029	2 063 890	2 225	1.0000	0.9357



Name:

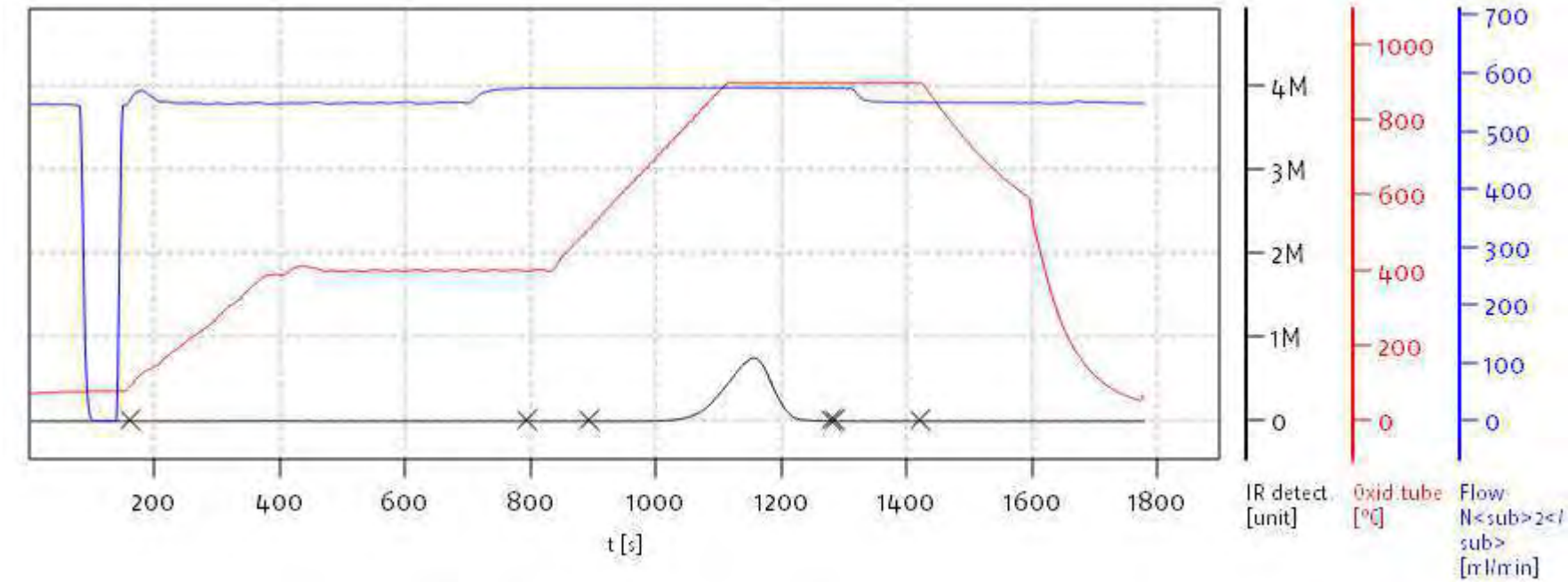
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
20	20	SEQ-CALI	200.00	0.0303	1.00	CARBON	4/26/2022 9:01 PM	0.017	1.800	1.817	bl,C2u	13 926	2 495 900	2 903	1.0000	0.9140



Name:

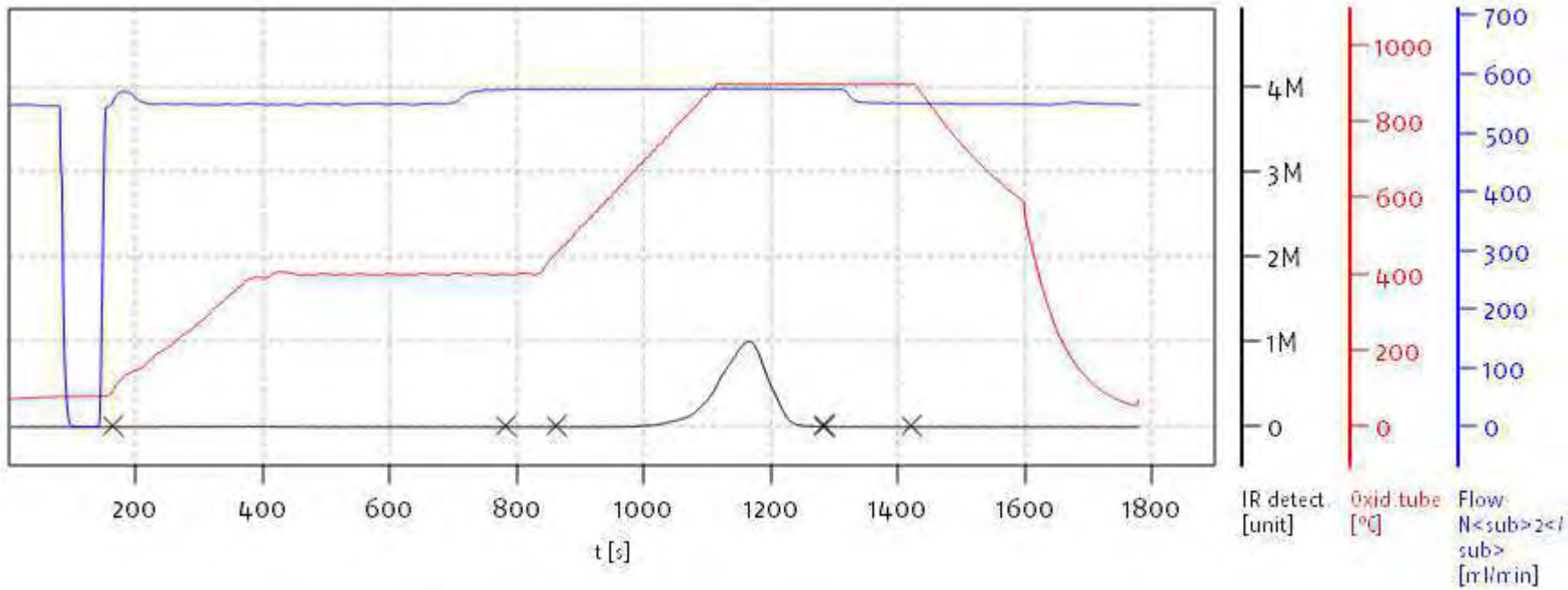
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
21	21	SEQ-CALJ	200.00	0.0415	1.00	CARBON	4/26/2022 9:31 PM	0.031	2.400	2.431	bl,C2u	28 786	3 482 530	5 351	1.0000	0.8737



Name:

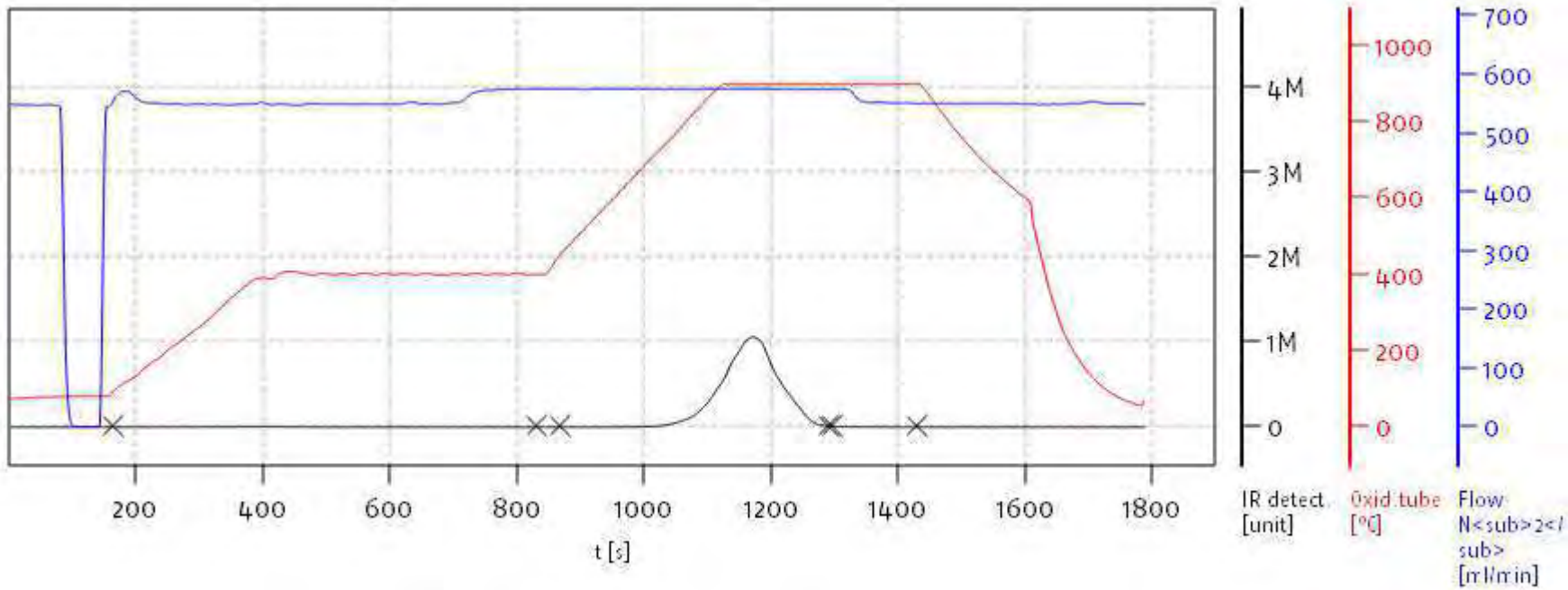
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

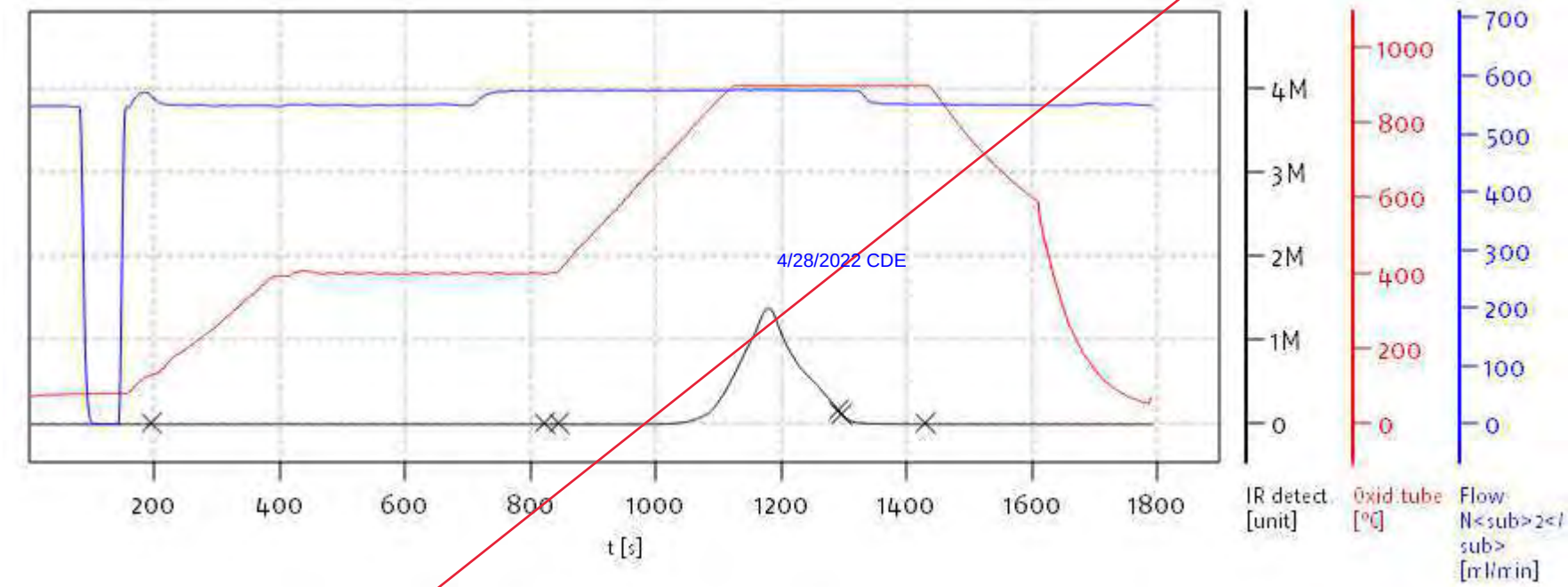
	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
22	22	SEQ-CALK	200.00	0.0497	1.00	CARBON	4/26/2022 10:01 PM	0.031	3.012	3.043	bl	23 732	4 105 830	9 736	1.0000	0.9301



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
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	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/26/2022 10:31 PM	0.005	3.805	3.810	bl,C1u	3 605	5 648 620	71 970	1.0000	0.9443



Name:

Access: soliTOC superuser

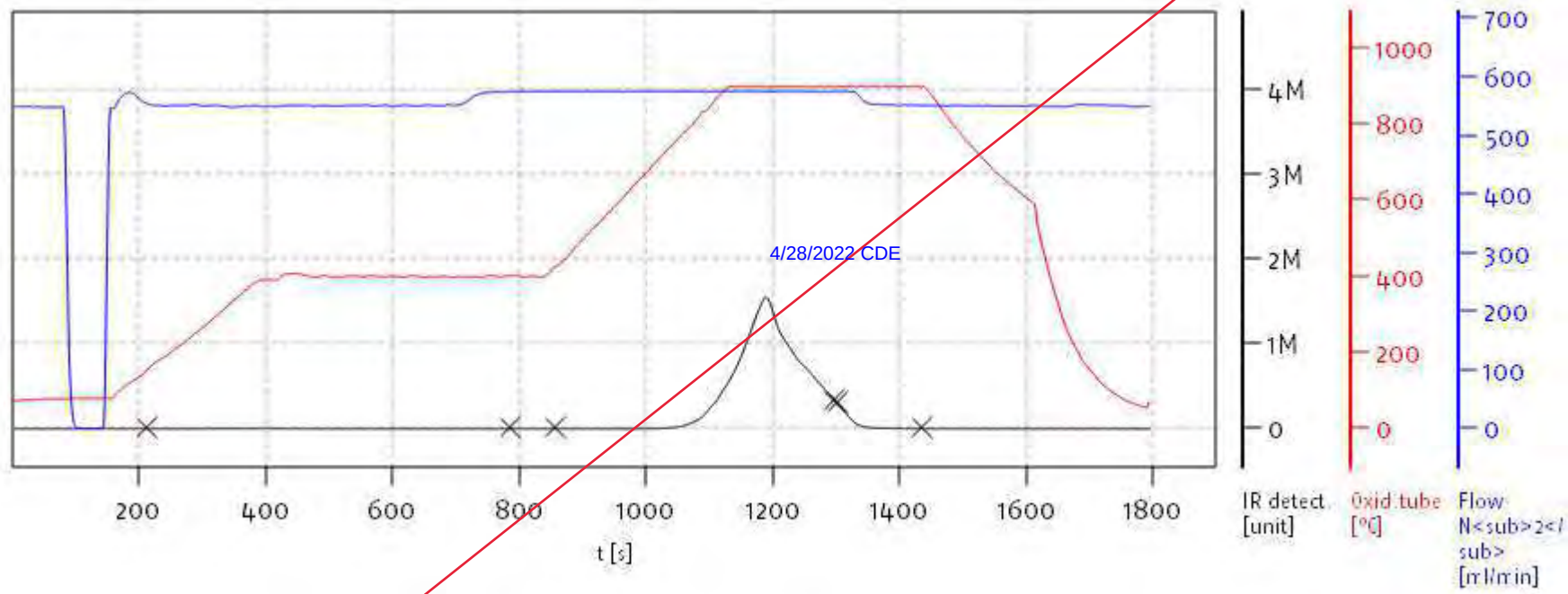
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/26/2022 11:02 PM	0.010	4.637	4.647	bl	10 023	6 397 530	228 171	1.0000	0.9539



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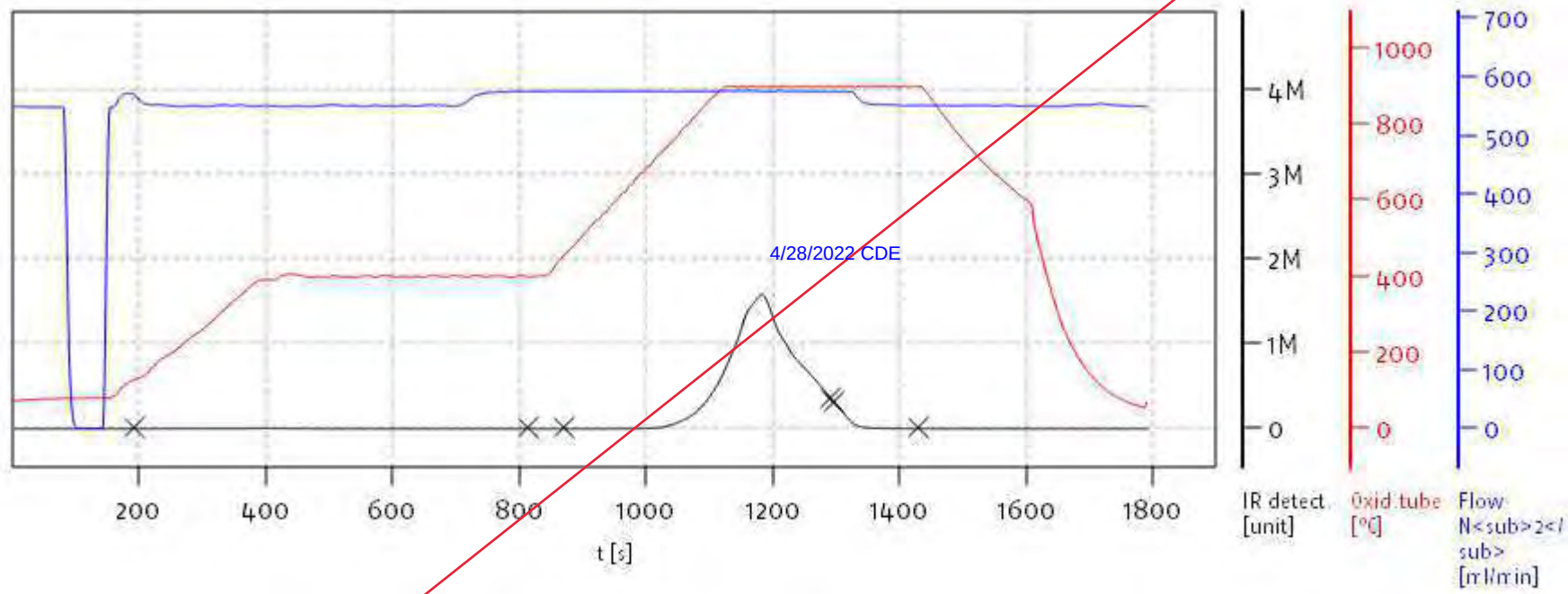
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/26/2022 11:32 PM	0.020	5.219	5.239	bl	23 354	7 186 580	239 986	1.0000	0.9540



Name:

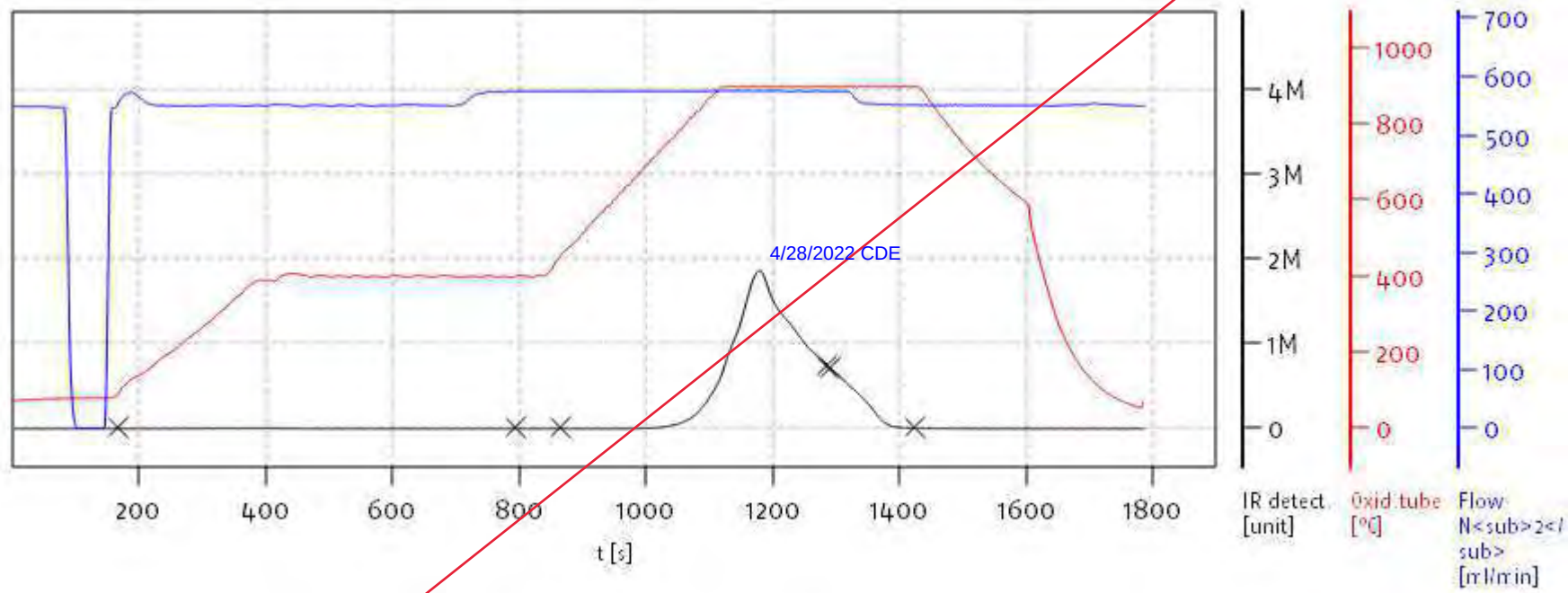
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 12:02 AM	0.019	7.915	7.934	bl,C3o	21 248	8 544 610	1 334 580	1.0000	1.0714



Name:

Access: soliTOC superuser

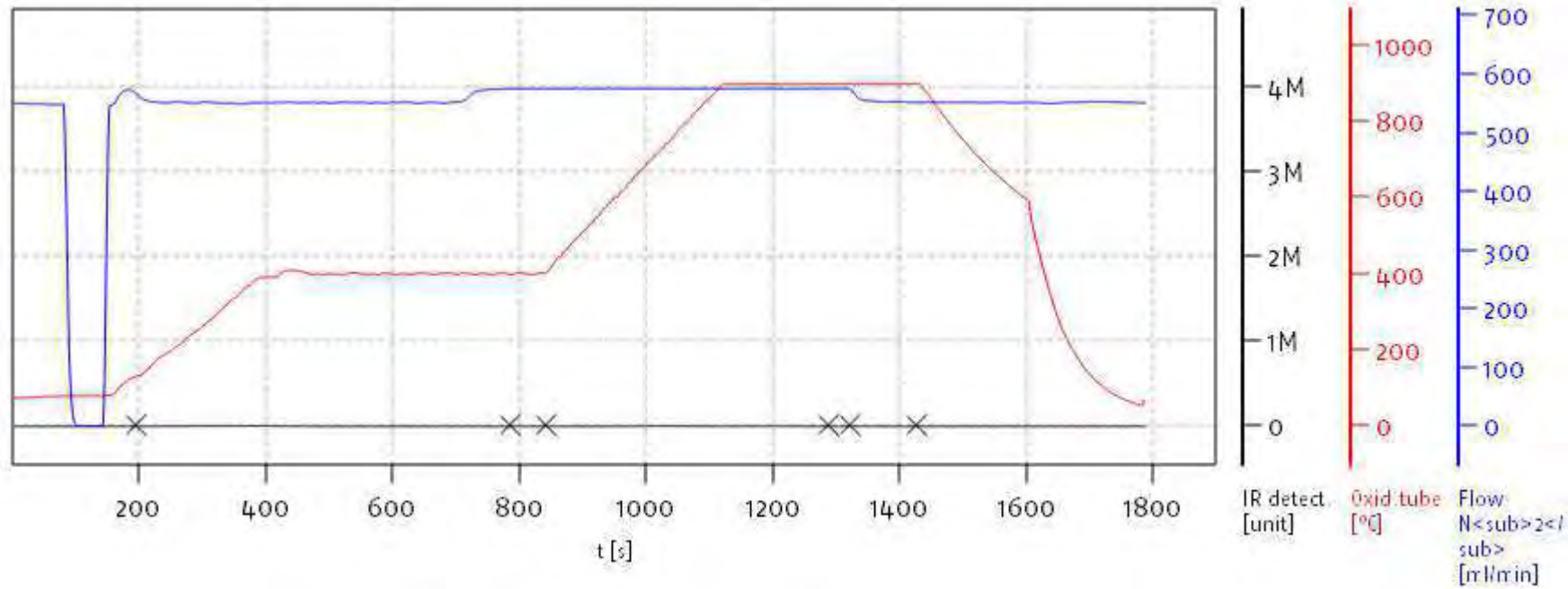
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
27	27	BLANK	1.00		1.00	CARBON	4/27/2022 12:32 AM	0.000	0.000	0.000	bl	29 766	19 596	1 205	1.0000	0.9007



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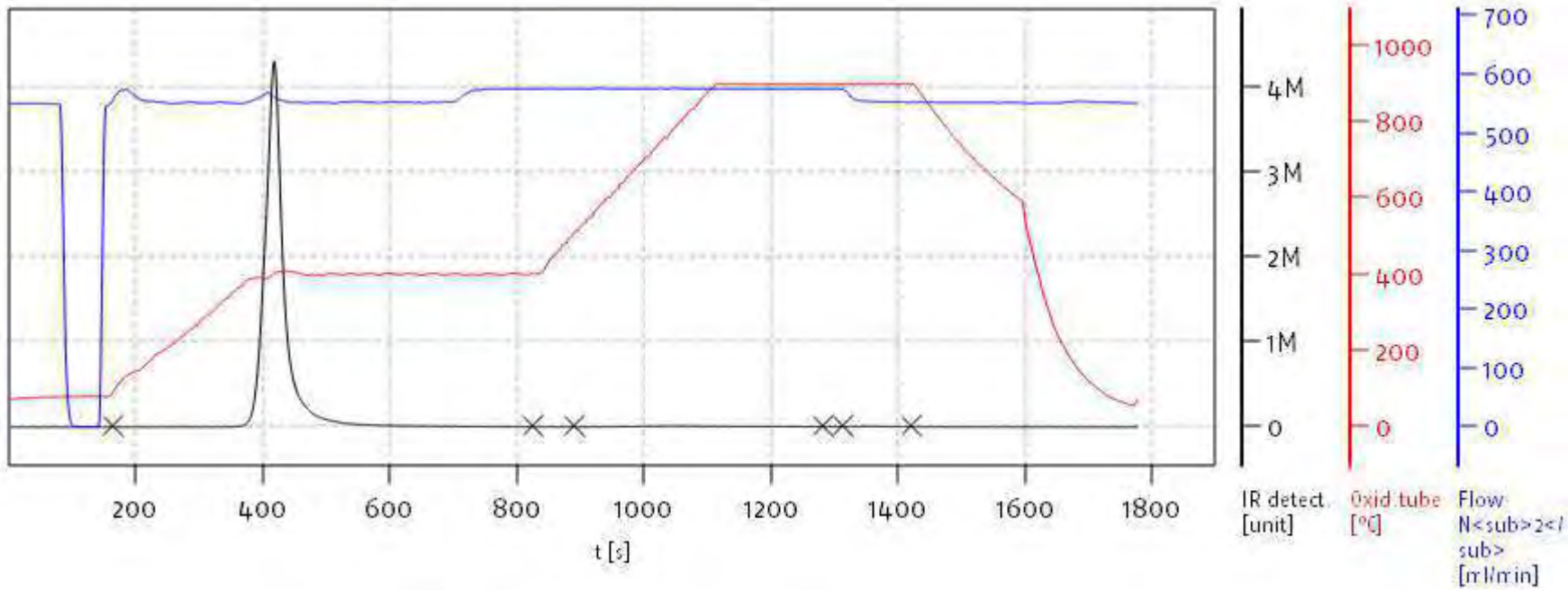
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
28	28	Dfactor	19.00		1.00	CARBON	4/27/2022 1:02 AM	44.678	0.893	45.571	bl	5 588 680	104 999	25 384	0.9581	1.0000



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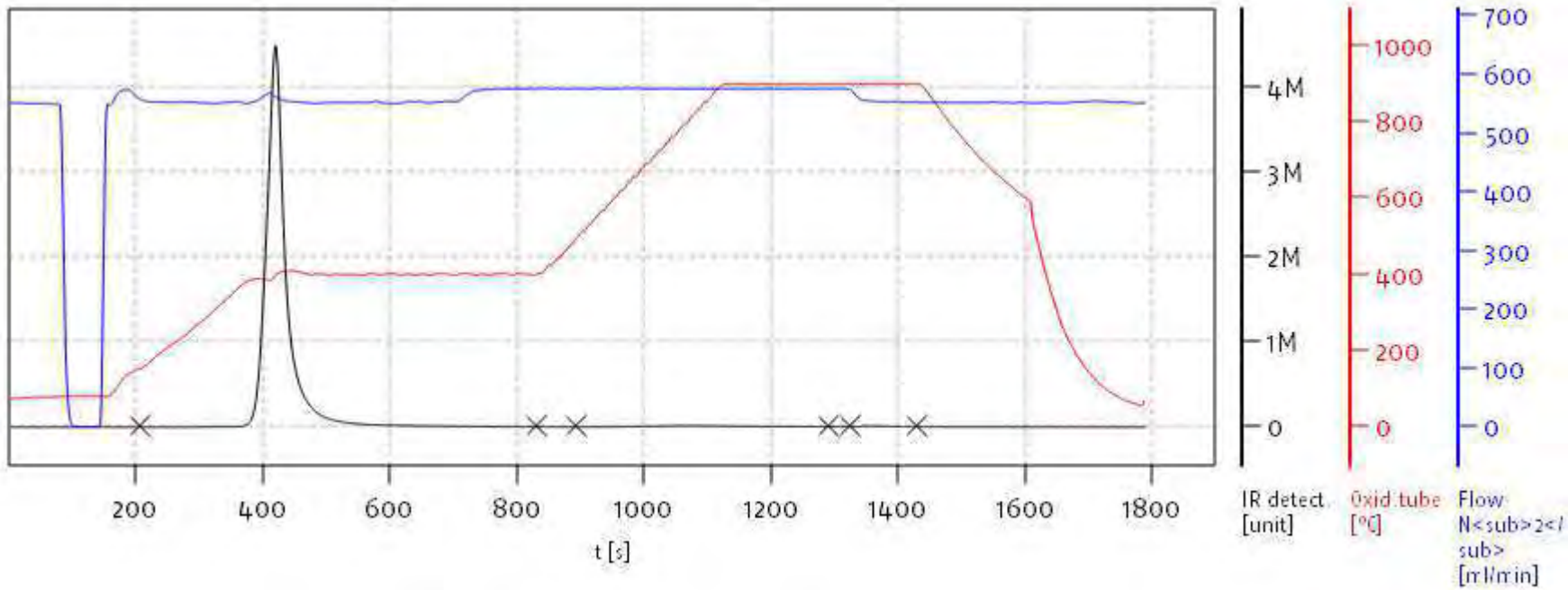
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
29	29	Dfactor	20.80		1.00	CARBON	4/27/2022 1:32 AM	44.694	0.937	45.631	bl	6 076 750	120 961	30 224	0.9647	1.0000



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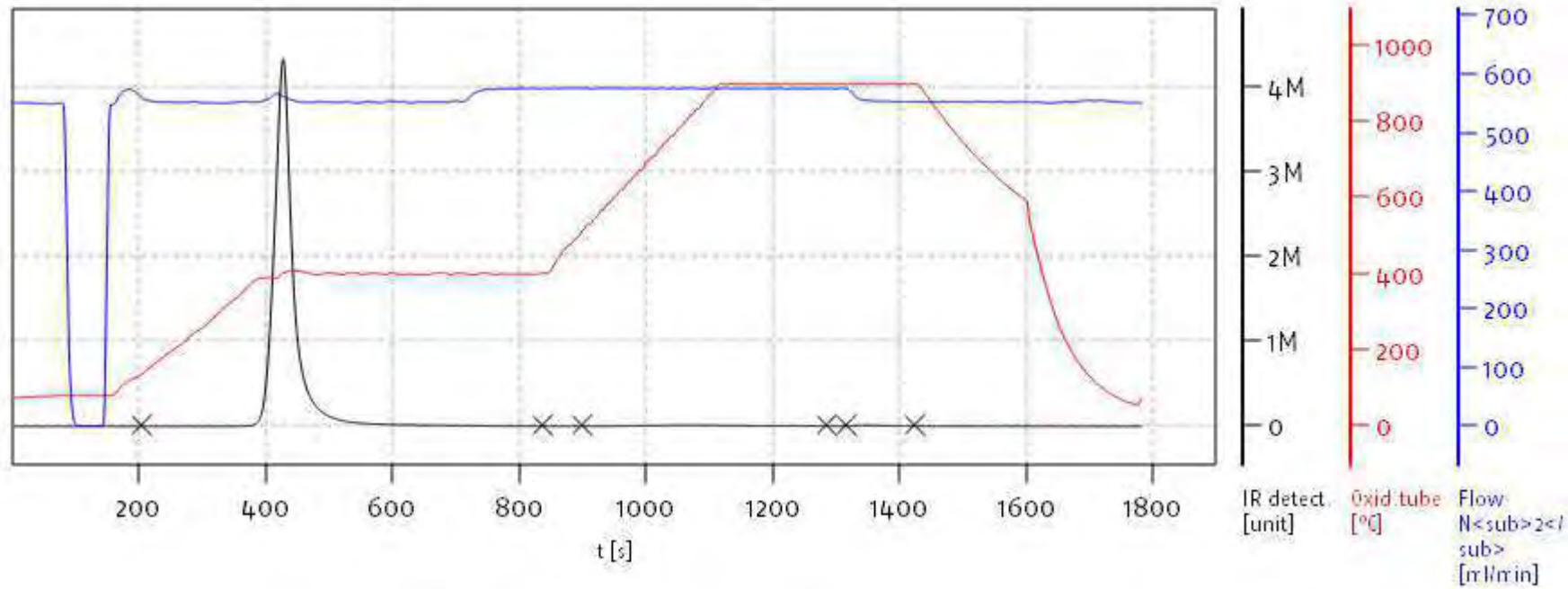
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Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
30	30	SEQ-ICV1	19.40		1.00	CARBON	4/27/2022 2:03 AM	44.964	0.742	45.706	bl	5 722 450	98 735	27 054	0.9614	0.9007



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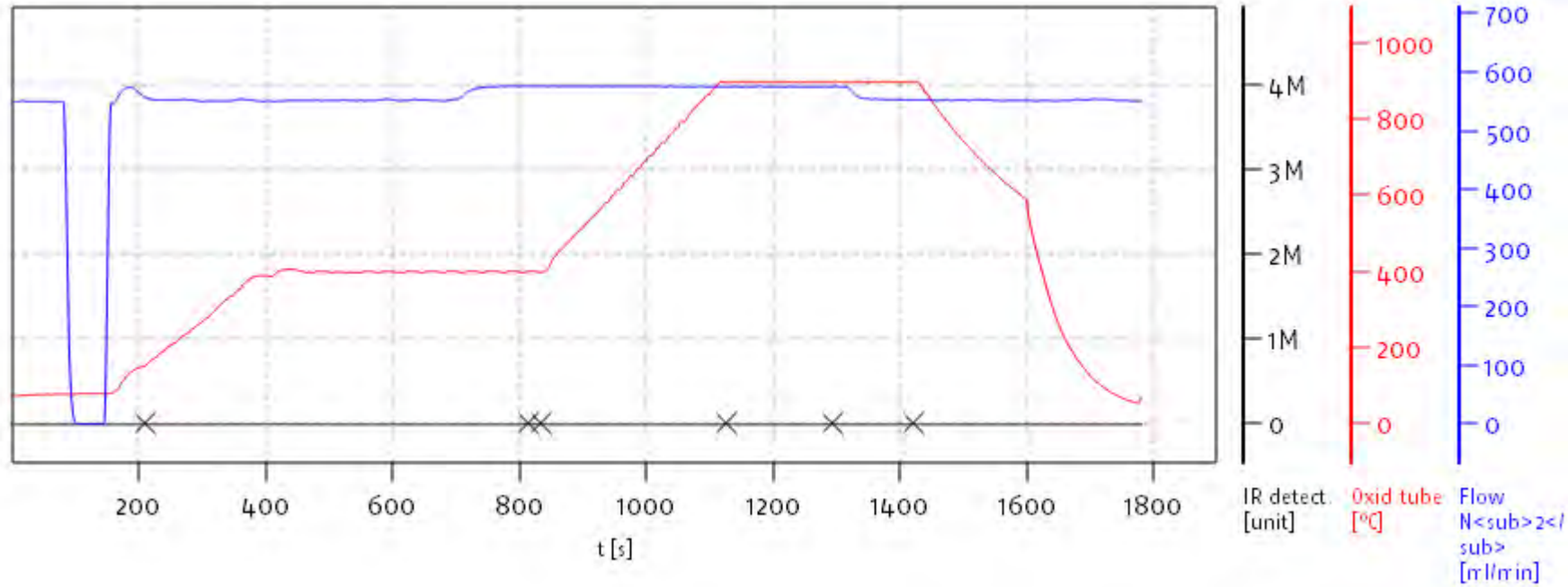
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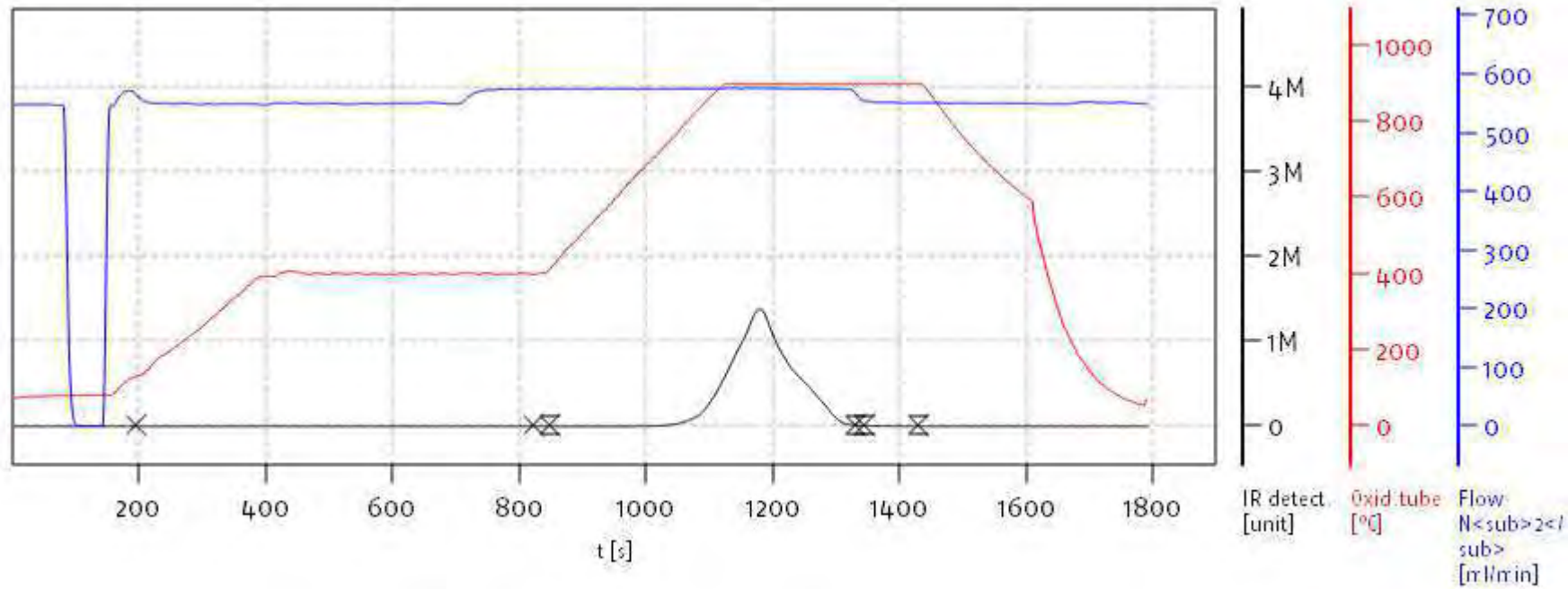
	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
31	31	SEQ-ICB1	501.10		1.00	CARBON	4/27/2022 2:33 AM	0.002	0.001	0.003	bl,C1u,C3u,C2u	2 158	225	165	0.9614	0.9007



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/27/2022 11:08 AM	0.005	3.917	3.922	bl,C1u	3 605	**5 260 365**	**0**	1.0000	0.9443



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

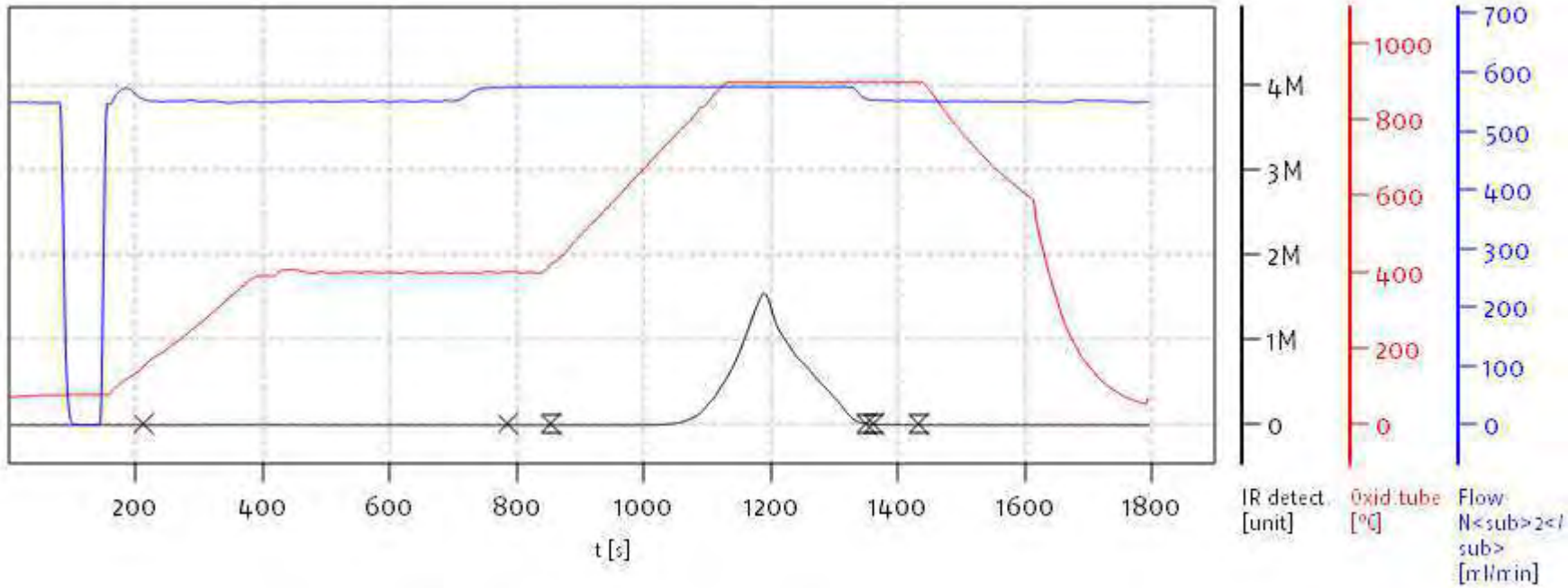
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/27/2022 11:08 AM	0.010	4.637	4.647	bl	10 023	**6 164 833**	**0**	1.0000	0.9539



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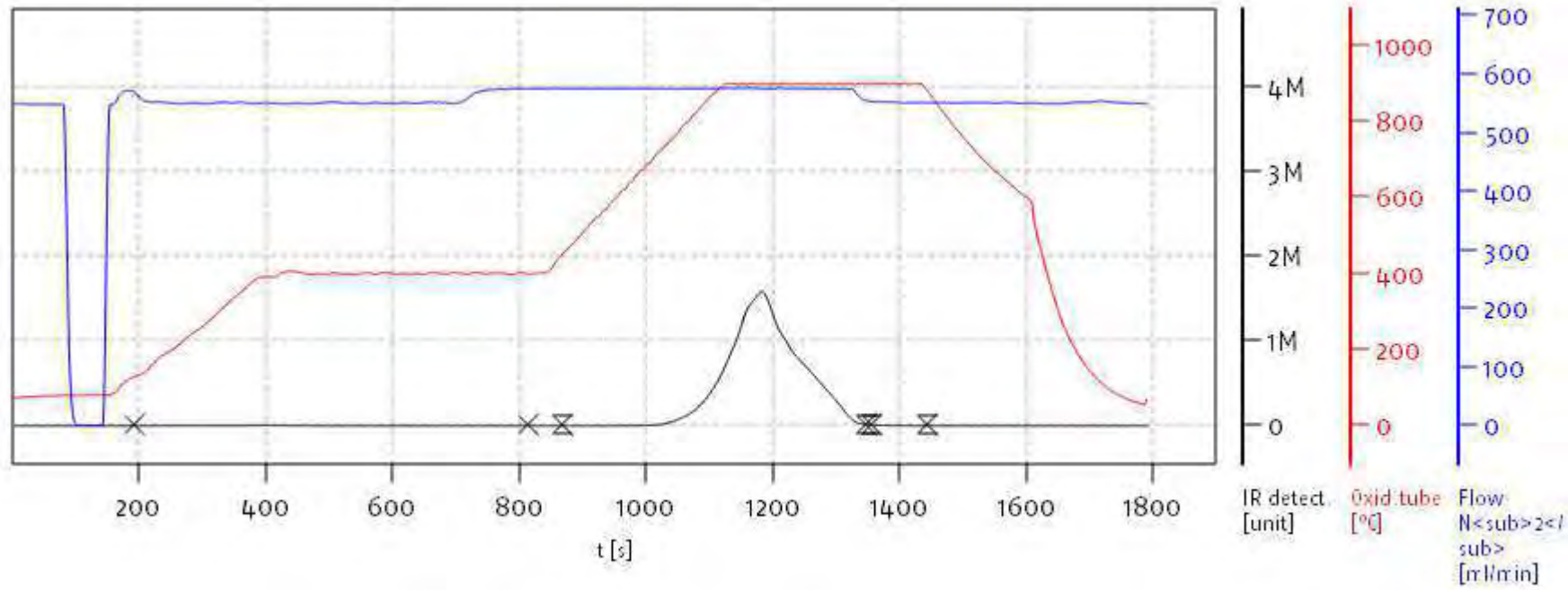
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Date: Wed Apr 27 11:10:16 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/27/2022 11:09 AM	0.020	5.219	5.239	bl	23 354	**6 937 833**	**0**	1.0000	0.9540



Name:

Access: soliTOC superuser

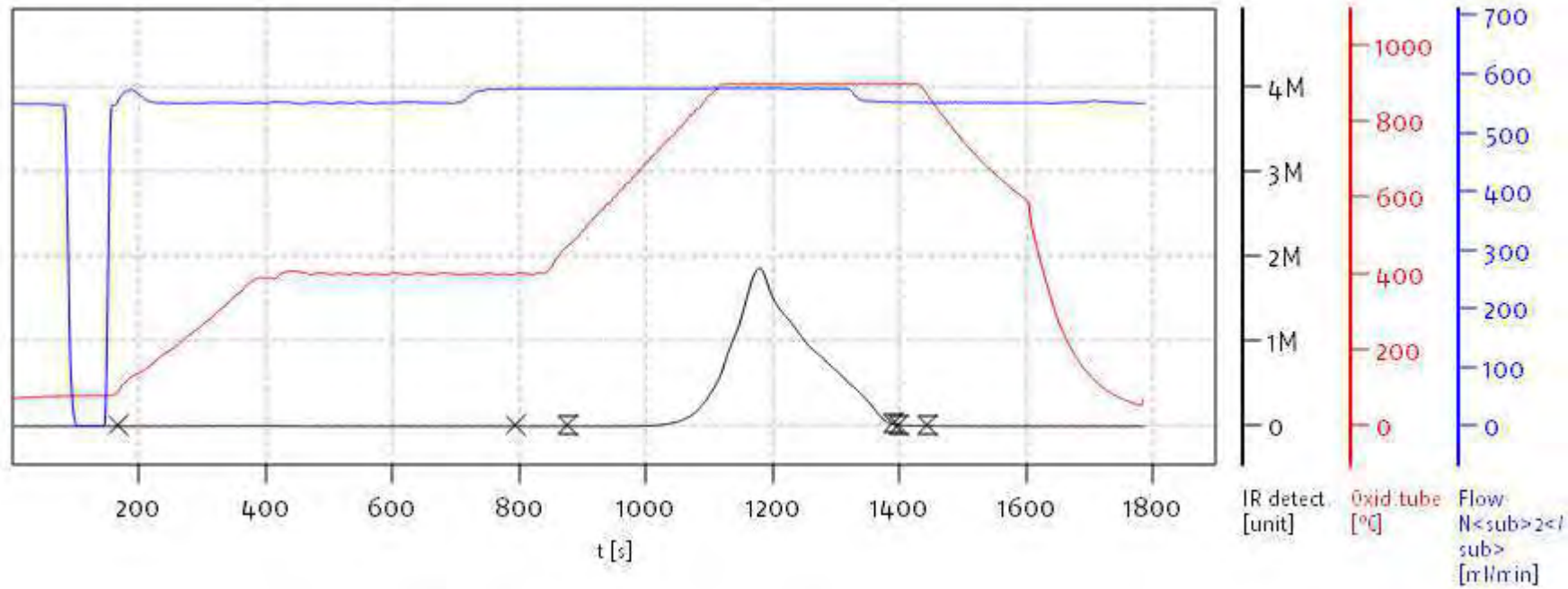
Date: Wed Apr 27 11:10:16 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 11:09 AM	0.019	7.915	7.934	bl,C3o	21 248	9 370 139	0	1.0000	1.0714



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

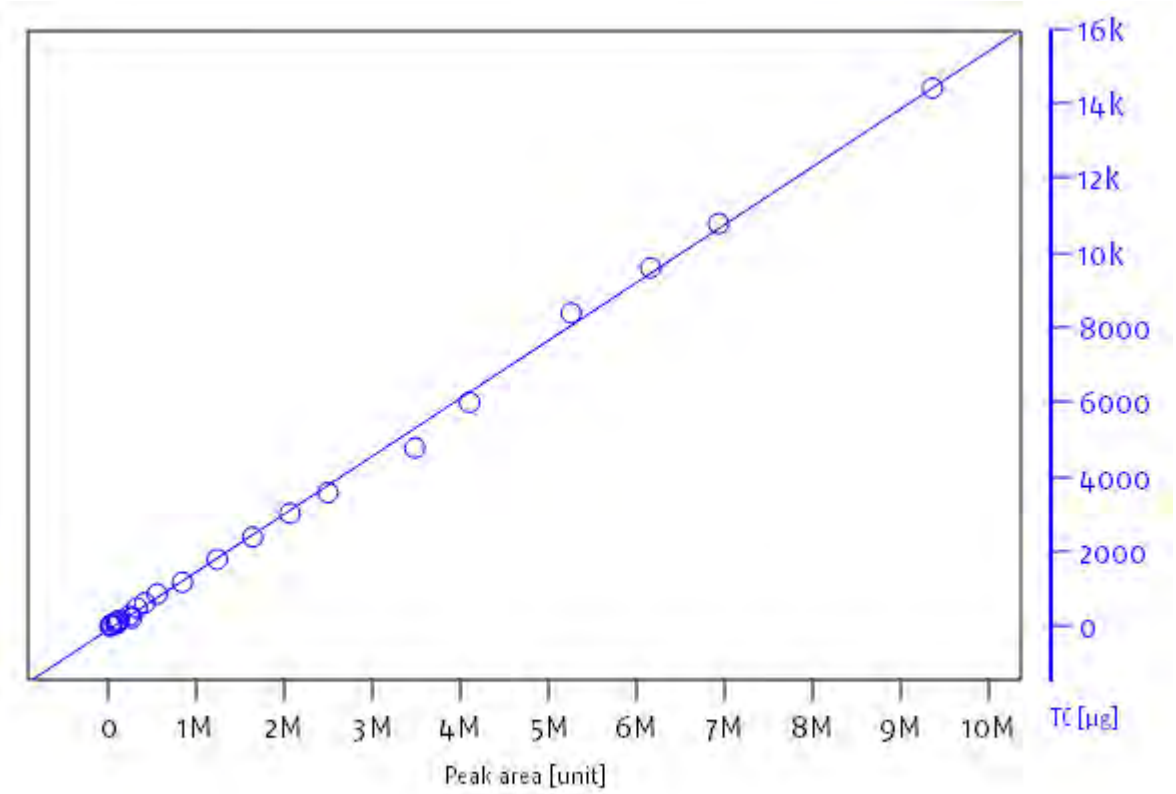
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Calibration parameters TC, Whole range

a	-4.107546e-02
b	+1.548032e-06
c	+0.000000e+00
d	+0.000000e+00
e	+0.000000e+00
r	0.998372
r_old	0.998372
Proc.-SD	166.070255 µg

Calibration graph TC, Whole range



INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SKD0371
Date Analyzed: 04/27/22 02:33

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SKD0371-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	

INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SLE0117
Date Analyzed: 05/06/23 16:47

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SLE0117-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB2	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB3	Total Organic Carbon	0.003	0.02	0.02	%	
SLE0117-CCB4	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB5	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB6	Total Organic Carbon	0.00	0.02	0.02	%	

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SKD0371

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SKD0371-ICV1	Total Organic Carbon	44.446	43.7	98.3	%	EPA 9060A m
	Total Carbon	44.446	44.1	99.2	%	EPA 9060A m
	Total Inorganic Carbon	0.0000	0.40		%	EPA 9060A m
	% Soot	0.0000	0.004		%	EPA 9060A m

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SLE0117

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SLE0117-ICV1	Total Organic Carbon	44.446	43.7	98.2	%	EPA 9060A m
SLE0117-CCV1	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV2	Total Organic Carbon	44.446	43.8	98.6	%	EPA 9060A m
SLE0117-CCV3	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV4	Total Organic Carbon	44.446	43.7	98.4	%	EPA 9060A m
SLE0117-CCV5	Total Organic Carbon	44.446	43.5	98.0	%	EPA 9060A m
SLE0117-CCV6	Total Organic Carbon	44.446	43.5	97.8	%	EPA 9060A m

* Values outside of QC limits

STANDARD REFERENCE MATERIAL RECOVERY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0200-SRM1
Batch: BLE0200
Initial/Final: 0.3102 g / 0.3102 g
Preparation: No Prep Wet Chem
Analyzed: 05/06/2023 20:18
Standard ID: L000790
Expires: 05/19/2024
Standard Lot#: NA
Description: 1941B - Organics in Marine Sediment (Conv

ANALYTE	TRUE (% wet)	FOUND (% wet)	MDL	MRL	Q	SRM % REC.	QC LIMITS REC.
Total Organic Carbon	2.9900	2.99	0.02	0.02		100	80 - 120

* Values outside of QC limits

HOLDING TIME SUMMARY

Analysis: EPA 9060A m

Laboratory: Analytical Resources, LLC SDG: 23E0148

Client: Friedman & Bruya Inc. Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-07G:0-10 23E0148-01	03/20/23 10:02	05/05/23 14:20	05/06/23 12:06	47	180	05/06/23 21:19			
SED-11G:0-10 23E0148-02	03/20/23 09:24	05/05/23 14:20	05/06/23 12:06	47	180	05/07/23 03:23			
SED-14G:0-10 23E0148-03	03/20/23 10:11	05/05/23 14:20	05/06/23 12:06	47	180	05/07/23 03:54			
SED-15G:0-10 23E0148-04	03/20/23 12:42	05/05/23 14:20	05/06/23 12:06	46	180	05/07/23 05:25			
SED-03G:0-10 23E0148-05	03/20/23 13:15	05/05/23 14:20	05/06/23 12:06	46	180	05/07/23 05:56			
SED-01G:0-10 23E0148-06	03/20/23 14:45	05/05/23 14:20	05/06/23 12:06	46	180	05/07/23 06:26			
SED-01C:0-1 23E0148-07	03/20/23 11:51	05/05/23 14:20	05/06/23 12:06	47	180	05/07/23 06:56			
SED-05C:0-1 23E0148-08	03/21/23 12:44	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 07:27			
SED-05G:0-10 23E0148-09	03/21/23 13:10	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 07:57			
SED-03C:0-1 23E0148-10	03/21/23 14:42	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 08:28			
SED-14C:0-1 23E0148-11	03/21/23 15:53	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 08:58			
SED-14C:1-3 23E0148-12	03/21/23 15:53	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 09:28			
SED-DUPC 23E0148-13	03/21/23 12:00	05/05/23 14:20	05/06/23 12:06	46	180	05/07/23 09:59			
Duplicate BLE0200-DUP1	03/20/23 10:02	05/05/23 14:20	05/06/23 12:06	47	180	05/06/23 21:49			
Duplicate BLE0200-DUP2	03/20/23 10:02	05/05/23 14:20	05/06/23 12:06	47	180	05/06/23 23:20			
Matrix Spike BLE0200-MS1	03/20/23 10:02	05/05/23 14:20	05/06/23 12:06	47	180	05/06/23 23:51			
Matrix Spike Dup BLE0200-MSD1	03/20/23 10:02	05/05/23 14:20	05/06/23 12:06	47	180	05/07/23 00:21			

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument: TOC Cube

Analyte	MDL	RL	Units
Total Organic Carbon	0.02	0.02	%

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1941b

Organics in Marine Sediment

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. Information values are also provided for total organic carbon (TOC), total carbon, hydrogen, and nitrogen. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Certified Mass Fraction Values: Certified mass fraction values for PAHs, PCB congeners, and chlorinated pesticides are provided in Table 1 through Table 3. The certified values for the PAHs, PCB congeners, and chlorinated pesticides are based on the agreement of results obtained at NIST from two or more chemically independent analytical techniques along with results from an interlaboratory comparison study [1]. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1].

Reference Mass Fraction Values: Reference mass fraction values for additional PAHs (some in combination), additional PCB congeners, and additional chlorinated pesticides are provided in Table 4 through Table 7. Reference values for alkylated PAH groups are provided in Table 8 and for selected hopanes and steranes in Table 9. A reference value for total organic carbon is provided in Table 10. Reference values are noncertified values that are the best estimate of the true value; however, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods [1].

Information Mass Fraction Values: Information mass fraction values are provided in Table 11 for carbon, hydrogen, and nitrogen. An information value is considered to be a value that will be of use to the SRM user, but insufficient information is available to assess the uncertainty associated with the value [1]. Information values cannot be used to establish metrological traceability.

Expiration of Certification: The certification of **SRM 1941b** is valid, within the measurement uncertainty specified, until **01 October 2020**, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Handling, Storage, and Use"). This certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet or register online) will facilitate notification.

Coordination of the technical measurements leading to the certification of this material was under the leadership of M.M. Schantz and S.A. Wise of the NIST Chemical Sciences Division.

Analytical measurements for the certification of SRM 1941b were performed at NIST by J.R. Kucklick, B.J. Porter, D.L. Poster, M.M. Schantz, P. Schubert, S. Tutschku, and L.L. Yu of the NIST Chemical Sciences Division.

Carlos A. Gonzalez, Chief
Chemical Sciences Division

Gaithersburg, MD 20899
Certificate Issue Date: 16 January 2015

Robert L. Watters, Jr., Director
Office of Reference Materials

Measurements for TOC were provided by a commercial laboratory and T.L. Wade of the Geochemical and Environmental Research Group, Texas A&M University (College Station, TX). The carbon, hydrogen, and nitrogen data were provided by a commercial laboratory. Results for the PAHs, PCBs, and chlorinated pesticides from 38 laboratories (see Appendix A) that participated in an interlaboratory comparison exercise coordinated by NIST were used. Results for the alkylated PAH groups, hopanes, and steranes from 33 laboratories (see Appendix B) that participated in another interlaboratory comparison exercise coordinated by NIST were also used.

Collection and preparation of SRM 1941b were performed by M.P. Cronise and C.N. Fales of the NIST Office of Reference Materials and B.J. Porter and M.M. Schantz of the NIST Chemical Sciences Division. The sediment material was collected with the assistance of G.G. Lauenstein, J. Collier, and J. Lewis (National Oceanic and Atmospheric Administration, Silver Spring, MD).

Consultation on the statistical design of the experimental work and evaluation of the data were provided by S.D. Leigh and J.H. Yen of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

Handling: This material is naturally occurring marine sediment from an urban area and may contain constituents of unknown toxicities; therefore, caution and care should be exercised during its handling and use.

Storage: SRM 1941b must be stored in its original bottle at temperatures less than 30 °C and away from direct sunlight.

Use: Prior to removal of subsamples for analysis, the contents of the bottle should be mixed. The mass fractions of constituents in SRM 1941b are reported on a dry-mass basis. The SRM, as received, contains a mass fraction of approximately 2.4 % moisture (see "Conversion to Dry-Mass Basis"). The sediment sample should be dried to a constant mass before weighing for analysis; or a separate subsample of the sediment should be removed from the bottle at the time of analysis and dried to determine the mass fraction on a dry-mass basis. If the constituents of interest are volatile, then the moisture must be determined with a separate subsample.

PREPARATION AND ANALYSIS[1]

Sample Collection and Preparation: The sediment used to prepare this SRM was collected from the Chesapeake Bay at the mouth of the Baltimore (MD) Harbor near the Francis Scott Key Bridge (39°12.3'N and 76°31.4'W). This location is very near the site where SRM 1941 and SRM 1941a were collected. The sediment was collected using a Kynar-coated modified Van Veen-type grab sampler. A total of approximately 3300 kg of wet sediment was collected from the site. The sediment was freeze-dried, sieved at 150 μm (100 % passing), homogenized in a cone blender, radiation sterilized (^{60}Co), and then packaged in screw-capped amber glass bottles each containing approximately 50 g.

Conversion to Dry-Mass Basis: The results for the constituents in SRM 1941b are reported on a dry-mass basis; however, the material "as received" contains residual moisture. The amount of moisture in SRM 1941b was determined by measuring the mass loss after freeze-drying subsamples of 1.1 g to 1.3 g for four days at 1 Pa with a –10 °C shelf temperature and a –50 °C condenser temperature. The moisture content in SRM 1941b at the time of the certification analyses was 2.39 % ± 0.08 % (95 % confidence level). Analytical results for the organic constituents were determined on an as-received basis and then converted to a dry-mass basis by dividing by the conversion factor of 0.9761 (gram dry mass per gram as-received mass).

Polycyclic Aromatic Hydrocarbons: The general approach used for the value assignment of the PAHs in SRM 1941b was similar to that reported in detail elsewhere [2]. The approach consisted of combining results from analyses using various combinations of different extraction techniques and solvents, clean-up/isolation procedures, and chromatographic separation and detection techniques: Soxhlet extraction and pressurized-fluid extraction (PFE) using dichloromethane (DCM) or a hexane/acetone mixture, cleanup of the extracts using solid-phase extraction (SPE) or normal-phase liquid chromatography (LC), followed by analysis using the following techniques: (1) reversed-phase liquid chromatography with fluorescence detection (LC-FL) analysis of the total PAH fraction, (2) reversed-phase

[1] Certain commercial equipment, instruments or materials are identified in this certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards

LC-FL analysis of isomeric PAH fractions isolated by normal-phase LC (i.e., multidimensional LC), (3) gas chromatography/mass spectrometry (GC/MS) analysis of the PAH fraction on three stationary phases of different selectivity, i.e., a 5 % (all column compositions are given as mole fractions in %) phenyl-substituted methylpolysiloxane phase, a 50 % phenyl-substituted methylpolysiloxane phase, and a relatively non-polar proprietary phase.

Three sets of GC/MS results, designated as GC/MS (I), GC/MS (II), and GC/MS (III), were obtained using three columns with different selectivities for the separation of PAHs. For GC/MS (I) analyses, duplicate subsamples of approximately 1 g from ten bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 2 % DCM in hexane (all solvent concentrations are given as volume fractions in %). The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5 MS, J&W Scientific, Folsom, CA). The GC/MS (II) analyses were performed using 5 g subsamples from six bottles of SRM 1941b. These samples were extracted using PFE with DCM. The high molecular mass compounds were removed from the extracts using size exclusion chromatography (SEC) with a preparative-scale divinylbenzene-polystyrene column (10 μm particle size with 10 nm diameter pores), and the sulfur was removed from the extracts by adding copper powder. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The analysis was by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17 MS, J&W Scientific). For the GC/MS (III), 9 g subsamples from six bottles of SRM 1941b were Soxhlet-extracted for 18 h with 250 mL of a mixture of 50 % hexane/50 % acetone. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific).

Two sets of LC-FL results, designated as LC-FL (total) and LC-FL (isomer), were used in the certification process. For the LC-FL (total), subsamples of approximately 1 g from six bottles of SRM 1941b were extracted using PFE with a mixture of 50 % hexane/50 % acetone. The extracts were concentrated and then processed through an aminopropylsilane SPE cartridge using 2 % DCM in hexane to obtain the total PAH fraction. For the LC-FL (isomer), a 5 g subsample from the six bottles was extracted using PFE with DCM and processed through an aminopropylsilane SPE cartridge using 10 % DCM in hexane; the PAH fraction was then fractionated further on a semi-preparative aminopropylsilane column (μBondapak NH_2, 9 mm i.d. × 30 cm, Waters Associates, Milford, MA) to isolate isomeric PAH fractions as described previously [3–6]. The total PAH fraction and the isomeric PAH fractions were analyzed using a 5 μm particle-size polymeric octadecylsilane (C_{18}) column (4.6 mm i.d. × 25 cm, Hypersil-PAH, Keystone Scientific, Inc., Bellefonte, PA) with wavelength-programmed fluorescence detection [4,5].

For the GC/MS and LC-FL measurements described above, selected perdeuterated PAHs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PAHs in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

Homogeneity Assessment for PAHs: The homogeneity of SRM 1941b was assessed by analyzing duplicate samples of approximately 1 g from ten bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described above for GC/MS (I). No statistically significant differences among bottles were observed for the PAHs at this sample size.

PAH Isomers of Molecular Mass 300 and 302: For the determination of the molecular mass 300 and 302 isomers, three subsamples of approximately 5 g each were extracted using PFE with DCM. The extracts were then concentrated with a solvent change to hexane and passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17MS, J&W Scientific). Perdeuterated dibenzo[*a,i*]pyrene was added to the sediment prior to extraction for use as an internal standard [8].

PCBs and Chlorinated Pesticides: The general approach used for the determination of PCBs and chlorinated pesticides in SRM 1941b consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques. Techniques and solvents included Soxhlet extraction and PFE using DCM or a hexane/acetone mixture,

clean-up/isolation using SPE or LC, followed by analysis using GC/MS and gas chromatography with electron capture detection (GC-ECD) on two columns with different selectivity for the separation of PCBs and chlorinated pesticides. The analytical methods are described in detail elsewhere [2].

Six sets of results were obtained and designated as GC-ECD (I) A and B, GC/MS (I) A and B, GC/MS (II), and Interlaboratory Comparison Exercise. For the GC-ECD (I) analyses, approximately 10 g subsamples from six bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur, and SEC, as described above, was used to remove the high molecular mass compounds. The concentrated extract was then fractionated on a semi-preparative aminopropylsilane column to isolate two fractions containing: (1) the PCBs and lower-polarity pesticides and (2) the more polar pesticides. GC-ECD analyses of the two fractions were performed on two columns of different selectivities for PCB separations: 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5, J&W Scientific), and a 0.25 mm × 60 m fused silica capillary column with a non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The results from the 5 % phenyl phase are designated as GC-ECD (IA) and the results from the proprietary phase are designated as GC-ECD (IB). For the GC-ECD analyses, two PCB congeners that are not significantly present in the sediment extract (PCB 103 and PCB 198 [9,10]) and endosulfan I-d_4, 4,4'-DDE-d_8, 4,4'-DD-d_8, and 4,4'-DDT-d_8 were added to the sediment prior to extraction for use as internal standards for quantification purposes.

Two sets of results were obtained by GC/MS. For GC/MS (I), approximately 9 g subsamples from six bottles were Soxhlet- extracted with a mixture of 50 % hexane/50 % acetone for approximately 18 h. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS with two ionization modes, electron impact (EI) and negative ion chemical ionization (NICI). The GC/MS EI method, GC/MS (IA), used a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The GC/MS NICI method, GC/MS (IB), used a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5MS, J&W Scientific). The GC/MS (II) results were obtained in the same manner as the GC/MS (IA) analyses except that three subsamples were Soxhlet-extracted with DCM for approximately 18 h. For the GC/MS analyses, selected carbon-13 labeled PCB congeners and chlorinated pesticides were added to the sediment prior to extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PCB congeners and chlorinated pesticides in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

The reference value for PCB 77 was determined from a separate fraction. The samples were extracted and processed as for GC-ECD (I) above. The first (PCB and lower-polarity pesticide) fraction from the semi-preparative aminopropylsilane column was further fractionated using a Cosmosil PYE (pyrenylethyl group bonded) column (5 μm particle size, 4.6 mm i.d. × 25 cm ; Phenomenex, Torrance, CA) [11]. Three fractions were collected: the first fraction contained the pesticides and multi-*ortho* PCBs, the second fraction contained the polychlorinated naphthalenes, non-*ortho* PCB congeners, and some mono-*ortho* PCB congeners, and the third fraction removed the residual planar compounds from the column. The second fraction was analyzed by GC/MS NICI using the same column as GC/MS (IB) above. Carbon-13 labeled PCB 77 was used as an internal standard for quantification purposes.

Alkylated PAH Groups, Hopanes, and Steranes: SRM 1941b was used in an interlaboratory comparison exercise in 2011 [12]. Results from 33 laboratories that participated in this exercise were used in the determination of the reference values for alkylated PAH groups, hopanes, and steranes in SRM 1941b. Note that not all laboratories returned data for each analyte. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest. For the alkylated PAHs, the majority of the laboratories (>90 %) used the parent PAH for determination of the response factor for the corresponding alkylated group.

Total Organic Carbon (TOC): Two laboratories provided results for TOC using similar procedures. Briefly, subsamples of approximately 200 mg were reacted with 6 mol/L hydrochloric acid and rinsed with deionized water prior to combustion in a gas fusion furnace. The carbon monoxide and carbon dioxide produced were measured and compared to a blank for calculation of the percent TOC. Each laboratory analyzed subsamples from three bottles of SRM 1941b. One of the laboratories also analyzed three subsamples from three bottles of SRM 1941b for carbon, hydrogen, and nitrogen.

Table 1. Certified Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
Naphthalene[b,c,d,e,f,g]	848	±	95[h]
Fluorene[b,c,d,e,f,g]	85	±	15[h]
Phenanthrene[b,c,d,e,f,g]	406	±	44[h]
Anthracene[b,c,d,e,f,g]	184	±	18[h]
3-Methylphenanthrene[b,c,d]	105	±	13[h]
2-Methylphenathrene[b,c,d]	128	±	14[h]
1-Methylphenanthrene[b,c,d,g]	73.2	±	5.9[h]
Fluoranthene[b,c,d,e,f,g]	651	±	50[h]
Pyrene[b,c,d,e,f,g]	581	±	39[h]
Benz[*a*]anthracene[b,c,d,e,f,g]	335	±	25[h]
Chrysene[d,f]	291	±	31[h]
Triphenylene[d,f]	108	±	5[i]
Benzo[*b*]fluoranthene[c,e]	453	±	21[h]
Benzo[*k*]fluoranthene[b,c,d,e]	225	±	18[h]
Benzo[*e*]pyrene[b,c,d,g]	325	±	25[h]
Benzo[*a*]pyrene[b,c,d,f,g]	358	±	17[h]
Perylene[b,c,d,f,g]	397	±	45[h]
Benzo[*ghi*]perylene[b,c,d,f,g]	307	±	45[h]
Indeno[1,2,3-*cd*]pyrene[b,c,d,f,g]	341	±	57[h]
Dibenz[*a,j*]anthracene[b,c,d,f]	48.9	±	4.6[h]
Dibenz[*a,c*]anthracene[c,f]	36.7	±	5.2[h]
Dibenz[*a,h*]anthracene[c,f]	53	±	10[h]
Benzo[*b*]chrysene[b,c,d,f]	53	±	12[h]
Picene[b,c,d]	46.6	±	4.7[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[e] LC-FL (total) of total PAH fraction after PFE with DCM.
[f] LC-FL (isomer) of isomeric PAH fractions after PFE with DCM.
[g] 1999 Interlaboratory Comparison Study [7] with 21 to 29 laboratories submitting data for each PAH.
[h] Certified values are weighted means of the results from two to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[i] The certified value is an unweighted mean of the results from two analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the value is metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 2. Certified Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b] (µg/kg)		
PCB	8	(2,4'-Dichlorobiphenyl)[c,d,e,f,g]	1.65	±	0.19[h]
PCB	18	(2,2',5-Trichlorobiphenyl)[c,d,e,f,g]	2.39	±	0.29[h]
PCB	28	(2,4,4'-Trichlorobiphenyl)[c,d,e,f,g]	4.52	±	0.57[h]
PCB	31	(2,4',5-Trichlorobiphenyl)[c,e,f]	3.18	±	0.41[h]
PCB	44	(2,2'3,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	3.85	±	0.20[i]
PCB	49	(2,2'4,5'-Tetrachlorobiphenyl)[c,d,e,f]	4.34	±	0.28[i]
PCB	52	(2,2',5,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	5.24	±	0.28[i]
PCB	66	(2,3',4,4'-Tetrachlorobiphenyl)[c,e,f,g,j]	4.96	±	0.53[i]
PCB	87	(2,2',3,4,5'-Pentachlorobiphenyl)[c,d,f,j]	1.14	±	0.16[h]
PCB	95	(2,2',3,5',6-Pentachlorobiphenyl)[c,e,f,g]	3.93	±	0.62[i]
PCB	99	(2,2',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g]	2.90	±	0.36[i]
PCB	101	(2,2',4,5,5'-Pentachlorobiphenyl)[c,e,f,g,j]	5.11	±	0.34[i]
PCB	105	(2,3,3',4,4'-Pentachlorobiphenyl)[c,d,e,f,g,j]	1.43	±	0.10[i]
PCB	110	(2,3,3',4',6-Pentachlorobiphenyl)[c,e,f,j]	4.62	±	0.36[i]
PCB	118	(2,3',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g,j]	4.23	±	0.19[i]
PCB	128	(2,2',3,3',4,4'-Hexachlorobiphenyl)[c,d,e,f,g,j]	0.696	±	0.044[i]
PCB	138	(2,2',3,4,4',5'-Hexachlorobiphenyl)[c,e,f,j]	3.60	±	0.28[i]
PCB	149	(2,2',3,4',5',6-Hexachlorobiphenyl)[c,d,e,j]	4.35	±	0.26[h]
PCB	153	(2,2',4,4',5,5'-Hexachlorobiphenyl)[c,d,e,f,g,j]	5.47	±	0.32[i]
PCB	156	(2,3,3',4,4',5-Hexachlorobiphenyl)[c,d,e,f,j]	0.507	±	0.090[h]
PCB	170	(2,2',3,3',4,4',5-Heptachlorobiphenyl)[c,d,e,f,g,j]	1.35	±	0.09[i]
PCB	180	(2,2',3,4,4',5,5'-Heptachlorobiphenyl)[c,d,e,f,g,j]	3.24	±	0.51[i]
PCB	183	(2,2',3,4,4',5',6-Heptachlorobiphenyl)[c,d,e,j]	0.979	±	0.087[h]
PCB	187	(2,2',3,4',5,5',6-Heptachlorobiphenyl)[c,d,e,f,g,j]	2.17	±	0.22[i]
PCB	194	(2,2',3,3',4,4',5,5'-Octachlorobiphenyl)[c,d,e,j]	1.04	±	0.06[h]
PCB	195	(2,2',3,3',4,4',5,6-Octachlorbiphenyl)[c,e,g,j]	0.645	±	0.060[i]
PCB	201	(2,2',3,3',4,5',6,6'-Octachlorobiphenyl)[c,e,j]	0.777	±	0.034[h]
PCB	206	(2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)[c,e,f,g,j]	2.42	±	0.19[i]
PCB	209	Decachlorobiphenyl[c,d,e,f,g,j]	4.86	±	0.45[i]

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform to IUPAC rules, except PCB 201. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 201 is listed as PCB 200.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[g] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each PCB congener.

[h] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[i] Certified values are weighted means of the results from three to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[j] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

Table 3. Certified Mass Fraction Values for Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a] (µg/kg)
Hexachlorobenzene[b,c,d,e]	5.83 ± 0.38[f]
cis-Chlordane[b,c,d,e,g]	0.85 ± 0.11[h]
trans-Chlordane[b,c,e]	0.566 ± 0.093[f]
cis-Nonachlor[b,e,g]	0.378 ± 0.053[h]
trans-Nonachlor[b,c,d,e,g]	0.438 ± 0.073[f]
4,4'-DDE[b,d,e,g]	3.22 ± 0.28[h]
4,4'-DDD[b,d,e,g]	4.66 ± 0.46[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[e] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each pesticide.
[f] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[g] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.
[h] Certified values are weighted means of the results from three to five analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed and the values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 4. Reference Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
1-Methylnaphthalene[b,c,d,e]	127	±	14[f]
2-Methylnaphthalene[b,c,d,e]	276	±	53[f]
2,6-Dimethylnaphthalene[b,c,d,e]	75.9	±	4.5[f]
2,3,5-Trimethylnaphthalene[b,c,d,e]	25.5	±	5.1[f]
Biphenyl[b,c,d,e]	74.0	±	8.0[f]
Acenaphthylene[b,c,d,e]	53.3	±	6.4[f]
Acenaphthene[b,c,d,e]	38.4	±	5.2[f]
9-Methylphenanthrene[c]	63.5	±	2.5[g]
4-Methylphenanthrene and 9-Methylphenanthrene[b,d]	80.1	±	4.8[f]
2-Methylanthracene[c,d]	36	±	15[f]
8-Methylfluoranthene[b]	49.5	±	2.7[g]
7-Methylfluoranthene[b]	45.4	±	1.5[g]
1-Methylfluoranthene[b]	42.4	±	2.1[g]
3-Methylfluoranthene[b]	28.8	±	1.3[g]
2-Methylpyrene[b]	78.7	±	4.0[g]
4-Methylpyrene[b]	66.4	±	2.6[g]
1-Methylpyrene[b]	52.5	±	2.3[g]
Acephenanthrene[d]	30.5	±	1.9[g]
Benzo[*c*]phenanthrene[b,c,d]	58	±	15[f]
Benzo[*a*]fluoranthene[b,c,d]	73	±	18[f]
Benzo[*j*]fluoranthene[c]	217	±	5[g]
Indeno[1,2,3-*cd*]fluoranthene[d]	9.63	±	0.34[g]
Pentaphene[d]	25.3	±	1.0[g]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[e] 1999 Interlaboratory Comparison Study [7] with 14 to 26 laboratories submitting data for each PAH.
[f] Reference values are weighted means of the results from two to four analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of PAHs listed as determined by the methods indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[g] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for the associated degrees of freedom (19 for footnote b and 5 for footnotes c and d) and 95 % confidence level for each analyte. The measurand is the total mass fraction of the PAHs listed as determined by the method indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 5. Reference Mass Fraction Values for PAHs of Molecular Mass 300 and 302 in SRM 1941b

PAHs of Molecular Mass 300 and 302	Mass Fractions[a,b,c] (µg/kg)		
Coronene	72.6	±	4.7
Dibenzo[*b,e*]fluoranthene	10.3	±	0.3
Naphtho[1,2-*b*]fluoranthene	91.0	±	3.1
Naphtho[1,2-*k*]fluoranthene and Naphtho[2,3-*j*]fluoranthene	79.8	±	2.5
Naphtho[2,3-*b*]fluoranthene	23.5	±	0.3
Dibenzo[*b,k*]fluoranthene	95.6	±	3.1
Dibenzo[*a,k*]fluoranthene	26.6	±	0.4
Dibenzo[*j,l*]fluoranthene	63.8	±	1.8
Dibenzo[*a,l*]pyrene	11.1	±	1.0
Naphtho[2,3-*k*]fluoranthene	10.7	±	0.6
Naphtho[1,2-*a*]pyrene	16.7	±	1.4
Naphtho[2,3-*e*]pyrene	33.2	±	2.3
Dibenzo[*a,e*]pyrene	76.1	±	3.6
Naphtho[2,1-*a*]pyrene	59.2	±	1.8
Dibenzo[*e,i*]pyrene	35.0	±	2.4
Naphtho[2,3-*a*]pyrene	16.5	±	0.6
Benzo[*b*]perylene	38.2	±	1.2
Dibenzo[*a,i*]pyrene	25.5	±	1.0
Dibenzo[*a,h*]pyrene	6.94	±	0.29

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for two degrees of freedom and 95 % confidence level for each analyte. The measurand is the total mass fraction of the constituent listed as determined by the method indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[c] GC/MS on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM [8].

Table 6. Reference Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b,c] (µg/kg)		
PCB	45	(2,2',3,6-Tetrachlorobiphenyl)[d,e]	0.73	±	0.12
PCB	56	(2,3,3',4'-Tetrachlorobiphenyl)[d,f,g]	1.21	±	0.11
PCB	63	(2,3,4',5-Tetrachlorobiphenyl)[e,f,g]	0.213	±	0.040
PCB	70	(2,3',4',5-Tetrachlorobiphenyl)[e,f,g]	4.99	±	0.29
PCB	74	(2,4,4',5-Tetrachlorobiphenyl)[e,f,g]	2.04	±	0.15
PCB	77	(3,3',4,4'-Tetrachlorobiphenyl)[h]	0.31	±	0.03
PCB	107	(2,3,3',4',5-Pentachlorobiphenyl)[d,e,f,g]	0.628	±	0.028
PCB	132	(2,2',3,3',4,6'-Hexachlorobiphenyl)[d,f,g]	1.28	±	0.27
PCB	146	(2,2',3,4',5,5'-Hexachlorobiphenyl)[e,f,g]	1.22	±	0.12
PCB	158	(2,3,3',4,4',6-Hexachlorobiphenyl)[d,e,f,g]	0.65	±	0.15
PCB	163	(2,3,3',4',5,6-Hexachlorobiphenyl)[e,f,g]	1.28	±	0.06
PCB	174	(2,2',3,3',4,5,6'-Heptachlorobiphenyl)[d,e,f,g]	1.51	±	0.39
PCB	193	(2,3,3',4',5,5',6-Heptachlorobiphenyl)[d,e,f,g]	0.292	±	0.075

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform with IUPAC rules, except PCB 107. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 107 is listed as PCB 108.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] For these PCB congeners except PCB 77, the reference values are unweighted means of the results from two to four analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled within-method variance following the ISO/JCGM Guide [14,15]. For PCB 77, the reference value is the mean of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to two degrees of freedom and 95 % confidence level for PCB 77. The measurand is the total mass fraction of the PCB Congeners listed as determined by the method or methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as microgram per kilogram on a dry-mass basis.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[h] GC/MS NICI on a 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (I) fractionated using a PYE column.

Table 7. Reference Mass Fraction Values for Selected Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a,b] (µg/kg)		
2,4'-DDE[c,d]	0.38	±	0.12
4,4'-DDT[e,f]	1.12	±	0.42

[a] Mass Fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference values are unweighted means of the results from two analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).
[e] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[f] 1999 Interlaboratory Comparison Study [7] with 10 laboratories submitting data for 4,4'-DDT.

Table 8. Reference Mass Fraction Values for Alkylated PAH Groups in SRM 1941b

Alkylated PAH Group	Mass Fraction[a,b] (µg/kg)		
C2-decalins	18	±	5
C4-decalins	41	±	4
C2-naphthalenes	187	±	53
C3-naphthalenes	158	±	42
C1-benzothiophenes	25	±	14
C2-benzothiophenes	20	±	11
C3-benzothiophenes	22	±	13
C4-benzothiophenes	18	±	5
C1-fluorenes	57	±	18
C2-fluorenes	122	±	43
C3-fluorenes	128	±	31
C1-phenanthrenes/anthracenes	313	±	99
C2-phenanthrenes/anthracenes	247	±	62
C3-phenanthrenes/anthracenes	165	±	46
C4-phenanthrenes/anthracenes	87	±	36
C1-dibenzothiophenes	54	±	13
C2-dibenzothiophenes	91	±	18
C3-dibenzothiophenes	84	±	15
C4-dibenzothiophenes	57	±	13
C1-fluoranthenes/pyrenes	252	±	48
C2-fluoranthenes/pyrenes	205	±	38
C3-fluoranthenes/pyrenes	102	±	22
C4-fluoranthenes/pyrenes	121	±	59
C1-benzanthraces/chrysenes/triphenylenes	208	±	43
C2-benzanthraces/chrysenes/triphenylenes	120	±	24
C3-benzanthraces/chrysenes/triphenylenes	73	±	31
C4-benzanthraces/chrysenes/triphenylenes	41	±	11

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the alkylated PAH groups listed as determined by the interlaboratory study methods. The values listed are metrologically traceable to the SI unit of mass fraction, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 9. Reference Mass Fraction Values for Hopanes and Steranes in SRM 1941b

Hopane or Sterane	Mass Fraction[a,b] (µg/kg)
17α(H)-22,29,30-Trisnorhopane	54 ± 18
17α(H)-21β(H)-30-Norhopane	137 ± 21
17α(H)-21β(H)-30-Hopane	215 ± 44
17α(H)-21β(H)-22R-Homohopane	44 ± 10
17α(H)-21β(H)-22S-Homohopane	48 ± 13
5α(H)-14α(H),17α(H)-Cholestane 20R	41 ± 11
5α(H)-14β(H),17β(H)-Cholestane 20R	27 ± 6
5α(H)-14β(H),17β(H)-24-Methylcholestane 20R	21 ± 8
5α(H)-14α(H),17α(H)-24-Ethylcholestane 20R	19 ± 5
5α(H)-14β(H),17β(H)-24-Ethylcholestane 20R	41 ± 9

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the constituent listed as determined by the methods used during the interlaboratory study. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 10. Reference Mass Fraction Value for Total Organic Carbon in SRM 1941b

Total Organic Carbon (TOC)	2.99 % ± 0.24 %[a,b]

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference value for total organic carbon is a weighted mean value from routine measurements made by two laboratories [21]. The uncertainty listed is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance. The reporting follows the ISO/JCGM Guides [2]. The measurand is the total mass fraction of TOC listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as a percent on a dry-mass basis.

Table 11. Information Mass Fraction Values for Carbon, Hydrogen, and Nitrogen in SRM 1941b

Elements	Mass Fractions[a] (%)
Carbon	3.3
Hydrogen	1.2
Nitrogen	<0.5

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.

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Certificate Revision History: 16 January 2015 (Corrected IUPAC name for PCB-56 and PCB-107; editorial changes); 10 June 2014 (Units corrected from mg/kg to µg/kg in Tables 8 and 9; editorial changes); 10 April 2012 (Reference value added for alkylated PAH groups, hopanes, and steranes; extension of certification period; editorial changes); 16 August 2004 (Reference values for the butyl tins removed; editorial changes); 15 July 2002 (Original certificate date).

Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

APPENDIX A

The laboratories listed below performed measurements that contributed to the certification of PAHs, PCBs, and chlorinated pesticides in SRM 1941b Organics in Marine Sediment.

Arthur D. Little, Inc; Cambridge, MA
Axys Analytical Services; Sidney, BC, Canada
B & B Laboratories; College Station, TX
Battelle Ocean Sciences; Duxbury, MA
Bedford Institute of Oceanography; Dartmouth, NS, Canada
California Department of Fish and Game; Rancho Cordova, CA
Central Contra Costa Sanitary District; Martinez, CA
Chesapeake Biological Laboratory; Solomons, MD
Centro de Investigacionies Energeticas Medioambientales y Tecnologicas; Madrid, Spain
City of Los Angeles Environmental Monitoring Division; Playa del Rey, CA
City of San Jose Environmental Services Department; San Jose, CA
Columbia Analytical Services; Kelso, WA
East Bay Municipal Utility District; Oakland, CA
Florida Department of Environmental Protection; Tallahassee, FL
Manchester Environmental Laboratory; Port Orchard, WA
Murray State University; Murray, KY
Massachusetts Water Resources Authority Central Lab; Winthrop, MA
National Research Council of Canada; Ottawa, Ontario, Canada
National Oceanic and Atmospheric Association (NOAA), National Marine Fisheries Service (NMFS), Auke Bay Laboratory; Juneau, AK
NOAA, National Ocean Service/Center for Coastal Environmental Health and Biomolecular Research; Charleston, SC
NOAA, NMFS, Sandy Hook Marine Laboratory; Highlands, NJ
NOAA, NMFS, Northwest Fisheries Science Center; Seattle, WA
Orange County Sanitation District; Fountain Valley, CA
Philip Analytical Services; Burlington, Ontario, Canada
Serv de Hidrografia Naval; Buenos Aires, Argentina
Skidaway Institute of Technology; Savannah, GA
Southwest Laboratory of Oklahoma; Broken Arrow, OK
Severn Trent Knoxville Laboratory; Knoxville, TN
Texas A&M University, Geochemical and Environmental Research Group; College Station, TX
Texas Parks and Wildlife Department; San Marcos, TX
University of California at Los Angeles, Institute of Geophysics and Planetary Physics; Los Angeles, CA
University of Connecticut, Environmental Research Institute; Storrs, CT
University of Rhode Island, Graduate School of Oceanography; Narragansett, RI
US Department of Agriculture, Environmental Chemistry Laboratory; Beltsville, MD
US Environmental Protection Agency, Atlantic Ecology Division; Narragansett, RI
US Geological Survey, National Water Quality Laboratory; Denver, CO
Woods Hole Group Environmental Lab; Raynham, MA
Wright State University; Dayton, OH

APPENDIX B

The laboratories listed below performed measurements that contributed to the certification of alkylated PAH groups, hopanes, and steranes in SRM 1941b Organics in Marine Sediment.

Alpha Analytical, Inc.; Mansfield, MA
Analytical Resources, Inc.; Tukwila, WA
Axys Analytical Services; Sydney, BC, Canada
Battelle Analytical & Environmental Chemistry Laboratory; Duxbury, MA
Center for Laboratory Sciences; Pasco, WA
Columbia Analytical Services; Jacksonville, FL
Columbia Analytical Services; Rochester, NY
Columbia Analytical Services, Kelso, WA
Florida Department of Environmental Protection; Tallahassee, FL
Florida International University; North Miami, FL
Michigan Department of Natural Resources and Environment; Lansing, MI
Mississippi State Chemical Laboratory; Mississippi State, MS
NIST; Charleston, SC
NIST; Gaithersburg, MD
NOAA/NCCOS/NOS; Charleston, SC
NOAA/NMFS/Alaska Fisheries Science Center; Juneau, AK
NY State Department of Health; Albany, NY
Pace Analytical Services, Inc. Minneapolis; Minneapolis, MN
RJ Lee Group, Inc; Monroeville, PA
TDI/B&B Laboratories, Inc.; College Station, TX
TestAmerica Laboratories; Mobile, AL
TestAmerica Laboratories; West Sacramento, CA
TestAmerica Laboratories; University Park, IL
TestAmerica Laboratories; Schriever, LA
TestAmerica Laboratories; Edison, NJ
TestAmerica Laboratories; Knoxville, TN
TestAmerica Laboratories; Pittsburgh, PA
TestAmerica Laboratories; South Burlington, VT
TestAmerica Laboratories; Tacoma, WA
US Army Engineer Research and Development Center; Vicksburg, MS
USGS Columbia Environmental Research Center; Columbia, MO
University of Iowa, State Hygienic Laboratory; Iowa City, IO
Washington State Public Health Laboratories; Shoreline, WA

NIST

Date of Issue:
31 March 2014

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 1941b
SRM Name: Organics in Marine Sediment
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements
Symbol
No Symbol/Pictogram

Signal Word
Not applicable.

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Marine sediment

Other Designations: Sediment.

This material is naturally occurring marine sediment from an urban area. The material contains trace amounts of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and should be handled with care. Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Marine Sediment	Not available	Not available	100

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:
Suitable: Use extinguishing media appropriate for surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. Handling and Storage

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handling in accordance with all current regulations and standards.

8. Exposure Controls and Personal Protection

Exposure Limits: No occupational exposure limits have been established for marine sediment. This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure. The exposure limits for Particulates Not Otherwise Regulated (PNOR) are applicable.

OSHA (PEL): 15 mg/m^3 (TWA, total particulates not otherwise regulated)
OSHA (PEL) 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

NIOSH (REL): 10 mg/m^3 (TWA, total particulates not otherwise regulated, 8 h)
NIOSH (REL): 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):	amorphous powder
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not applicable
Melting point/freezing point (°C):	not available
Specific Gravity (water=1)	not available
Vapor Pressure (mmHg):	not applicable
Vapor Density (air = 1):	not applicable
Viscosity (cP):	not applicable
Solubility(ies):	not available
Partition coefficient (n-octanol/water):	not available
Particle Size:	<150 µm

Thermal Stability Properties:

Autoignition Temperature (°C):	not available
Thermal Decomposition (°C):	not available
Initial boiling point and boiling range (°C):	not available
Explosive Limits, LEL (Volume %):	not available
Explosive Limits, UEL (Volume %):	not available
Flash Point (°C):	not available
Flammability (solid, gas):	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: None listed.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: __X__ Inhalation __X__ Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Generated dust may cause irritation if inhaled.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Generated dust may cause irritation.

Skin Contact: May cause mechanical irritation.

Eye Contact: May cause mechanical irritation.

Ingestion: No data available.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified; no data available.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/ Eye irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes __X__ No
Marine sediment is not listed by NTP, IARC or OSHA as a carcinogen.

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:
California Proposition 65: Not listed.

U.S. TSCA Inventory: Not listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 31 March 2014

Sources: 29 CFR Occupational Health and Safety Office (OSHA) 1910.1000, *Limits for Air Contaminants*, Table Z-1; available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992 (accessed Mar 2014).

Center for Disease Control (CDC) NIOSH Pocket Guide to Chemical Hazards, *Particulates not otherwise regulated*; available at http://www.cdc.gov/niosh/npg/npgd0480.html (accessed Mar 2014).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or Internet at http://www.nist.gov/srm.

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	DAVE MITCHELL ANALYTICAL RESOURCES INC 4611 S 134TH PLACE SUITE 100 TUKWILA, WA 98168-3240 1 (206)695-6205		DAVE MITCHELL ANALYTICAL RESOURCES INC 4611 S 134TH PLACE SUITE 100 TUKWILA, WA 98168-3240 1 (206)695-6205

Ship via	UPS Ground	Description		Ship from	
Salesmen	MCMIDM2	Instructions		Blanket	
Contact	DAVE MITCHELL	Pro#		Truck#	

Order discrepancies (other than back ordered items) must be reported to our Customer Relations Department at 301-975-6776 within 5 days of receipt of shipment or this order will be considered complete. NIST SRMs/RMs are generally not returnable - with the exception of defective goods or shipments made in error by NIST. To return a SRM/RM, please call for instructions and a Return SRM/RM Authorization Number before shipment. Returns WILL NOT BE ACCEPTED without prior authorization.

Order	UOM	Ship	UOM	B/O	UOM	Item	Description
1	EACH	1	EACH	0	EACH	1941B	Organics in Marine Sediment
						Total qty:	1 / EACH
							NOT FOR HUMAN CONSUMPTION, LABORATORY USE ONLY.

9/21/16
04:04 PM

1700101

Picked by	
Packed by	
# of pieces	
Weight	

MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

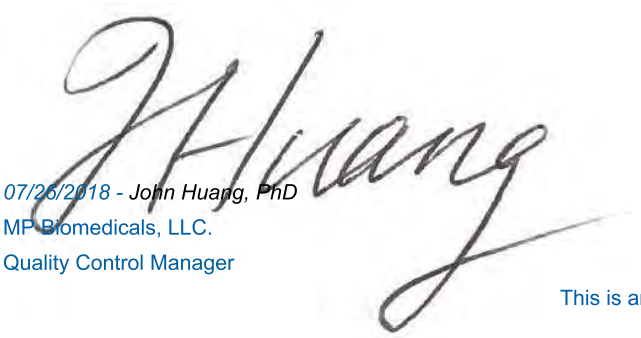
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

Identification A & B: Passes
Bulk Density: 0.29 g/ml
Bulk Density (graduated cylinder): 0.31 g/ml
Conductivity: 18 µS/cm
Starch: Negative
Ether Soluble Substances: 0.01%
Total Aerobic microbial Count: 100 cfu/g
Total Mold and Yeast Count: 20 cfu/g
Staphylococcus aureus: Absent/1 g
Pseudomonas aeruginosa: Absent/1 g
E. coli: Absent/1 g
Salmonella: Absent/10 g
Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
Recommended Retest Date: 11/30/2022



07/26/2018 - *John Huang, PhD*
MP Biomedicals, LLC.
Quality Control Manager

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mailto:biotech@mpbio.com
http://www.mpbio.com
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Technical Service: 1-800-279-5490 (440-337-1200) Customer Service: 1-800-854-0530 (440-337-1200)

MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

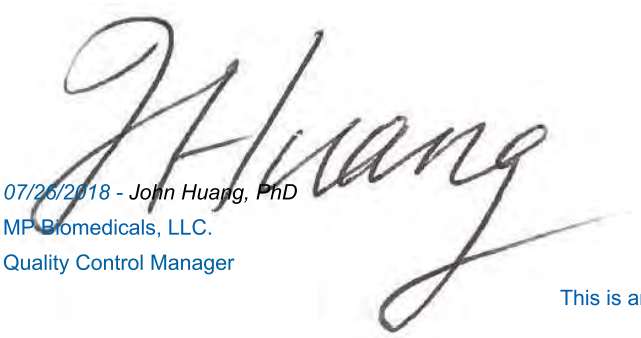
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

Identification A & B: Passes
Bulk Density: 0.29 g/ml
Bulk Density (graduated cylinder): 0.31 g/ml
Conductivity: 18 µS/cm
Starch: Negative
Ether Soluble Substances: 0.01%
Total Aerobic microbial Count: 100 cfu/g
Total Mold and Yeast Count: 20 cfu/g
Staphylococcus aureus: Absent/1 g
Pseudomonas aeruginosa: Absent/1 g
E. coli: Absent/1 g
Salmonella: Absent/10 g
Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
Recommended Retest Date: 11/30/2022



07/26/2018 - *John Huang, PhD*
MP Biomedicals, LLC.
Quality Control Manager

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MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

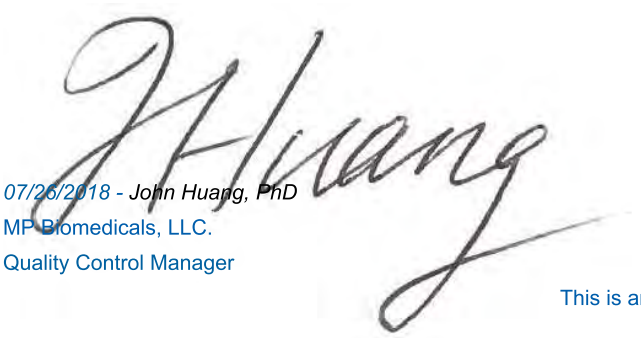
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

Identification A & B: Passes
Bulk Density: 0.29 g/ml
Bulk Density (graduated cylinder): 0.31 g/ml
Conductivity: 18 µS/cm
Starch: Negative
Ether Soluble Substances: 0.01%
Total Aerobic microbial Count: 100 cfu/g
Total Mold and Yeast Count: 20 cfu/g
Staphylococcus aureus: Absent/1 g
Pseudomonas aeruginosa: Absent/1 g
E. coli: Absent/1 g
Salmonella: Absent/10 g
Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
Recommended Retest Date: 11/30/2022



07/26/2018 - *John Huang, PhD*
MP Biomedicals, LLC.
Quality Control Manager

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Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-07G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-01 A	SDG:	23E0148
Sampled:	03/20/23 10:02	Prepared:	05/08/23 13:06	File ID:	
% Solids:	73.61	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	73.61	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-11G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-02 A	SDG:	23E0148
Sampled:	03/20/23 09:24	Prepared:	05/08/23 13:06	File ID:	
% Solids:	72.27	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	72.27	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-14G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-03 A	SDG:	23E0148
Sampled:	03/20/23 10:11	Prepared:	05/08/23 13:06	File ID:	
% Solids:	54.58	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	54.58	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-15G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-04 A	SDG:	23E0148
Sampled:	03/20/23 12:42	Prepared:	05/08/23 13:06	File ID:	
% Solids:	61.15	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	61.15	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-03G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-05 A	SDG:	23E0148
Sampled:	03/20/23 13:15	Prepared:	05/08/23 13:06	File ID:	
% Solids:	45.94	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	45.94	1	0.04	0.04	

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Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-01G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-06 A	SDG:	23E0148
Sampled:	03/20/23 14:45	Prepared:	05/08/23 13:06	File ID:	
% Solids:	53.25	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	53.25	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-01C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-07 A	SDG:	23E0148
Sampled:	03/20/23 11:51	Prepared:	05/08/23 13:06	File ID:	
% Solids:	55.22	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	55.22	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-05C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-08 A	SDG:	23E0148
Sampled:	03/21/23 12:44	Prepared:	05/08/23 13:06	File ID:	
% Solids:	54.83	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	54.83	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-05G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-09 A	SDG:	23E0148
Sampled:	03/21/23 13:10	Prepared:	05/08/23 13:06	File ID:	
% Solids:	51.94	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	51.94	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-03C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-10 A	SDG:	23E0148
Sampled:	03/21/23 14:42	Prepared:	05/08/23 13:06	File ID:	
% Solids:	55.48	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	55.48	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-14C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-11 A	SDG:	23E0148
Sampled:	03/21/23 15:53	Prepared:	05/08/23 13:06	File ID:	
% Solids:	68.13	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	68.13	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-14C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-12 A	SDG:	23E0148
Sampled:	03/21/23 15:53	Prepared:	05/08/23 13:06	File ID:	
% Solids:	67.96	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	67.96	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-DUPC

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0148-13 A	SDG:	23E0148
Sampled:	03/21/23 12:00	Prepared:	05/08/23 13:06	File ID:	
% Solids:	65.16	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	65.16	1	0.04	0.04	

PREPARATION BATCH SUMMARY

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0230 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-07G:0-10	23E0148-01		05/08/23 13:06	
SED-11G:0-10	23E0148-02		05/08/23 13:06	
SED-14G:0-10	23E0148-03		05/08/23 13:06	
SED-15G:0-10	23E0148-04		05/08/23 13:06	
SED-03G:0-10	23E0148-05		05/08/23 13:06	
SED-01G:0-10	23E0148-06		05/08/23 13:06	
SED-01C:0-1	23E0148-07		05/08/23 13:06	
SED-05C:0-1	23E0148-08		05/08/23 13:06	
SED-05G:0-10	23E0148-09		05/08/23 13:06	
SED-03C:0-1	23E0148-10		05/08/23 13:06	
SED-14C:0-1	23E0148-11		05/08/23 13:06	
SED-14C:1-3	23E0148-12		05/08/23 13:06	
SED-DUPC	23E0148-13		05/08/23 13:06	
Blank	BLE0230-BLK1		05/08/23 13:06	
SED-07G:0-10	BLE0230-DUP1		05/08/23 13:06	
SED-07G:0-10	BLE0230-DUP2		05/08/23 13:06	

TOTAL SOLIDS/VOLATILE SOLIDS (TS / TVS) BENCHSHEET for Solid samples

Method: PSEP 1986, SM2540, EPA 160.1

(dry at 104 (12-24 hr) then combust at 550 (30 min))

Batch:	BLE0230
Date:	5/8/2023 13:08
Analyst:	UW

Instrumentation			
Drying Ovens:	12	**Analytical Balance:**	BAL2
Muffle Furnace:	2		

Batch drying time				**Oven Temps, °C**	
record times as mm/dd/yy hh:mm		TS (%) calculated as:		Start Temp	103
date/time in oven:	5/8/2023 14:34	Final dry wt (g) = (Dry Wt - Tare Wt)		Dry Cycle 1	103
date/time out:	5/9/2023 8:45	TS = (Final Dry Wt)/ (grams Sample-Tare)		Dry Cycle 2	
elapsed hrs =	18.2	OK		Dry Cycle 3	

TVS (mg/kg dry wt) calculated as:
Final ash wt (g) = (min ash wt - tare wt)
TVS (mg/kg) = [(Dry wt-Ash wt)/ (dry weight)] *1,000,000
if ash wt > dry wt, "Chk for Err"
if dry wt-ash wt < 0.001 g, "< (1/dry wt)*1,000,000

Balance Calibration Check

Record weights to 4 places											
	Cal Weight ID:	CV-02	CV-02	CV-02	CV-02	CV-02		CV-02	CV-02	CV-02	
	Date & Time:	5/8/23 13:10	5/8/23 13:18	5/9/23 9:12							
Cal Wt (g):	10.0000	10.0000	10.0000	10.0000							
		Cal OK!	Cal OK!	Cal OK!							

Sample ID	Dish #	Tare Wt. (g)	Dish & Sample (g)	Dry Wt 104C (grams) 1	2	3	dry Wt (g)	TS (%)	Notes	ASH WT 550C (grams) 1	2	3	Ash Wt (g)	TVS (mg/kg)	(%)	Notes
BLE0230-BLK1	1	0.7988	0.0000	0.7987			-0.0001	0.01%								
23E0148-01	2	0.8061	7.4724	5.7132			4.9071	73.61%								
BLE0230-DUP1	3	0.8165	9.3341	7.2135			6.3970	75.10%	RPD=2							
BLE0230-DUP2	4	0.7812	8.0676	6.3211			5.5399	76.03%	RSD=1.6							
23E0148-02	5	0.7888	7.0616	5.3222			4.5334	72.27%								
23E0148-03	6	0.8156	7.2626	4.3341			3.5185	54.58%								
23E0148-04	7	0.7911	6.0021	3.9775			3.1864	61.15%								
23E0148-05	8	0.7941	6.9578	3.6257			2.8316	45.94%								
23E0148-06	9	0.7966	9.3822	5.3686			4.5720	53.25%								
23E0148-07	10	0.8020	8.2302	4.9042			4.1022	55.22%								
23E0148-08	11	0.8165	7.1570	4.2931			3.4766	54.83%								
23E0148-09	12	0.8366	6.9676	4.0212			3.1846	51.94%								
23E0148-10	13	0.8203	6.7735	4.1229			3.3026	55.48%								
23E0148-11	14	0.7856	8.3342	5.9281			5.1425	68.13%								
23E0148-12	15	0.7910	9.4251	6.6589			5.8679	67.96%								
23E0148-13	16	0.8467	8.2742	5.6866			4.8399	65.16%								
23E0156-01	17	0.8090	8.0014	3.9066			3.0976	43.07%								
23E0156-02	18	0.8359	7.7488	3.6195			2.7836	40.27%								
23E0156-03	19	0.8130	7.7601	4.2232			3.4102	49.09%								
23E0156-04	20	0.8170	7.3864	3.7664			2.9494	44.90%								
23E0156-05	21	0.8121	8.2455	5.5413			4.7292	63.62%								
23E0156-06	22	0.8220	7.0456	4.2587			3.4367	55.22%								
23E0156-07	23	0.8086	9.5710	5.1544			4.3458	49.60%								

Form I

METHOD BLANK DATA SHEET

SM 2540 G-11

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0230
Laboratory ID: BLE0230-BLK1
Prepared: 05/08/23 13:06
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/08/23 13:08
Sequence:
Calibration:
Instrument: BAL2

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	ND	1	0.04	0.04	U

SED-07G:0-10

DUPLICATES

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0230-DUP1
Batch: BLE0230
Lab Source ID: 23E0148-01
Preparation: No Prep Wet Chem
Initial/Final: 5 g / 5 g
Source Sample Name: SED-07G:0-10
% Solids: 73.61

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Solids	20	73.61	75.10	2.01	

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

SED-07G:0-10

DUPLICATES

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0230-DUP2
Batch: BLE0230
Lab Source ID: 23E0148-01
Preparation: No Prep Wet Chem
Initial/Final: 5 g / 5 g
Source Sample Name: SED-07G:0-10
% Solids: 73.61

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Solids	20	73.61	76.03	3.23	

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

HOLDING TIME SUMMARY

Analysis: SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-07G:0-10 23E0148-01	03/20/23 10:02	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-11G:0-10 23E0148-02	03/20/23 09:24	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-14G:0-10 23E0148-03	03/20/23 10:11	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-15G:0-10 23E0148-04	03/20/23 12:42	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-03G:0-10 23E0148-05	03/20/23 13:15	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	49	180	
SED-01G:0-10 23E0148-06	03/20/23 14:45	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	49	180	
SED-01C:0-1 23E0148-07	03/20/23 11:51	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-05C:0-1 23E0148-08	03/21/23 12:44	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	48	180	
SED-05G:0-10 23E0148-09	03/21/23 13:10	05/05/23 14:20	05/08/23 13:06	47	180	05/08/23 13:08	48	180	
SED-03C:0-1 23E0148-10	03/21/23 14:42	05/05/23 14:20	05/08/23 13:06	47	180	05/08/23 13:08	48	180	
SED-14C:0-1 23E0148-11	03/21/23 15:53	05/05/23 14:20	05/08/23 13:06	47	180	05/08/23 13:08	48	180	
SED-14C:1-3 23E0148-12	03/21/23 15:53	05/05/23 14:20	05/08/23 13:06	47	180	05/08/23 13:08	48	180	
SED-DUPC 23E0148-13	03/21/23 12:00	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	48	180	
Duplicate BLE0230-DUP1	03/20/23 10:02	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
Duplicate BLE0230-DUP2	03/20/23 10:02	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0148
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids	0.04	0.04	%

Analytical Resources, LLC
Analytical Chemists and Consultants

18 July 2024

Michael Erdahl
Friedman & Bruya Inc.
5500 4th Ave S
Seattle, WA 98108

RE: Port of Friday Harbor (303388)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23E0152	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC



Susan Dunnihoo For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Cert# 100006-012

23E0152

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303388	D-229

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon										Notes
SED-07C:0-1		3/22/2023	729	sediment	1	x										
~~SED-07C:1-3~~		~~3/22/2023~~	~~729~~	~~sediment~~	~~1~~	~~x~~										No further sample
SED-08C:0-1		3/22/2023	807	sediment	1	x										at F&B. Use container
SED-08C:1-3		3/22/2023	807	sediment	1	x										at ARI. ME 5/5/23
SED-09C:0-1		3/22/2023	833	sediment	1	x										
SED-09C:1-3		3/22/2023	833	sediment	1	x										
SED-12C:0-1		3/22/2023	925	sediment	1	x										
SED-26C:0-1		3/22/2023	1038	sediment	1	x										
SED-26C:1-3		3/22/2023	1038	sediment	1	x										
SED-25C:0-1		3/22/2023	1119	sediment	1	x										
SED-25C:1-3		3/22/2023	1119	sediment	1	x										
SED-10C:0-1		3/23/2023	817	sediment	1	x										
SED-10C:1-3		3/23/2023	817	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:		Matthew Bares	ARI LLC	5/5/23	1420
Relinquished by:					
Received by:					

23E0152

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303388	D-229

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Total Organic Carbon										Notes
SED-11C:0-1		3/23/2023	729	sediment	1	x										
SED-11C:1-3		3/23/2023	842	sediment	1	x										
SED-DUP3C		3/23/2023	1200	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:		Matthew Nanver	ARI LLC	5/5/23	1420
Relinquished by:					
Received by:					

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman and Bruya Project Name: 303388

COC No(s): NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 23E0152 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1420 3.6 °C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 300 9708

Cooler Accepted by: MP Date: 05/05/23 Time: 1420

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: PZB Date: 5/5/23 Time: 15:57 Labels checked by: PZB

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303388	**Reported:**
Seattle, WA 98108	Project Manager: Michael Erdahl	07/18/2024 15:39

ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Sample ID	Matrix	Date Sampled	Date Received
23E0152-01	SED-07C:0-1	Solid	03/22/23 07:29	05/05/23 14:20
23E0152-02	SED-07C:1-3	Solid	03/22/23 07:29	05/05/23 14:20
23E0152-03	SED-08C:0-1	Solid	03/22/23 08:07	05/05/23 14:20
23E0152-04	SED-08C:1-3	Solid	03/22/23 08:07	05/05/23 14:20
23E0152-05	SED-09C:0-1	Solid	03/22/23 08:33	05/05/23 14:20
23E0152-06	SED-09C:1-3	Solid	03/22/23 08:33	05/05/23 14:20
23E0152-07	SED-12C:0-1	Solid	03/22/23 09:25	05/05/23 14:20
23E0152-08	SED-26C:0-1	Solid	03/22/23 10:38	05/05/23 14:20
23E0152-09	SED-26C:1-3	Solid	03/22/23 10:38	05/05/23 14:20
23E0152-10	SED-25C:0-1	Solid	03/22/23 11:19	05/05/23 14:20
23E0152-11	SED-25C:1-3	Solid	03/22/23 11:19	05/05/23 14:20
23E0152-12	SED-10C:0-1	Solid	03/23/23 08:17	05/05/23 14:20
23E0152-13	SED-10C:1-3	Solid	03/23/23 08:17	05/05/23 14:20
23E0152-14	SED-11C:0-1	Solid	03/23/23 07:29	05/05/23 14:20
23E0152-15	SED-11C:1-3	Solid	03/23/23 08:42	05/05/23 14:20
23E0152-16	SED-DUP3C	Solid	03/23/23 12:00	05/05/23 14:20

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303388	**Reported:**
Seattle WA, 98108	Project Manager: Michael Erdahl	18-Jul-2024 15:39

Case Narrative

Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Work Order: 23E0152

Sample receipt

Samples as listed on the preceding page(s) were pulled from frozen archive and logged under ARI work order 23E0152. Sample 23E0152 was from ARI frozen archive. The remaining samples were frozen at Friedman & Bruya. For details regarding sample receipt, please refer to the original Cooler Receipt Forms.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times for samples stored frozen.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

In batch BLE0200 reported under work order 23E0148, one sample was run in triplicate. reported as the original sample, DUP1 and DUP2. The relative percent differences (RPD) were outside advisory control limits. The matrix spike (MS) percent recovery was out of control low. The matrix spike duplicate (MSD) percent recovery was within advisory control limits. The MS/MSD RPD was outside advisory limits. Outliers are attributed to a non-homogeneous sample.

In batch BLE0201, one sample was run in triplicate (DUP1 and DUP2). The relative percent difference (RPD) between the original and DUP1 was within advisory limits. The RPD between the original and DUP2 was outside advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits. The deviation has been flagged.

QUALIFIERS AND NOTES

Qualifier	Definition
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-07C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-01 A	SDG:	23E0152
Sampled:	03/22/23 07:29	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-041
% Solids:	81.65	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 11:30
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5616 g Wet / 0.5616 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.16	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-07C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-02 A	SDG:	23E0152
Sampled:	03/22/23 07:29	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-042
% Solids:	77.08	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 12:01
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.6585 g Wet / 0.6585 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.85	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-08C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-03 A	SDG:	23E0152
Sampled:	03/22/23 08:07	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-043
% Solids:	68.94	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 12:31
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.5689 g Wet / 0.5689 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	2.89	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-08C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-04 A	SDG:	23E0152
Sampled:	03/22/23 08:07	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-044
% Solids:	72.56	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 13:02
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.6295 g Wet / 0.6295 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.53	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-09C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-05 A	SDG:	23E0152
Sampled:	03/22/23 08:33	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-045
% Solids:	67.96	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 13:32
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.3327 g Wet / 0.3327 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.40	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-09C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-06 A	SDG:	23E0152
Sampled:	03/22/23 08:33	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-046
% Solids:	76.50	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 14:02
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.3554 g Wet / 0.3554 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.75	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-12C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-07 A	SDG:	23E0152
Sampled:	03/22/23 09:25	Prepared:	05/06/23 12:06	File ID:	CubeData_05092023@1825-047
% Solids:	59.79	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 14:32
Batch:	BLE0200	Sequence:	SLE0117	Initial/Final:	0.2526 g Wet / 0.2526 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.72	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-26C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-08 A	SDG:	23E0152
Sampled:	03/22/23 10:38	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-020
% Solids:	60.95	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 00:51
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.2665 g Wet / 0.2665 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.47	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-26C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-09 A	SDG:	23E0152
Sampled:	03/22/23 10:38	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-052
% Solids:	73.81	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 17:35
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.3119 g Wet / 0.3119 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.43	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-25C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-10 A	SDG:	23E0152
Sampled:	03/22/23 11:19	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-053
% Solids:	75.95	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 18:06
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5284 g Wet / 0.5284 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.49	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-25C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-11 A	SDG:	23E0152
Sampled:	03/22/23 11:19	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-054
% Solids:	77.79	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 18:36
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.4742 g Wet / 0.4742 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.18	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-10C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-12 A	SDG:	23E0152
Sampled:	03/23/23 08:17	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-055
% Solids:	77.06	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 19:06
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5448 g Wet / 0.5448 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.71	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-10C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-13 A	SDG:	23E0152
Sampled:	03/23/23 08:17	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-056
% Solids:	82.83	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 19:37
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5098 g Wet / 0.5098 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	2.07	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-11C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-14 A	SDG:	23E0152
Sampled:	03/23/23 07:29	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-057
% Solids:	67.04	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 20:07
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5578 g Wet / 0.5578 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.10	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-11C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-15 A	SDG:	23E0152
Sampled:	03/23/23 08:42	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-058
% Solids:	73.76	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 20:38
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5786 g Wet / 0.5786 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.69	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-DUP3C

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-16 A	SDG:	23E0152
Sampled:	03/23/23 12:00	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-059
% Solids:	77.15	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 21:08
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.4618 g Wet / 0.4618 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.73	1	0.02	0.02	

PREPARATION BATCH SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0200 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-07C:0-1	23E0152-01	eData_05092023@1825-	05/06/23 12:06	
SED-07C:1-3	23E0152-02	eData_05092023@1825-	05/06/23 12:06	
SED-08C:0-1	23E0152-03	eData_05092023@1825-	05/06/23 12:06	
SED-08C:1-3	23E0152-04	eData_05092023@1825-	05/06/23 12:06	
SED-09C:0-1	23E0152-05	eData_05092023@1825-	05/06/23 12:06	
SED-09C:1-3	23E0152-06	eData_05092023@1825-	05/06/23 12:06	
SED-12C:0-1	23E0152-07	eData_05092023@1825-	05/06/23 12:06	
Blank	BLE0200-BLK1	eData_05092023@1825-	05/06/23 12:06	
LCS	BLE0200-BS1	eData_05092023@1825-	05/06/23 12:06	
MRL Check	BLE0200-MRL1	eData_05092023@1825-	05/06/23 12:06	
Reference	BLE0200-SRM1	eData_05092023@1825-	05/06/23 12:06	

PREPARATION BATCH SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0201 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-26C:0-1	23E0152-08	eData_05092023@1825-	05/06/23 12:10	
SED-26C:1-3	23E0152-09	eData_05092023@1825-	05/06/23 12:10	
SED-25C:0-1	23E0152-10	eData_05092023@1825-	05/06/23 12:10	
SED-25C:1-3	23E0152-11	eData_05092023@1825-	05/06/23 12:10	
SED-10C:0-1	23E0152-12	eData_05092023@1825-	05/06/23 12:10	
SED-10C:1-3	23E0152-13	eData_05092023@1825-	05/06/23 12:10	
SED-11C:0-1	23E0152-14	eData_05092023@1825-	05/06/23 12:10	
SED-11C:1-3	23E0152-15	eData_05092023@1825-	05/06/23 12:10	
SED-DUP3C	23E0152-16	eData_05092023@1825-	05/06/23 12:10	
Blank	BLE0201-BLK1	eData_05092023@1825-	05/06/23 12:10	
LCS	BLE0201-BS1	eData_05092023@1825-	05/06/23 12:10	
SED-26C:0-1	BLE0201-DUP1	eData_05092023@1825-	05/06/23 12:10	
SED-26C:0-1	BLE0201-DUP2	eData_05092023@1825-	05/06/23 12:10	
MRL Check	BLE0201-MRL1	eData_05092023@1825-	05/06/23 12:10	
SED-26C:0-1	BLE0201-MS1	eData_05092023@1825-	05/06/23 12:10	
SED-26C:0-1	BLE0201-MSD1	eData_05092023@1825-	05/06/23 12:10	
Reference	BLE0201-SRM1	eData_05092023@1825-	05/06/23 12:10	

Form I

METHOD BLANK DATA SHEET

EPA 9060A m

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0200
Laboratory ID: BLE0200-BLK1
Prepared: 05/06/23 12:06
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/06/23 18:17
Sequence: SLE0117
Calibration: FD00070
Instrument: TOC Cube

CAS NO.	Analyte	Concentration (% wet)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	ND	1	0.02	0.02	U

Form I

METHOD BLANK DATA SHEET

EPA 9060A m

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0201
Laboratory ID: BLE0201-BLK1
Prepared: 05/06/23 12:10
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/06/23 18:47
Sequence: SLE0117
Calibration: FD00070
Instrument: TOC Cube

CAS NO.	Analyte	Concentration (% wet)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	ND	1	0.02	0.02	U

LCS / LCS DUPLICATE RECOVERY

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0152
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/06/23 19:17
Batch:	BLE0200	Laboratory ID:	BLE0200-BS1
Preparation:	No Prep Wet Chem	Sequence Name:	LCS
Initial/Final:	0.0212 g / 0.0212 g		

COMPOUND	SPIKE ADDED (% wet)	LCS CONCENTRATION (% wet)	Q	LCS % REC. #	QC LIMITS REC.
Total Organic Carbon	44.4	44.3		99.6	80 - 120

* Indicates values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0152
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/06/23 19:48
Batch:	BLE0201	Laboratory ID:	BLE0201-BS1
Preparation:	No Prep Wet Chem	Sequence Name:	LCS
Initial/Final:	0.0224 g / 0.0224 g		

COMPOUND	SPIKE ADDED (% wet)	LCS CONCENTRATION (% wet)	Q	LCS % REC. #	QC LIMITS REC.
Total Organic Carbon	44.4	43.5		98.0	80 - 120

* Indicates values outside of QC limits

SED-26C:0-1

DUPLICATES

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0201-DUP1
Batch: BLE0201
Lab Source ID: 23E0152-08
Preparation: No Prep Wet Chem
Initial/Final: 0.3517 g / 0.3517 g
Source Sample Name: SED-26C:0-1
% Solids: 60.95

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Organic Carbon	20	1.47	1.51	2.76	

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

SED-26C:0-1

DUPLICATES

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0201-DUP2
Batch: BLE0201
Lab Source ID: 23E0152-08
Preparation: No Prep Wet Chem
Initial/Final: 0.2029 g / 0.2029 g
Source Sample Name: SED-26C:0-1
% Solids: 60.95

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Organic Carbon	20	1.47	2.09	34.8	*

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

MS / MS DUPLICATE RECOVERY
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0152
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/07/23 02:23
Batch:	BLE0201	Laboratory ID:	BLE0201-MS1
Preparation:	No Prep Wet Chem	Sequence Name:	Matrix Spike
Initial/Final:	0.1793 g / 0.1793 g	Source Sample:	SED-26C:0-1

COMPOUND	SPIKE ADDED (% dry)	SAMPLE CONCENTRATION (% dry)	Q	MS CONCENTRATION (% dry)	Q	MS % REC. #	QC LIMITS REC.
Total Organic Carbon	2.85	1.47		4.54		108	75 - 125

* Values outside of QC limits

MS / MS DUPLICATE RECOVERY
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0152
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/07/23 02:53
Batch:	BLE0201	Laboratory ID:	BLE0201-MSD1
Preparation:	No Prep Wet Chem	Sequence Name:	Matrix Spike Dup
Initial/Final:	0.2436 g / 0.2436 g	Source Sample:	SED-26C:0-1

COMPOUND	SPIKE ADDED (% dry)	MSD CONCENTRATION (% dry)	Q	MSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Total Organic Carbon	2.34	4.00		109	12.5	20	75 - 125

* Values outside of QC limits

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SKD0371
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Cal Standard	SKD0371-CAL1	CubeData_04272022@1136-001	NA	04/26/22 12:30
Cal Standard	SKD0371-CAL2	CubeData_04272022@1136-002	NA	04/26/22 13:00
Cal Standard	SKD0371-CAL3	CubeData_04272022@1136-003	NA	04/26/22 13:30
Cal Standard	SKD0371-CAL4	CubeData_04272022@1136-004	NA	04/26/22 14:00
Cal Standard	SKD0371-CAL5	CubeData_04272022@1136-005	NA	04/26/22 14:30
Cal Standard	SKD0371-CAL6	CubeData_04272022@1136-006	NA	04/26/22 15:00
Cal Standard	SKD0371-CAL7	CubeData_04272022@1136-007	NA	04/26/22 15:30
Cal Standard	SKD0371-CAL8	CubeData_04272022@1136-008	NA	04/26/22 16:00
Cal Standard	SKD0371-CAL9	CubeData_04272022@1136-009	NA	04/26/22 16:30
Cal Standard	SKD0371-CALA	CubeData_04272022@1136-010	NA	04/26/22 17:00
Cal Standard	SKD0371-CALB	CubeData_04272022@1136-011	NA	04/26/22 17:30
Cal Standard	SKD0371-CALC	CubeData_04272022@1136-012	NA	04/26/22 18:00
Cal Standard	SKD0371-CALD	CubeData_04272022@1136-013	NA	04/26/22 18:30
Cal Standard	SKD0371-CALE	CubeData_04272022@1136-014	NA	04/26/22 19:00
Cal Standard	SKD0371-CALF	CubeData_04272022@1136-015	NA	04/26/22 19:31
Cal Standard	SKD0371-CALG	CubeData_04272022@1136-016	NA	04/26/22 20:01
Cal Standard	SKD0371-CALH	CubeData_04272022@1136-017	NA	04/26/22 20:31
Cal Standard	SKD0371-CALI	CubeData_04272022@1136-018	NA	04/26/22 21:01
Cal Standard	SKD0371-CALJ	CubeData_04272022@1136-019	NA	04/26/22 21:31
Cal Standard	SKD0371-CALK	CubeData_04272022@1136-020	NA	04/26/22 22:01
Initial Cal Check	SKD0371-ICV1	CubeData_04272022@1136-027	NA	04/27/22 02:03
Initial Cal Blank	SKD0371-ICB1	CubeData_04272022@1136-028	NA	04/27/22 02:33
Cal Standard	SKD0371-CALL	CubeData_04272022@1136-021	NA	04/27/22 11:08
Cal Standard	SKD0371-CALM	CubeData_04272022@1136-022	NA	04/27/22 11:08
Cal Standard	SKD0371-CALN	CubeData_04272022@1136-023	NA	04/27/22 11:09
Cal Standard	SKD0371-CALO	CubeData_04272022@1136-024	NA	04/27/22 11:09

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLE0117
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Initial Cal Check	SLE0117-ICV1	CubeData_05092023@1825-003	NA	05/06/23 16:16
Initial Cal Blank	SLE0117-ICB1	CubeData_05092023@1825-004	NA	05/06/23 16:47
MRL Check	BLE0200-MRL1	CubeData_05092023@1825-005	Solid	05/06/23 17:17
MRL Check	BLE0201-MRL1	CubeData_05092023@1825-006	Solid	05/06/23 17:47
Blank	BLE0200-BLK1	CubeData_05092023@1825-007	Solid	05/06/23 18:17
Blank	BLE0201-BLK1	CubeData_05092023@1825-008	Solid	05/06/23 18:47
LCS	BLE0200-BS1	CubeData_05092023@1825-009	Solid	05/06/23 19:17
LCS	BLE0201-BS1	CubeData_05092023@1825-010	Solid	05/06/23 19:48
Reference	BLE0200-SRM1	CubeData_05092023@1825-011	Solid	05/06/23 20:18
Reference	BLE0201-SRM1	CubeData_05092023@1825-012	Solid	05/06/23 20:49
Calibration Check	SLE0117-CCV1	CubeData_05092023@1825-015	NA	05/06/23 22:20
Calibration Blank	SLE0117-CCB1	CubeData_05092023@1825-016	NA	05/06/23 22:50
SED-26C:0-1	23E0152-08	CubeData_05092023@1825-020	Solid	05/07/23 00:51
SED-26C:0-1	BLE0201-DUP1	CubeData_05092023@1825-021	Solid	05/07/23 01:22
SED-26C:0-1	BLE0201-DUP2	CubeData_05092023@1825-022	Solid	05/07/23 01:52
SED-26C:0-1	BLE0201-MS1	CubeData_05092023@1825-023	Solid	05/07/23 02:23
SED-26C:0-1	BLE0201-MSD1	CubeData_05092023@1825-024	Solid	05/07/23 02:53
Calibration Check	SLE0117-CCV2	CubeData_05092023@1825-027	NA	05/07/23 04:24
Calibration Blank	SLE0117-CCB2	CubeData_05092023@1825-028	NA	05/07/23 04:55
Calibration Check	SLE0117-CCV3	CubeData_05092023@1825-039	NA	05/07/23 10:29
Calibration Blank	SLE0117-CCB3	CubeData_05092023@1825-040	NA	05/07/23 11:00
SED-07C:0-1	23E0152-01	CubeData_05092023@1825-041	Solid	05/07/23 11:30
SED-07C:1-3	23E0152-02	CubeData_05092023@1825-042	Solid	05/07/23 12:01
SED-08C:0-1	23E0152-03	CubeData_05092023@1825-043	Solid	05/07/23 12:31
SED-08C:1-3	23E0152-04	CubeData_05092023@1825-044	Solid	05/07/23 13:02
SED-09C:0-1	23E0152-05	CubeData_05092023@1825-045	Solid	05/07/23 13:32
SED-09C:1-3	23E0152-06	CubeData_05092023@1825-046	Solid	05/07/23 14:02
SED-12C:0-1	23E0152-07	CubeData_05092023@1825-047	Solid	05/07/23 14:32
Calibration Check	SLE0117-CCV4	CubeData_05092023@1825-050	NA	05/07/23 16:34

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
Client: Friedman & Bruya Inc.
Sequence: SLE0117

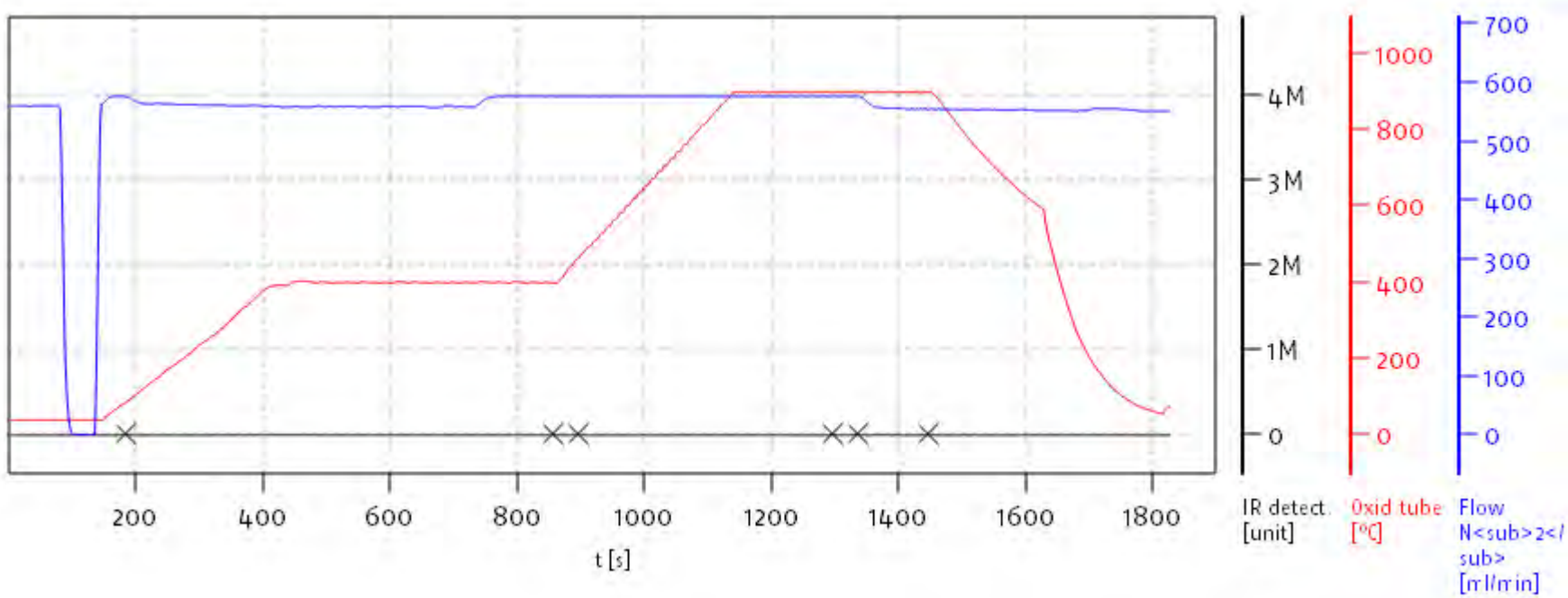
SDG: 23E0152
Project: Port of Friday Harbor
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Calibration Blank	SLE0117-CCB4	CubeData_05092023@1825-051	NA	05/07/23 17:05
SED-26C:1-3	23E0152-09	CubeData_05092023@1825-052	Solid	05/07/23 17:35
SED-25C:0-1	23E0152-10	CubeData_05092023@1825-053	Solid	05/07/23 18:06
SED-25C:1-3	23E0152-11	CubeData_05092023@1825-054	Solid	05/07/23 18:36
SED-10C:0-1	23E0152-12	CubeData_05092023@1825-055	Solid	05/07/23 19:06
SED-10C:1-3	23E0152-13	CubeData_05092023@1825-056	Solid	05/07/23 19:37
SED-11C:0-1	23E0152-14	CubeData_05092023@1825-057	Solid	05/07/23 20:07
SED-11C:1-3	23E0152-15	CubeData_05092023@1825-058	Solid	05/07/23 20:38
SED-DUP3C	23E0152-16	CubeData_05092023@1825-059	Solid	05/07/23 21:08
Calibration Check	SLE0117-CCV5	CubeData_05092023@1825-062	NA	05/07/23 22:38
Calibration Blank	SLE0117-CCB5	CubeData_05092023@1825-063	NA	05/07/23 23:09
Calibration Check	SLE0117-CCV6	CubeData_05092023@1825-073	NA	05/08/23 04:13
Calibration Blank	SLE0117-CCB6	CubeData_05092023@1825-074	NA	05/08/23 04:43

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		CARBON	5/6/2023 2:45 PM	bl	0.000	12 258	0.000	0.000	3 247	4 370	0.000	0.000	1.0000	1.0000



Name:

Access: soliTOC superuser

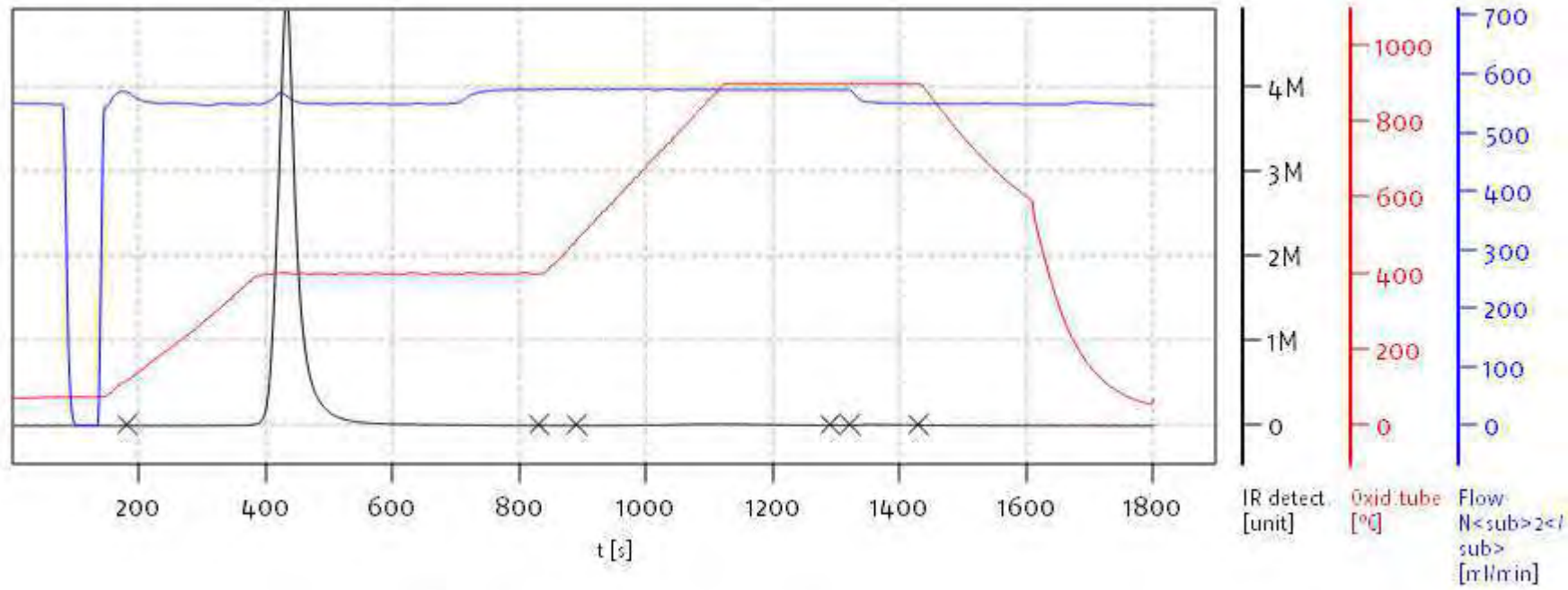
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
2	2	Dfactor	22.80		CARBON	5/6/2023 3:15 PM	bl	44.530	6 800 200	45.312	0.085	38 981	141 651	44.446	0.782	0.9664	1.0000



Name:

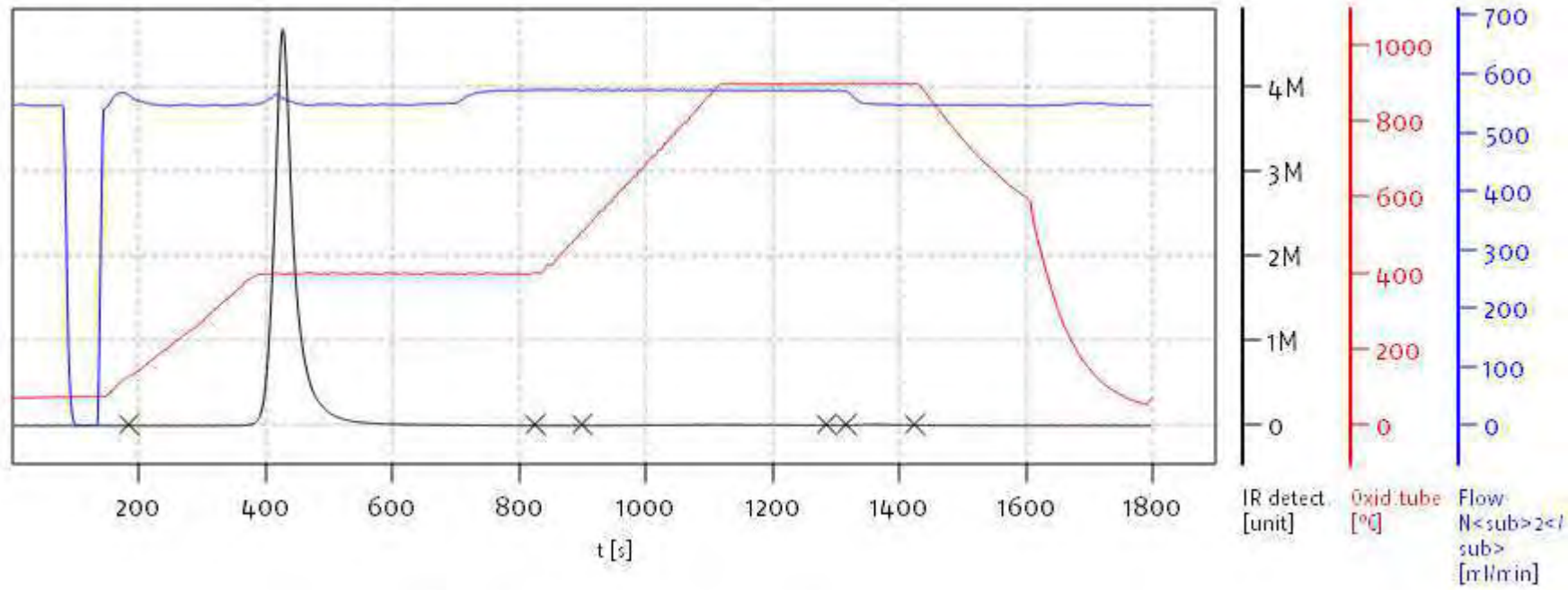
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
3	3	Dfactor	22.40		CARBON	5/6/2023 3:46 PM	bl	44.534	6 602 640	45.064	0.089	39 349	103 249	44.446	0.530	0.9780	1.0000



Name:

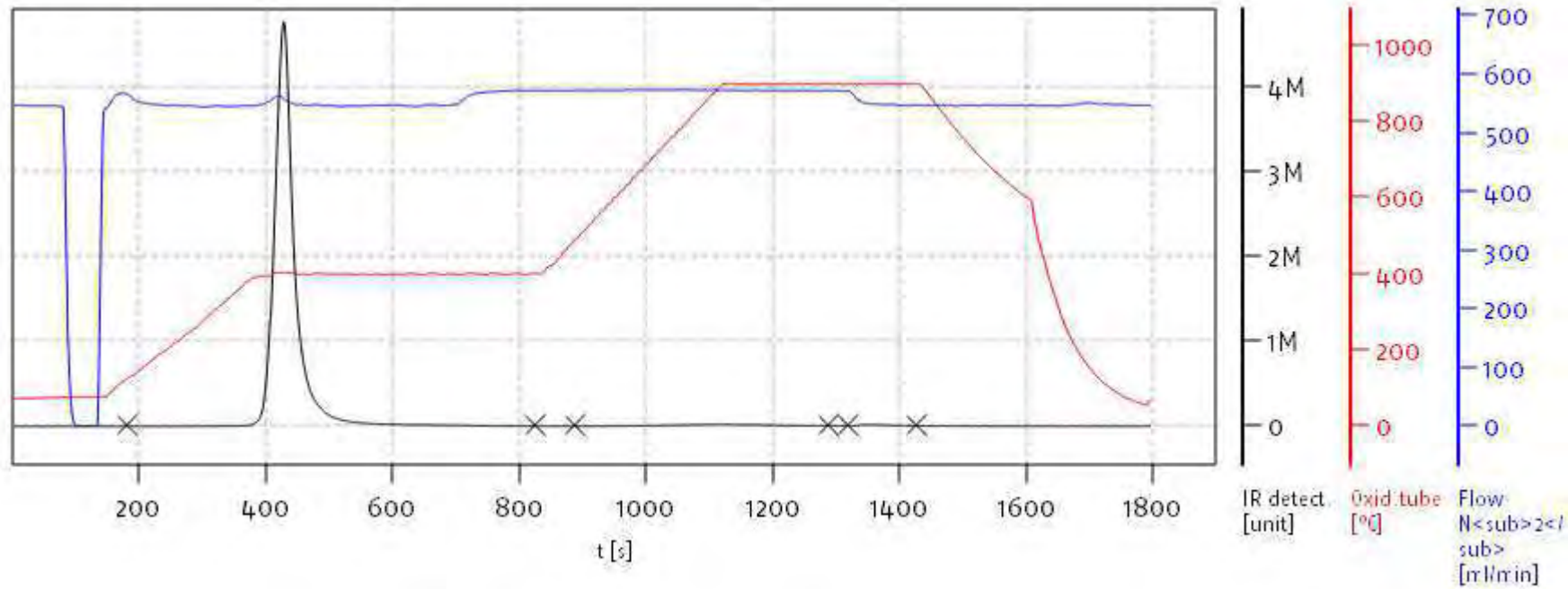
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
4	4	SLE0117-ICV1	22.60		CARBON	5/6/2023 4:16 PM	bl	43.663	6 561 740	44.606	0.144	47 553	164 093	43.519	0.942	0.9722	1.0000



Name:

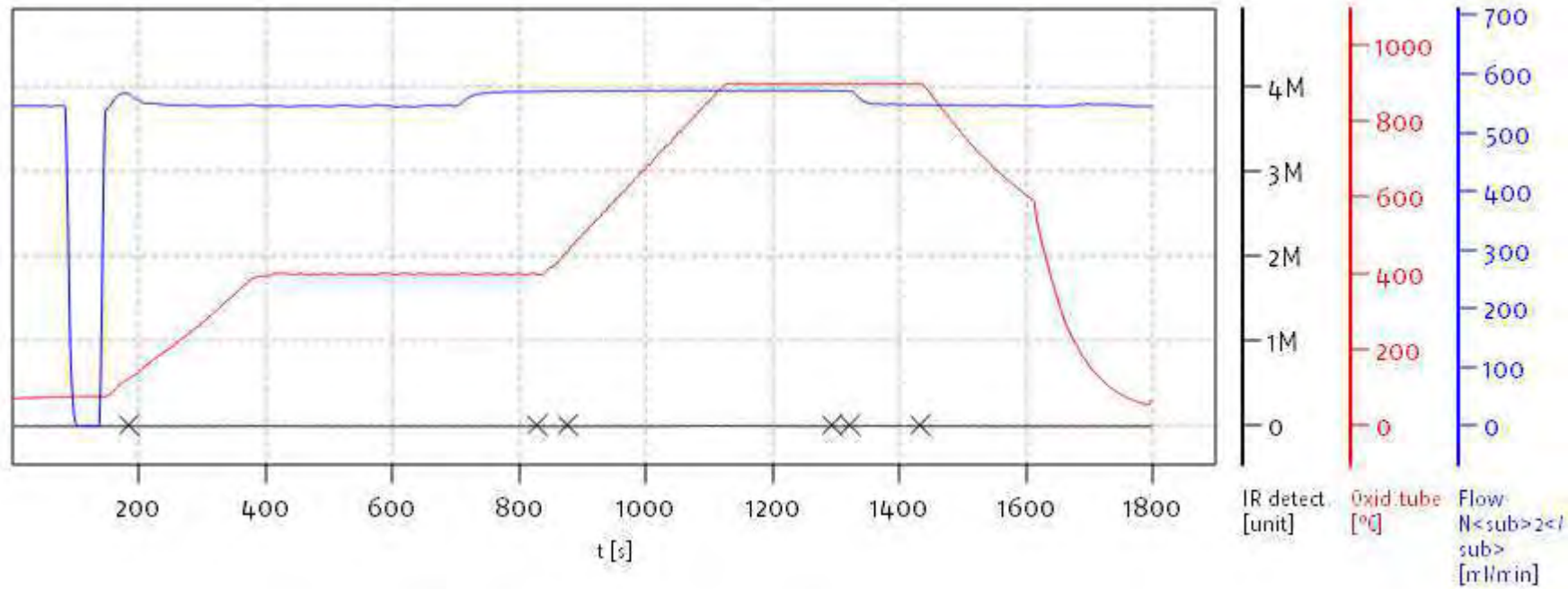
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
5	5	SLE0117-ICB1	524.90		CARBON	5/6/2023 4:47 PM	bl	0.000	10 594	0.001	0.000	12 025	29 347	0.000	0.001	0.9722	1.0000



Name:

Access: soliTOC superuser

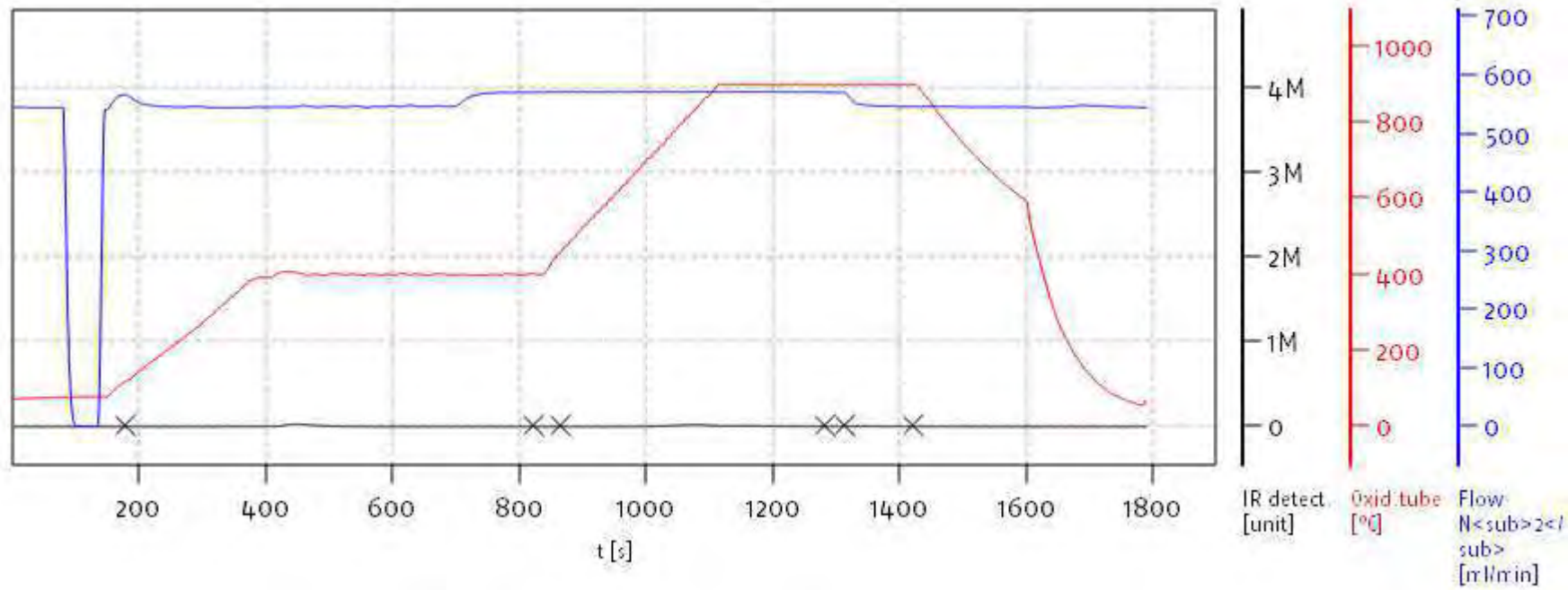
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
6	6	BLE0200-MRL1	524.10		CARBON	5/6/2023 5:17 PM	bl	0.014	74 661	0.034	0.000	12 743	93 689	0.014	0.020	0.9722	1.0000



Name:

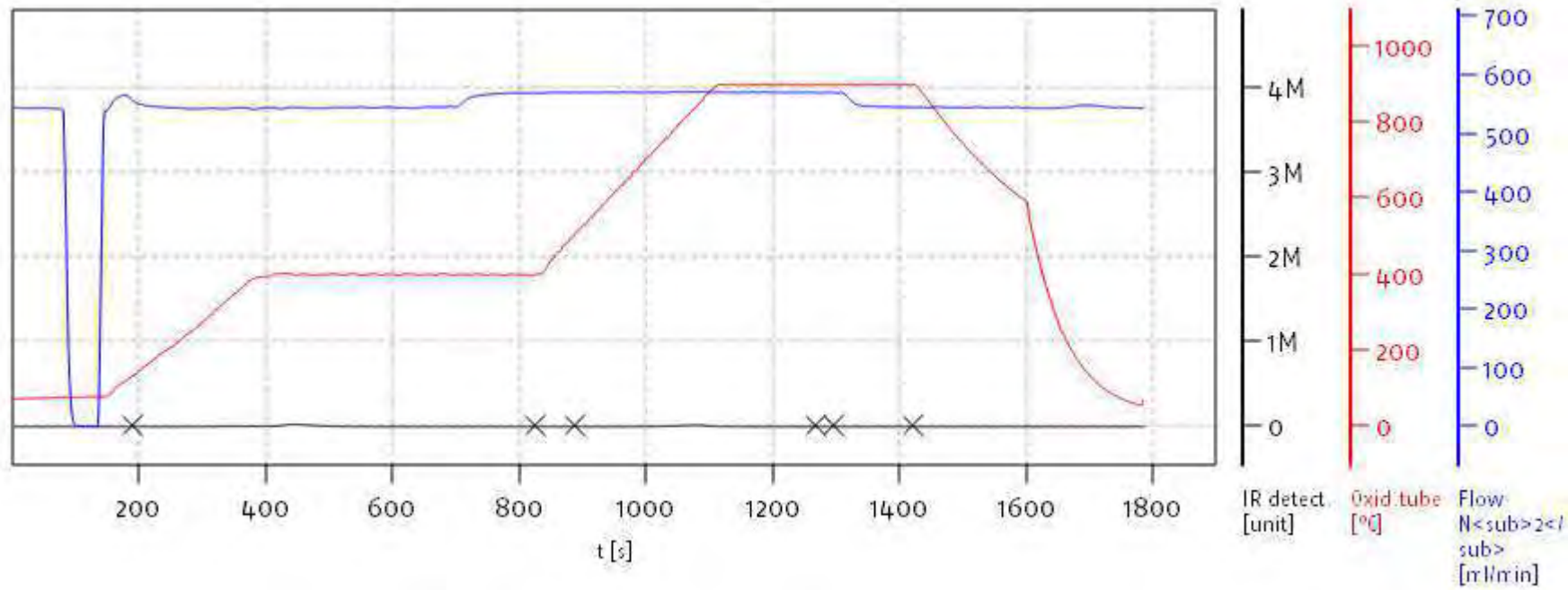
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

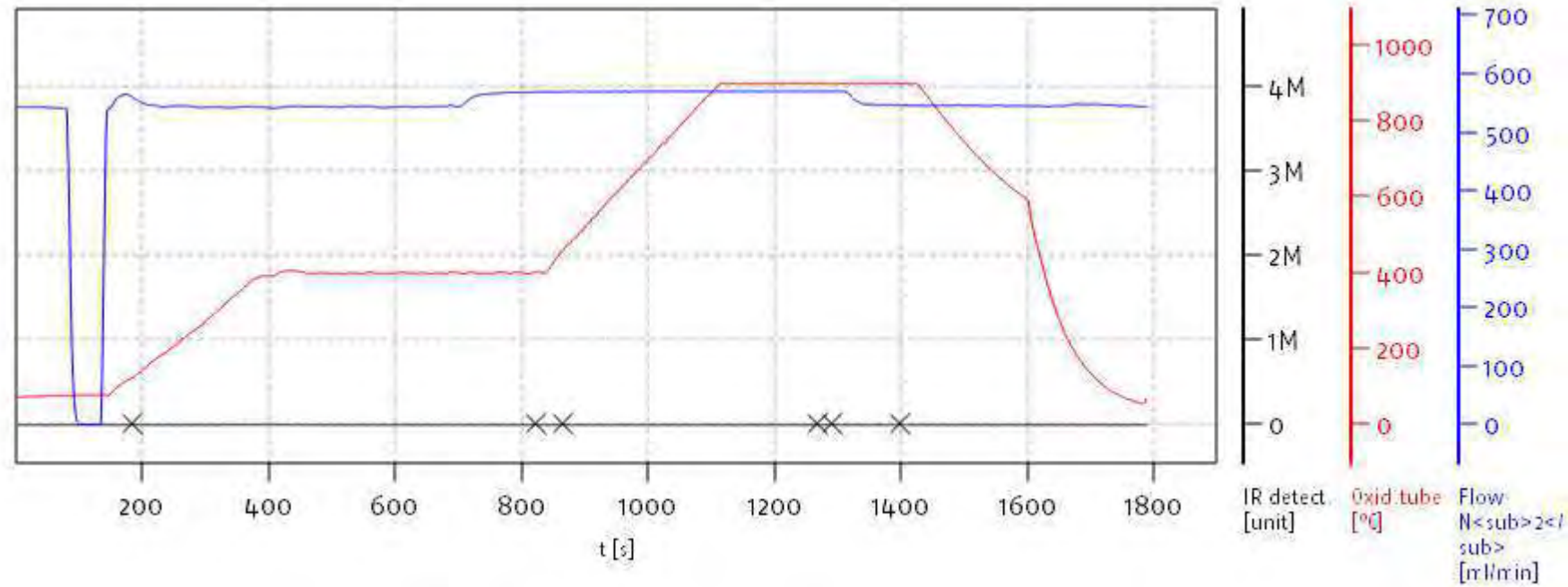
	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
7	7	BLE0201-MRL1	543.30		CARBON	5/6/2023 5:47 PM	bl,C2u	0.014	78 359	0.019	0.000	967	43 353	0.014	0.005	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
8	8	BLE0200-BLK1	562.90		CARBON	5/6/2023 6:17 PM	bl,C3u,C2u	0.000	8 729	0.000	0.000	1 028	1 149	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

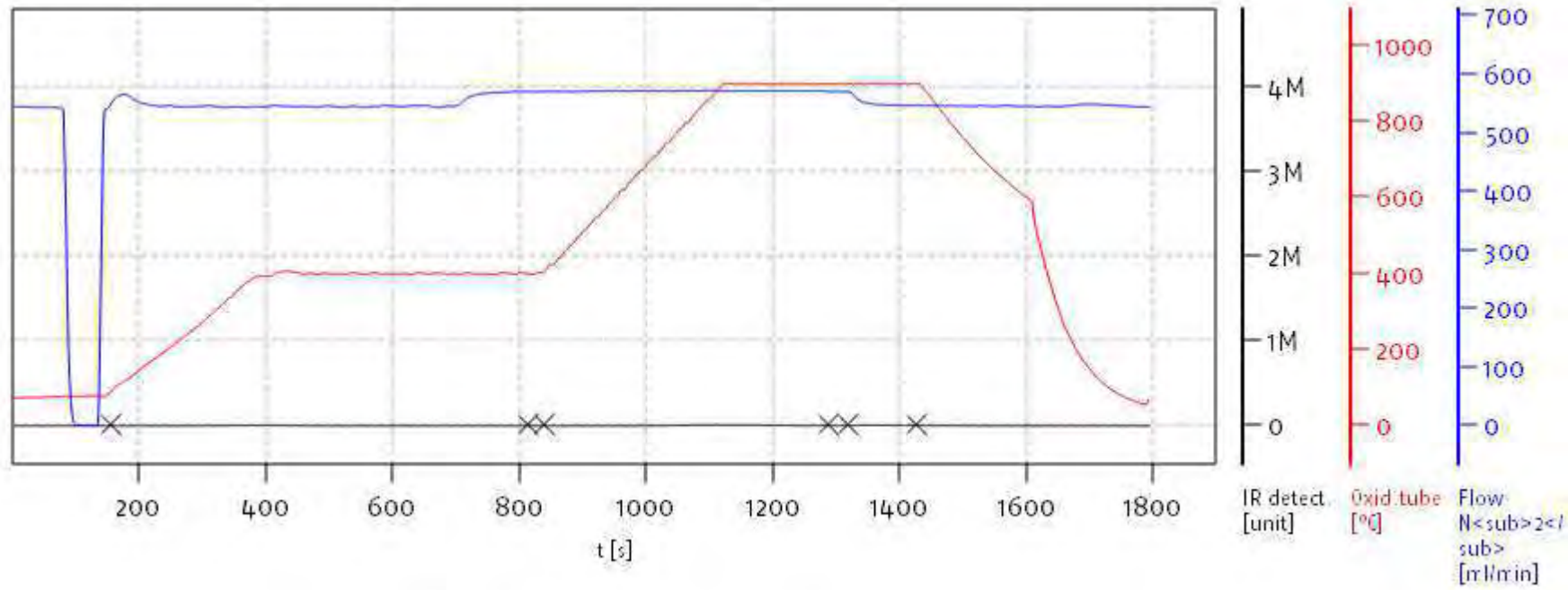
Date: Tue May 9 14:33:55 2023

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EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
9	9	BLE0201-BLK1	550.40		CARBON	5/6/2023 6:47 PM	bl	0.000	22 024	0.010	0.000	19 854	61 208	0.000	0.010	0.9722	1.0000



Name:

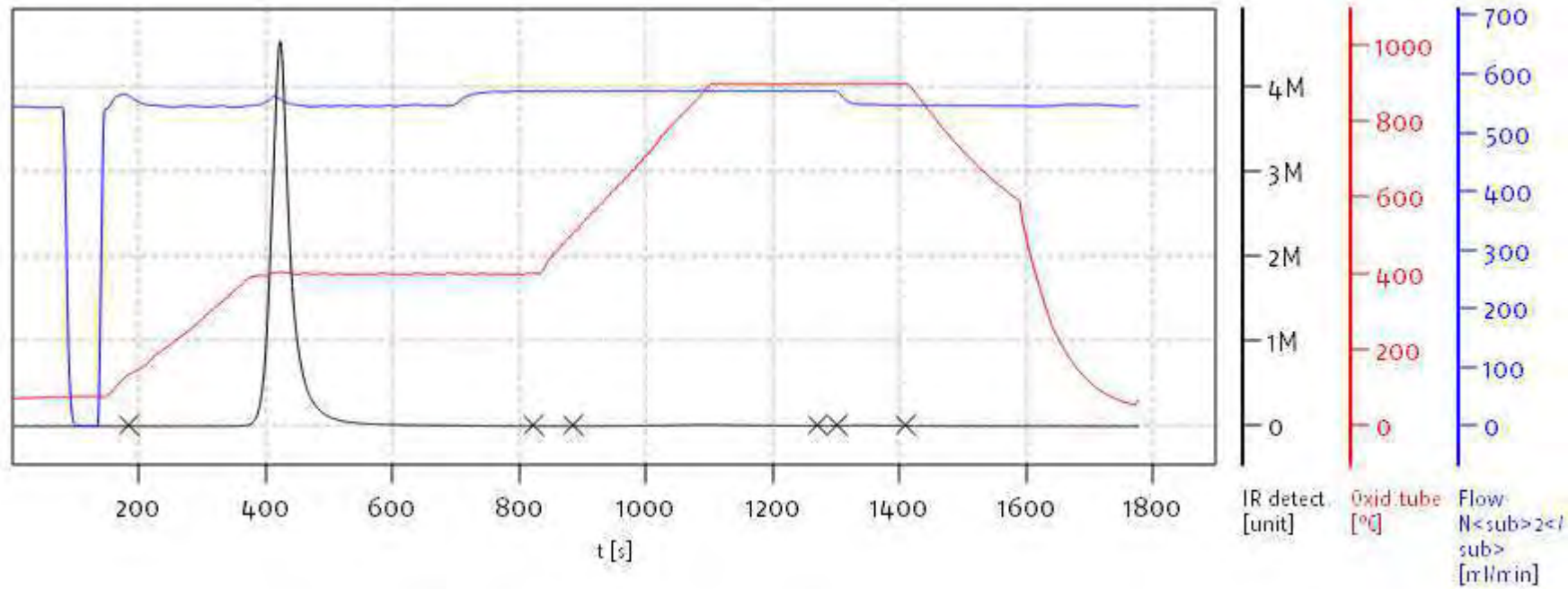
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soliTOC V2.0.2 (31015f9) 2018-11-19
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
10	10	BLE0200-BS1	21.20		CARBON	5/6/2023 7:17 PM	bl	44.286	6 259 360	44.994	0.039	31 930	123 467	44.247	0.708	0.9722	1.0000



Name:

Access: soliTOC superuser

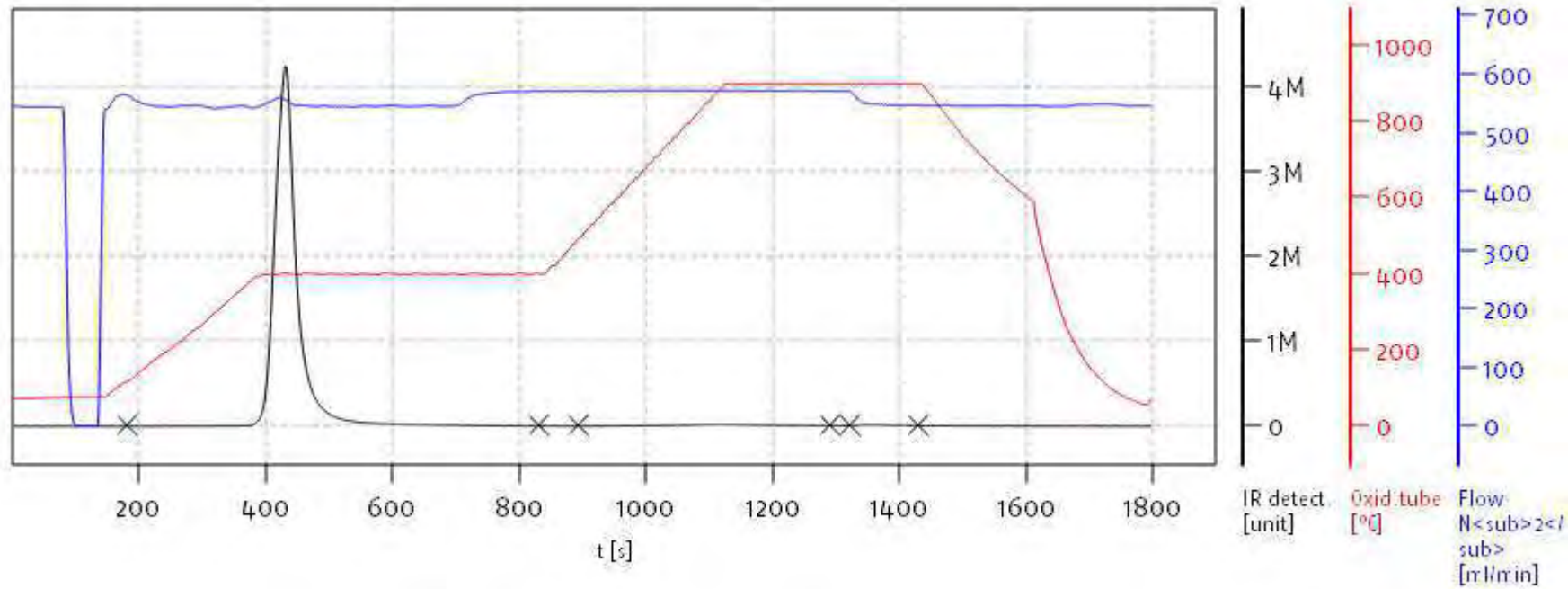
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
11	11	BLE0201-BS1	22.40		CARBON	5/6/2023 7:48 PM	bl	43.541	6 474 990	44.674	0.216	57 813	190 372	43.325	1.132	0.9722	1.0000



Name:

Access: soliTOC superuser

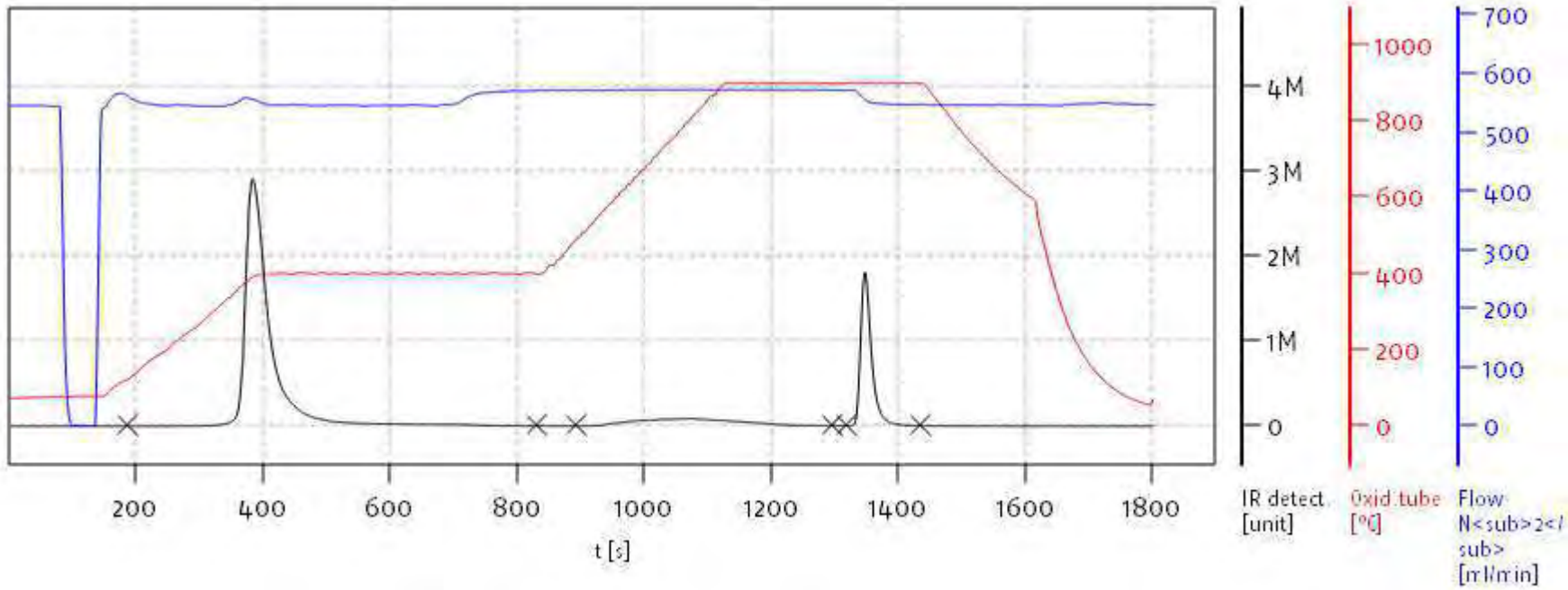
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elementar
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
12	12	BLE0200-SRM1	310.20		CARBON	5/6/2023 8:18 PM	bl	2.994	4 819 070	3.310	0.668	1 365 840	661 114	2.325	0.317	0.9722	1.0000



Name:

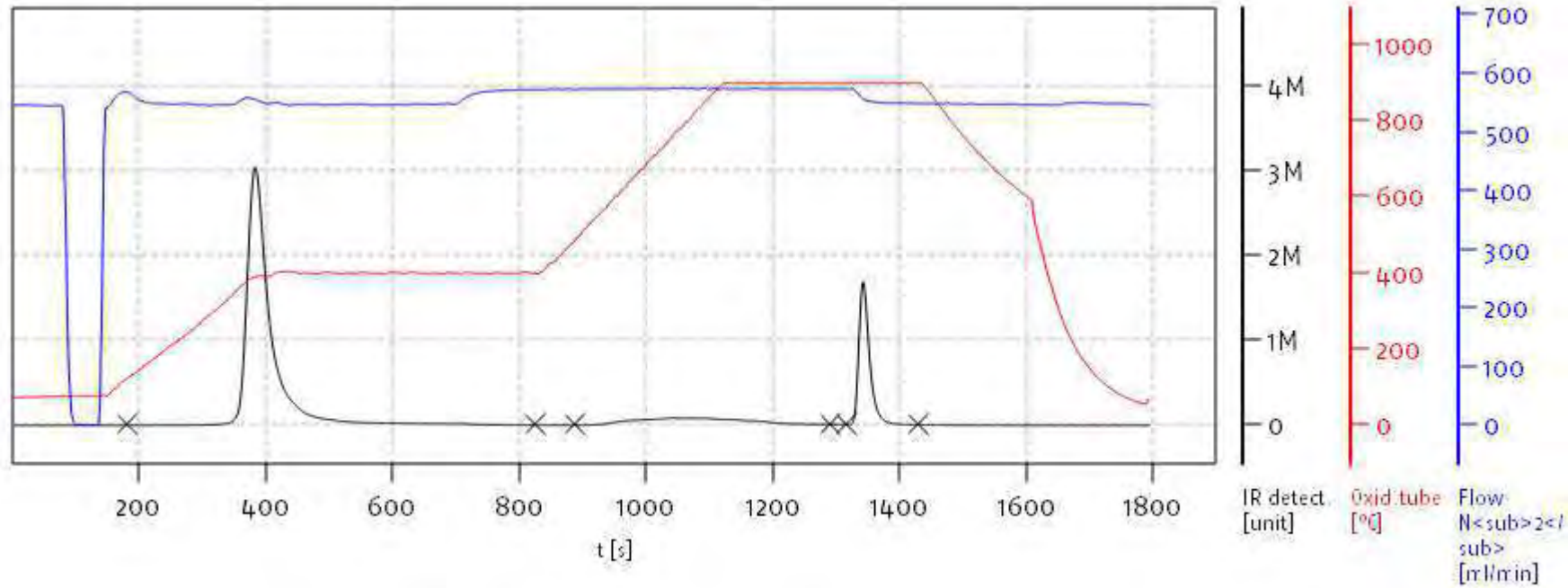
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
13	13	BLE0201-SRM1	310.50		CARBON	5/6/2023 8:49 PM	bl	2.983	4 908 180	3.328	0.616	1 263 010	718 756	2.366	0.345	0.9722	1.0000



Name:

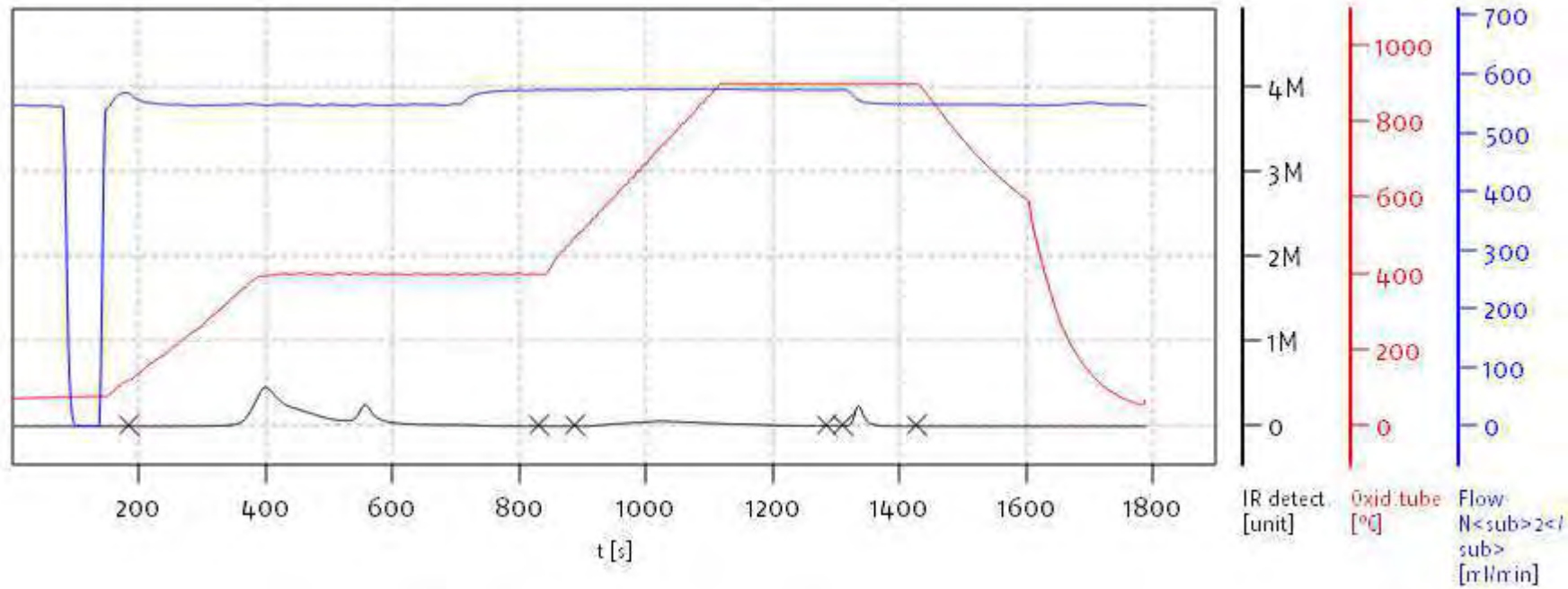
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
14	14	23E0148-01	285.30		CARBON	5/6/2023 9:19 PM	bl	1.005	1 784 560	1.210	0.077	168 929	405 785	0.927	0.206	0.9722	1.0000



Name:

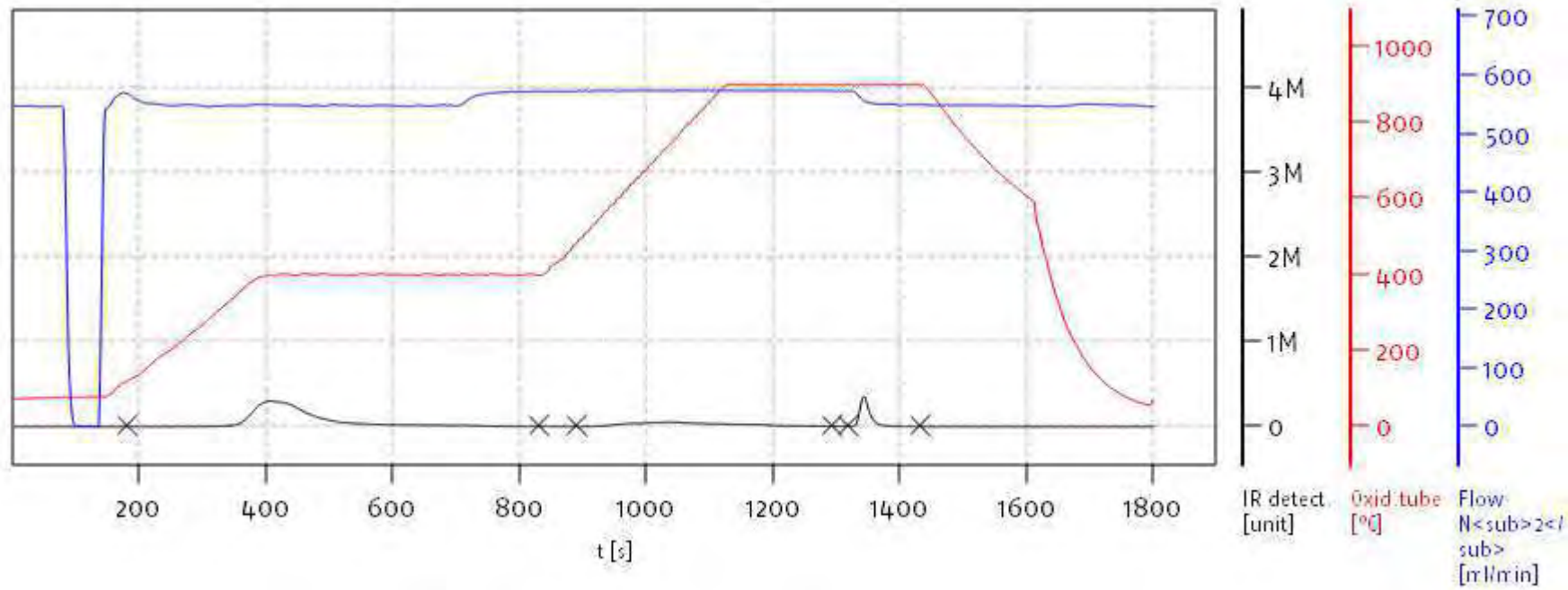
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
15	15	BLE0200-DUP1	291.30		CARBON	5/6/2023 9:49 PM	bl	0.785	1 318 750	0.977	0.117	246 587	387 873	0.668	0.192	0.9722	1.0000



Name:

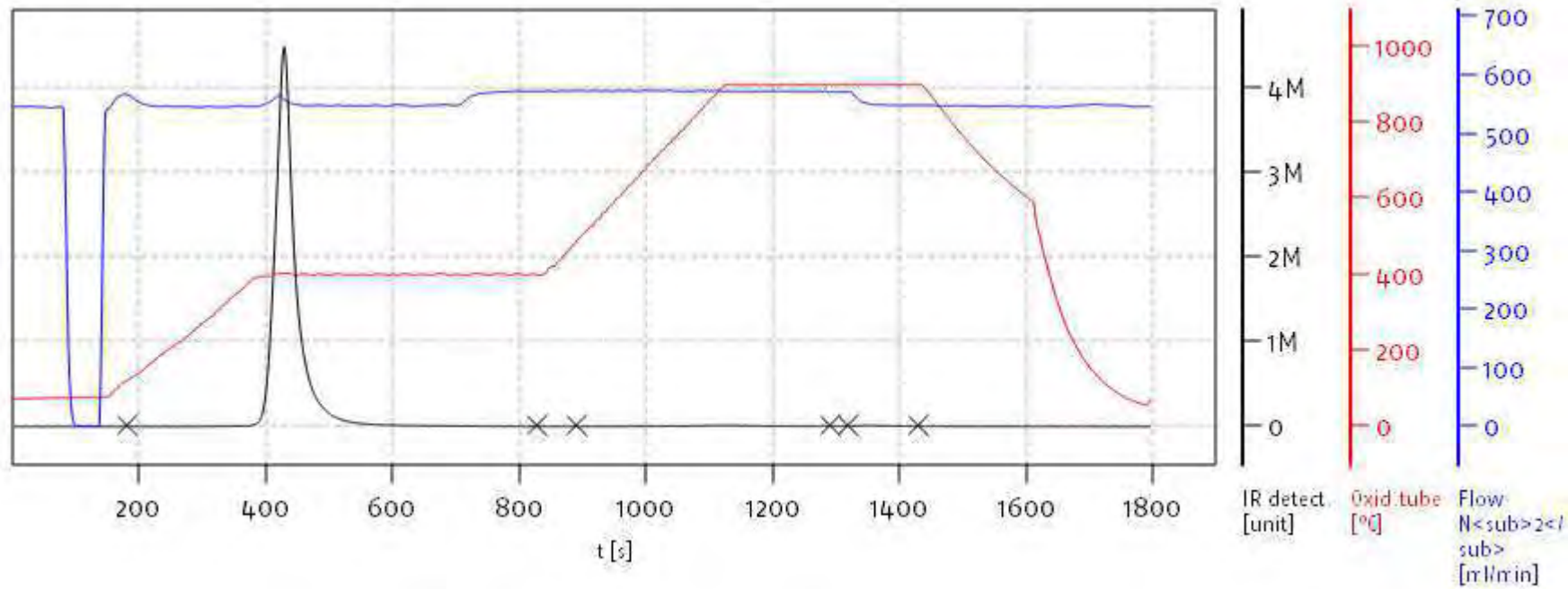
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
16	16	SLE0117-CCV1	21.00		CARBON	5/6/2023 10:20 PM	bl	44.801	6 274 040	45.243	0.028	30 290	86 446	44.773	0.442	0.9722	1.0000



Name:

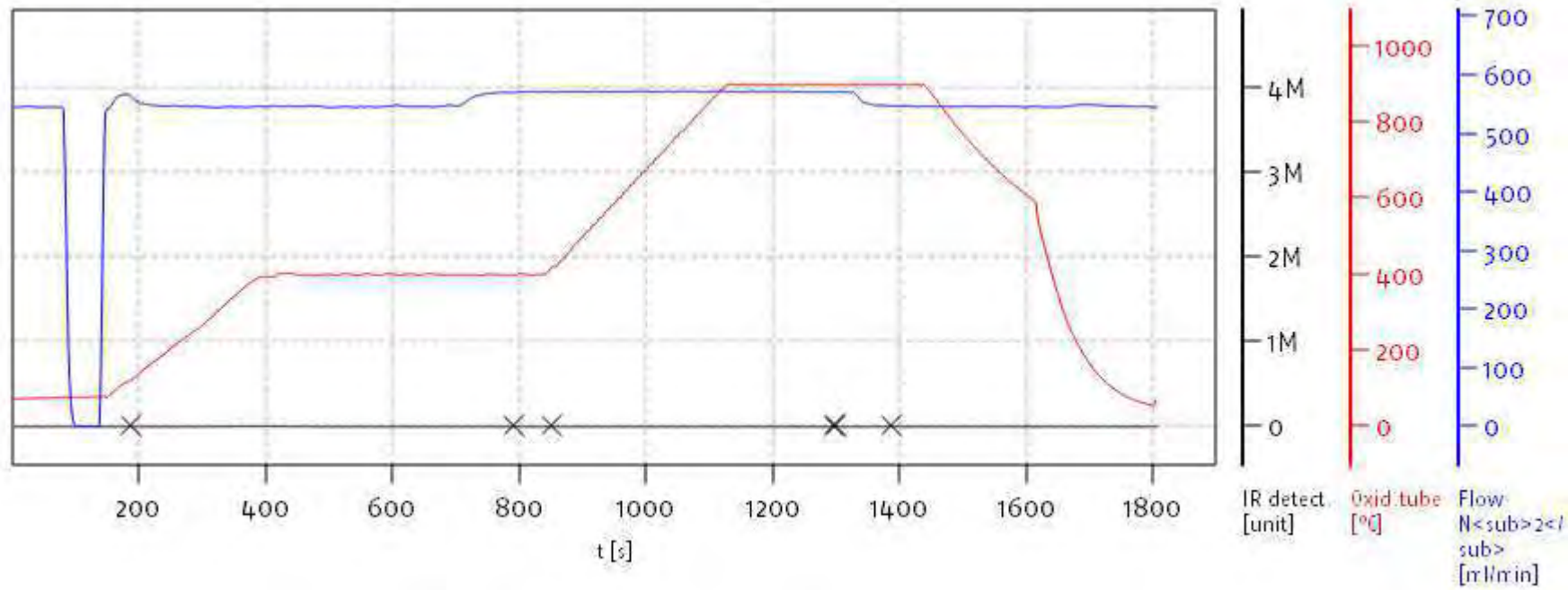
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
17	17	SLE0117-CCB1	501.90		CARBON	5/6/2023 10:50 PM	bl,C3u,C2u	0.000	17 046	0.000	0.000	625	257	0.000	0.000	0.9722	1.0000



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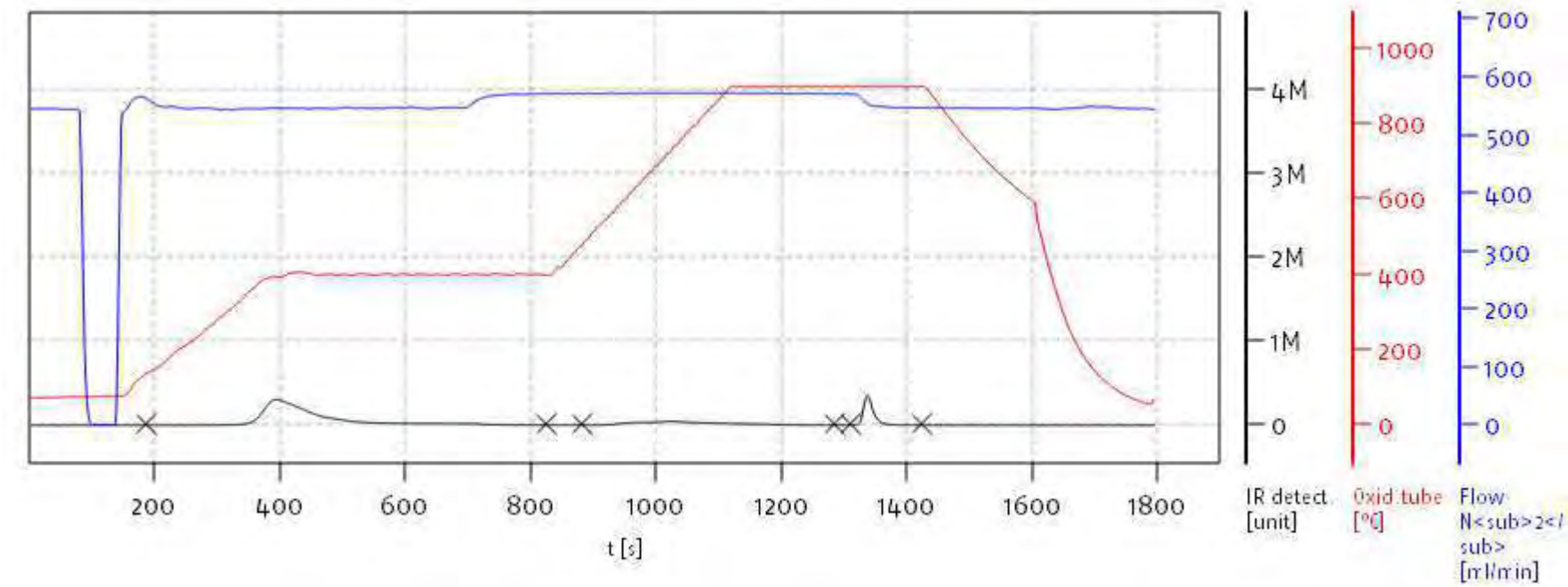
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Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
18	18	BLE0200-DUP2	267.60		CARBON	5/6/2023 11:20 PM	bl	0.782	1 190 600	0.928	0.127	246 593	278 516	0.655	0.146	0.9722	1.0000



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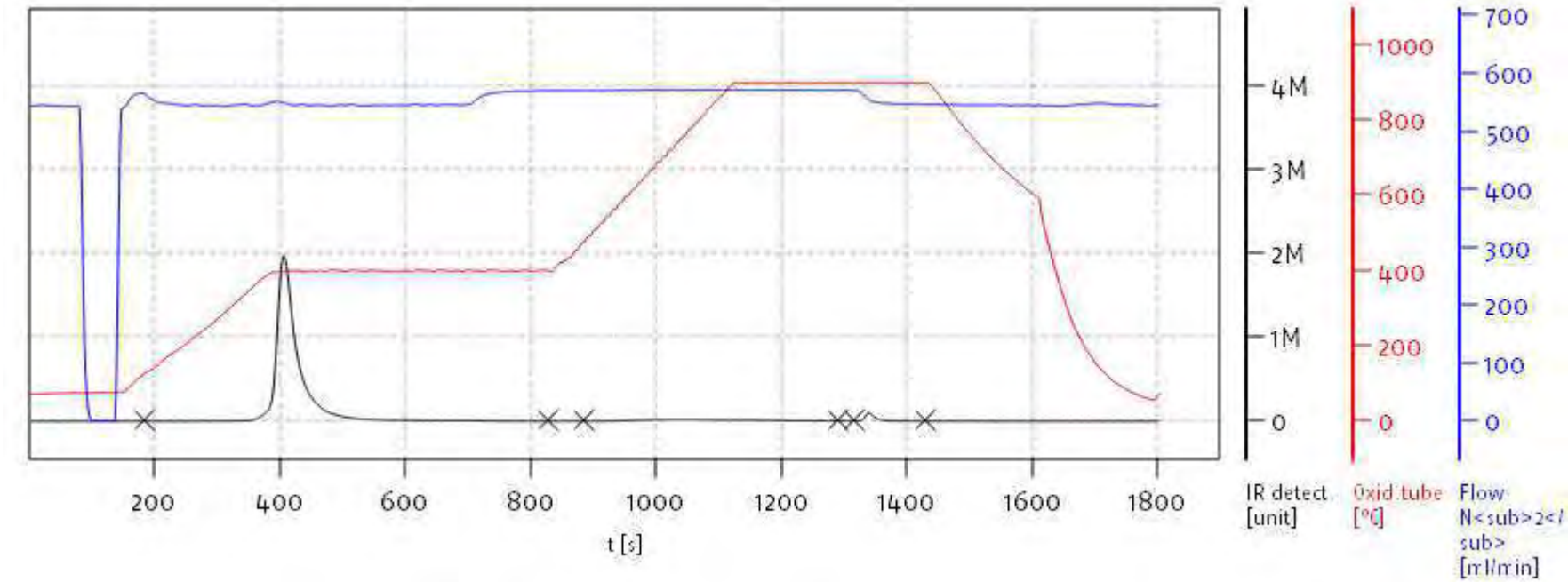
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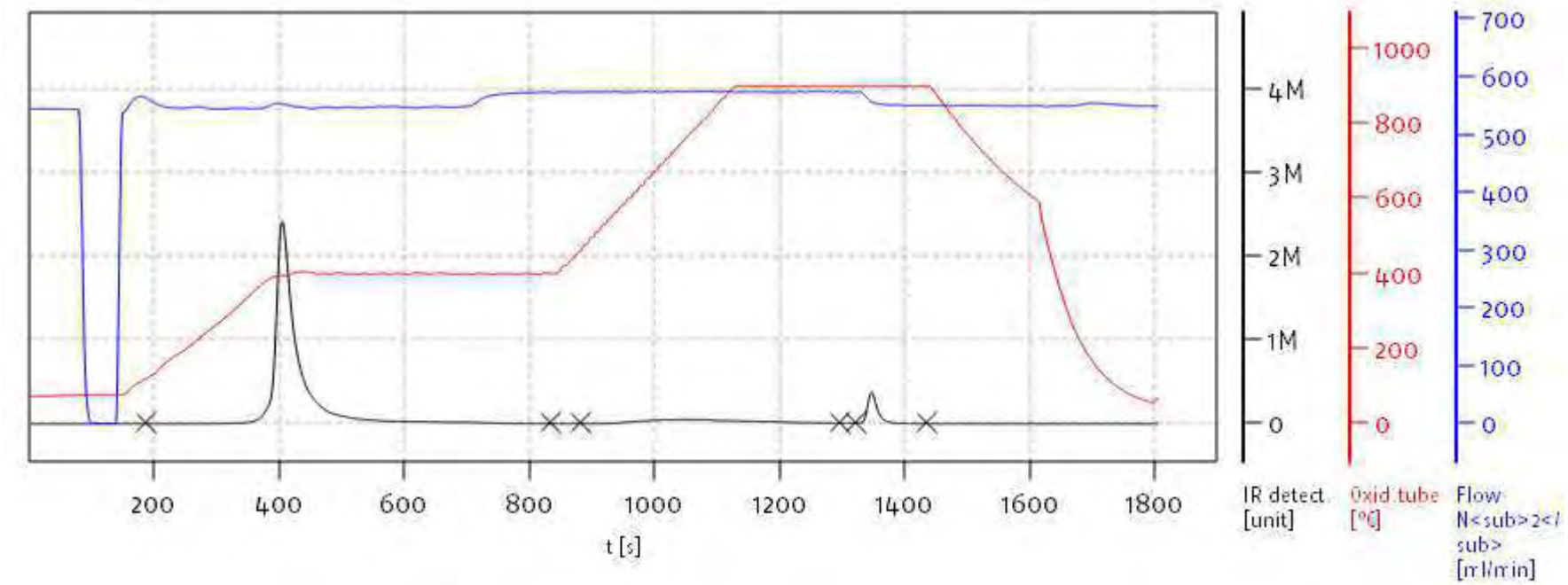
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
19	19	BLE0200-MS1	183.50	0.0077	CARBON	5/6/2023 11:51 PM	bl	2.396	2 896 250	2.537	0.042	76 403	193 907	2.354	0.141	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
20	20	BLE0200-MSD1	294.20	0.0075	CARBON	5/7/2023 12:21 AM	bl	1.948	3 587 200	2.150	0.126	266 242	411 825	1.821	0.203	0.9722	1.0000



Name:

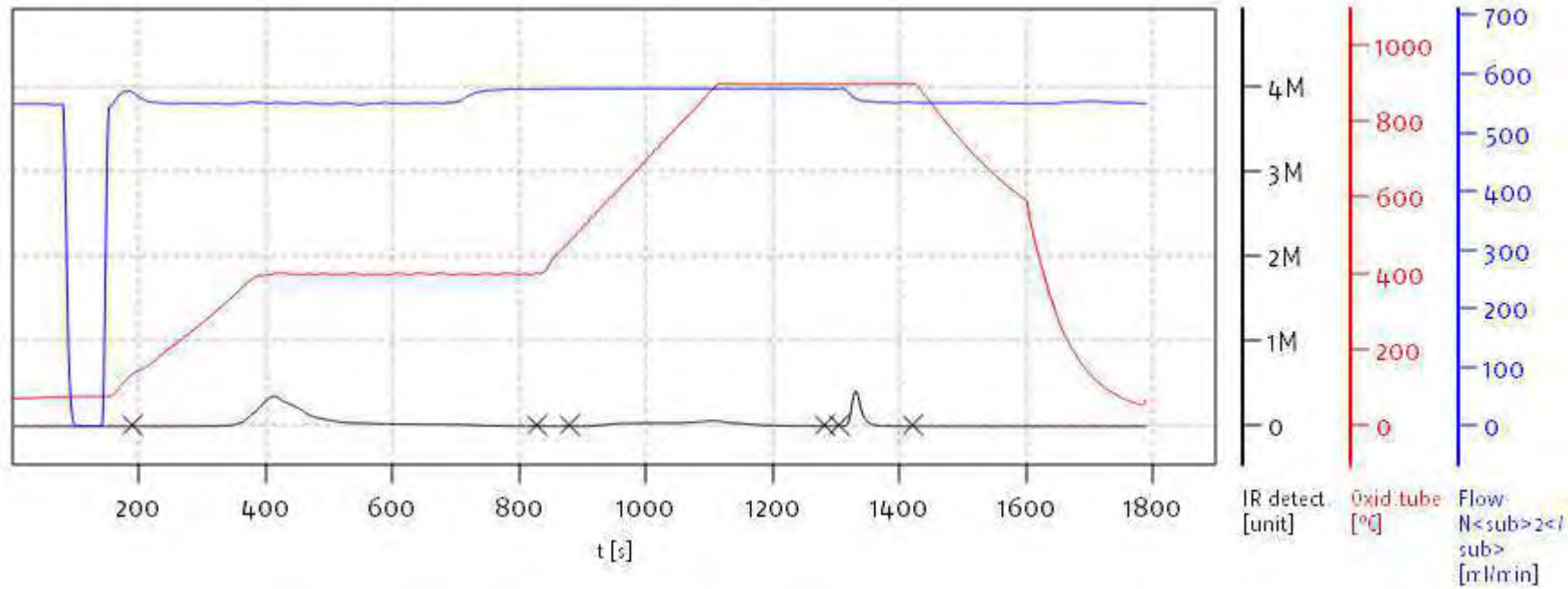
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
21	21	23E0152-08	266.50		CARBON	5/7/2023 12:51 AM	bl	0.894	1 346 000	1.114	0.149	283 072	404 515	0.745	0.220	0.9722	1.0000



Name:

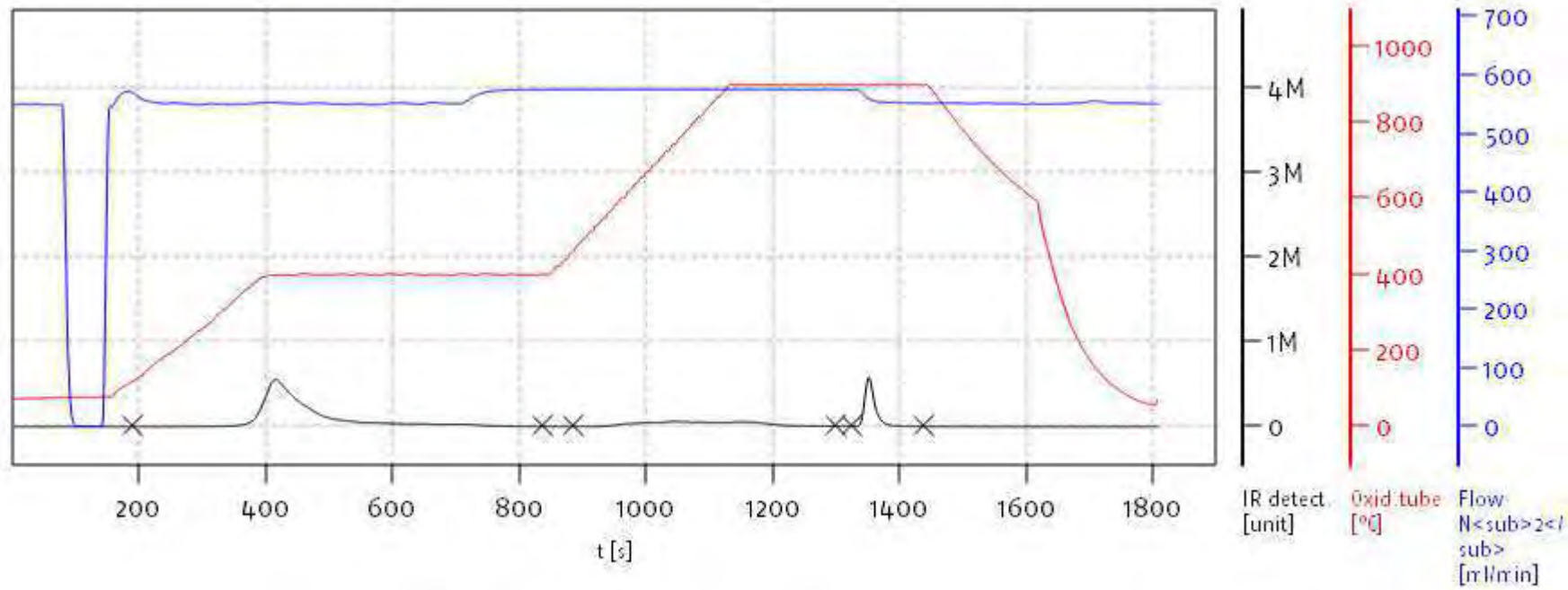
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
22	22	BLE0201-DUP1	351.70		CARBON	5/7/2023 1:22 AM	bl	0.919	1 784 460	1.129	0.167	406 343	501 954	0.752	0.209	0.9722	1.0000



Name:

Access: soliTOC superuser

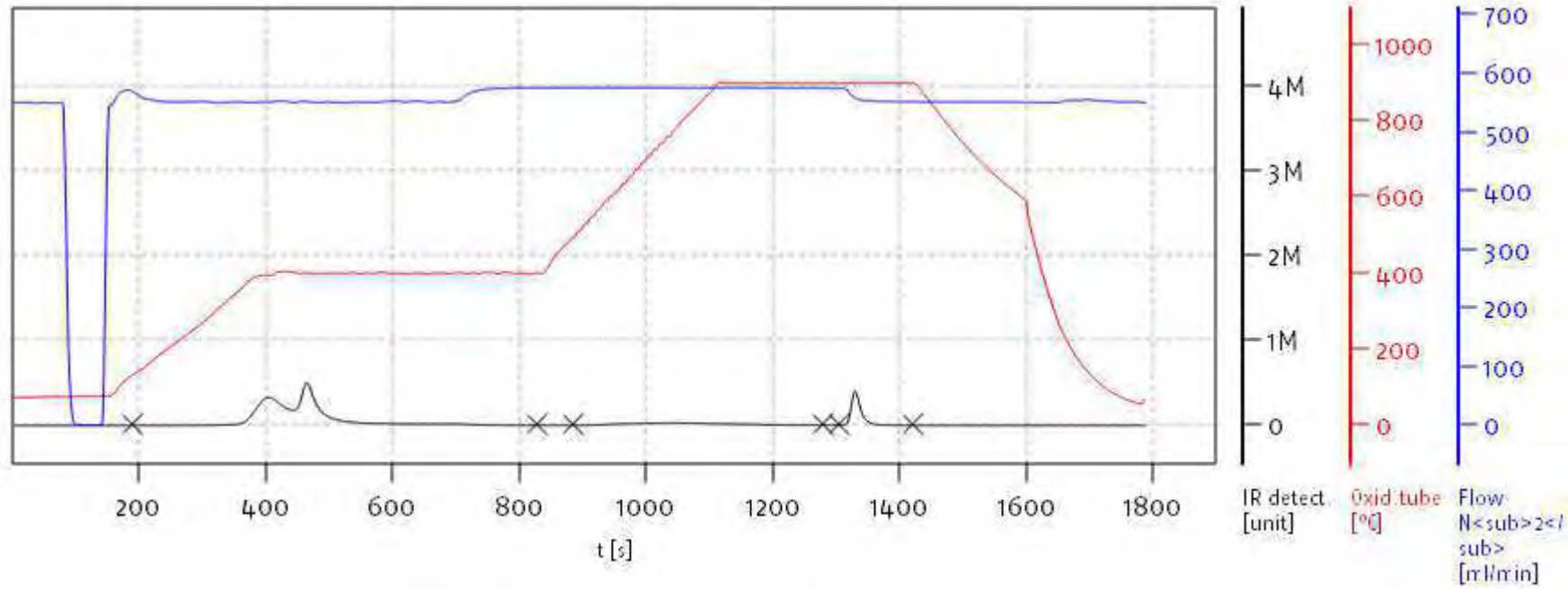
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
23	23	BLE0201-DUP2	202.90		CARBON	5/7/2023 1:52 AM	bl	1.271	1 489 950	1.421	0.186	270 172	222 226	1.085	0.149	0.9722	1.0000



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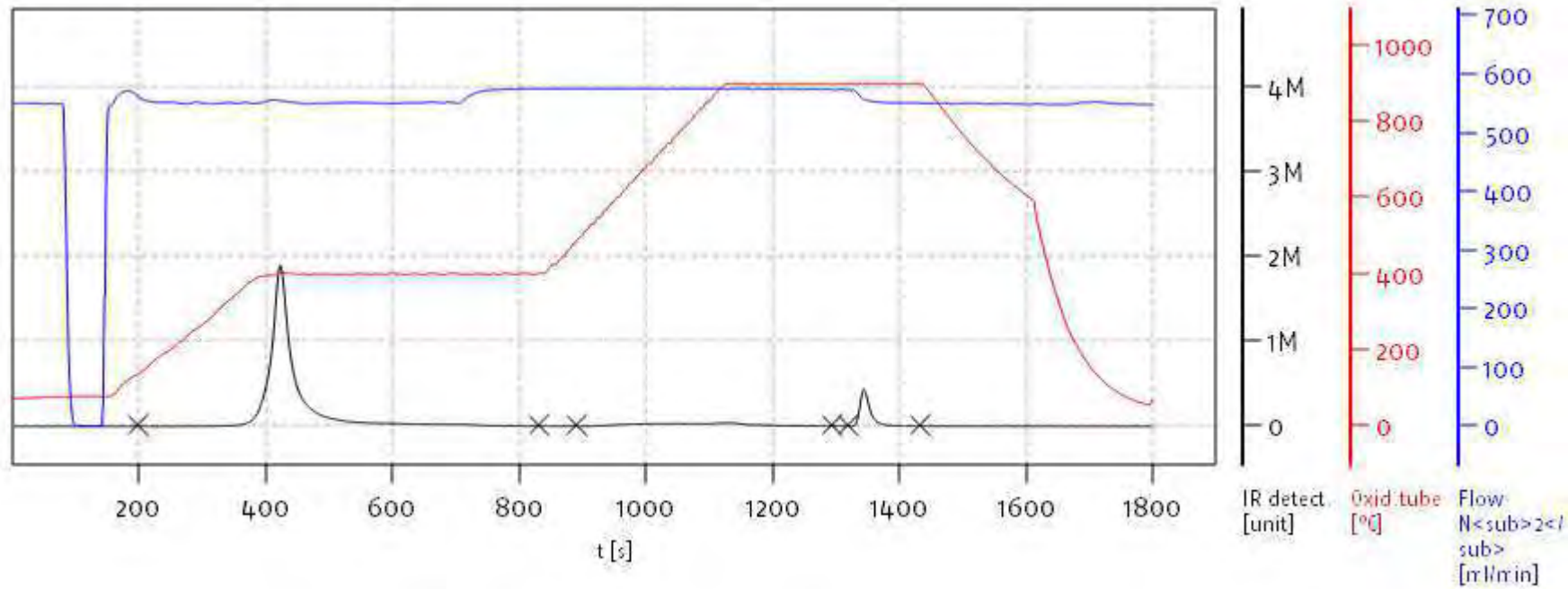
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
24	24	BLE0201-MS1	179.30	0.0070	CARBON	5/7/2023 2:23 AM	bl	2.766	3 029 890	2.996	0.245	310 847	292 951	2.521	0.230	0.9722	1.0000



Name:

Access: soliTOC superuser

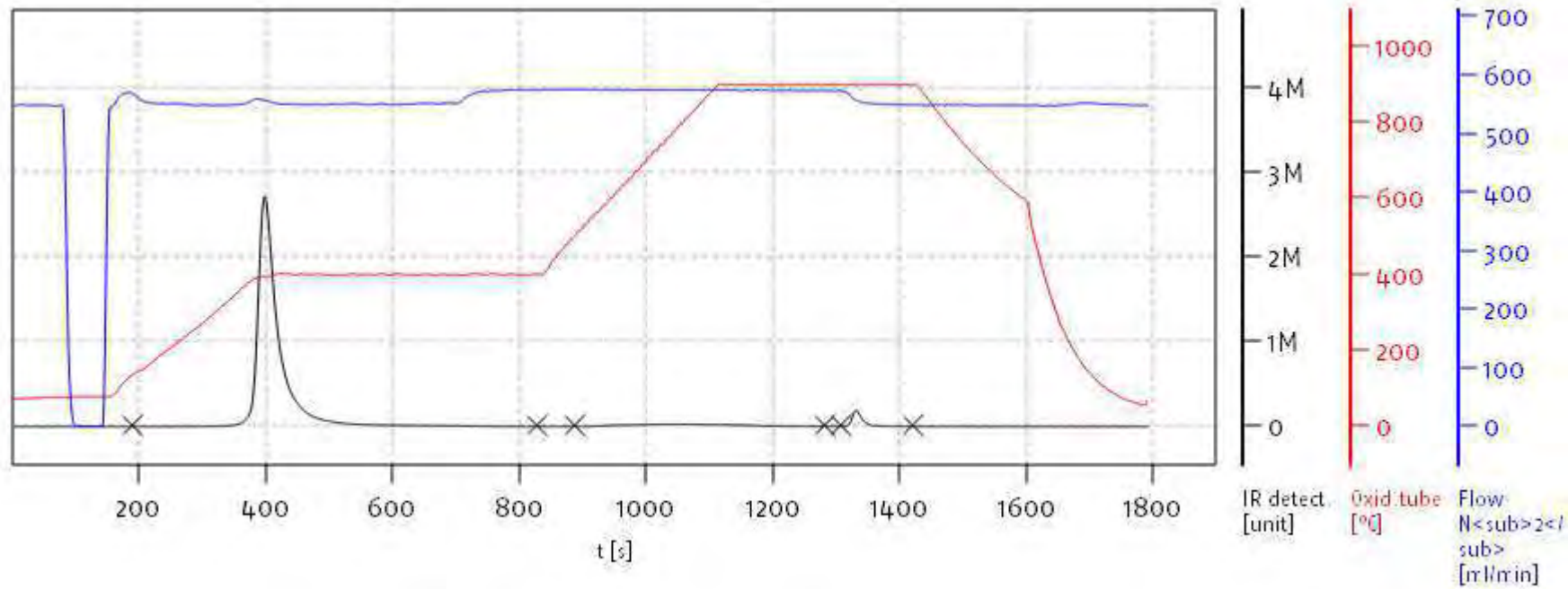
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
25	25	BLE0201-MSD1	243.60	0.0078	CARBON	5/7/2023 2:53 AM	bl	2.440	3 863 150	2.563	0.070	136 707	219 110	2.370	0.122	0.9722	1.0000



Name:

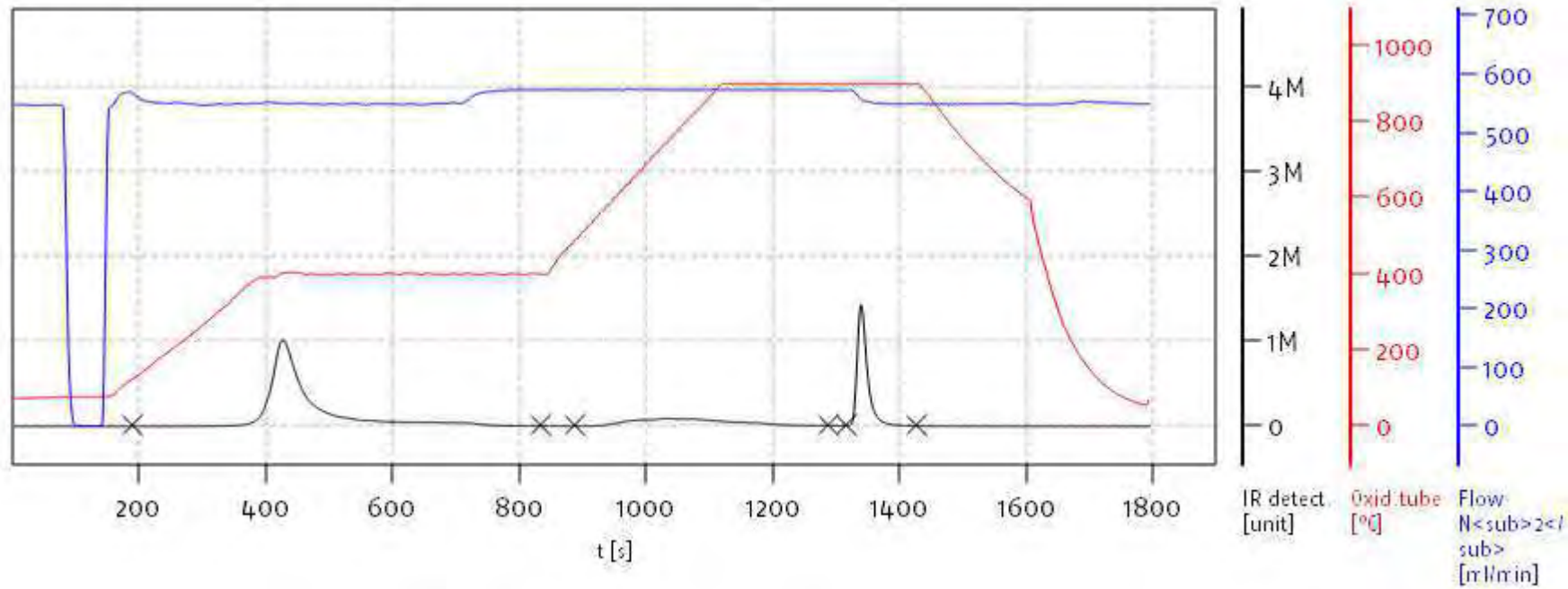
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
26	26	23E0148-02	595.20		CARBON	5/7/2023 3:23 AM	bl	0.914	2 620 610	1.082	0.258	1 016 960	672 750	0.656	0.168	0.9722	1.0000



Name:

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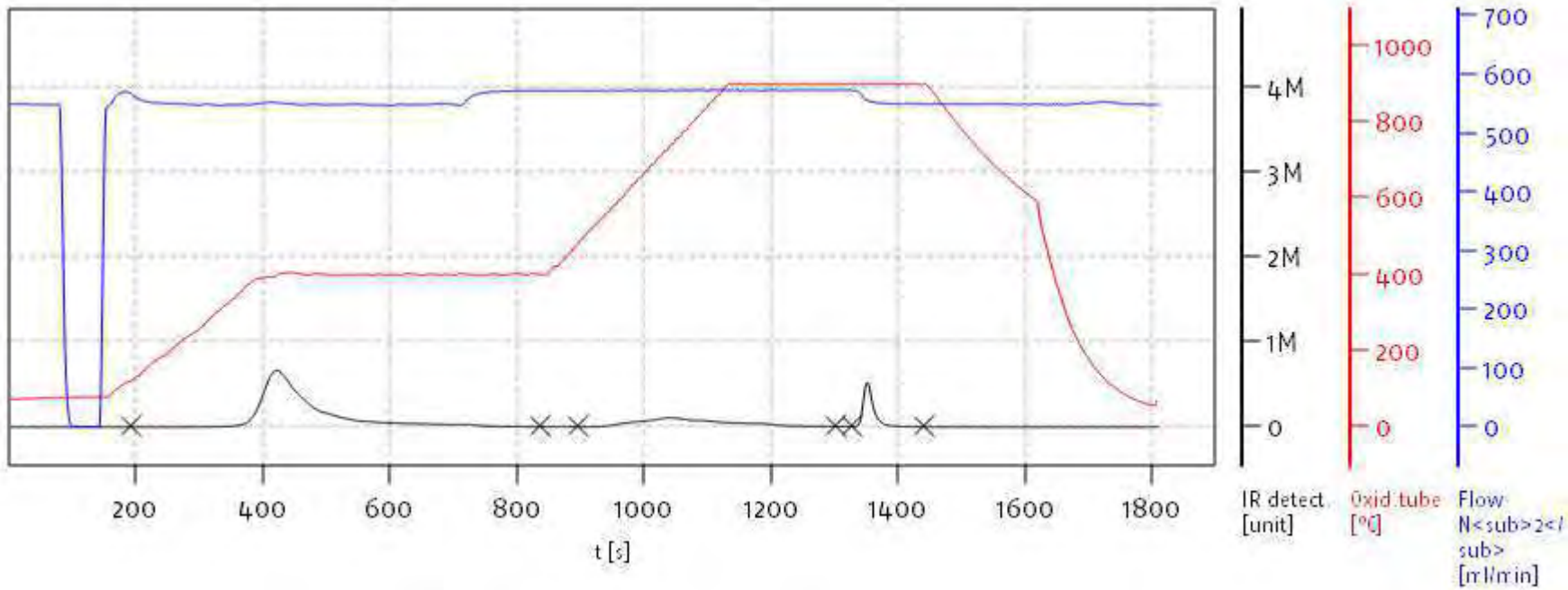
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EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
27	27	23E0148-03	608.00		CARBON	5/7/2023 3:54 AM	bl	0.654	2 311 200	0.819	0.088	373 235	674 968	0.566	0.165	0.9722	1.0000



Name:

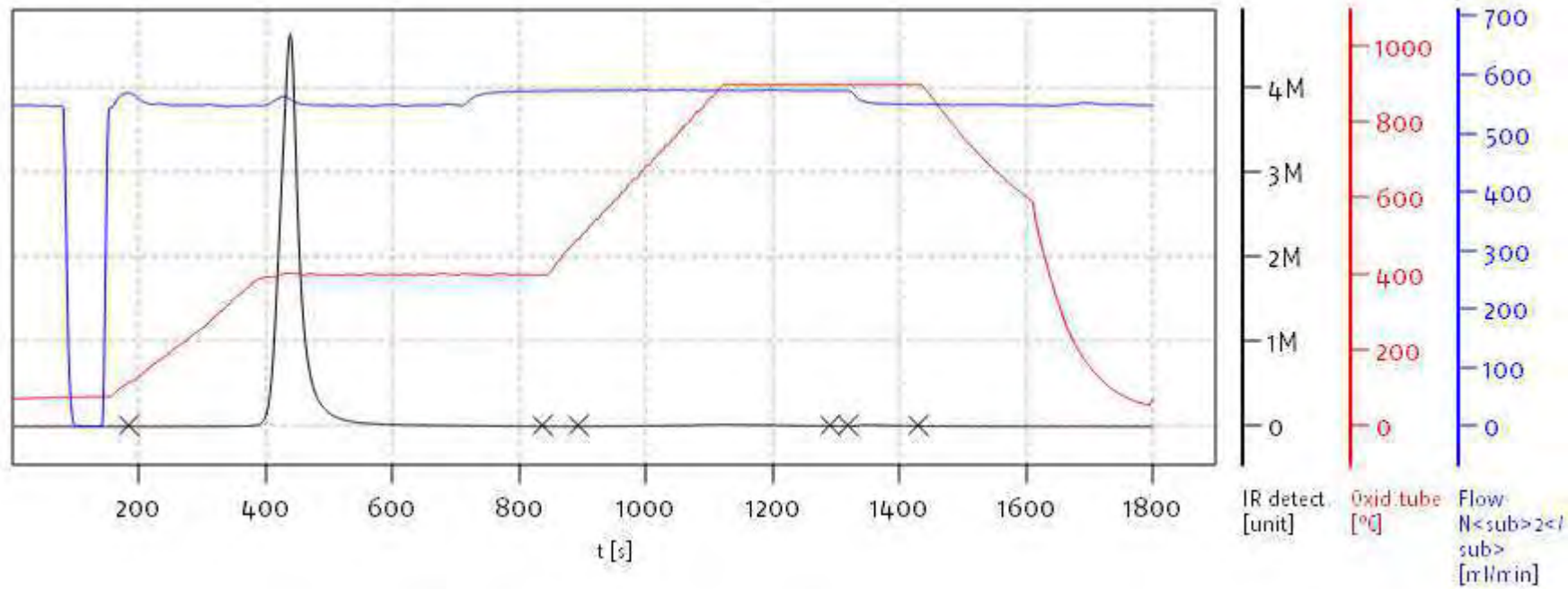
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

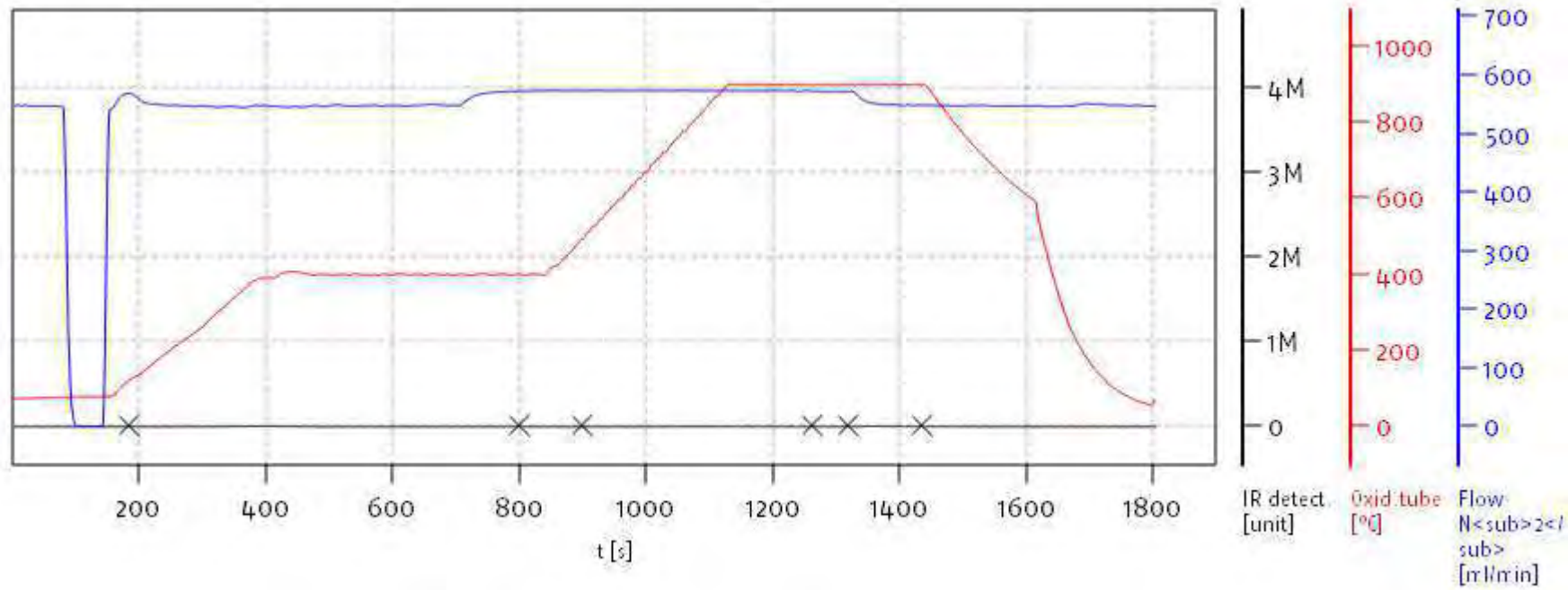
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
28	28	SLE0117-CCV2	22.00		CARBON	5/7/2023 4:24 AM	bl	43.829	6 414 480	44.870	0.130	45 056	174 400	43.699	1.040	0.9722	1.0000



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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
29	29	SLE0117-CCB2	534.90		CARBON	5/7/2023 4:55 AM	bl	0.000	26 059	0.000	0.000	13 453	10 454	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

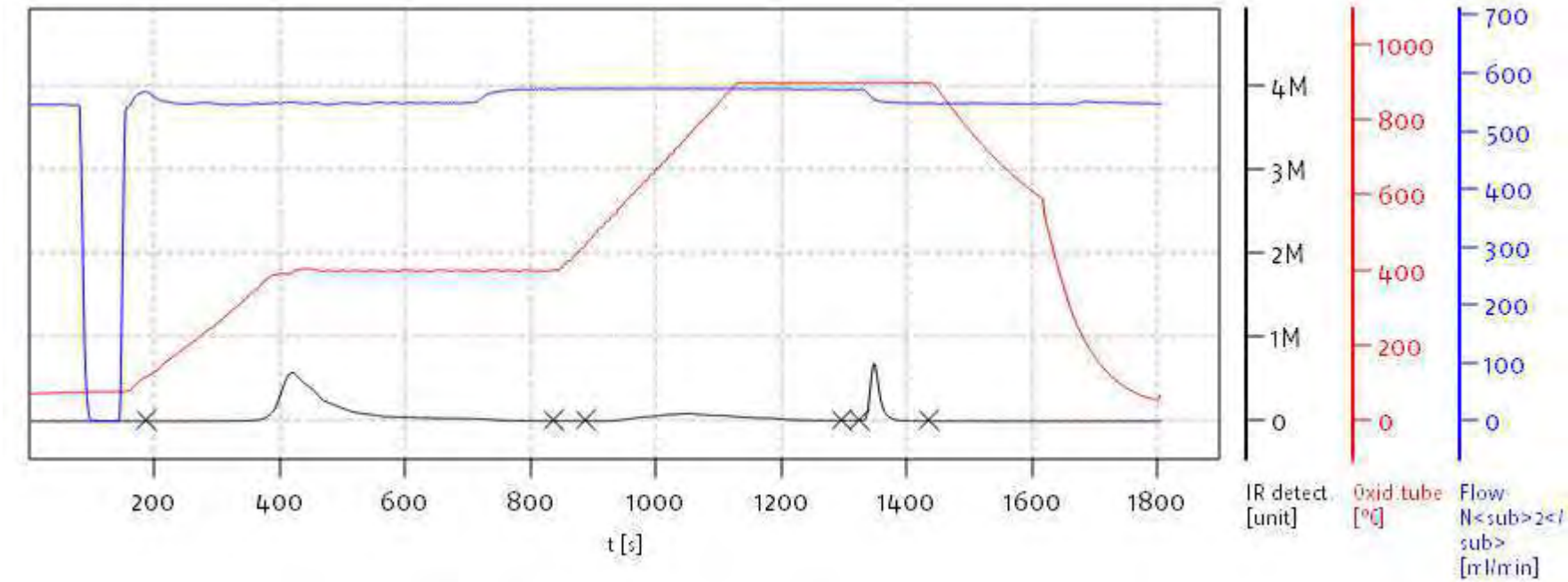
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
30	30	23E0148-04	538.80		CARBON	5/7/2023 5:25 AM	bl	0.686	2 031 590	0.858	0.126	466 289	622 251	0.560	0.171	0.9722	1.0000



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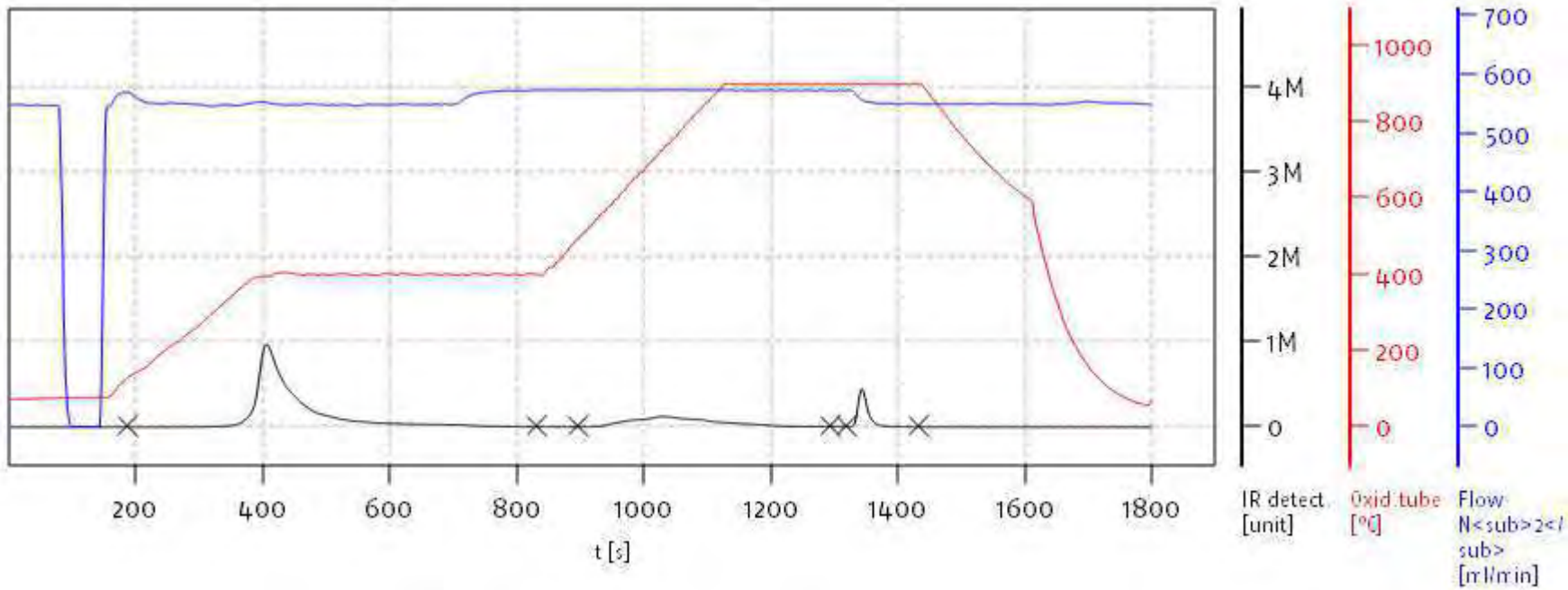
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
31	31	23E0148-05	657.60		CARBON	5/7/2023 5:56 AM	bl	0.637	2 523 280	0.803	0.066	304 977	731 593	0.571	0.166	0.9722	1.0000



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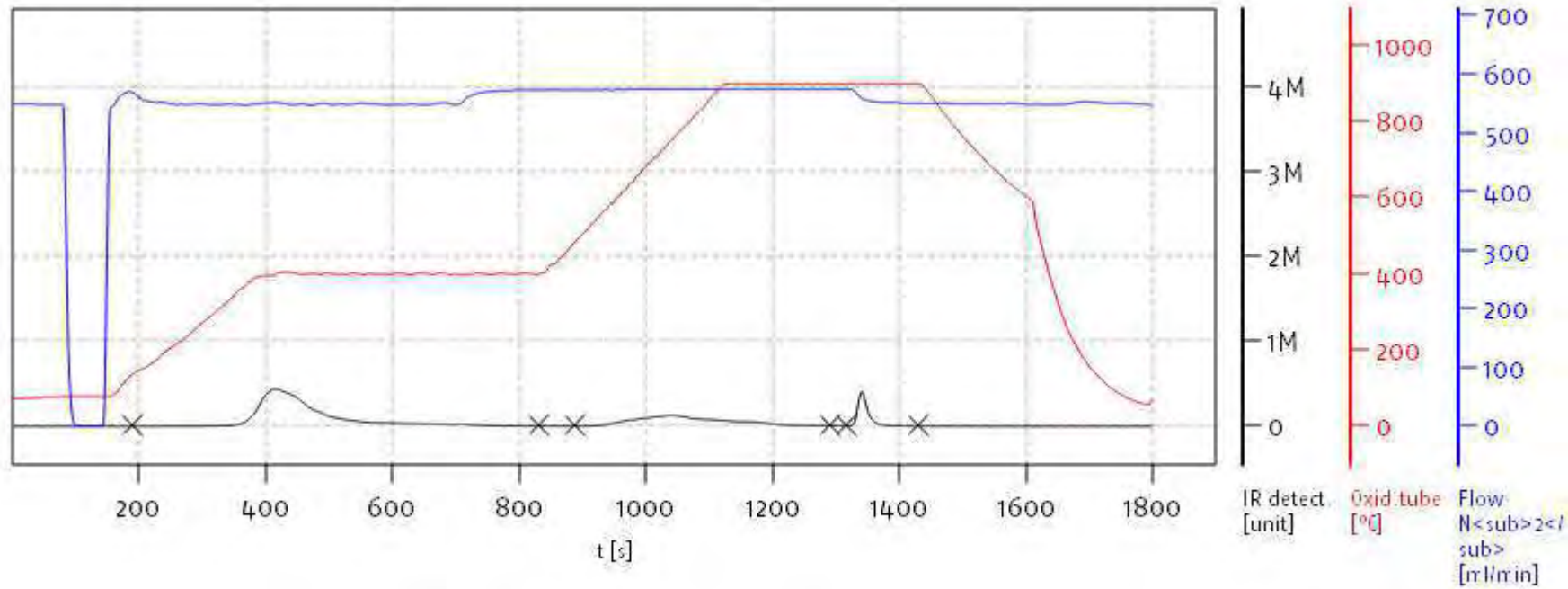
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
32	32	23E0148-06	686.20		CARBON	5/7/2023 6:26 AM	bl	0.454	1 822 130	0.633	0.060	291 884	823 256	0.394	0.180	0.9722	1.0000



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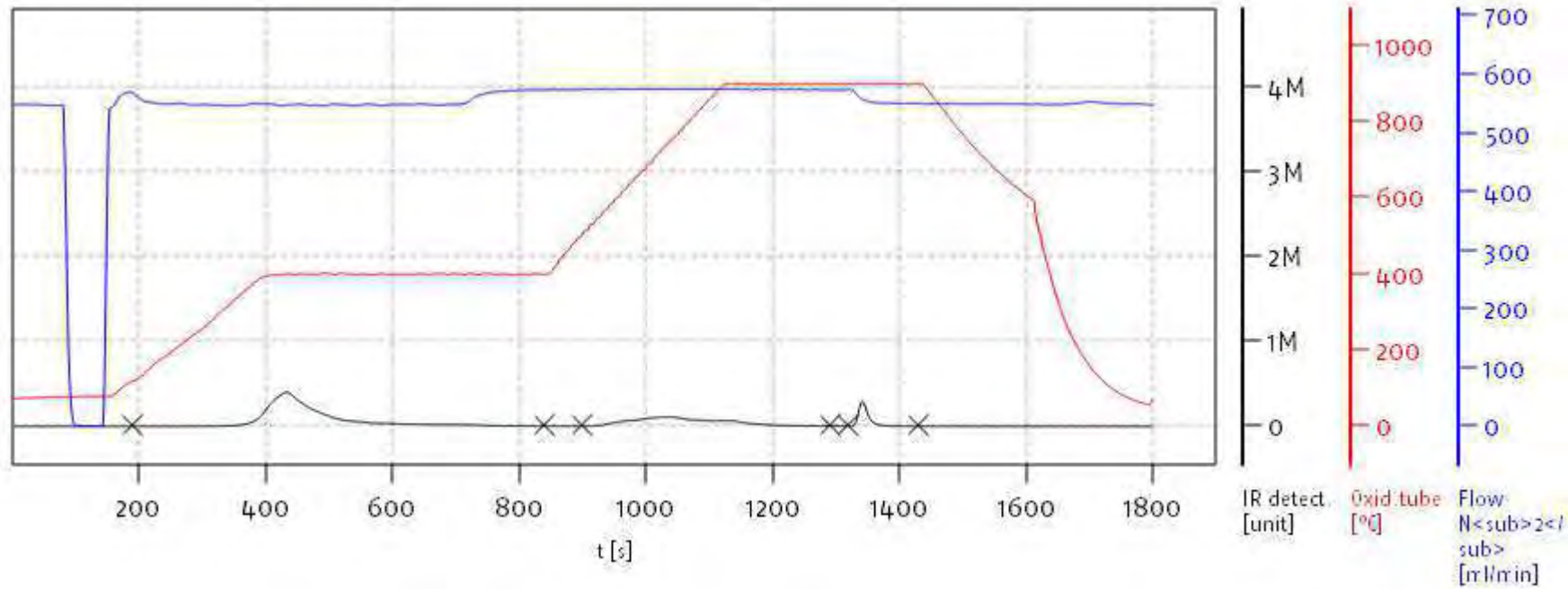
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
33	33	23E0148-07	623.70		CARBON	5/7/2023 6:56 AM	bl	0.395	1 485 620	0.562	0.043	200 102	697 398	0.352	0.167	0.9722	1.0000



Name:

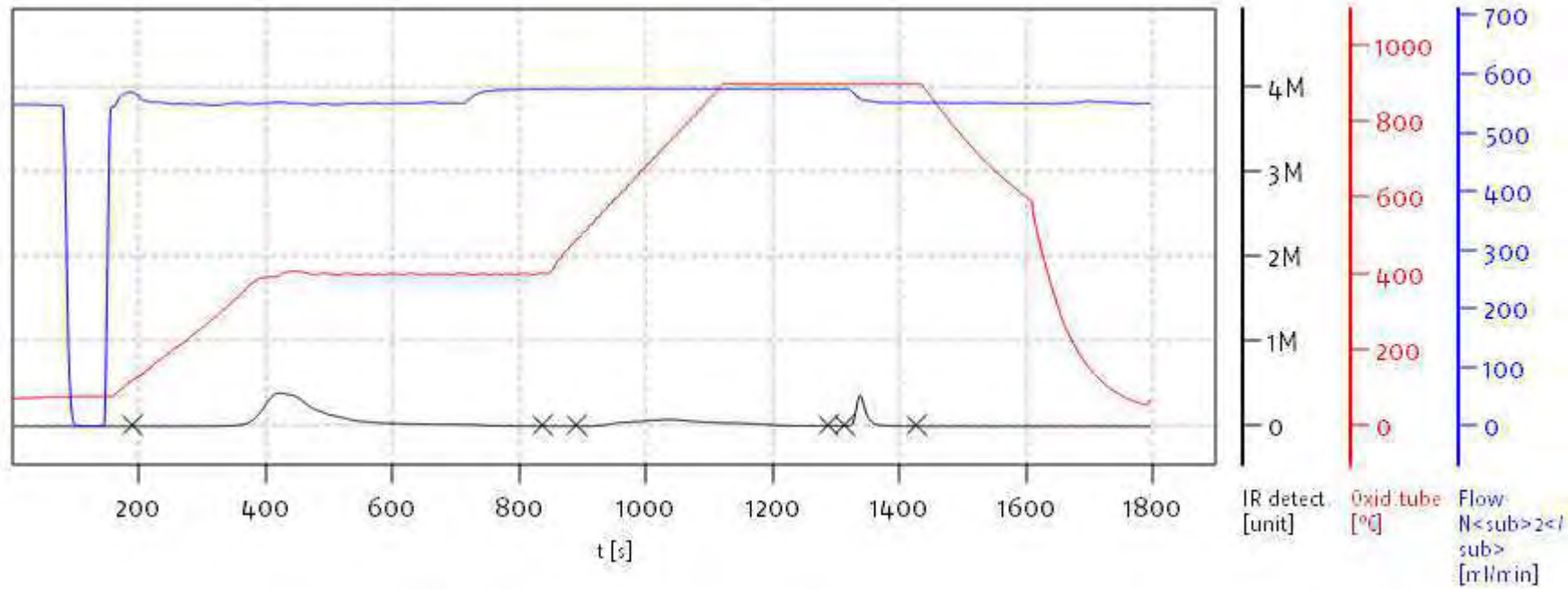
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
34	34	23E0148-08	516.00		CARBON	5/7/2023 7:27 AM	bl	0.549	1 676 190	0.699	0.068	251 611	526 270	0.481	0.150	0.9722	1.0000



Name:

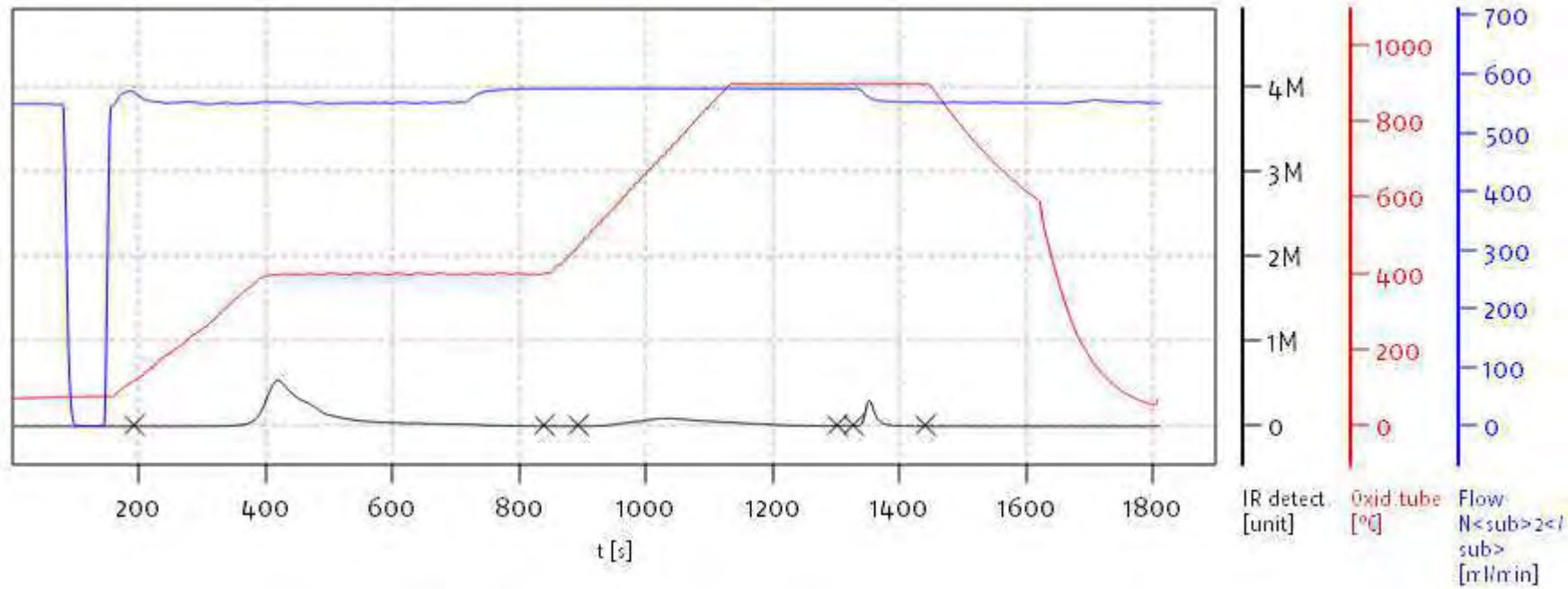
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
35	35	23E0148-09	531.10		CARBON	5/7/2023 7:57 AM	bl	0.584	1 890 380	0.746	0.056	217 460	584 529	0.528	0.163	0.9722	1.0000



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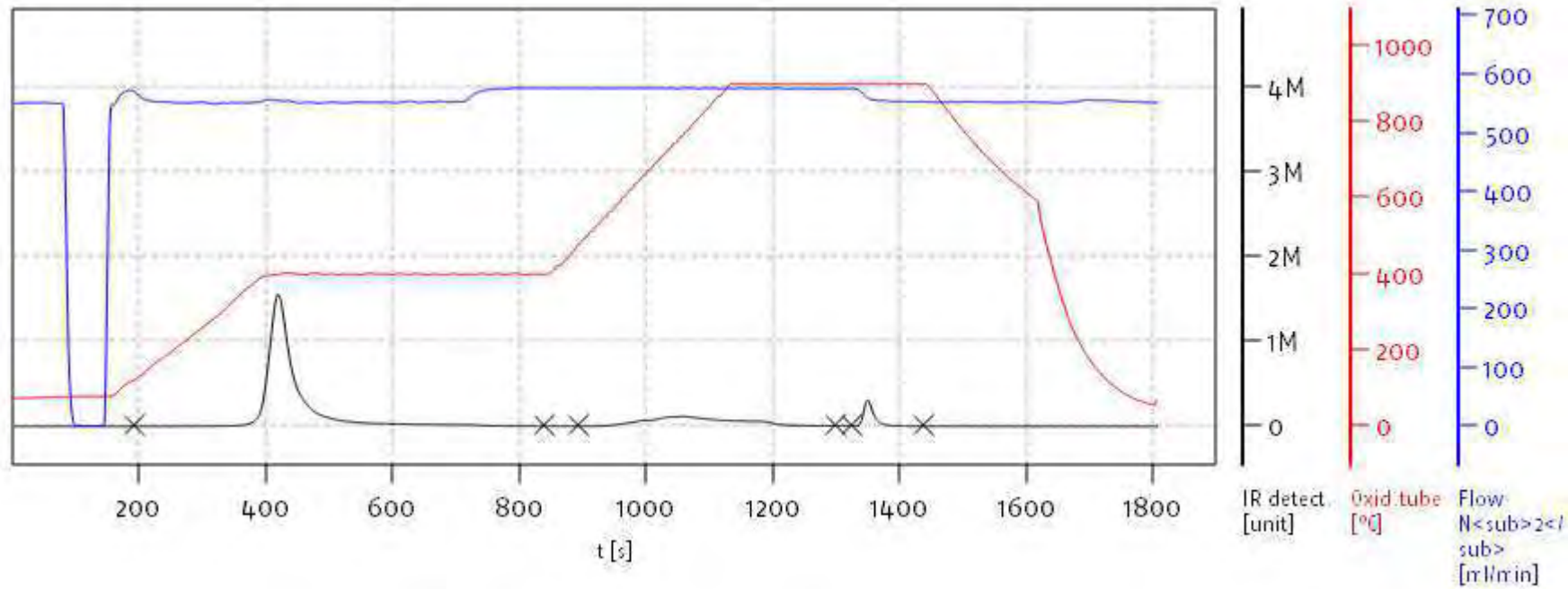
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
36	36	23E0148-10	533.00		CARBON	5/7/2023 8:28 AM	bl	0.845	2 821 580	1.055	0.055	217 501	749 382	0.789	0.210	0.9722	1.0000



Name:

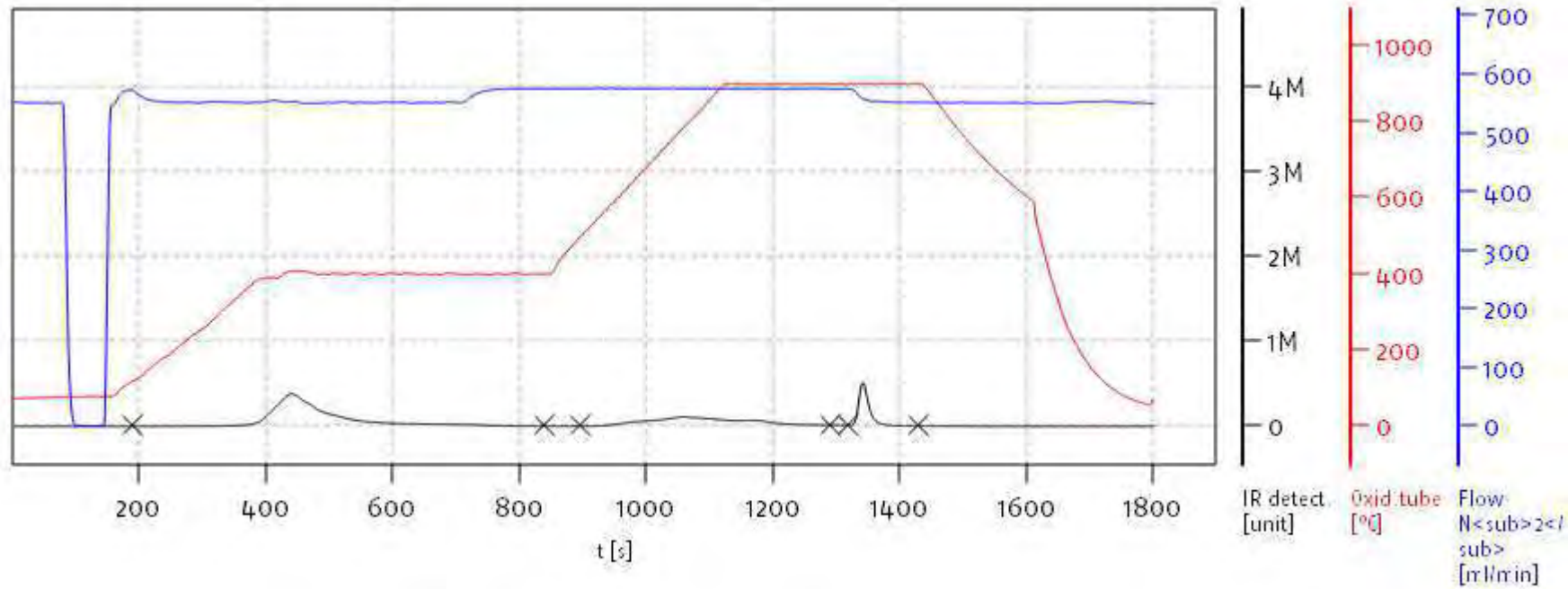
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
37	37	23E0148-11	544.00		CARBON	5/7/2023 8:58 AM	bl	0.504	1 486 110	0.720	0.100	379 025	786 211	0.404	0.216	0.9722	1.0000



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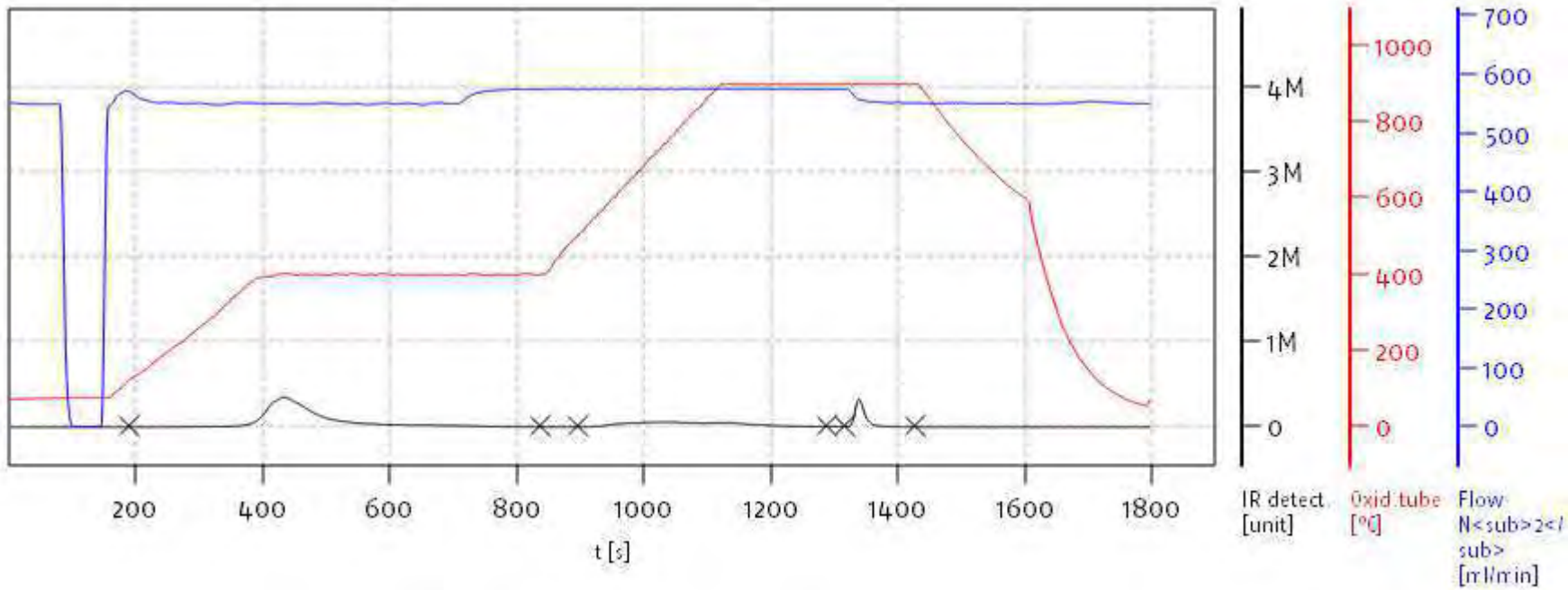
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
38	38	23E0148-12	508.40		CARBON	5/7/2023 9:28 AM	bl	0.450	1 335 390	0.588	0.062	230 616	481 513	0.387	0.139	0.9722	1.0000



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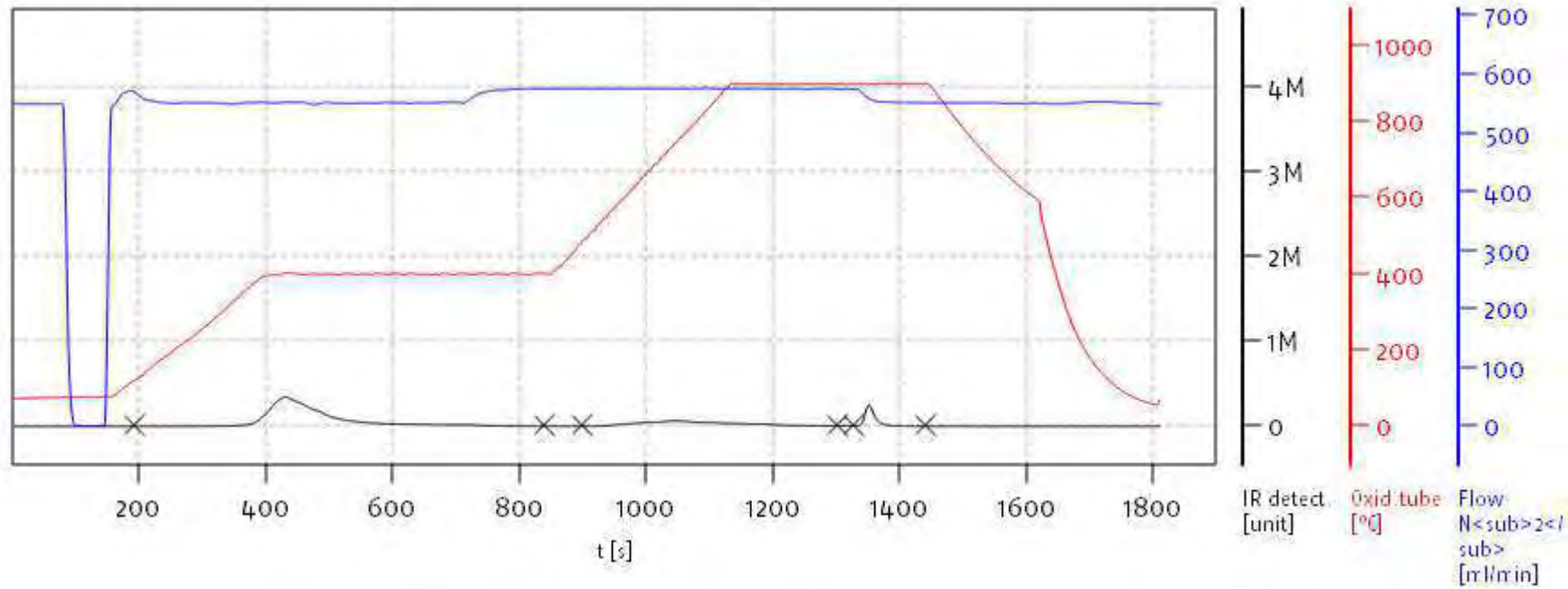
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
39	39	23E0148-13	524.50		CARBON	5/7/2023 9:59 AM	bl	0.425	1 352 130	0.545	0.045	179 292	431 464	0.380	0.120	0.9722	1.0000



Name:

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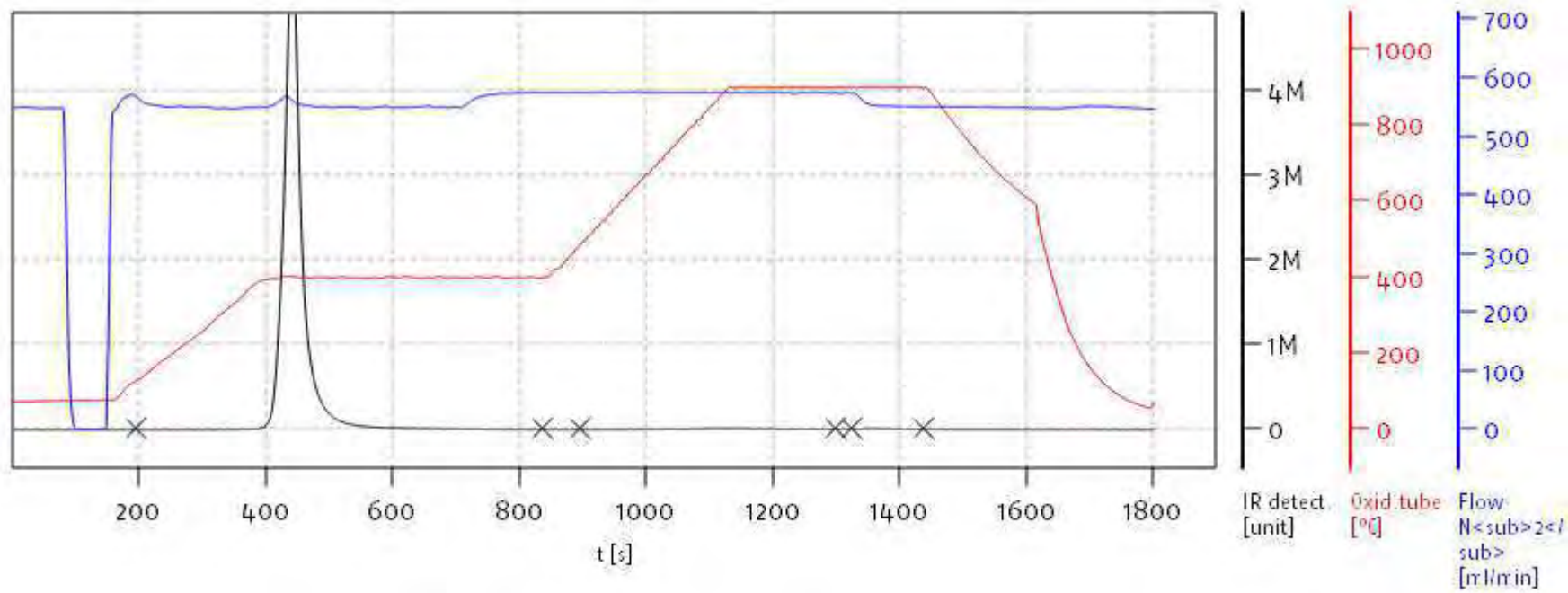
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Serial No: 0300.181017
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
40	40	SLE0117-CCV3	23.10		CARBON	5/7/2023 10:29 AM	bl	44.772	6 894 140	45.253	0.029	30 898	98 318	44.743	0.481	0.9722	1.0000



Name:

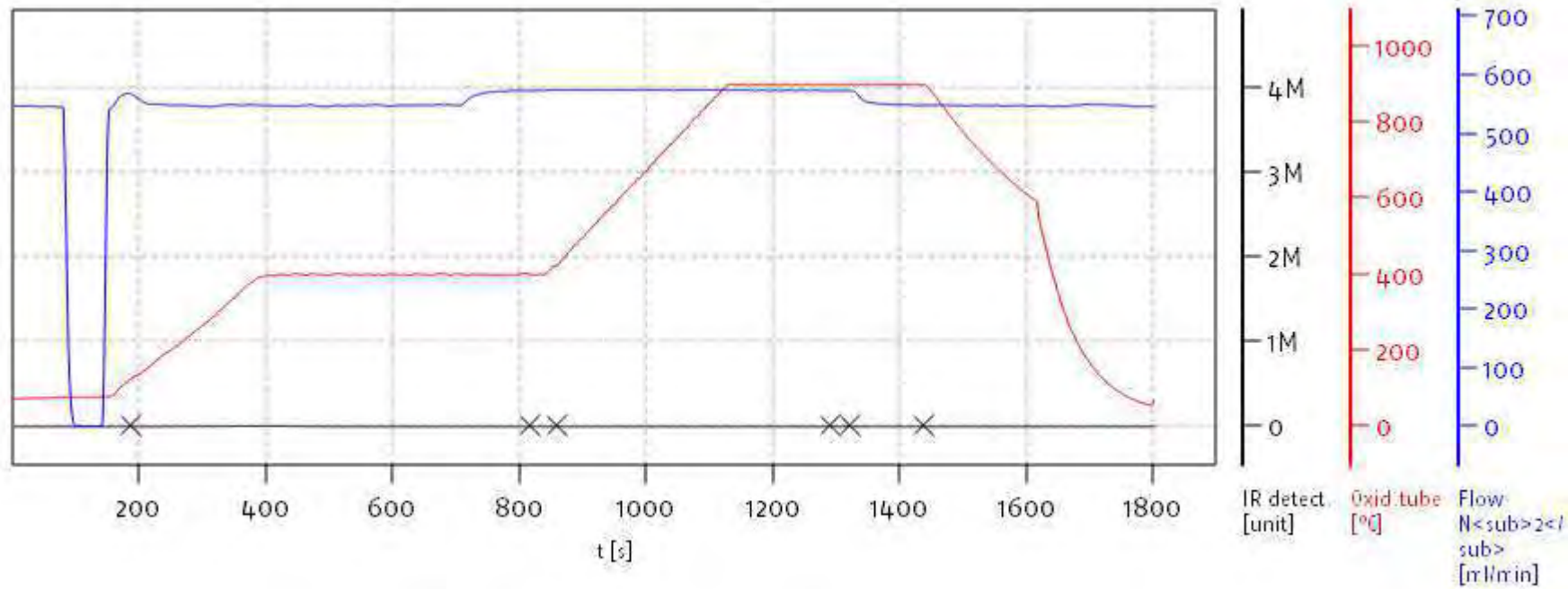
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
41	41	SLE0117-CCB3	521.50		CARBON	5/7/2023 11:00 AM	bl,C2u	0.003	36 851	0.003	0.000	2 251	2 615	0.003	0.000	0.9722	1.0000



Name:

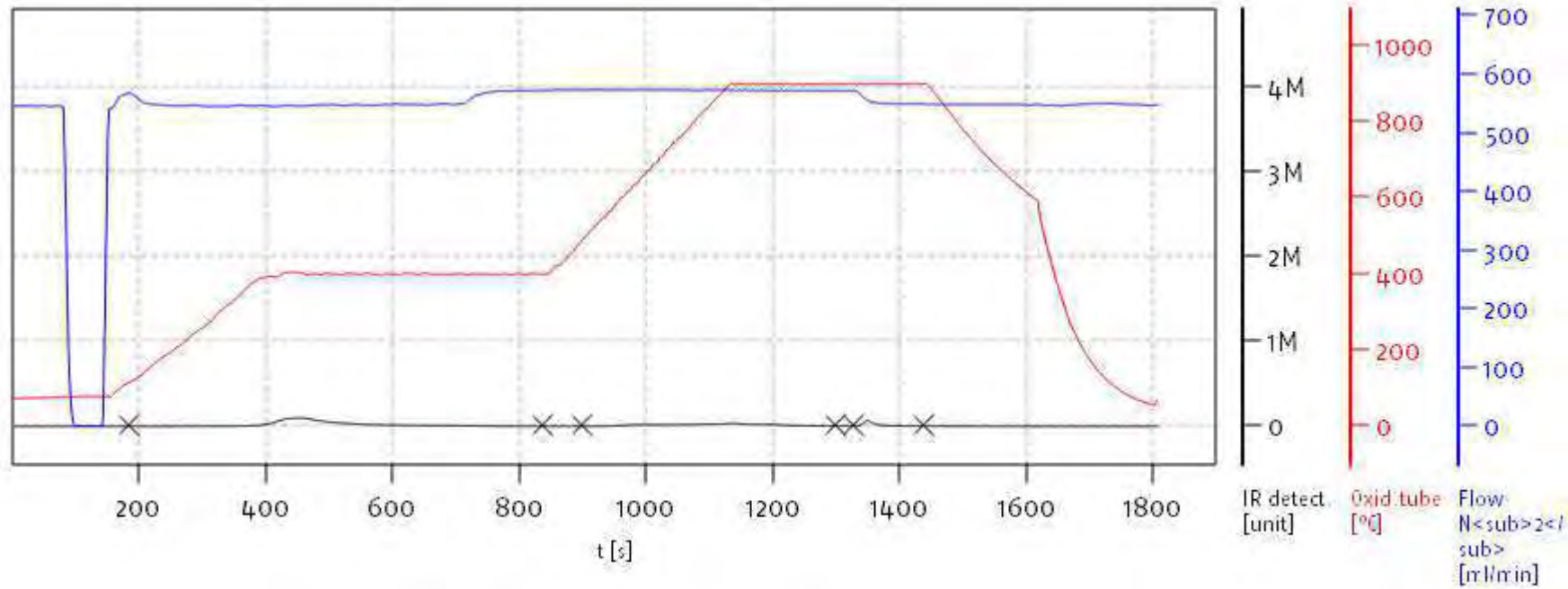
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
42	42	23E0152-01	561.60		CARBON	5/7/2023 11:30 AM	bl	0.127	461 802	0.186	0.010	63 842	240 874	0.117	0.059	0.9722	1.0000



Name:

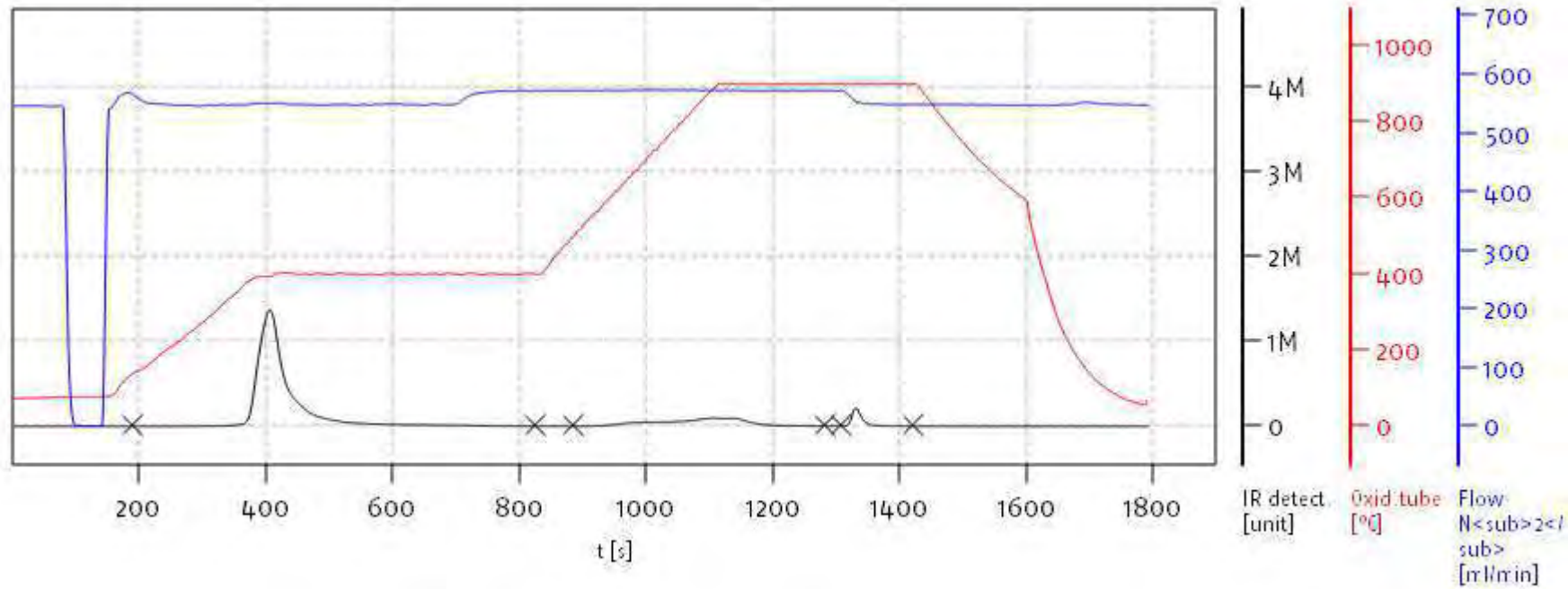
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Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
43	43	23E0152-02	658.50		CARBON	5/7/2023 12:01 PM	bl	0.653	2 753 860	0.784	0.030	152 505	583 668	0.623	0.131	0.9722	1.0000



Name:

Access: soliTOC superuser

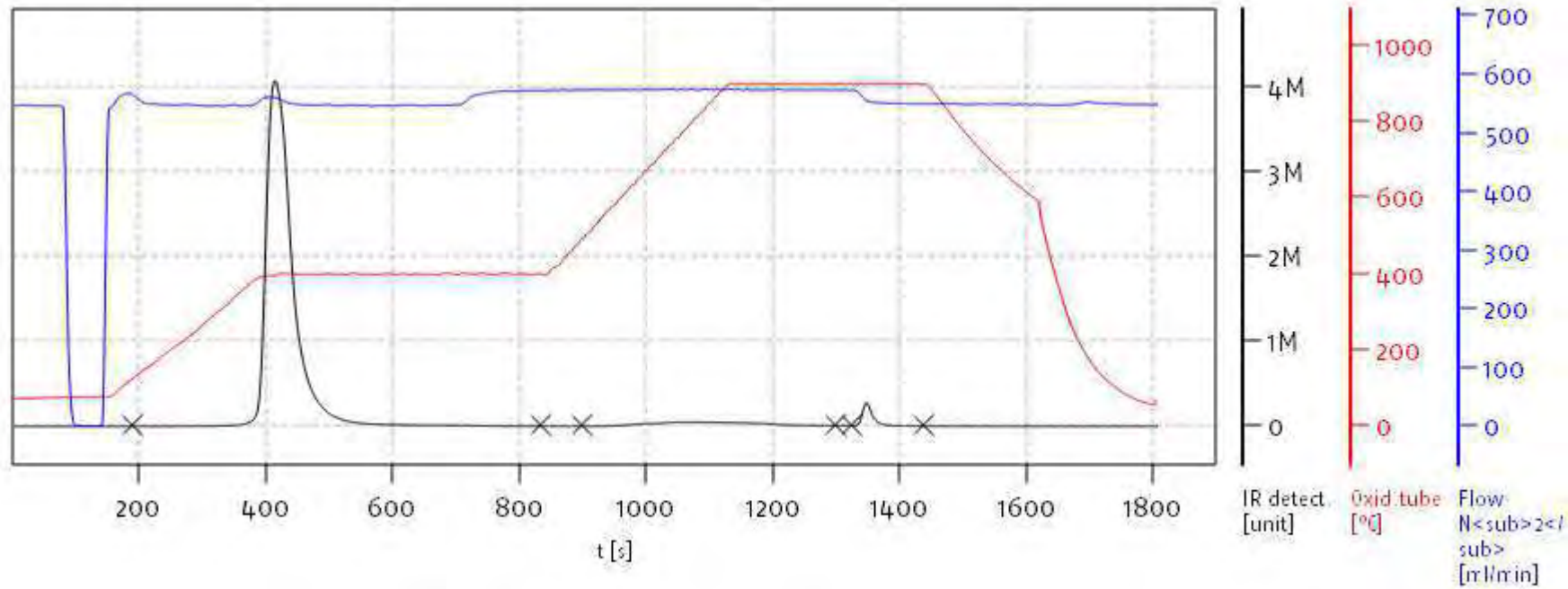
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elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
44	44	23E0152-03	568.90		CARBON	5/7/2023 12:31 PM	bl	1.990	7 365 020	2.094	0.049	205 724	408 888	1.941	0.104	0.9722	1.0000



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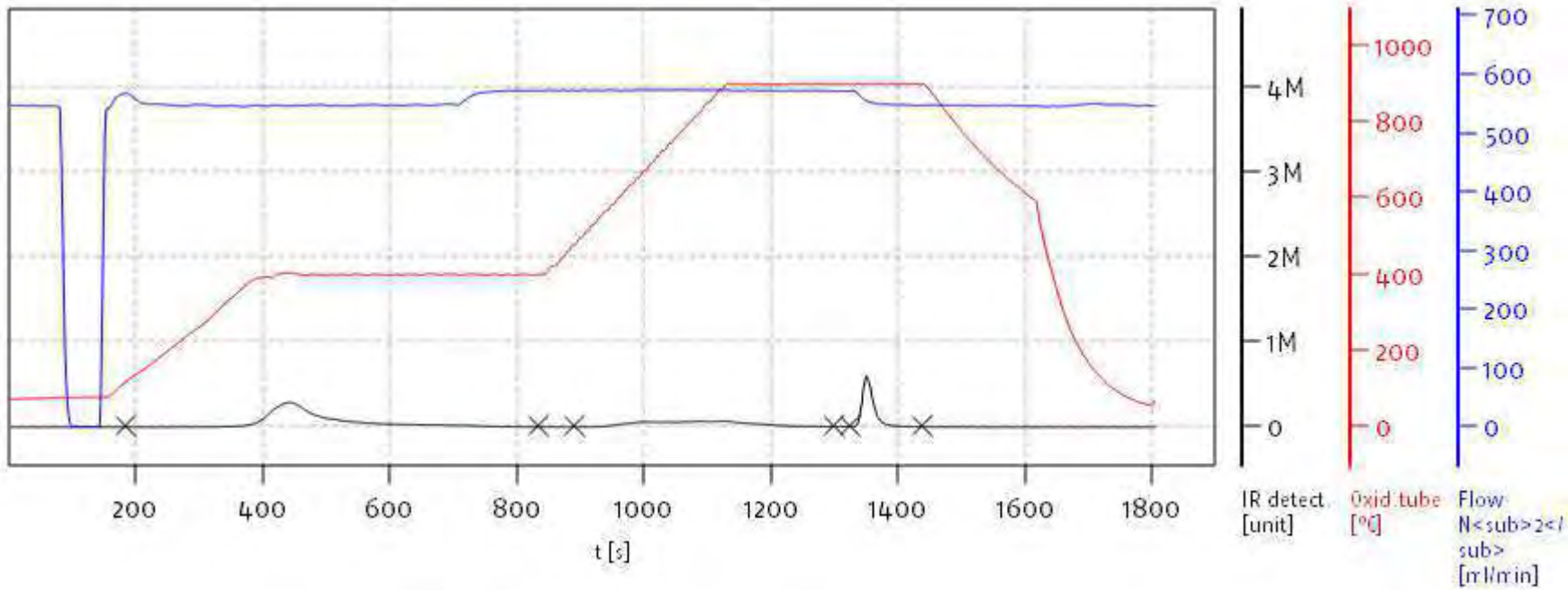
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
45	45	23E0152-04	629.50		CARBON	5/7/2023 1:02 PM	bl	0.388	1 196 600	0.518	0.108	466 755	554 972	0.280	0.130	0.9722	1.0000



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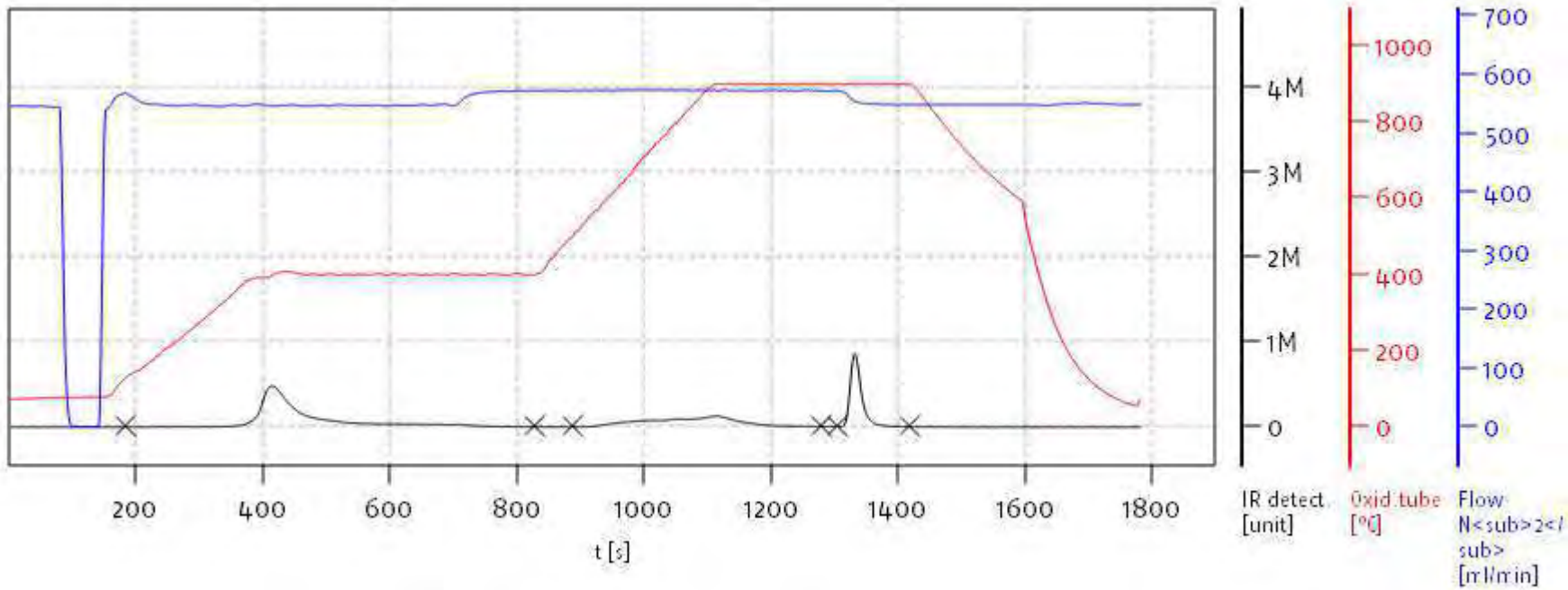
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
46	46	23E0152-05	332.70		CARBON	5/7/2023 1:32 PM	bl	0.949	1 452 620	1.303	0.303	678 718	787 674	0.645	0.354	0.9722	1.0000



Name:

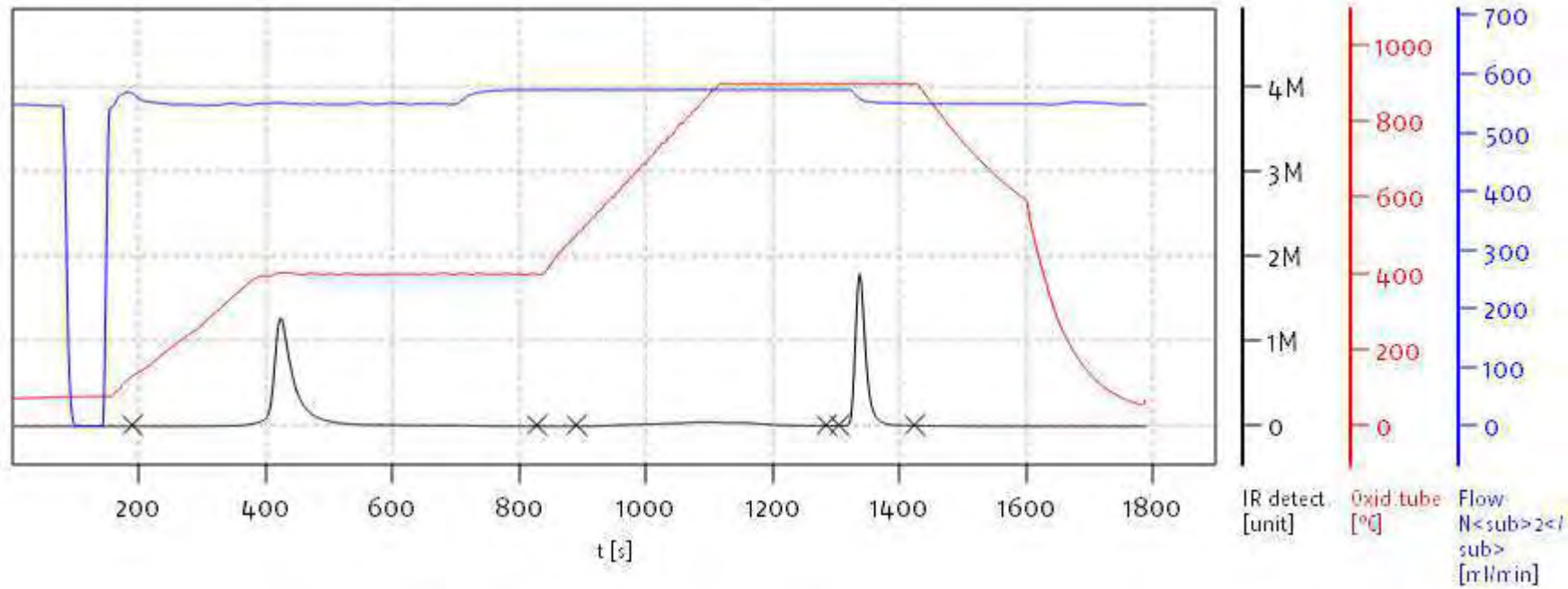
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Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
47	47	23E0152-06	355.40		CARBON	5/7/2023 2:02 PM	bl	1.340	1 882 930	1.486	0.554	1 297 340	362 409	0.786	0.146	0.9722	1.0000



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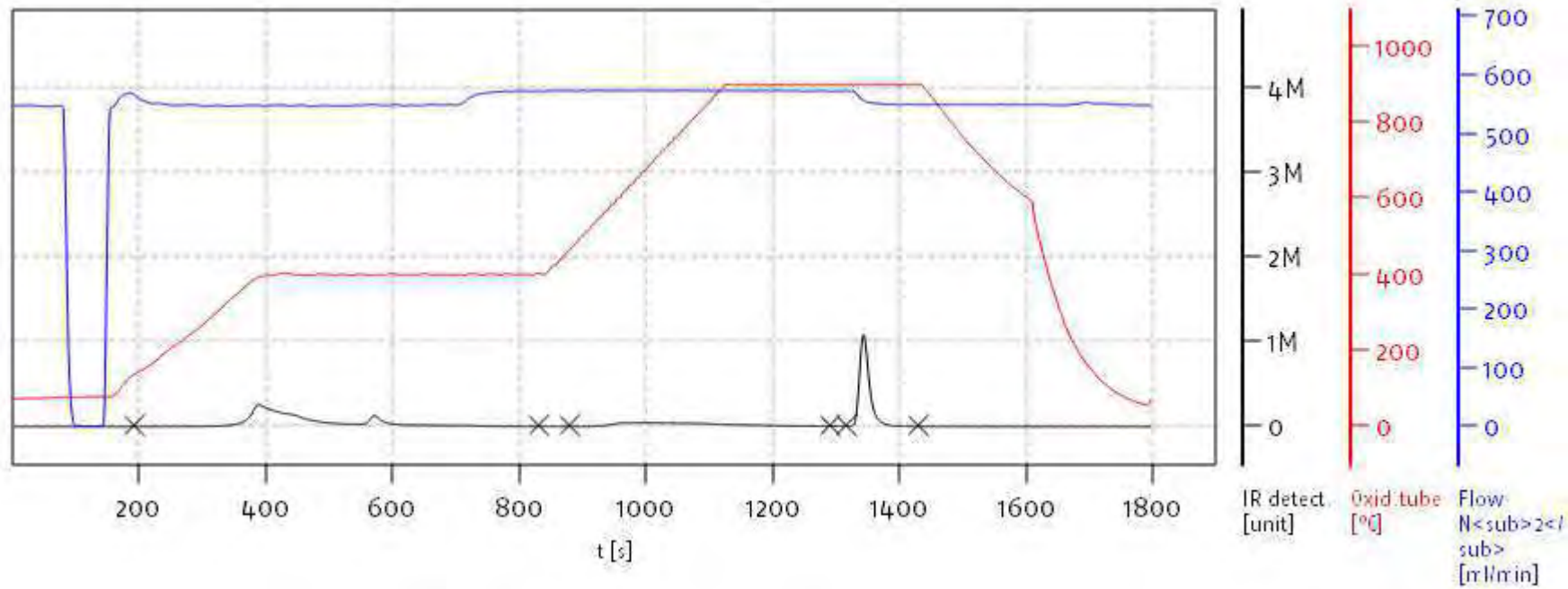
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Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
48	48	23E0152-07	252.60		CARBON	5/7/2023 2:32 PM	bl	1.029	1 013 240	1.232	0.441	746 387	357 184	0.588	0.203	0.9722	1.0000



Name:

Access: soliTOC superuser

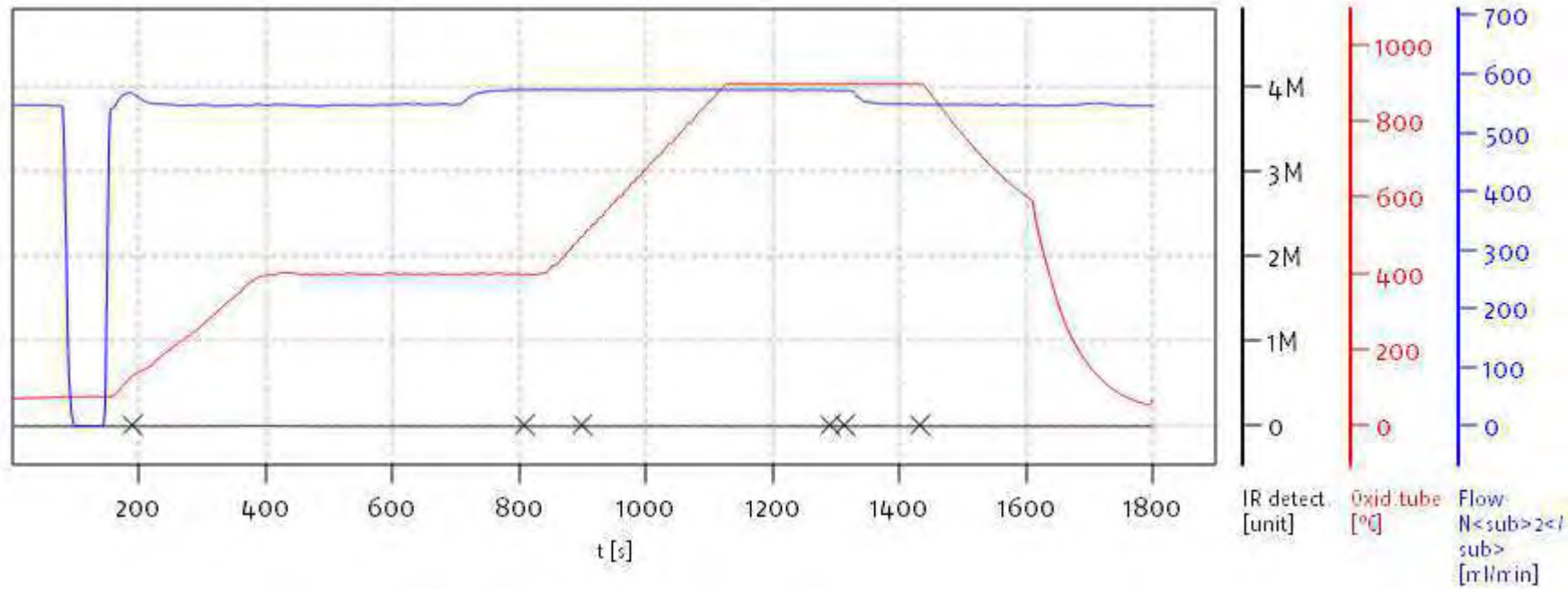
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
49	49	BLANK	1.00		CARBON	5/7/2023 3:03 PM	bl	0.000	19 746	0.000	0.000	3 210	7 915	0.000	0.000	0.9722	1.0000



Name:

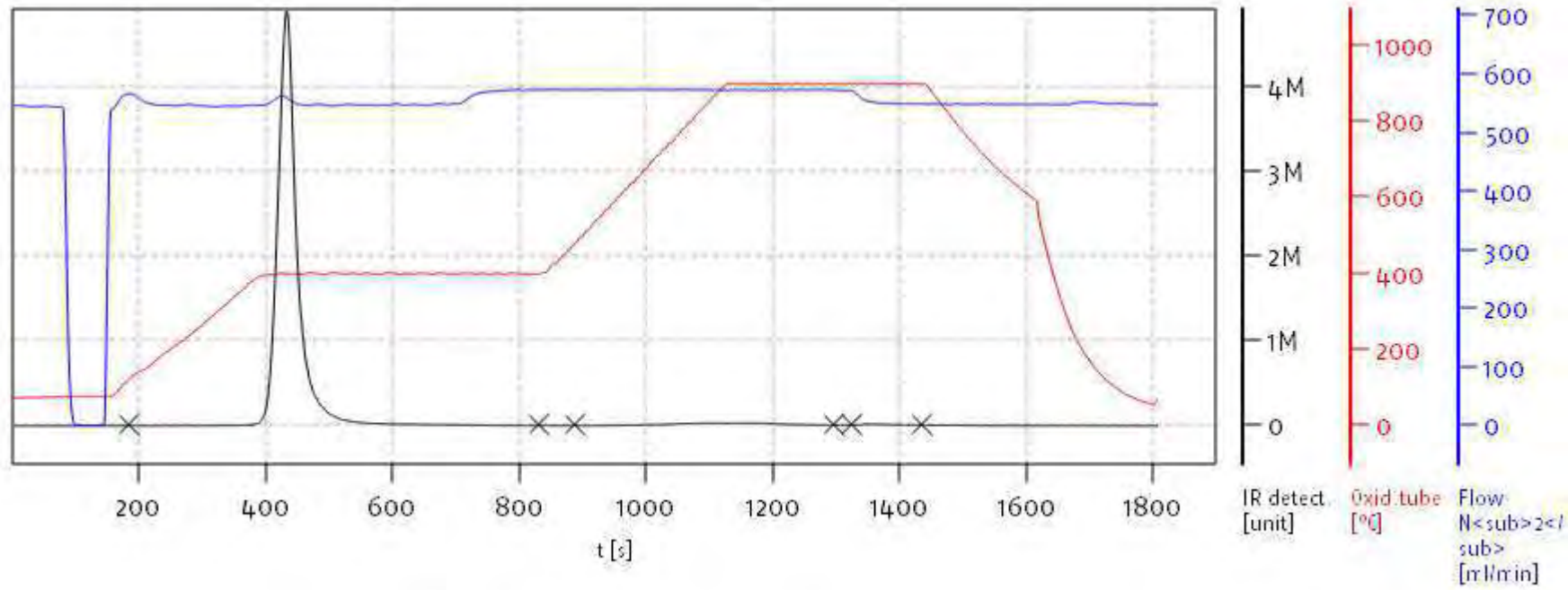
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
50	50	Dfactor	21.90		CARBON	5/7/2023 3:33 PM	bl	44.617	6 602 010	46.278	0.171	50 724	261 516	44.446	1.661	0.9562	1.0000



Name:

Access: soliTOC superuser

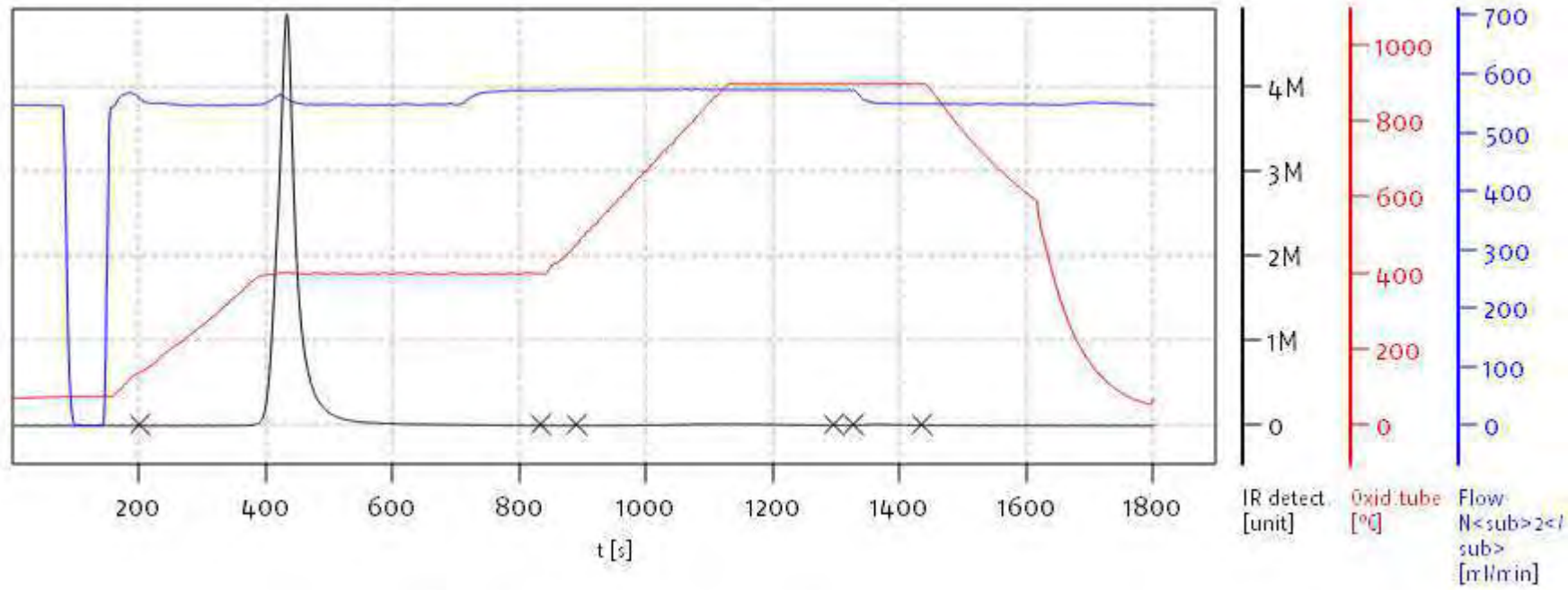
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
51	51	Dfactor	22.20		CARBON	5/7/2023 4:04 PM	bl	44.534	6 440 570	45.442	0.089	39 271	156 669	44.446	0.907	0.9937	1.0000



Name:

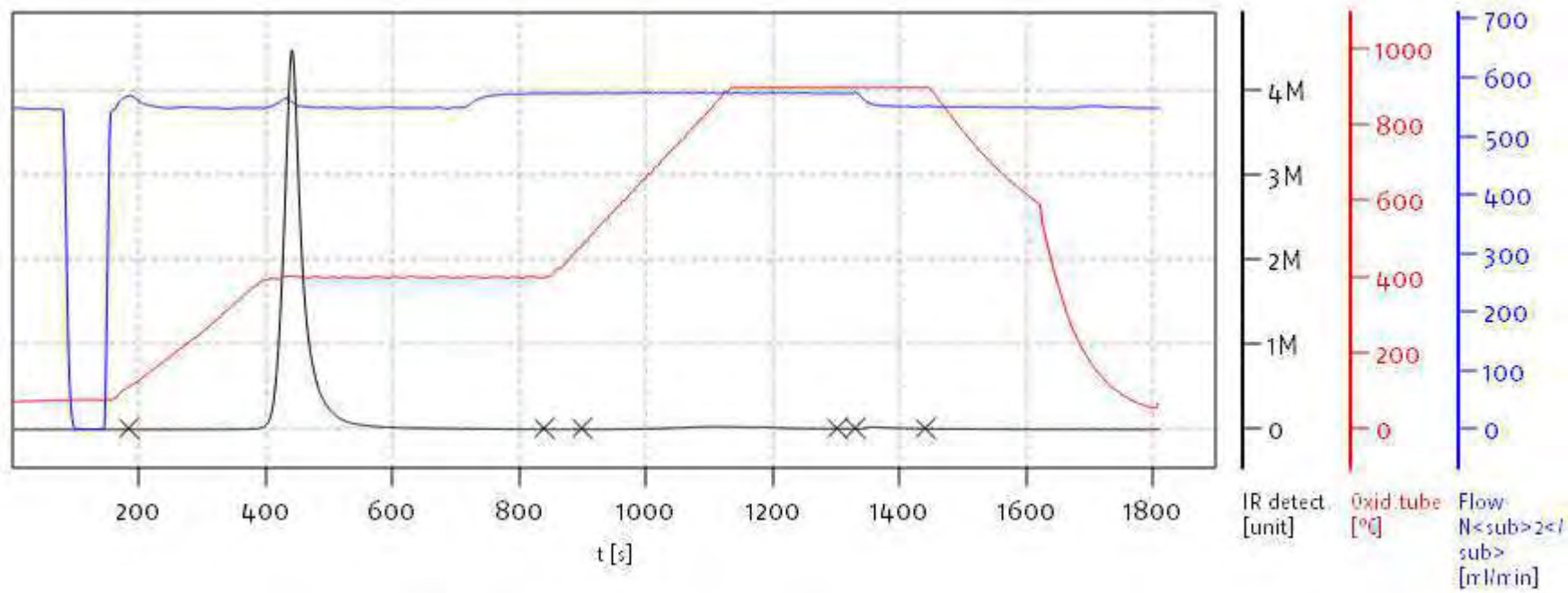
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
52	52	SLE0117-CCV4	21.20		CARBON	5/7/2023 4:34 PM	bl	43.721	6 119 690	45.436	0.341	73 291	261 463	43.380	1.715	0.9750	1.0000



Name:

Access: soliTOC superuser

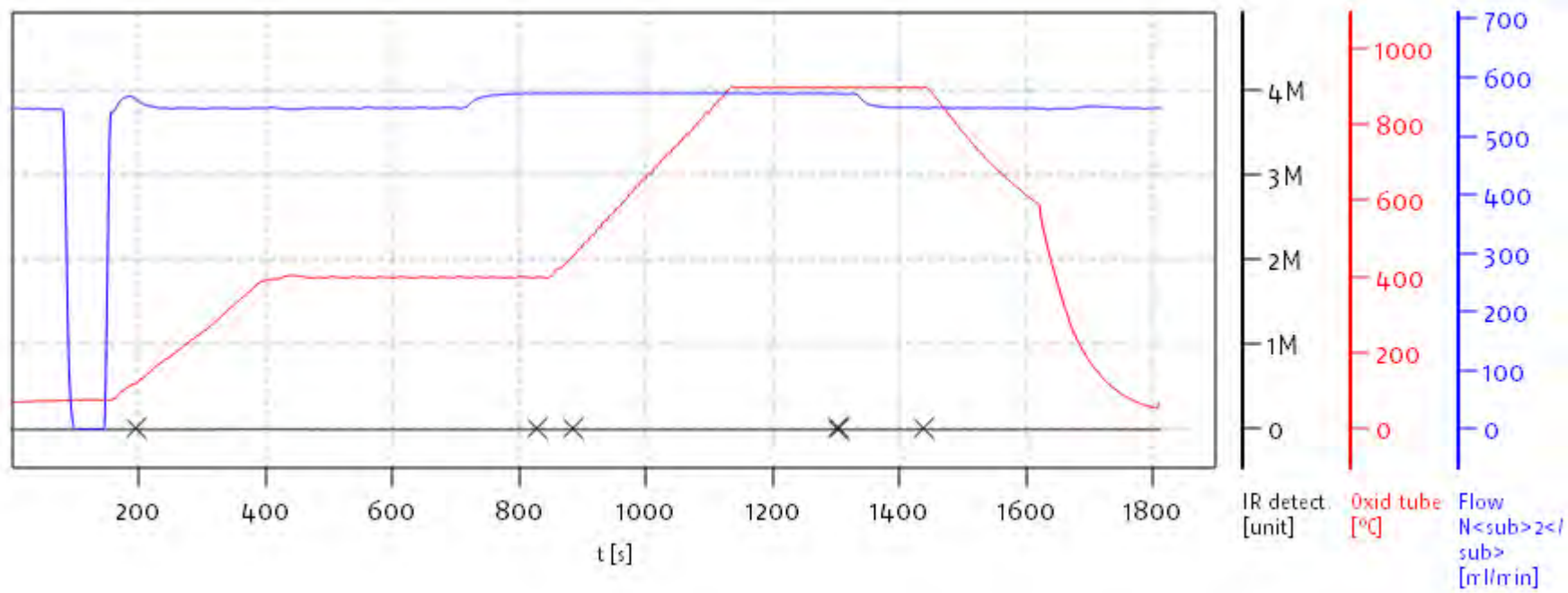
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elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
53	53	SLE0117-CCB4	502.50		CARBON	5/7/2023 5:05 PM	bl,C3u,C2u	0.000	13 138	0.000	0.000	1 211	32	0.000	0.000	0.9750	1.0000



Name:

Access: soliTOC superuser

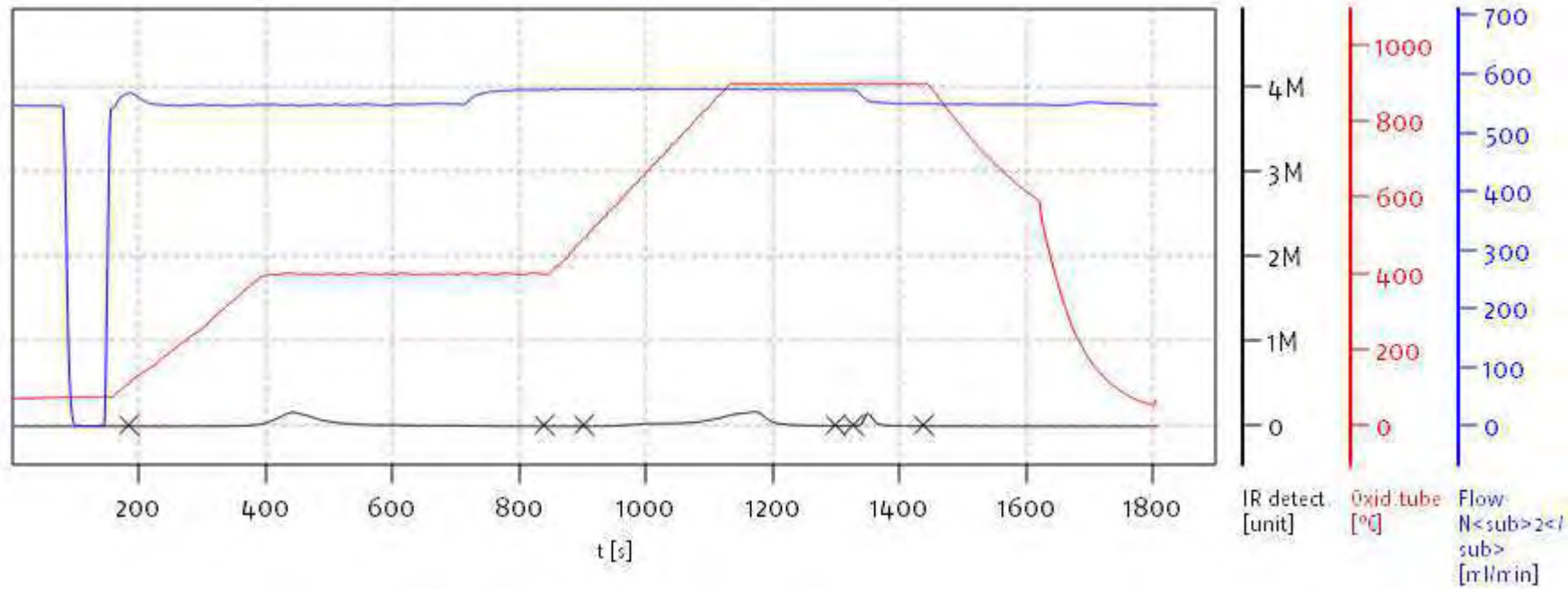
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
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elementar
EXCELLENCE IN ELEMENTS

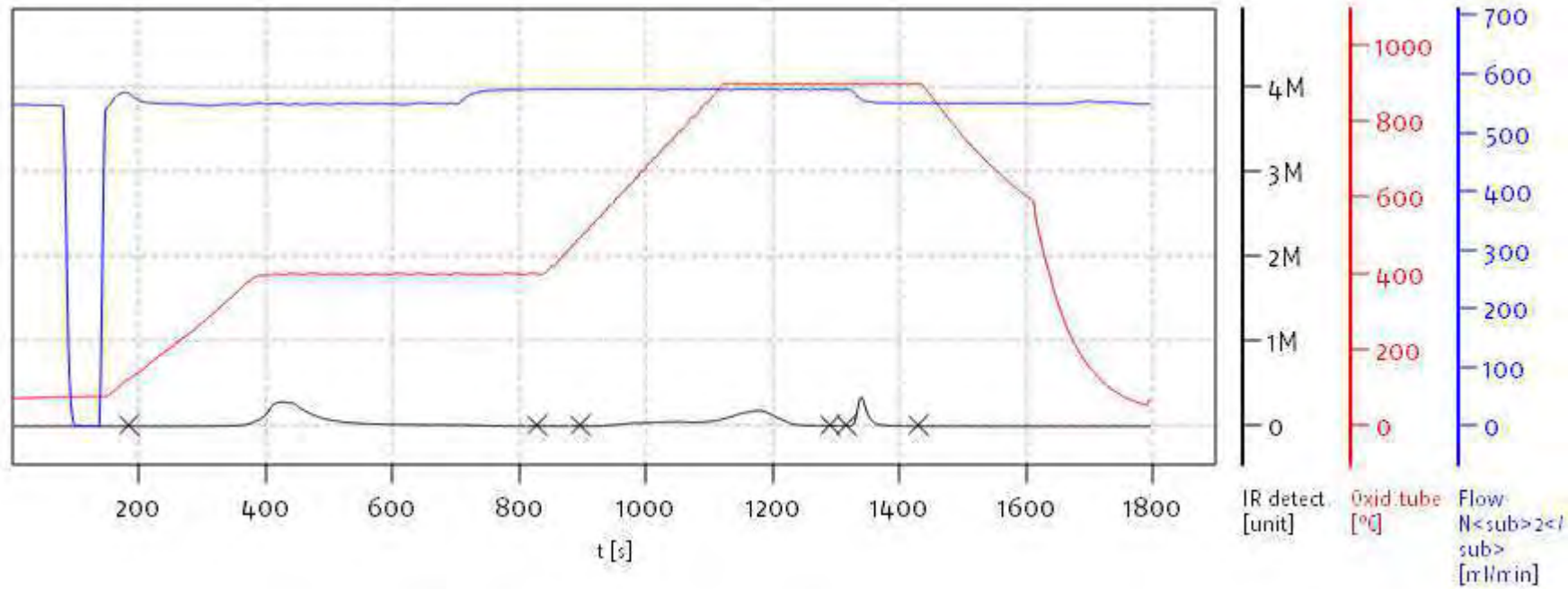
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
54	54	23E0152-09	311.90		CARBON	5/7/2023 5:35 PM	bl	0.320	597 497	0.669	0.044	114 774	728 690	0.276	0.348	0.9750	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
55	55	23E0152-10	528.40		CARBON	5/7/2023 6:06 PM	bl	0.369	1 096 750	0.618	0.064	243 528	875 143	0.306	0.249	0.9750	1.0000



Name:

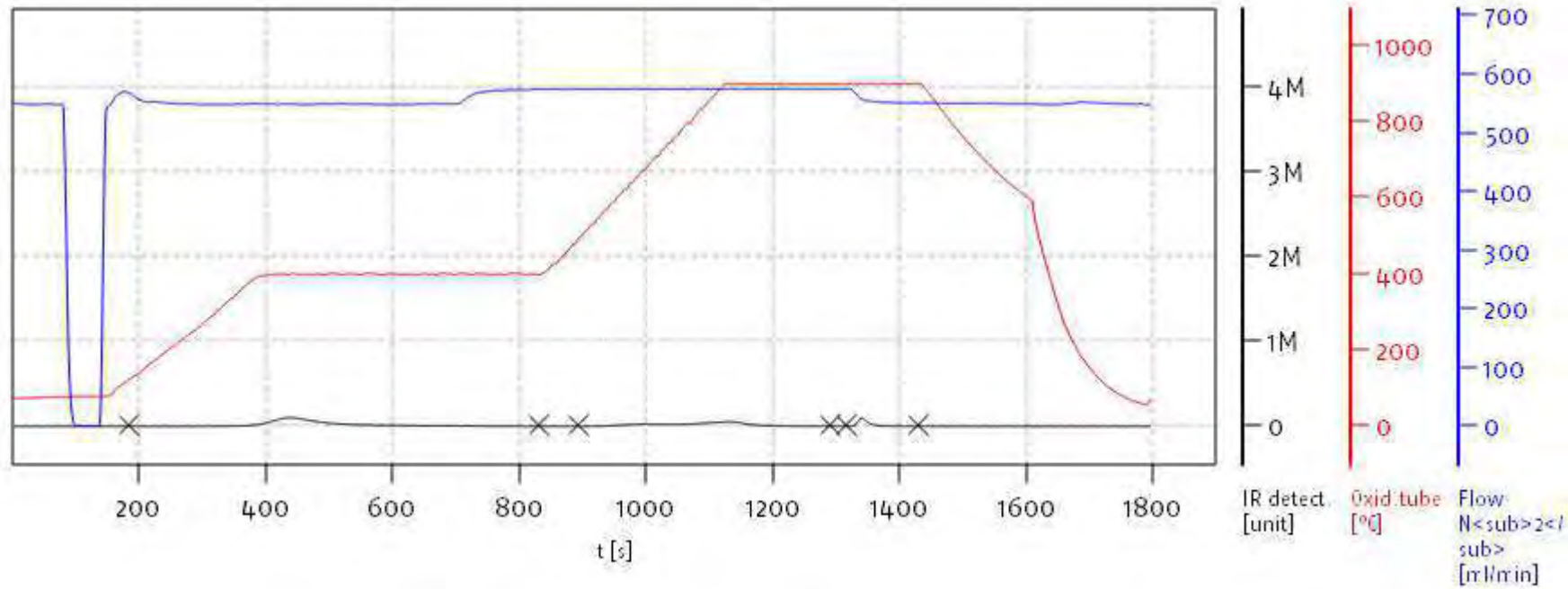
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
56	56	23E0152-11	474.20		CARBON	5/7/2023 6:36 PM	bl	0.142	423 766	0.224	0.015	73 714	277 093	0.126	0.082	0.9750	1.0000



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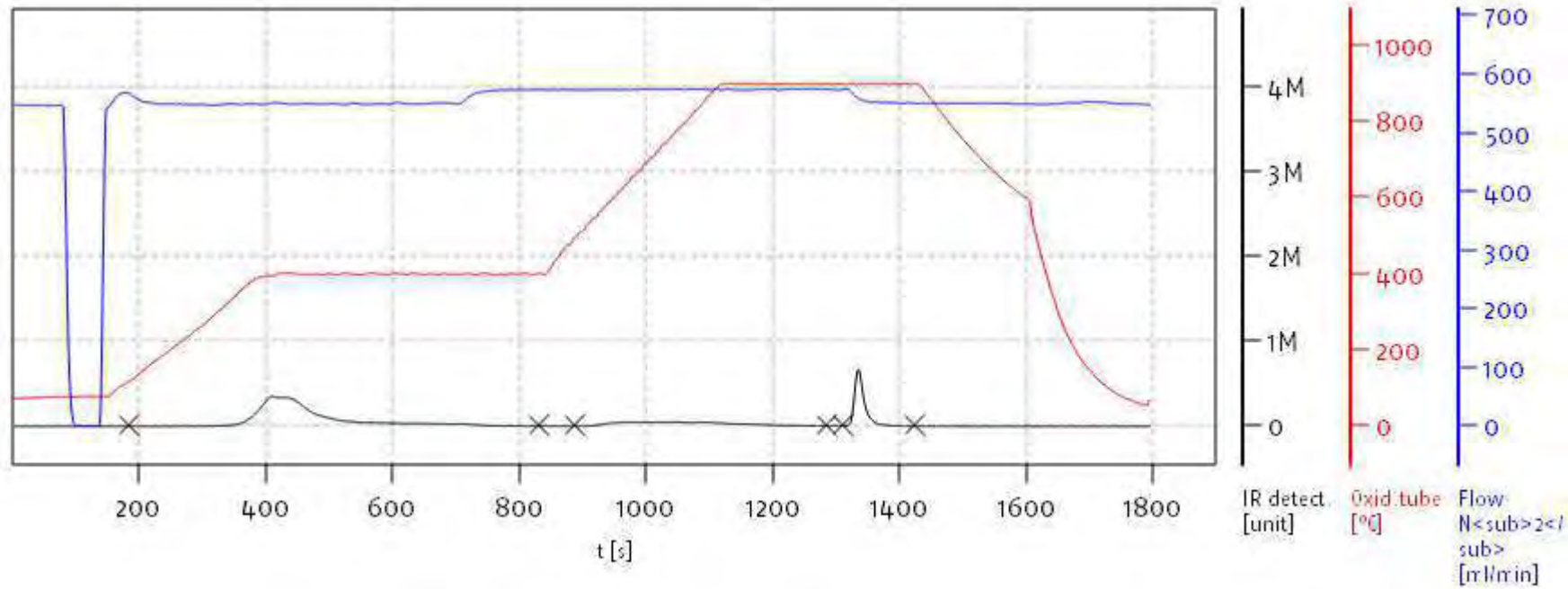
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
57	57	23E0152-12	544.80		CARBON	5/7/2023 7:06 PM	bl	0.548	1 561 810	0.667	0.123	459 114	443 760	0.425	0.119	0.9750	1.0000



Name:

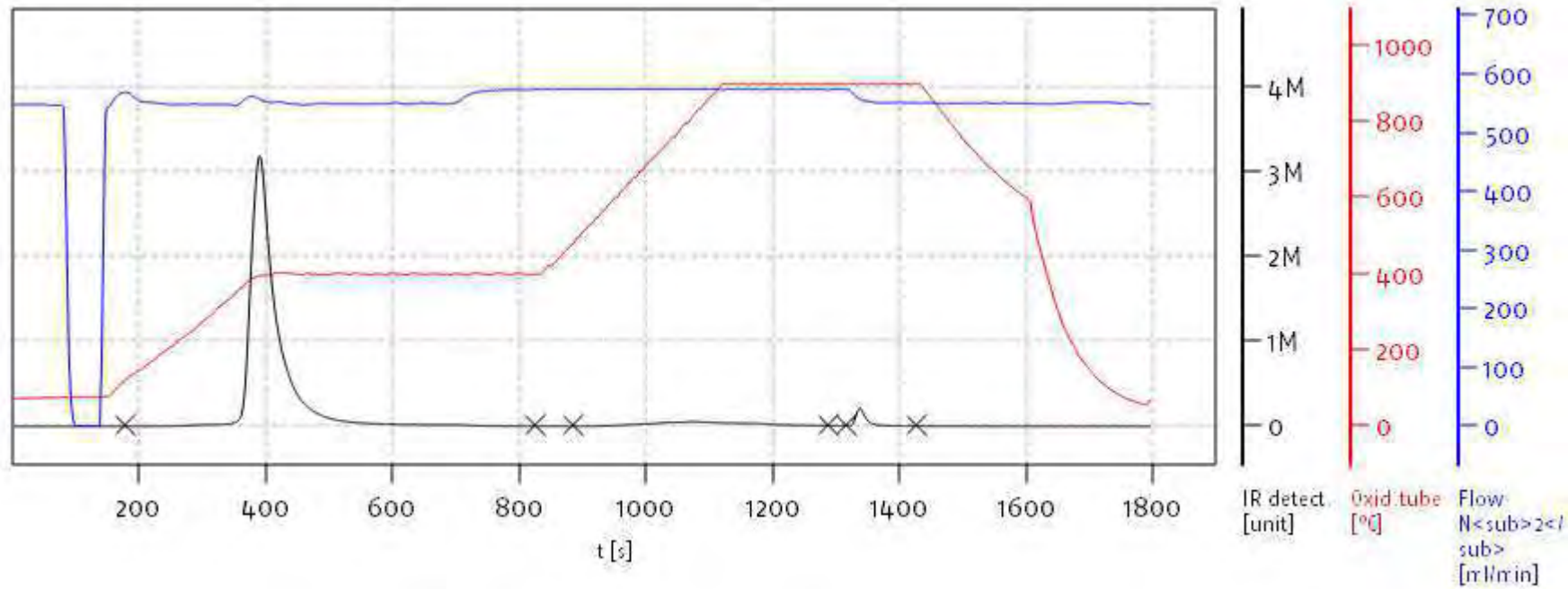
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
58	58	23E0152-13	509.80		CARBON	5/7/2023 7:37 PM	bl	1.712	5 668 710	1.824	0.041	162 027	398 133	1.670	0.113	0.9750	1.0000



Name:

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Date: Tue May 9 14:33:55 2023

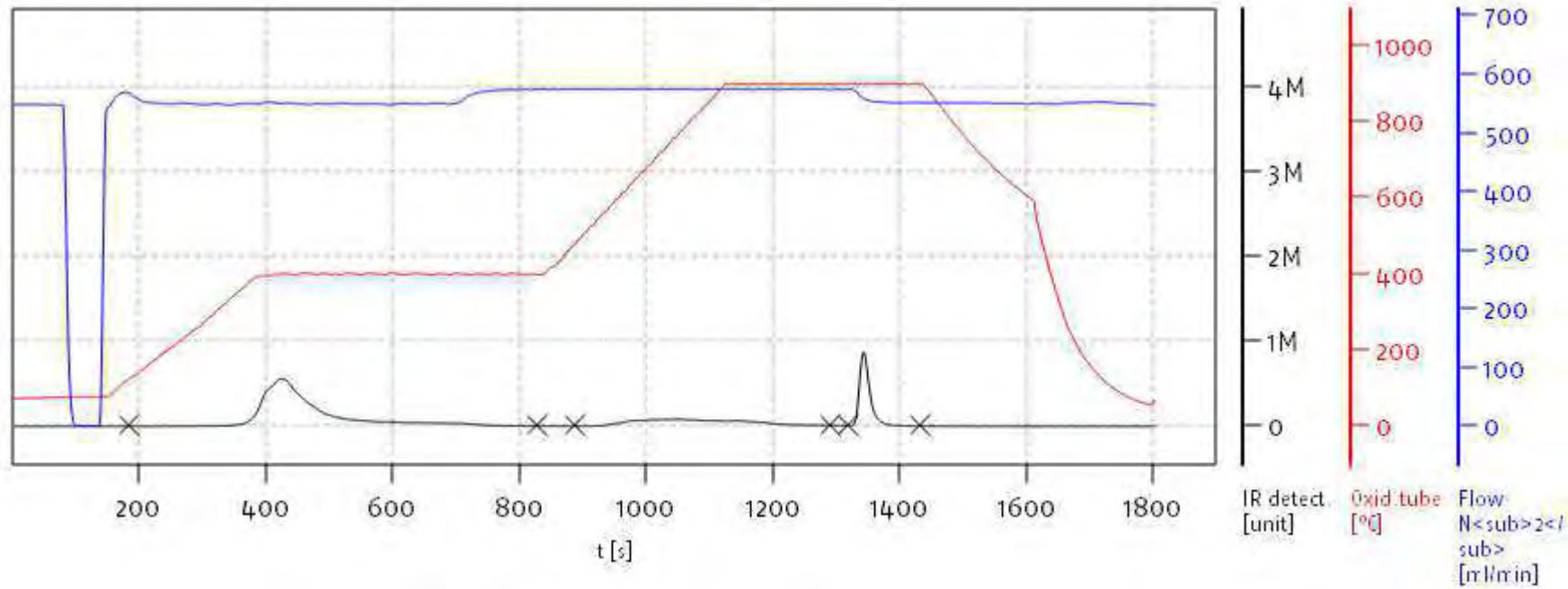
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
59	59	23E0152-14	557.80		CARBON	5/7/2023 8:07 PM	bl	0.738	2 127 070	0.924	0.170	637 583	696 921	0.568	0.186	0.9750	1.0000



Name:

Access: soliTOC superuser

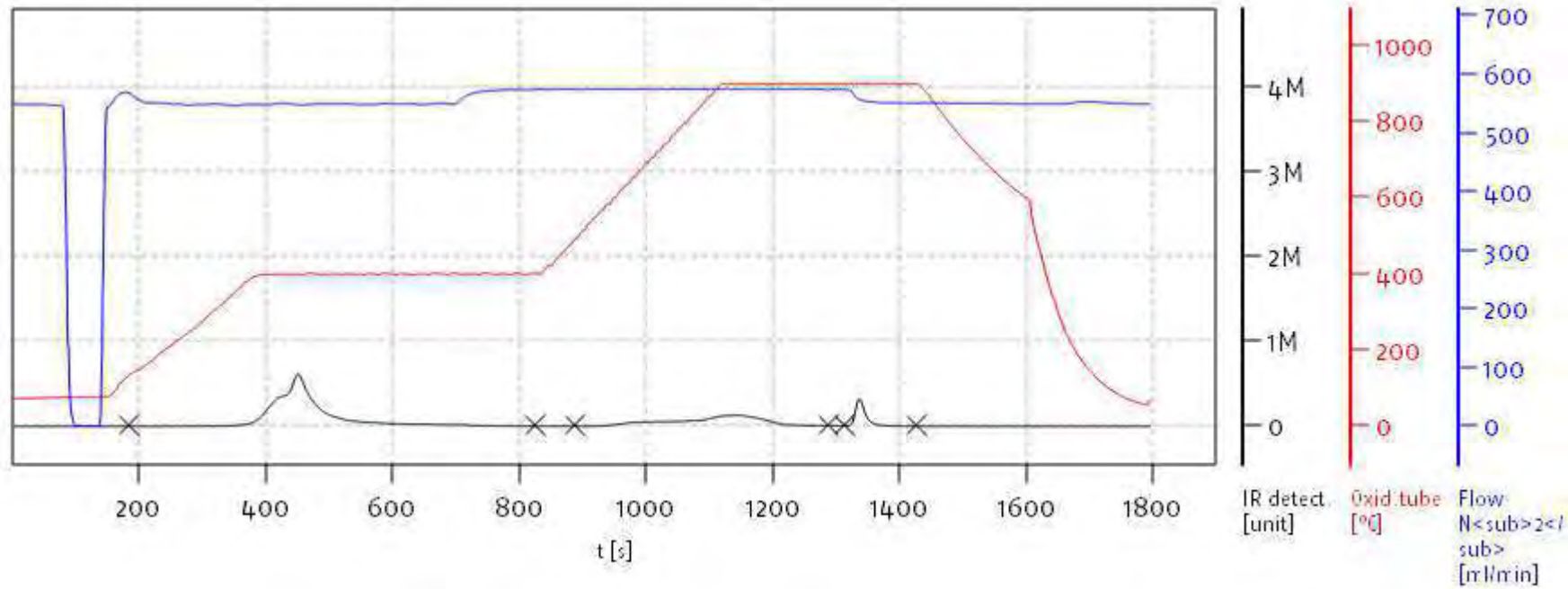
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elementar
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
60	60	23E0152-15	578.60		CARBON	5/7/2023 8:38 PM	bl	0.510	1 770 670	0.709	0.055	231 354	773 011	0.455	0.200	0.9750	1.0000



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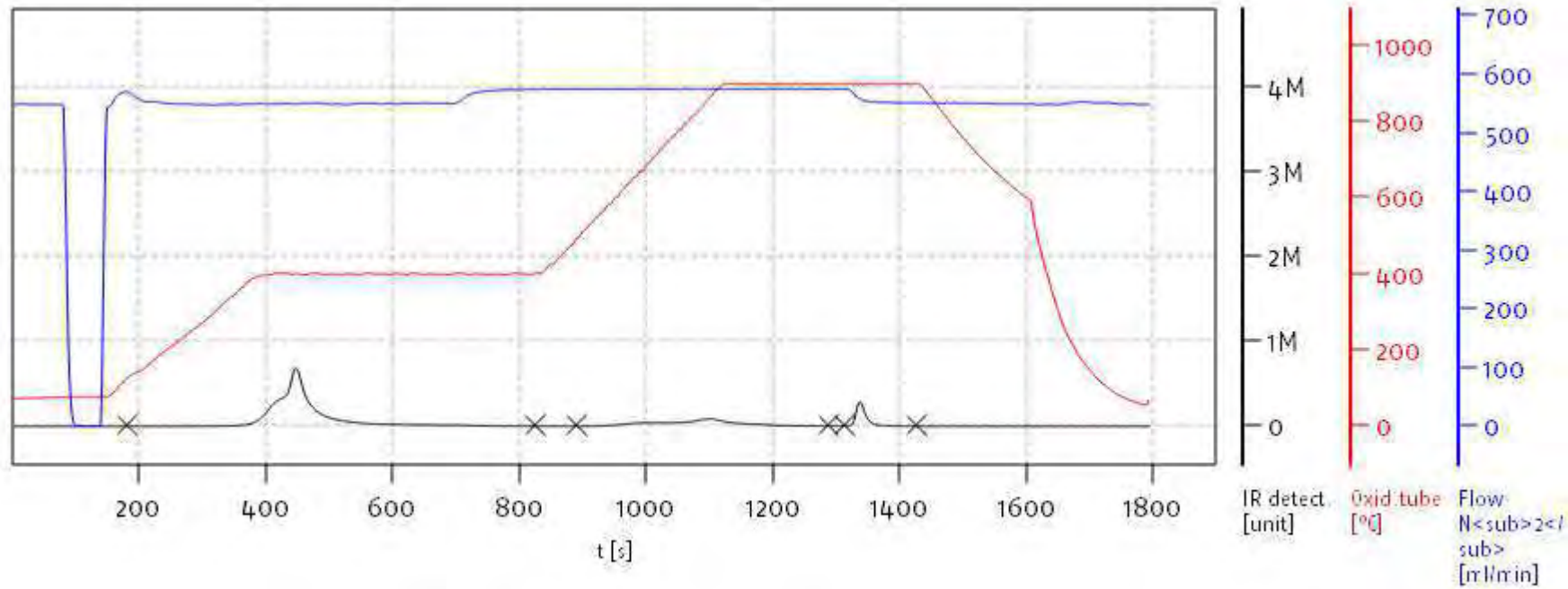
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
61	61	23E0152-16	461.80		CARBON	5/7/2023 9:08 PM	bl	0.565	1 574 710	0.706	0.059	202 770	447 305	0.506	0.141	0.9750	1.0000



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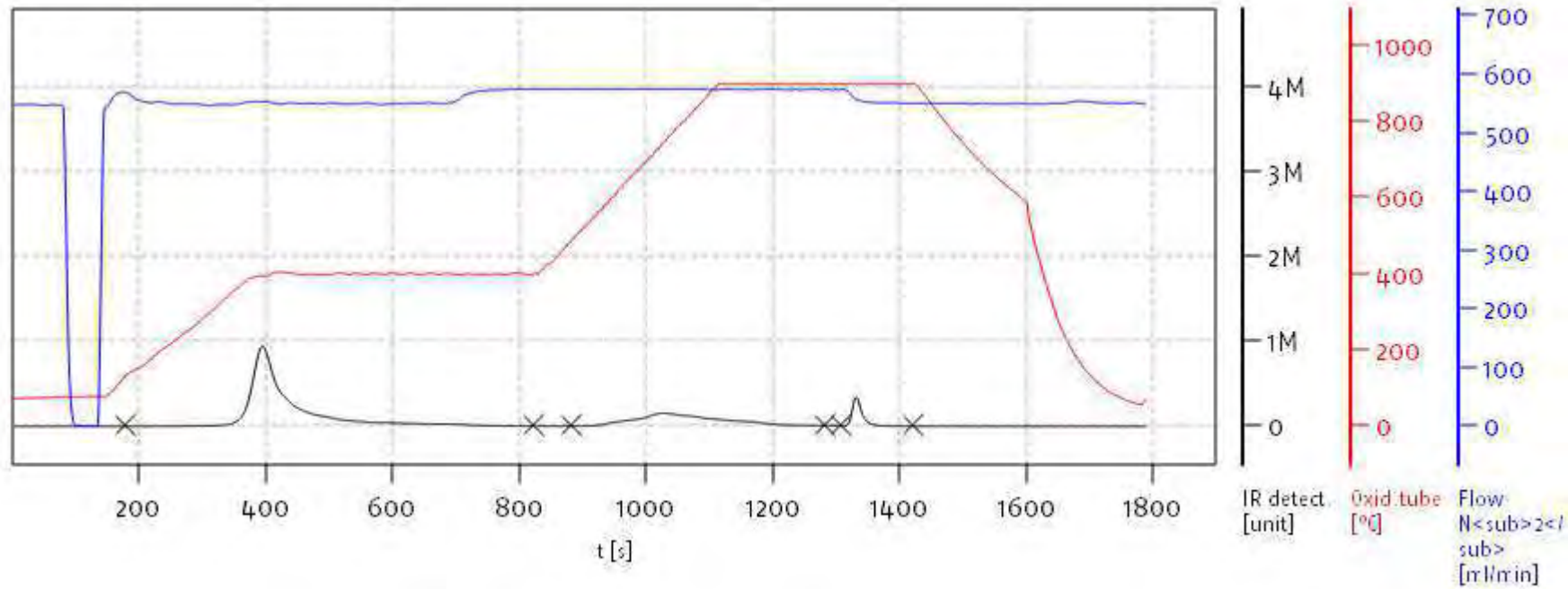
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elementar
EXCELLENCE IN ELEMENTS

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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
62	62	23E0156-01	561.80		CARBON	5/7/2023 9:38 PM	bl	0.694	2 390 790	0.942	0.059	239 481	925 976	0.635	0.248	0.9750	1.0000



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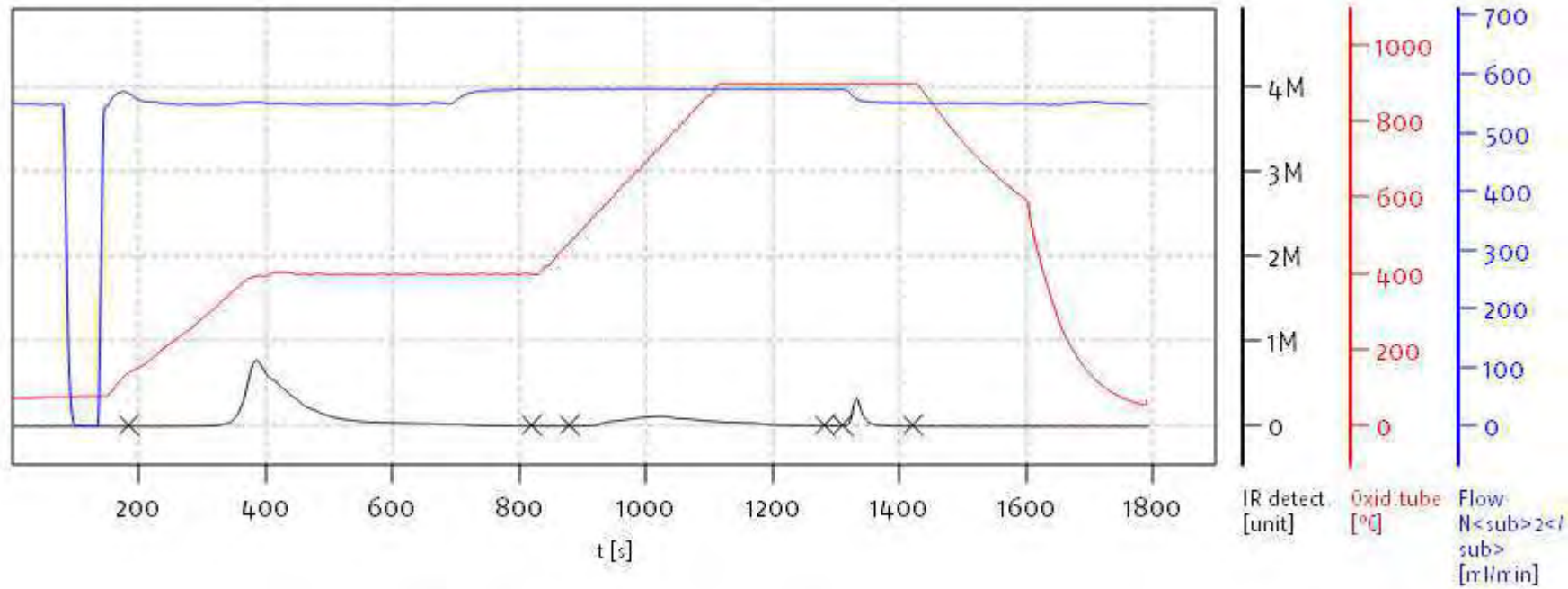
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
63	63	23E0156-02	594.40		CARBON	5/7/2023 10:08 PM	bl	0.721	2 652 250	0.914	0.054	234 598	768 791	0.667	0.193	0.9750	1.0000



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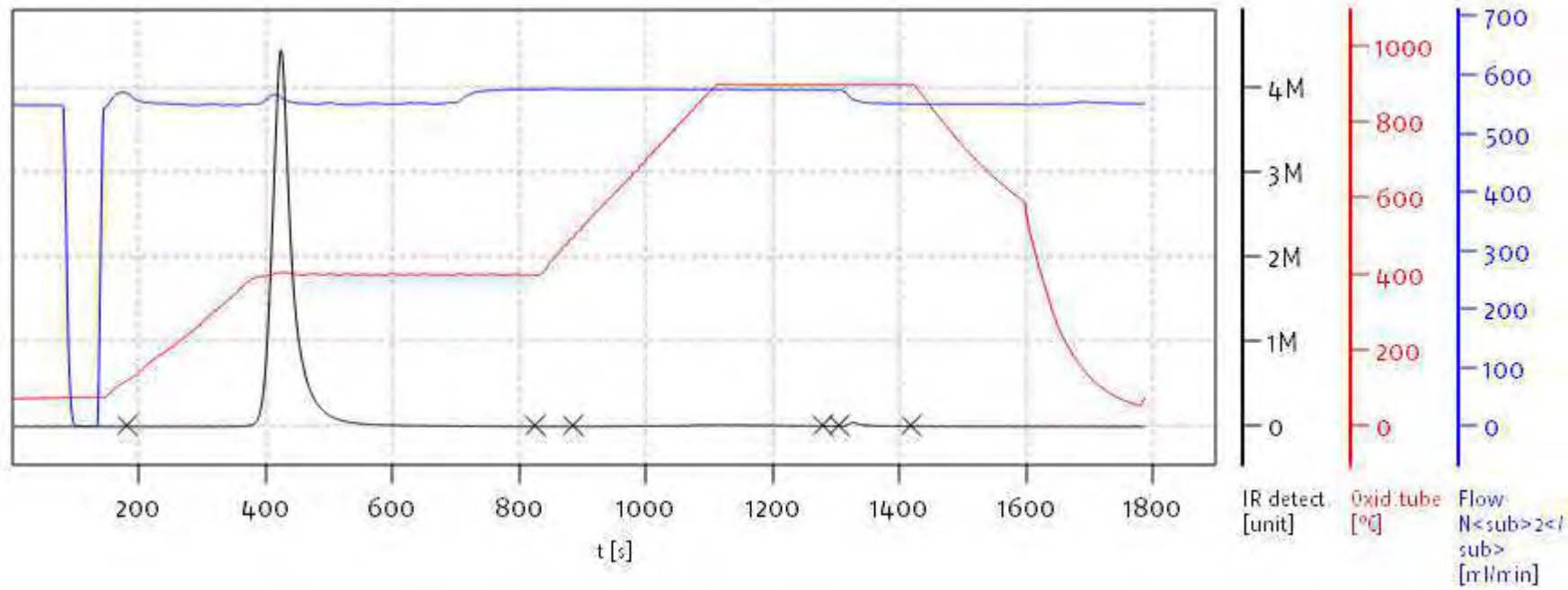
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
64	64	SLE0117-CCV5	21.80		CARBON	5/7/2023 10:38 PM	bl	43.547	6 283 530	44.394	0.228	58 573	145 749	43.320	0.847	0.9750	1.0000



Name:

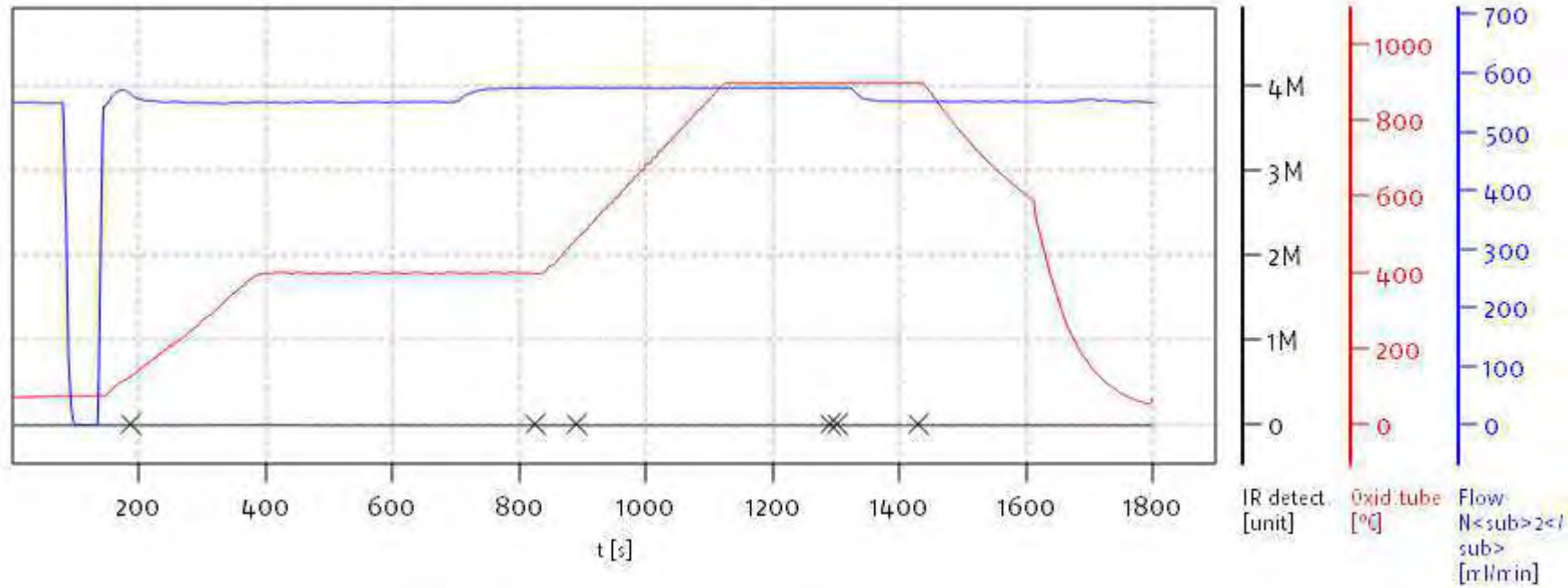
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Serial No: 0300.181017
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
65	65	SLE0117-CCB5	557.50		CARBON	5/7/2023 11:09 PM	bl,C3u,C2u	0.000	10 898	0.000	0.000	555	18	0.000	0.000	0.9750	1.0000



Name:

Access: soliTOC superuser

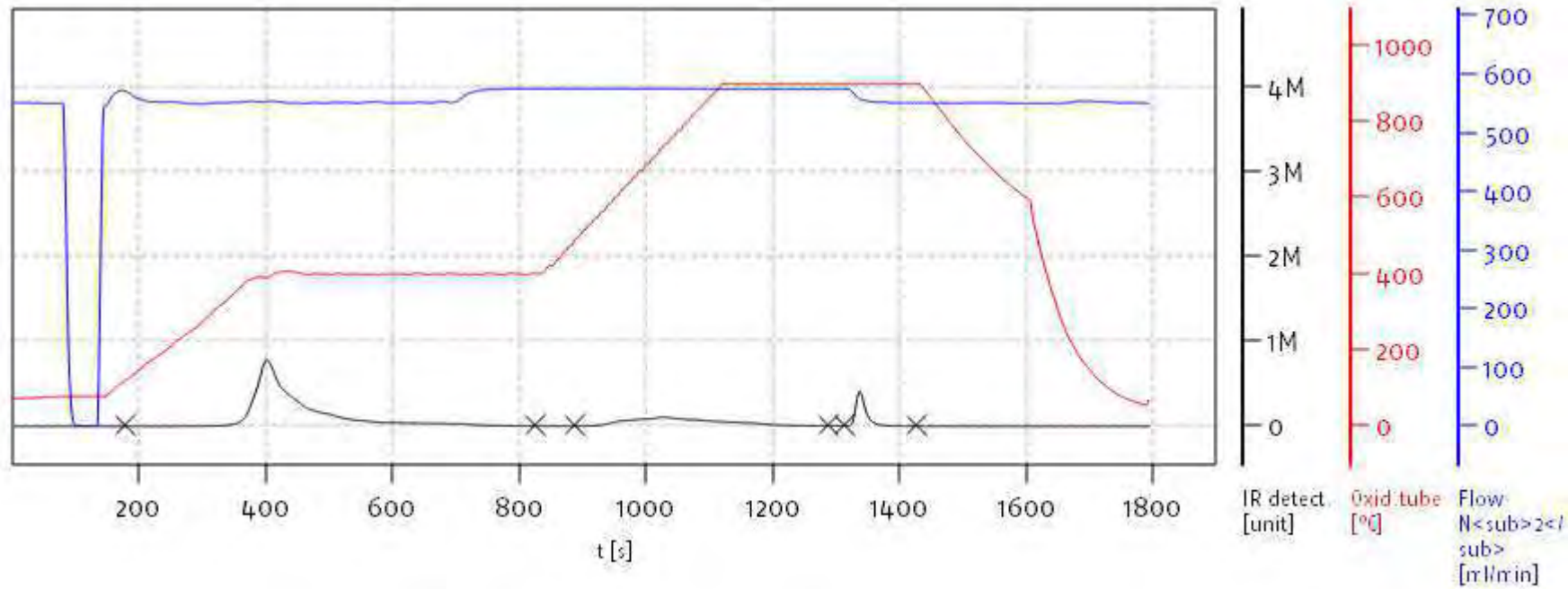
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
66	66	23E0156-03	515.90		CARBON	5/7/2023 11:39 PM	bl	0.762	2 359 810	0.960	0.079	290 105	687 602	0.683	0.198	0.9750	1.0000



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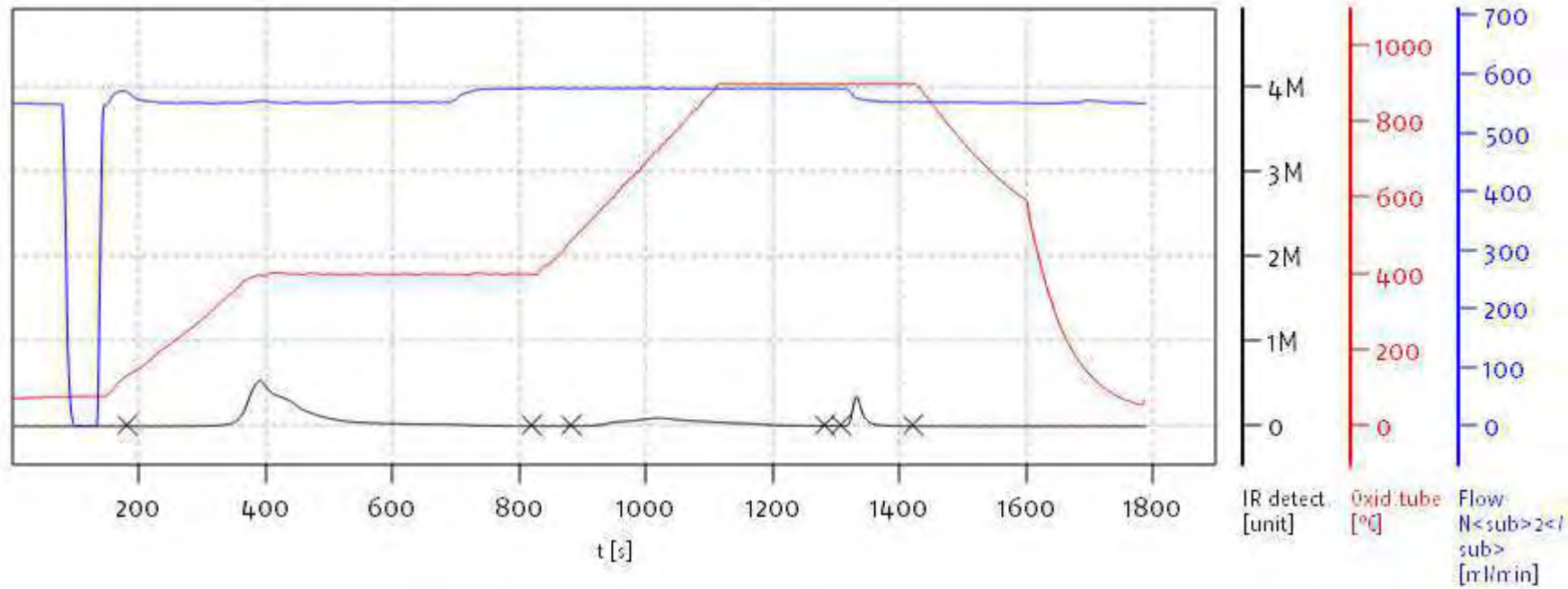
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
67	67	23E0156-04	529.20		CARBON	5/8/2023 12:09 AM	bl	0.599	1 898 900	0.770	0.065	250 346	610 345	0.534	0.171	0.9750	1.0000



Name:

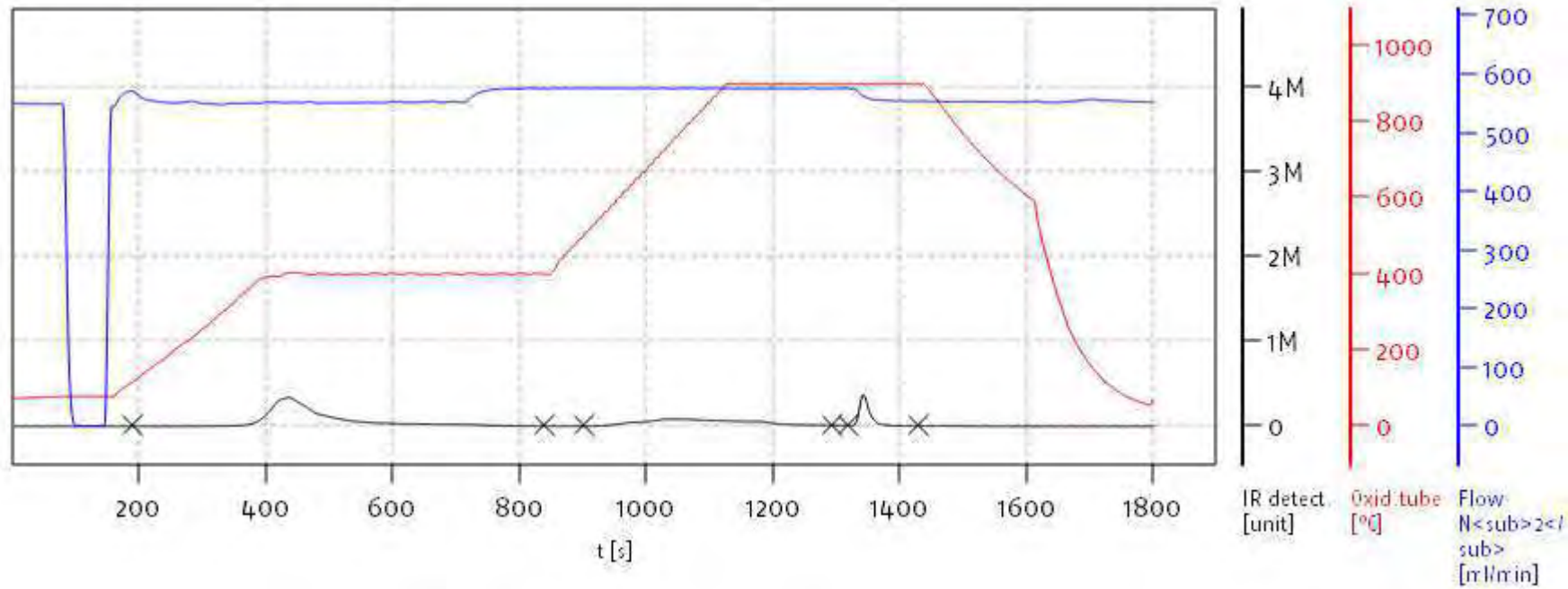
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Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
68	68	23E0156-05	587.40		CARBON	5/8/2023 12:40 AM	bl	0.402	1 335 240	0.572	0.066	276 098	671 509	0.336	0.170	0.9750	1.0000



Name:

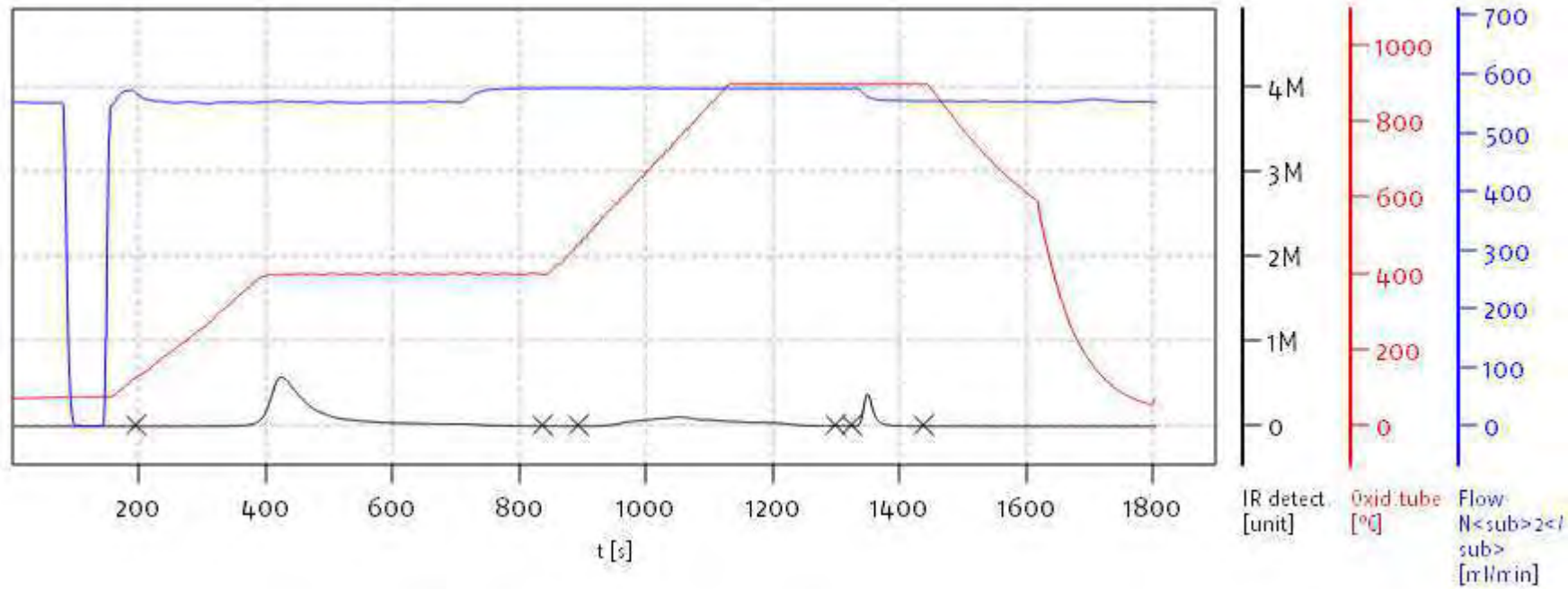
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
69	69	23E0156-06	591.80		CARBON	5/8/2023 1:10 AM	bl	0.515	1 801 930	0.698	0.062	264 380	725 340	0.453	0.183	0.9750	1.0000



Name:

Access: soliTOC superuser

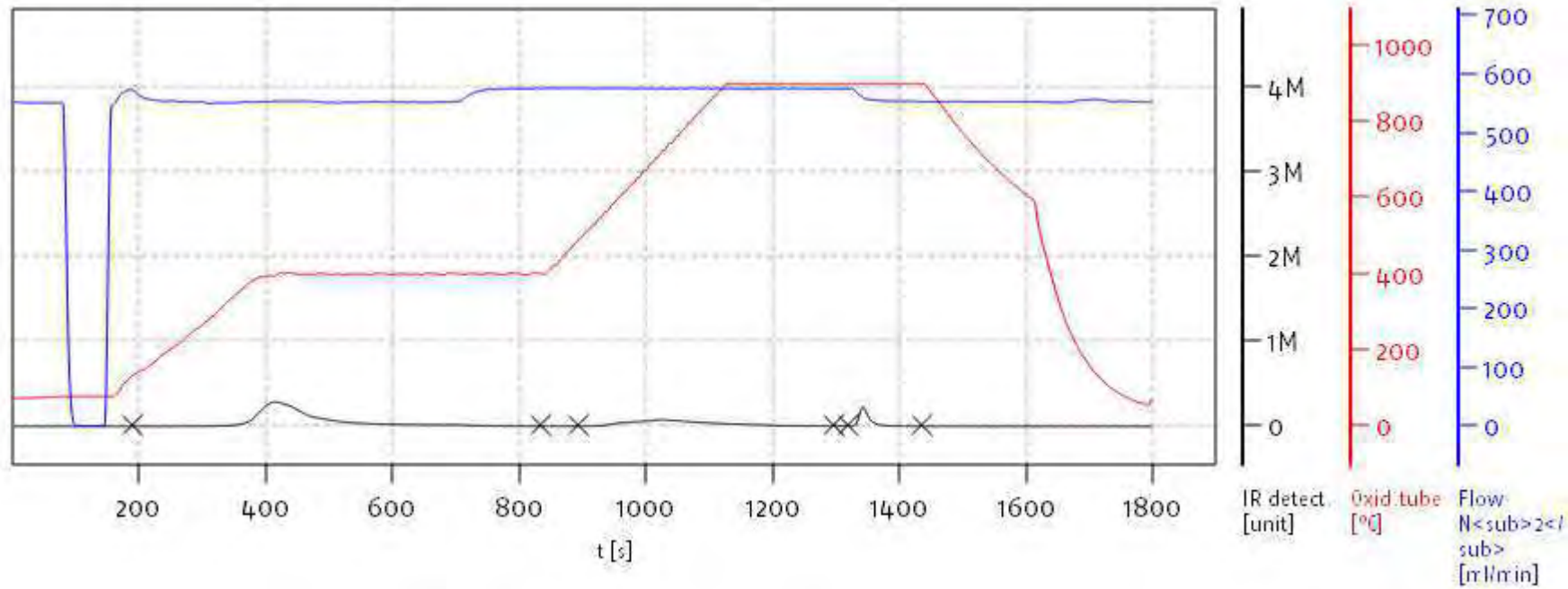
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
70	70	23E0156-07	626.70		CARBON	5/8/2023 1:41 AM	bl	0.303	1 147 840	0.409	0.033	159 116	458 289	0.270	0.107	0.9750	1.0000



Name:

Access: soliTOC superuser

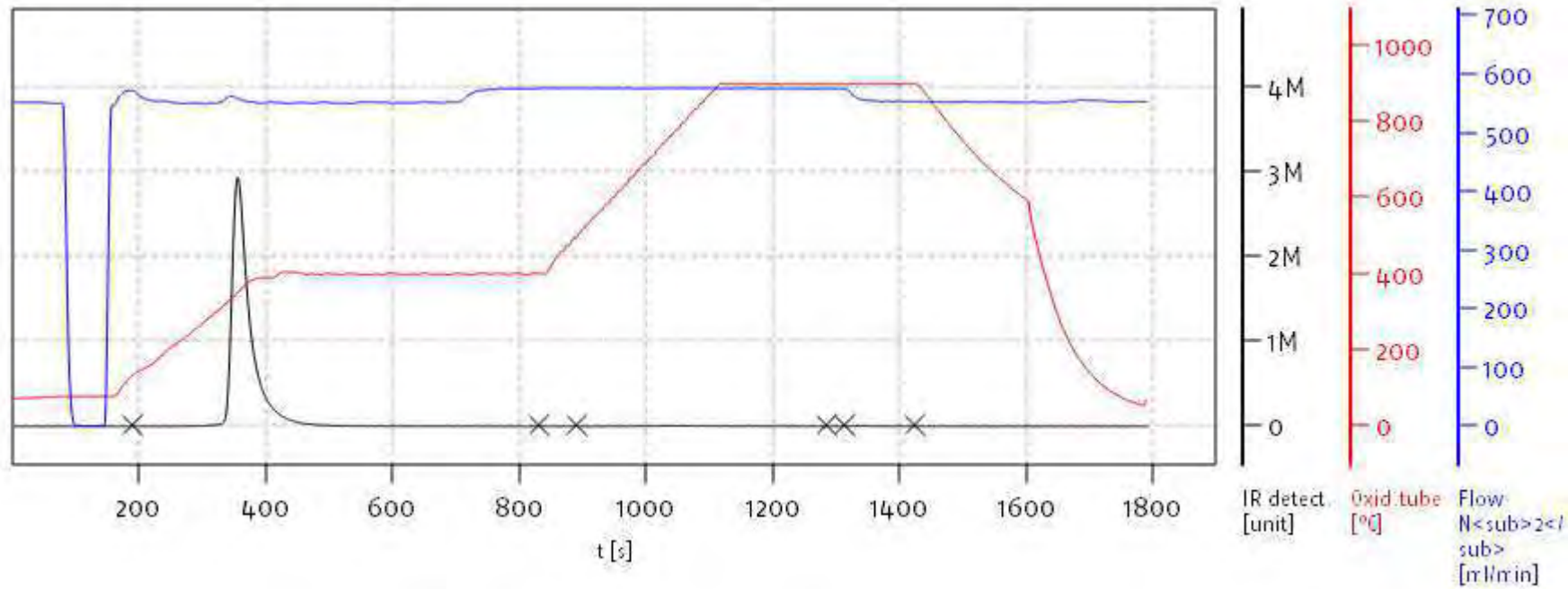
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
71	71	23C0164-01	91.50		CARBON	5/8/2023 2:11 AM	bl	5.982	3 653 180	5.999	0.000	9 575	36 592	5.982	0.017	0.9750	1.0000



Name:

Access: soliTOC superuser

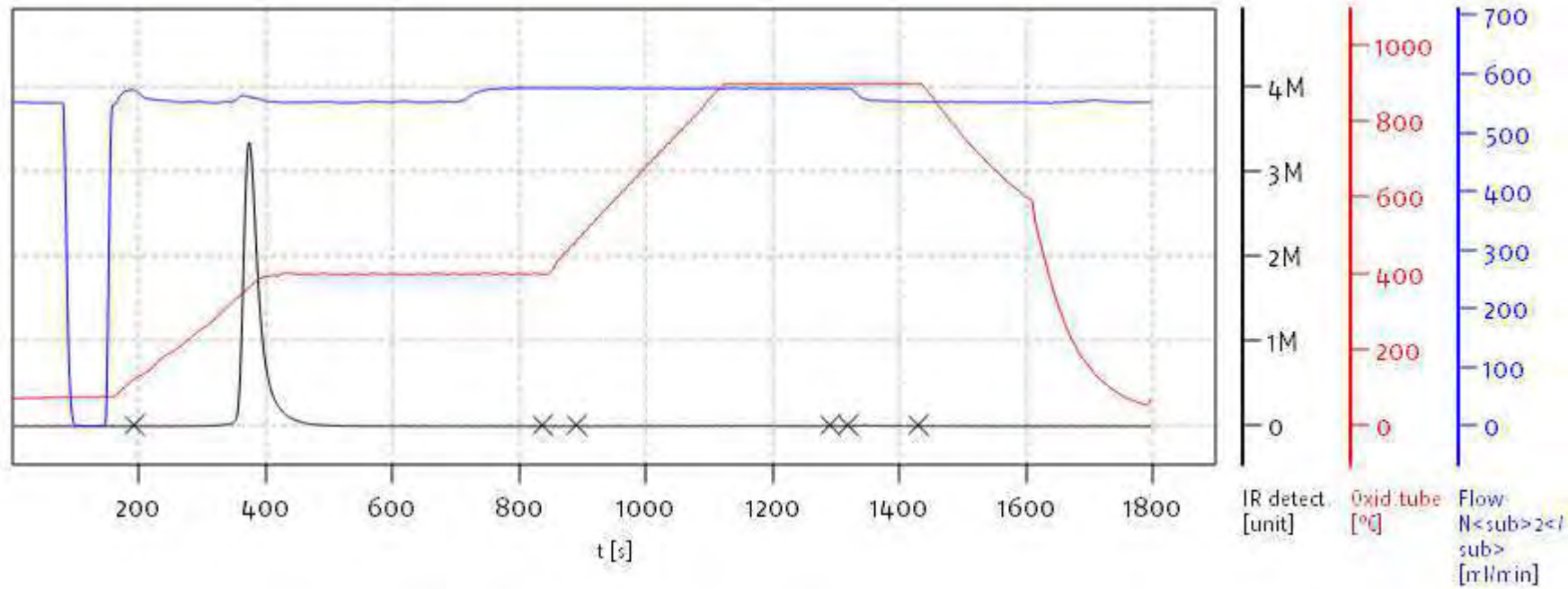
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
72	72	23C0164-02	135.50		CARBON	5/8/2023 2:41 AM	bl	4.151	3 752 700	4.153	0.000	17 691	28 703	4.151	0.002	0.9750	1.0000



Name:

Access: soliTOC superuser

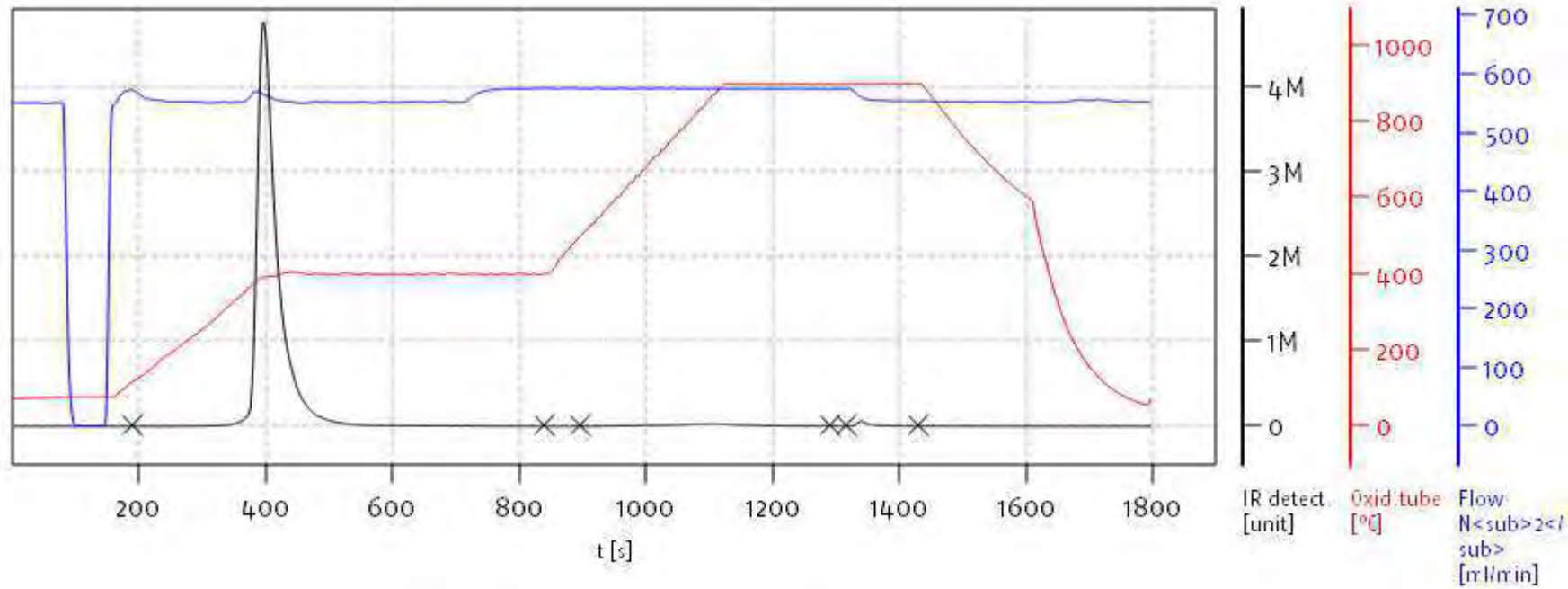
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elementar
EXCELLENCE IN ELEMENTS

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
73	73	23C0673-01	228.00		CARBON	5/8/2023 3:12 AM	bl	4.391	6 625 970	4.493	0.022	58 727	177 663	4.369	0.103	0.9750	1.0000



Name:

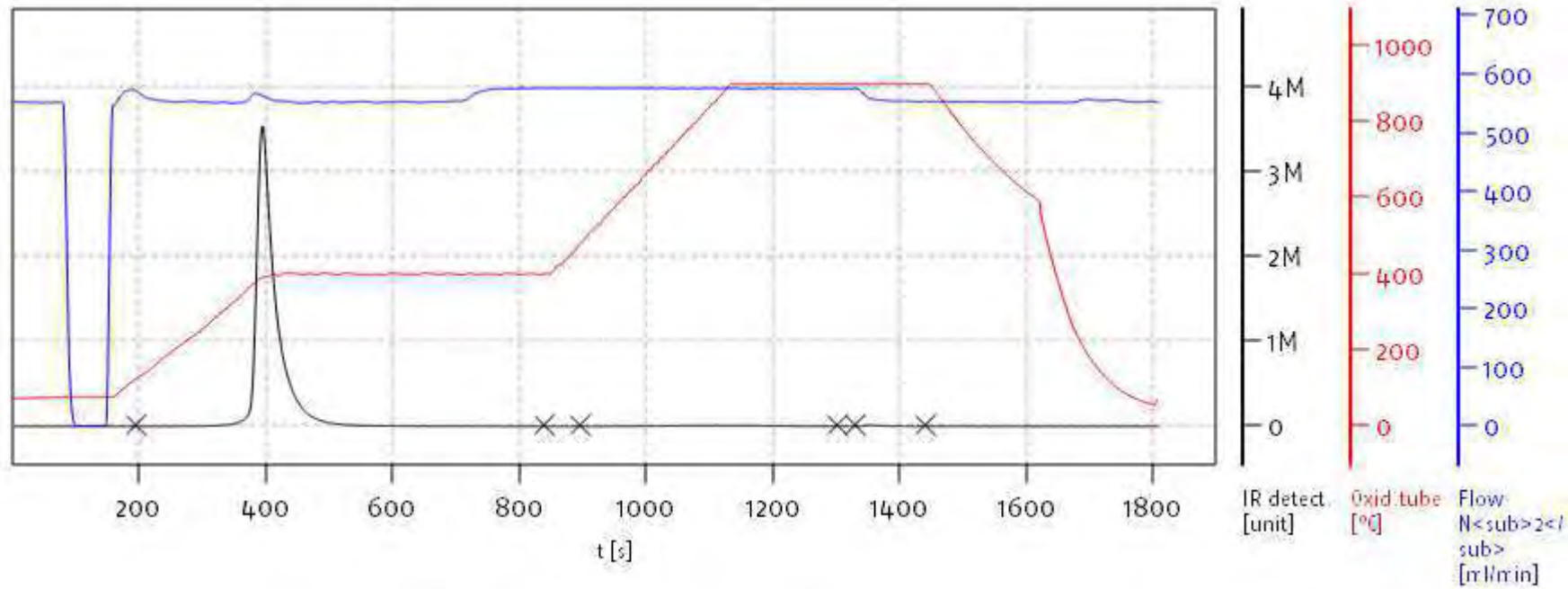
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
74	74	23C0673-02	156.50		CARBON	5/8/2023 3:42 AM	bl	4.428	4 617 720	4.474	0.000	18 796	73 169	4.428	0.046	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

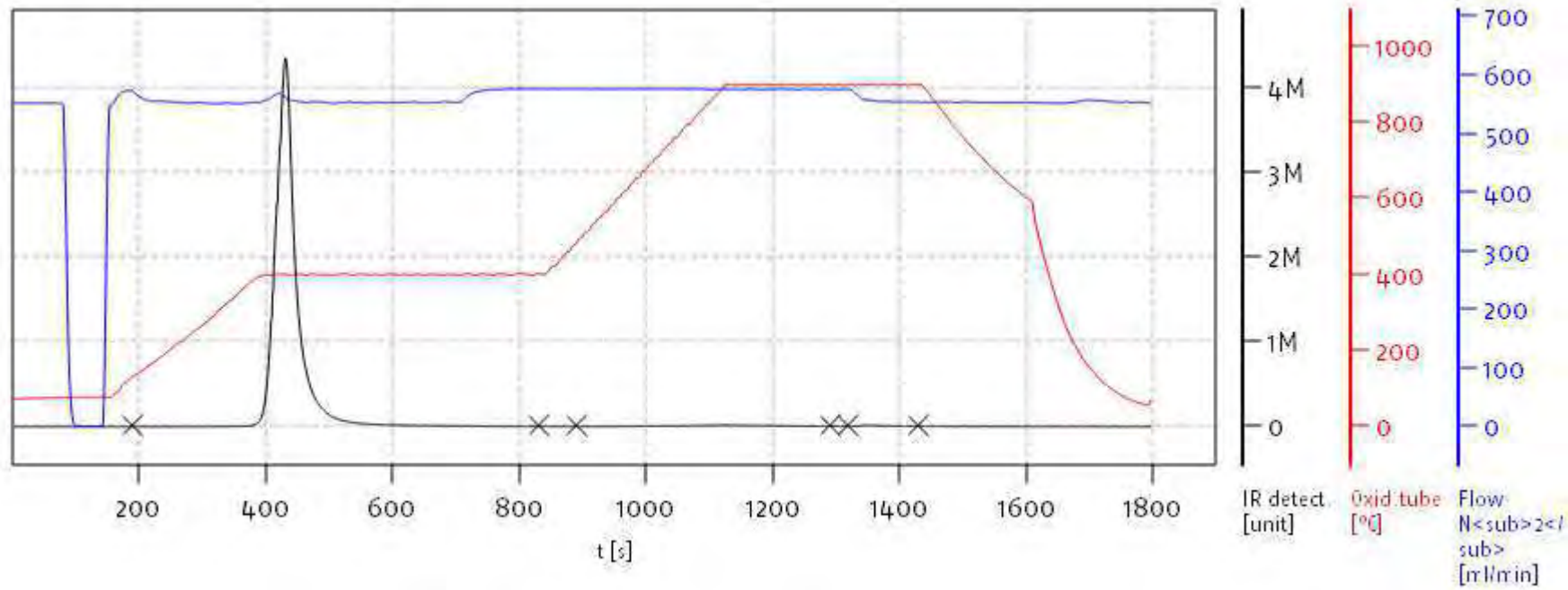
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Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
75	75	SLE0117-CCV6	21.20		CARBON	5/8/2023 4:13 AM	bl	43.463	6 122 490	44.164	0.064	35 240	122 595	43.399	0.701	0.9750	1.0000



Name:

Access: soliTOC superuser

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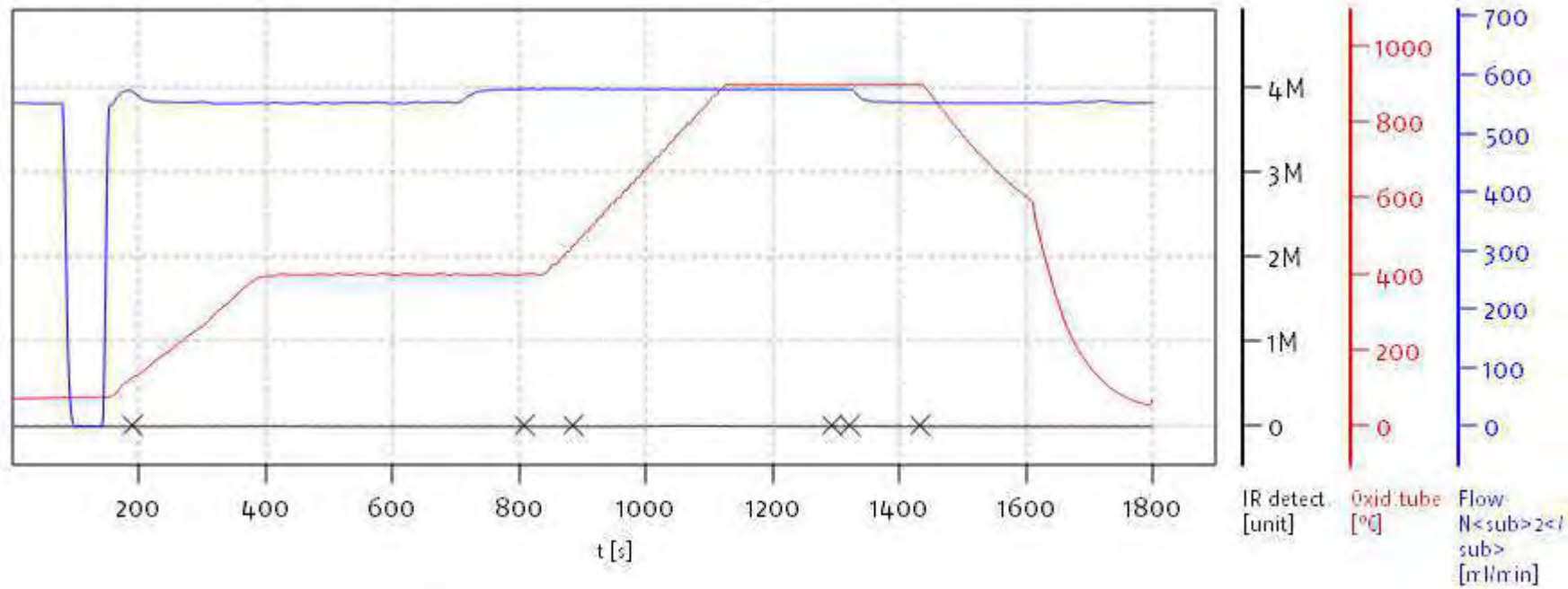
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
76	76	SLE0117-CCB6	533.90		CARBON	5/8/2023 4:43 AM	bl	0.000	16 528	0.005	0.000	8 189	44 397	0.000	0.005	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 050623 CDE from: 5/9/2023 12:50 PM

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Inorganic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
% Soot	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Inorganic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
% Soot	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Inorganic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
% Soot	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882

Analytical Resources, LLC
Analytical Chemists and Consultants

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0152
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Calibration:	FD00070	Instrument:	TOC Cube
Calibration Date:	04/26/2022 11:29		

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Inorganic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
% Soot	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408

INITIAL CALIBRATION DATA

EPA 9060A m

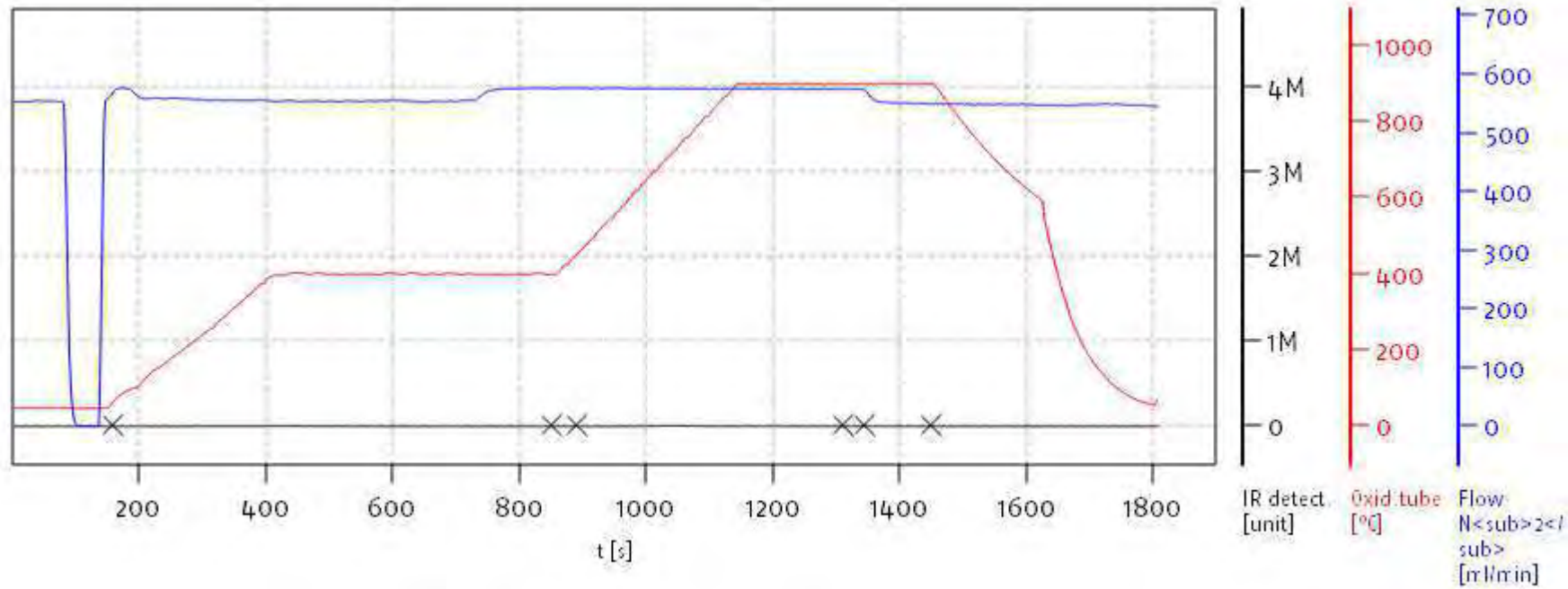
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Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Calibration:	FD00070	Instrument:	TOC Cube
Calibration Date:	04/26/2022 11:29		

COMPOUND	Mean RF	RF RSD	Linear COD	Quad COD	COD Limit	Q
Total Organic Carbon	1424064	15.9	0.9988			
Total Carbon	1424064	15.9	0.9988			
Total Inorganic Carbon	1424064	15.9	0.9988			
% Soot	1424064	15.9	0.9988			

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		1.00	CARBON	4/26/2022 11:29 AM	0.000	0.000	0.000	bl	29 049	30 612	3 899	1.0000	1.0000



Name:

Access: soliTOC superuser

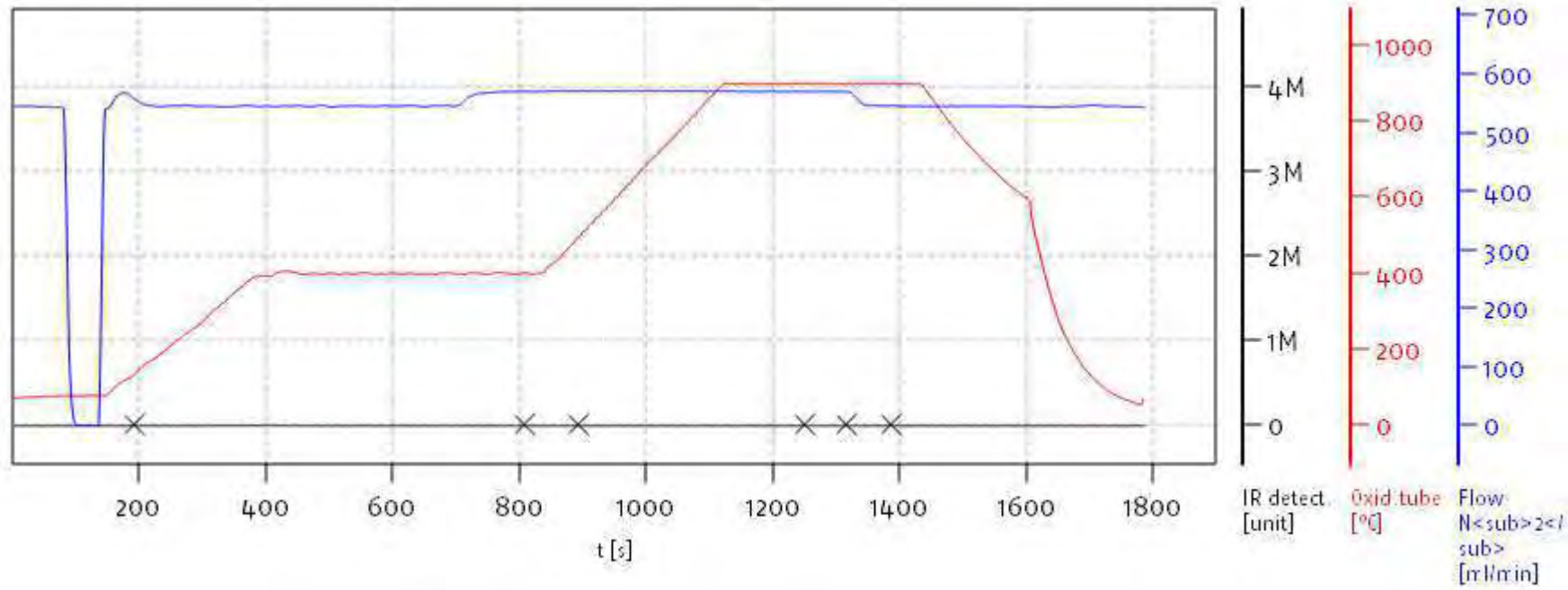
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elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
2	2	BLANK	1.00		1.00	CARBON	4/26/2022 12:00 PM	0.000	0.000	0.000	bl	11 115	60	8	1.0000	1.0000



Name:

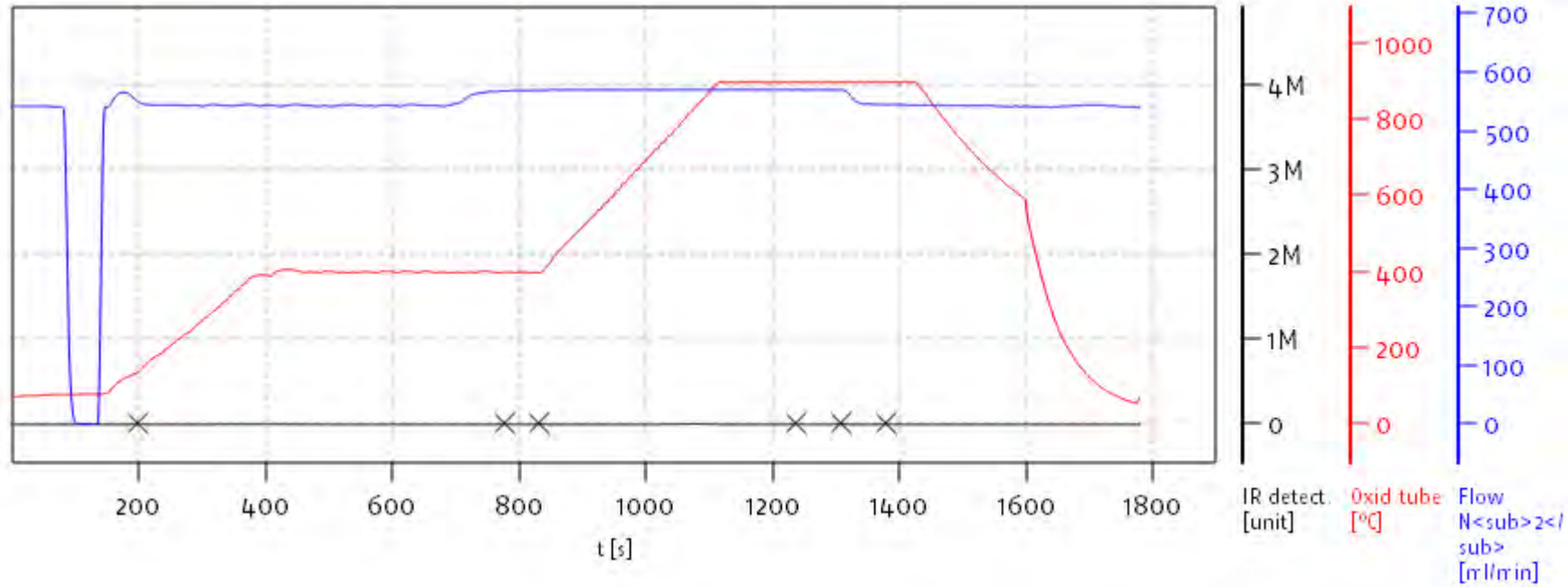
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
3	3	SEQ-CAL1	200.00	0.0027	1.00	CARBON	4/26/2022 12:30 PM	0.010	0.008	0.018	bl,C1u,C2u	7 294	11 739	22	1.0000	0.7425



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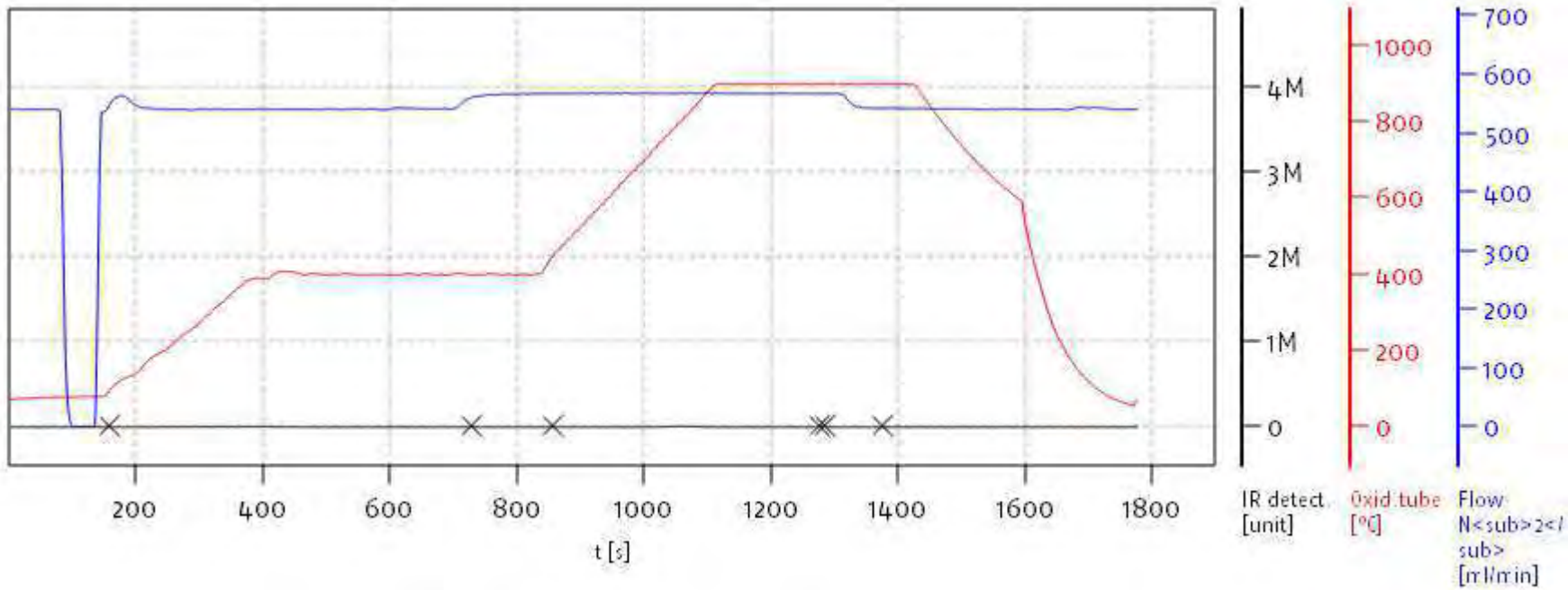
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
4	4	SEQ-CAL2	200.00	0.0049	1.00	CARBON	4/26/2022 1:00 PM	0.023	0.015	0.038	bl,C2u	23 296	19 107	47	1.0000	0.8936



Name:

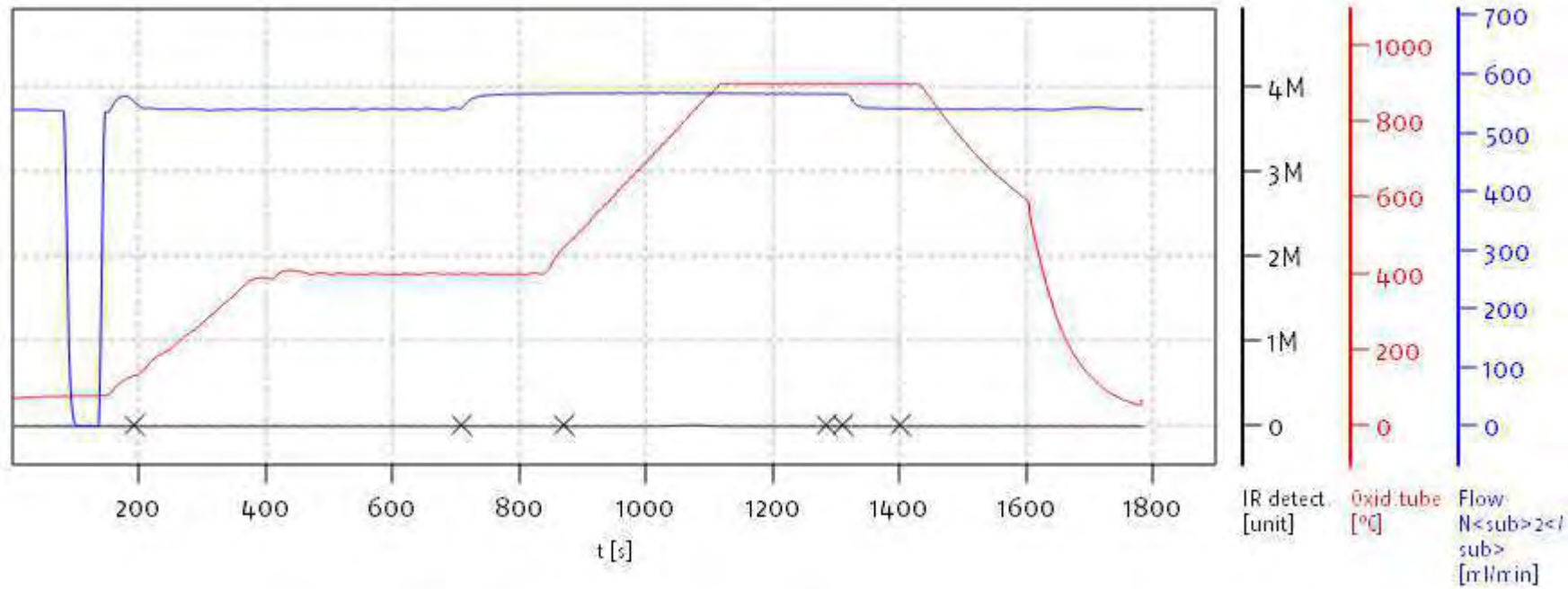
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
5	5	SEQ-CAL3	200.00	0.0071	1.00	CARBON	4/26/2022 1:30 PM	0.006	0.022	0.028	bl,C1u,C2u	2 319	27 530	170	1.0000	0.9343



Name:

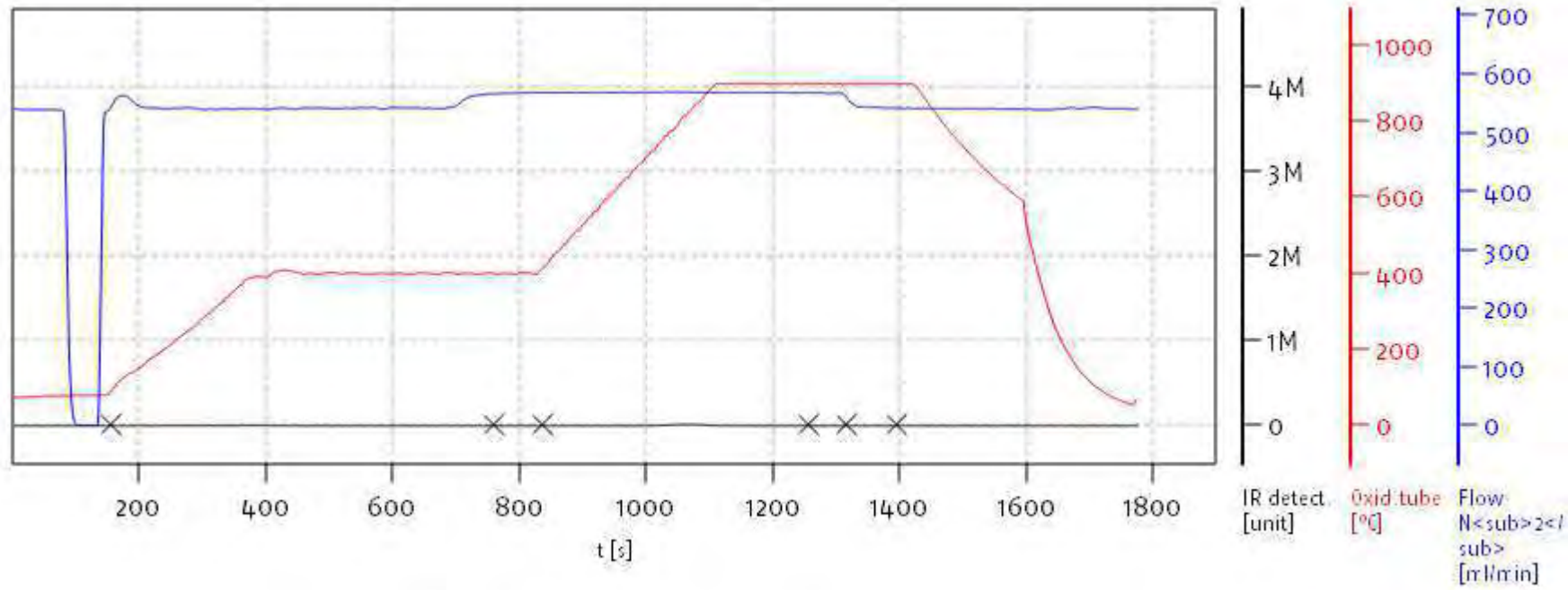
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
6	6	SEQ-CAL4	200.00	0.0098	1.00	CARBON	4/26/2022 2:00 PM	0.020	0.030	0.050	bl,C2u	19 746	38 017	109	1.0000	0.9461



Name:

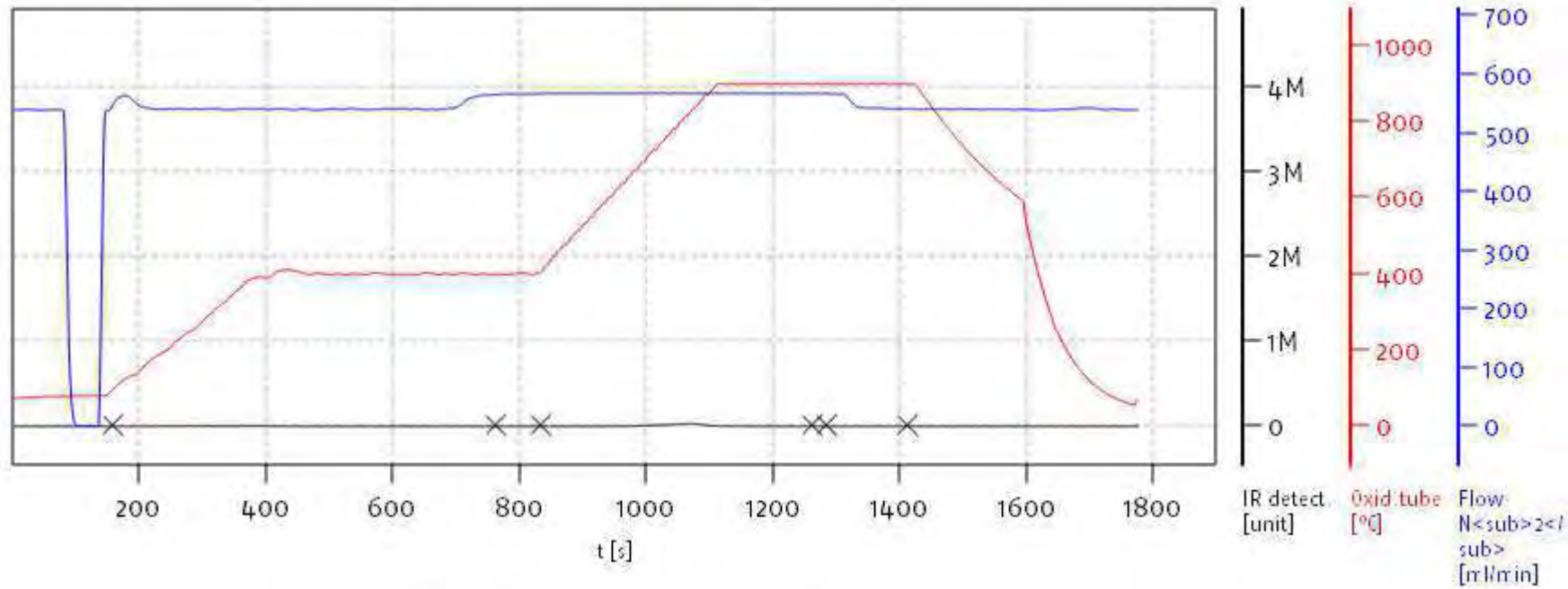
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
7	7	SEQ-CAL5	200.00	0.0148	1.00	CARBON	4/26/2022 2:30 PM	0.021	0.045	0.066	bl,C2u	20 951	92 945	236	1.0000	0.5975



Name:

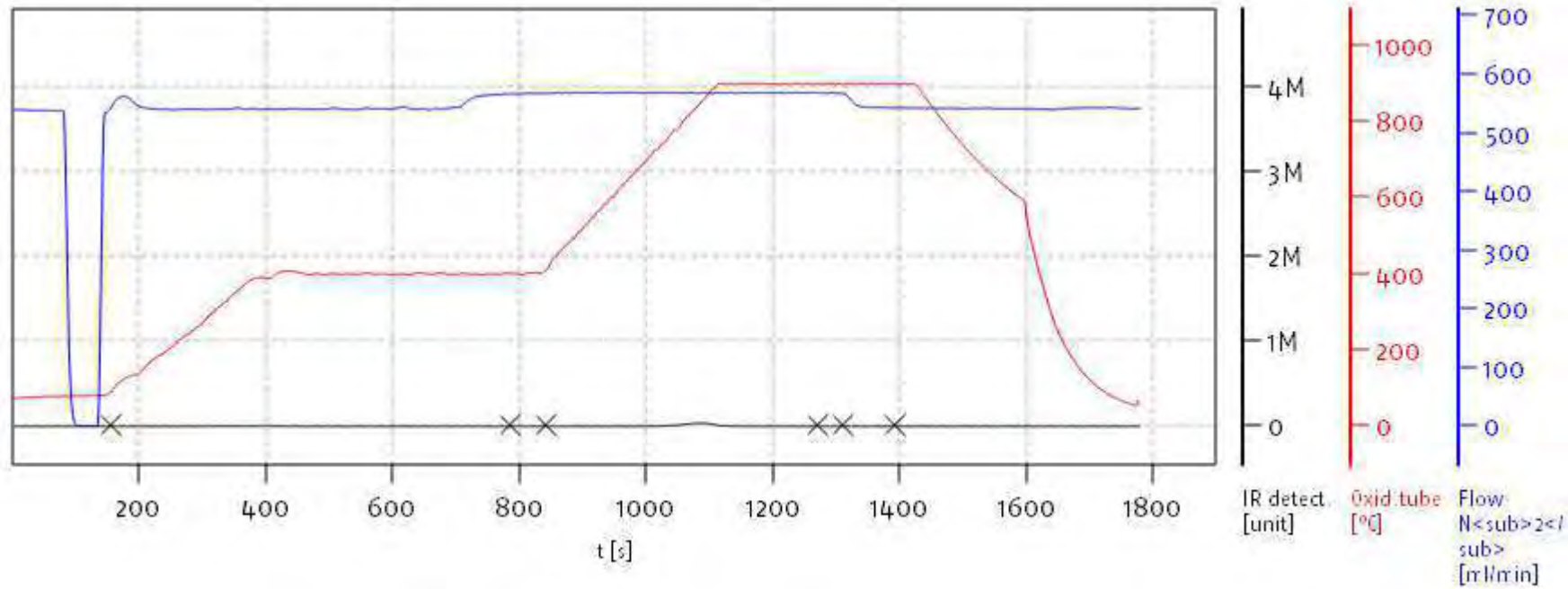
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
8	8	SEQ-CAL6	200.00	0.0196	1.00	CARBON	4/26/2022 3:00 PM	0.012	0.061	0.073	bl,C2u	10 118	82 297	59	1.0000	0.9144



Name:

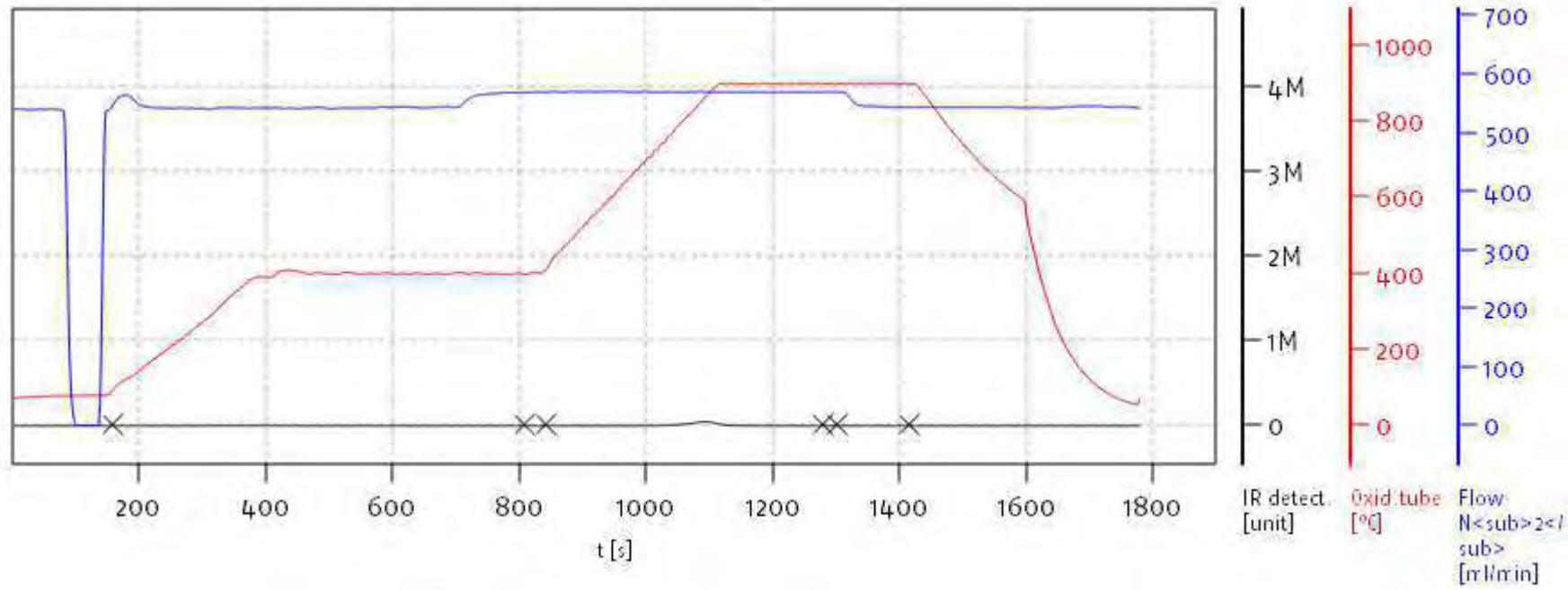
Access: soliTOC superuser

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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
9	9	SEQ-CAL7	200.00	0.0247	1.00	CARBON	4/26/2022 3:30 PM	0.013	0.075	0.088	bl,C2u	10 555	101 530	292	1.0000	0.9173



Name:

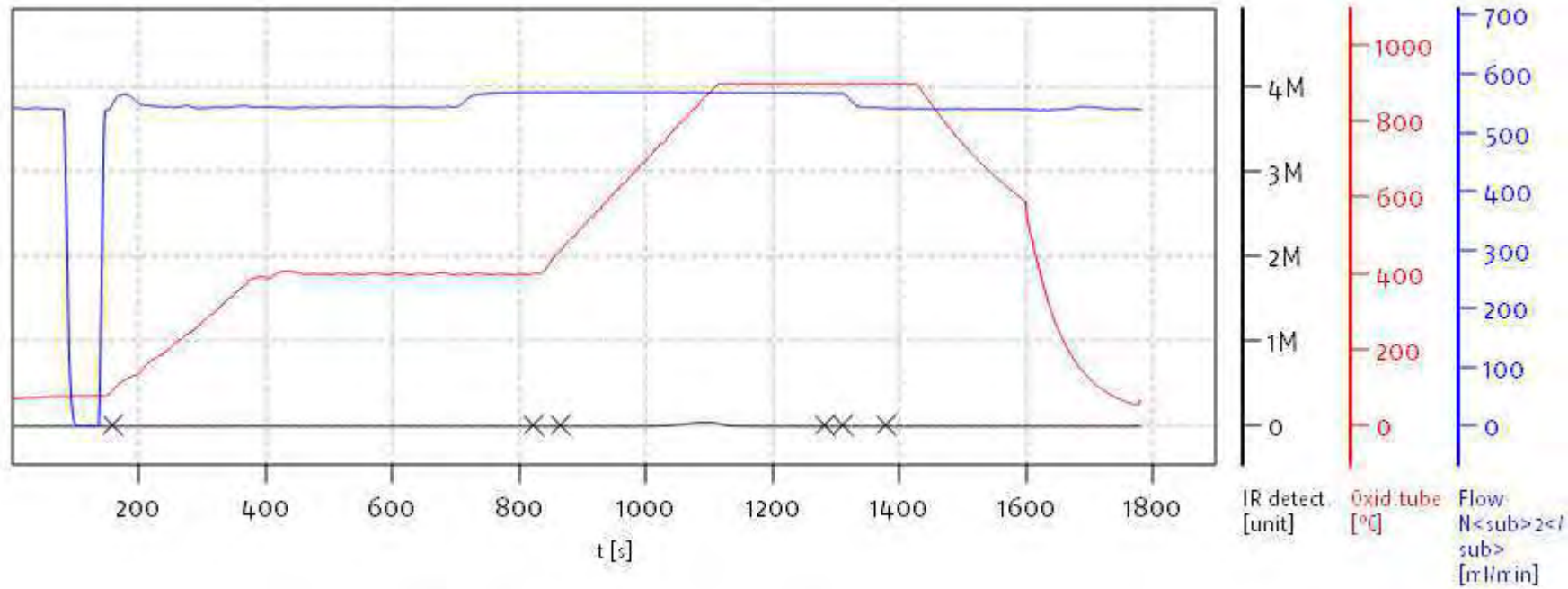
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
10	10	SEQ-CAL8	200.00	0.0298	1.00	CARBON	4/26/2022 4:00 PM	0.009	0.091	0.100	bl,C1u,C2u	6 668	120 822	116	1.0000	0.9312



Name:

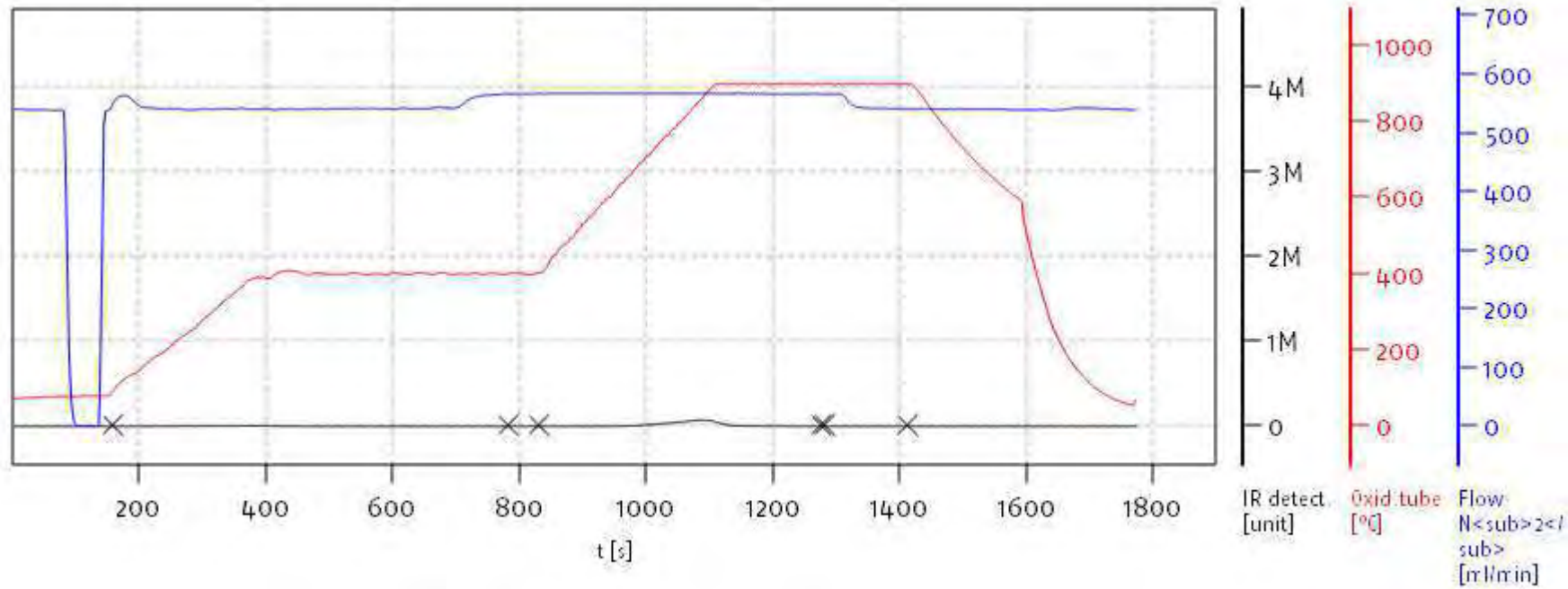
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
11	11	SEQ-CAL9	200.00	0.0402	1.00	CARBON	4/26/2022 4:30 PM	0.031	0.120	0.151	bl,C2u	32 999	260 234	1 044	1.0000	0.5792



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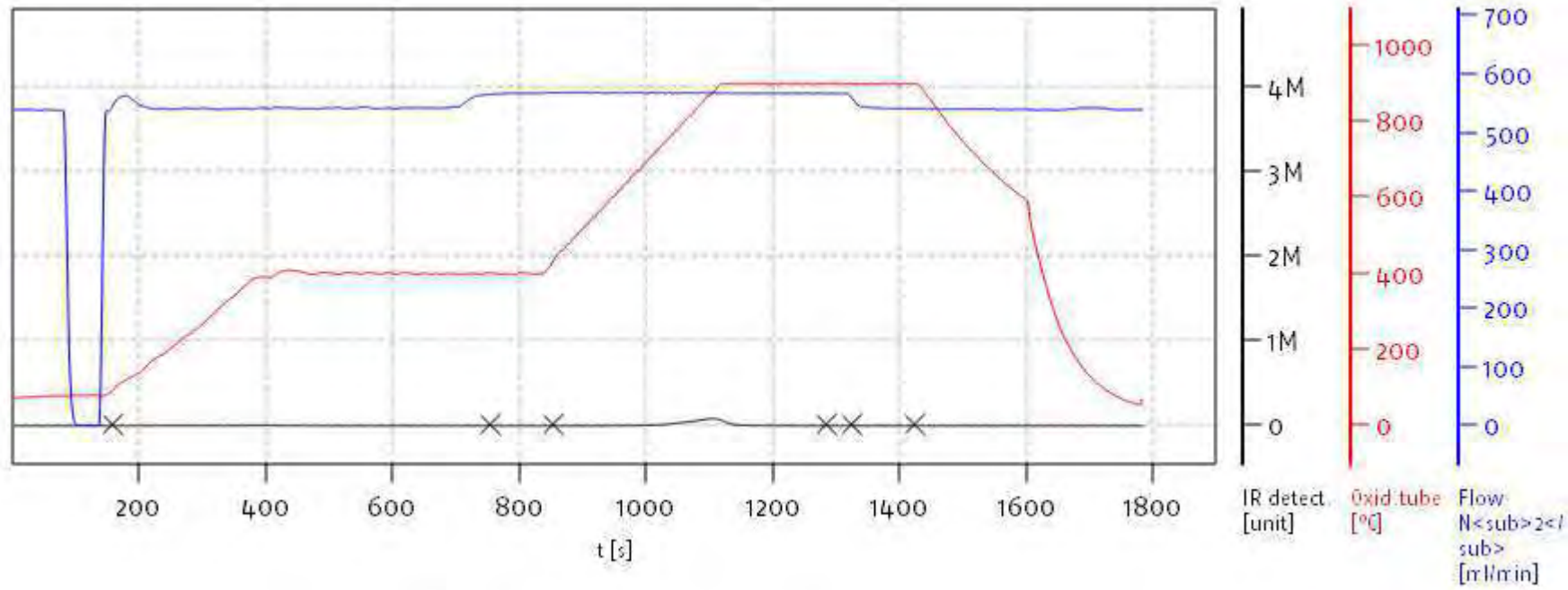
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
12	12	SEQ-CALA	200.00	0.0500	1.00	CARBON	4/26/2022 5:00 PM	0.021	0.151	0.172	bl,C2u	20 147	233 779	913	1.0000	0.8099



Name:

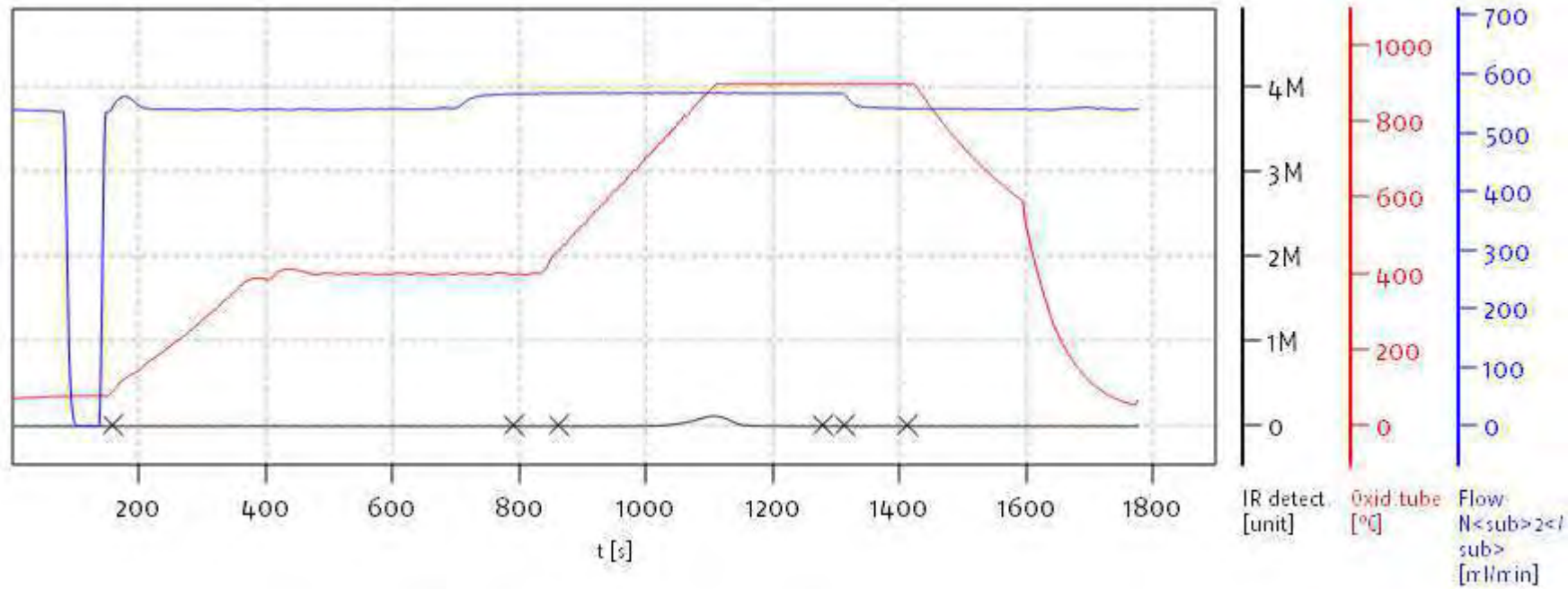
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
13	13	SEQ-CALB	200.00	0.0040	1.00	CARBON	4/26/2022 5:30 PM	0.010	0.258	0.268	bl,C1u,C2u	7 070	323 151	663	1.0000	1.0048



Name:

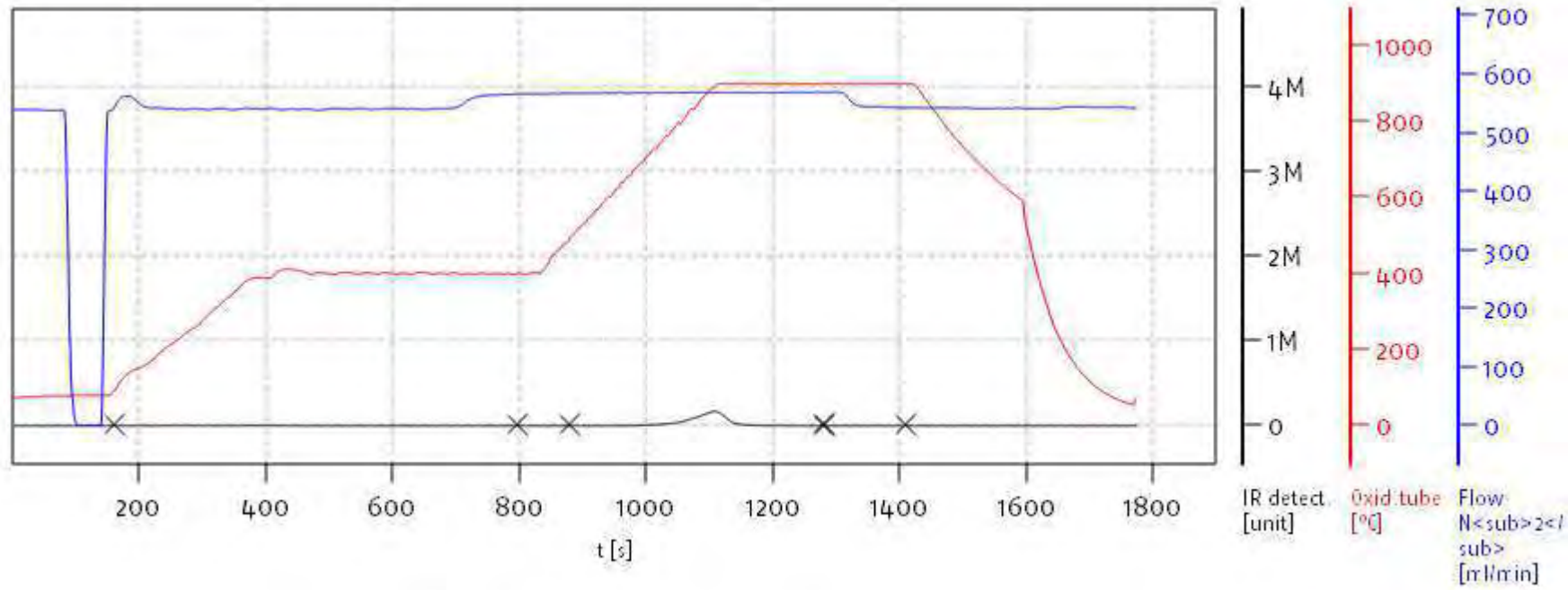
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
14	14	SEQ-CALC	200.00	0.0048	1.00	CARBON	4/26/2022 6:00 PM	0.015	0.324	0.339	bl,C2u	13 785	411 879	575	1.0000	0.9917



Name:

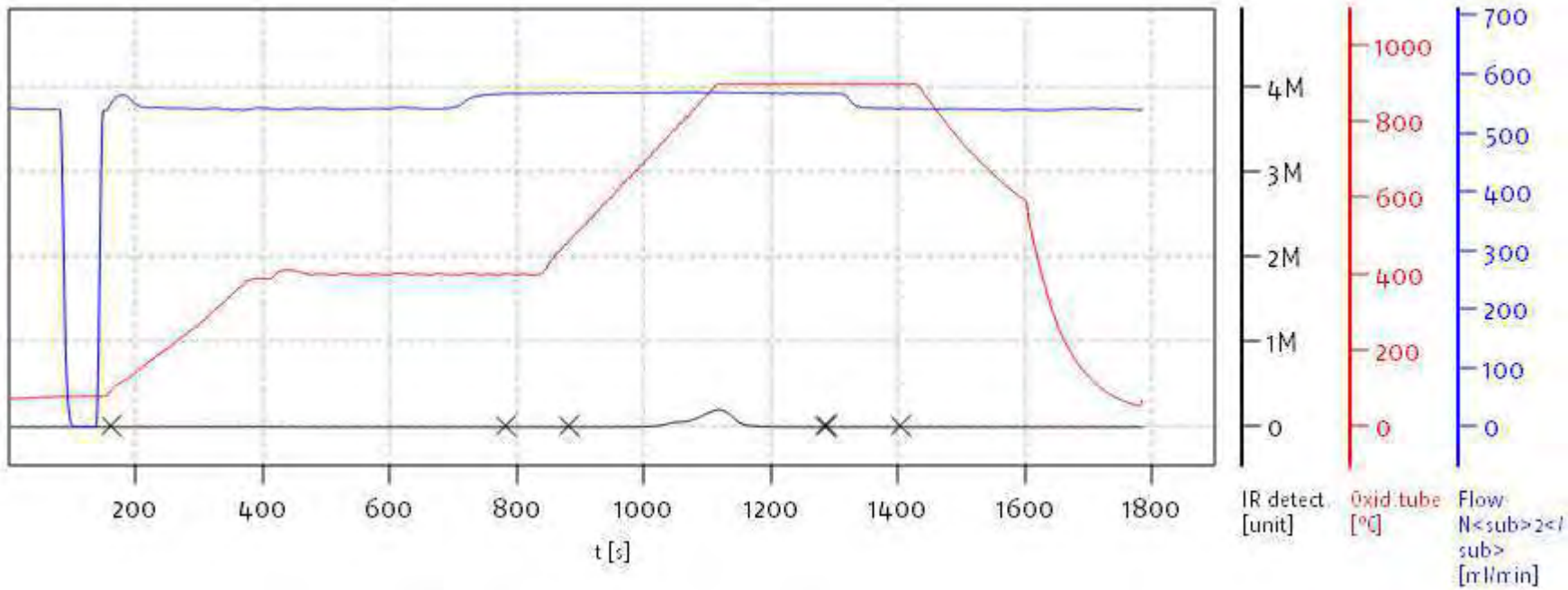
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
15	15	SEQ-CALD	200.00	0.0069	1.00	CARBON	4/26/2022 6:30 PM	0.019	0.444	0.463	bl,C2u	18 465	553 540	263	1.0000	1.0129



Name:

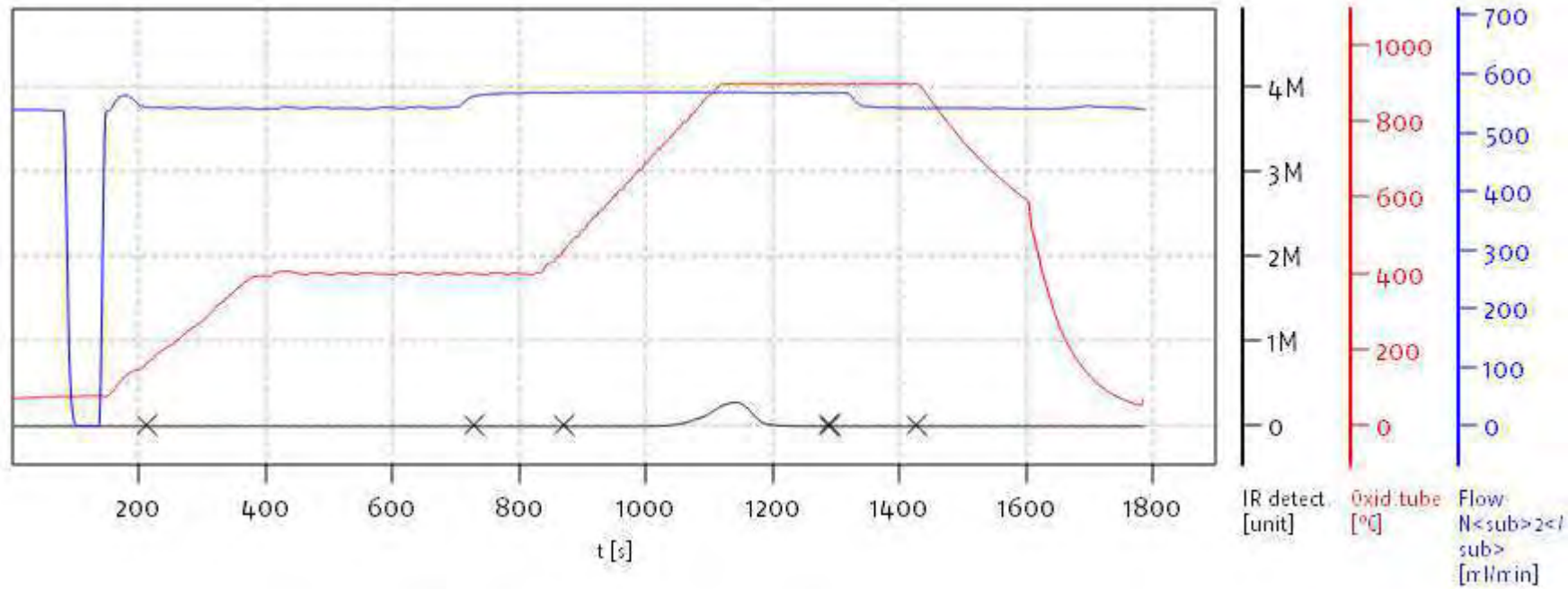
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
16	16	SEQ-CALE	200.00	0.0101	1.00	CARBON	4/26/2022 7:00 PM	0.009	0.600	0.609	bl,C1u,C2u	5 485	839 878	536	1.0000	0.9036



Name:

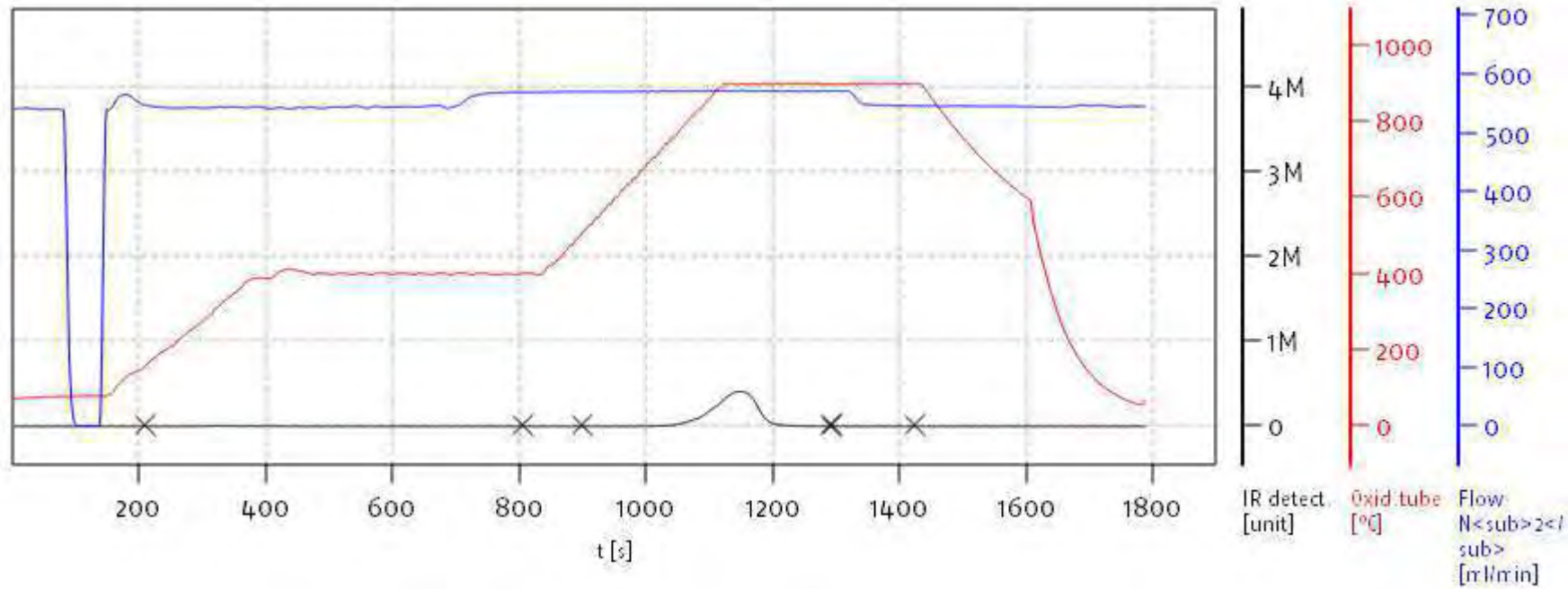
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
17	17	SEQ-CALF	200.00	0.0149	1.00	CARBON	4/26/2022 7:31 PM	0.019	0.906	0.925	bl,C2u	17 439	1 236 200	814	1.0000	0.9279



Name:

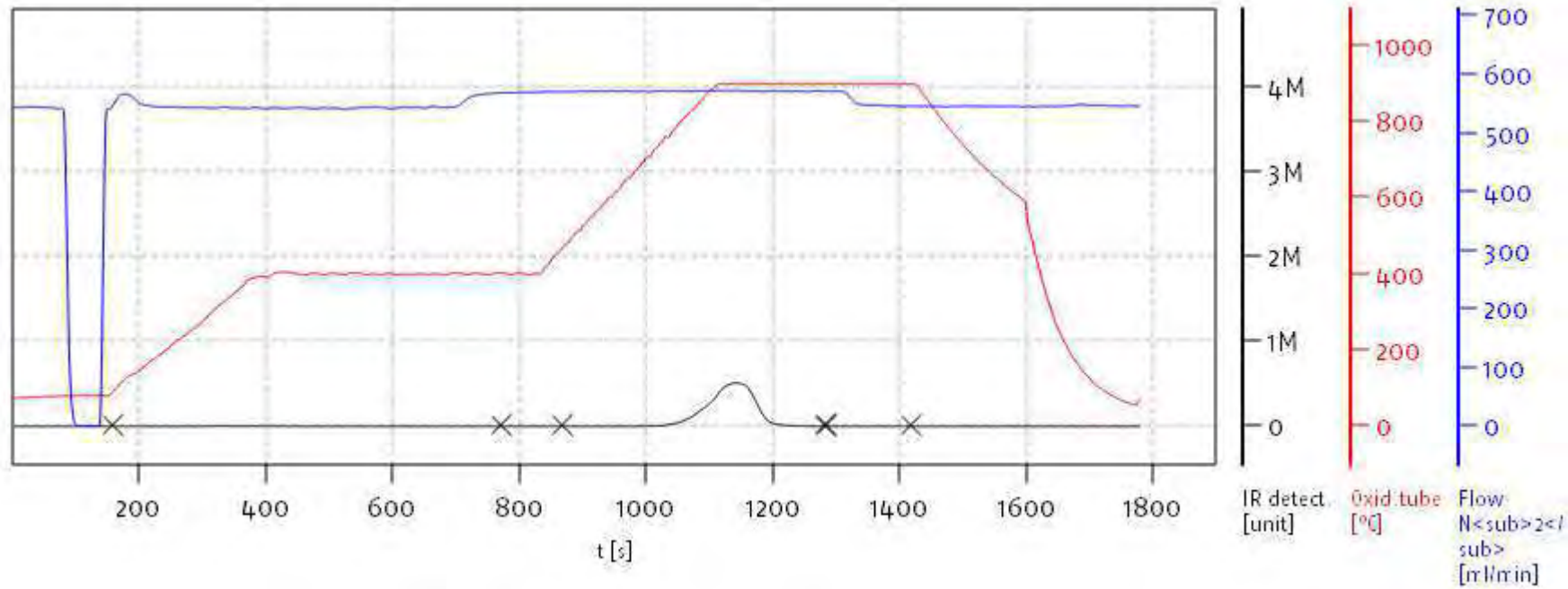
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
18	18	SEQ-CALG	200.00	0.0198	1.00	CARBON	4/26/2022 8:01 PM	0.015	1.206	1.221	bl,C2u	12 557	1 639 190	1 295	1.0000	0.9320



Name:

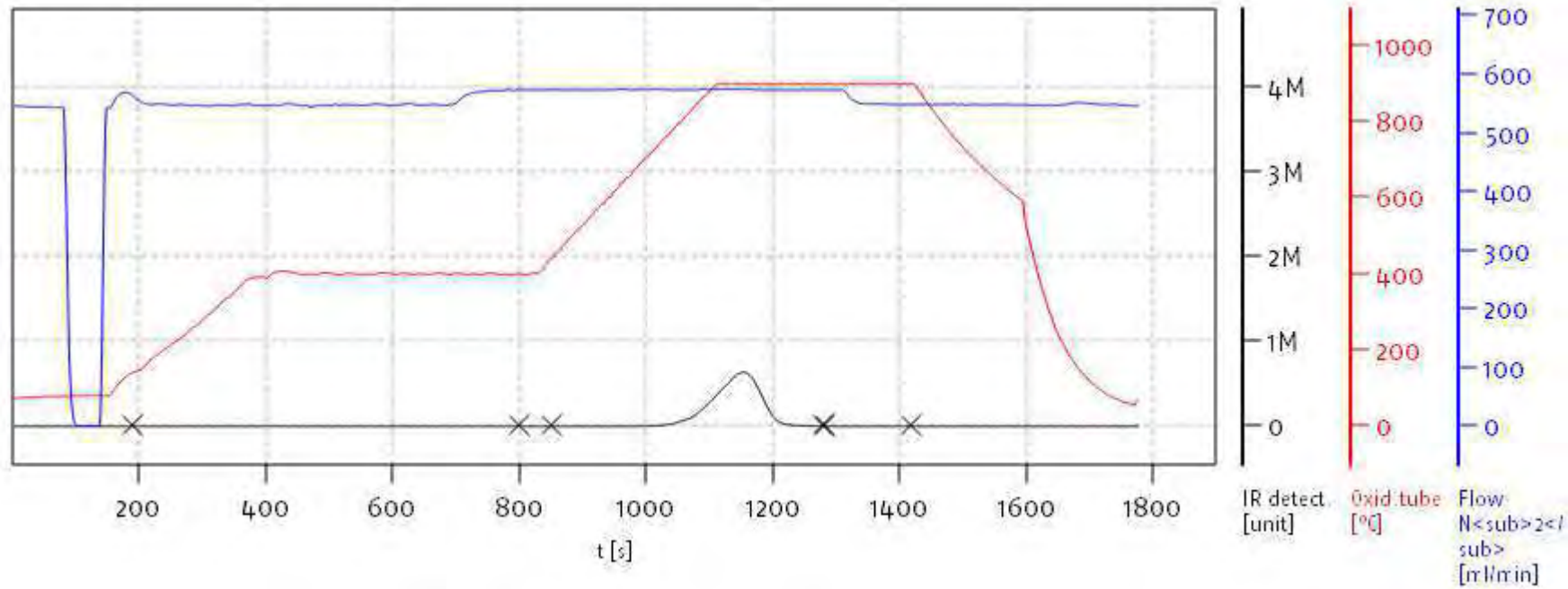
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
19	19	SEQ-CALH	200.00	0.0250	1.00	CARBON	4/26/2022 8:31 PM	0.009	1.524	1.533	bl,C1u,C2u	4 029	2 063 890	2 225	1.0000	0.9357



Name:

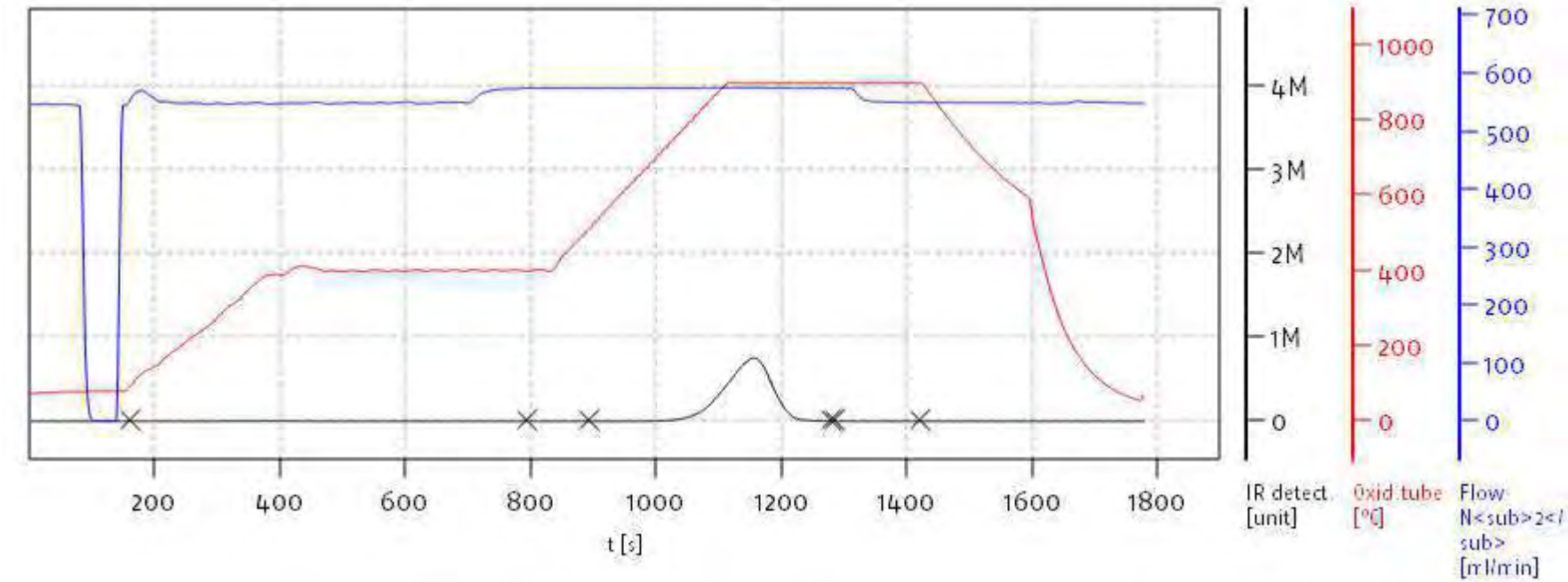
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
20	20	SEQ-CALI	200.00	0.0303	1.00	CARBON	4/26/2022 9:01 PM	0.017	1.800	1.817	bl,C2u	13 926	2 495 900	2 903	1.0000	0.9140



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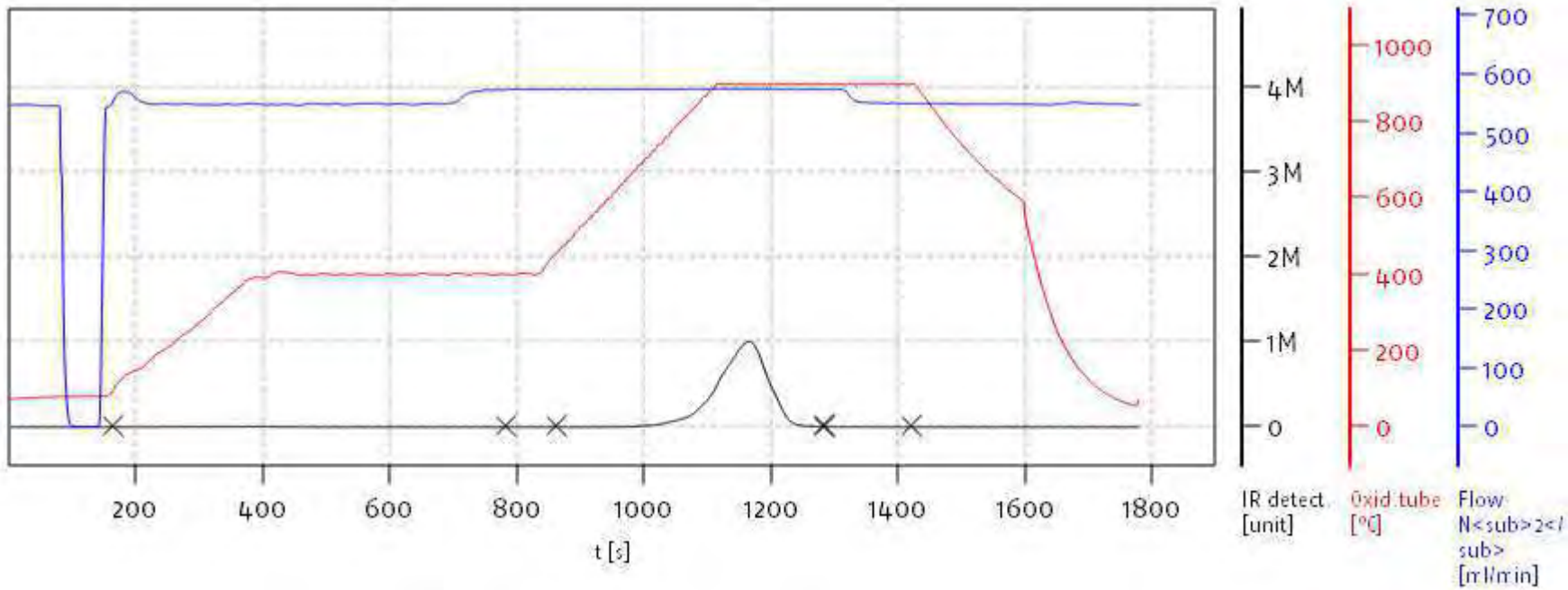
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
21	21	SEQ-CALJ	200.00	0.0415	1.00	CARBON	4/26/2022 9:31 PM	0.031	2.400	2.431	bl,C2u	28 786	3 482 530	5 351	1.0000	0.8737



Name:

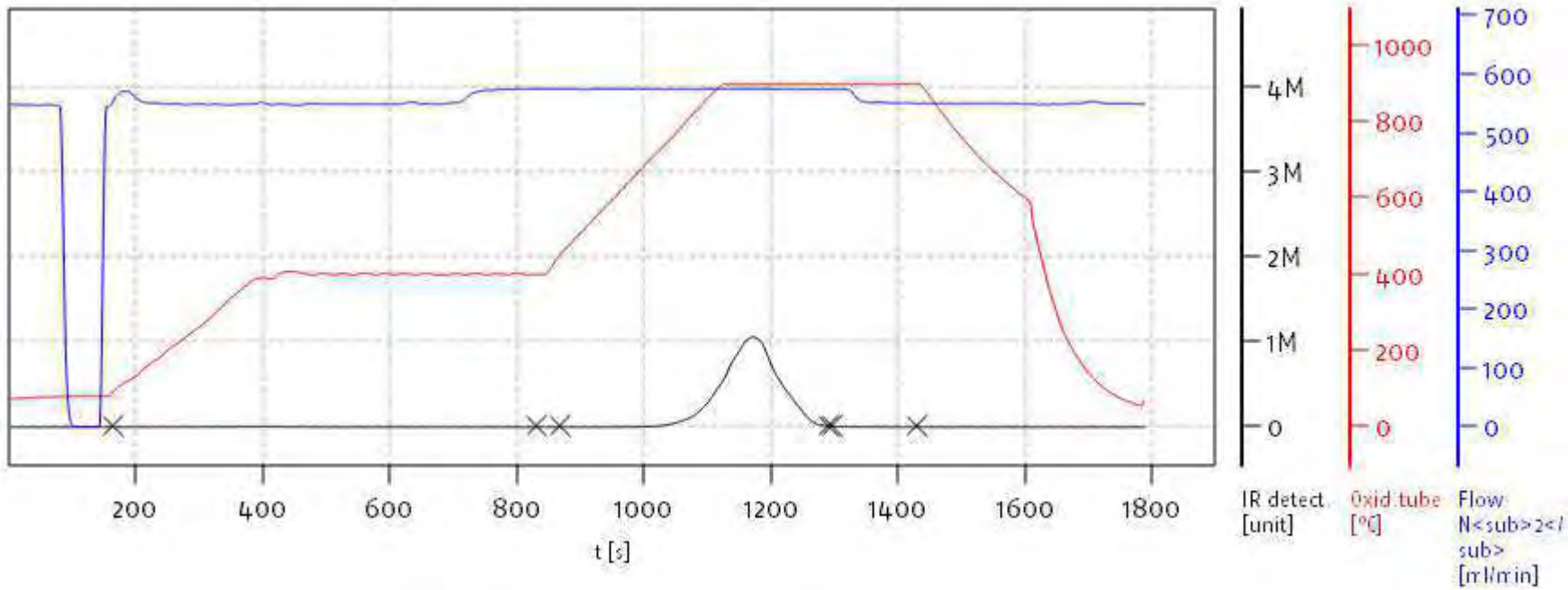
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
22	22	SEQ-CALK	200.00	0.0497	1.00	CARBON	4/26/2022 10:01 PM	0.031	3.012	3.043	bl	23 732	4 105 830	9 736	1.0000	0.9301



Name:

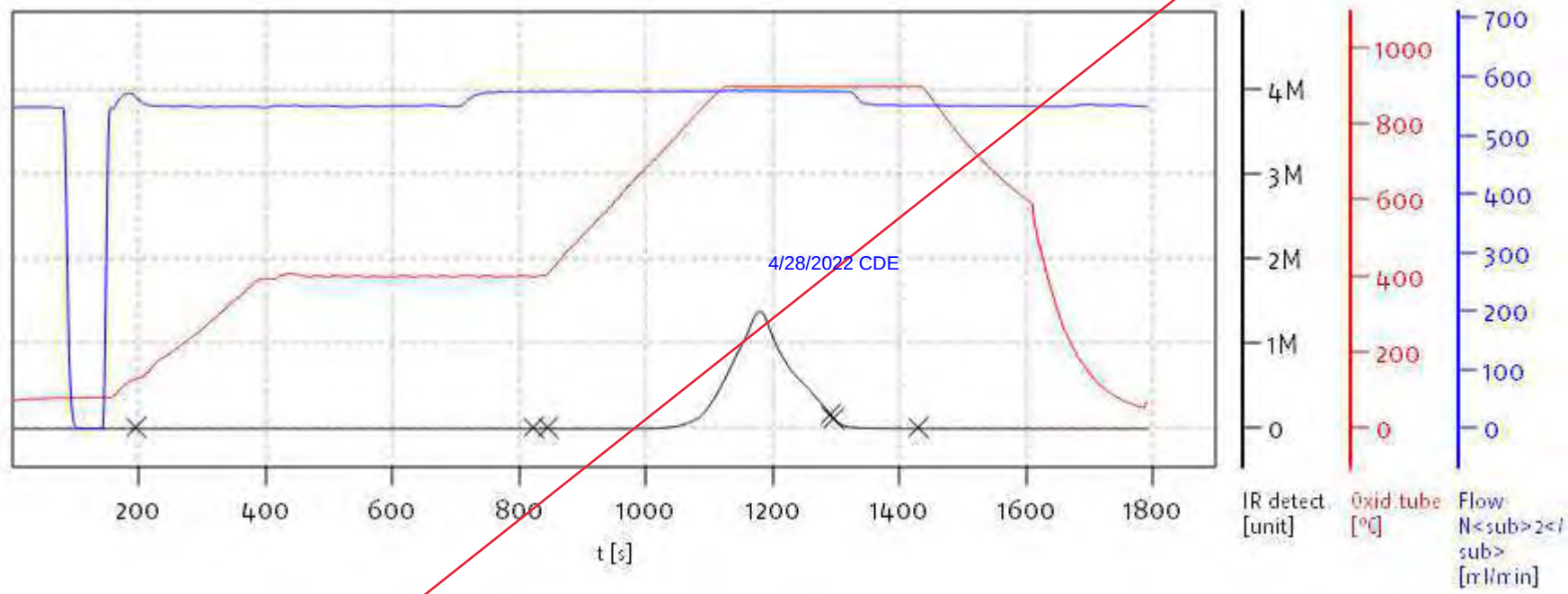
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/26/2022 10:31 PM	0.005	3.805	3.810	bl,C1u	3 605	5 648 620	71 970	1.0000	0.9443



Name:

Access: soliTOC superuser

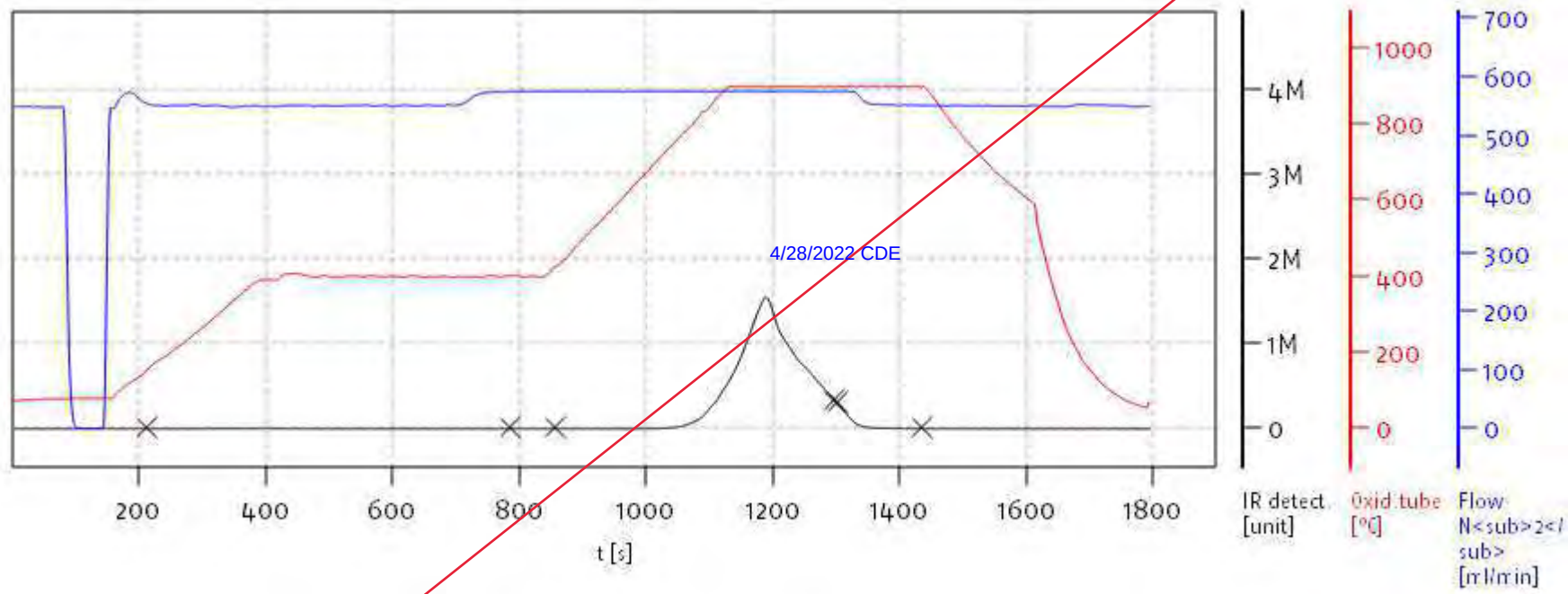
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/26/2022 11:02 PM	0.010	4.637	4.647	bl	10 023	6 397 530	228 171	1.0000	0.9539



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

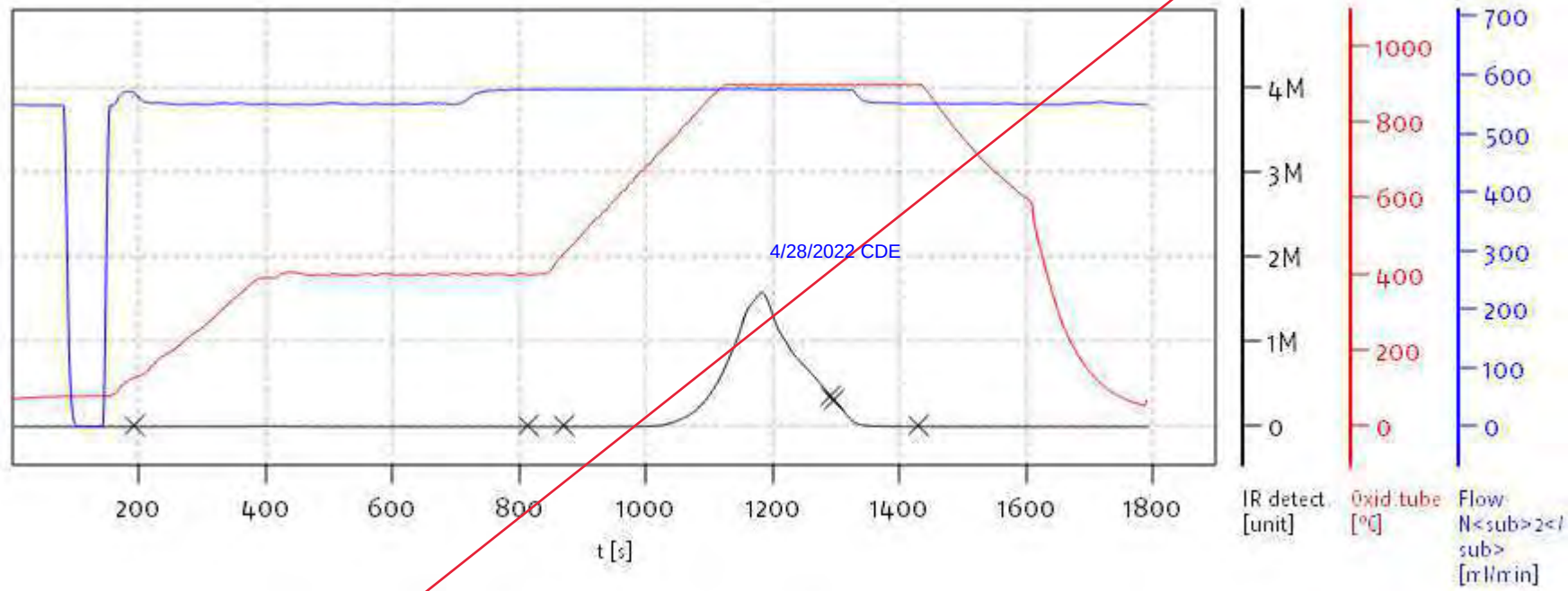
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/26/2022 11:32 PM	0.020	5.219	5.239	bl	23 354	7 186 580	239 986	1.0000	0.9540



Name:

Access: soliTOC superuser

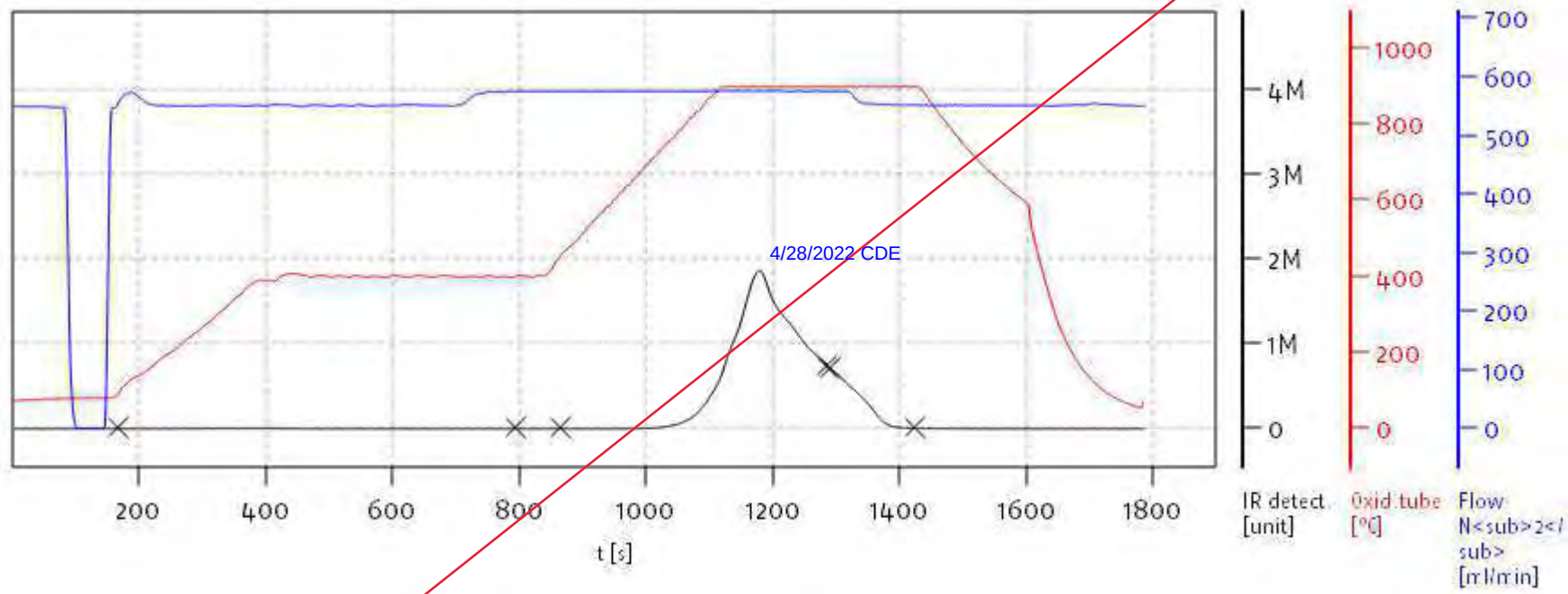
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 12:02 AM	0.019	7.915	7.934	bl,C3o	21 248	8 544 610	1 334 580	1.0000	1.0714



Name:

Access: soliTOC superuser

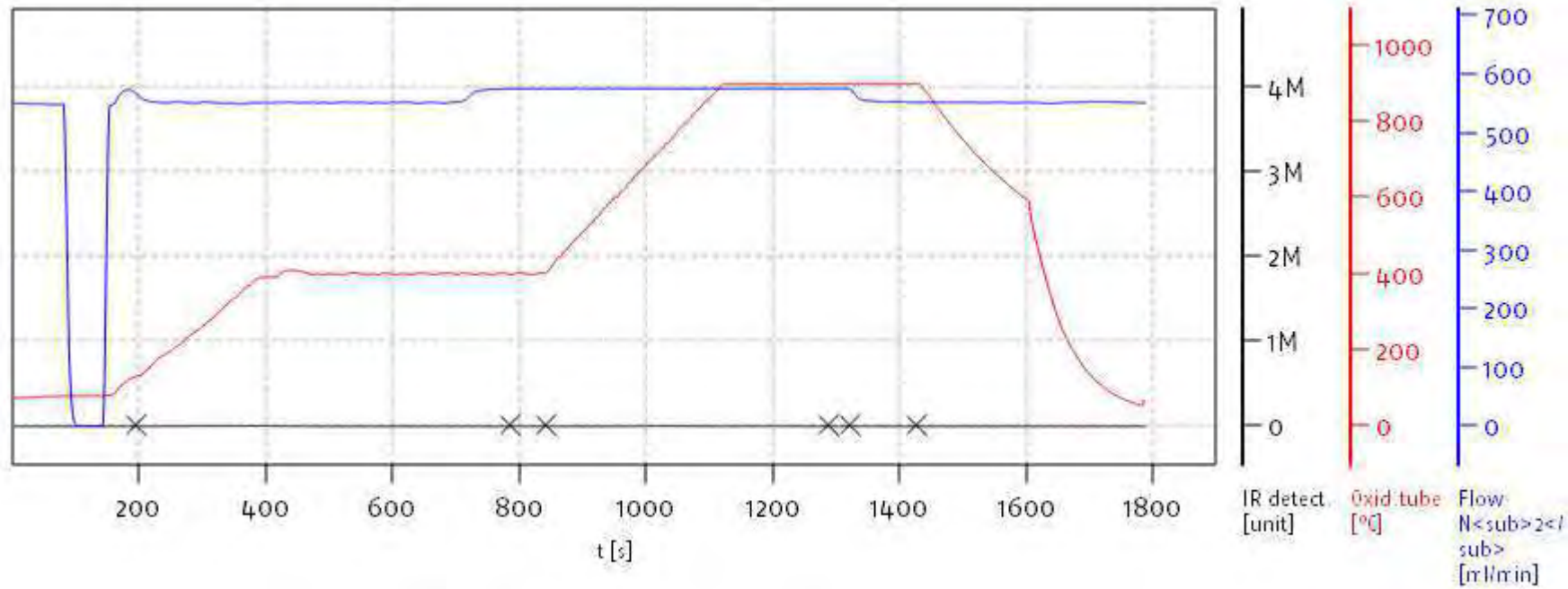
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
27	27	BLANK	1.00		1.00	CARBON	4/27/2022 12:32 AM	0.000	0.000	0.000	bl	29 766	19 596	1 205	1.0000	0.9007



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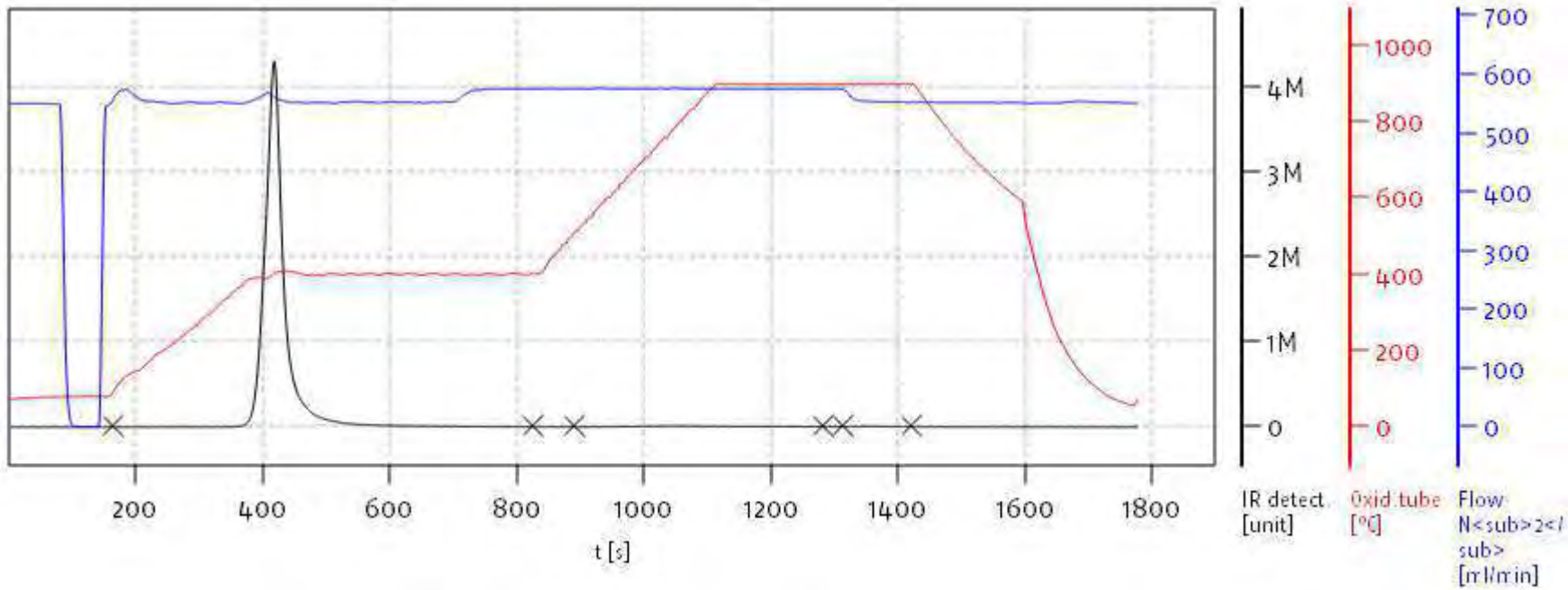
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
28	28	Dfactor	19.00		1.00	CARBON	4/27/2022 1:02 AM	44.678	0.893	45.571	bl	5 588 680	104 999	25 384	0.9581	1.0000



Name:

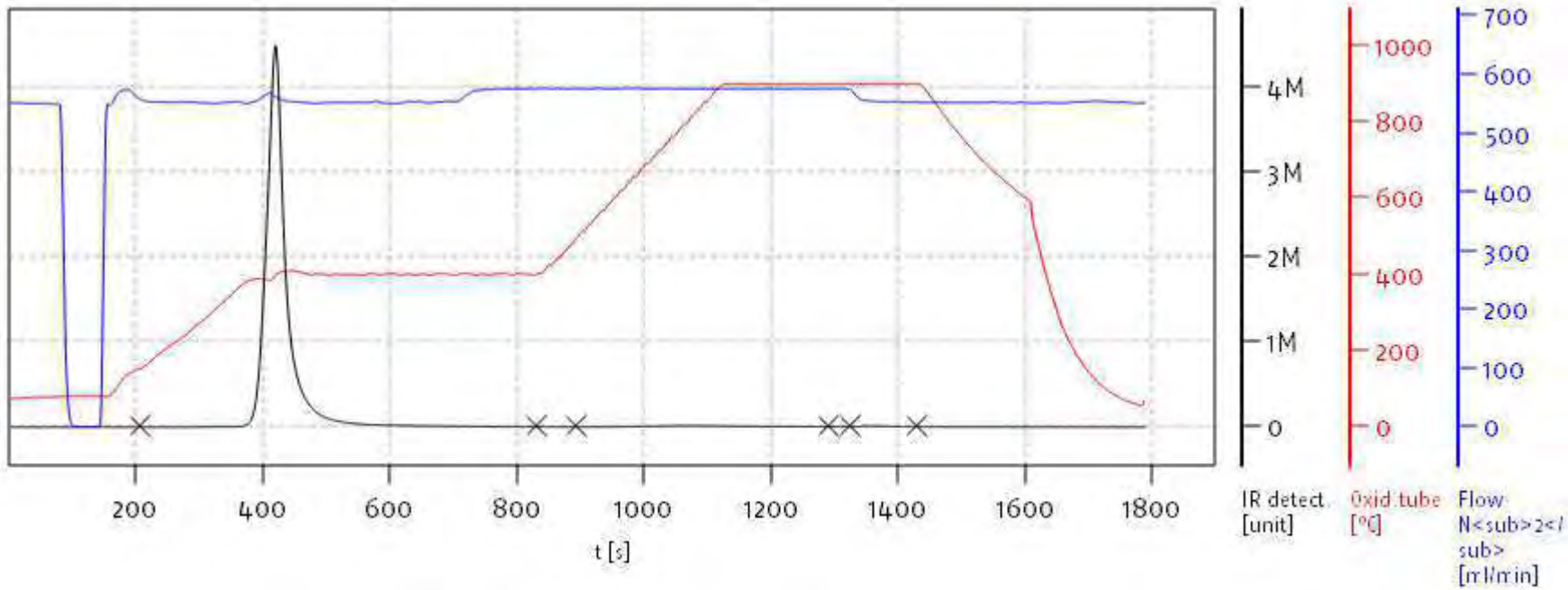
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
29	29	Dfactor	20.80		1.00	CARBON	4/27/2022 1:32 AM	44.694	0.937	45.631	bl	6 076 750	120 961	30 224	0.9647	1.0000



Name:

Access: soliTOC superuser

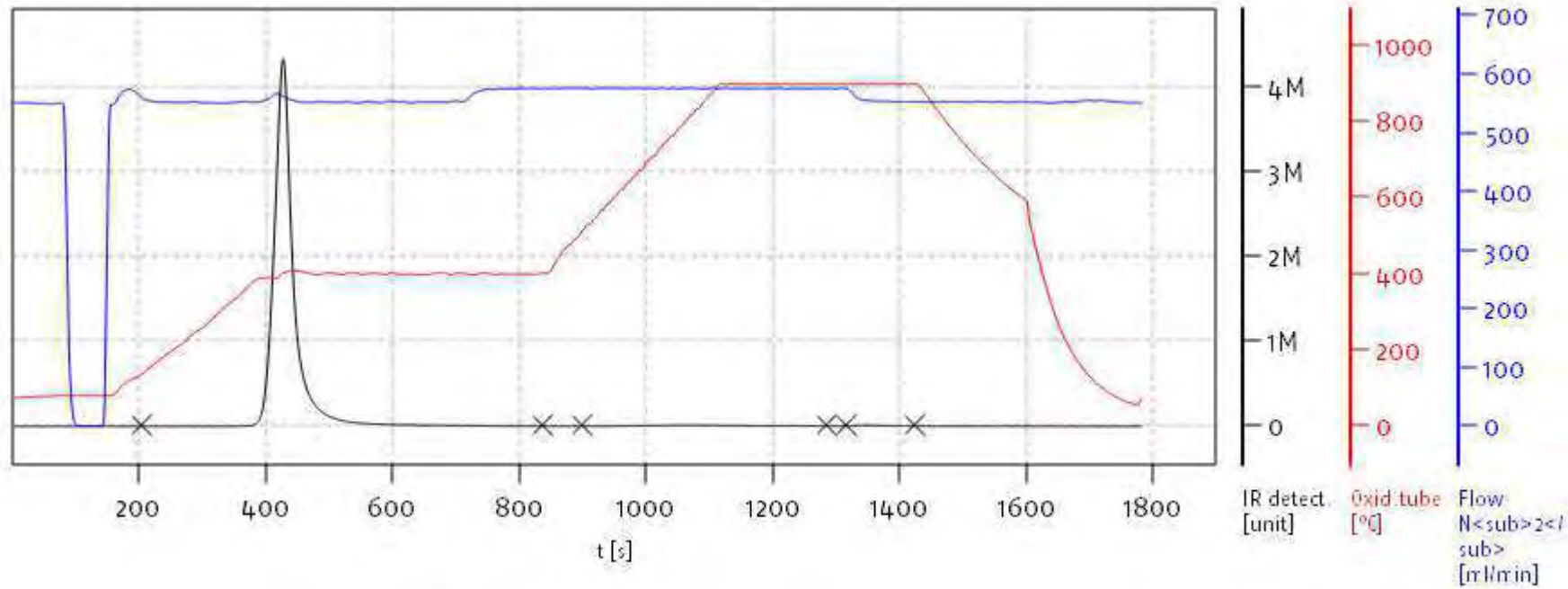
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
30	30	SEQ-ICV1	19.40		1.00	CARBON	4/27/2022 2:03 AM	44.964	0.742	45.706	bl	5 722 450	98 735	27 054	0.9614	0.9007



Name:

Access: soliTOC superuser

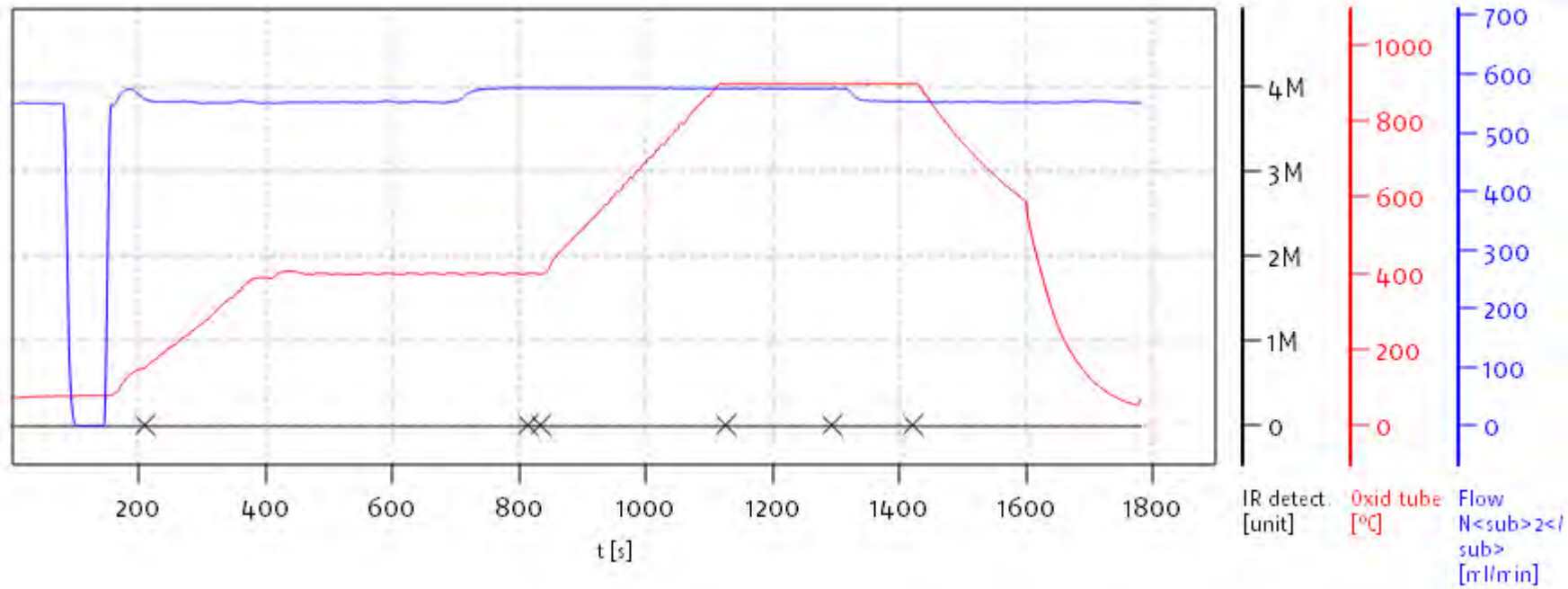
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
31	31	SEQ-ICB1	501.10		1.00	CARBON	4/27/2022 2:33 AM	0.002	0.001	0.003	bl,C1u,C3u,C2u	2 158	225	165	0.9614	0.9007



Name:

Access: soliTOC superuser

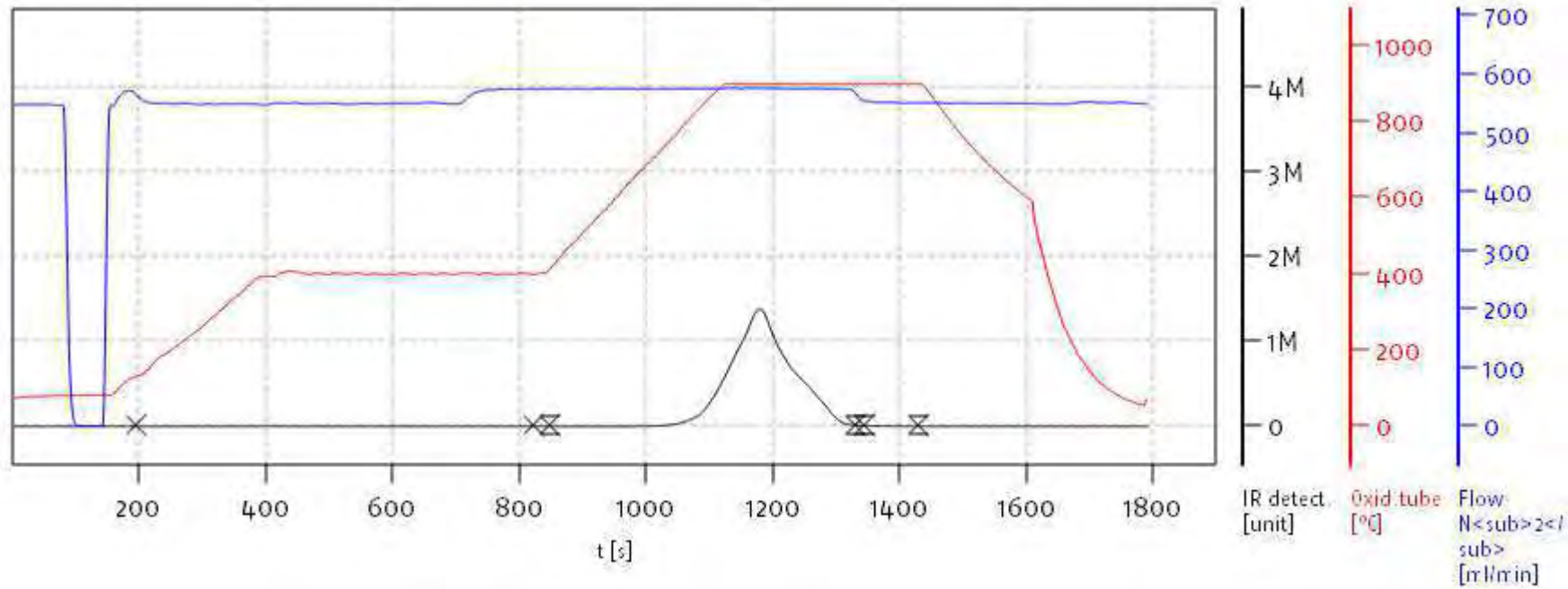
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/27/2022 11:08 AM	0.005	3.917	3.922	bl,C1u	3 605	**5 260 365**	**0**	1.0000	0.9443



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

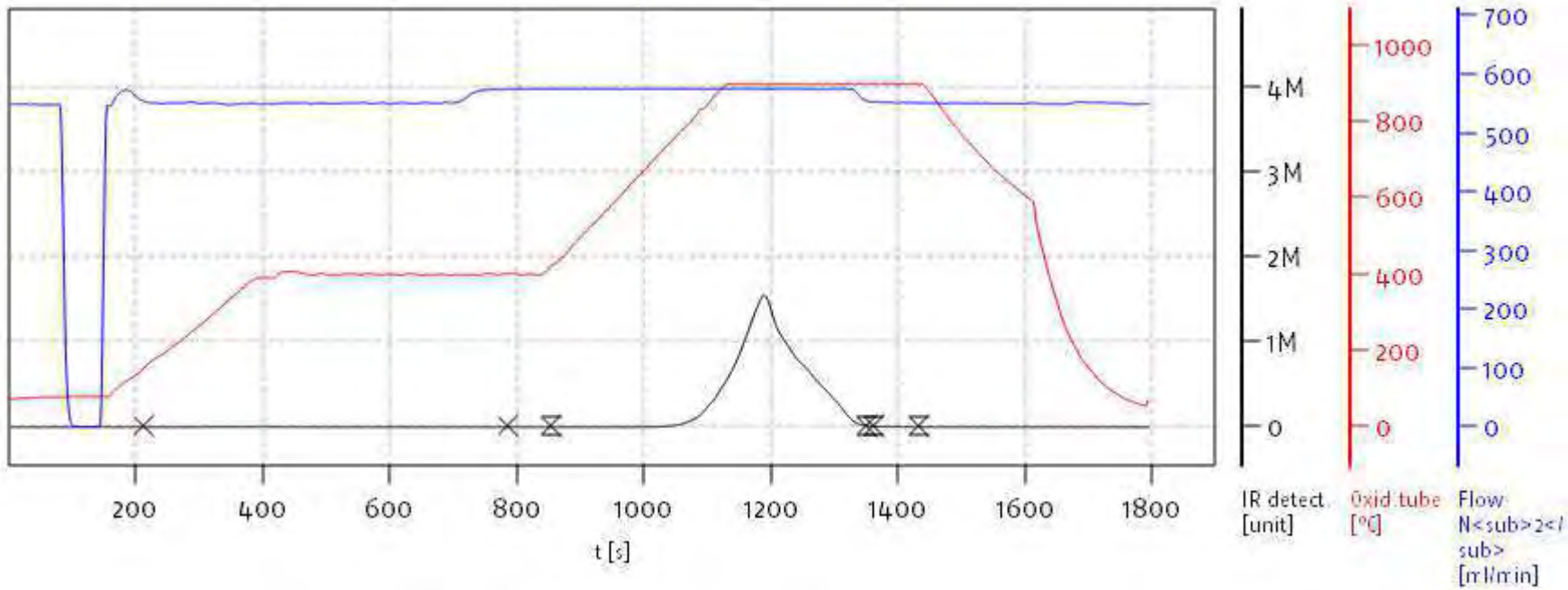
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/27/2022 11:08 AM	0.010	4.637	4.647	bl	10 023	**6 164 833**	**0**	1.0000	0.9539



Name:

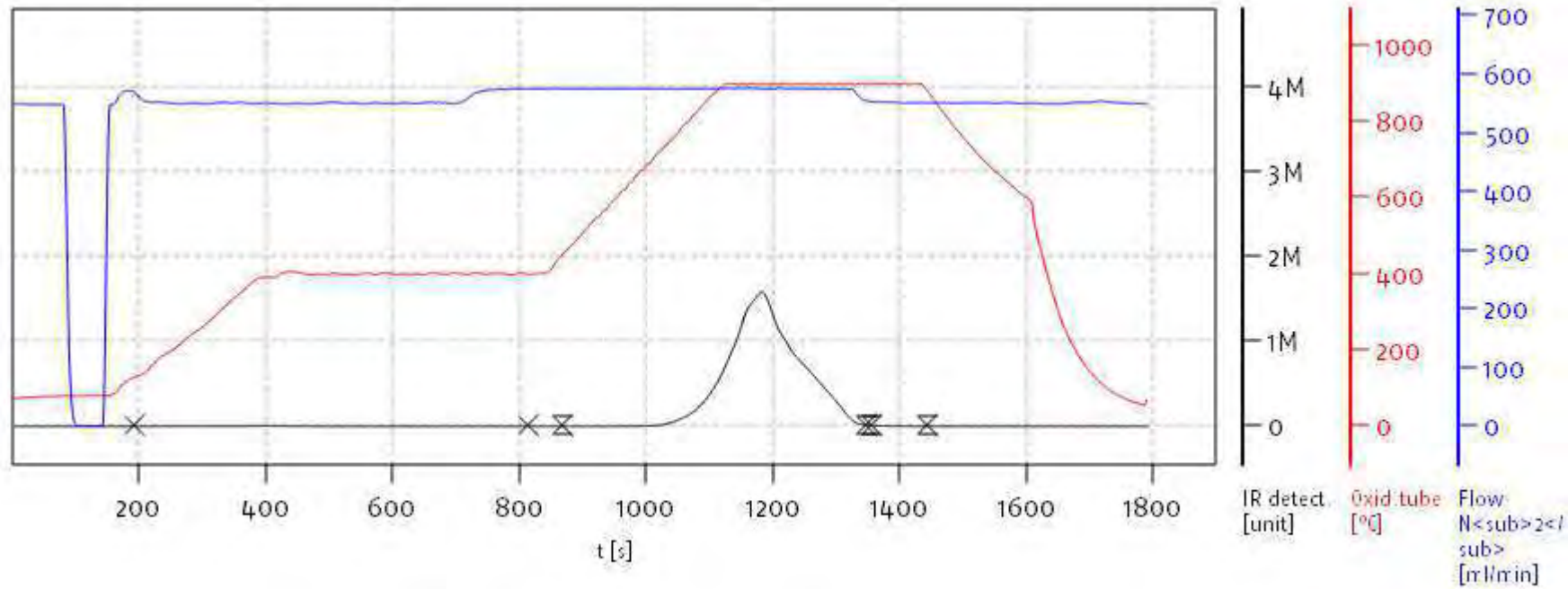
Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/27/2022 11:09 AM	0.020	5.219	5.239	bl	23 354	**6 937 833**	**0**	1.0000	0.9540



Name:

Access: soliTOC superuser

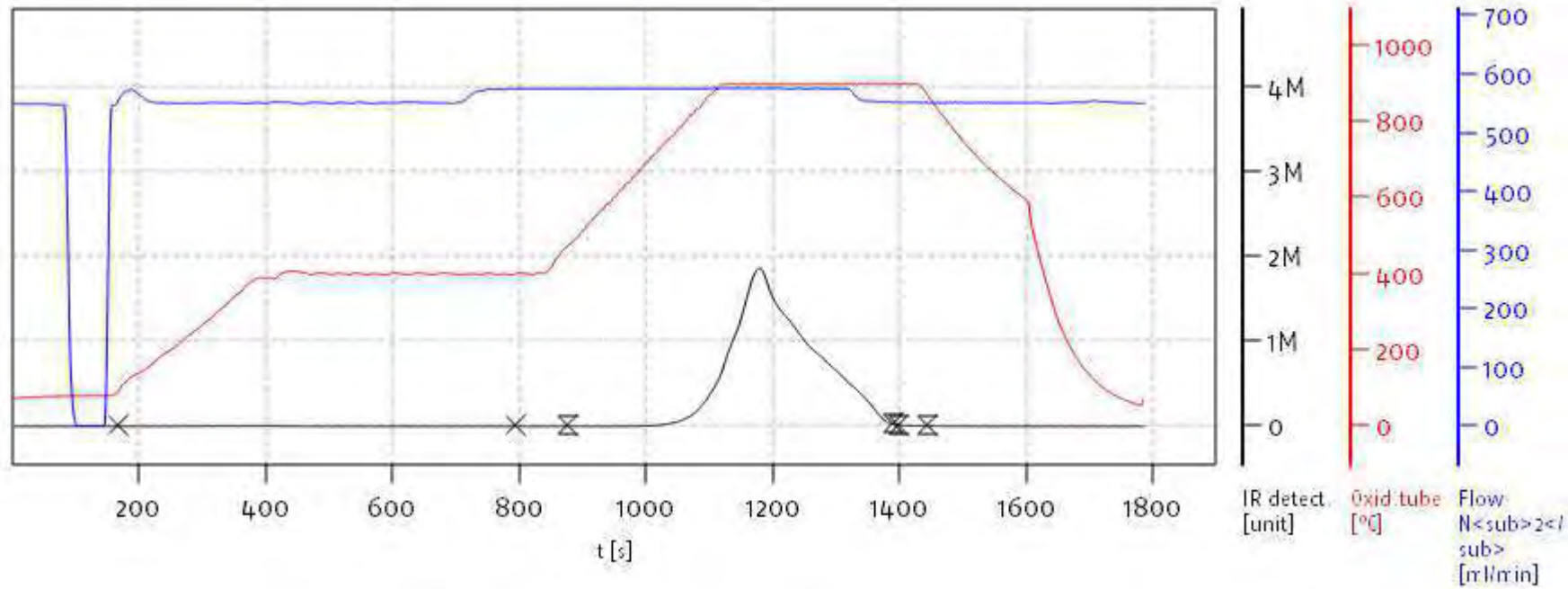
Date: Wed Apr 27 11:10:16 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 11:09 AM	0.019	7.915	7.934	bl,C3o	21 248	9 370 139	0	1.0000	1.0714



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

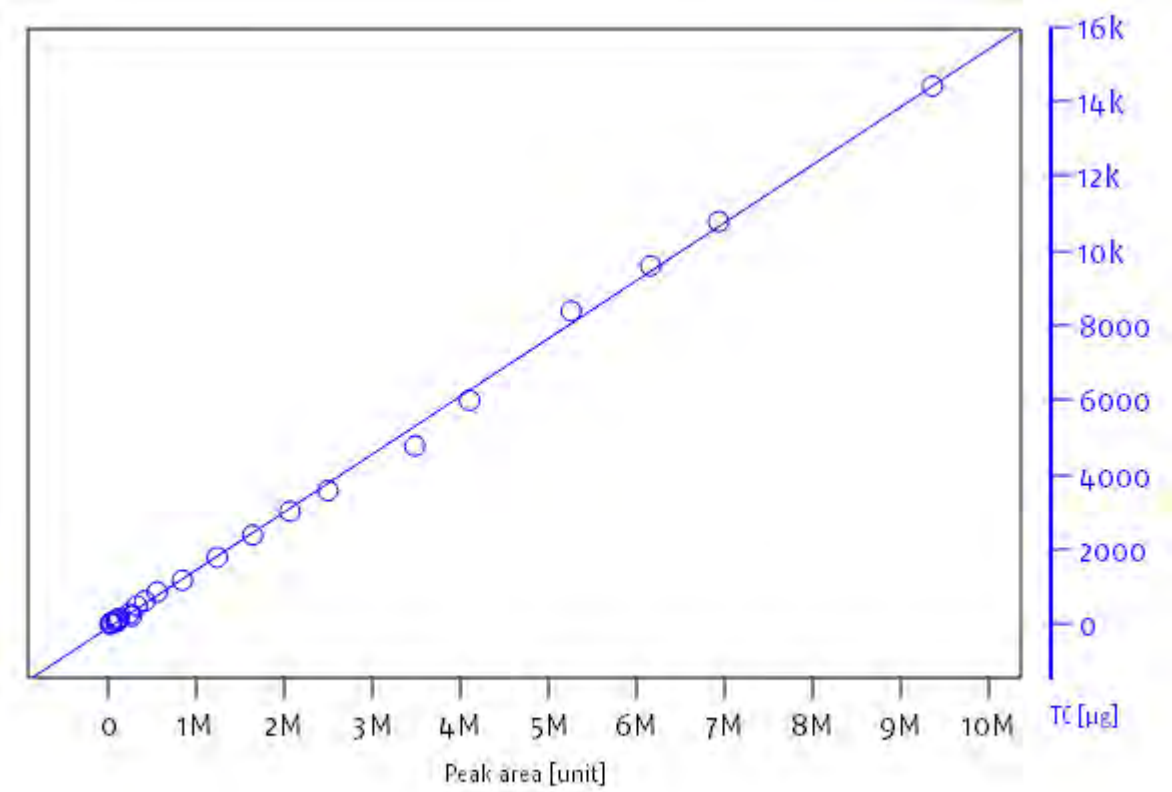
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Calibration parameters TC, Whole range

a	-4.107546e-02
b	+1.548032e-06
c	+0.000000e+00
d	+0.000000e+00
e	+0.000000e+00
r	0.998372
r_old	0.998372
Proc.-SD	166.070255 µg

Calibration graph TC, Whole range



INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SKD0371
Date Analyzed: 04/27/22 02:33

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SKD0371-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	

INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SLE0117
Date Analyzed: 05/06/23 16:47

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SLE0117-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB2	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB3	Total Organic Carbon	0.003	0.02	0.02	%	
SLE0117-CCB4	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB5	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB6	Total Organic Carbon	0.00	0.02	0.02	%	

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SKD0371

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SKD0371-ICV1	Total Organic Carbon	44.446	43.7	98.3	%	EPA 9060A m
	Total Carbon	44.446	44.1	99.2	%	EPA 9060A m
	Total Inorganic Carbon	0.0000	0.40		%	EPA 9060A m
	% Soot	0.0000	0.004		%	EPA 9060A m

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SLE0117

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SLE0117-ICV1	Total Organic Carbon	44.446	43.7	98.2	%	EPA 9060A m
SLE0117-CCV1	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV2	Total Organic Carbon	44.446	43.8	98.6	%	EPA 9060A m
SLE0117-CCV3	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV4	Total Organic Carbon	44.446	43.7	98.4	%	EPA 9060A m
SLE0117-CCV5	Total Organic Carbon	44.446	43.5	98.0	%	EPA 9060A m
SLE0117-CCV6	Total Organic Carbon	44.446	43.5	97.8	%	EPA 9060A m

* Values outside of QC limits

STANDARD REFERENCE MATERIAL RECOVERY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0200-SRM1
Batch: BLE0200
Initial/Final: 0.3102 g / 0.3102 g
Preparation: No Prep Wet Chem
Analyzed: 05/06/2023 20:18
Standard ID: L000790
Expires: 05/19/2024
Standard Lot#: NA
Description: 1941B - Organics in Marine Sediment (Conv

ANALYTE	TRUE (% wet)	FOUND (% wet)	MDL	MRL	Q	SRM % REC.	QC LIMITS REC.
Total Organic Carbon	2.9900	2.99	0.02	0.02		100	80 - 120

* Values outside of QC limits

STANDARD REFERENCE MATERIAL RECOVERY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0201-SRM1
Batch: BLE0201
Initial/Final: 0.3105 g / 0.3105 g
Preparation: No Prep Wet Chem
Analyzed: 05/06/2023 20:49
Standard ID: L000790
Expires: 05/19/2024
Standard Lot#: NA
Description: 1941B - Organics in Marine Sediment (Conv

ANALYTE	TRUE (% wet)	FOUND (% wet)	MDL	MRL	Q	SRM % REC.	QC LIMITS REC.
Total Organic Carbon	2.9900	2.98	0.02	0.02		99.8	80 - 120

* Values outside of QC limits

HOLDING TIME SUMMARY

Analysis: EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-07C:0-1 23E0152-01	03/22/23 07:29	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 11:30			
SED-07C:1-3 23E0152-02	03/22/23 07:29	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 12:01			
SED-08C:0-1 23E0152-03	03/22/23 08:07	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 12:31			
SED-08C:1-3 23E0152-04	03/22/23 08:07	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 13:02			
SED-09C:0-1 23E0152-05	03/22/23 08:33	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 13:32			
SED-09C:1-3 23E0152-06	03/22/23 08:33	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 14:02			
SED-12C:0-1 23E0152-07	03/22/23 09:25	05/05/23 14:20	05/06/23 12:06	45	180	05/07/23 14:32			
SED-26C:0-1 23E0152-08	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 00:51			
SED-26C:1-3 23E0152-09	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 17:35			
SED-25C:0-1 23E0152-10	03/22/23 11:19	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 18:06			
SED-25C:1-3 23E0152-11	03/22/23 11:19	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 18:36			
SED-10C:0-1 23E0152-12	03/23/23 08:17	05/05/23 14:20	05/06/23 12:10	44	180	05/07/23 19:06			
SED-10C:1-3 23E0152-13	03/23/23 08:17	05/05/23 14:20	05/06/23 12:10	44	180	05/07/23 19:37			
SED-11C:0-1 23E0152-14	03/23/23 07:29	05/05/23 14:20	05/06/23 12:10	44	180	05/07/23 20:07			
SED-11C:1-3 23E0152-15	03/23/23 08:42	05/05/23 14:20	05/06/23 12:10	44	180	05/07/23 20:38			
SED-DUP3C 23E0152-16	03/23/23 12:00	05/05/23 14:20	05/06/23 12:10	44	180	05/07/23 21:08			
Duplicate BLE0201-DUP1	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 01:22			
Duplicate BLE0201-DUP2	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 01:52			
Matrix Spike BLE0201-MS1	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 02:23			
Matrix Spike Dup BLE0201-MSD1	03/22/23 10:38	05/05/23 14:20	05/06/23 12:10	45	180	05/07/23 02:53			

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument: TOC Cube

Analyte	MDL	RL	Units
Total Organic Carbon	0.02	0.02	%

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1941b

Organics in Marine Sediment

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. Information values are also provided for total organic carbon (TOC), total carbon, hydrogen, and nitrogen. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Certified Mass Fraction Values: Certified mass fraction values for PAHs, PCB congeners, and chlorinated pesticides are provided in Table 1 through Table 3. The certified values for the PAHs, PCB congeners, and chlorinated pesticides are based on the agreement of results obtained at NIST from two or more chemically independent analytical techniques along with results from an interlaboratory comparison study [1]. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1].

Reference Mass Fraction Values: Reference mass fraction values for additional PAHs (some in combination), additional PCB congeners, and additional chlorinated pesticides are provided in Table 4 through Table 7. Reference values for alkylated PAH groups are provided in Table 8 and for selected hopanes and steranes in Table 9. A reference value for total organic carbon is provided in Table 10. Reference values are noncertified values that are the best estimate of the true value; however, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods [1].

Information Mass Fraction Values: Information mass fraction values are provided in Table 11 for carbon, hydrogen, and nitrogen. An information value is considered to be a value that will be of use to the SRM user, but insufficient information is available to assess the uncertainty associated with the value [1]. Information values cannot be used to establish metrological traceability.

Expiration of Certification: The certification of **SRM 1941b** is valid, within the measurement uncertainty specified, until **01 October 2020**, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Handling, Storage, and Use"). This certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet or register online) will facilitate notification.

Coordination of the technical measurements leading to the certification of this material was under the leadership of M.M. Schantz and S.A. Wise of the NIST Chemical Sciences Division.

Analytical measurements for the certification of SRM 1941b were performed at NIST by J.R. Kucklick, B.J. Porter, D.L. Poster, M.M. Schantz, P. Schubert, S. Tutschku, and L.L. Yu of the NIST Chemical Sciences Division.

Carlos A. Gonzalez, Chief
Chemical Sciences Division

Gaithersburg, MD 20899
Certificate Issue Date: 16 January 2015

Robert L. Watters, Jr., Director
Office of Reference Materials

Measurements for TOC were provided by a commercial laboratory and T.L. Wade of the Geochemical and Environmental Research Group, Texas A&M University (College Station, TX). The carbon, hydrogen, and nitrogen data were provided by a commercial laboratory. Results for the PAHs, PCBs, and chlorinated pesticides from 38 laboratories (see Appendix A) that participated in an interlaboratory comparison exercise coordinated by NIST were used. Results for the alkylated PAH groups, hopanes, and steranes from 33 laboratories (see Appendix B) that participated in another interlaboratory comparison exercise coordinated by NIST were also used.

Collection and preparation of SRM 1941b were performed by M.P. Cronise and C.N. Fales of the NIST Office of Reference Materials and B.J. Porter and M.M. Schantz of the NIST Chemical Sciences Division. The sediment material was collected with the assistance of G.G. Lauenstein, J. Collier, and J. Lewis (National Oceanic and Atmospheric Administration, Silver Spring, MD).

Consultation on the statistical design of the experimental work and evaluation of the data were provided by S.D. Leigh and J.H. Yen of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

Handling: This material is naturally occurring marine sediment from an urban area and may contain constituents of unknown toxicities; therefore, caution and care should be exercised during its handling and use.

Storage: SRM 1941b must be stored in its original bottle at temperatures less than 30 °C and away from direct sunlight.

Use: Prior to removal of subsamples for analysis, the contents of the bottle should be mixed. The mass fractions of constituents in SRM 1941b are reported on a dry-mass basis. The SRM, as received, contains a mass fraction of approximately 2.4 % moisture (see "Conversion to Dry-Mass Basis"). The sediment sample should be dried to a constant mass before weighing for analysis; or a separate subsample of the sediment should be removed from the bottle at the time of analysis and dried to determine the mass fraction on a dry-mass basis. If the constituents of interest are volatile, then the moisture must be determined with a separate subsample.

PREPARATION AND ANALYSIS[1]

Sample Collection and Preparation: The sediment used to prepare this SRM was collected from the Chesapeake Bay at the mouth of the Baltimore (MD) Harbor near the Francis Scott Key Bridge (39°12.3'N and 76°31.4'W). This location is very near the site where SRM 1941 and SRM 1941a were collected. The sediment was collected using a Kynar-coated modified Van Veen-type grab sampler. A total of approximately 3300 kg of wet sediment was collected from the site. The sediment was freeze-dried, sieved at 150 μm (100 % passing), homogenized in a cone blender, radiation sterilized (^{60}Co), and then packaged in screw-capped amber glass bottles each containing approximately 50 g.

Conversion to Dry-Mass Basis: The results for the constituents in SRM 1941b are reported on a dry-mass basis; however, the material "as received" contains residual moisture. The amount of moisture in SRM 1941b was determined by measuring the mass loss after freeze-drying subsamples of 1.1 g to 1.3 g for four days at 1 Pa with a –10 °C shelf temperature and a –50 °C condenser temperature. The moisture content in SRM 1941b at the time of the certification analyses was 2.39 % ± 0.08 % (95 % confidence level). Analytical results for the organic constituents were determined on an as-received basis and then converted to a dry-mass basis by dividing by the conversion factor of 0.9761 (gram dry mass per gram as-received mass).

Polycyclic Aromatic Hydrocarbons: The general approach used for the value assignment of the PAHs in SRM 1941b was similar to that reported in detail elsewhere [2]. The approach consisted of combining results from analyses using various combinations of different extraction techniques and solvents, clean-up/isolation procedures, and chromatographic separation and detection techniques: Soxhlet extraction and pressurized-fluid extraction (PFE) using dichloromethane (DCM) or a hexane/acetone mixture, cleanup of the extracts using solid-phase extraction (SPE) or normal-phase liquid chromatography (LC), followed by analysis using the following techniques: (1) reversed-phase liquid chromatography with fluorescence detection (LC-FL) analysis of the total PAH fraction, (2) reversed-phase

[1] Certain commercial equipment, instruments or materials are identified in this certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards

LC-FL analysis of isomeric PAH fractions isolated by normal-phase LC (i.e., multidimensional LC), (3) gas chromatography/mass spectrometry (GC/MS) analysis of the PAH fraction on three stationary phases of different selectivity, i.e., a 5 % (all column compositions are given as mole fractions in %) phenyl-substituted methylpolysiloxane phase, a 50 % phenyl-substituted methylpolysiloxane phase, and a relatively non-polar proprietary phase.

Three sets of GC/MS results, designated as GC/MS (I), GC/MS (II), and GC/MS (III), were obtained using three columns with different selectivities for the separation of PAHs. For GC/MS (I) analyses, duplicate subsamples of approximately 1 g from ten bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 2 % DCM in hexane (all solvent concentrations are given as volume fractions in %). The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5 MS, J&W Scientific, Folsom, CA). The GC/MS (II) analyses were performed using 5 g subsamples from six bottles of SRM 1941b. These samples were extracted using PFE with DCM. The high molecular mass compounds were removed from the extracts using size exclusion chromatography (SEC) with a preparative-scale divinylbenzene-polystyrene column (10 μm particle size with 10 nm diameter pores), and the sulfur was removed from the extracts by adding copper powder. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The analysis was by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17 MS, J&W Scientific). For the GC/MS (III), 9 g subsamples from six bottles of SRM 1941b were Soxhlet-extracted for 18 h with 250 mL of a mixture of 50 % hexane/50 % acetone. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific).

Two sets of LC-FL results, designated as LC-FL (total) and LC-FL (isomer), were used in the certification process. For the LC-FL (total), subsamples of approximately 1 g from six bottles of SRM 1941b were extracted using PFE with a mixture of 50 % hexane/50 % acetone. The extracts were concentrated and then processed through an aminopropylsilane SPE cartridge using 2 % DCM in hexane to obtain the total PAH fraction. For the LC-FL (isomer), a 5 g subsample from the six bottles was extracted using PFE with DCM and processed through an aminopropylsilane SPE cartridge using 10 % DCM in hexane; the PAH fraction was then fractionated further on a semi-preparative aminopropylsilane column (μBondapak NH_2, 9 mm i.d. × 30 cm, Waters Associates, Milford, MA) to isolate isomeric PAH fractions as described previously [3–6]. The total PAH fraction and the isomeric PAH fractions were analyzed using a 5 μm particle-size polymeric octadecylsilane (C_{18}) column (4.6 mm i.d. × 25 cm, Hypersil-PAH, Keystone Scientific, Inc., Bellefonte, PA) with wavelength-programmed fluorescence detection [4,5].

For the GC/MS and LC-FL measurements described above, selected perdeuterated PAHs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PAHs in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

Homogeneity Assessment for PAHs: The homogeneity of SRM 1941b was assessed by analyzing duplicate samples of approximately 1 g from ten bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described above for GC/MS (I). No statistically significant differences among bottles were observed for the PAHs at this sample size.

PAH Isomers of Molecular Mass 300 and 302: For the determination of the molecular mass 300 and 302 isomers, three subsamples of approximately 5 g each were extracted using PFE with DCM. The extracts were then concentrated with a solvent change to hexane and passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17MS, J&W Scientific). Perdeuterated dibenzo[*a,i*]pyrene was added to the sediment prior to extraction for use as an internal standard [8].

PCBs and Chlorinated Pesticides: The general approach used for the determination of PCBs and chlorinated pesticides in SRM 1941b consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques. Techniques and solvents included Soxhlet extraction and PFE using DCM or a hexane/acetone mixture,

clean-up/isolation using SPE or LC, followed by analysis using GC/MS and gas chromatography with electron capture detection (GC-ECD) on two columns with different selectivity for the separation of PCBs and chlorinated pesticides. The analytical methods are described in detail elsewhere [2].

Six sets of results were obtained and designated as GC-ECD (I) A and B, GC/MS (I) A and B, GC/MS (II), and Interlaboratory Comparison Exercise. For the GC-ECD (I) analyses, approximately 10 g subsamples from six bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur, and SEC, as described above, was used to remove the high molecular mass compounds. The concentrated extract was then fractionated on a semi-preparative aminopropylsilane column to isolate two fractions containing: (1) the PCBs and lower-polarity pesticides and (2) the more polar pesticides. GC-ECD analyses of the two fractions were performed on two columns of different selectivities for PCB separations: 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5, J&W Scientific), and a 0.25 mm × 60 m fused silica capillary column with a non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The results from the 5 % phenyl phase are designated as GC-ECD (IA) and the results from the proprietary phase are designated as GC-ECD (IB). For the GC-ECD analyses, two PCB congeners that are not significantly present in the sediment extract (PCB 103 and PCB 198 [9,10]) and endosulfan I-d_4, 4,4'-DDE-d_8, 4,4'-DD-d_8, and 4,4'-DDT-d_8 were added to the sediment prior to extraction for use as internal standards for quantification purposes.

Two sets of results were obtained by GC/MS. For GC/MS (I), approximately 9 g subsamples from six bottles were Soxhlet- extracted with a mixture of 50 % hexane/50 % acetone for approximately 18 h. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS with two ionization modes, electron impact (EI) and negative ion chemical ionization (NICI). The GC/MS EI method, GC/MS (IA), used a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The GC/MS NICI method, GC/MS (IB), used a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5MS, J&W Scientific). The GC/MS (II) results were obtained in the same manner as the GC/MS (IA) analyses except that three subsamples were Soxhlet-extracted with DCM for approximately 18 h. For the GC/MS analyses, selected carbon-13 labeled PCB congeners and chlorinated pesticides were added to the sediment prior to extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PCB congeners and chlorinated pesticides in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

The reference value for PCB 77 was determined from a separate fraction. The samples were extracted and processed as for GC-ECD (I) above. The first (PCB and lower-polarity pesticide) fraction from the semi-preparative aminopropylsilane column was further fractionated using a Cosmosil PYE (pyrenylethyl group bonded) column (5 μm particle size, 4.6 mm i.d. × 25 cm ; Phenomenex, Torrance, CA) [11]. Three fractions were collected: the first fraction contained the pesticides and multi-*ortho* PCBs, the second fraction contained the polychlorinated naphthalenes, non-*ortho* PCB congeners, and some mono-*ortho* PCB congeners, and the third fraction removed the residual planar compounds from the column. The second fraction was analyzed by GC/MS NICI using the same column as GC/MS (IB) above. Carbon-13 labeled PCB 77 was used as an internal standard for quantification purposes.

Alkylated PAH Groups, Hopanes, and Steranes: SRM 1941b was used in an interlaboratory comparison exercise in 2011 [12]. Results from 33 laboratories that participated in this exercise were used in the determination of the reference values for alkylated PAH groups, hopanes, and steranes in SRM 1941b. Note that not all laboratories returned data for each analyte. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest. For the alkylated PAHs, the majority of the laboratories (>90 %) used the parent PAH for determination of the response factor for the corresponding alkylated group.

Total Organic Carbon (TOC): Two laboratories provided results for TOC using similar procedures. Briefly, subsamples of approximately 200 mg were reacted with 6 mol/L hydrochloric acid and rinsed with deionized water prior to combustion in a gas fusion furnace. The carbon monoxide and carbon dioxide produced were measured and compared to a blank for calculation of the percent TOC. Each laboratory analyzed subsamples from three bottles of SRM 1941b. One of the laboratories also analyzed three subsamples from three bottles of SRM 1941b for carbon, hydrogen, and nitrogen.

Table 1. Certified Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
Naphthalene[b,c,d,e,f,g]	848	±	95[h]
Fluorene[b,c,d,e,f,g]	85	±	15[h]
Phenanthrene[b,c,d,e,f,g]	406	±	44[h]
Anthracene[b,c,d,e,f,g]	184	±	18[h]
3-Methylphenanthrene[b,c,d]	105	±	13[h]
2-Methylphenathrene[b,c,d]	128	±	14[h]
1-Methylphenanthrene[b,c,d,g]	73.2	±	5.9[h]
Fluoranthene[b,c,d,e,f,g]	651	±	50[h]
Pyrene[b,c,d,e,f,g]	581	±	39[h]
Benz[*a*]anthracene[b,c,d,e,f,g]	335	±	25[h]
Chrysene[d,f]	291	±	31[h]
Triphenylene[d,f]	108	±	5[i]
Benzo[*b*]fluoranthene[c,e]	453	±	21[h]
Benzo[*k*]fluoranthene[b,c,d,e]	225	±	18[h]
Benzo[*e*]pyrene[b,c,d,g]	325	±	25[h]
Benzo[*a*]pyrene[b,c,d,f,g]	358	±	17[h]
Perylene[b,c,d,f,g]	397	±	45[h]
Benzo[*ghi*]perylene[b,c,d,f,g]	307	±	45[h]
Indeno[1,2,3-*cd*]pyrene[b,c,d,f,g]	341	±	57[h]
Dibenz[*a,j*]anthracene[b,c,d,f]	48.9	±	4.6[h]
Dibenz[*a,c*]anthracene[c,f]	36.7	±	5.2[h]
Dibenz[*a,h*]anthracene[c,f]	53	±	10[h]
Benzo[*b*]chrysene[b,c,d,f]	53	±	12[h]
Picene[b,c,d]	46.6	±	4.7[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[e] LC-FL (total) of total PAH fraction after PFE with DCM.
[f] LC-FL (isomer) of isomeric PAH fractions after PFE with DCM.
[g] 1999 Interlaboratory Comparison Study [7] with 21 to 29 laboratories submitting data for each PAH.
[h] Certified values are weighted means of the results from two to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[i] The certified value is an unweighted mean of the results from two analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the value is metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 2. Certified Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b] (µg/kg)		
PCB	8	(2,4'-Dichlorobiphenyl)[c,d,e,f,g]	1.65	±	0.19[h]
PCB	18	(2,2',5-Trichlorobiphenyl)[c,d,e,f,g]	2.39	±	0.29[h]
PCB	28	(2,4,4'-Trichlorobiphenyl)[c,d,e,f,g]	4.52	±	0.57[h]
PCB	31	(2,4',5-Trichlorobiphenyl)[c,e,f]	3.18	±	0.41[h]
PCB	44	(2,2'3,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	3.85	±	0.20[i]
PCB	49	(2,2'4,5'-Tetrachlorobiphenyl)[c,d,e,f]	4.34	±	0.28[i]
PCB	52	(2,2',5,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	5.24	±	0.28[i]
PCB	66	(2,3',4,4'-Tetrachlorobiphenyl)[c,e,f,g,j]	4.96	±	0.53[i]
PCB	87	(2,2',3,4,5'-Pentachlorobiphenyl)[c,d,f,j]	1.14	±	0.16[h]
PCB	95	(2,2',3,5',6-Pentachlorobiphenyl)[c,e,f,g]	3.93	±	0.62[i]
PCB	99	(2,2',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g]	2.90	±	0.36[i]
PCB	101	(2,2',4,5,5'-Pentachlorobiphenyl)[c,e,f,g,j]	5.11	±	0.34[i]
PCB	105	(2,3,3',4,4'-Pentachlorobiphenyl)[c,d,e,f,g,j]	1.43	±	0.10[i]
PCB	110	(2,3,3',4',6-Pentachlorobiphenyl)[c,e,f,j]	4.62	±	0.36[i]
PCB	118	(2,3',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g,j]	4.23	±	0.19[i]
PCB	128	(2,2',3,3',4,4'-Hexachlorobiphenyl)[c,d,e,f,g,j]	0.696	±	0.044[i]
PCB	138	(2,2',3,4,4',5'-Hexachlorobiphenyl)[c,e,f,j]	3.60	±	0.28[i]
PCB	149	(2,2',3,4',5',6-Hexachlorobiphenyl)[c,d,e,j]	4.35	±	0.26[h]
PCB	153	(2,2',4,4',5,5'-Hexachlorobiphenyl)[c,d,e,f,g,j]	5.47	±	0.32[i]
PCB	156	(2,3,3',4,4',5-Hexachlorobiphenyl)[c,d,e,f,j]	0.507	±	0.090[h]
PCB	170	(2,2',3,3',4,4',5-Heptachlorobiphenyl)[c,d,e,f,g,j]	1.35	±	0.09[i]
PCB	180	(2,2',3,4,4',5,5'-Heptachlorobiphenyl)[c,d,e,f,g,j]	3.24	±	0.51[i]
PCB	183	(2,2',3,4,4',5',6-Heptachlorobiphenyl)[c,d,e,j]	0.979	±	0.087[h]
PCB	187	(2,2',3,4',5,5',6-Heptachlorobiphenyl)[c,d,e,f,g,j]	2.17	±	0.22[i]
PCB	194	(2,2',3,3',4,4',5,5'-Octachlorobiphenyl)[c,d,e,j]	1.04	±	0.06[h]
PCB	195	(2,2',3,3',4,4',5,6-Octachlorbiphenyl)[c,e,g,j]	0.645	±	0.060[i]
PCB	201	(2,2',3,3',4,5',6,6'-Octachlorobiphenyl)[c,e,j]	0.777	±	0.034[h]
PCB	206	(2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)[c,e,f,g,j]	2.42	±	0.19[i]
PCB	209	Decachlorobiphenyl[c,d,e,f,g,j]	4.86	±	0.45[i]

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform to IUPAC rules, except PCB 201. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 201 is listed as PCB 200.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[g] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each PCB congener.

[h] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[i] Certified values are weighted means of the results from three to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[j] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

Table 3. Certified Mass Fraction Values for Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a] (µg/kg)
Hexachlorobenzene[b,c,d,e]	5.83 ± 0.38[f]
cis-Chlordane[b,c,d,e,g]	0.85 ± 0.11[h]
trans-Chlordane[b,c,e]	0.566 ± 0.093[f]
cis-Nonachlor[b,e,g]	0.378 ± 0.053[h]
trans-Nonachlor[b,c,d,e,g]	0.438 ± 0.073[f]
4,4'-DDE[b,d,e,g]	3.22 ± 0.28[h]
4,4'-DDD[b,d,e,g]	4.66 ± 0.46[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[e] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each pesticide.
[f] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[g] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.
[h] Certified values are weighted means of the results from three to five analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed and the values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 4. Reference Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
1-Methylnaphthalene[b,c,d,e]	127	±	14[f]
2-Methylnaphthalene[b,c,d,e]	276	±	53[f]
2,6-Dimethylnaphthalene[b,c,d,e]	75.9	±	4.5[f]
2,3,5-Trimethylnaphthalene[b,c,d,e]	25.5	±	5.1[f]
Biphenyl[b,c,d,e]	74.0	±	8.0[f]
Acenaphthylene[b,c,d,e]	53.3	±	6.4[f]
Acenaphthene[b,c,d,e]	38.4	±	5.2[f]
9-Methylphenanthrene[c]	63.5	±	2.5[g]
4-Methylphenanthrene and 9-Methylphenanthrene[b,d]	80.1	±	4.8[f]
2-Methylanthracene[c,d]	36	±	15[f]
8-Methylfluoranthene[b]	49.5	±	2.7[g]
7-Methylfluoranthene[b]	45.4	±	1.5[g]
1-Methylfluoranthene[b]	42.4	±	2.1[g]
3-Methylfluoranthene[b]	28.8	±	1.3[g]
2-Methylpyrene[b]	78.7	±	4.0[g]
4-Methylpyrene[b]	66.4	±	2.6[g]
1-Methylpyrene[b]	52.5	±	2.3[g]
Acephenanthrene[d]	30.5	±	1.9[g]
Benzo[*c*]phenanthrene[b,c,d]	58	±	15[f]
Benzo[*a*]fluoranthene[b,c,d]	73	±	18[f]
Benzo[*j*]fluoranthene[c]	217	±	5[g]
Indeno[1,2,3-*cd*]fluoranthene[d]	9.63	±	0.34[g]
Pentaphene[d]	25.3	±	1.0[g]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[e] 1999 Interlaboratory Comparison Study [7] with 14 to 26 laboratories submitting data for each PAH.

[f] Reference values are weighted means of the results from two to four analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of PAHs listed as determined by the methods indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[g] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for the associated degrees of freedom (19 for footnote b and 5 for footnotes c and d) and 95 % confidence level for each analyte. The measurand is the total mass fraction of the PAHs listed as determined by the method indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 5. Reference Mass Fraction Values for PAHs of Molecular Mass 300 and 302 in SRM 1941b

PAHs of Molecular Mass 300 and 302	Mass Fractions[a,b,c] (µg/kg)		
Coronene	72.6	±	4.7
Dibenzo[*b,e*]fluoranthene	10.3	±	0.3
Naphtho[1,2-*b*]fluoranthene	91.0	±	3.1
Naphtho[1,2-*k*]fluoranthene and Naphtho[2,3-*j*]fluoranthene	79.8	±	2.5
Naphtho[2,3-*b*]fluoranthene	23.5	±	0.3
Dibenzo[*b,k*]fluoranthene	95.6	±	3.1
Dibenzo[*a,k*]fluoranthene	26.6	±	0.4
Dibenzo[*j,l*]fluoranthene	63.8	±	1.8
Dibenzo[*a,l*]pyrene	11.1	±	1.0
Naphtho[2,3-*k*]fluoranthene	10.7	±	0.6
Naphtho[1,2-*a*]pyrene	16.7	±	1.4
Naphtho[2,3-*e*]pyrene	33.2	±	2.3
Dibenzo[*a,e*]pyrene	76.1	±	3.6
Naphtho[2,1-*a*]pyrene	59.2	±	1.8
Dibenzo[*e,i*]pyrene	35.0	±	2.4
Naphtho[2,3-*a*]pyrene	16.5	±	0.6
Benzo[*b*]perylene	38.2	±	1.2
Dibenzo[*a,i*]pyrene	25.5	±	1.0
Dibenzo[*a,h*]pyrene	6.94	±	0.29

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for two degrees of freedom and 95 % confidence level for each analyte. The measurand is the total mass fraction of the constituent listed as determined by the method indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[c] GC/MS on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM [8].

Table 6. Reference Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b,c] (µg/kg)		
PCB	45	(2,2',3,6-Tetrachlorobiphenyl)[d,e]	0.73	±	0.12
PCB	56	(2,3,3',4'-Tetrachlorobiphenyl)[d,f,g]	1.21	±	0.11
PCB	63	(2,3,4',5-Tetrachlorobiphenyl)[e,f,g]	0.213	±	0.040
PCB	70	(2,3',4',5-Tetrachlorobiphenyl)[e,f,g]	4.99	±	0.29
PCB	74	(2,4,4',5-Tetrachlorobiphenyl)[e,f,g]	2.04	±	0.15
PCB	77	(3,3',4,4'-Tetrachlorobiphenyl)[h]	0.31	±	0.03
PCB	107	(2,3,3',4',5-Pentachlorobiphenyl)[d,e,f,g]	0.628	±	0.028
PCB	132	(2,2',3,3',4,6'-Hexachlorobiphenyl)[d,f,g]	1.28	±	0.27
PCB	146	(2,2',3,4',5,5'-Hexachlorobiphenyl)[e,f,g]	1.22	±	0.12
PCB	158	(2,3,3',4,4',6-Hexachlorobiphenyl)[d,e,f,g]	0.65	±	0.15
PCB	163	(2,3,3',4',5,6-Hexachlorobiphenyl)[e,f,g]	1.28	±	0.06
PCB	174	(2,2',3,3',4,5,6'-Heptachlorobiphenyl)[d,e,f,g]	1.51	±	0.39
PCB	193	(2,3,3',4',5,5',6-Heptachlorobiphenyl)[d,e,f,g]	0.292	±	0.075

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform with IUPAC rules, except PCB 107. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 107 is listed as PCB 108.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] For these PCB congeners except PCB 77, the reference values are unweighted means of the results from two to four analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled within-method variance following the ISO/JCGM Guide [14,15]. For PCB 77, the reference value is the mean of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to two degrees of freedom and 95 % confidence level for PCB 77. The measurand is the total mass fraction of the PCB Congeners listed as determined by the method or methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as microgram per kilogram on a dry-mass basis.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[h] GC/MS NICI on a 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (I) fractionated using a PYE column.

Table 7. Reference Mass Fraction Values for Selected Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a,b] (µg/kg)
2,4'-DDE[c,d]	0.38 ± 0.12
4,4'-DDT[e,f]	1.12 ± 0.42

[a] Mass Fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference values are unweighted means of the results from two analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).
[e] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[f] 1999 Interlaboratory Comparison Study [7] with 10 laboratories submitting data for 4,4'-DDT.

Table 8. Reference Mass Fraction Values for Alkylated PAH Groups in SRM 1941b

Alkylated PAH Group	Mass Fraction[a,b] (µg/kg)
C2-decalins	18 ± 5
C4-decalins	41 ± 4
C2-naphthalenes	187 ± 53
C3-naphthalenes	158 ± 42
C1-benzothiophenes	25 ± 14
C2-benzothiophenes	20 ± 11
C3-benzothiophenes	22 ± 13
C4-benzothiophenes	18 ± 5
C1-fluorenes	57 ± 18
C2-fluorenes	122 ± 43
C3-fluorenes	128 ± 31
C1-phenanthrenes/anthracenes	313 ± 99
C2-phenanthrenes/anthracenes	247 ± 62
C3-phenanthrenes/anthracenes	165 ± 46
C4-phenanthrenes/anthracenes	87 ± 36
C1-dibenzothiophenes	54 ± 13
C2-dibenzothiophenes	91 ± 18
C3-dibenzothiophenes	84 ± 15
C4-dibenzothiophenes	57 ± 13
C1-fluoranthenes/pyrenes	252 ± 48
C2-fluoranthenes/pyrenes	205 ± 38
C3-fluoranthenes/pyrenes	102 ± 22
C4-fluoranthenes/pyrenes	121 ± 59
C1-benzanthraces/chrysenes/triphenylenes	208 ± 43
C2-benzanthraces/chrysenes/triphenylenes	120 ± 24
C3-benzanthraces/chrysenes/triphenylenes	73 ± 31
C4-benzanthraces/chrysenes/triphenylenes	41 ± 11

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the alkylated PAH groups listed as determined by the interlaboratory study methods. The values listed are metrologically traceable to the SI unit of mass fraction, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 9. Reference Mass Fraction Values for Hopanes and Steranes in SRM 1941b

Hopane or Sterane	Mass Fraction[a,b] (µg/kg)
17α(H)-22,29,30-Trisnorhopane	54 ± 18
17α(H)-21β(H)-30-Norhopane	137 ± 21
17α(H)-21β(H)-30-Hopane	215 ± 44
17α(H)-21β(H)-22R-Homohopane	44 ± 10
17α(H)-21β(H)-22S-Homohopane	48 ± 13
5α(H)-14α(H),17α(H)-Cholestane 20R	41 ± 11
5α(H)-14β(H),17β(H)-Cholestane 20R	27 ± 6
5α(H)-14β(H),17β(H)-24-Methylcholestane 20R	21 ± 8
5α(H)-14α(H),17α(H)-24-Ethylcholestane 20R	19 ± 5
5α(H)-14β(H),17β(H)-24-Ethylcholestane 20R	41 ± 9

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the constituent listed as determined by the methods used during the interlaboratory study. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 10. Reference Mass Fraction Value for Total Organic Carbon in SRM 1941b

Total Organic Carbon (TOC)	2.99 % ± 0.24 %[a,b]

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference value for total organic carbon is a weighted mean value from routine measurements made by two laboratories [21]. The uncertainty listed is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance. The reporting follows the ISO/JCGM Guides [2]. The measurand is the total mass fraction of TOC listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as a percent on a dry-mass basis.

Table 11. Information Mass Fraction Values for Carbon, Hydrogen, and Nitrogen in SRM 1941b

Elements	Mass Fractions[a] (%)
Carbon	3.3
Hydrogen	1.2
Nitrogen	<0.5

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.

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Certificate Revision History: 16 January 2015 (Corrected IUPAC name for PCB-56 and PCB-107; editorial changes); 10 June 2014 (Units corrected from mg/kg to µg/kg in Tables 8 and 9; editorial changes); 10 April 2012 (Reference value added for alkylated PAH groups, hopanes, and steranes; extension of certification period; editorial changes); 16 August 2004 (Reference values for the butyl tins removed; editorial changes); 15 July 2002 (Original certificate date).

Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

APPENDIX A

The laboratories listed below performed measurements that contributed to the certification of PAHs, PCBs, and chlorinated pesticides in SRM 1941b Organics in Marine Sediment.

Arthur D. Little, Inc; Cambridge, MA
Axys Analytical Services; Sidney, BC, Canada
B & B Laboratories; College Station, TX
Battelle Ocean Sciences; Duxbury, MA
Bedford Institute of Oceanography; Dartmouth, NS, Canada
California Department of Fish and Game; Rancho Cordova, CA
Central Contra Costa Sanitary District; Martinez, CA
Chesapeake Biological Laboratory; Solomons, MD
Centro de Investigacionies Energeticas Medioambientales y Tecnologicas; Madrid, Spain
City of Los Angeles Environmental Monitoring Division; Playa del Rey, CA
City of San Jose Environmental Services Department; San Jose, CA
Columbia Analytical Services; Kelso, WA
East Bay Municipal Utility District; Oakland, CA
Florida Department of Environmental Protection; Tallahassee, FL
Manchester Environmental Laboratory; Port Orchard, WA
Murray State University; Murray, KY
Massachusetts Water Resources Authority Central Lab; Winthrop, MA
National Research Council of Canada; Ottawa, Ontario, Canada
National Oceanic and Atmospheric Association (NOAA), National Marine Fisheries Service (NMFS), Auke Bay Laboratory; Juneau, AK
NOAA, National Ocean Service/Center for Coastal Environmental Health and Biomolecular Research; Charleston, SC
NOAA, NMFS, Sandy Hook Marine Laboratory; Highlands, NJ
NOAA, NMFS, Northwest Fisheries Science Center; Seattle, WA
Orange County Sanitation District; Fountain Valley, CA
Philip Analytical Services; Burlington, Ontario, Canada
Serv de Hidrografia Naval; Buenos Aires, Argentina
Skidaway Institute of Technology; Savannah, GA
Southwest Laboratory of Oklahoma; Broken Arrow, OK
Severn Trent Knoxville Laboratory; Knoxville, TN
Texas A&M University, Geochemical and Environmental Research Group; College Station, TX
Texas Parks and Wildlife Department; San Marcos, TX
University of California at Los Angeles, Institute of Geophysics and Planetary Physics; Los Angeles, CA
University of Connecticut, Environmental Research Institute; Storrs, CT
University of Rhode Island, Graduate School of Oceanography; Narragansett, RI
US Department of Agriculture, Environmental Chemistry Laboratory; Beltsville, MD
US Environmental Protection Agency, Atlantic Ecology Division; Narragansett, RI
US Geological Survey, National Water Quality Laboratory; Denver, CO
Woods Hole Group Environmental Lab; Raynham, MA
Wright State University; Dayton, OH

APPENDIX B

The laboratories listed below performed measurements that contributed to the certification of alkylated PAH groups, hopanes, and steranes in SRM 1941b Organics in Marine Sediment.

Alpha Analytical, Inc.; Mansfield, MA
Analytical Resources, Inc.; Tukwila, WA
Axys Analytical Services; Sydney, BC, Canada
Battelle Analytical & Environmental Chemistry Laboratory; Duxbury, MA
Center for Laboratory Sciences; Pasco, WA
Columbia Analytical Services; Jacksonville, FL
Columbia Analytical Services; Rochester, NY
Columbia Analytical Services, Kelso, WA
Florida Department of Environmental Protection; Tallahassee, FL
Florida International University; North Miami, FL
Michigan Department of Natural Resources and Environment; Lansing, MI
Mississippi State Chemical Laboratory; Mississippi State, MS
NIST; Charleston, SC
NIST; Gaithersburg, MD
NOAA/NCCOS/NOS; Charleston, SC
NOAA/NMFS/Alaska Fisheries Science Center; Juneau, AK
NY State Department of Health; Albany, NY
Pace Analytical Services, Inc. Minneapolis; Minneapolis, MN
RJ Lee Group, Inc; Monroeville, PA
TDI/B&B Laboratories, Inc.; College Station, TX
TestAmerica Laboratories; Mobile, AL
TestAmerica Laboratories; West Sacramento, CA
TestAmerica Laboratories; University Park, IL
TestAmerica Laboratories; Schriever, LA
TestAmerica Laboratories; Edison, NJ
TestAmerica Laboratories; Knoxville, TN
TestAmerica Laboratories; Pittsburgh, PA
TestAmerica Laboratories; South Burlington, VT
TestAmerica Laboratories; Tacoma, WA
US Army Engineer Research and Development Center; Vicksburg, MS
USGS Columbia Environmental Research Center; Columbia, MO
University of Iowa, State Hygienic Laboratory; Iowa City, IO
Washington State Public Health Laboratories; Shoreline, WA

NIST

Date of Issue:
31 March 2014

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 1941b
SRM Name: Organics in Marine Sediment
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements
Symbol
No Symbol/Pictogram

Signal Word
Not applicable.

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Marine sediment

Other Designations: Sediment.

This material is naturally occurring marine sediment from an urban area. The material contains trace amounts of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and should be handled with care. Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Marine Sediment	Not available	Not available	100

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:
Suitable: Use extinguishing media appropriate for surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. Handling and Storage

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handling in accordance with all current regulations and standards.

8. Exposure Controls and Personal Protection

Exposure Limits: No occupational exposure limits have been established for marine sediment. This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure. The exposure limits for Particulates Not Otherwise Regulated (PNOR) are applicable.

OSHA (PEL): 15 mg/m^3 (TWA, total particulates not otherwise regulated)
OSHA (PEL) 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

NIOSH (REL): 10 mg/m^3 (TWA, total particulates not otherwise regulated, 8 h)
NIOSH (REL): 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):	amorphous powder
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not applicable
Melting point/freezing point (°C):	not available
Specific Gravity (water=1)	not available
Vapor Pressure (mmHg):	not applicable
Vapor Density (air = 1):	not applicable
Viscosity (cP):	not applicable
Solubility(ies):	not available
Partition coefficient (n-octanol/water):	not available
Particle Size:	<150 µm

Thermal Stability Properties:

Autoignition Temperature (°C):	not available
Thermal Decomposition (°C):	not available
Initial boiling point and boiling range (°C):	not available
Explosive Limits, LEL (Volume %):	not available
Explosive Limits, UEL (Volume %):	not available
Flash Point (°C):	not available
Flammability (solid, gas):	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: None listed.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: __X__ Inhalation __X__ Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Generated dust may cause irritation if inhaled.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Generated dust may cause irritation.

Skin Contact: May cause mechanical irritation.

Eye Contact: May cause mechanical irritation.

Ingestion: No data available.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified; no data available.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/ Eye irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes __X__ No
Marine sediment is not listed by NTP, IARC or OSHA as a carcinogen.

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:
California Proposition 65: Not listed.

U.S. TSCA Inventory: Not listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 31 March 2014

Sources: 29 CFR Occupational Health and Safety Office (OSHA) 1910.1000, *Limits for Air Contaminants*, Table Z-1; available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992 (accessed Mar 2014).

Center for Disease Control (CDC) NIOSH Pocket Guide to Chemical Hazards, *Particulates not otherwise regulated*; available at http://www.cdc.gov/niosh/npg/npgd0480.html (accessed Mar 2014).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or Internet at http://www.nist.gov/srm.

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Order discrepancies (other than back ordered items) must be reported to our Customer Relations Department at 301-975-6776 within 5 days of receipt of shipment or this order will be considered complete. NIST SRMs/RMs are generally not returnable - with the exception of defective goods or shipments made in error by NIST. To return a SRM/RM, please call for instructions and a Return SRM/RM Authorization Number before shipment. Returns WILL NOT BE ACCEPTED without prior authorization.

Order	UOM	Ship	UOM	B/O	UOM	Item	Description
1	EACH	1	EACH	0	EACH	1941B	Organics in Marine Sediment
						Total qty:	1 / EACH
							NOT FOR HUMAN CONSUMPTION, LABORATORY USE ONLY.

9/21/16
04:04 PM

1700101

Picked by	
Packed by	
# of pieces	
Weight	

MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

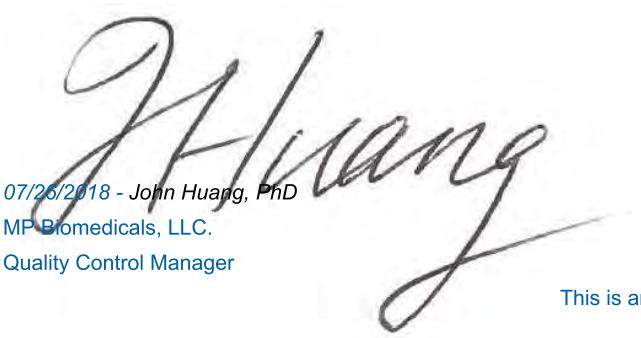
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

Identification A & B: Passes
Bulk Density: 0.29 g/ml
Bulk Density (graduated cylinder): 0.31 g/ml
Conductivity: 18 µS/cm
Starch: Negative
Ether Soluble Substances: 0.01%
Total Aerobic microbial Count: 100 cfu/g
Total Mold and Yeast Count: 20 cfu/g
Staphylococcus aureus: Absent/1 g
Pseudomonas aeruginosa: Absent/1 g
E. coli: Absent/1 g
Salmonella: Absent/10 g
Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
Recommended Retest Date: 11/30/2022



07/26/2018 - *John Huang, PhD*
MP Biomedicals, LLC.
Quality Control Manager

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MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

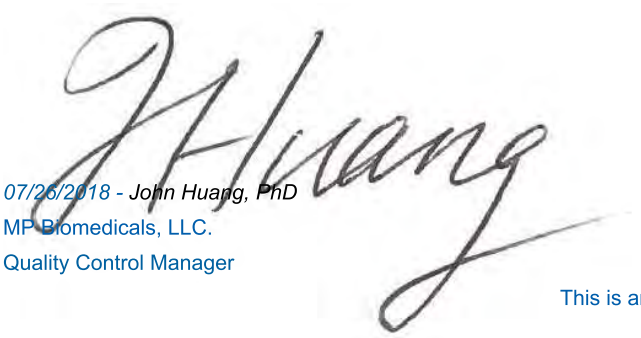
Test	Specification	Result
Identity Test	Passes	Passes
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Moisture	<5.0%	3.4%
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pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

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Bulk Density (graduated cylinder): 0.31 g/ml
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E. coli: Absent/1 g
Salmonella: Absent/10 g
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- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
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Certificate of Analysis

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Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
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Physical Description: White Powder	

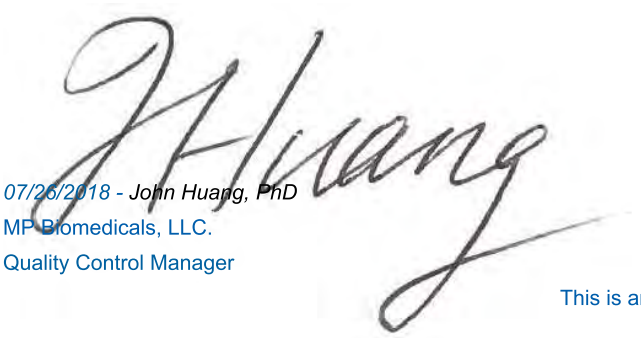
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

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E. coli: Absent/1 g
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Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
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Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-07C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-01 A	SDG:	23E0152
Sampled:	03/22/23 07:29	Prepared:	05/08/23 13:56	File ID:	
% Solids:	81.65	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	81.65	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-07C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-02 A	SDG:	23E0152
Sampled:	03/22/23 07:29	Prepared:	05/08/23 13:56	File ID:	
% Solids:	77.08	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	77.08	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-08C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-03 A	SDG:	23E0152
Sampled:	03/22/23 08:07	Prepared:	05/08/23 13:56	File ID:	
% Solids:	68.94	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	68.94	1	0.04	0.04	

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SM 2540 G-11

SED-08C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-04 A	SDG:	23E0152
Sampled:	03/22/23 08:07	Prepared:	05/08/23 13:56	File ID:	
% Solids:	72.56	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	72.56	1	0.04	0.04	

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INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-09C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-05 A	SDG:	23E0152
Sampled:	03/22/23 08:33	Prepared:	05/08/23 13:56	File ID:	
% Solids:	67.96	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	67.96	1	0.04	0.04	

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SM 2540 G-11

SED-09C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-06 A	SDG:	23E0152
Sampled:	03/22/23 08:33	Prepared:	05/08/23 13:56	File ID:	
% Solids:	76.50	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	76.50	1	0.04	0.04	

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INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-12C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-07 A	SDG:	23E0152
Sampled:	03/22/23 09:25	Prepared:	05/08/23 13:56	File ID:	
% Solids:	59.79	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	59.79	1	0.04	0.04	

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INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-26C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-08 A	SDG:	23E0152
Sampled:	03/22/23 10:38	Prepared:	05/08/23 13:56	File ID:	
% Solids:	60.95	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	60.95	1	0.04	0.04	

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INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-26C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-09 A	SDG:	23E0152
Sampled:	03/22/23 10:38	Prepared:	05/08/23 13:56	File ID:	
% Solids:	73.81	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	73.81	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-25C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-10 A	SDG:	23E0152
Sampled:	03/22/23 11:19	Prepared:	05/08/23 13:56	File ID:	
% Solids:	75.95	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	75.95	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-25C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-11 A	SDG:	23E0152
Sampled:	03/22/23 11:19	Prepared:	05/08/23 13:56	File ID:	
% Solids:	77.79	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	77.79	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-10C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-12 A	SDG:	23E0152
Sampled:	03/23/23 08:17	Prepared:	05/08/23 13:56	File ID:	
% Solids:	77.06	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	77.06	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-10C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-13 A	SDG:	23E0152
Sampled:	03/23/23 08:17	Prepared:	05/08/23 13:56	File ID:	
% Solids:	82.83	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	82.83	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-11C:0-1

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-14 A	SDG:	23E0152
Sampled:	03/23/23 07:29	Prepared:	05/08/23 13:56	File ID:	
% Solids:	67.04	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	67.04	1	0.04	0.04	

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Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-11C:1-3

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-15 A	SDG:	23E0152
Sampled:	03/23/23 08:42	Prepared:	05/08/23 13:56	File ID:	
% Solids:	73.76	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	73.76	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-DUP3C

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0152-16 A	SDG:	23E0152
Sampled:	03/23/23 12:00	Prepared:	05/08/23 13:56	File ID:	
% Solids:	77.15	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 14:00
Batch:	BLE0240	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	77.15	1	0.04	0.04	

PREPARATION BATCH SUMMARY

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0240 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-07C:0-1	23E0152-01		05/08/23 13:56	
SED-07C:1-3	23E0152-02		05/08/23 13:56	
SED-08C:0-1	23E0152-03		05/08/23 13:56	
SED-08C:1-3	23E0152-04		05/08/23 13:56	
SED-09C:0-1	23E0152-05		05/08/23 13:56	
SED-09C:1-3	23E0152-06		05/08/23 13:56	
SED-12C:0-1	23E0152-07		05/08/23 13:56	
SED-26C:0-1	23E0152-08		05/08/23 13:56	
SED-26C:1-3	23E0152-09		05/08/23 13:56	
SED-25C:0-1	23E0152-10		05/08/23 13:56	
SED-25C:1-3	23E0152-11		05/08/23 13:56	
SED-10C:0-1	23E0152-12		05/08/23 13:56	
SED-10C:1-3	23E0152-13		05/08/23 13:56	
SED-11C:0-1	23E0152-14		05/08/23 13:56	
SED-11C:1-3	23E0152-15		05/08/23 13:56	
SED-DUP3C	23E0152-16		05/08/23 13:56	
Blank	BLE0240-BLK1		05/08/23 13:56	
SED-07C:1-3	BLE0240-DUP1		05/08/23 13:56	
SED-07C:1-3	BLE0240-DUP2		05/08/23 13:56	

TOTAL SOLIDS/VOLATILE SOLIDS (TS / TVS) BENCHSHEET for Solid samples

Method: PSEP 1986, SM2540, EPA 160.1

(dry at 104 (12-24 hr) then combust at 550 (30 min))

Batch:	BLE0240
Date:	5/8/2023 14:00
Analyst:	UW

Instrumentation

Drying Ovens:	12	**Analytical Balance:**	BAL2
Muffle Furnace:	2		

Batch drying time

record times as mm/dd/yy hh:mm

date/time in oven:	5/8/2023 14:34	
date/time out:	5/9/2023 8:45	
elapsed hrs =	18.2	OK

TS (%) calculated as:
Final dry wt (g) = (Dry Wt - Tare Wt)
TS = (Final Dry Wt)/ (grams Sample-Tare)

Oven Temps, °C	
Start Temp	103
Dry Cycle 1	103
Dry Cycle 2	
Dry Cycle 3	

TVS (mg/kg dry wt) calculated as:
Final ash wt (g) = (min ash wt - tare wt)
TVS (mg/kg) = [(Dry wt-Ash wt)/ (dry weight)] *1,000,000
if ash wt > dry wt, "Chk for Err"
if dry wt-ash wt < 0.001 g, "< (1/dry wt)*1,000,000

Balance Calibration Check

Record weights to 4 places

	Cal Weight ID:	CV-02	CV-02	CV-02	CV-02	CV-02		CV-02	CV-02	CV-02		
	Date & Time:	5/8/23 14:00	5/8/23 14:10	5/9/23 9:22								
Cal Wt (g):	10.0000	10.0000	10.0000	10.0000								
		Cal OK!	Cal OK!	Cal OK!								

Sample ID	Dish #	Tare Wt. (g)	Dish & Sample (g)	Dry Wt 104C (grams) 1	2	3	dry Wt (g)	TS (%)	Notes	ASH WT 550C (grams) 1	2	3	Ash Wt (g)	TVS (mg/kg)	(%)	Notes
BLE0240-BLK1	24	0.8231	0.0000	0.8229			-0.0002	0.02%								
23E0152-01	25	0.8188	8.4589	7.0569			6.2381	81.65%								
23E0152-02	26	0.7997	9.7208	7.6764			6.8767	77.08%								
BLE0240-DUP1	27	0.8250	8.1881	6.4403			5.6153	76.26%	RPD=1.1							
BLE0240-DUP2	28	0.8088	8.1608	6.3862			5.5774	75.86%	RSD=0.8							
23E0152-03	29	0.8084	9.7750	6.9901			6.1817	68.94%								
23E0152-04	30	0.7988	8.8455	6.6378			5.8390	72.56%								
23E0152-05	31	0.8273	6.6604	4.7917			3.9644	67.96%								
23E0152-06	32	0.8196	8.5933	6.7666			5.9470	76.50%								
23E0152-07	33	0.8074	9.9011	6.2448			5.4374	59.79%								
23E0152-08	34	0.8035	7.3027	4.7645			3.9610	60.95%								
23E0152-09	35	0.8308	8.6288	6.5862			5.7554	73.81%								
23E0152-10	36	0.8156	8.6333	6.7528			5.9372	75.95%								
23E0152-11	37	0.7964	10.3768	8.2492			7.4528	77.79%								
23E0152-12	38	0.7842	8.2094	6.5058			5.7216	77.06%								
23E0152-13	39	0.8222	9.2936	7.8394			7.0172	82.83%								
23E0152-14	40	0.8292	7.5294	5.3212			4.4920	67.04%								
23E0152-15	41	0.8220	8.0927	6.1849			5.3629	73.76%								
23E0152-16	42	0.8059	7.8291	6.2243			5.4184	77.15%								

Form I

METHOD BLANK DATA SHEET

SM 2540 G-11

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0240
Laboratory ID: BLE0240-BLK1
Prepared: 05/08/23 13:56
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/08/23 14:00
Sequence:
Calibration:
Instrument: BAL2

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	ND	1	0.04	0.04	U

SED-07C:1-3

DUPLICATES

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0240-DUP1
Batch: BLE0240
Lab Source ID: 23E0152-02
Preparation: No Prep Wet Chem
Initial/Final: 5 g / 5 g
Source Sample Name: SED-07C:1-3
% Solids: 77.08

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Solids	20	77.08	76.26	1.07	

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

SED-07C:1-3

DUPLICATES

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0240-DUP2
Batch: BLE0240
Lab Source ID: 23E0152-02
Preparation: No Prep Wet Chem
Initial/Final: 5 g / 5 g
Source Sample Name: SED-07C:1-3
% Solids: 77.08

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
Total Solids	20	77.08	75.86	1.60	

*: Values outside of QC limits
L: Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to Dup = +/- RL instead of 20% RPD

HOLDING TIME SUMMARY

Analysis: SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-07C:0-1 23E0152-01	03/22/23 07:29	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-07C:1-3 23E0152-02	03/22/23 07:29	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-08C:0-1 23E0152-03	03/22/23 08:07	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-08C:1-3 23E0152-04	03/22/23 08:07	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-09C:0-1 23E0152-05	03/22/23 08:33	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-09C:1-3 23E0152-06	03/22/23 08:33	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-12C:0-1 23E0152-07	03/22/23 09:25	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-26C:0-1 23E0152-08	03/22/23 10:38	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-26C:1-3 23E0152-09	03/22/23 10:38	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-25C:0-1 23E0152-10	03/22/23 11:19	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-25C:1-3 23E0152-11	03/22/23 11:19	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
SED-10C:0-1 23E0152-12	03/23/23 08:17	05/05/23 14:20	05/08/23 13:56	46	180	05/08/23 14:00	46	180	
SED-10C:1-3 23E0152-13	03/23/23 08:17	05/05/23 14:20	05/08/23 13:56	46	180	05/08/23 14:00	46	180	
SED-11C:0-1 23E0152-14	03/23/23 07:29	05/05/23 14:20	05/08/23 13:56	46	180	05/08/23 14:00	46	180	
SED-11C:1-3 23E0152-15	03/23/23 08:42	05/05/23 14:20	05/08/23 13:56	46	180	05/08/23 14:00	46	180	
SED-DUP3C 23E0152-16	03/23/23 12:00	05/05/23 14:20	05/08/23 13:56	46	180	05/08/23 14:00	46	180	
Duplicate BLE0240-DUP1	03/22/23 07:29	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	
Duplicate BLE0240-DUP2	03/22/23 07:29	05/05/23 14:20	05/08/23 13:56	47	180	05/08/23 14:00	47	180	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0152
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids	0.04	0.04	%

Analytical Resources, LLC
Analytical Chemists and Consultants

18 July 2024

Michael Erdahl
Friedman & Bruya Inc.
5500 4th Ave S
Seattle, WA 98108

RE: Port of Friday Harbor (303333)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23E0156	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC



Susan Dunnihoo For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Accredited in accordance with nelac
Cert# 100006-012

23E0156

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303333	D-221

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon										Notes
SED-24G:0-10		3/20/2023	1106	sediment	1	x										
SED-23G:0-10		3/20/2023	1142	sediment	1	x										
SED-22G:0-10		3/20/2023	1158	sediment	1	x										
SED-21G:0-10		3/20/2023	1216	sediment	1	x										
SED-20G:0-10		3/20/2023	1338	sediment	1	x										
SED-18G:0-10		3/20/2023	1408	sediment	1	x										
SED-19G:0-10		3/20/2023	1427	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:		Matthew Daniel	ARI LLC	5/5/23	1420
Relinquished by:					
Received by:					

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman and Bruya

Project Name: 303333

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 23E0156

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1420 3.6°C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 5009708

Cooler Accepted by: MP Date: 05/05/23 Time: 1420

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: MP Date: 05/05/23 Time: 1710 Labels checked by: PJB

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303333	**Reported:**
Seattle, WA 98108	Project Manager: Michael Erdahl	07/18/2024 15:43

ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Sample ID	Matrix	Date Sampled	Date Received
23E0156-01	SED-24G:0-10	Solid	03/20/23 11:06	05/05/23 14:20
23E0156-02	SED-23G:0-10	Solid	03/20/23 11:42	05/05/23 14:20
23E0156-03	SED-22G:0-10	Solid	03/20/23 11:58	05/05/23 14:20
23E0156-04	SED-21G:0-10	Solid	03/20/23 12:16	05/05/23 14:20
23E0156-05	SED-20G:0-10	Solid	03/20/23 13:38	05/05/23 14:20
23E0156-06	SED-18G:0-10	Solid	03/20/23 14:08	05/05/23 14:20
23E0156-07	SED-19G:0-10	Solid	03/20/23 14:27	05/05/23 14:20

Friedman & Bruya Inc.	Project: Port of Friday Harbor	
5500 4th Ave S	Project Number: 303333	**Reported:**
Seattle WA, 98108	Project Manager: Michael Erdahl	18-Jul-2024 15:43

Case Narrative

Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Work Order: 23E0156

Sample receipt

Samples as listed on the preceding page(s) were pulled from Friedman & Bruya frozen archive and logged under ARI work order 23E0156. For details regarding sample receipt, please refer to the original Cooler Receipt Forms.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times for samples stored frozen.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

In batch BLE0201 reported under work order 23E0152, one sample was run in triplicate (DUP1 and DUP2). The relative percent difference (RPD) between the original and DUP1 was within advisory limits. The RPD between the original and DUP2 was outside advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits. The deviation has been flagged.

QUALIFIERS AND NOTES

Qualifier	Definition
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-24G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-01 A	SDG:	23E0156
Sampled:	03/20/23 11:06	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-060
% Solids:	43.07	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 21:38
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5618 g Wet / 0.5618 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.61	1	0.02	0.02	

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-23G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-02 A	SDG:	23E0156
Sampled:	03/20/23 11:42	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-061
% Solids:	40.27	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 22:08
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5944 g Wet / 0.5944 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.79	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-22G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-03 A	SDG:	23E0156
Sampled:	03/20/23 11:58	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-064
% Solids:	49.09	Preparation:	No Prep Wet Chem	Analyzed:	05/07/23 23:39
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5159 g Wet / 0.5159 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.55	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-21G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-04 A	SDG:	23E0156
Sampled:	03/20/23 12:16	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-065
% Solids:	44.90	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 00:09
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5292 g Wet / 0.5292 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	1.33	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-20G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-05 A	SDG:	23E0156
Sampled:	03/20/23 13:38	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-066
% Solids:	63.62	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 00:40
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5874 g Wet / 0.5874 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.63	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-18G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-06 A	SDG:	23E0156
Sampled:	03/20/23 14:08	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-067
% Solids:	55.22	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 01:10
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.5918 g Wet / 0.5918 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.93	1	0.02	0.02	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
EPA 9060A m

SED-19G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-07 A	SDG:	23E0156
Sampled:	03/20/23 14:27	Prepared:	05/06/23 12:10	File ID:	CubeData_05092023@1825-068
% Solids:	49.60	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 01:41
Batch:	BLE0201	Sequence:	SLE0117	Initial/Final:	0.6267 g Wet / 0.6267 g
Instrument:	TOC Cube			Calibration:	FD00070

CAS NO.	Analyte	Concentration (% dry)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	0.61	1	0.02	0.02	

PREPARATION BATCH SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0201 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-24G:0-10	23E0156-01	eData_05092023@1825-	05/06/23 12:10	
SED-23G:0-10	23E0156-02	eData_05092023@1825-	05/06/23 12:10	
SED-22G:0-10	23E0156-03	eData_05092023@1825-	05/06/23 12:10	
SED-21G:0-10	23E0156-04	eData_05092023@1825-	05/06/23 12:10	
SED-20G:0-10	23E0156-05	eData_05092023@1825-	05/06/23 12:10	
SED-18G:0-10	23E0156-06	eData_05092023@1825-	05/06/23 12:10	
SED-19G:0-10	23E0156-07	eData_05092023@1825-	05/06/23 12:10	
Blank	BLE0201-BLK1	eData_05092023@1825-	05/06/23 12:10	
LCS	BLE0201-BS1	eData_05092023@1825-	05/06/23 12:10	
MRL Check	BLE0201-MRL1	eData_05092023@1825-	05/06/23 12:10	
Reference	BLE0201-SRM1	eData_05092023@1825-	05/06/23 12:10	

Form I

METHOD BLANK DATA SHEET

EPA 9060A m

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0201
Laboratory ID: BLE0201-BLK1
Prepared: 05/06/23 12:10
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/06/23 18:47
Sequence: SLE0117
Calibration: FD00070
Instrument: TOC Cube

CAS NO.	Analyte	Concentration (% wet)	Dilution Factor	MDL	MRL	Q
	Total Organic Carbon	ND	1	0.02	0.02	U

LCS / LCS DUPLICATE RECOVERY

EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0156
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Matrix:	Solid	Analyzed:	05/06/23 19:48
Batch:	BLE0201	Laboratory ID:	BLE0201-BS1
Preparation:	No Prep Wet Chem	Sequence Name:	LCS
Initial/Final:	0.0224 g / 0.0224 g		

COMPOUND	SPIKE ADDED (% wet)	LCS CONCENTRATION (% wet)	Q	LCS % REC. #	QC LIMITS REC.
Total Organic Carbon	44.4	43.5		98.0	80 - 120

* Indicates values outside of QC limits

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SKD0371
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Cal Standard	SKD0371-CAL1	CubeData_04272022@1136-001	NA	04/26/22 12:30
Cal Standard	SKD0371-CAL2	CubeData_04272022@1136-002	NA	04/26/22 13:00
Cal Standard	SKD0371-CAL3	CubeData_04272022@1136-003	NA	04/26/22 13:30
Cal Standard	SKD0371-CAL4	CubeData_04272022@1136-004	NA	04/26/22 14:00
Cal Standard	SKD0371-CAL5	CubeData_04272022@1136-005	NA	04/26/22 14:30
Cal Standard	SKD0371-CAL6	CubeData_04272022@1136-006	NA	04/26/22 15:00
Cal Standard	SKD0371-CAL7	CubeData_04272022@1136-007	NA	04/26/22 15:30
Cal Standard	SKD0371-CAL8	CubeData_04272022@1136-008	NA	04/26/22 16:00
Cal Standard	SKD0371-CAL9	CubeData_04272022@1136-009	NA	04/26/22 16:30
Cal Standard	SKD0371-CALA	CubeData_04272022@1136-010	NA	04/26/22 17:00
Cal Standard	SKD0371-CALB	CubeData_04272022@1136-011	NA	04/26/22 17:30
Cal Standard	SKD0371-CALC	CubeData_04272022@1136-012	NA	04/26/22 18:00
Cal Standard	SKD0371-CALD	CubeData_04272022@1136-013	NA	04/26/22 18:30
Cal Standard	SKD0371-CALE	CubeData_04272022@1136-014	NA	04/26/22 19:00
Cal Standard	SKD0371-CALF	CubeData_04272022@1136-015	NA	04/26/22 19:31
Cal Standard	SKD0371-CALG	CubeData_04272022@1136-016	NA	04/26/22 20:01
Cal Standard	SKD0371-CALH	CubeData_04272022@1136-017	NA	04/26/22 20:31
Cal Standard	SKD0371-CALI	CubeData_04272022@1136-018	NA	04/26/22 21:01
Cal Standard	SKD0371-CALJ	CubeData_04272022@1136-019	NA	04/26/22 21:31
Cal Standard	SKD0371-CALK	CubeData_04272022@1136-020	NA	04/26/22 22:01
Initial Cal Check	SKD0371-ICV1	CubeData_04272022@1136-027	NA	04/27/22 02:03
Initial Cal Blank	SKD0371-ICB1	CubeData_04272022@1136-028	NA	04/27/22 02:33
Cal Standard	SKD0371-CALL	CubeData_04272022@1136-021	NA	04/27/22 11:08
Cal Standard	SKD0371-CALM	CubeData_04272022@1136-022	NA	04/27/22 11:08
Cal Standard	SKD0371-CALN	CubeData_04272022@1136-023	NA	04/27/22 11:09
Cal Standard	SKD0371-CALO	CubeData_04272022@1136-024	NA	04/27/22 11:09

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060A m

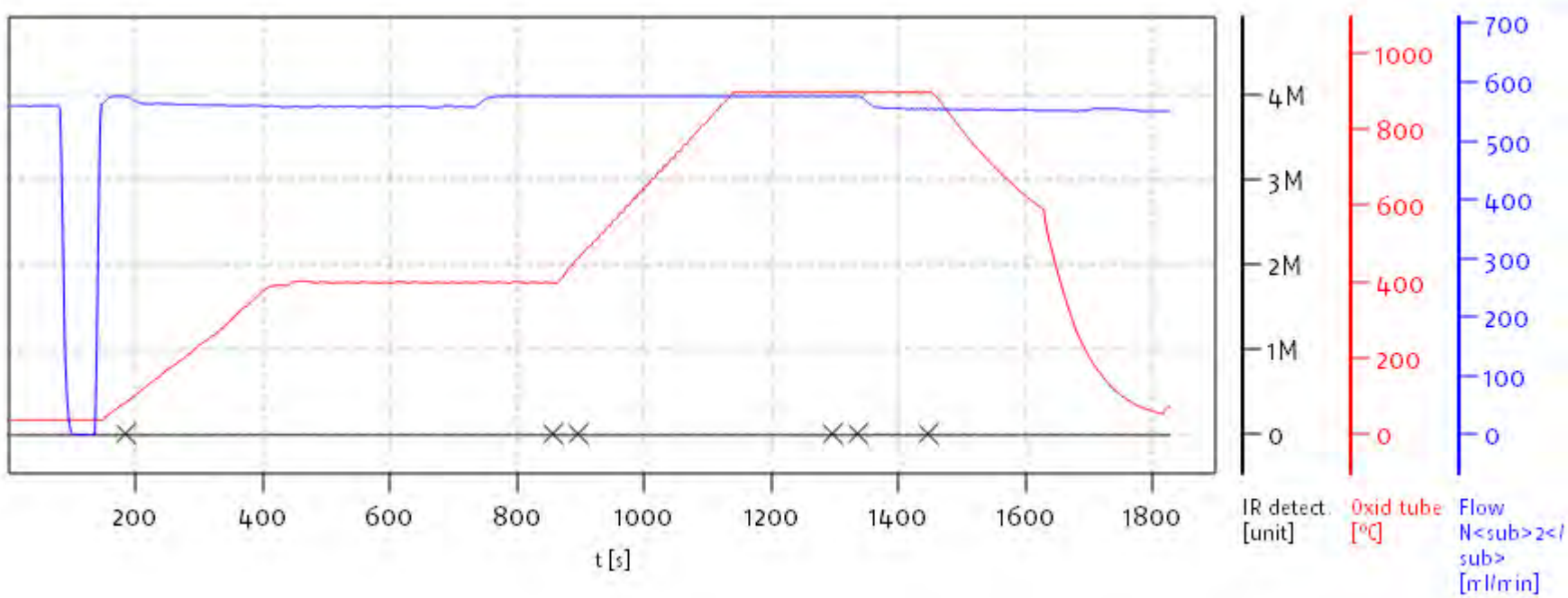
Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Sequence: SLE0117
Instrument: TOC Cube
Calibration: FD00070

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Initial Cal Check	SLE0117-ICV1	CubeData_05092023@1825-003	NA	05/06/23 16:16
Initial Cal Blank	SLE0117-ICB1	CubeData_05092023@1825-004	NA	05/06/23 16:47
MRL Check	BLE0201-MRL1	CubeData_05092023@1825-006	Solid	05/06/23 17:47
Blank	BLE0201-BLK1	CubeData_05092023@1825-008	Solid	05/06/23 18:47
LCS	BLE0201-BS1	CubeData_05092023@1825-010	Solid	05/06/23 19:48
Reference	BLE0201-SRM1	CubeData_05092023@1825-012	Solid	05/06/23 20:49
Calibration Check	SLE0117-CCV1	CubeData_05092023@1825-015	NA	05/06/23 22:20
Calibration Blank	SLE0117-CCB1	CubeData_05092023@1825-016	NA	05/06/23 22:50
Calibration Check	SLE0117-CCV2	CubeData_05092023@1825-027	NA	05/07/23 04:24
Calibration Blank	SLE0117-CCB2	CubeData_05092023@1825-028	NA	05/07/23 04:55
Calibration Check	SLE0117-CCV3	CubeData_05092023@1825-039	NA	05/07/23 10:29
Calibration Blank	SLE0117-CCB3	CubeData_05092023@1825-040	NA	05/07/23 11:00
Calibration Check	SLE0117-CCV4	CubeData_05092023@1825-050	NA	05/07/23 16:34
Calibration Blank	SLE0117-CCB4	CubeData_05092023@1825-051	NA	05/07/23 17:05
SED-24G:0-10	23E0156-01	CubeData_05092023@1825-060	Solid	05/07/23 21:38
SED-23G:0-10	23E0156-02	CubeData_05092023@1825-061	Solid	05/07/23 22:08
Calibration Check	SLE0117-CCV5	CubeData_05092023@1825-062	NA	05/07/23 22:38
Calibration Blank	SLE0117-CCB5	CubeData_05092023@1825-063	NA	05/07/23 23:09
SED-22G:0-10	23E0156-03	CubeData_05092023@1825-064	Solid	05/07/23 23:39
SED-21G:0-10	23E0156-04	CubeData_05092023@1825-065	Solid	05/08/23 00:09
SED-20G:0-10	23E0156-05	CubeData_05092023@1825-066	Solid	05/08/23 00:40
SED-18G:0-10	23E0156-06	CubeData_05092023@1825-067	Solid	05/08/23 01:10
SED-19G:0-10	23E0156-07	CubeData_05092023@1825-068	Solid	05/08/23 01:41
Calibration Check	SLE0117-CCV6	CubeData_05092023@1825-073	NA	05/08/23 04:13
Calibration Blank	SLE0117-CCB6	CubeData_05092023@1825-074	NA	05/08/23 04:43

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		CARBON	5/6/2023 2:45 PM	bl	0.000	12 258	0.000	0.000	3 247	4 370	0.000	0.000	1.0000	1.0000



Name:

Access: soliTOC superuser

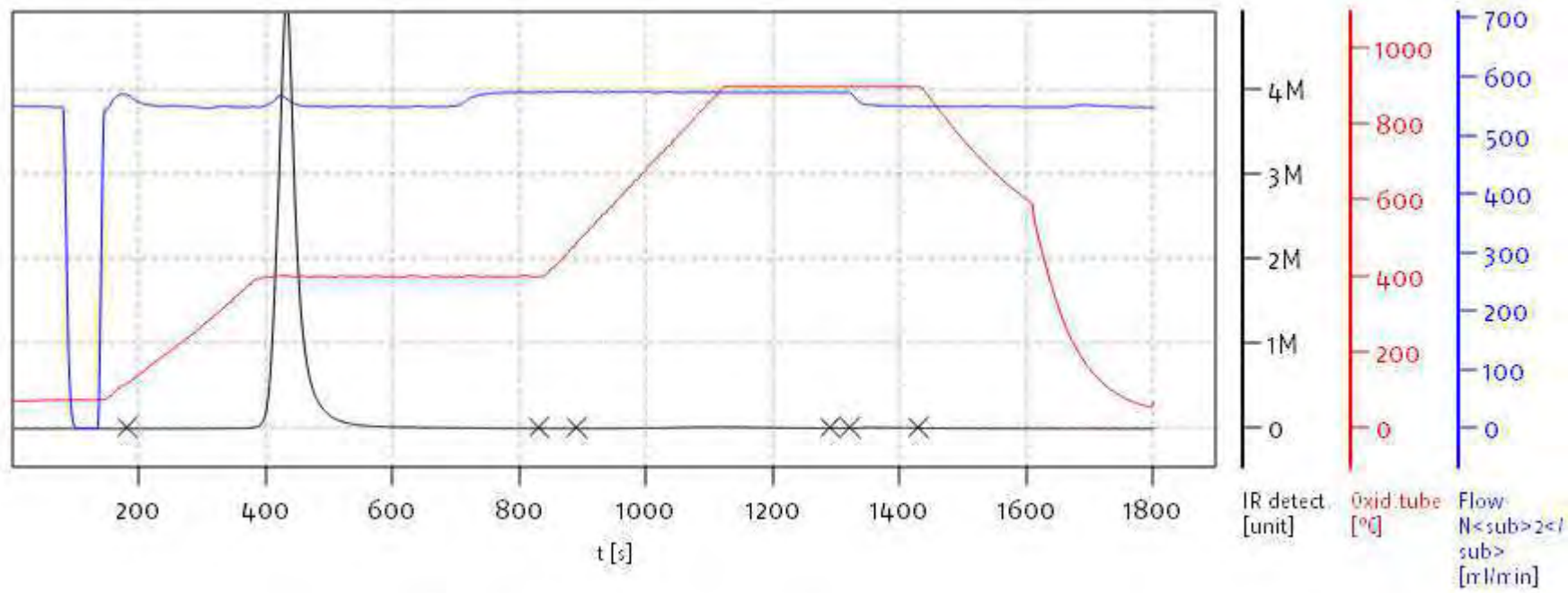
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
2	2	Dfactor	22.80		CARBON	5/6/2023 3:15 PM	bl	44.530	6 800 200	45.312	0.085	38 981	141 651	44.446	0.782	0.9664	1.0000



Name:

Access: soliTOC superuser

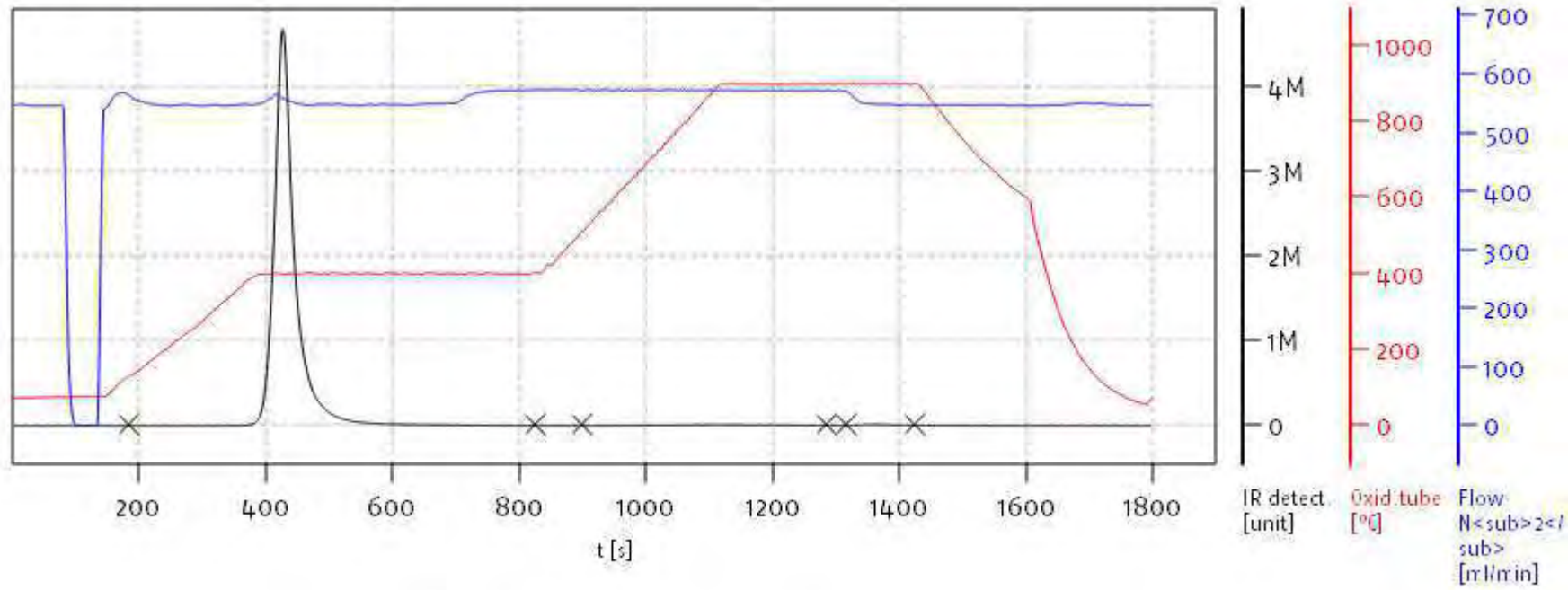
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
3	3	Dfactor	22.40		CARBON	5/6/2023 3:46 PM	bl	44.534	6 602 640	45.064	0.089	39 349	103 249	44.446	0.530	0.9780	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

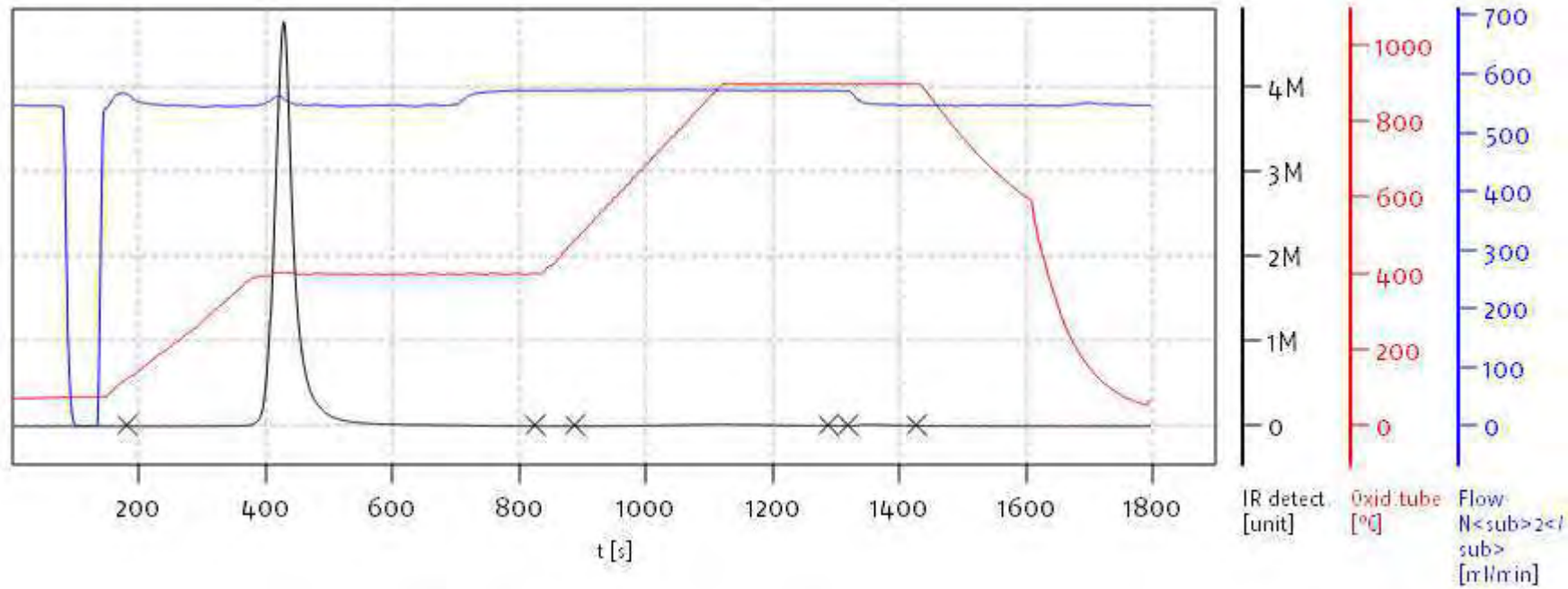
elementar
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
4	4	SLE0117-ICV1	22.60		CARBON	5/6/2023 4:16 PM	bl	43.663	6 561 740	44.606	0.144	47 553	164 093	43.519	0.942	0.9722	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

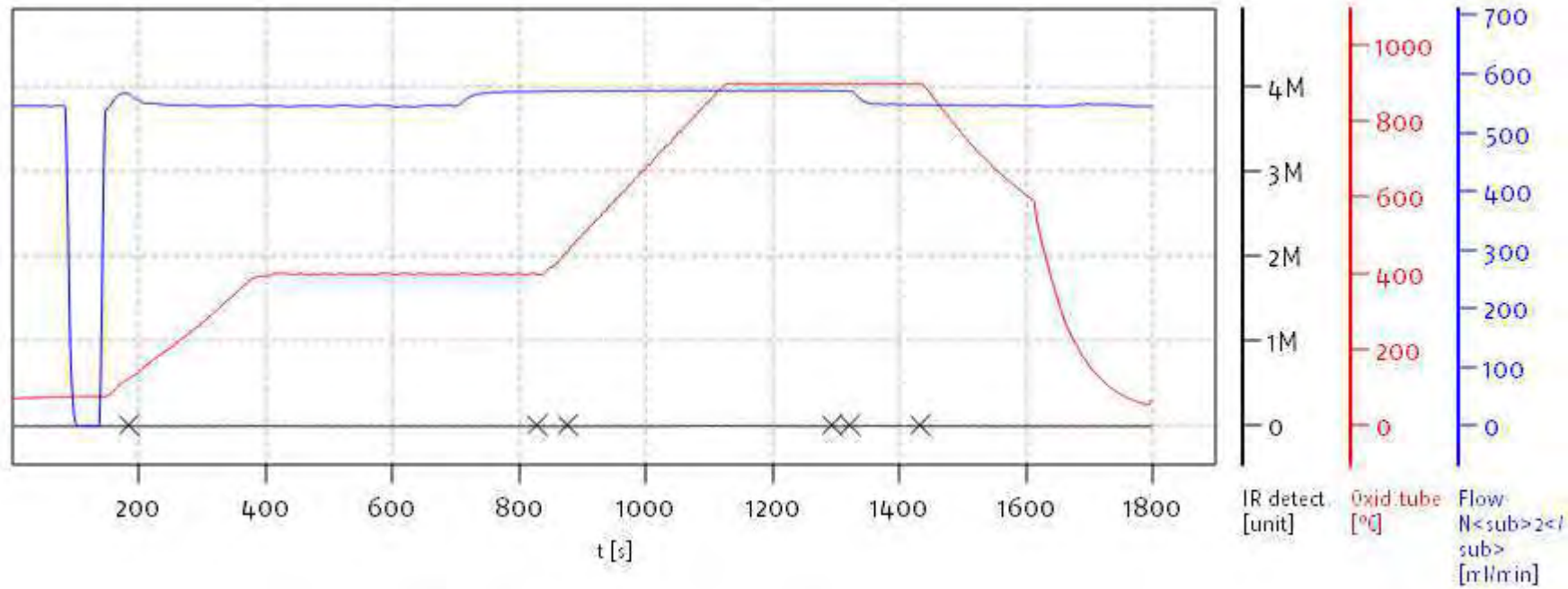
elementar
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
5	5	SLE0117-ICB1	524.90		CARBON	5/6/2023 4:47 PM	bl	0.000	10 594	0.001	0.000	12 025	29 347	0.000	0.001	0.9722	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

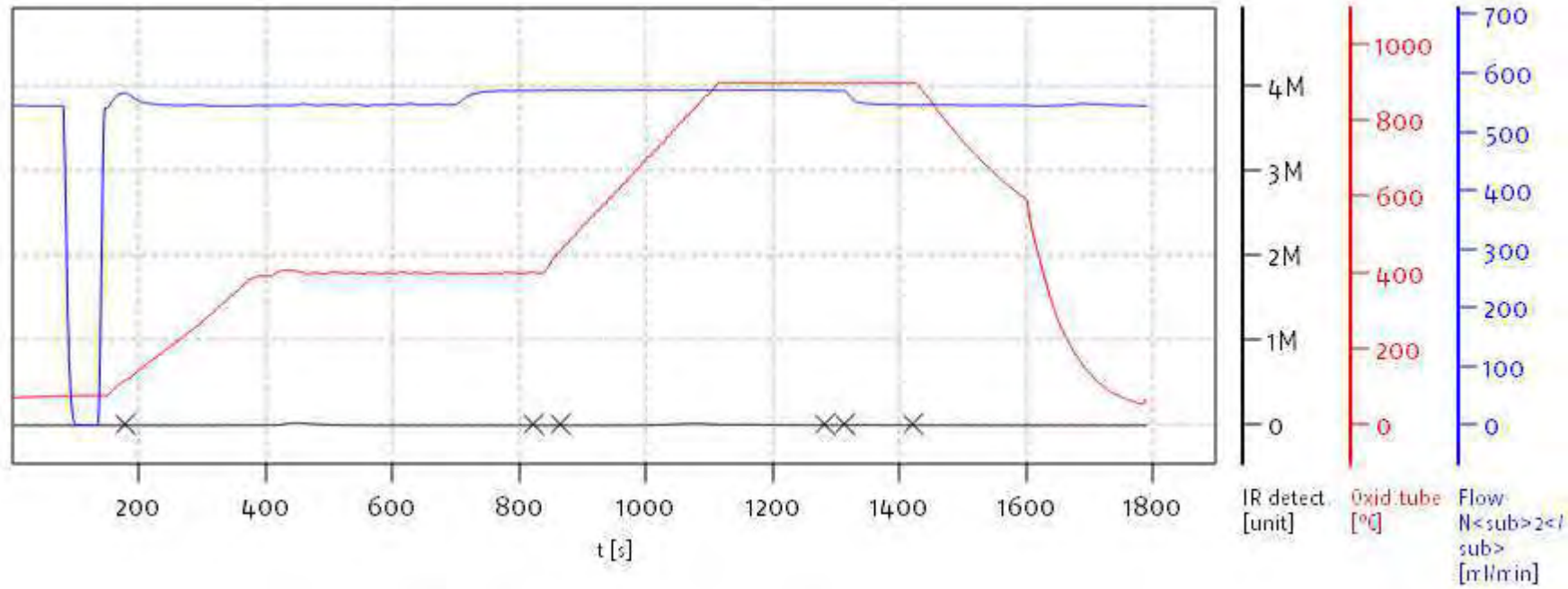
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
6	6	BLE0200-MRL1	524.10		CARBON	5/6/2023 5:17 PM	bl	0.014	74 661	0.034	0.000	12 743	93 689	0.014	0.020	0.9722	1.0000



Name:

Access: soliTOC superuser

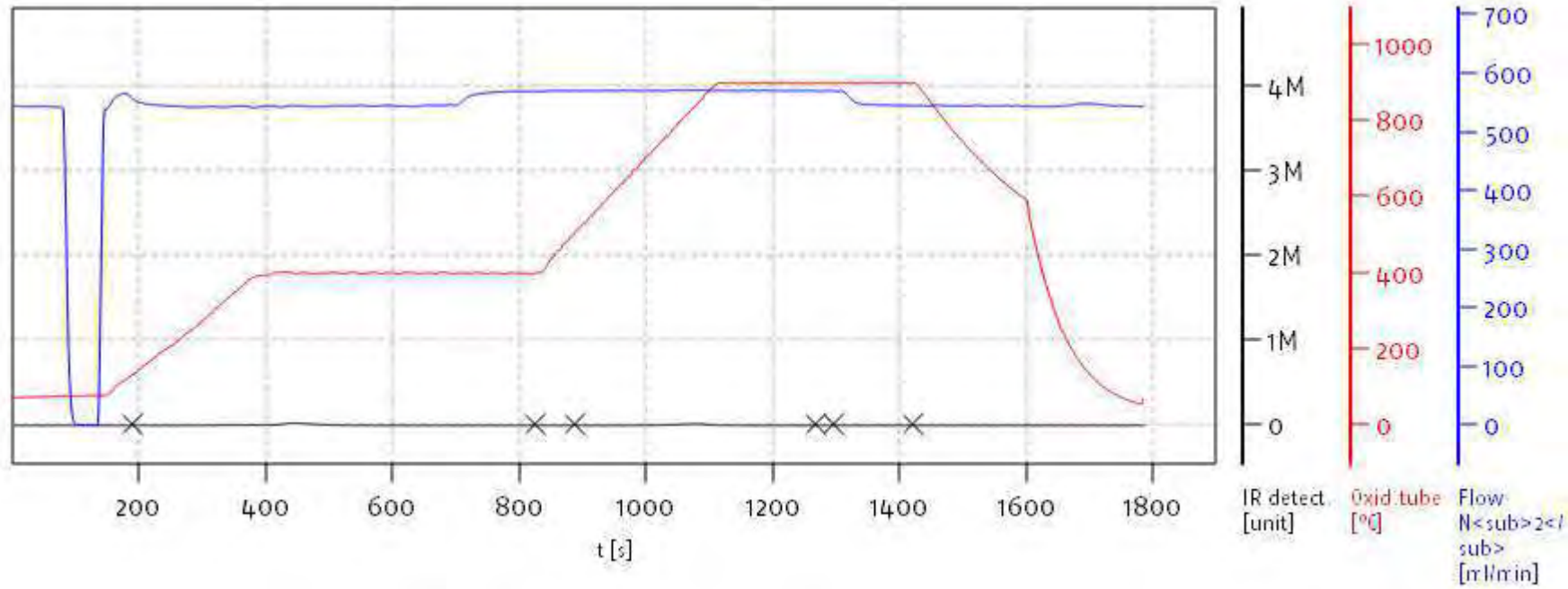
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elementar
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

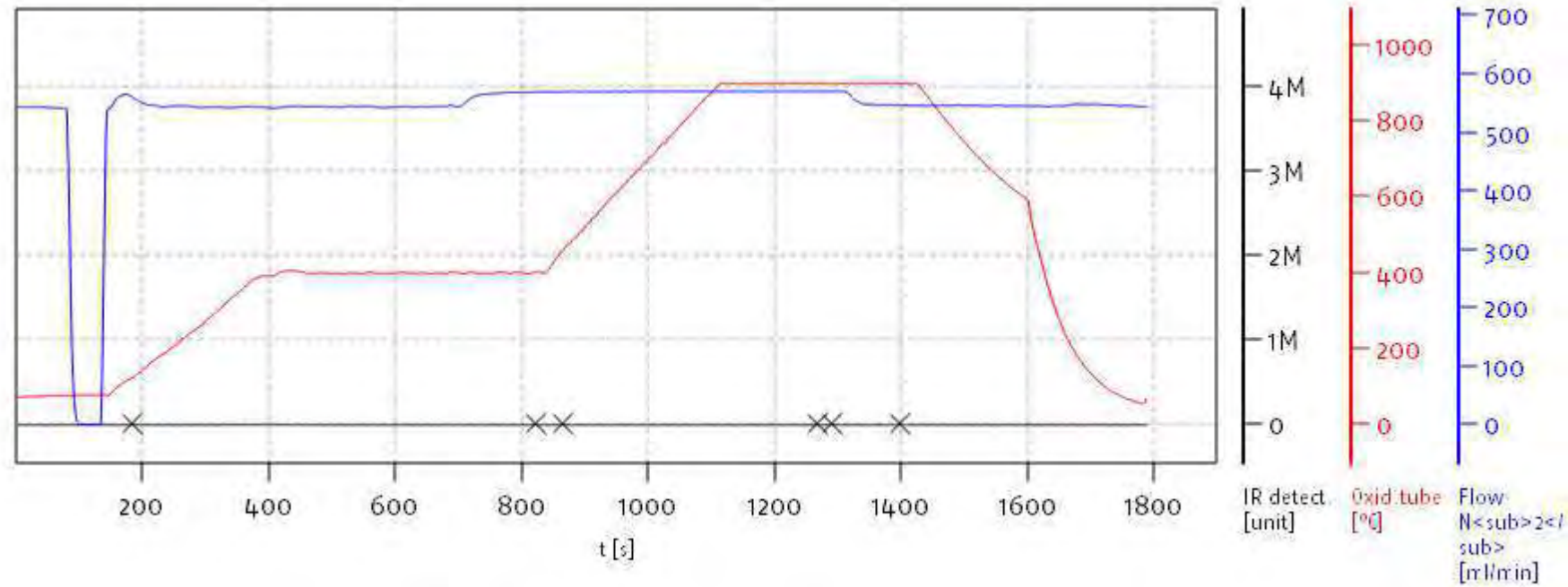
Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
7	7	BLE0201-MRL1	543.30		CARBON	5/6/2023 5:47 PM	bl,C2u	0.014	78 359	0.019	0.000	967	43 353	0.014	0.005	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
8	8	BLE0200-BLK1	562.90		CARBON	5/6/2023 6:17 PM	bl,C3u,C2u	0.000	8 729	0.000	0.000	1 028	1 149	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

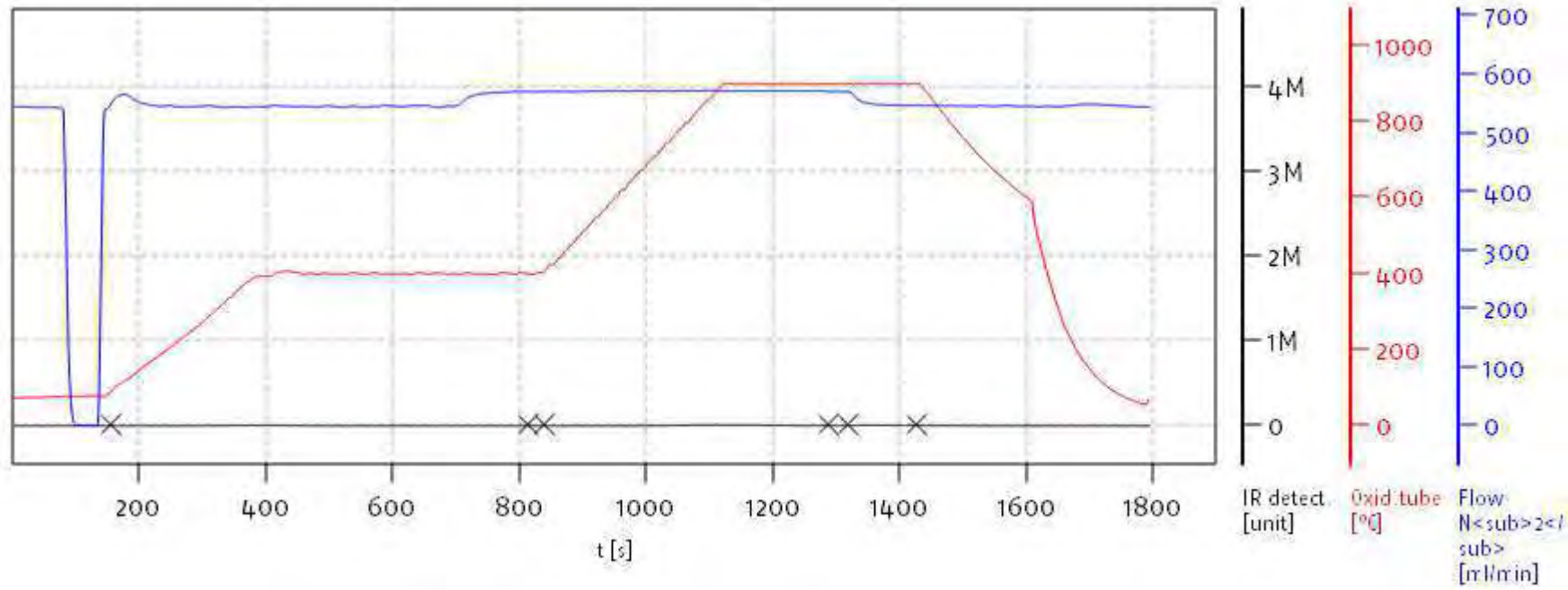
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
9	9	BLE0201-BLK1	550.40		CARBON	5/6/2023 6:47 PM	bl	0.000	22 024	0.010	0.000	19 854	61 208	0.000	0.010	0.9722	1.0000



Name:

Access: soliTOC superuser

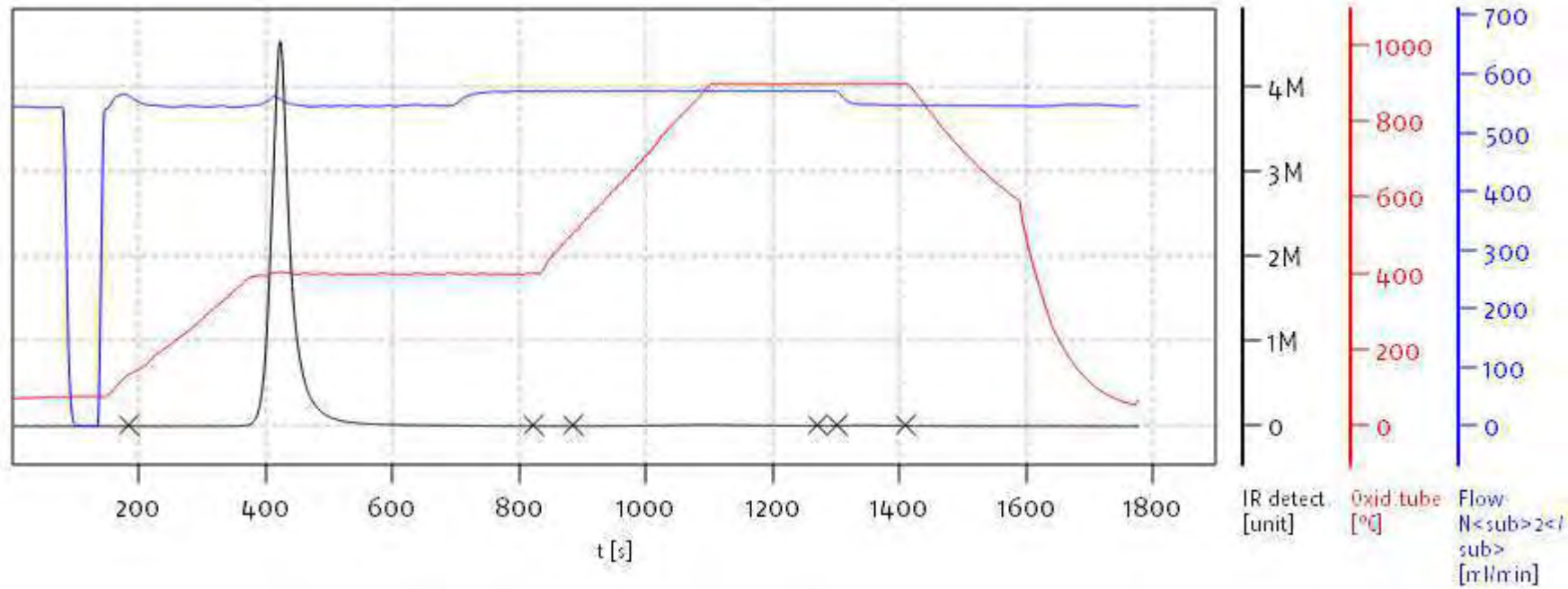
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EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

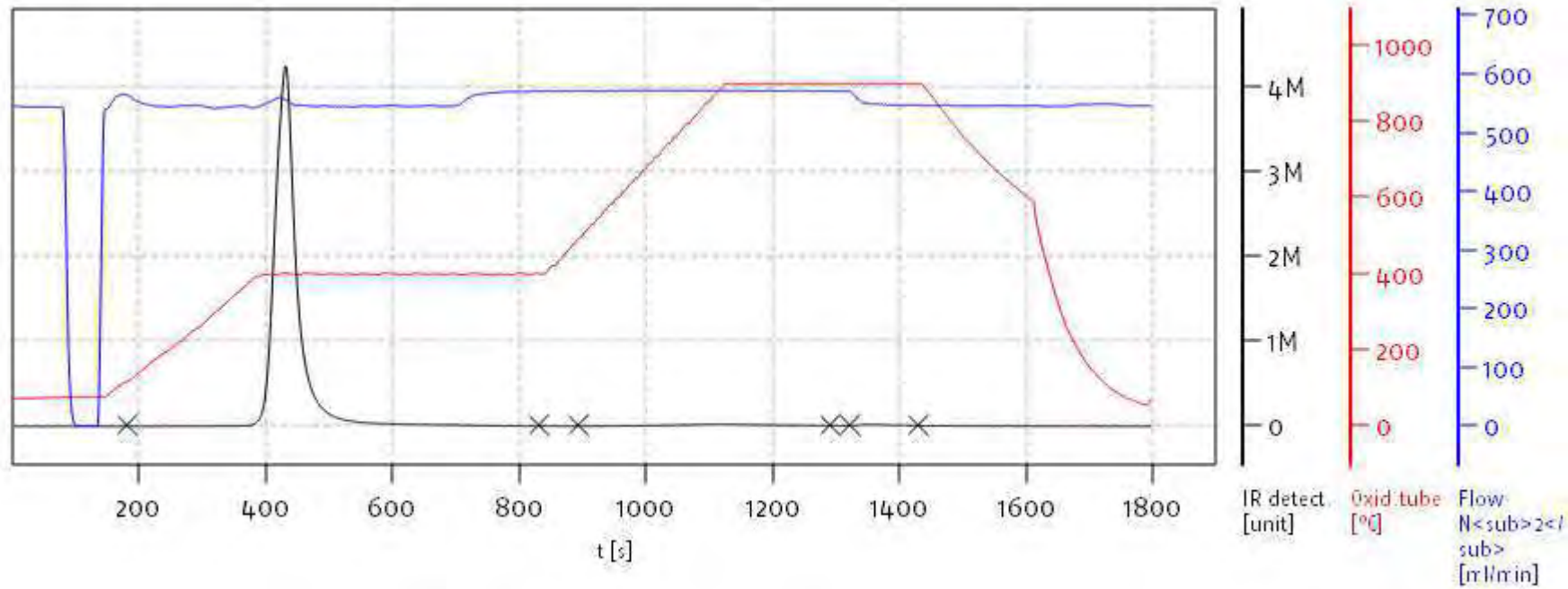
	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
10	10	BLE0200-BS1	21.20		CARBON	5/6/2023 7:17 PM	bl	44.286	6 259 360	44.994	0.039	31 930	123 467	44.247	0.708	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
11	11	BLE0201-BS1	22.40		CARBON	5/6/2023 7:48 PM	bl	43.541	6 474 990	44.674	0.216	57 813	190 372	43.325	1.132	0.9722	1.0000



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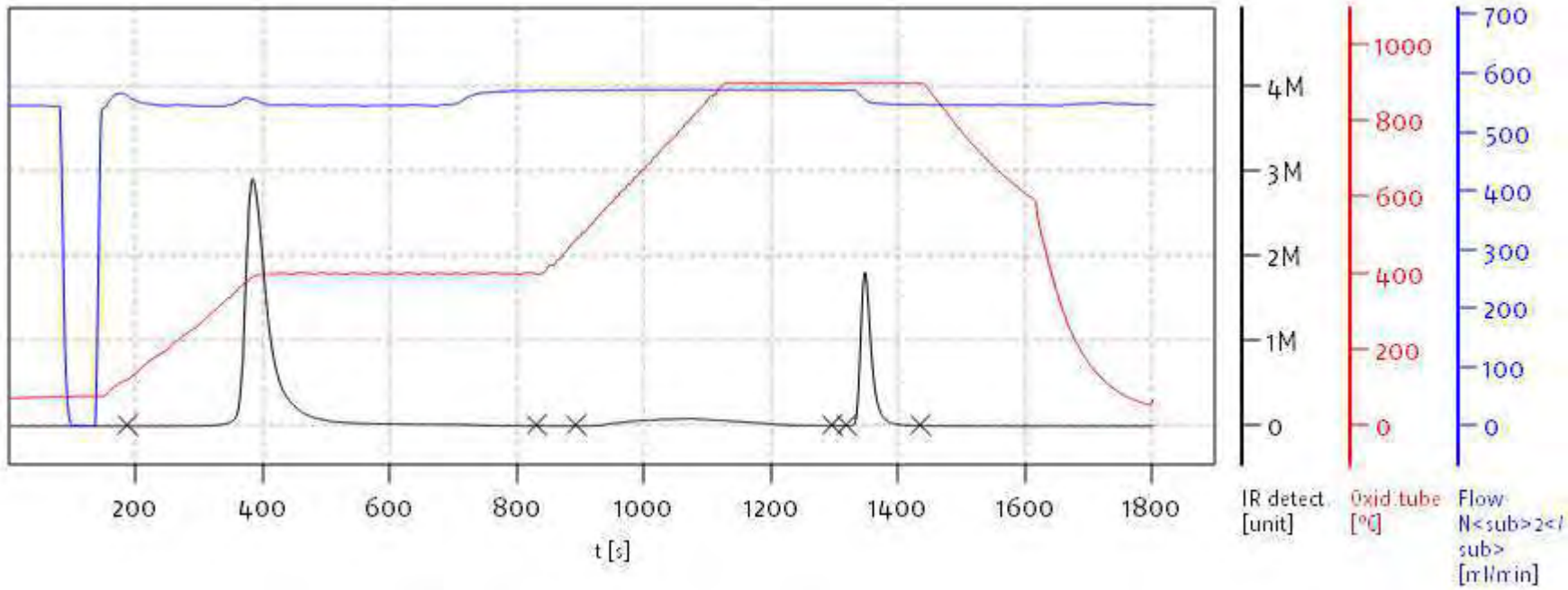
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
12	12	BLE0200-SRM1	310.20		CARBON	5/6/2023 8:18 PM	bl	2.994	4 819 070	3.310	0.668	1 365 840	661 114	2.325	0.317	0.9722	1.0000



Name:

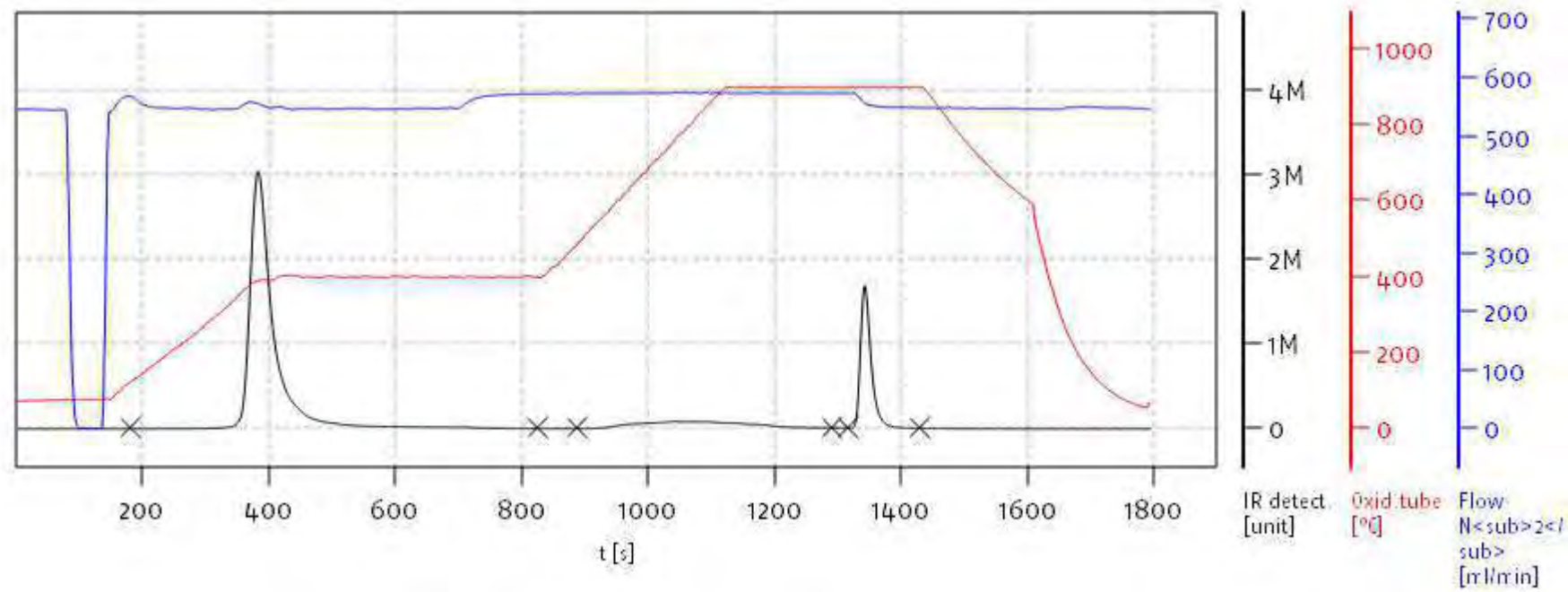
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
13	13	BLE0201-SRM1	310.50		CARBON	5/6/2023 8:49 PM	bl	2.983	4 908 180	3.328	0.616	1 263 010	718 756	2.366	0.345	0.9722	1.0000



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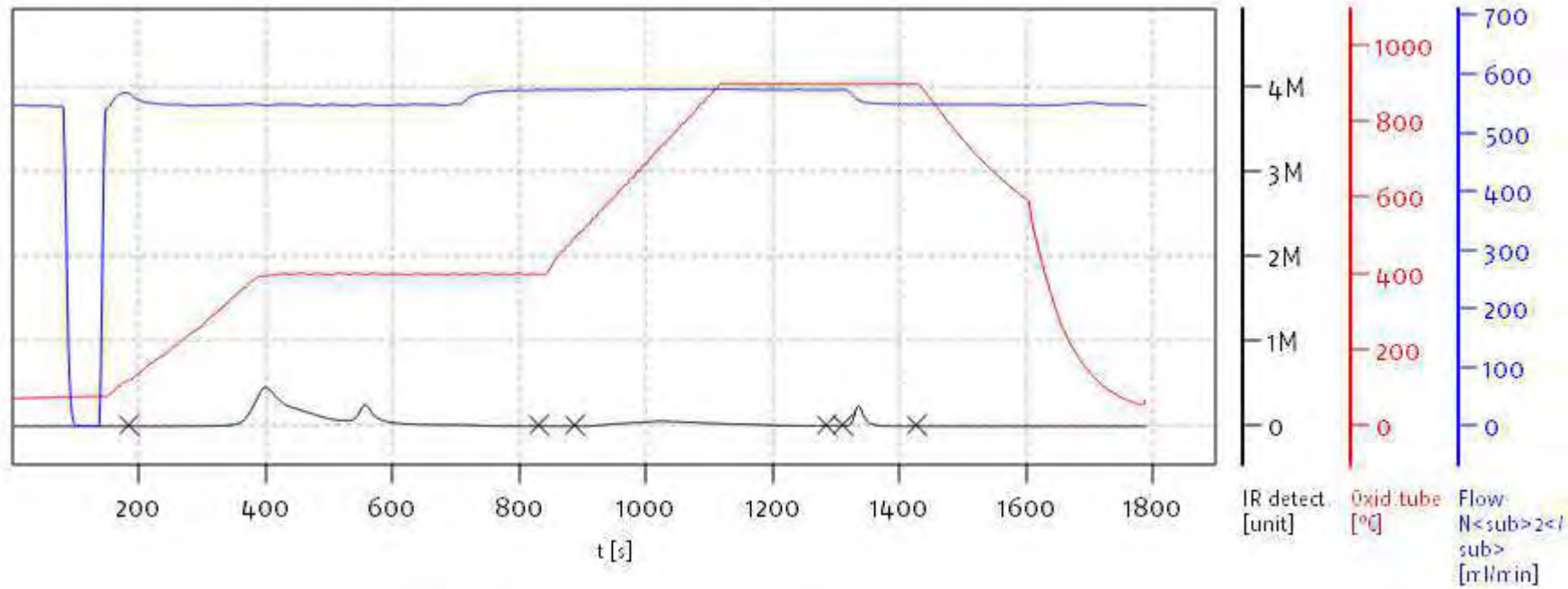
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
14	14	23E0148-01	285.30		CARBON	5/6/2023 9:19 PM	bl	1.005	1 784 560	1.210	0.077	168 929	405 785	0.927	0.206	0.9722	1.0000



Name:

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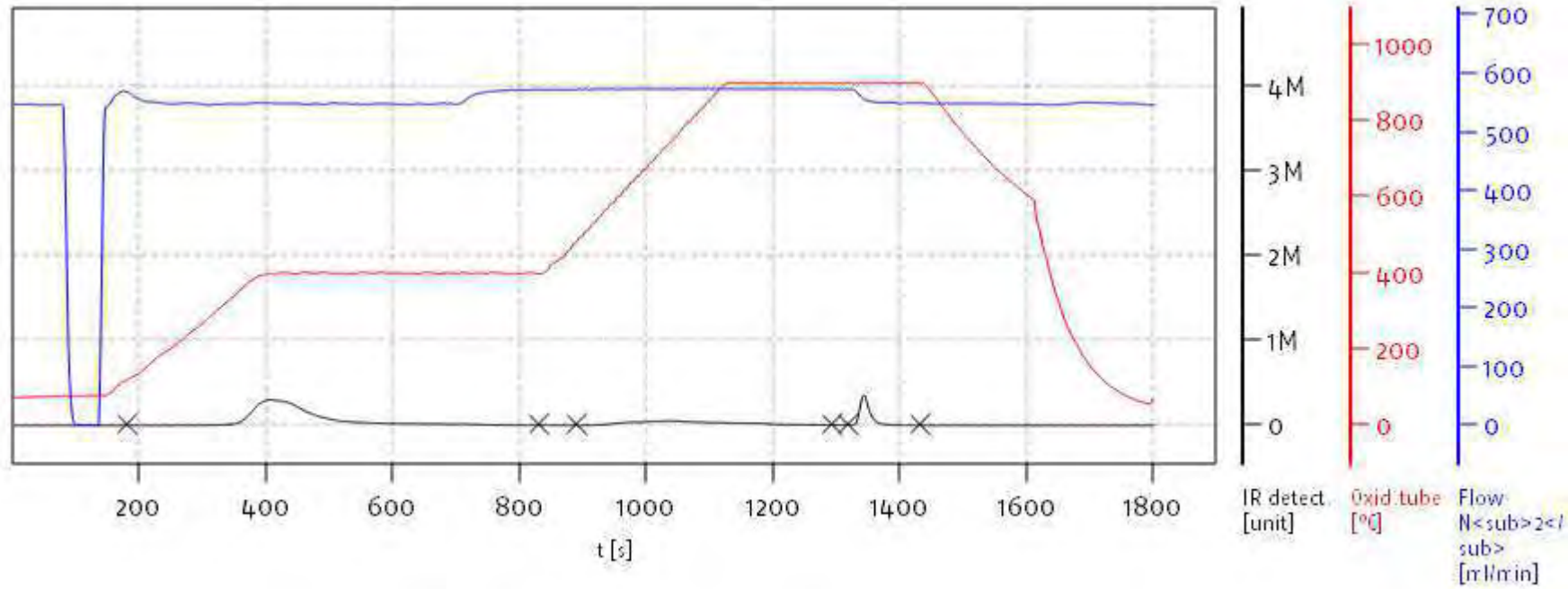
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EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
15	15	BLE0200-DUP1	291.30		CARBON	5/6/2023 9:49 PM	bl	0.785	1 318 750	0.977	0.117	246 587	387 873	0.668	0.192	0.9722	1.0000



Name:

Access: soliTOC superuser

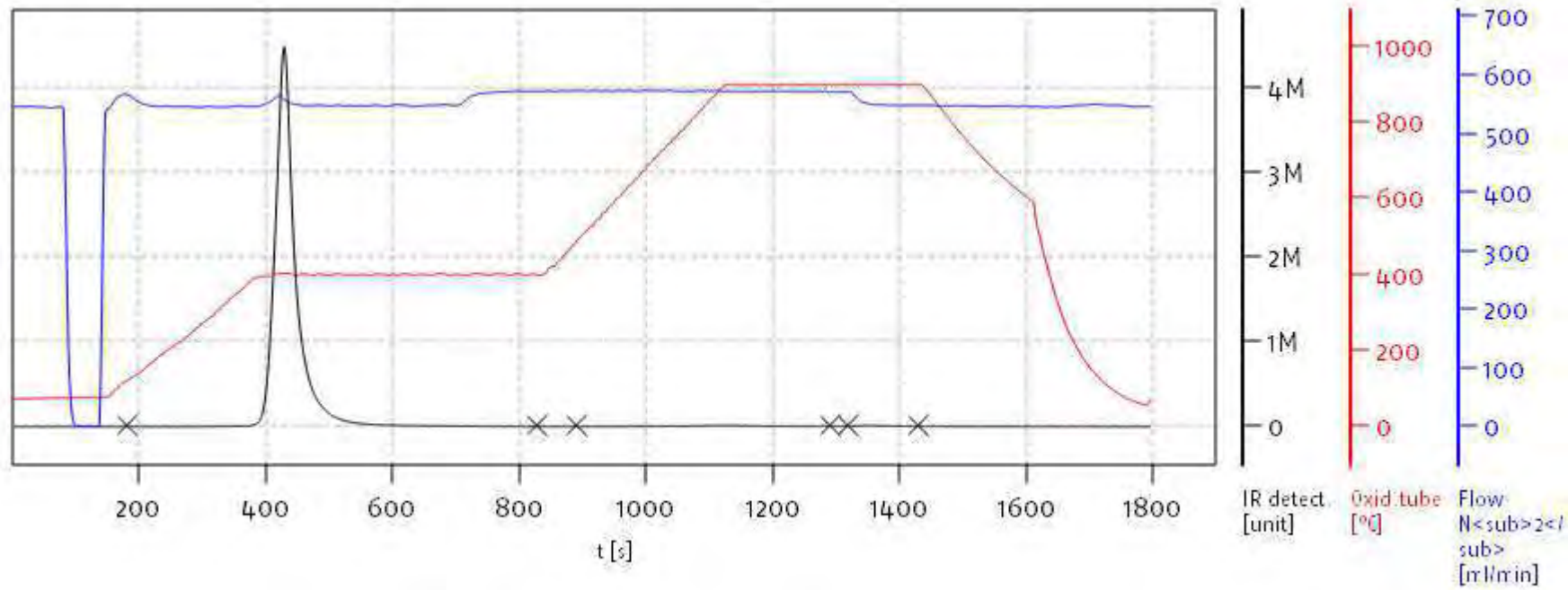
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Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
16	16	SLE0117-CCV1	21.00		CARBON	5/6/2023 10:20 PM	bl	44.801	6 274 040	45.243	0.028	30 290	86 446	44.773	0.442	0.9722	1.0000



Name:

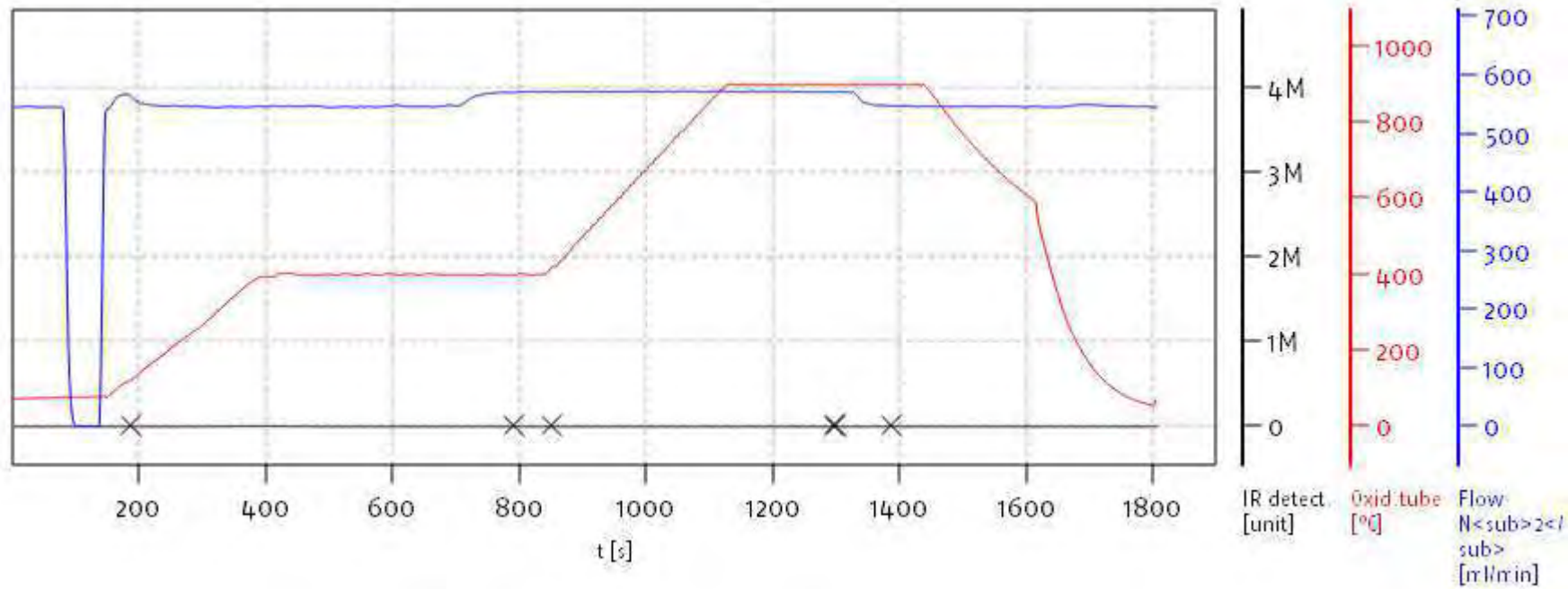
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
17	17	SLE0117-CCB1	501.90		CARBON	5/6/2023 10:50 PM	bl,C3u,C2u	0.000	17 046	0.000	0.000	625	257	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

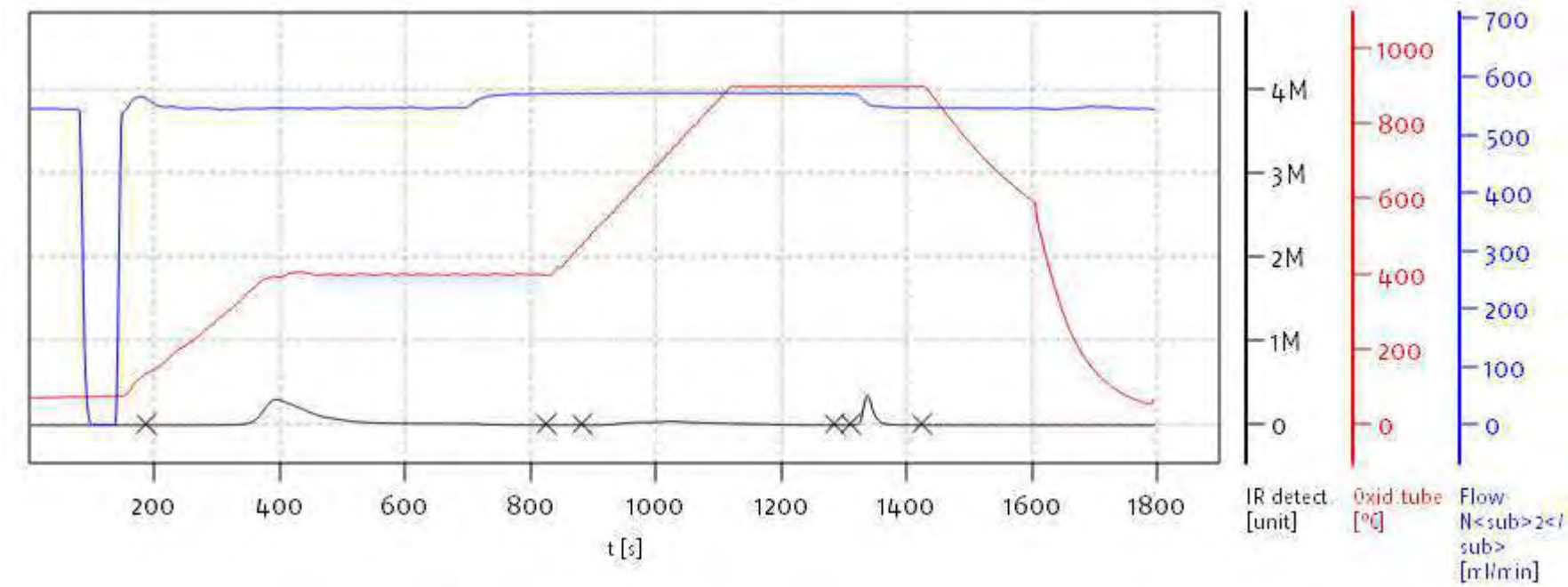
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
18	18	BLE0200-DUP2	267.60		CARBON	5/6/2023 11:20 PM	bl	0.782	1 190 600	0.928	0.127	246 593	278 516	0.655	0.146	0.9722	1.0000



Name:

Access: soliTOC superuser

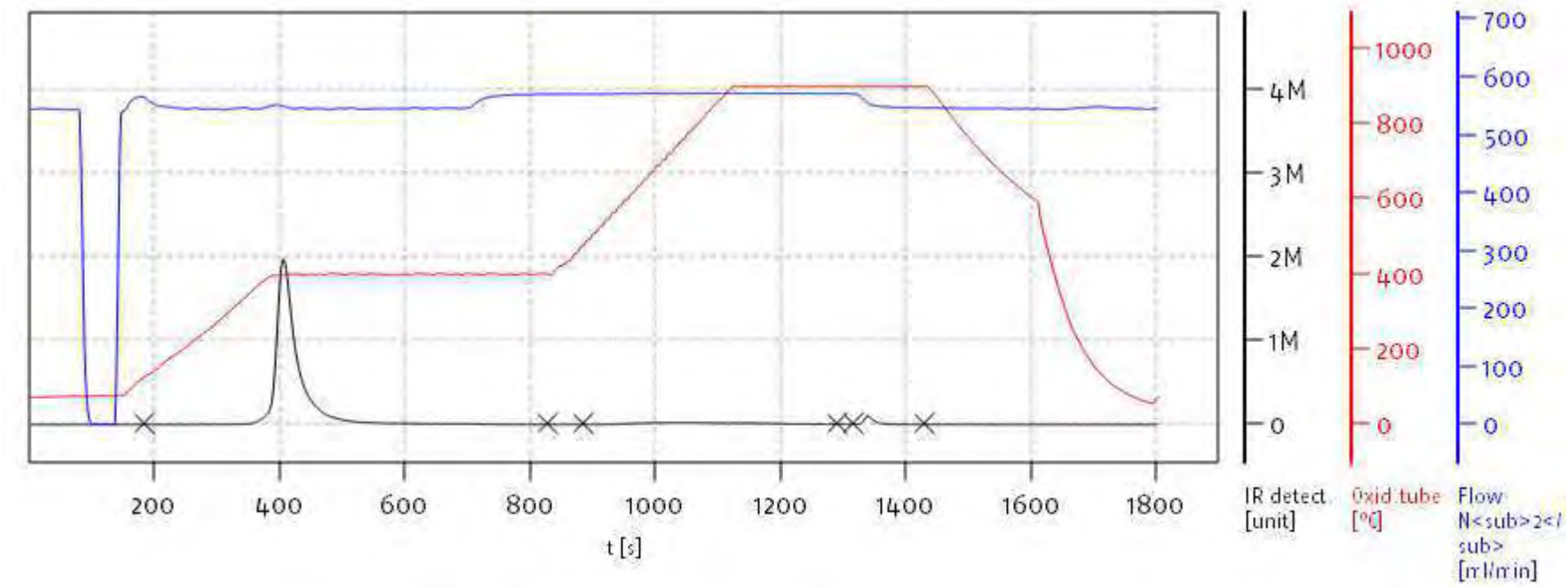
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

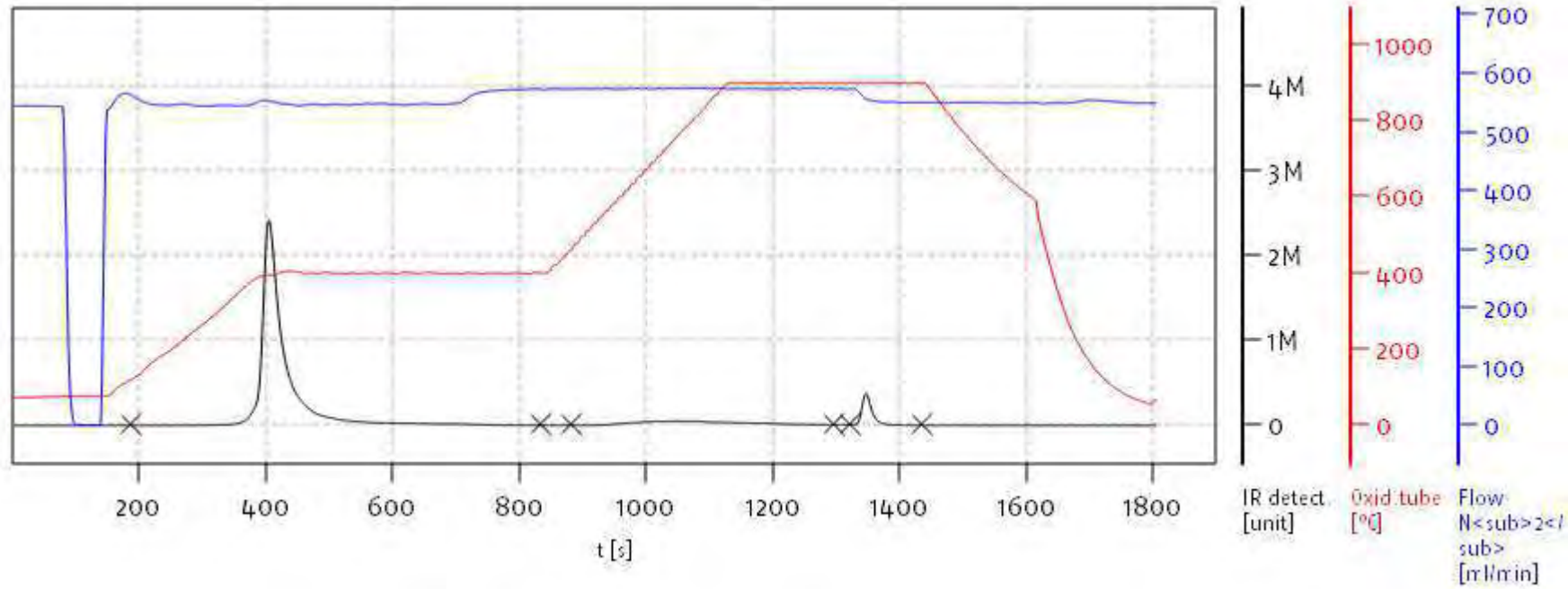
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
19	19	BLE0200-MS1	183.50	0.0077	CARBON	5/6/2023 11:51 PM	bl	2.396	2 896 250	2.537	0.042	76 403	193 907	2.354	0.141	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
20	20	BLE0200-MSD1	294.20	0.0075	CARBON	5/7/2023 12:21 AM	bl	1.948	3 587 200	2.150	0.126	266 242	411 825	1.821	0.203	0.9722	1.0000



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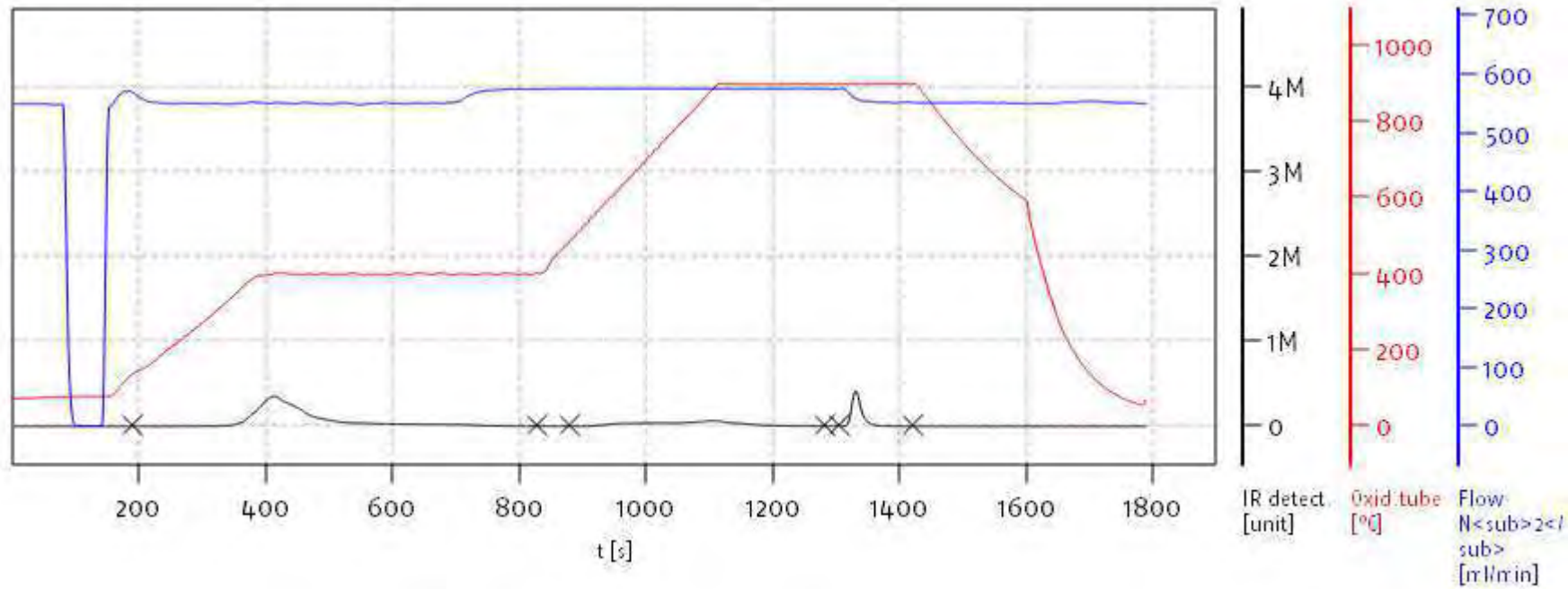
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
21	21	23E0152-08	266.50		CARBON	5/7/2023 12:51 AM	bl	0.894	1 346 000	1.114	0.149	283 072	404 515	0.745	0.220	0.9722	1.0000



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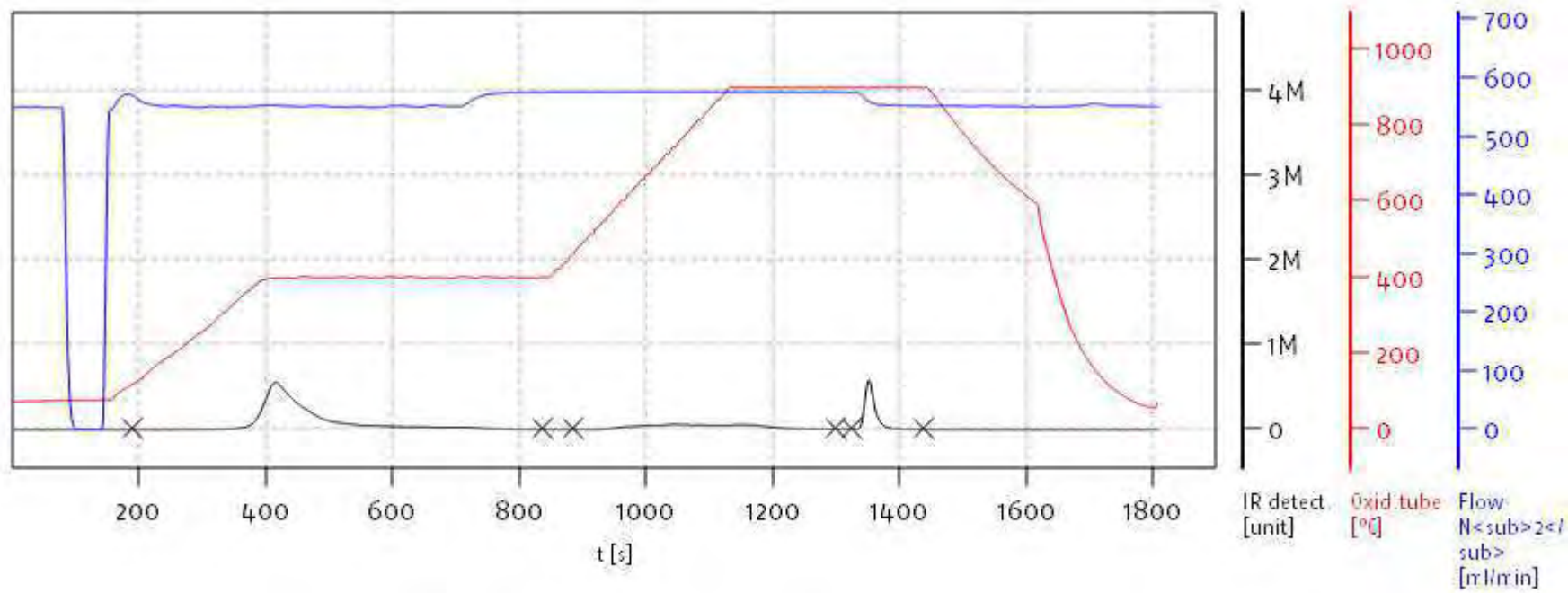
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soliTOC V2.0.2 (31015f9) 2018-11-19
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Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
22	22	BLE0201-DUP1	351.70		CARBON	5/7/2023 1:22 AM	bl	0.919	1 784 460	1.129	0.167	406 343	501 954	0.752	0.209	0.9722	1.0000



Name:

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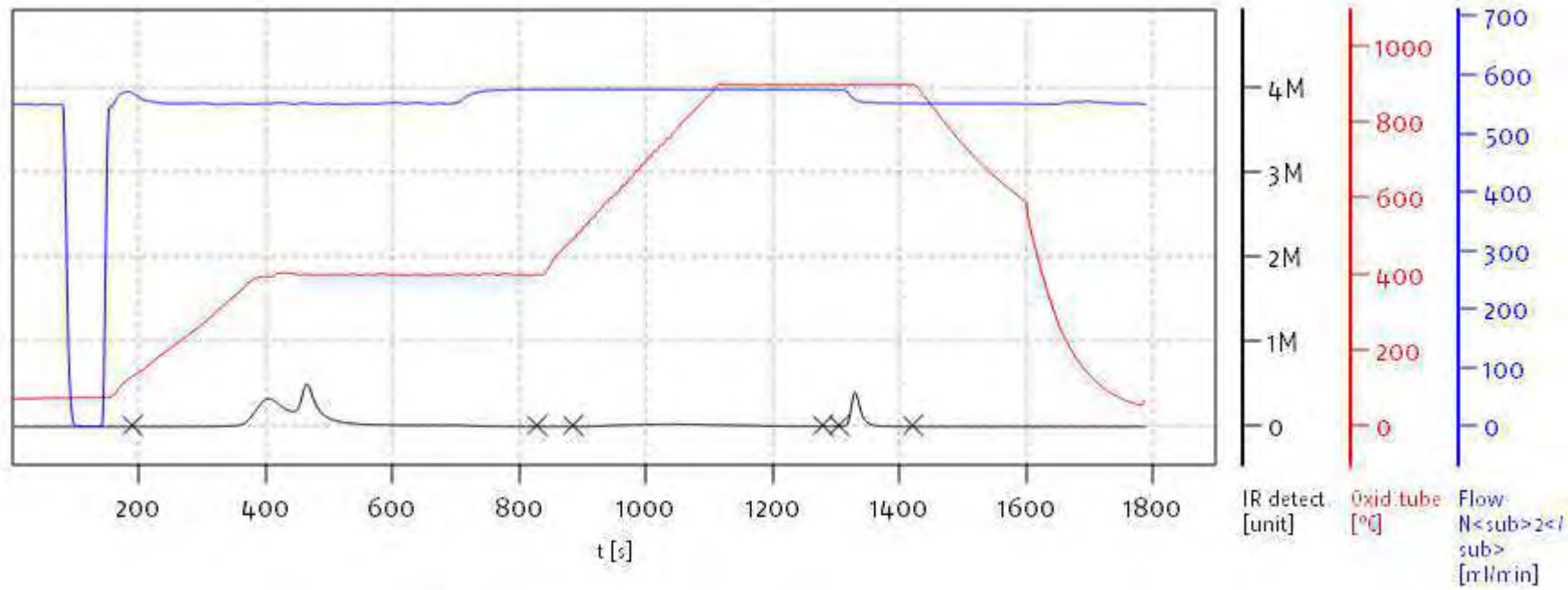
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
23	23	BLE0201-DUP2	202.90		CARBON	5/7/2023 1:52 AM	bl	1.271	1 489 950	1.421	0.186	270 172	222 226	1.085	0.149	0.9722	1.0000



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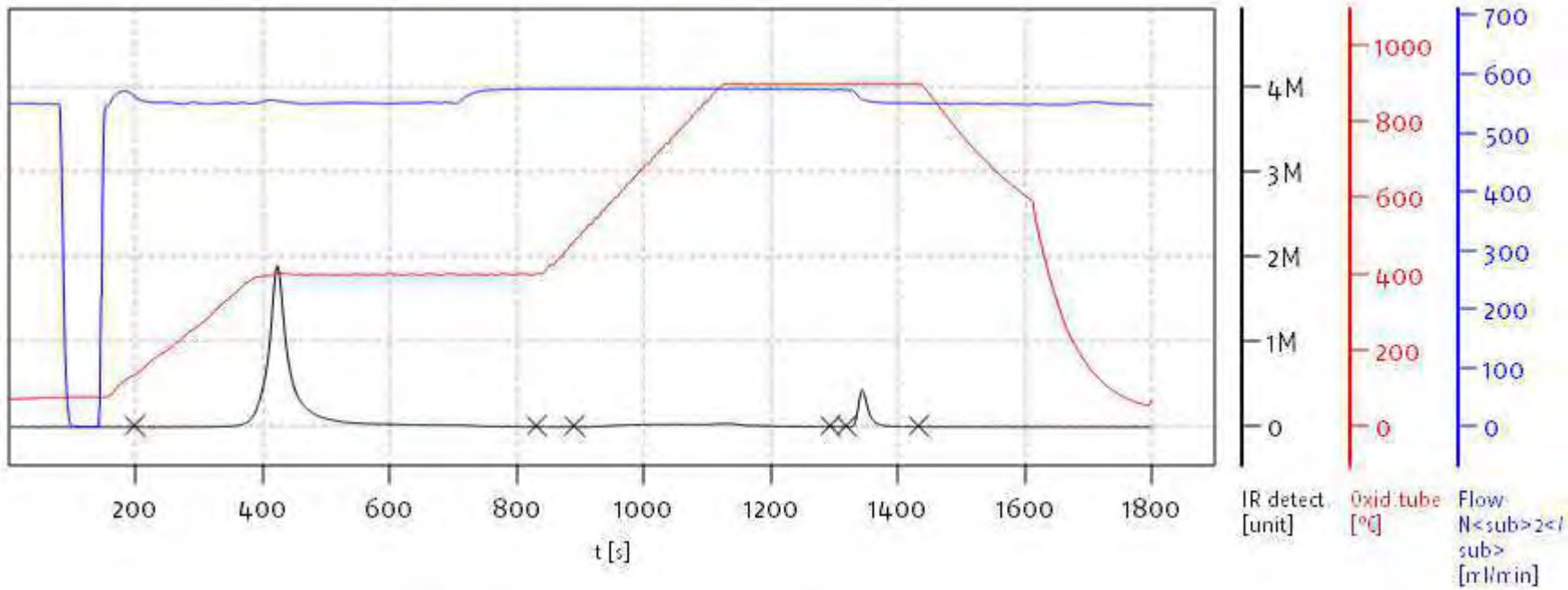
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
24	24	BLE0201-MS1	179.30	0.0070	CARBON	5/7/2023 2:23 AM	bl	2.766	3 029 890	2.996	0.245	310 847	292 951	2.521	0.230	0.9722	1.0000



Name:

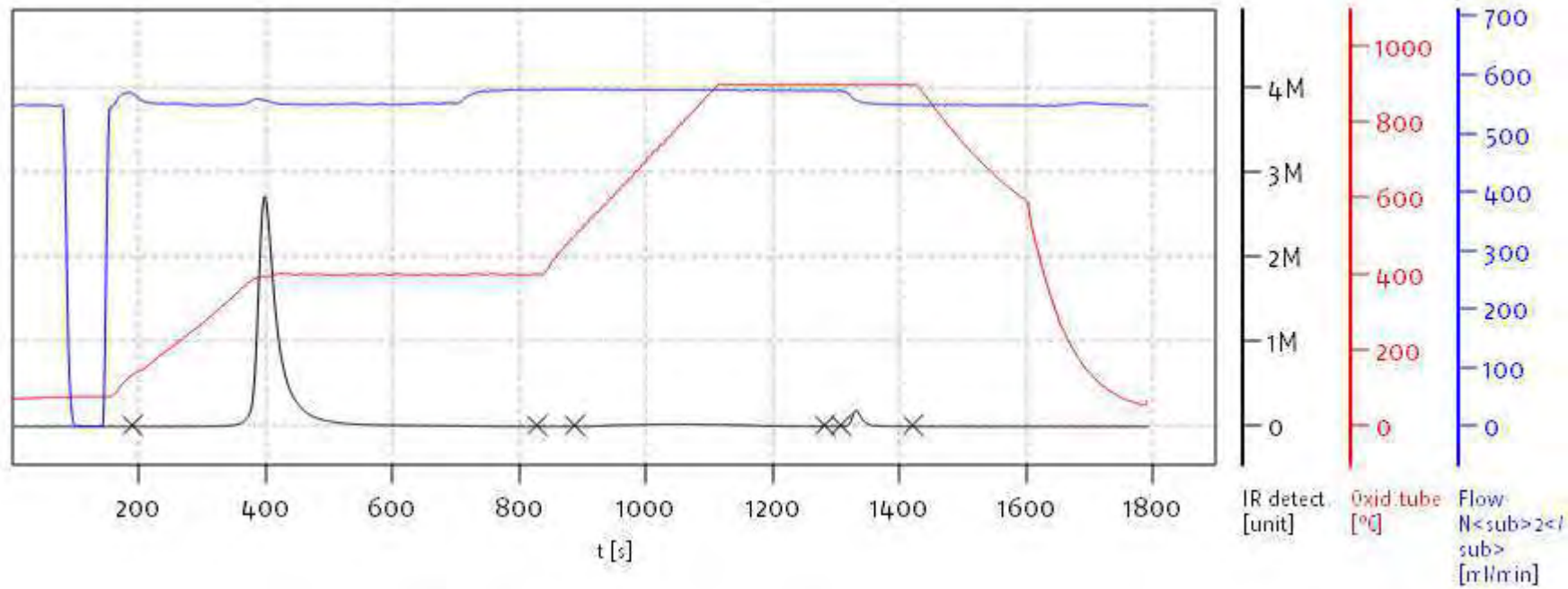
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
25	25	BLE0201-MSD1	243.60	0.0078	CARBON	5/7/2023 2:53 AM	bl	2.440	3 863 150	2.563	0.070	136 707	219 110	2.370	0.122	0.9722	1.0000



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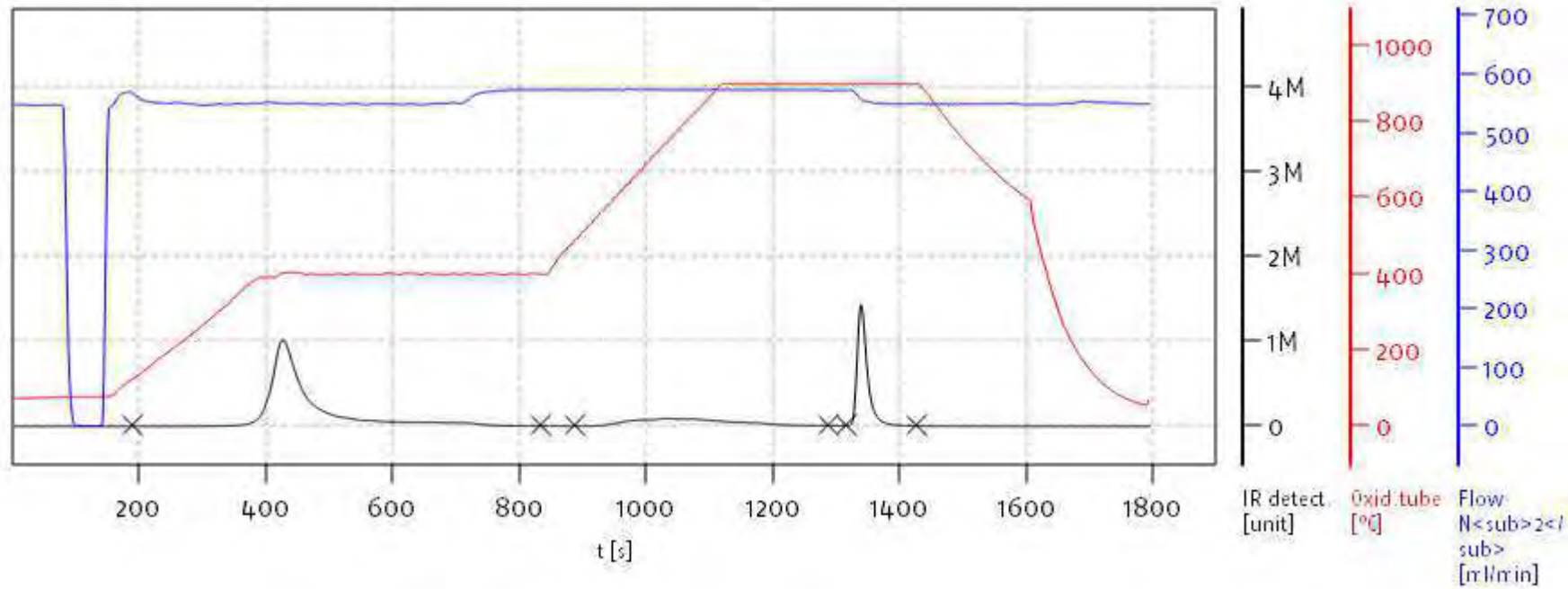
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Soli TOC Cube, Carbon
Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
26	26	23E0148-02	595.20		CARBON	5/7/2023 3:23 AM	bl	0.914	2 620 610	1.082	0.258	1 016 960	672 750	0.656	0.168	0.9722	1.0000



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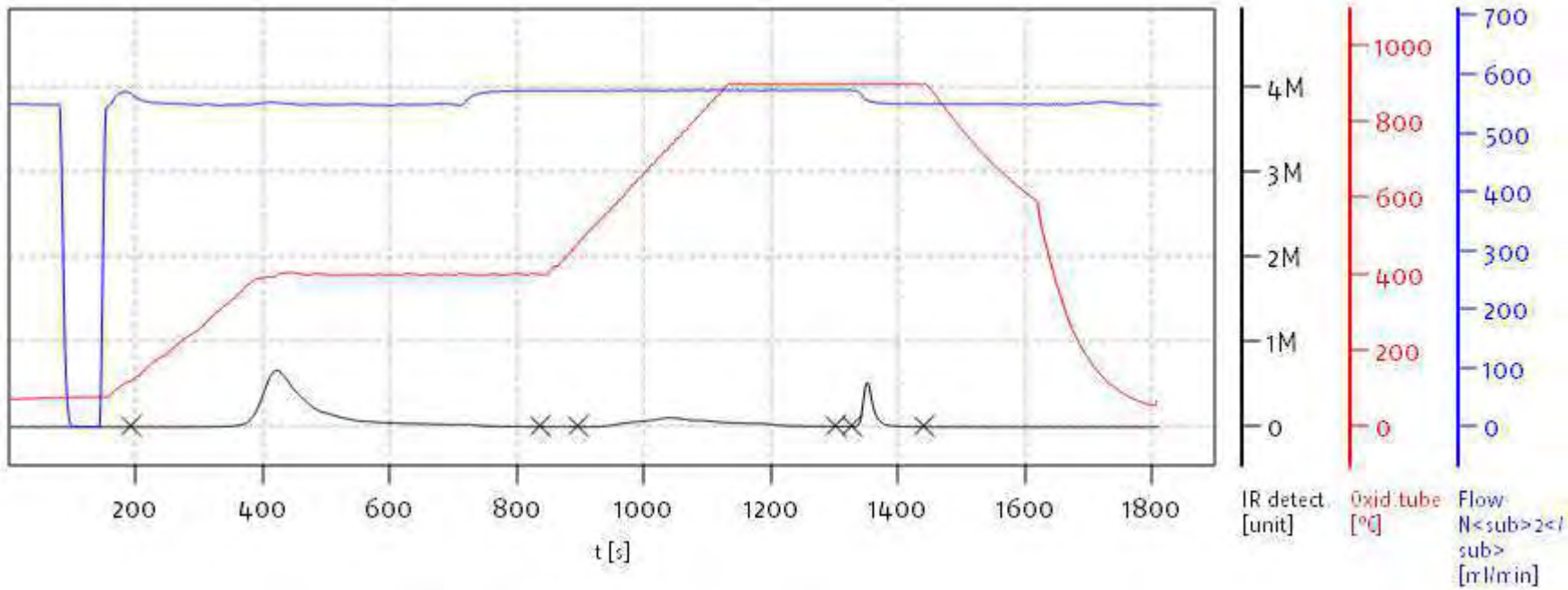
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Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
27	27	23E0148-03	608.00		CARBON	5/7/2023 3:54 AM	bl	0.654	2 311 200	0.819	0.088	373 235	674 968	0.566	0.165	0.9722	1.0000



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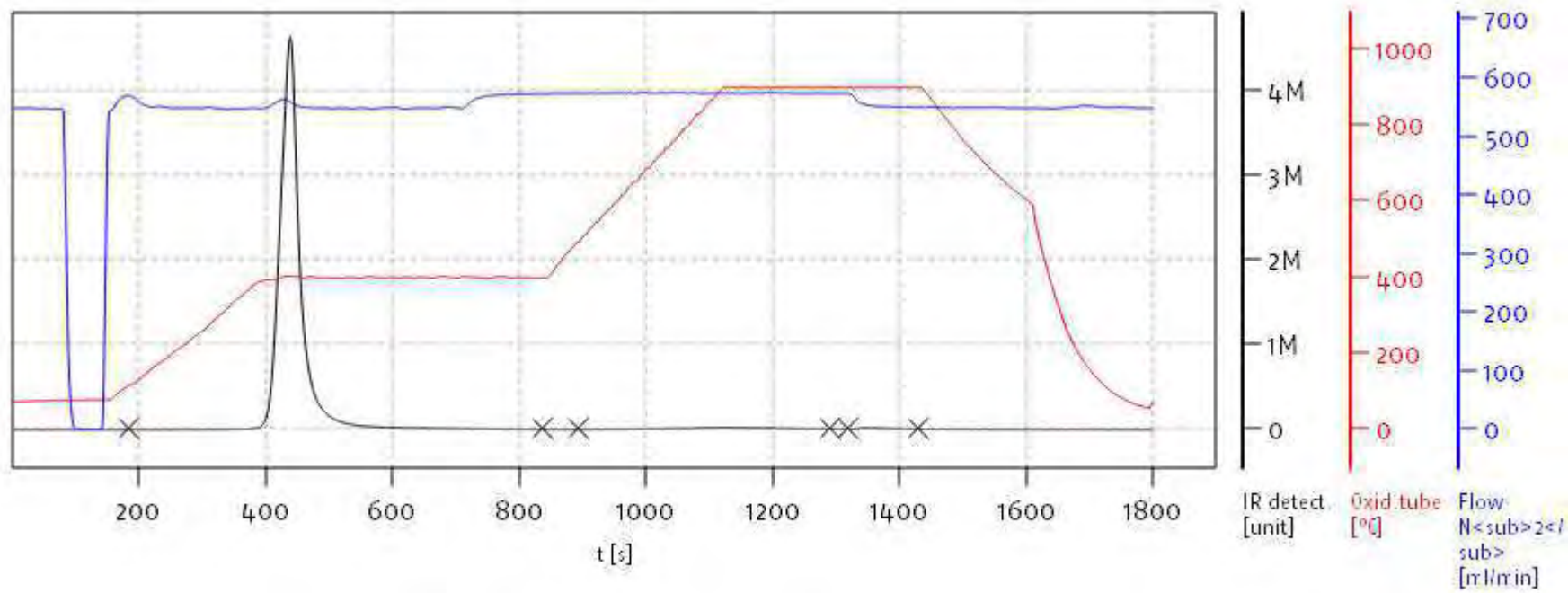
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
28	28	SLE0117-CCV2	22.00		CARBON	5/7/2023 4:24 AM	bl	43.829	6 414 480	44.870	0.130	45 056	174 400	43.699	1.040	0.9722	1.0000



Name:

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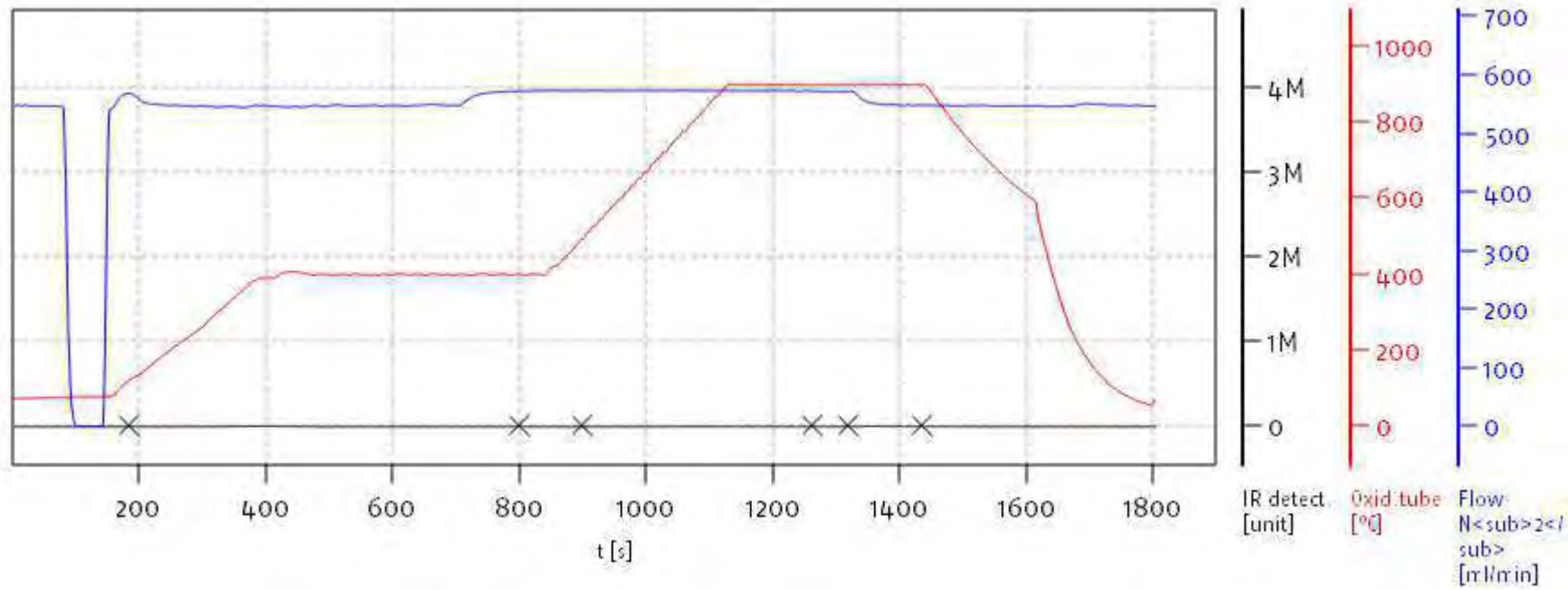
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
29	29	SLE0117-CCB2	534.90		CARBON	5/7/2023 4:55 AM	bl	0.000	26 059	0.000	0.000	13 453	10 454	0.000	0.000	0.9722	1.0000



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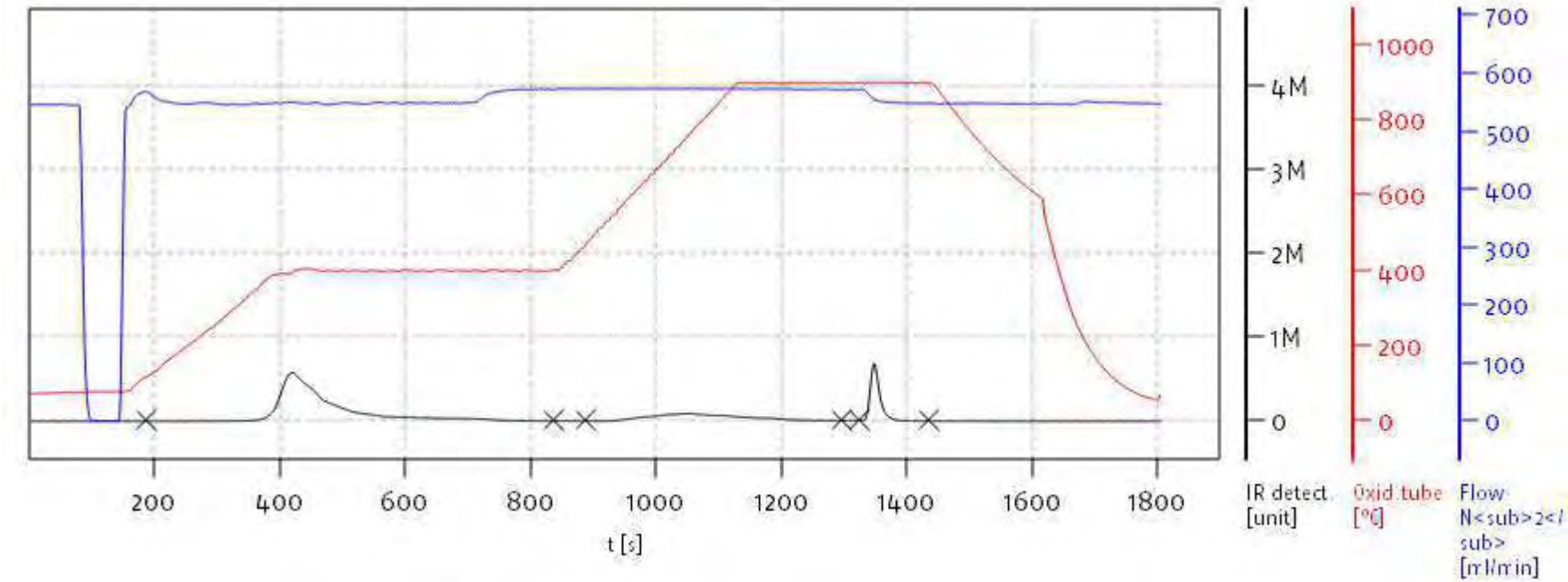
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EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
30	30	23E0148-04	538.80		CARBON	5/7/2023 5:25 AM	bl	0.686	2 031 590	0.858	0.126	466 289	622 251	0.560	0.171	0.9722	1.0000



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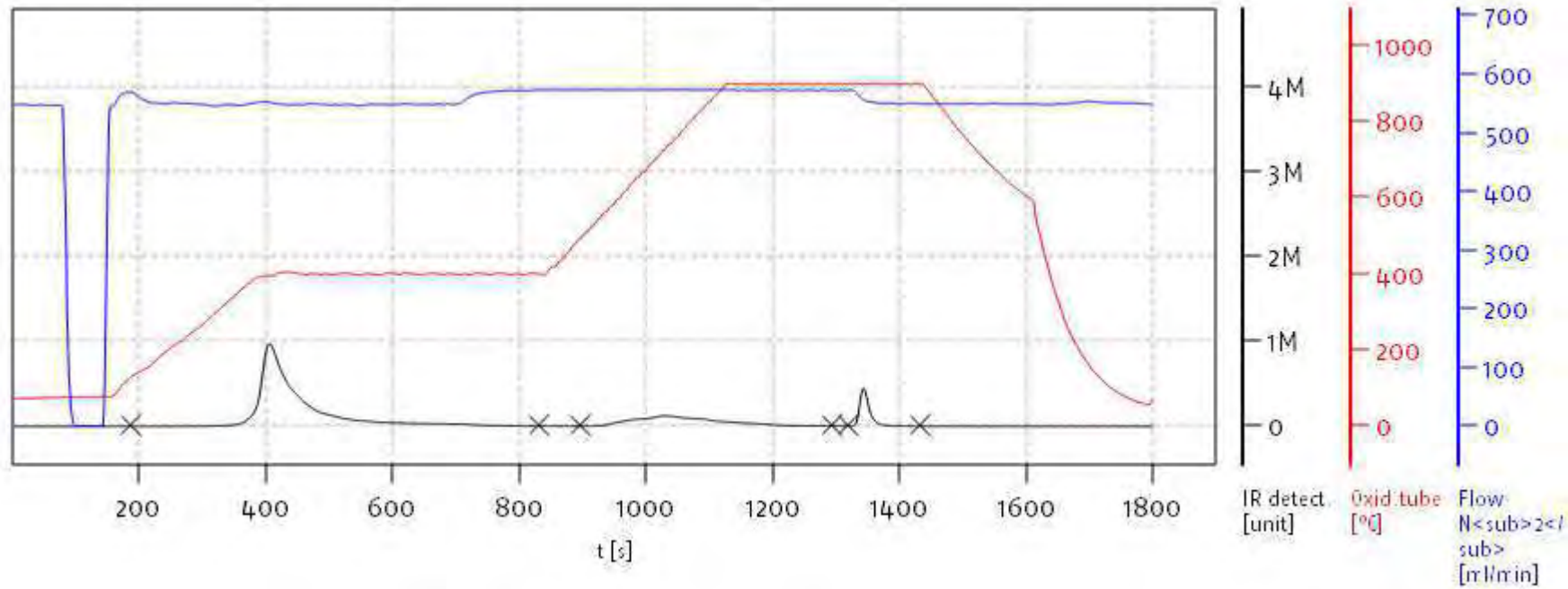
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Soli TOC Cube, Carbon
Balance: BAL3
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
31	31	23E0148-05	657.60		CARBON	5/7/2023 5:56 AM	bl	0.637	2 523 280	0.803	0.066	304 977	731 593	0.571	0.166	0.9722	1.0000



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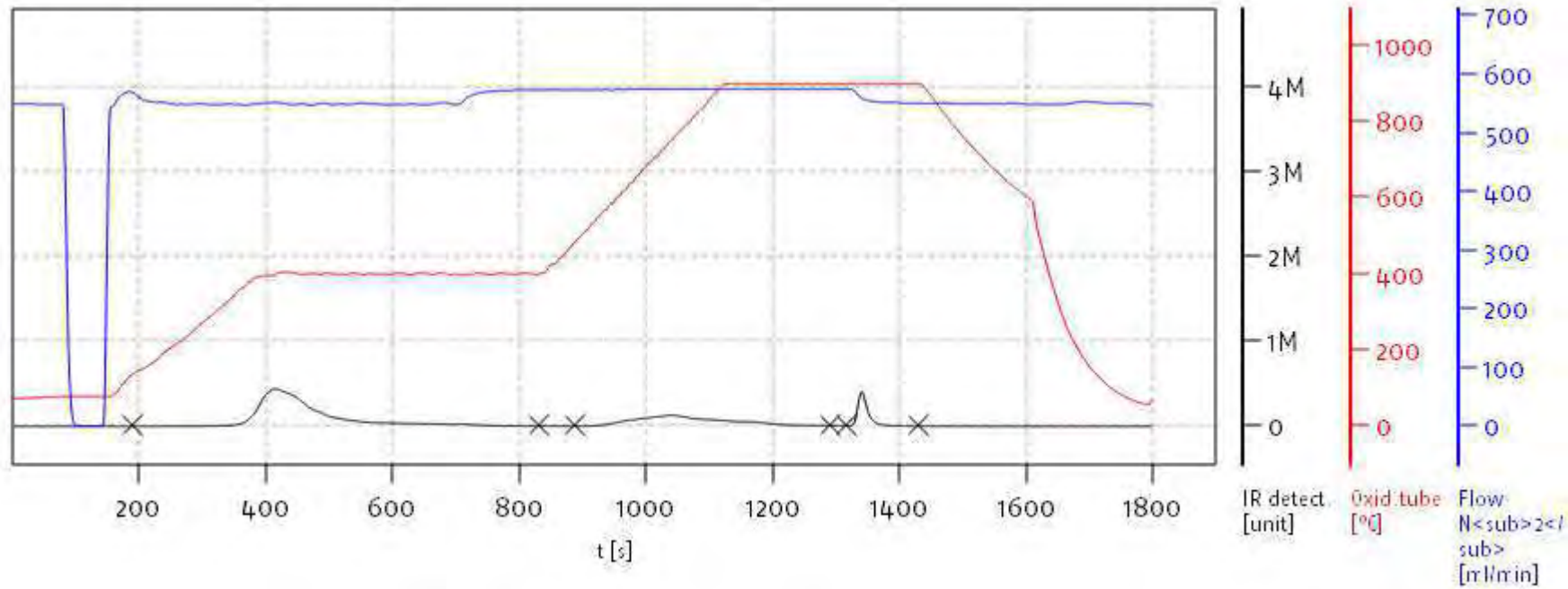
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
32	32	23E0148-06	686.20		CARBON	5/7/2023 6:26 AM	bl	0.454	1 822 130	0.633	0.060	291 884	823 256	0.394	0.180	0.9722	1.0000



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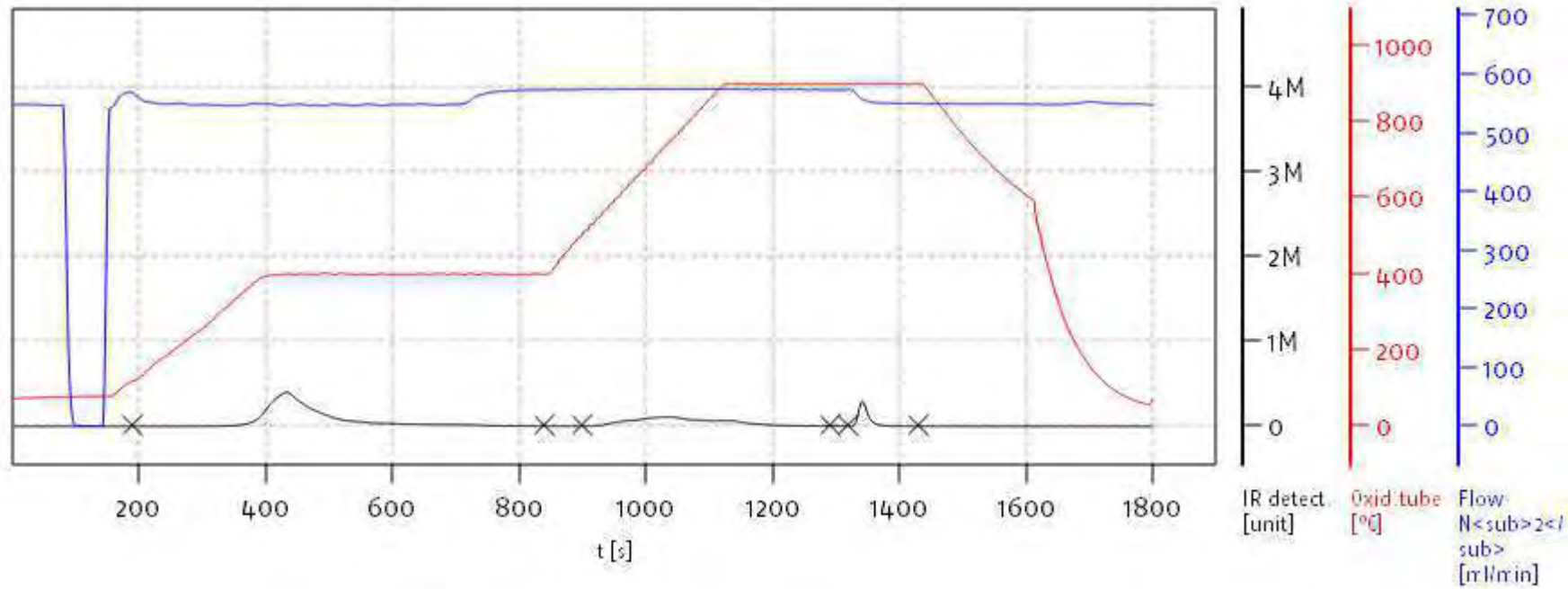
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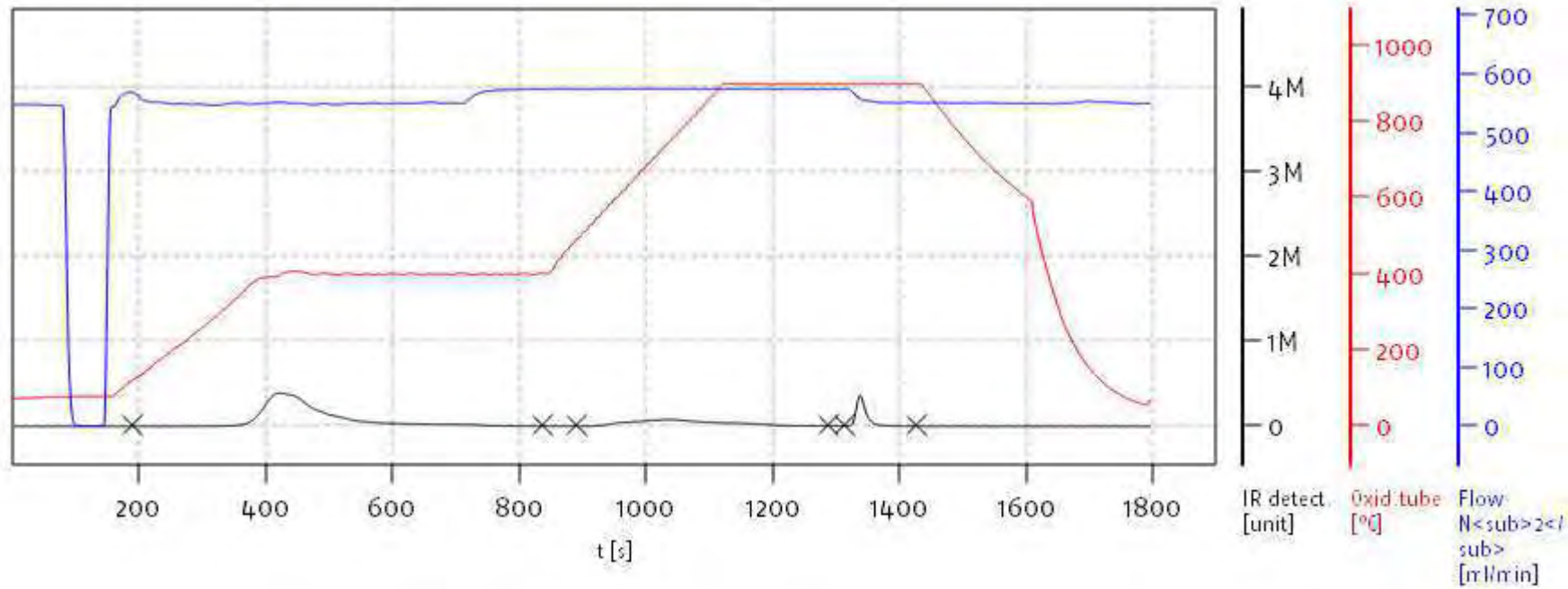
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
33	33	23E0148-07	623.70		CARBON	5/7/2023 6:56 AM	bl	0.395	1 485 620	0.562	0.043	200 102	697 398	0.352	0.167	0.9722	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
34	34	23E0148-08	516.00		CARBON	5/7/2023 7:27 AM	bl	0.549	1 676 190	0.699	0.068	251 611	526 270	0.481	0.150	0.9722	1.0000



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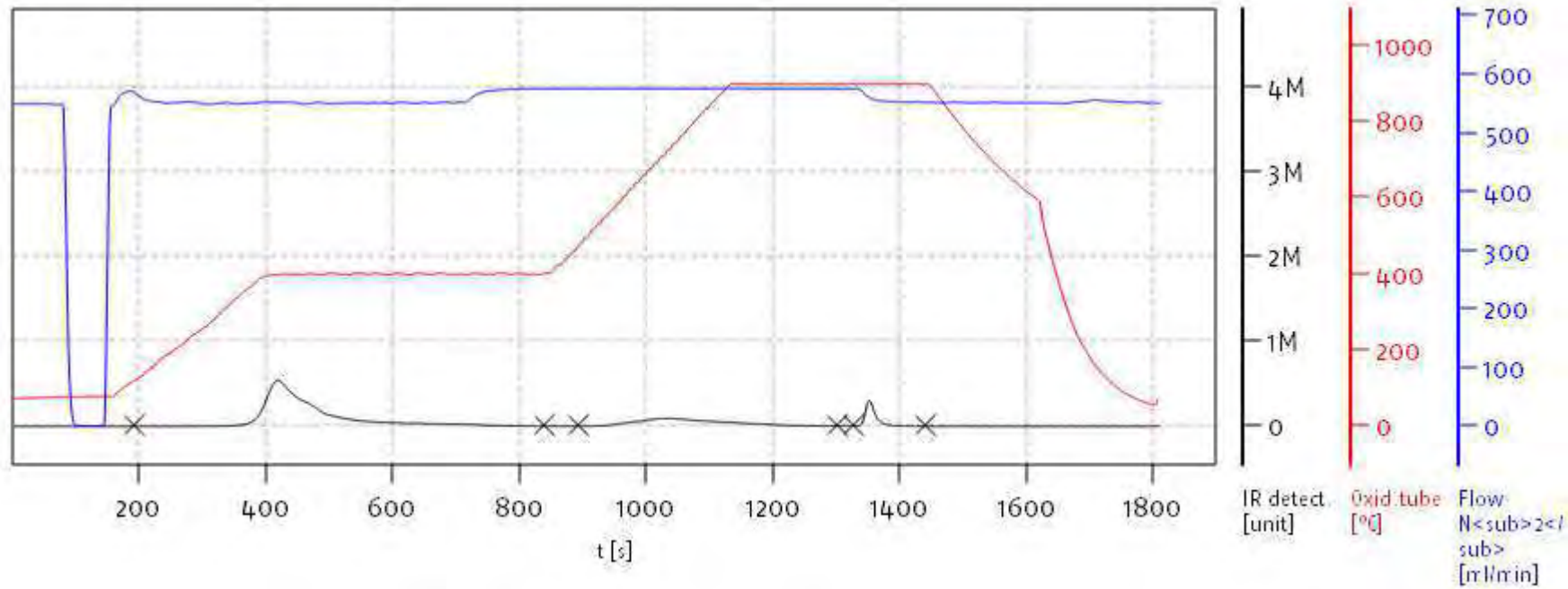
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
35	35	23E0148-09	531.10		CARBON	5/7/2023 7:57 AM	bl	0.584	1 890 380	0.746	0.056	217 460	584 529	0.528	0.163	0.9722	1.0000



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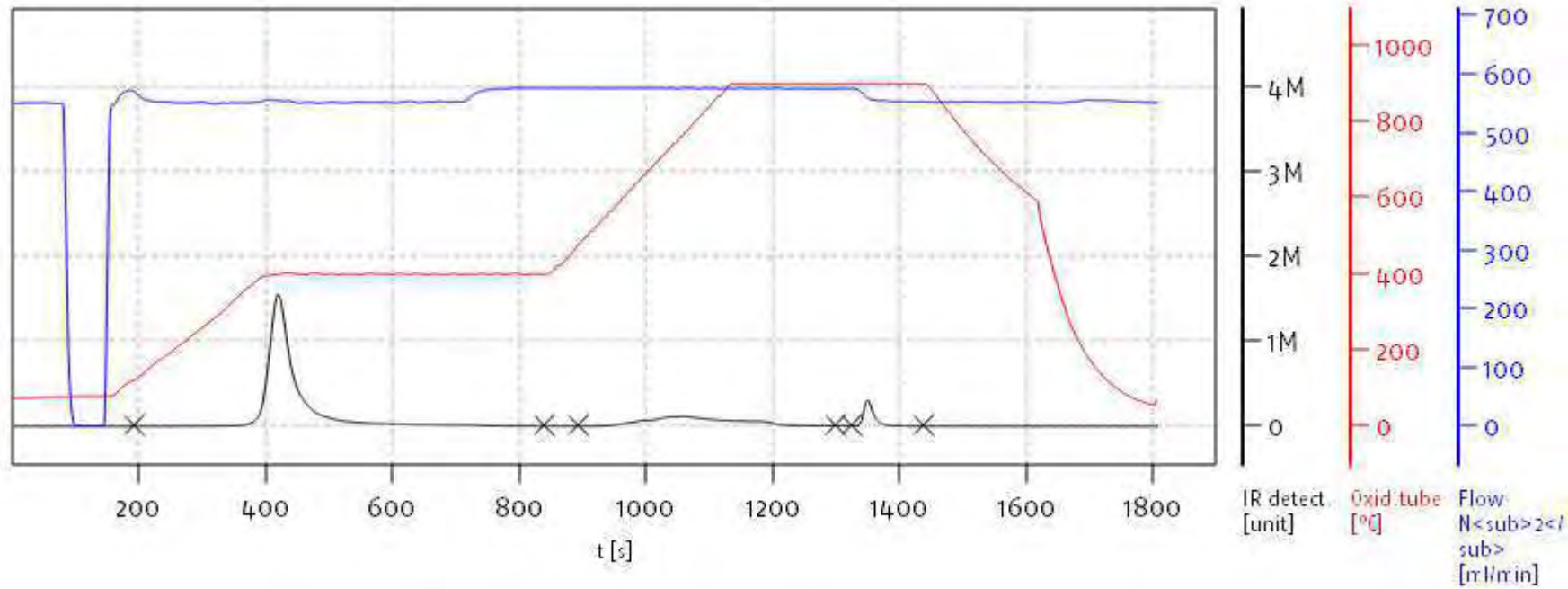
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
36	36	23E0148-10	533.00		CARBON	5/7/2023 8:28 AM	bl	0.845	2 821 580	1.055	0.055	217 501	749 382	0.789	0.210	0.9722	1.0000



Name:

Access: soliTOC superuser

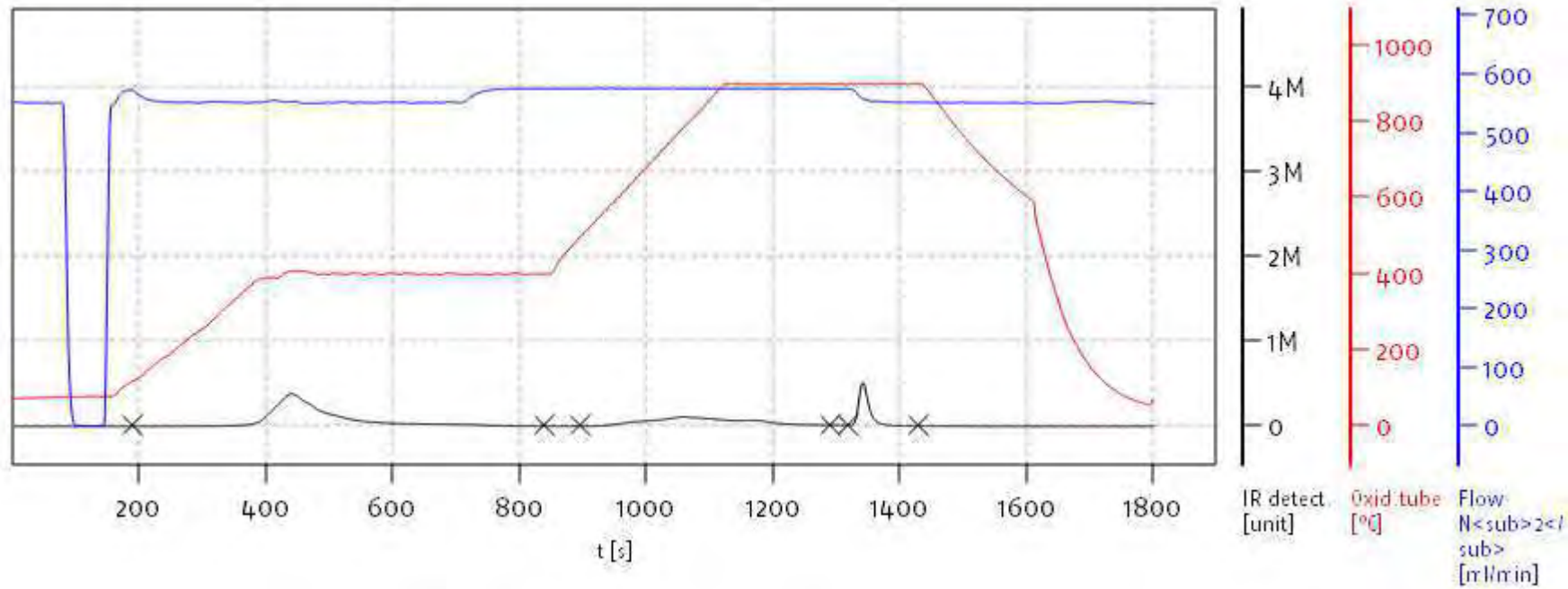
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
37	37	23E0148-11	544.00		CARBON	5/7/2023 8:58 AM	bl	0.504	1 486 110	0.720	0.100	379 025	786 211	0.404	0.216	0.9722	1.0000



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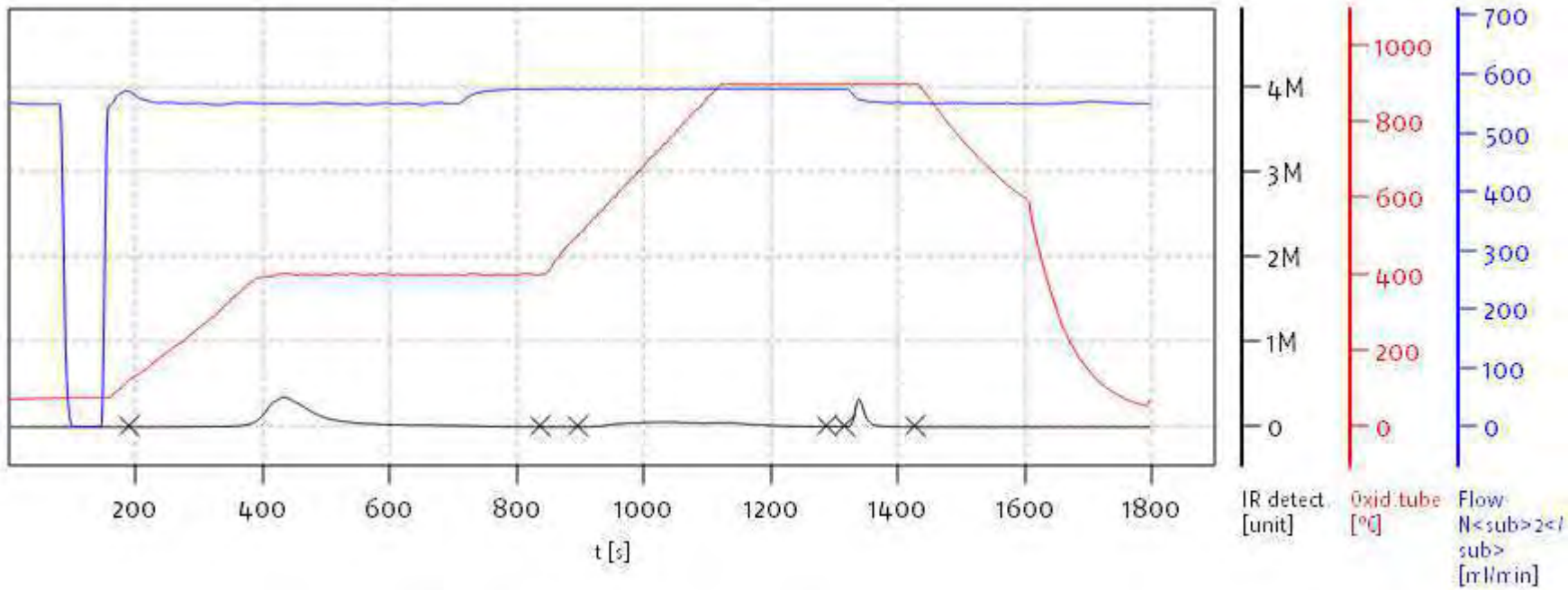
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
38	38	23E0148-12	508.40		CARBON	5/7/2023 9:28 AM	bl	0.450	1 335 390	0.588	0.062	230 616	481 513	0.387	0.139	0.9722	1.0000



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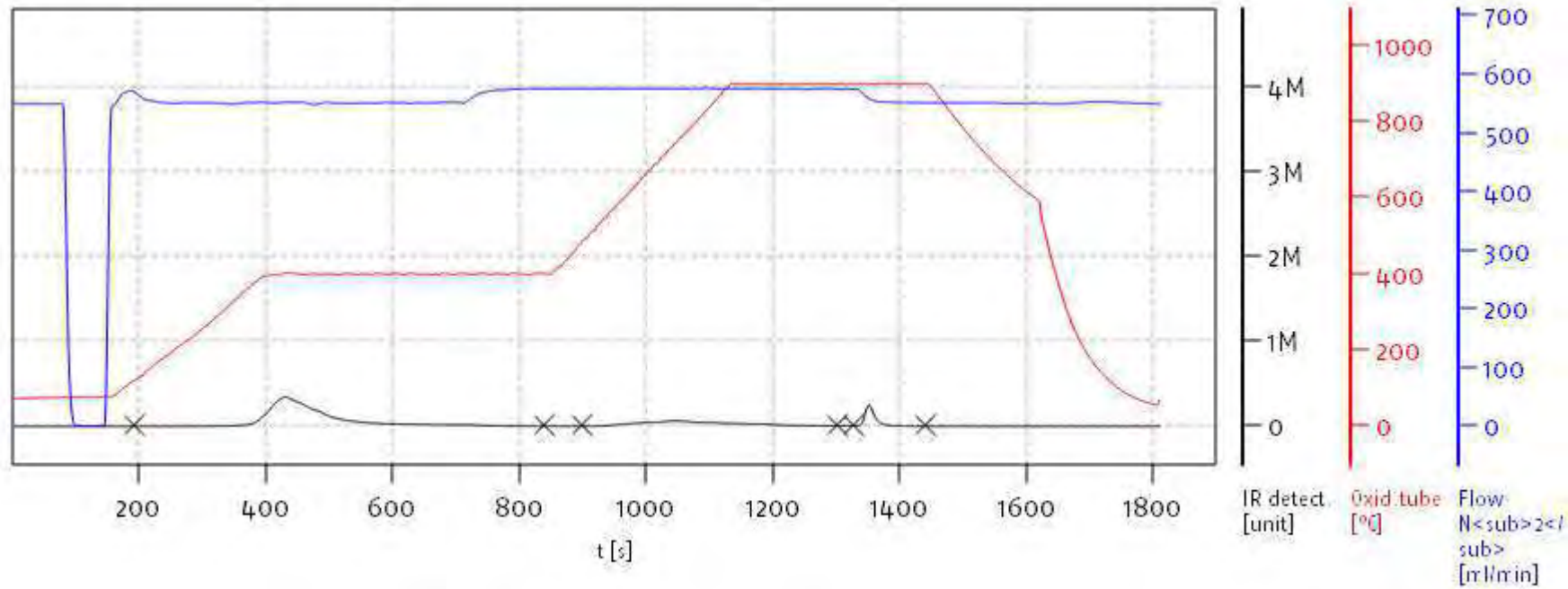
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
39	39	23E0148-13	524.50		CARBON	5/7/2023 9:59 AM	bl	0.425	1 352 130	0.545	0.045	179 292	431 464	0.380	0.120	0.9722	1.0000



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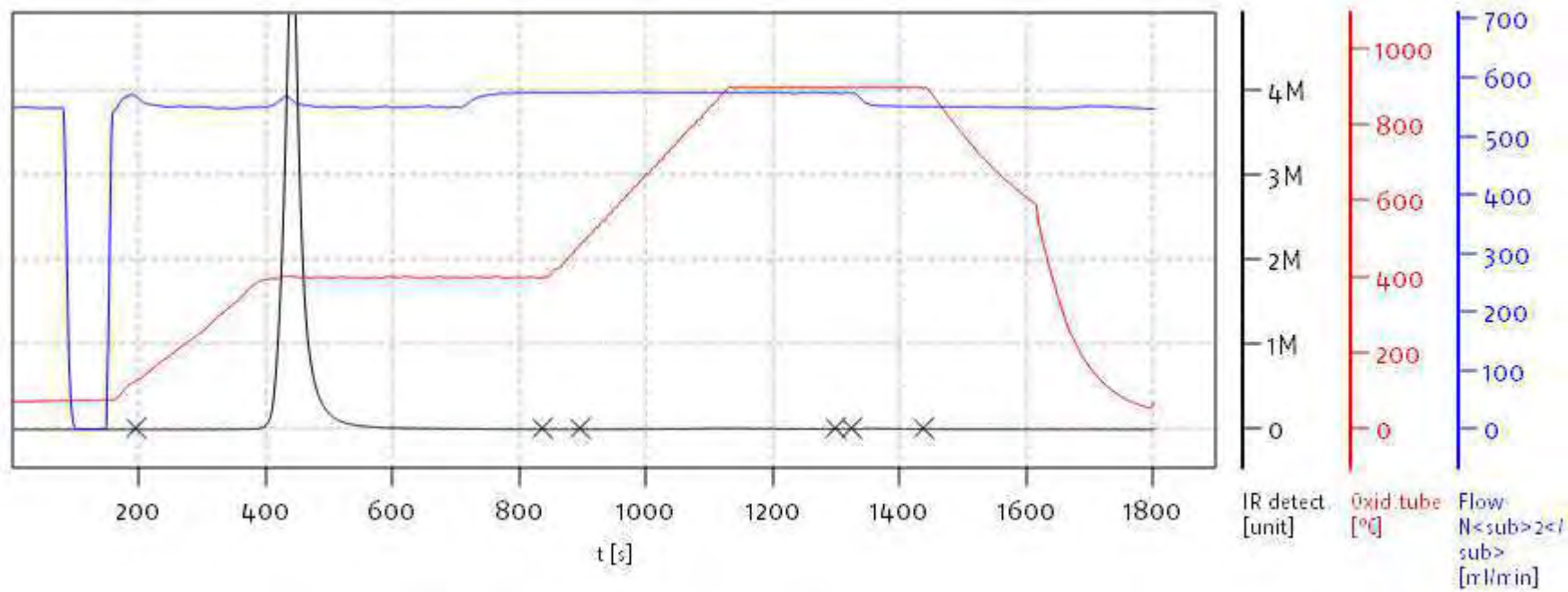
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
40	40	SLE0117-CCV3	23.10		CARBON	5/7/2023 10:29 AM	bl	44.772	6 894 140	45.253	0.029	30 898	98 318	44.743	0.481	0.9722	1.0000



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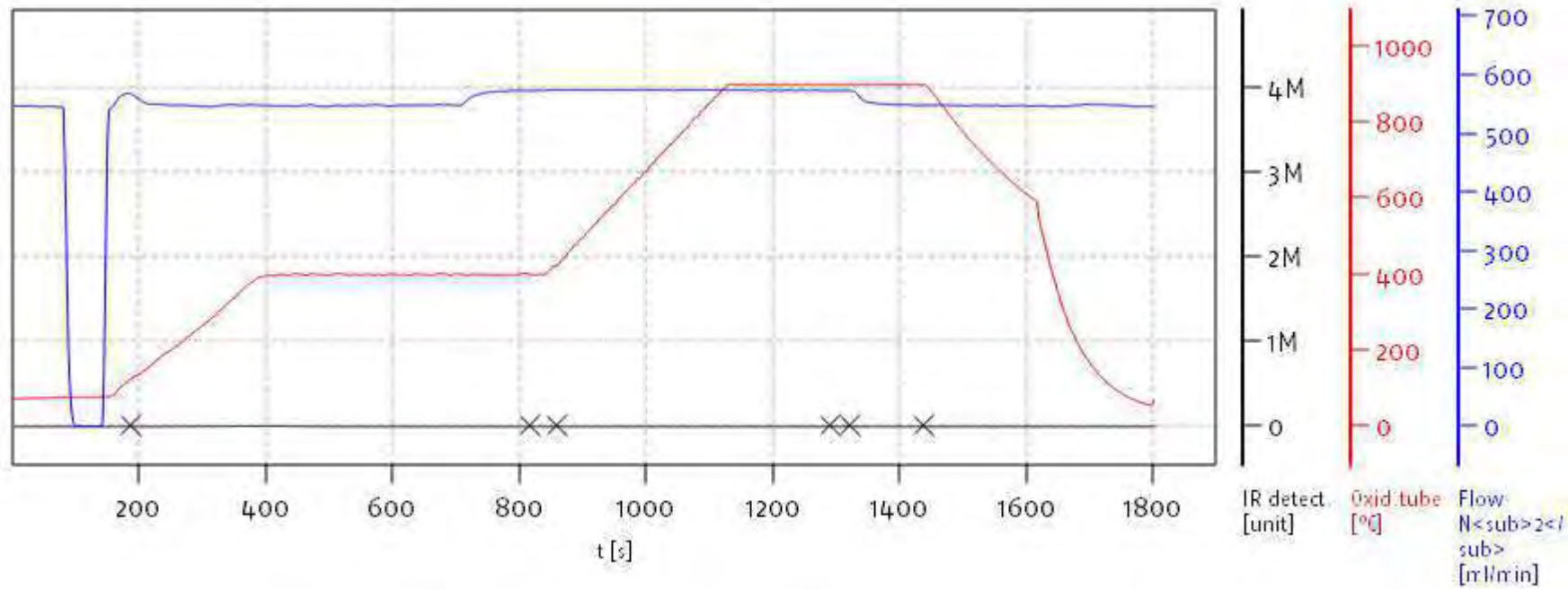
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
41	41	SLE0117-CCB3	521.50		CARBON	5/7/2023 11:00 AM	bl,C2u	0.003	36 851	0.003	0.000	2 251	2 615	0.003	0.000	0.9722	1.0000



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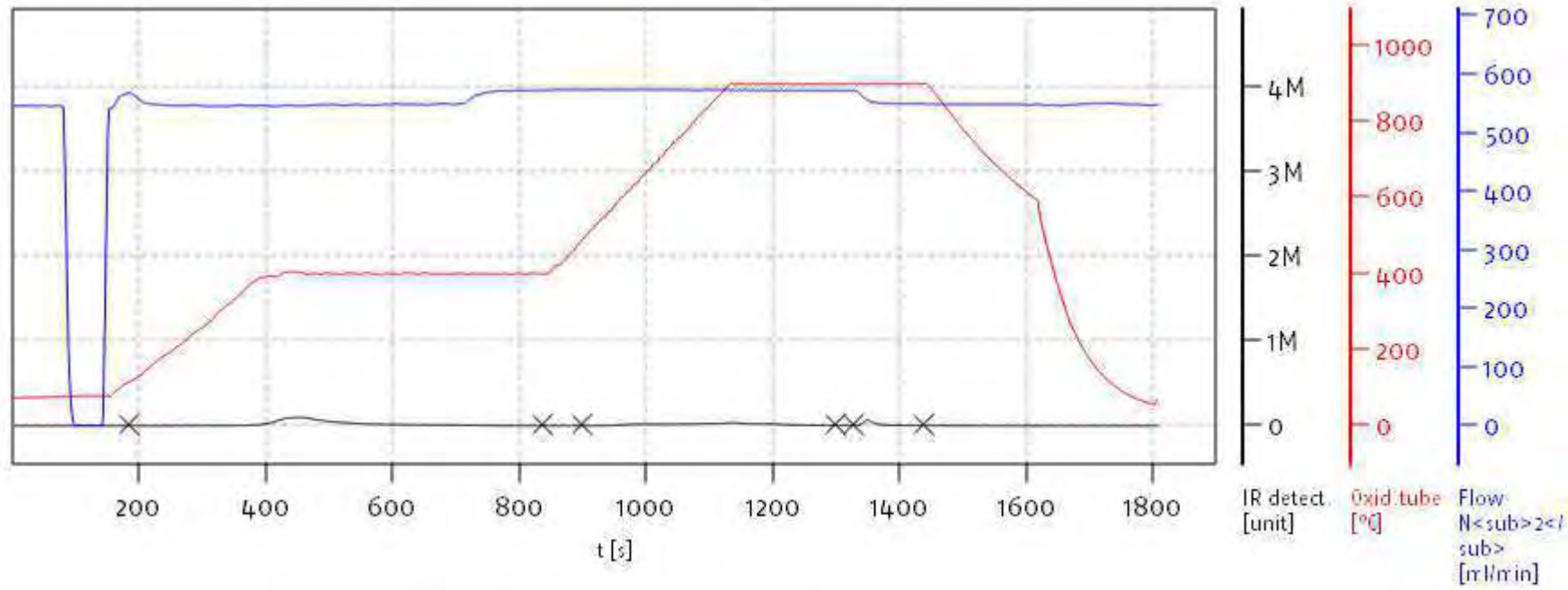
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
42	42	23E0152-01	561.60		CARBON	5/7/2023 11:30 AM	bl	0.127	461 802	0.186	0.010	63 842	240 874	0.117	0.059	0.9722	1.0000



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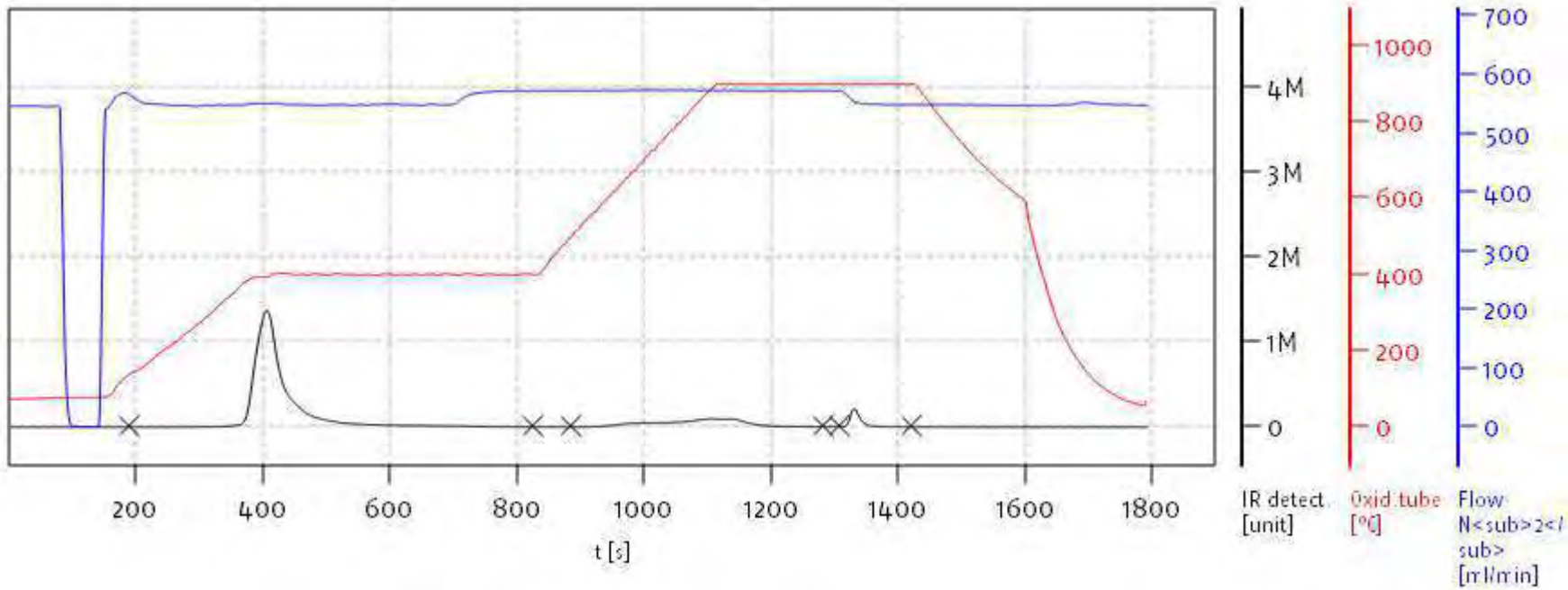
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
43	43	23E0152-02	658.50		CARBON	5/7/2023 12:01 PM	bl	0.653	2 753 860	0.784	0.030	152 505	583 668	0.623	0.131	0.9722	1.0000



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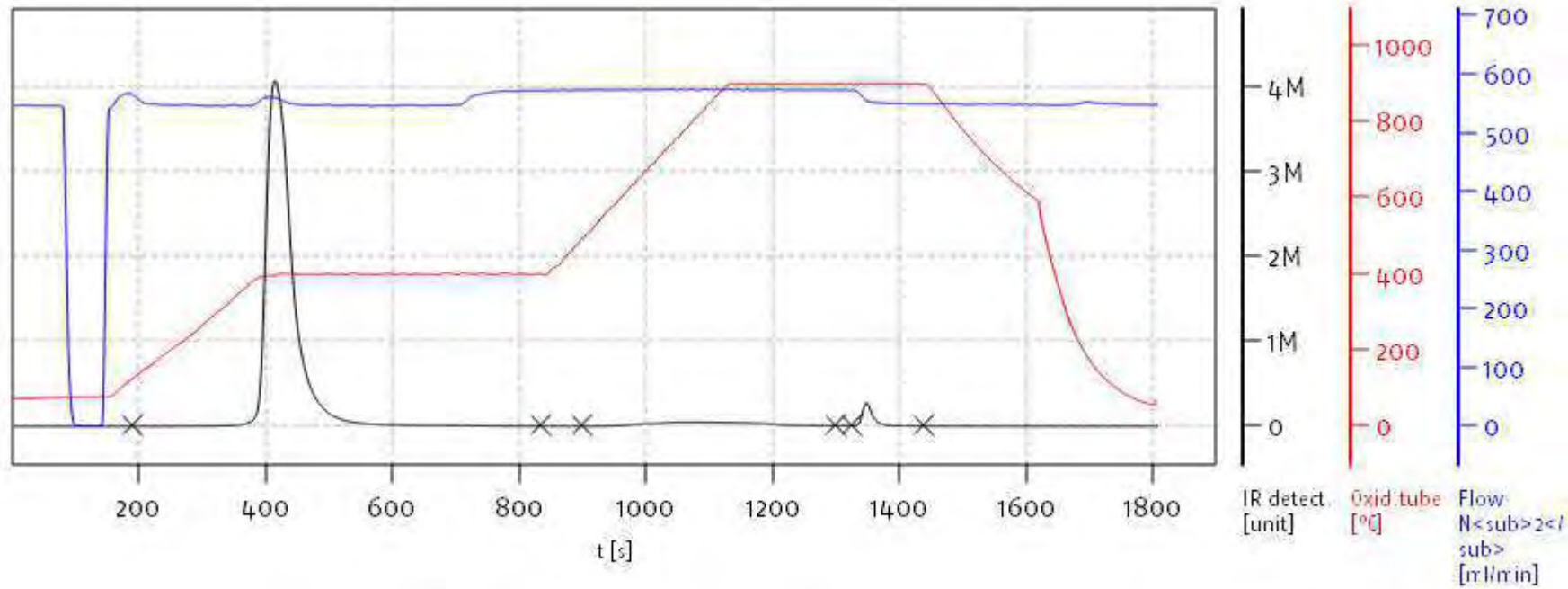
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soliTOC V2.0.2 (31015f9) 2018-11-19
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
44	44	23E0152-03	568.90		CARBON	5/7/2023 12:31 PM	bl	1.990	7 365 020	2.094	0.049	205 724	408 888	1.941	0.104	0.9722	1.0000



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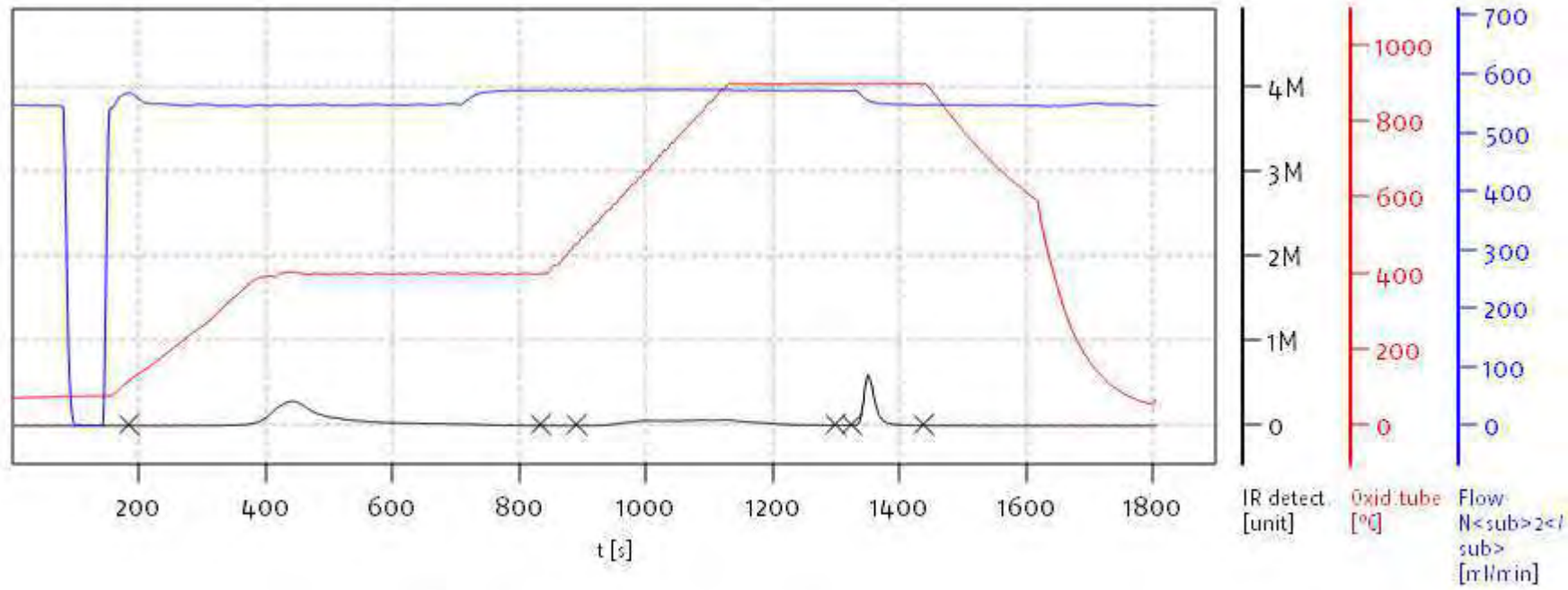
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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
45	45	23E0152-04	629.50		CARBON	5/7/2023 1:02 PM	bl	0.388	1 196 600	0.518	0.108	466 755	554 972	0.280	0.130	0.9722	1.0000



Name:

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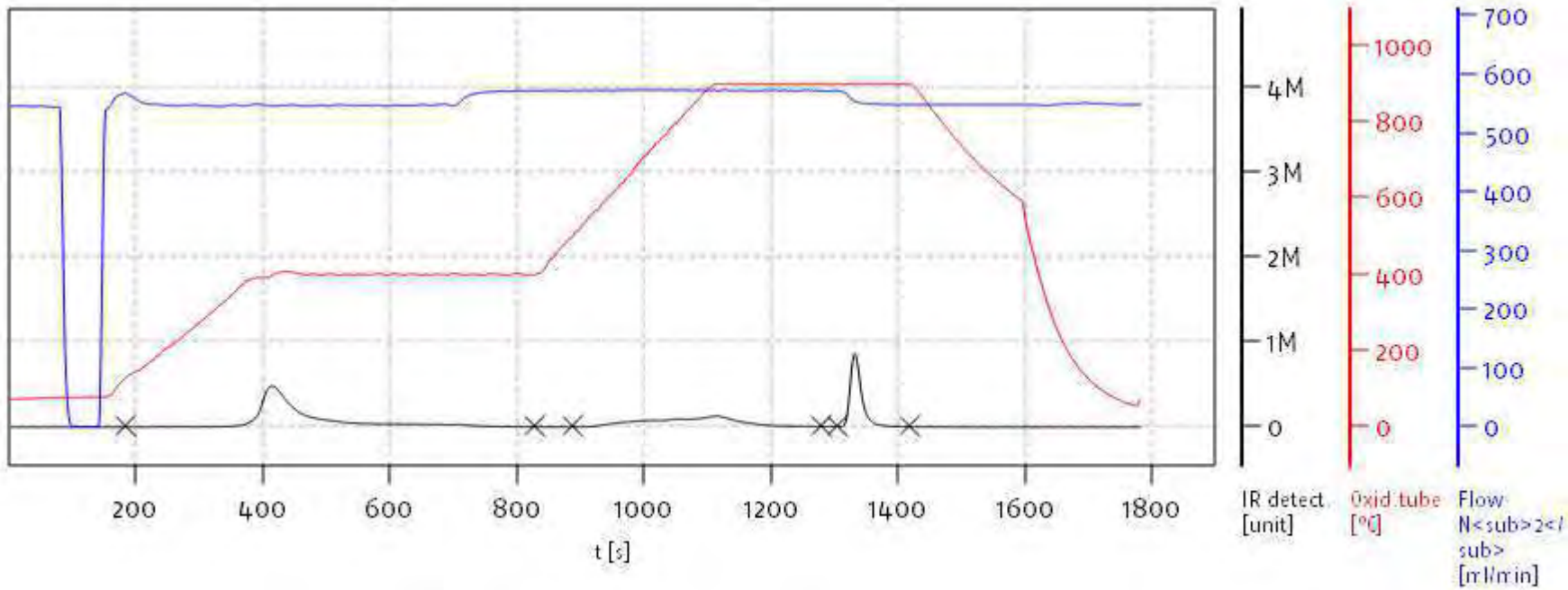
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
46	46	23E0152-05	332.70		CARBON	5/7/2023 1:32 PM	bl	0.949	1 452 620	1.303	0.303	678 718	787 674	0.645	0.354	0.9722	1.0000



Name:

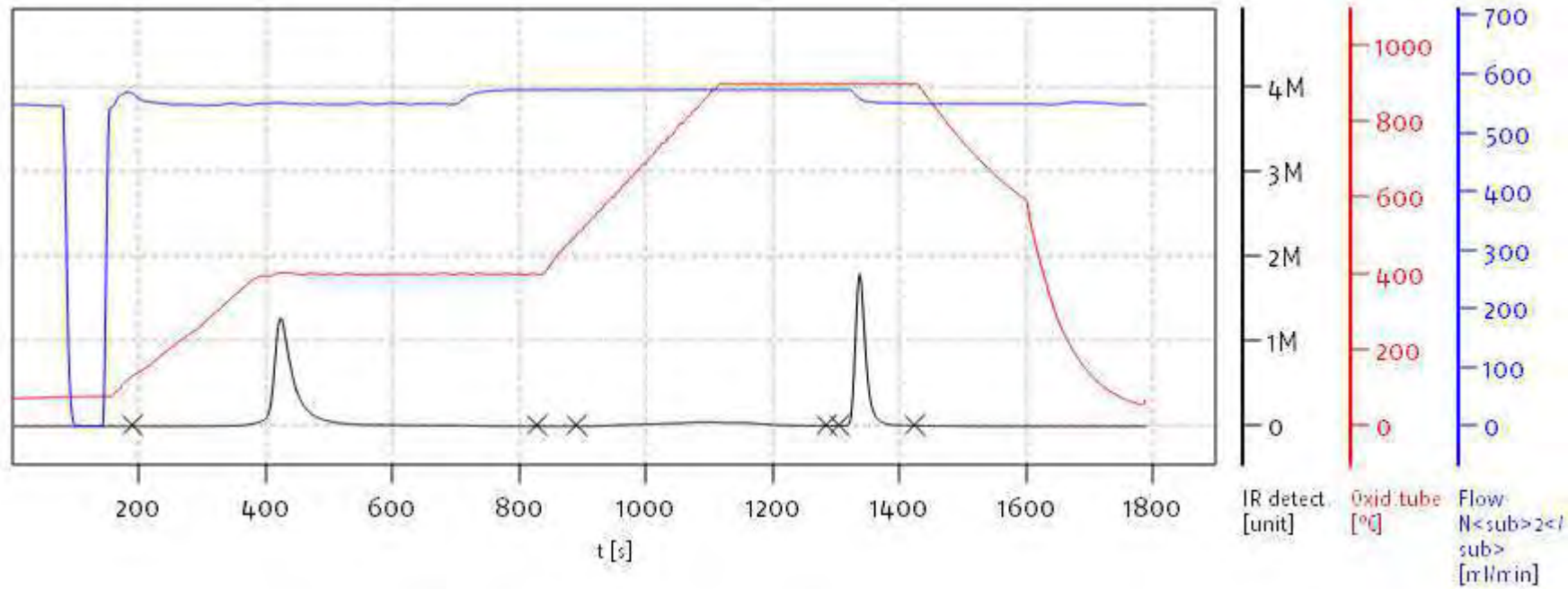
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Date: Tue May 9 14:33:55 2023

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Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
47	47	23E0152-06	355.40		CARBON	5/7/2023 2:02 PM	bl	1.340	1 882 930	1.486	0.554	1 297 340	362 409	0.786	0.146	0.9722	1.0000



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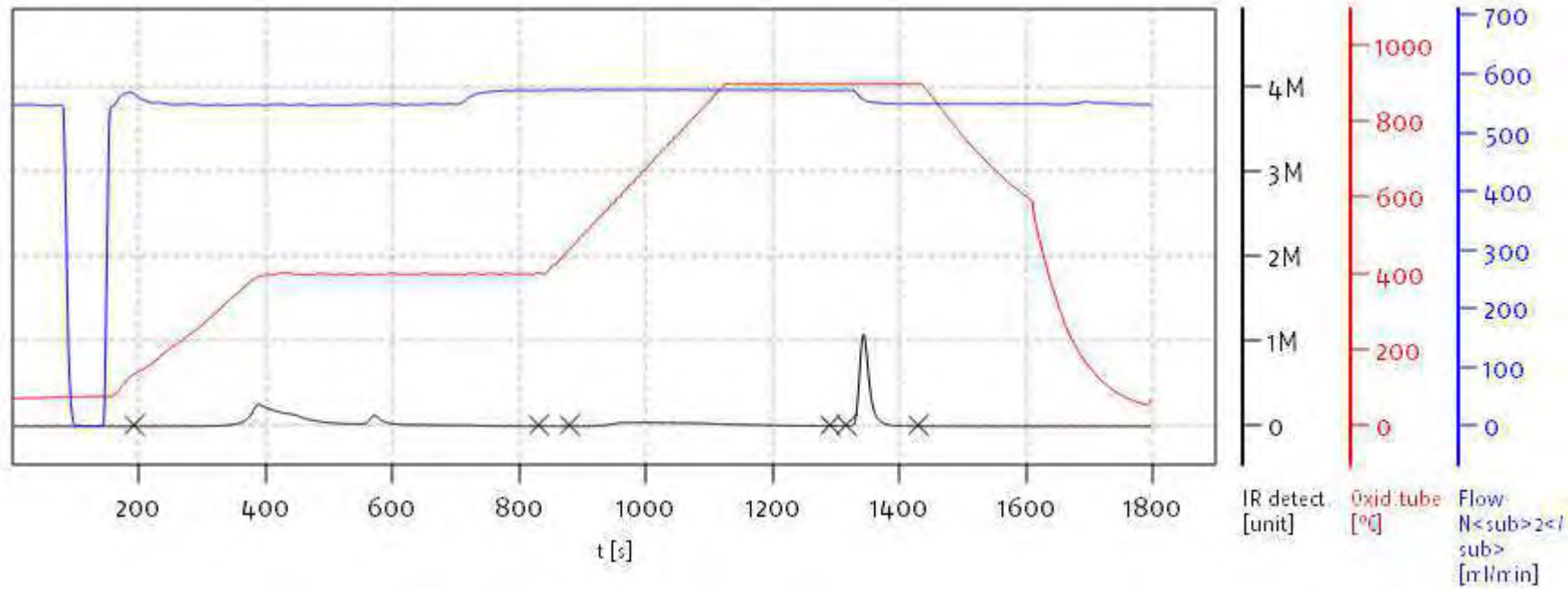
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
48	48	23E0152-07	252.60		CARBON	5/7/2023 2:32 PM	bl	1.029	1 013 240	1.232	0.441	746 387	357 184	0.588	0.203	0.9722	1.0000



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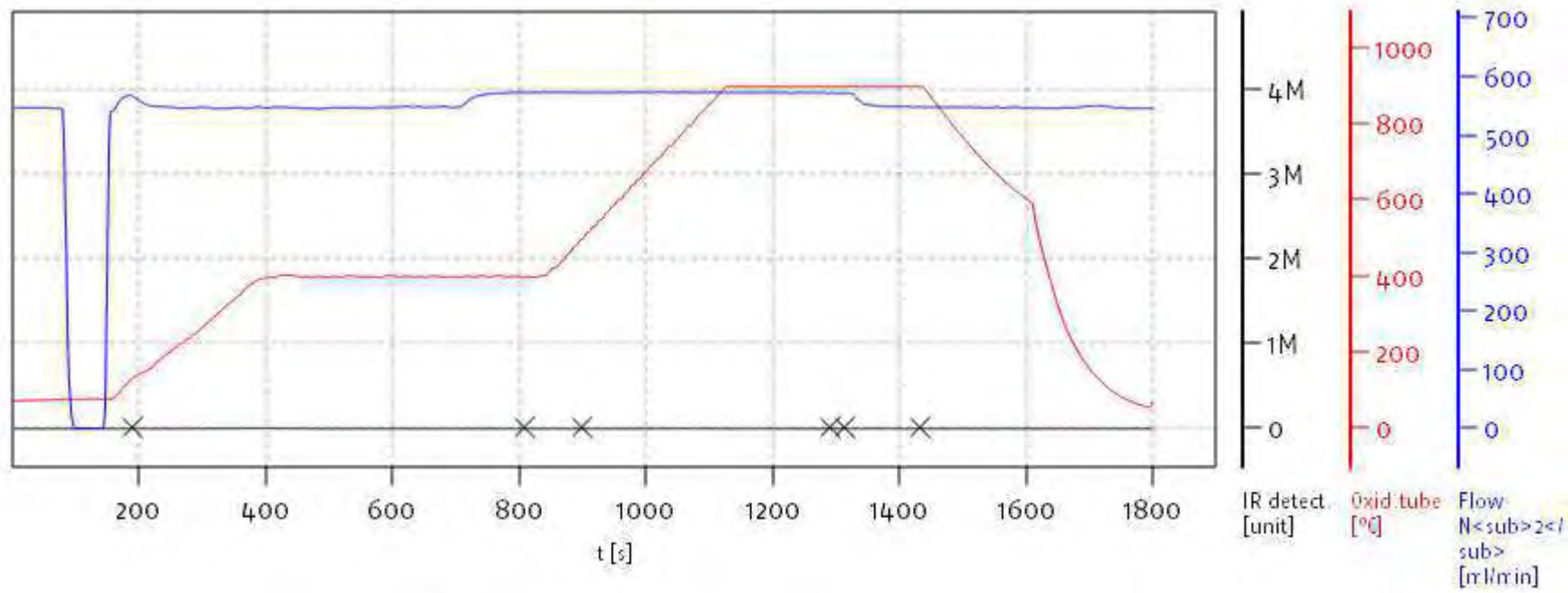
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
49	49	BLANK	1.00		CARBON	5/7/2023 3:03 PM	bl	0.000	19 746	0.000	0.000	3 210	7 915	0.000	0.000	0.9722	1.0000



Name:

Access: soliTOC superuser

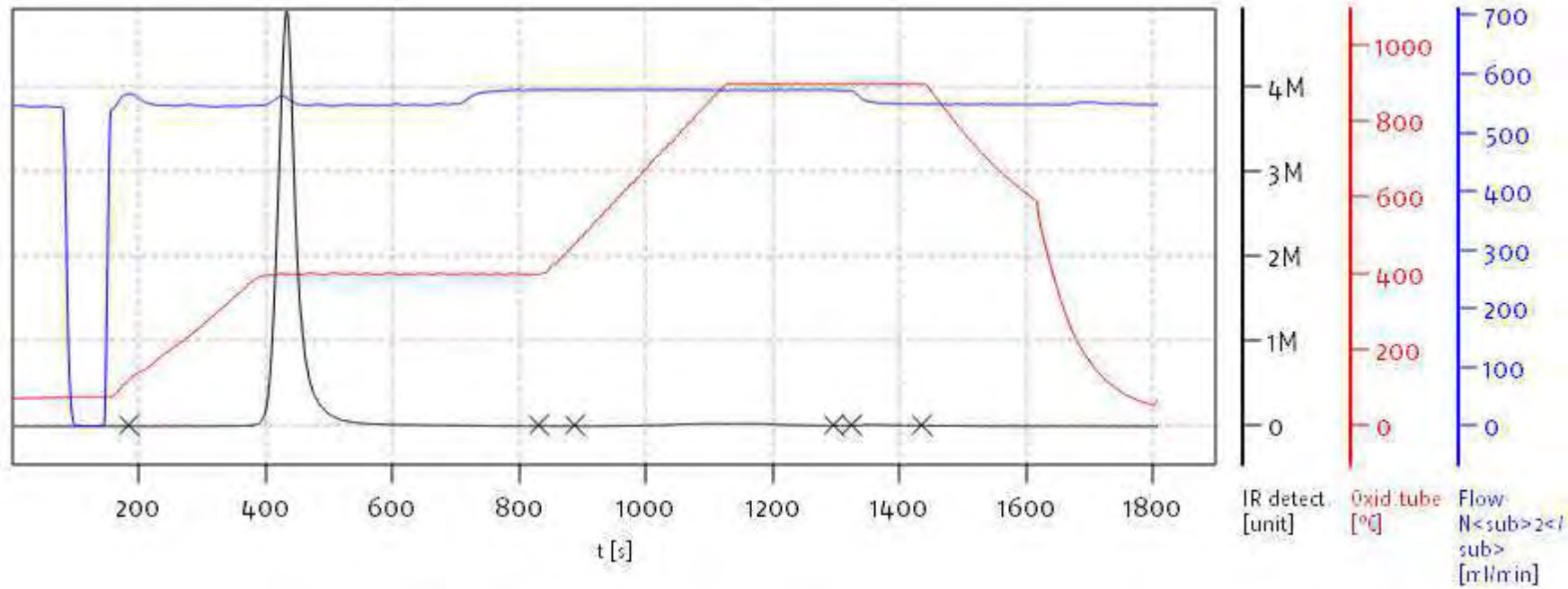
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
50	50	Dfactor	21.90		CARBON	5/7/2023 3:33 PM	bl	44.617	6 602 010	46.278	0.171	50 724	261 516	44.446	1.661	0.9562	1.0000



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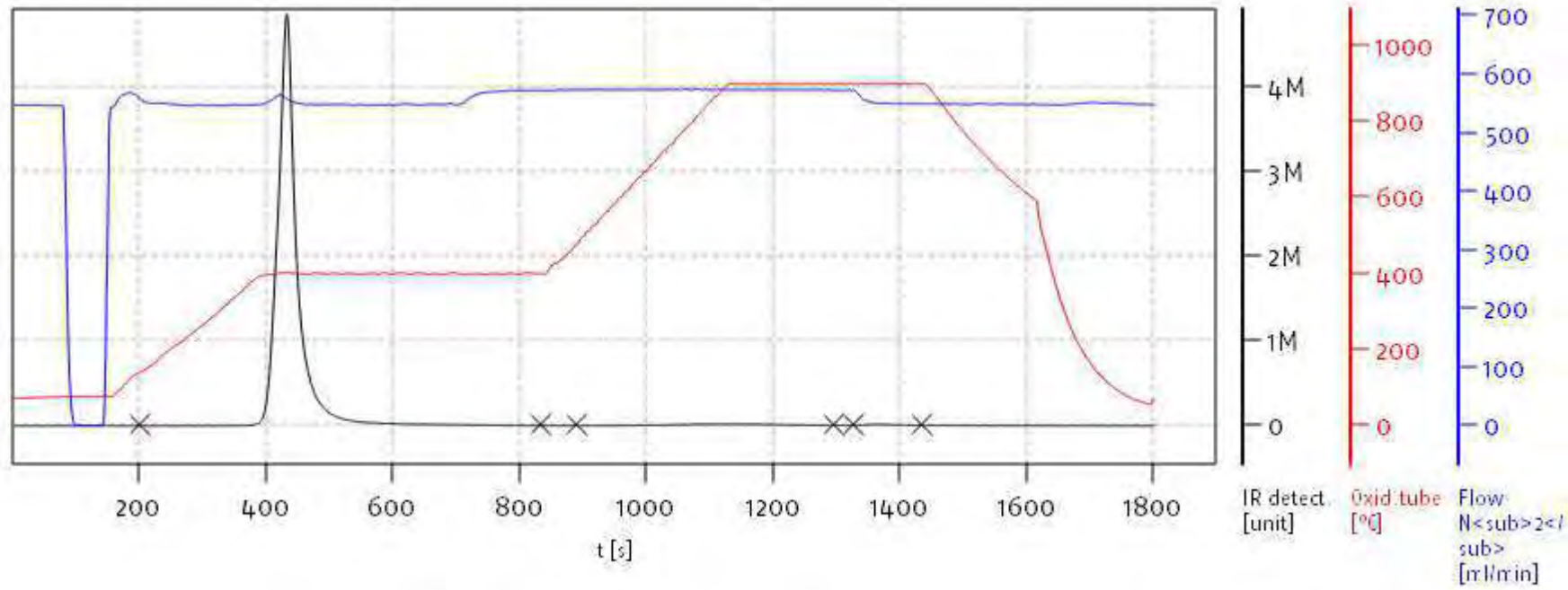
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
51	51	Dfactor	22.20		CARBON	5/7/2023 4:04 PM	bl	44.534	6 440 570	45.442	0.089	39 271	156 669	44.446	0.907	0.9937	1.0000



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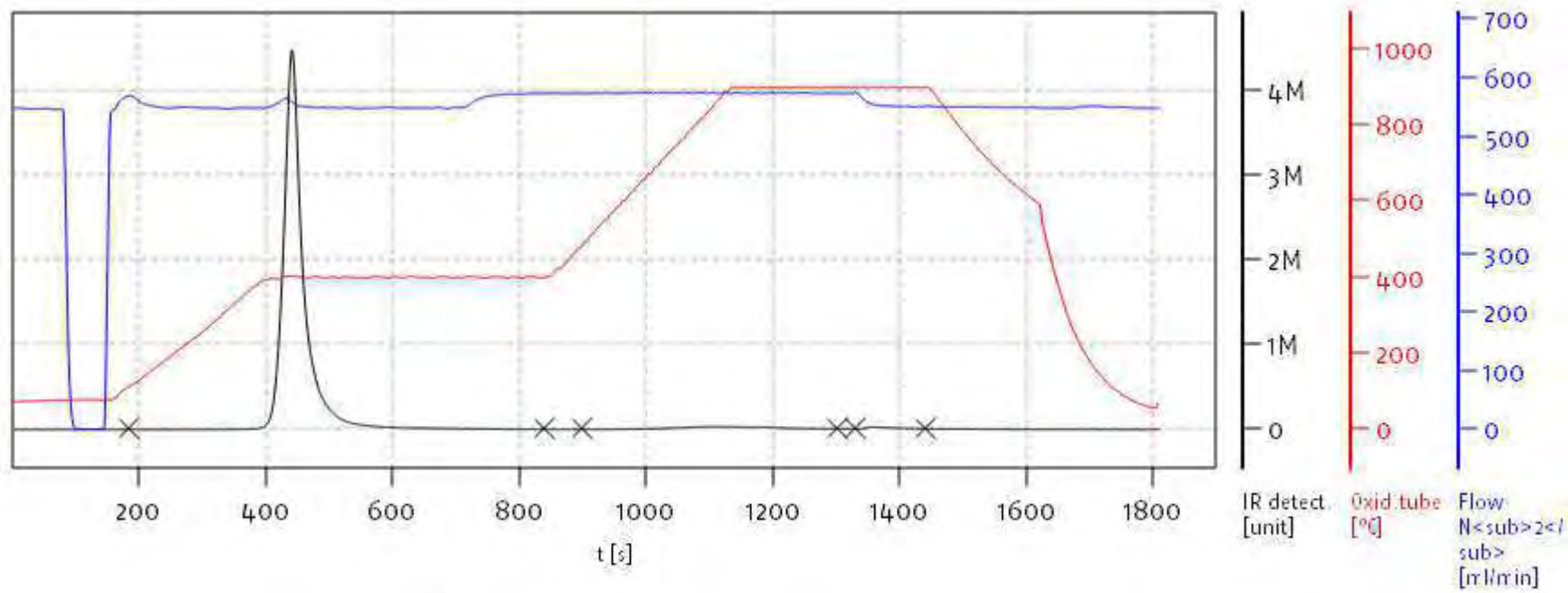
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
52	52	SLE0117-CCV4	21.20		CARBON	5/7/2023 4:34 PM	bl	43.721	6 119 690	45.436	0.341	73 291	261 463	43.380	1.715	0.9750	1.0000



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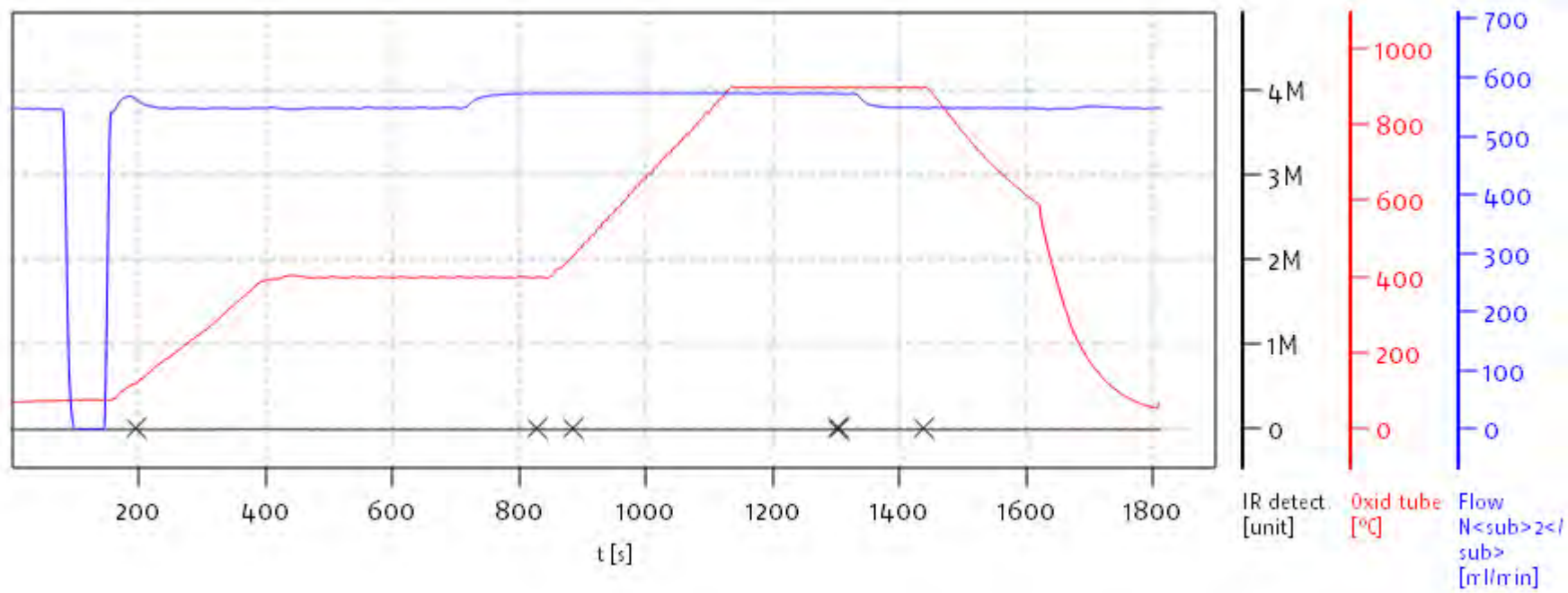
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Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
53	53	SLE0117-CCB4	502.50		CARBON	5/7/2023 5:05 PM	bl,C3u,C2u	0.000	13 138	0.000	0.000	1 211	32	0.000	0.000	0.9750	1.0000



Name:

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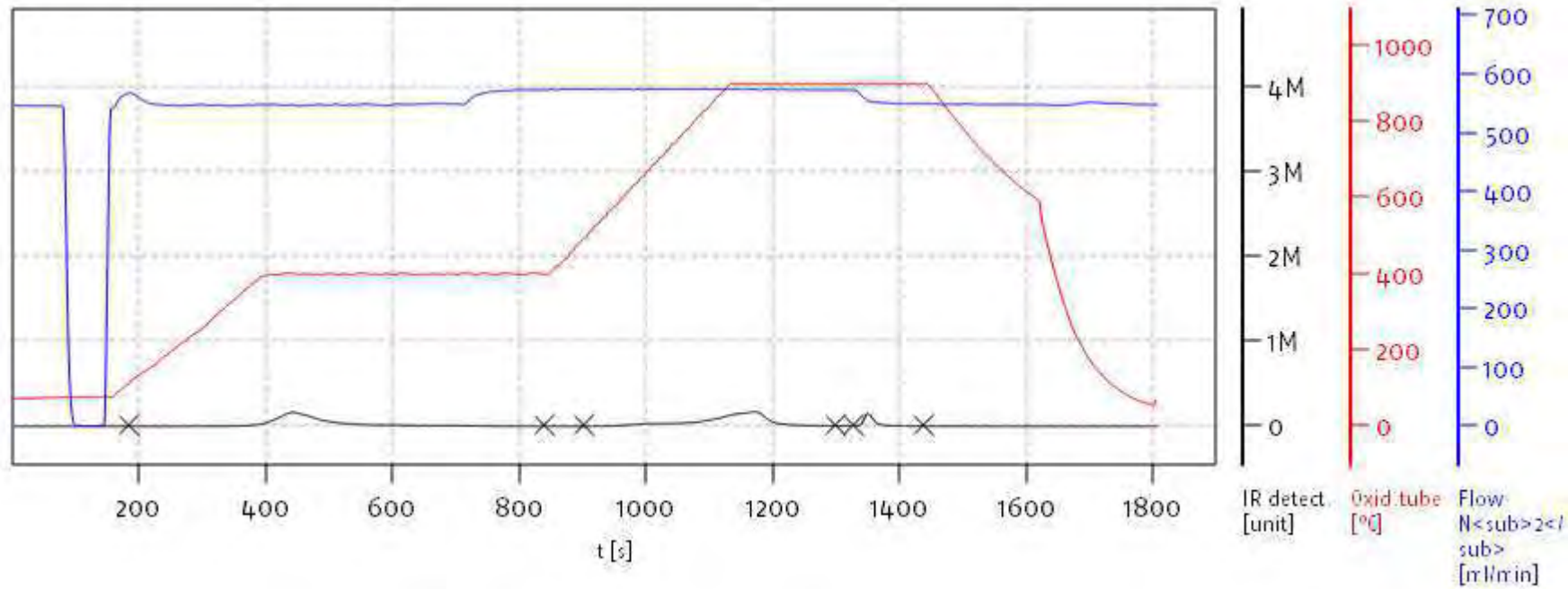
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elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
54	54	23E0152-09	311.90		CARBON	5/7/2023 5:35 PM	bl	0.320	597 497	0.669	0.044	114 774	728 690	0.276	0.348	0.9750	1.0000



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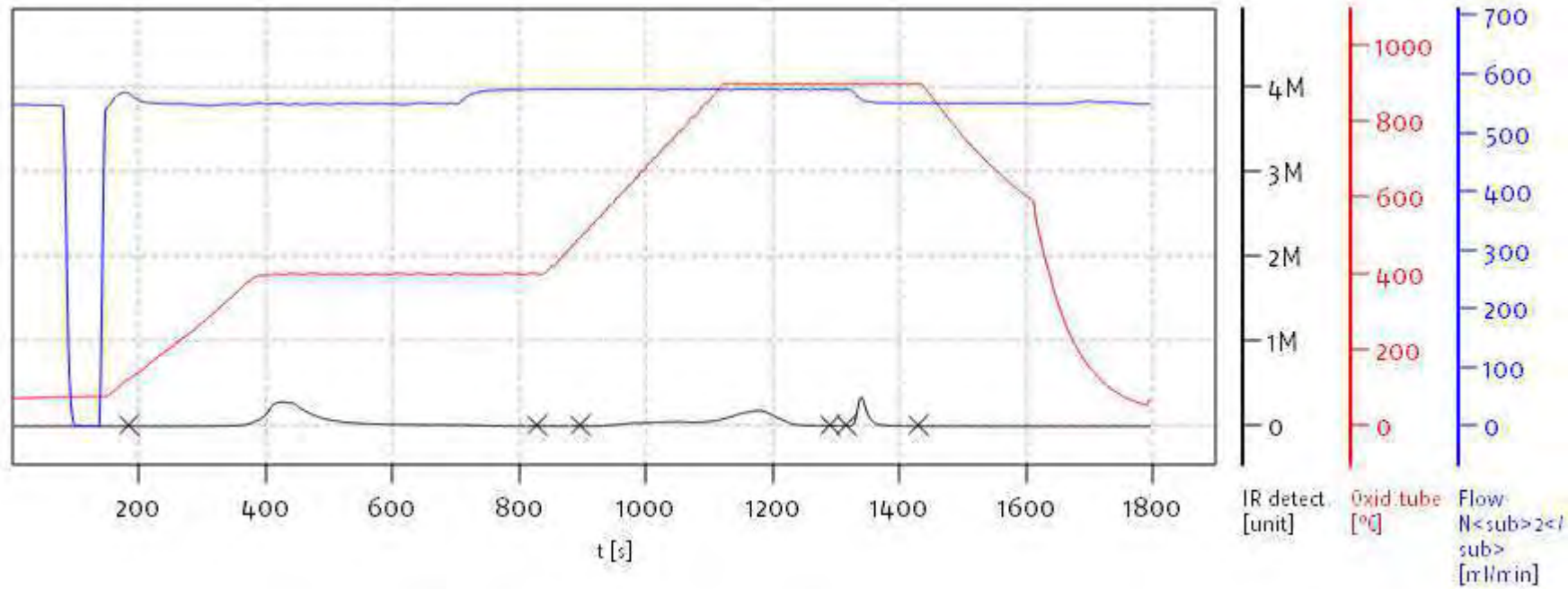
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
55	55	23E0152-10	528.40		CARBON	5/7/2023 6:06 PM	bl	0.369	1 096 750	0.618	0.064	243 528	875 143	0.306	0.249	0.9750	1.0000



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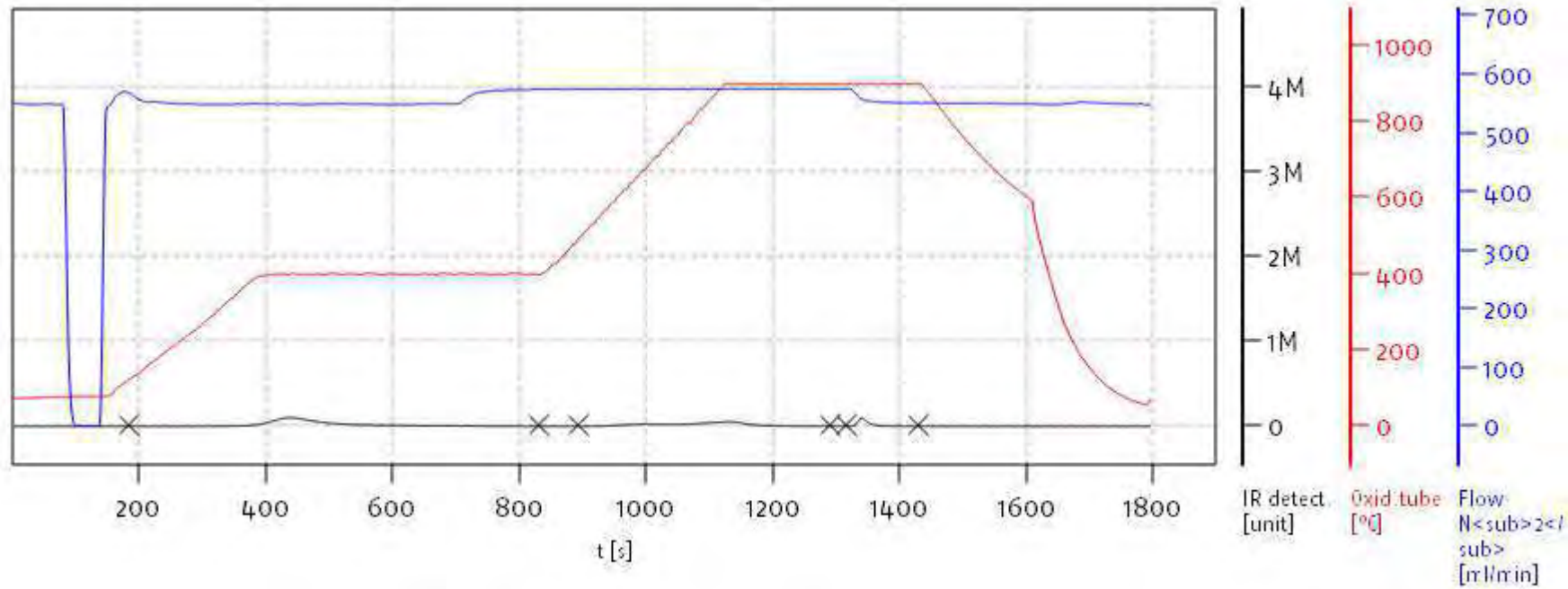
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
56	56	23E0152-11	474.20		CARBON	5/7/2023 6:36 PM	bl	0.142	423 766	0.224	0.015	73 714	277 093	0.126	0.082	0.9750	1.0000



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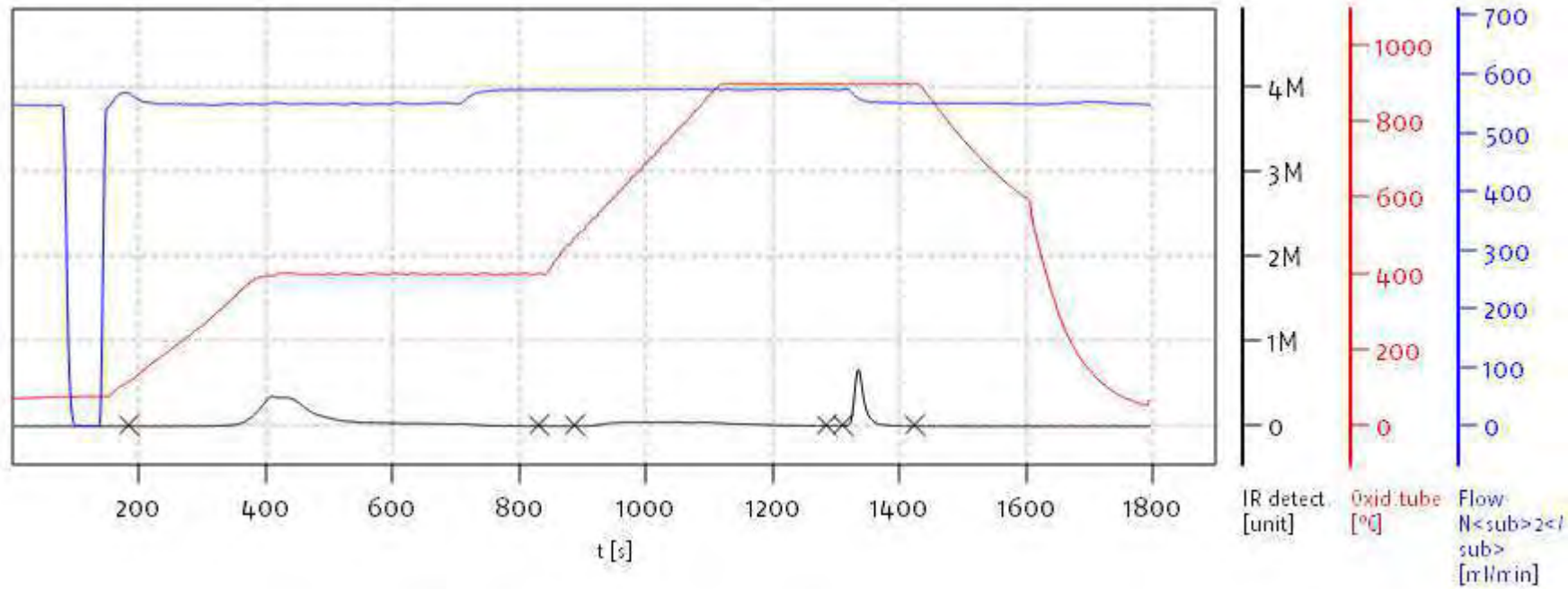
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
57	57	23E0152-12	544.80		CARBON	5/7/2023 7:06 PM	bl	0.548	1 561 810	0.667	0.123	459 114	443 760	0.425	0.119	0.9750	1.0000



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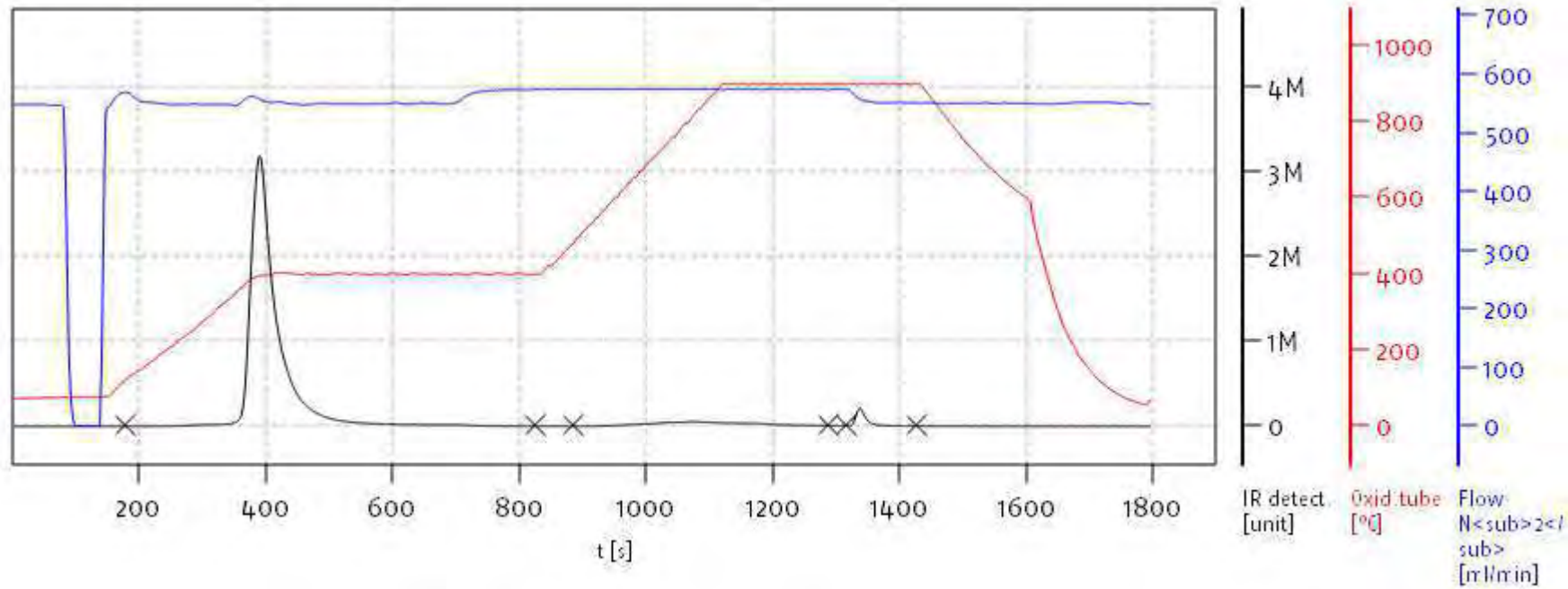
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	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
58	58	23E0152-13	509.80		CARBON	5/7/2023 7:37 PM	bl	1.712	5 668 710	1.824	0.041	162 027	398 133	1.670	0.113	0.9750	1.0000



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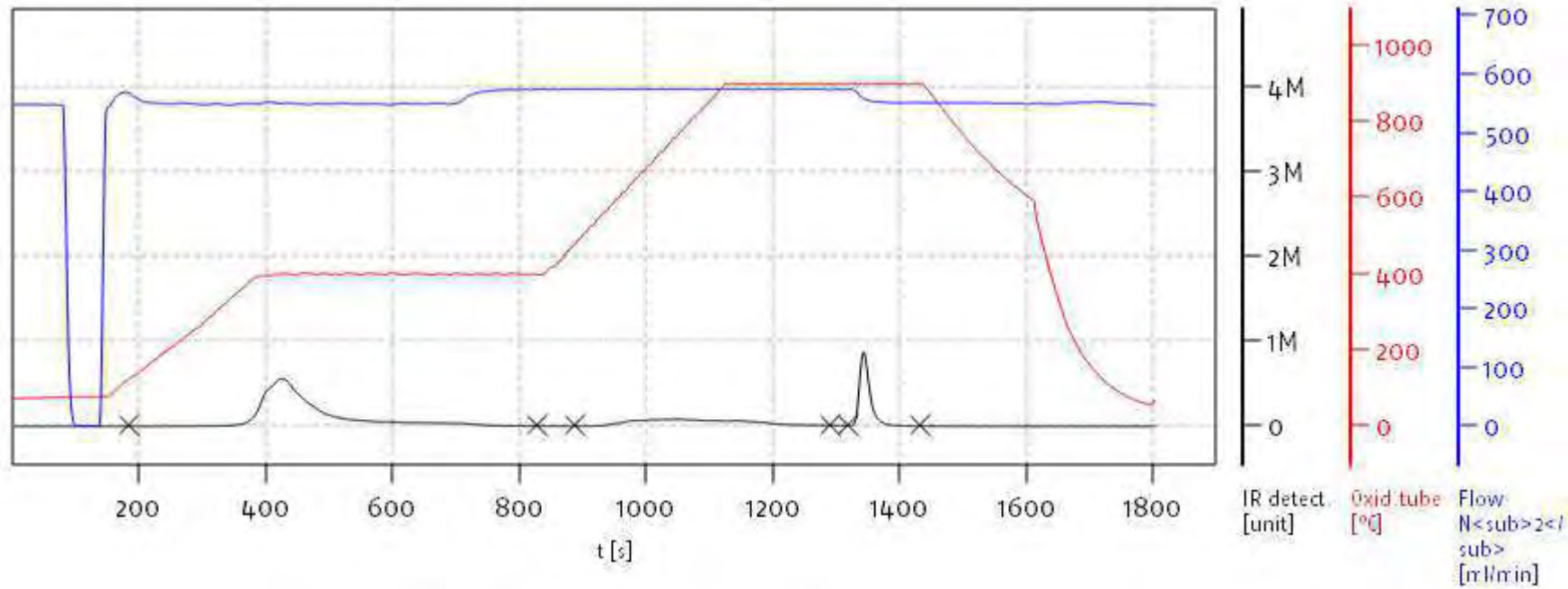
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Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
59	59	23E0152-14	557.80		CARBON	5/7/2023 8:07 PM	bl	0.738	2 127 070	0.924	0.170	637 583	696 921	0.568	0.186	0.9750	1.0000



Name:

Access: soliTOC superuser

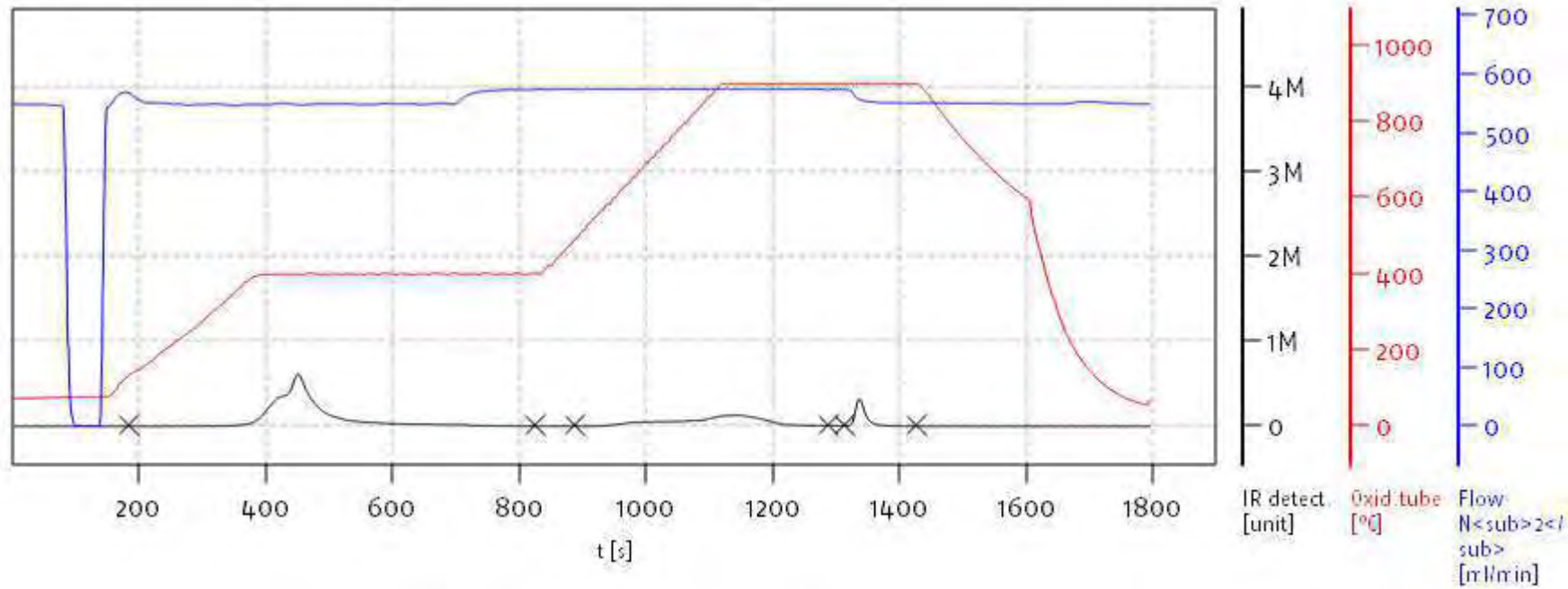
Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

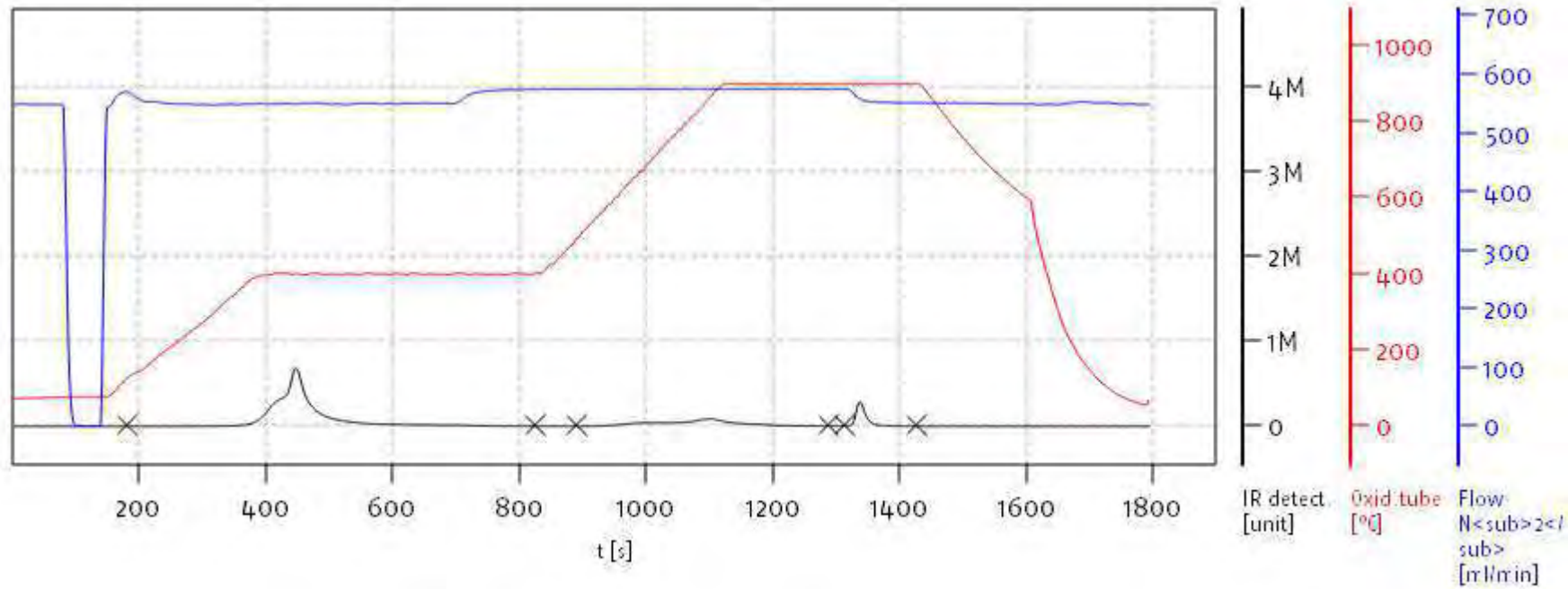
	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
60	60	23E0152-15	578.60		CARBON	5/7/2023 8:38 PM	bl	0.510	1 770 670	0.709	0.055	231 354	773 011	0.455	0.200	0.9750	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
61	61	23E0152-16	461.80		CARBON	5/7/2023 9:08 PM	bl	0.565	1 574 710	0.706	0.059	202 770	447 305	0.506	0.141	0.9750	1.0000



Name:

Access: soliTOC superuser

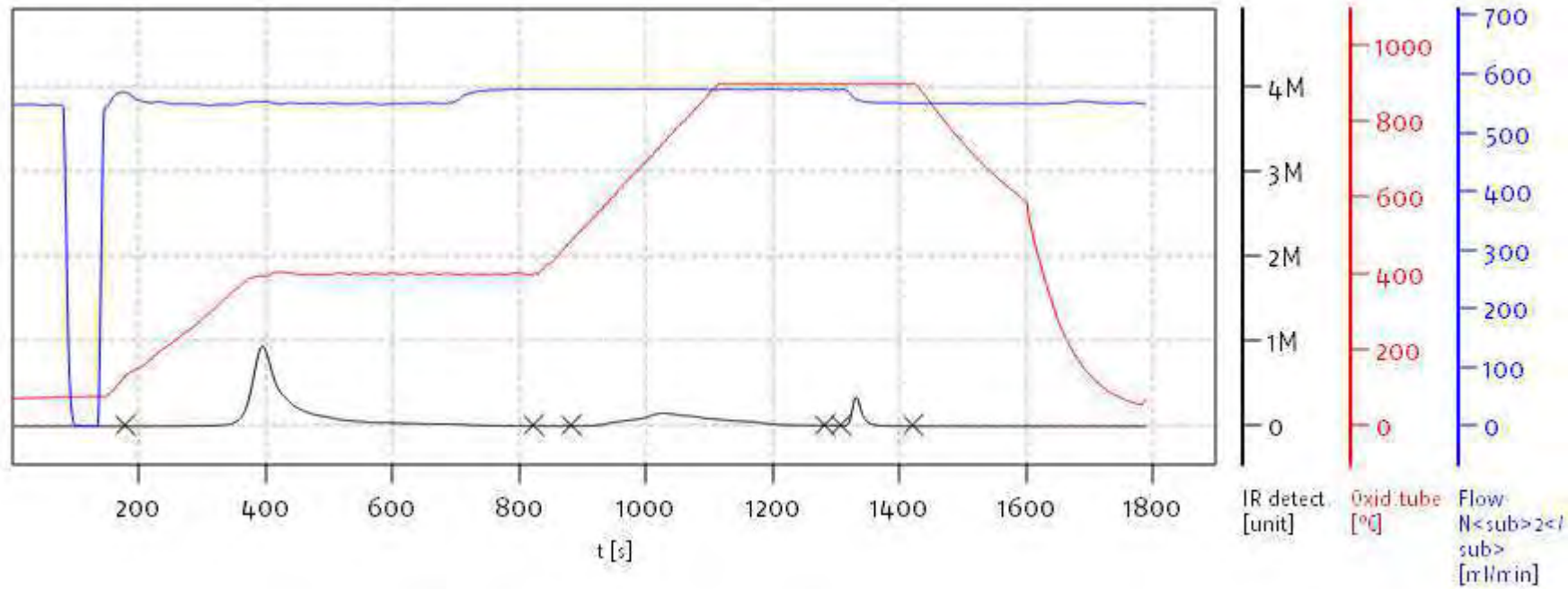
Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
62	62	23E0156-01	561.80		CARBON	5/7/2023 9:38 PM	bl	0.694	2 390 790	0.942	0.059	239 481	925 976	0.635	0.248	0.9750	1.0000



Name:

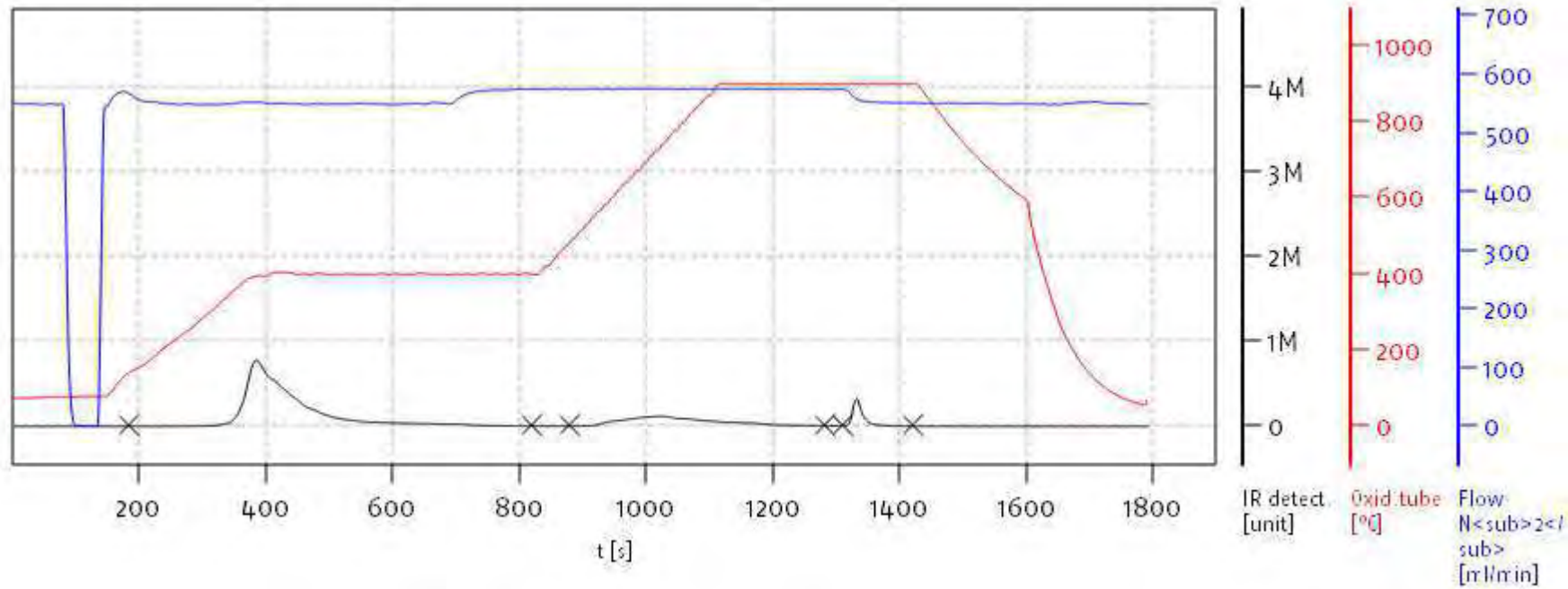
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
63	63	23E0156-02	594.40		CARBON	5/7/2023 10:08 PM	bl	0.721	2 652 250	0.914	0.054	234 598	768 791	0.667	0.193	0.9750	1.0000



Name:

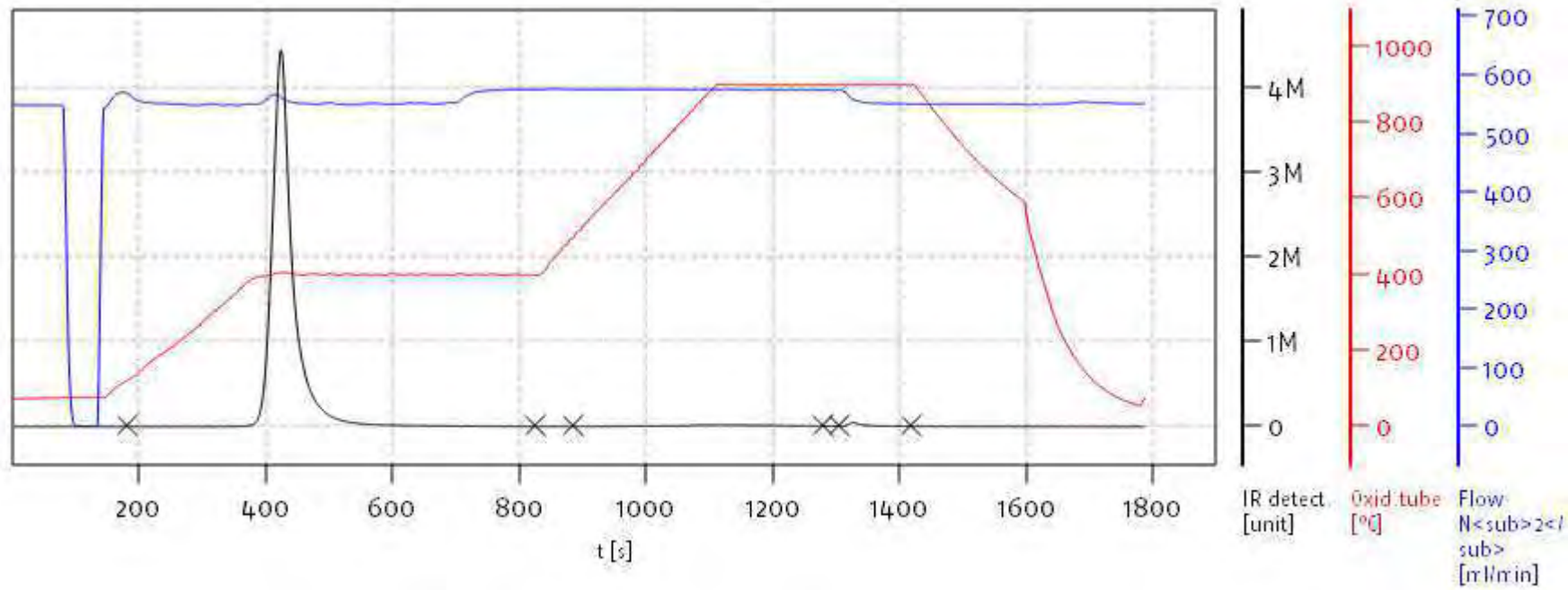
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
64	64	SLE0117-CCV5	21.80		CARBON	5/7/2023 10:38 PM	bl	43.547	6 283 530	44.394	0.228	58 573	145 749	43.320	0.847	0.9750	1.0000



Name:

Access: soliTOC superuser

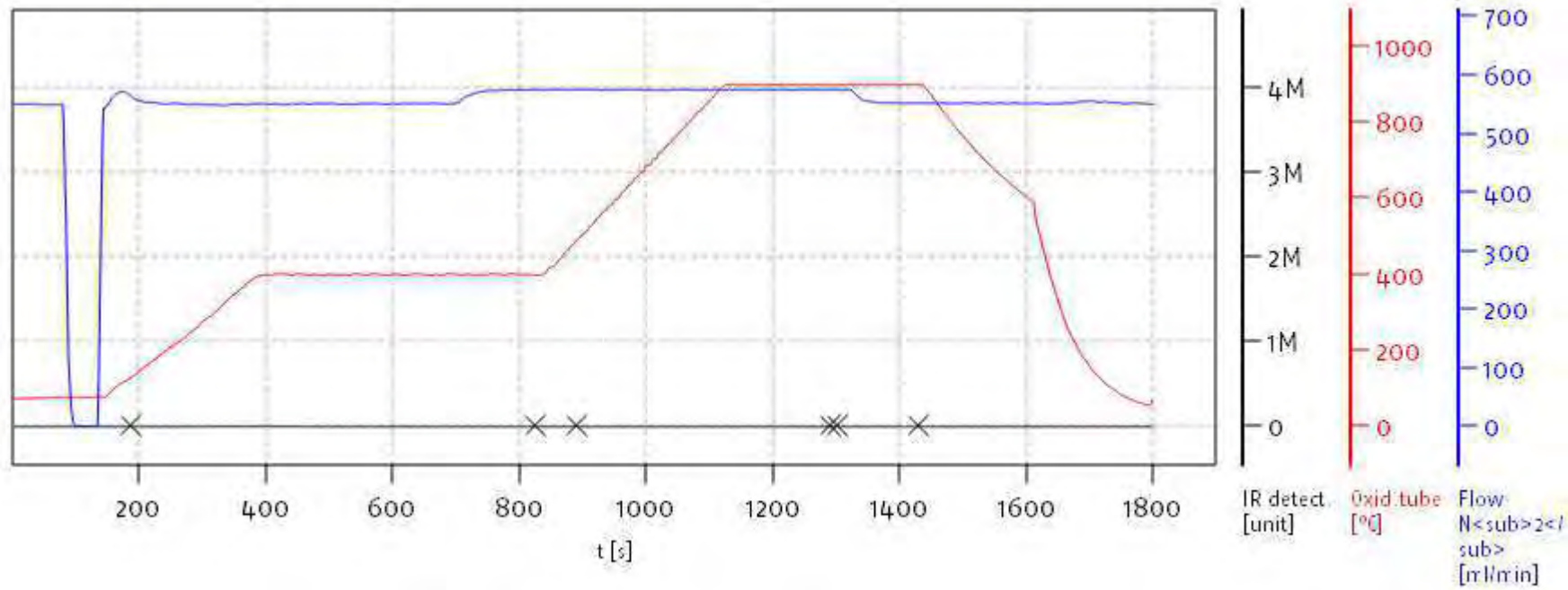
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
65	65	SLE0117-CCB5	557.50		CARBON	5/7/2023 11:09 PM	bl,C3u,C2u	0.000	10 898	0.000	0.000	555	18	0.000	0.000	0.9750	1.0000



Name:

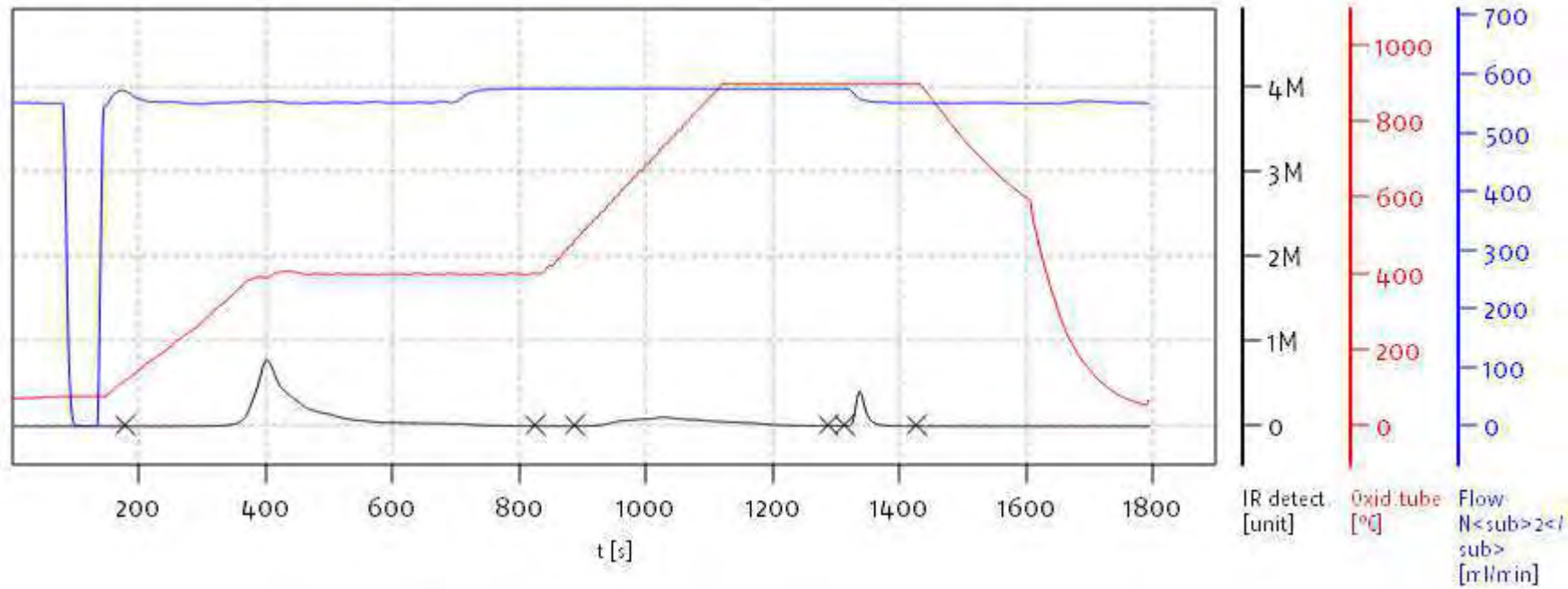
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
66	66	23E0156-03	515.90		CARBON	5/7/2023 11:39 PM	bl	0.762	2 359 810	0.960	0.079	290 105	687 602	0.683	0.198	0.9750	1.0000



Name:

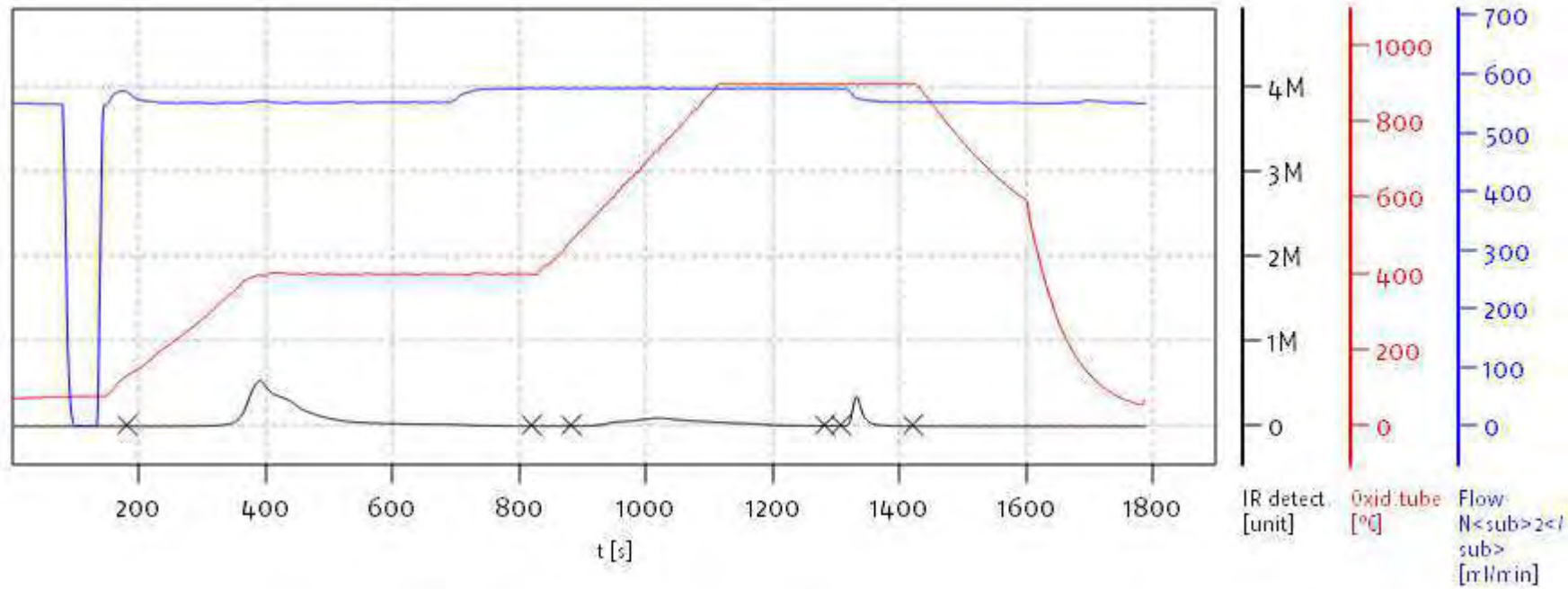
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
67	67	23E0156-04	529.20		CARBON	5/8/2023 12:09 AM	bl	0.599	1 898 900	0.770	0.065	250 346	610 345	0.534	0.171	0.9750	1.0000



Name:

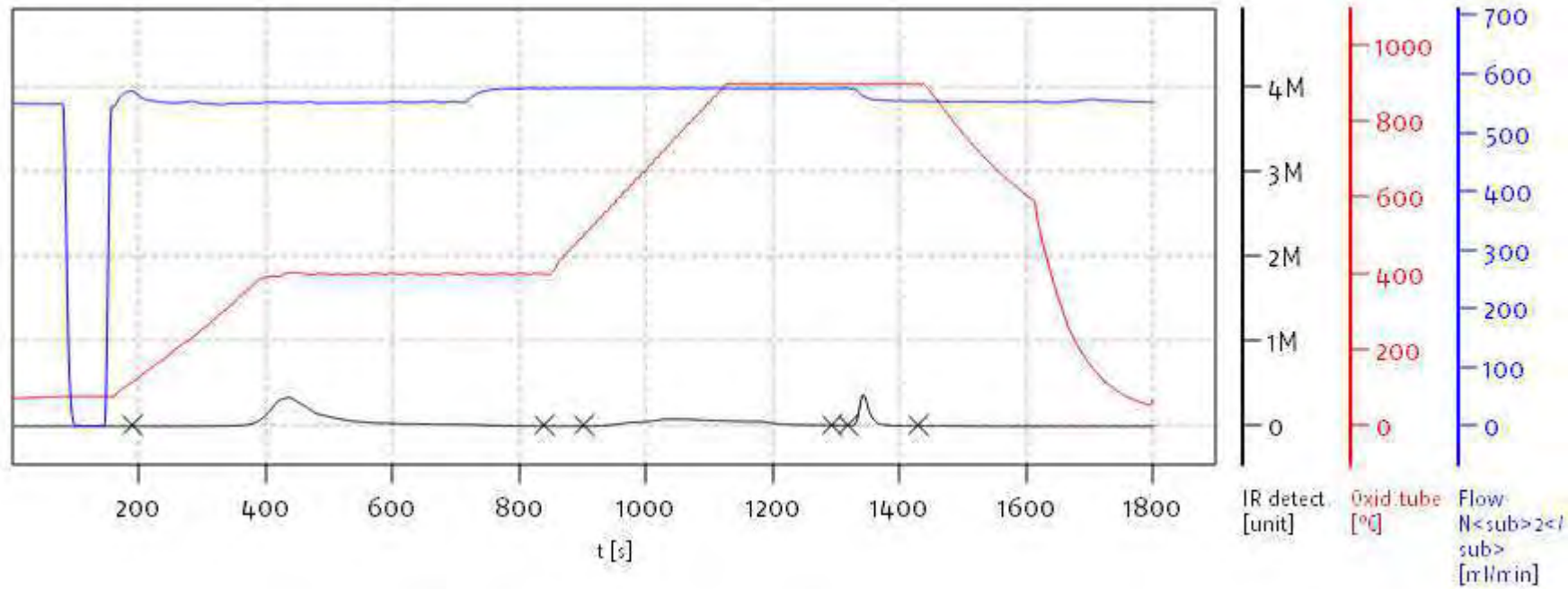
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
68	68	23E0156-05	587.40		CARBON	5/8/2023 12:40 AM	bl	0.402	1 335 240	0.572	0.066	276 098	671 509	0.336	0.170	0.9750	1.0000



Name:

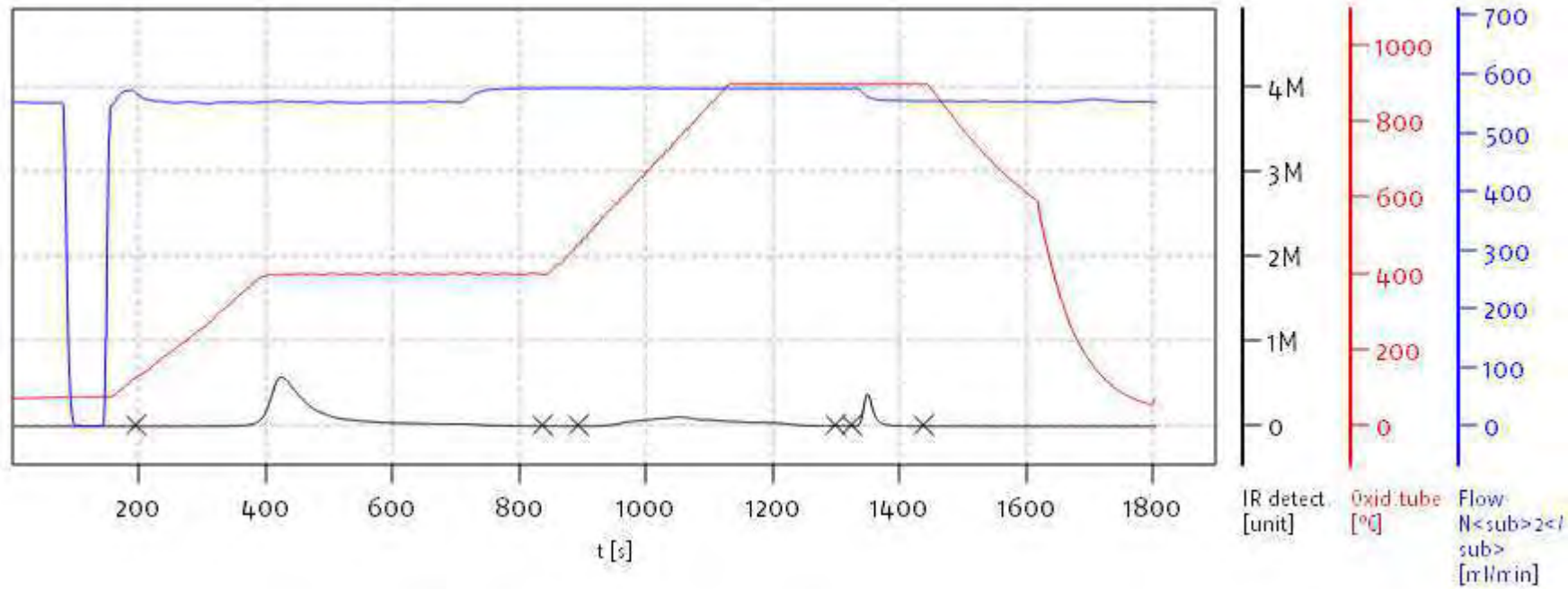
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Serial No: 0300.181017
Mode CCC

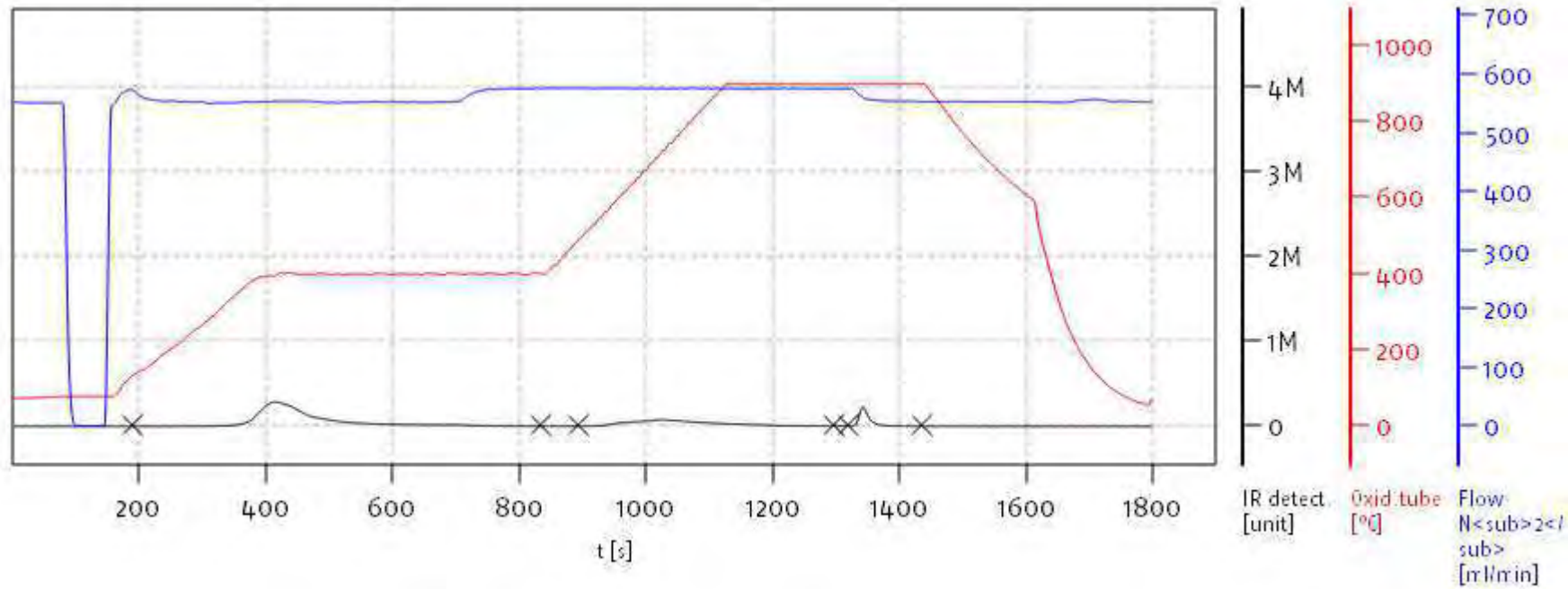
Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
69	69	23E0156-06	591.80		CARBON	5/8/2023 1:10 AM	bl	0.515	1 801 930	0.698	0.062	264 380	725 340	0.453	0.183	0.9750	1.0000



Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
70	70	23E0156-07	626.70		CARBON	5/8/2023 1:41 AM	bl	0.303	1 147 840	0.409	0.033	159 116	458 289	0.270	0.107	0.9750	1.0000



Name:

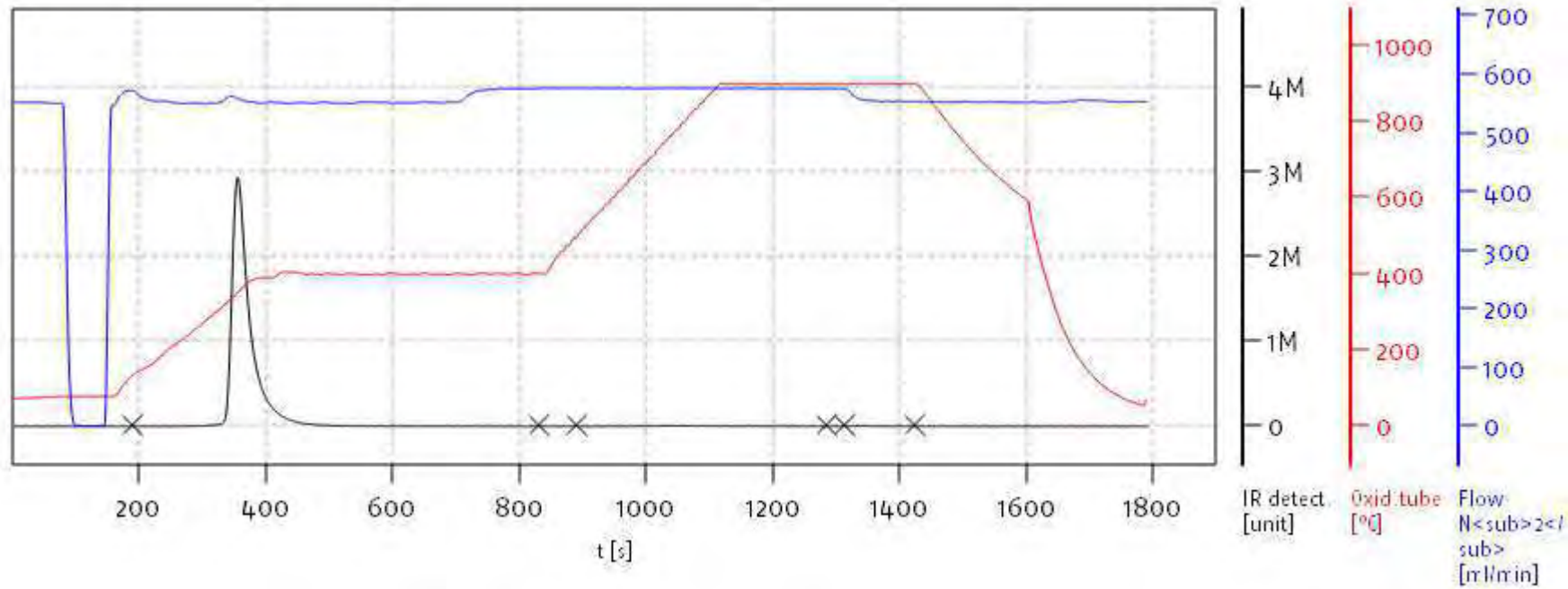
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Date: Tue May 9 14:33:55 2023

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
71	71	23C0164-01	91.50		CARBON	5/8/2023 2:11 AM	bl	5.982	3 653 180	5.999	0.000	9 575	36 592	5.982	0.017	0.9750	1.0000



Name:

Access: soliTOC superuser

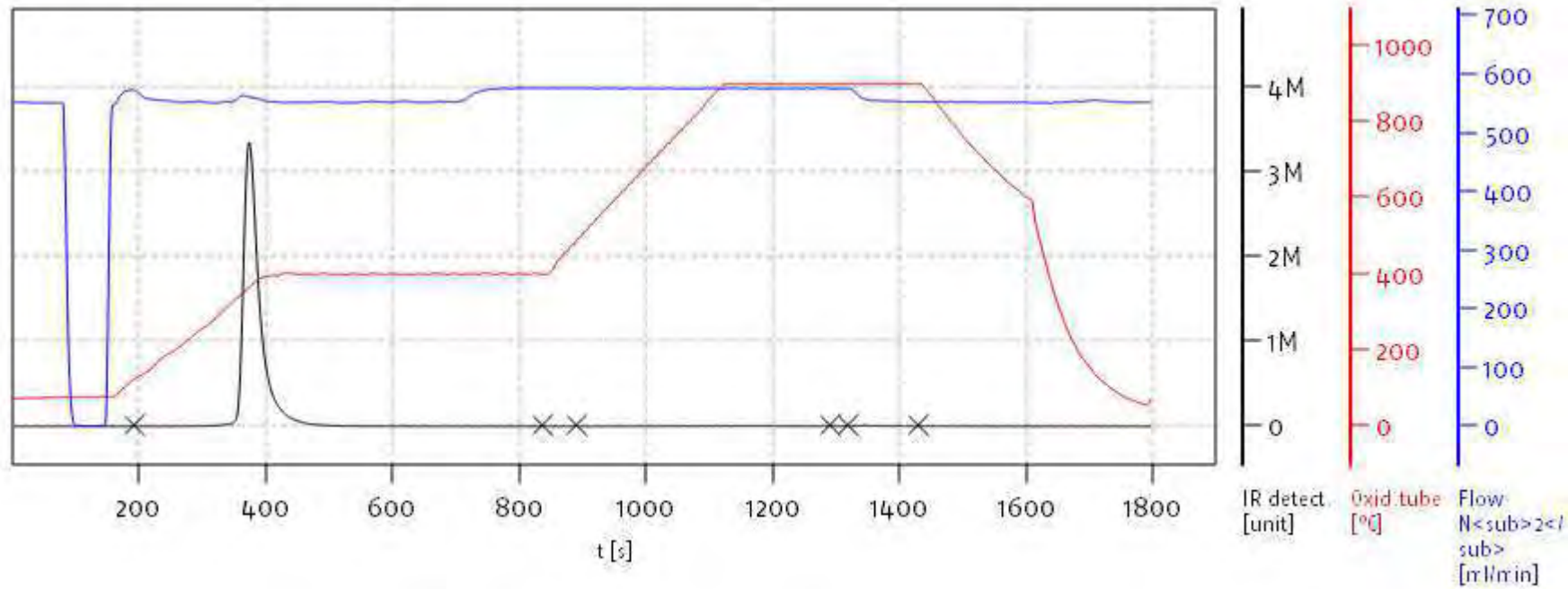
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
72	72	23C0164-02	135.50		CARBON	5/8/2023 2:41 AM	bl	4.151	3 752 700	4.153	0.000	17 691	28 703	4.151	0.002	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

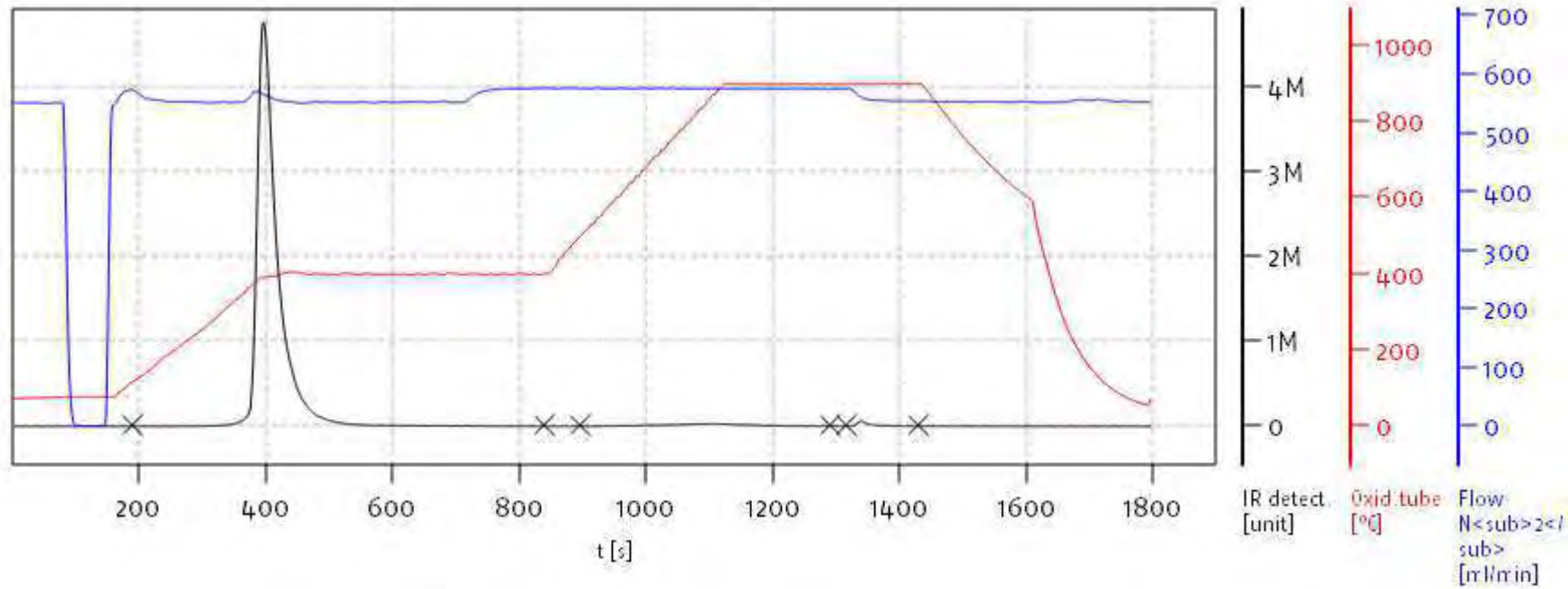
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
73	73	23C0673-01	228.00		CARBON	5/8/2023 3:12 AM	bl	4.391	6 625 970	4.493	0.022	58 727	177 663	4.369	0.103	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

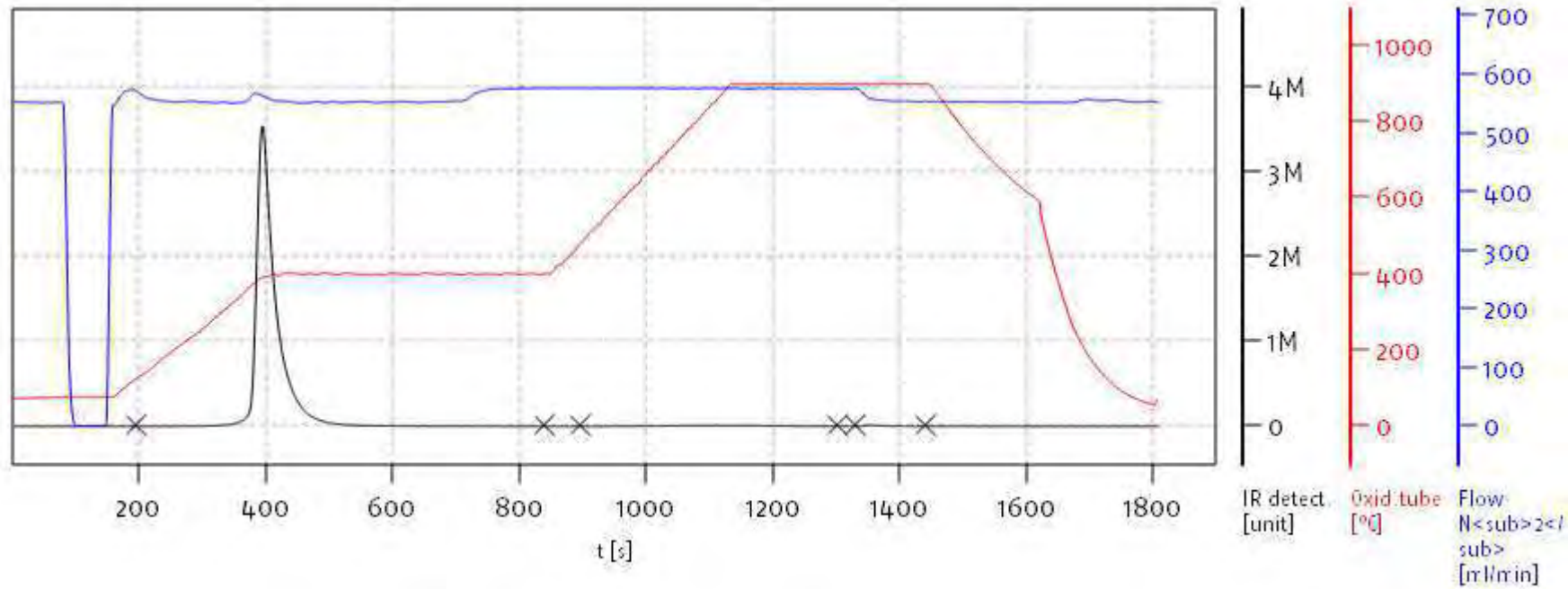
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
74	74	23C0673-02	156.50		CARBON	5/8/2023 3:42 AM	bl	4.428	4 617 720	4.474	0.000	18 796	73 169	4.428	0.046	0.9750	1.0000



Name:

Access: soliTOC superuser

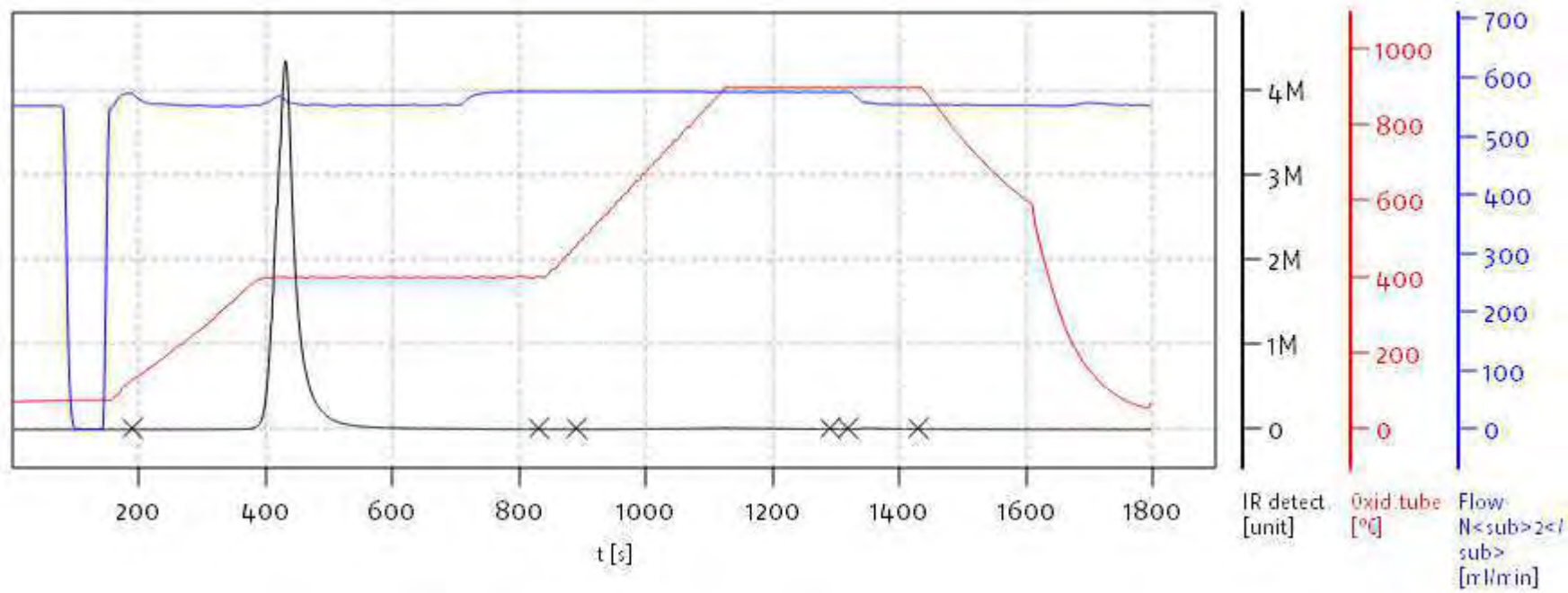
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elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
75	75	SLE0117-CCV6	21.20		CARBON	5/8/2023 4:13 AM	bl	43.463	6 122 490	44.164	0.064	35 240	122 595	43.399	0.701	0.9750	1.0000



Name:

Access: soliTOC superuser

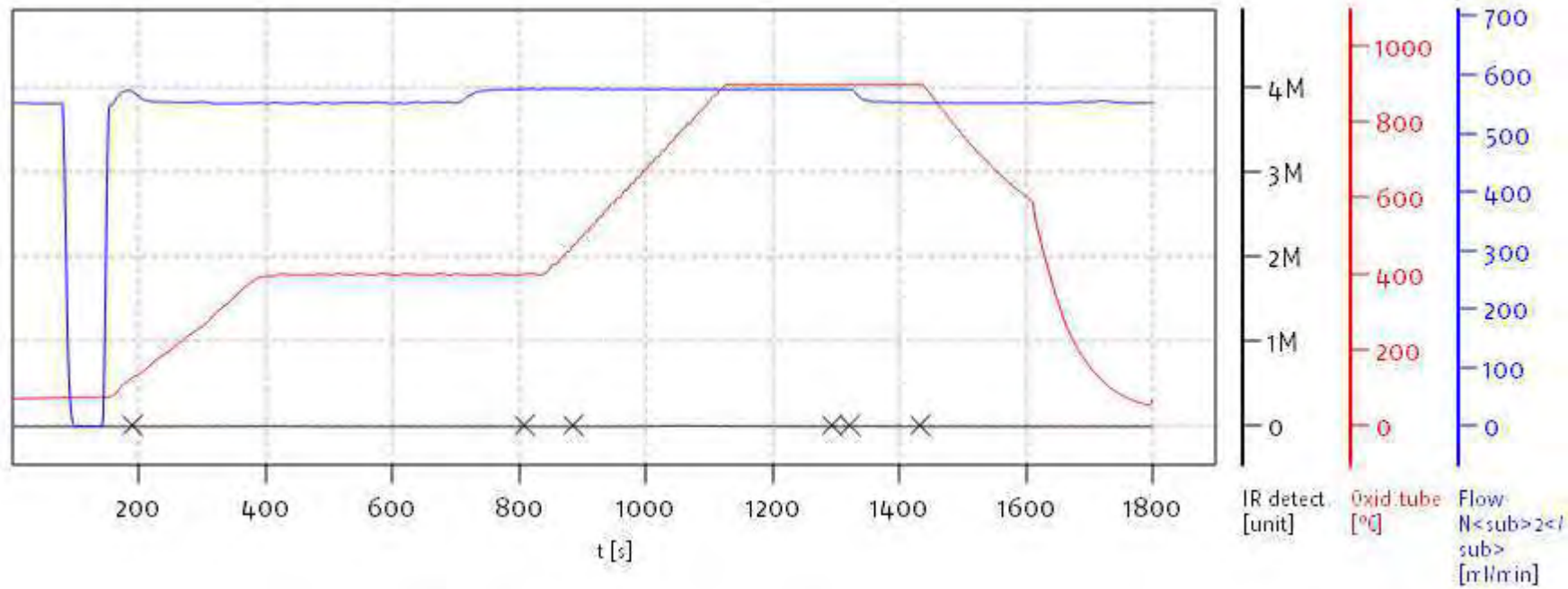
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
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Soli TOC Cube, Carbon
Balance: BAL3
Analyst: CDE

Analytical Resources, LLC
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Method	Date Time	Info	TOC [%]	TOC400 Area	TC [%]	ROC [%]	ROC Area	TIC900 Area	TOC400 [%]	TIC900 [%]	TOC400 Factor	TIC900 Factor
76	76	SLE0117-CCB6	533.90		CARBON	5/8/2023 4:43 AM	bl	0.000	16 528	0.005	0.000	8 189	44 397	0.000	0.005	0.9750	1.0000



Name:

Access: soliTOC superuser

Date: Tue May 9 14:33:55 2023

elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
Total Inorganic Carbon	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085
% Soot	0.0080973	1449743	0.014695	1300238	0.021293	1292913	0.02939	1293535	0.044385	2094063	0.05878	1400085

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
Total Inorganic Carbon	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135
% Soot	0.074075	1370638	0.08937	1351930	0.12056	2158544	0.14995	1559046	0.24	1346463	0.288	1430135

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
Total Inorganic Carbon	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882
% Soot	0.414	1337053	0.606	1385937	0.894	1382774	1.188	1379790	1.5	1375927	1.818	1372882

INITIAL CALIBRATION DATA

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Calibration: FD00070
Instrument: TOC Cube
Calibration Date: 04/26/2022 11:29

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF	Conc	RF
Total Organic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
Total Inorganic Carbon	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408
% Soot	2.49	1398606	2.982	1376871	4.188	1256057	4.818	1279542	5.406	1283358	7.2	1301408

INITIAL CALIBRATION DATA

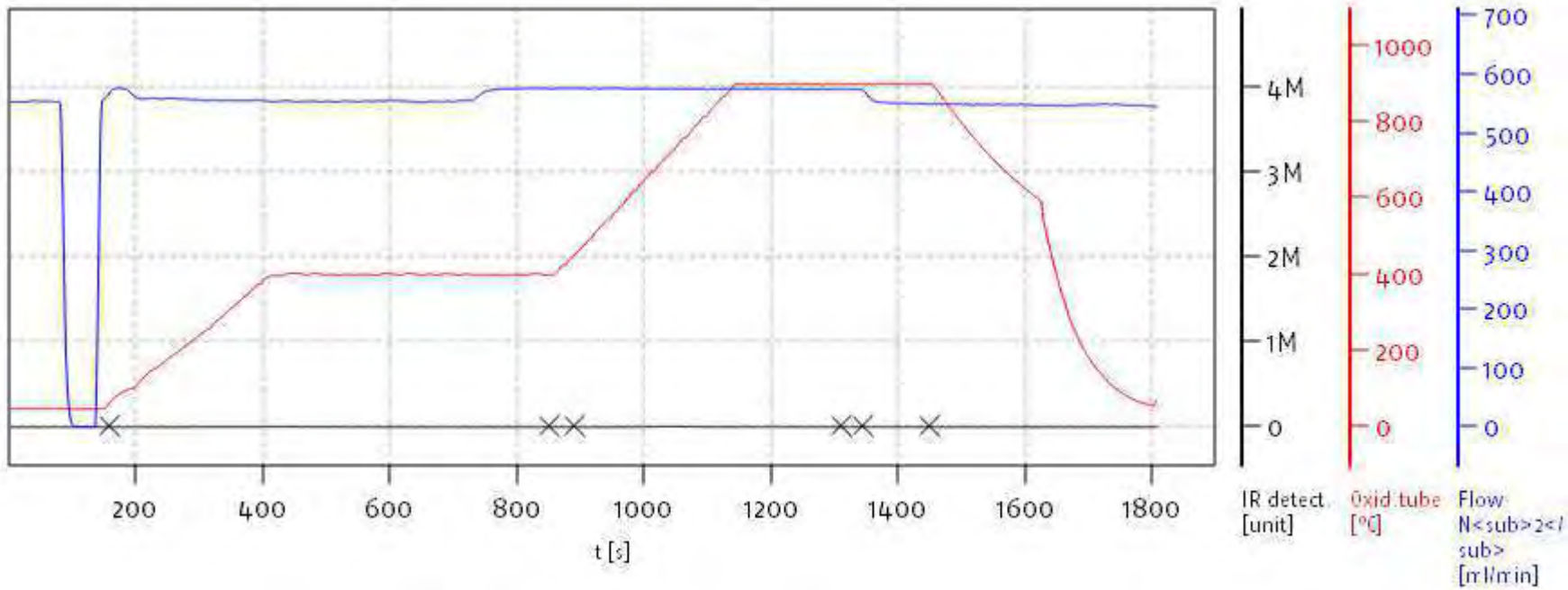
EPA 9060A m

Laboratory:	Analytical Resources, LLC	SDG:	23E0156
Client:	Friedman & Bruya Inc.	Project:	Port of Friday Harbor
Calibration:	FD00070	Instrument:	TOC Cube
Calibration Date:	04/26/2022 11:29		

COMPOUND	Mean RF	RF RSD	Linear COD	Quad COD	COD Limit	Q
Total Organic Carbon	1424064	15.9	0.9988			
Total Carbon	1424064	15.9	0.9988			
Total Inorganic Carbon	1424064	15.9	0.9988			
% Soot	1424064	15.9	0.9988			

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
1	1	BLANK	1.00		1.00	CARBON	4/26/2022 11:29 AM	0.000	0.000	0.000	bl	29 049	30 612	3 899	1.0000	1.0000



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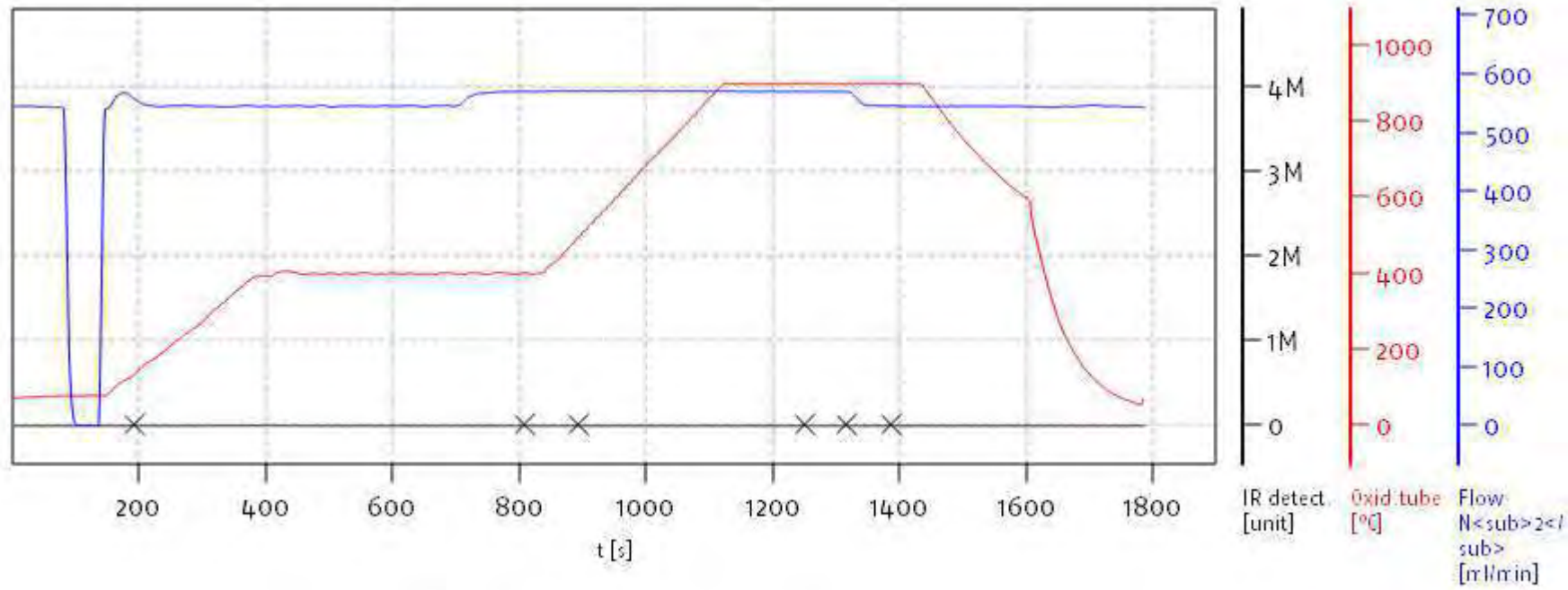
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
2	2	BLANK	1.00		1.00	CARBON	4/26/2022 12:00 PM	0.000	0.000	0.000	bl	11 115	60	8	1.0000	1.0000



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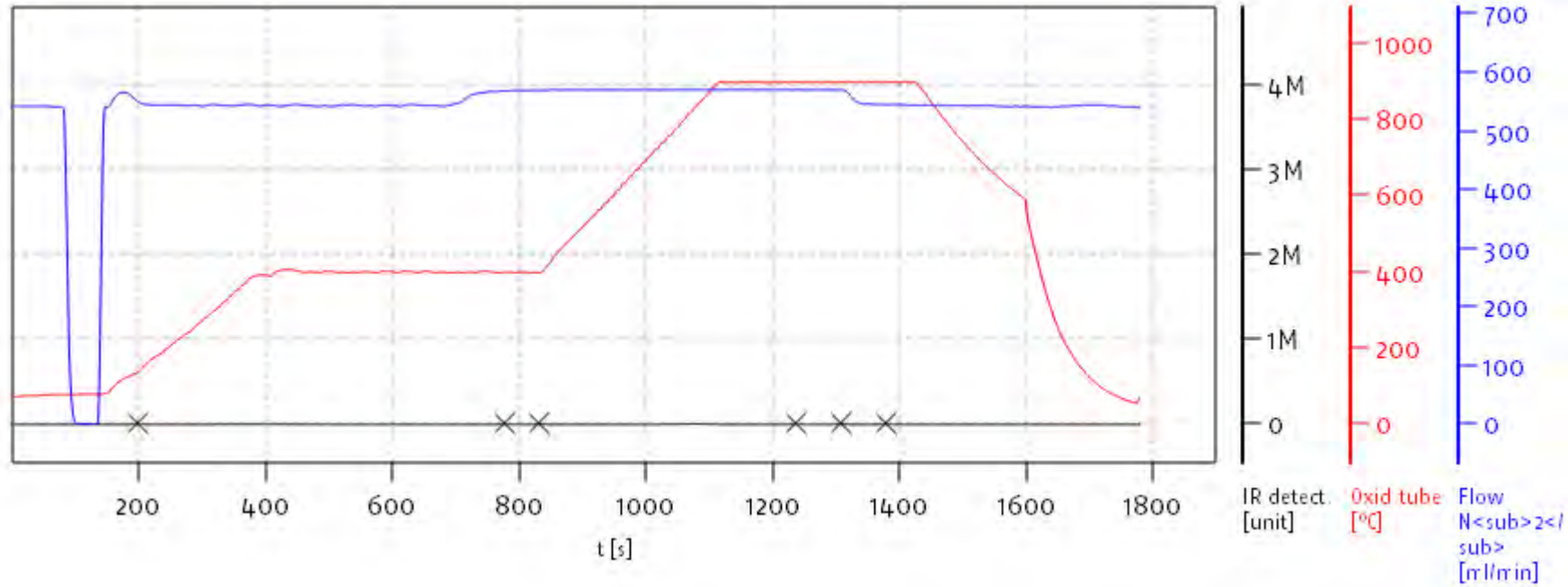
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
3	3	SEQ-CAL1	200.00	0.0027	1.00	CARBON	4/26/2022 12:30 PM	0.010	0.008	0.018	bl,C1u,C2u	7 294	11 739	22	1.0000	0.7425



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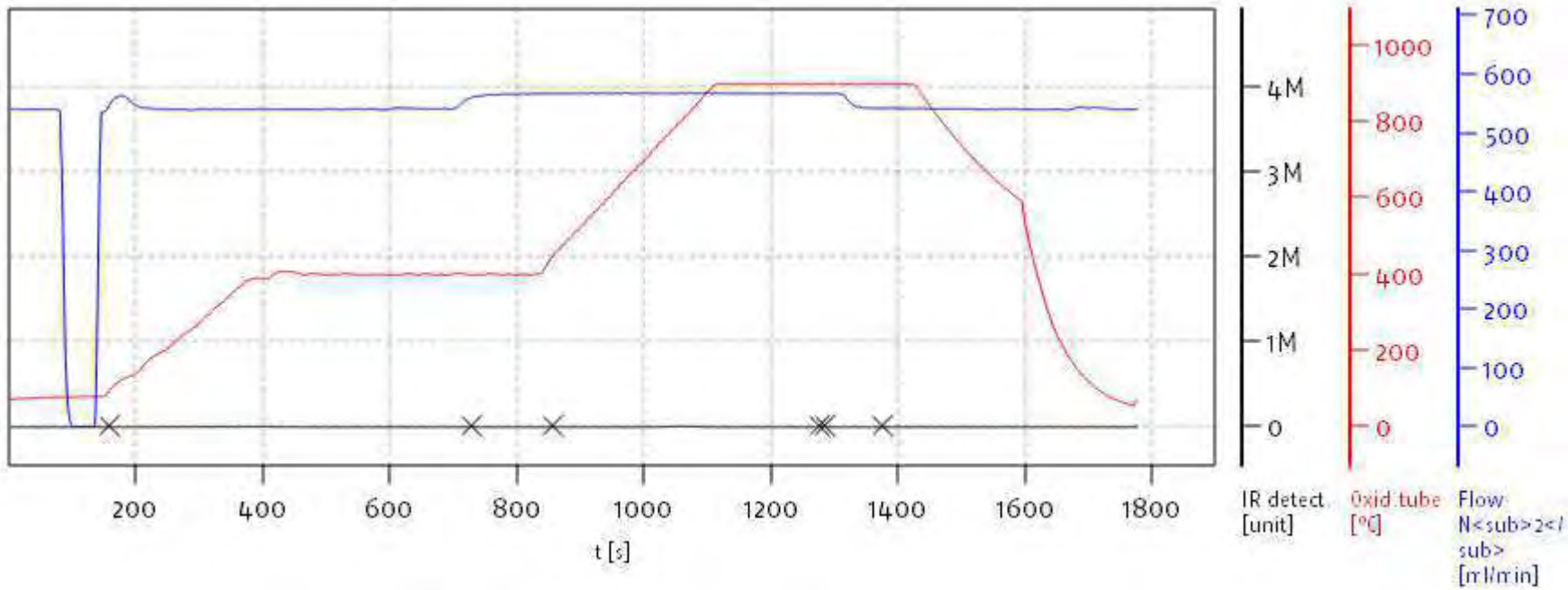
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
4	4	SEQ-CAL2	200.00	0.0049	1.00	CARBON	4/26/2022 1:00 PM	0.023	0.015	0.038	bl,C2u	23 296	19 107	47	1.0000	0.8936



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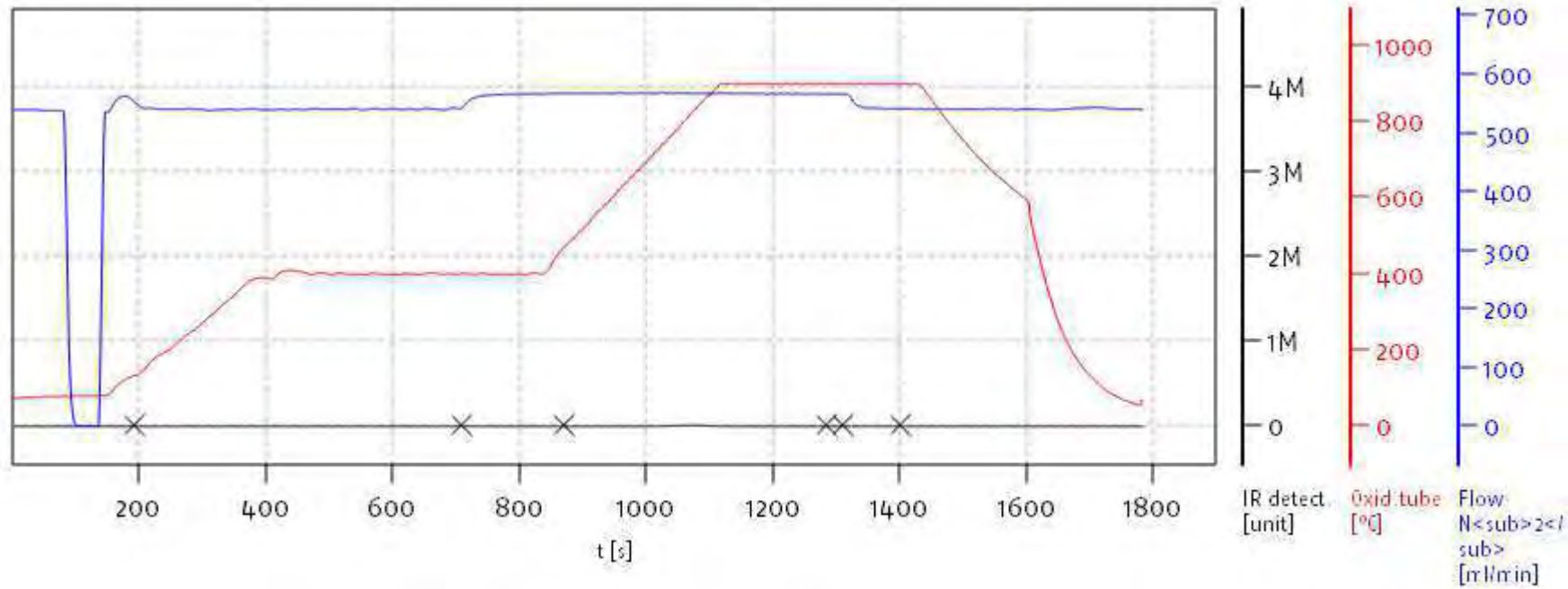
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
5	5	SEQ-CAL3	200.00	0.0071	1.00	CARBON	4/26/2022 1:30 PM	0.006	0.022	0.028	bl,C1u,C2u	2 319	27 530	170	1.0000	0.9343



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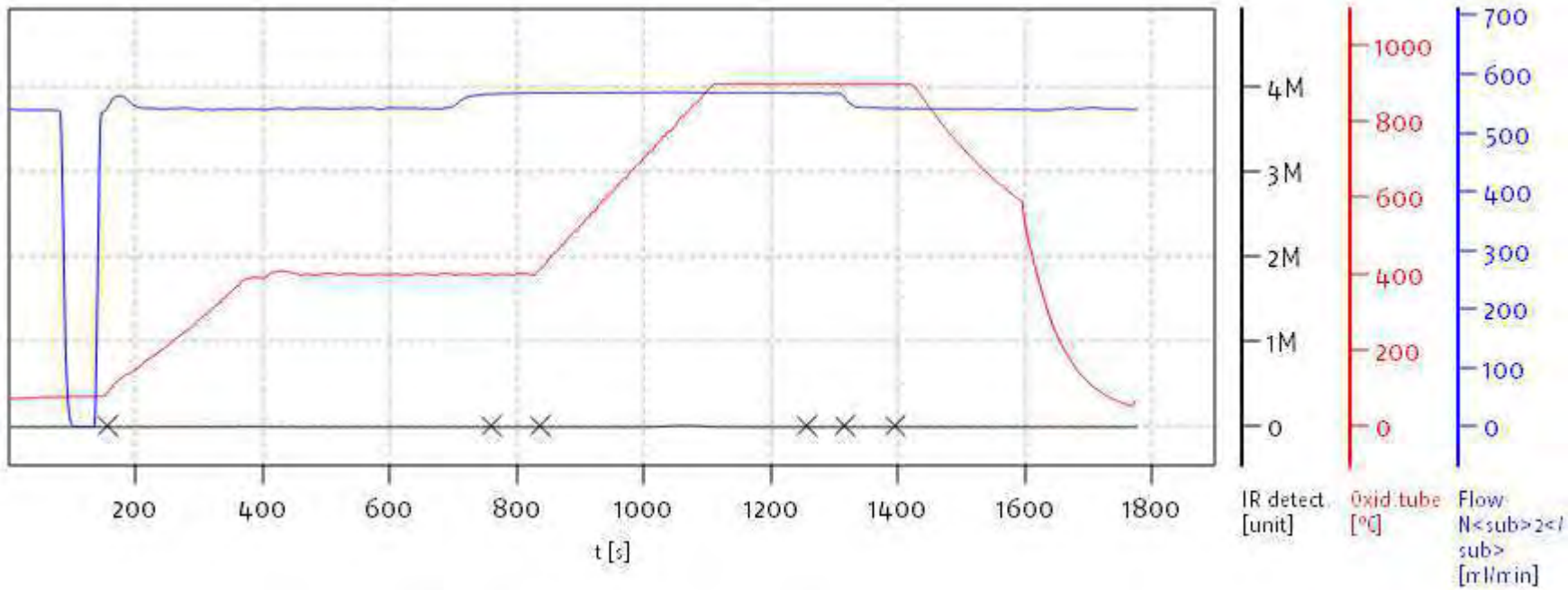
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
6	6	SEQ-CAL4	200.00	0.0098	1.00	CARBON	4/26/2022 2:00 PM	0.020	0.030	0.050	bl,C2u	19 746	38 017	109	1.0000	0.9461



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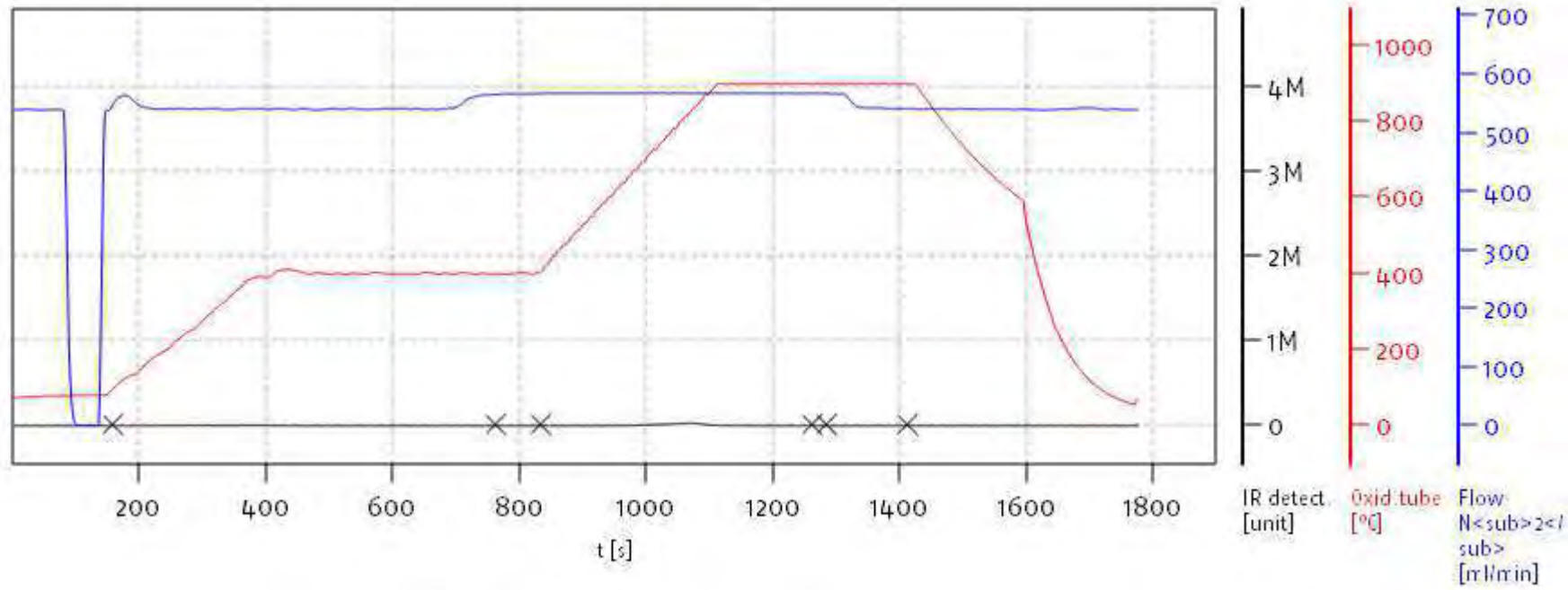
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
7	7	SEQ-CAL5	200.00	0.0148	1.00	CARBON	4/26/2022 2:30 PM	0.021	0.045	0.066	bl,C2u	20 951	92 945	236	1.0000	0.5975



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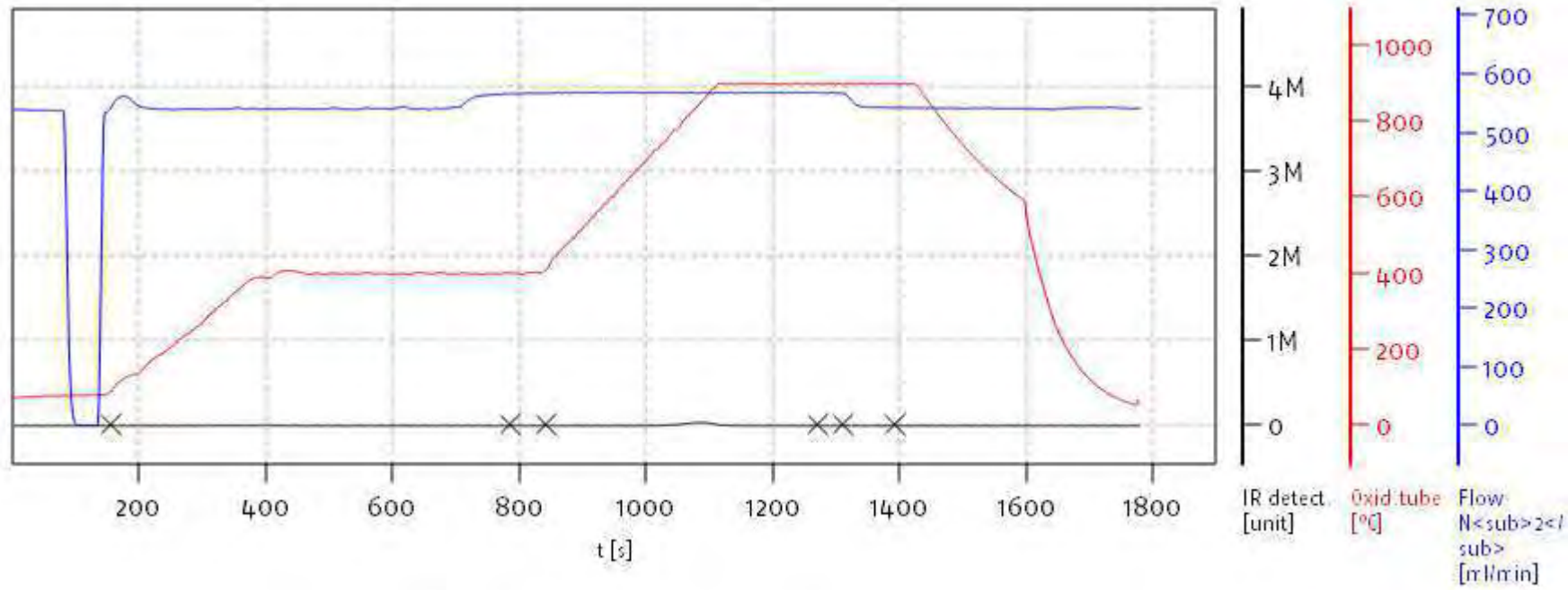
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
8	8	SEQ-CAL6	200.00	0.0196	1.00	CARBON	4/26/2022 3:00 PM	0.012	0.061	0.073	bl,C2u	10 118	82 297	59	1.0000	0.9144



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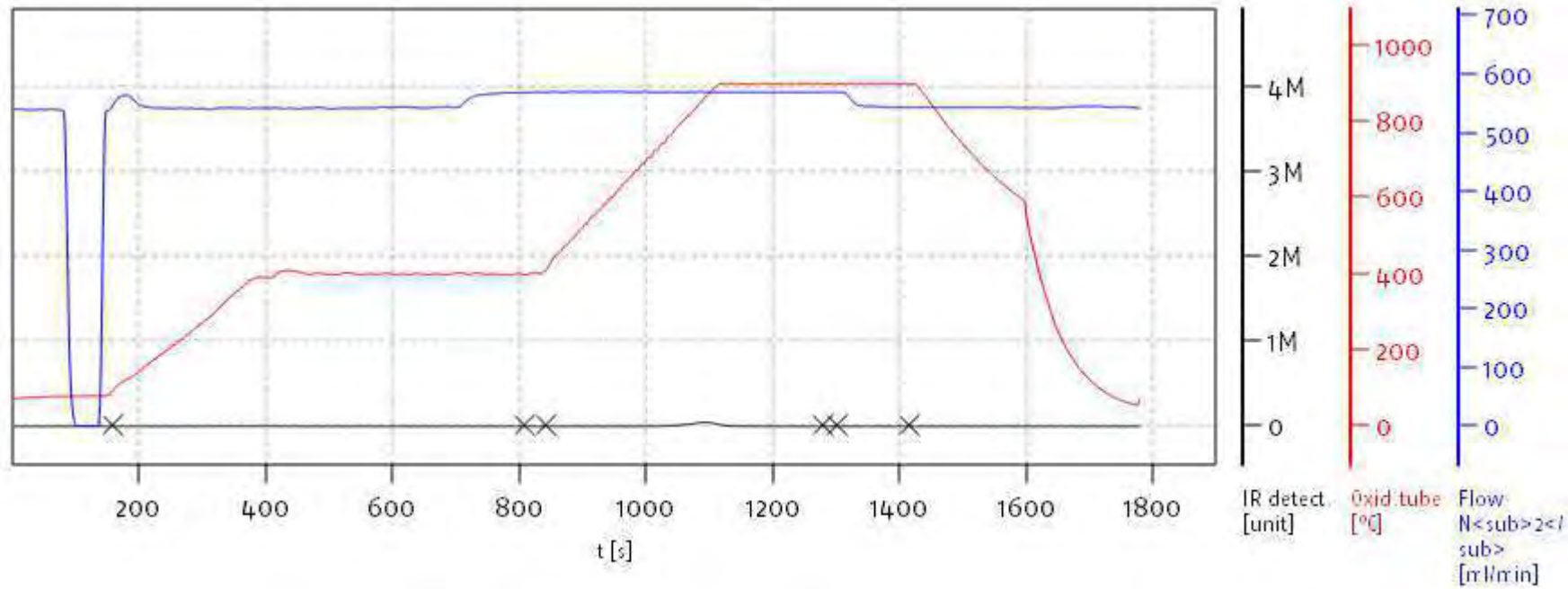
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
9	9	SEQ-CAL7	200.00	0.0247	1.00	CARBON	4/26/2022 3:30 PM	0.013	0.075	0.088	bl,C2u	10 555	101 530	292	1.0000	0.9173



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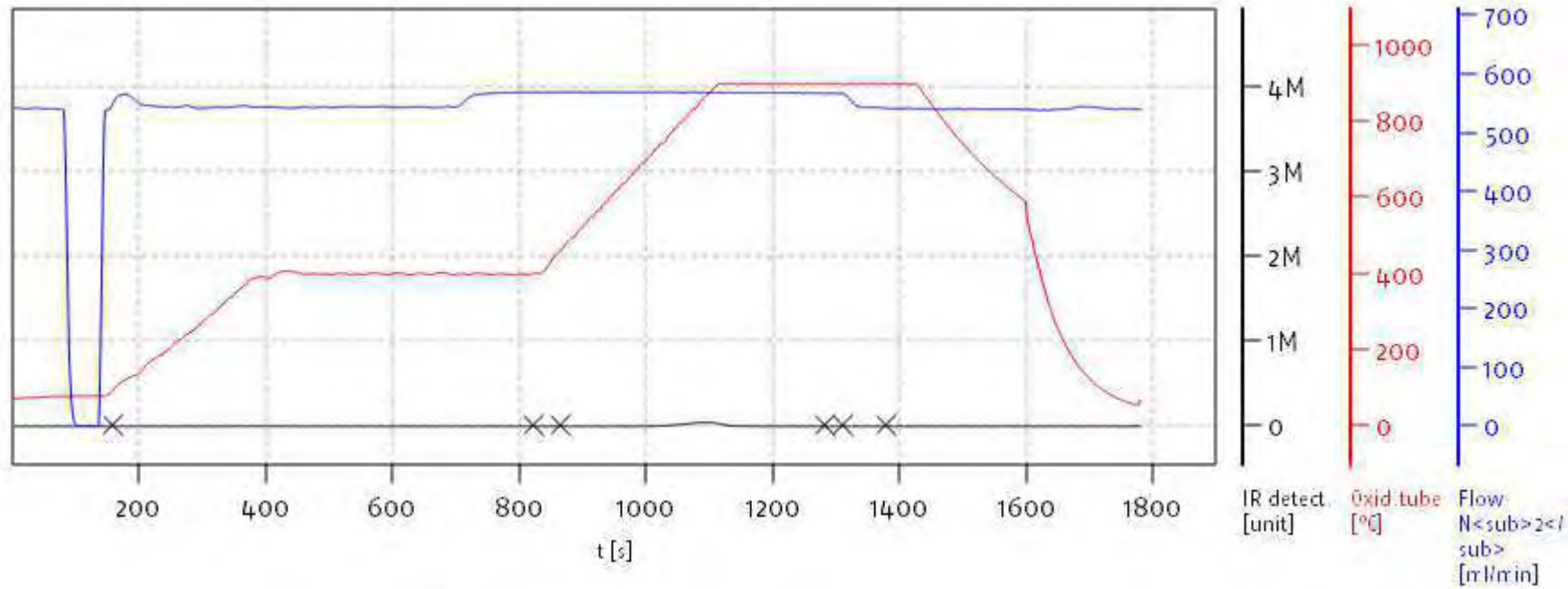
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
10	10	SEQ-CAL8	200.00	0.0298	1.00	CARBON	4/26/2022 4:00 PM	0.009	0.091	0.100	bl,C1u,C2u	6 668	120 822	116	1.0000	0.9312



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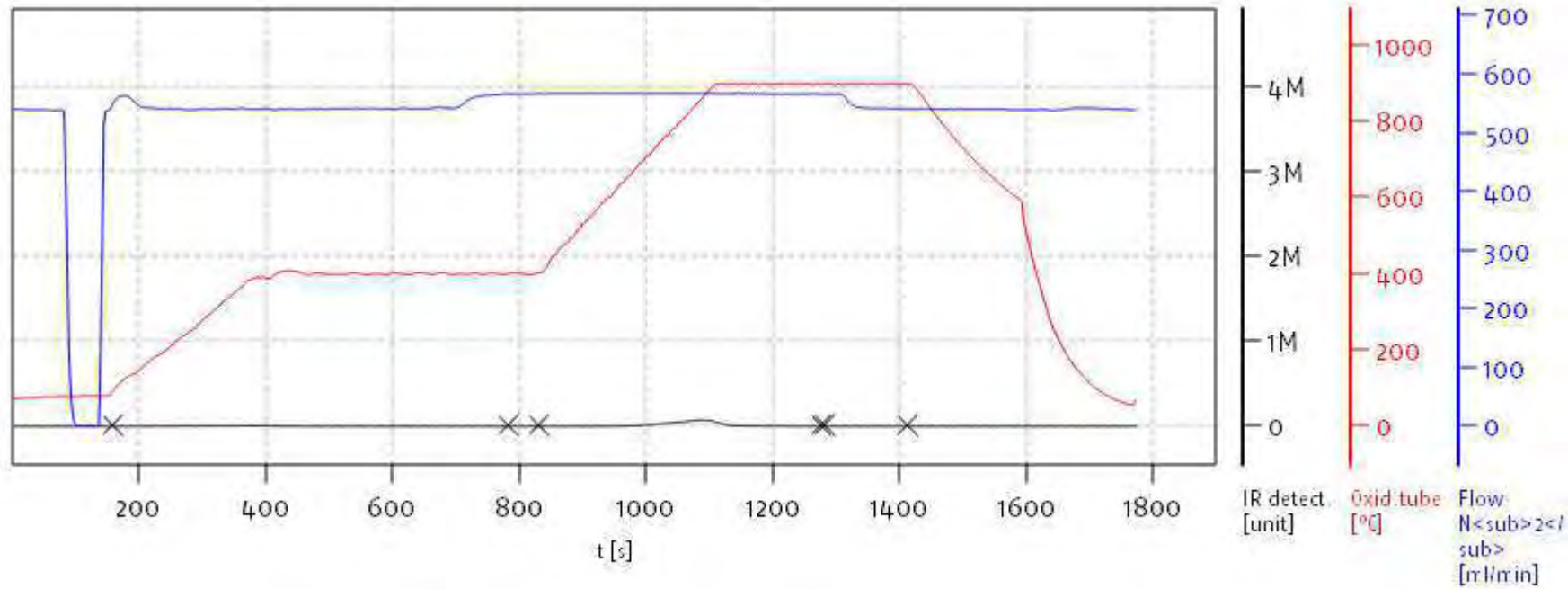
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
11	11	SEQ-CAL9	200.00	0.0402	1.00	CARBON	4/26/2022 4:30 PM	0.031	0.120	0.151	bl,C2u	32 999	260 234	1 044	1.0000	0.5792



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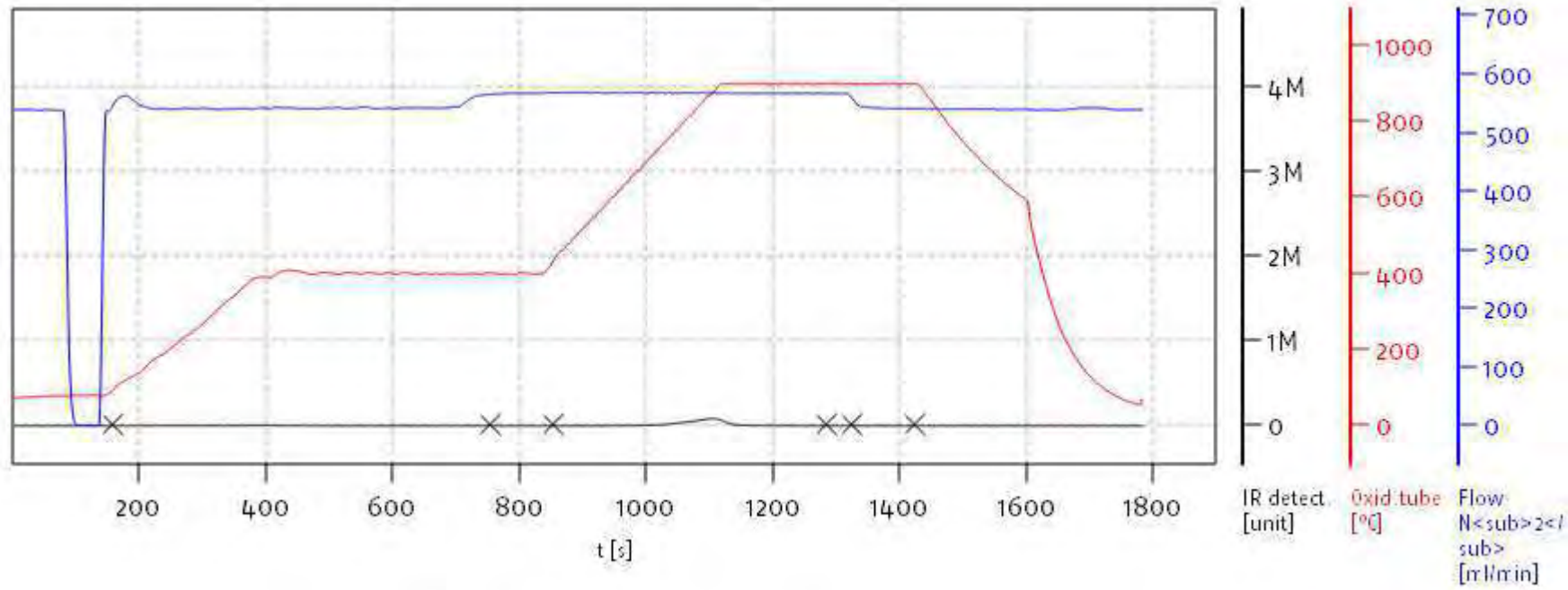
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
12	12	SEQ-CALA	200.00	0.0500	1.00	CARBON	4/26/2022 5:00 PM	0.021	0.151	0.172	bl,C2u	20 147	233 779	913	1.0000	0.8099



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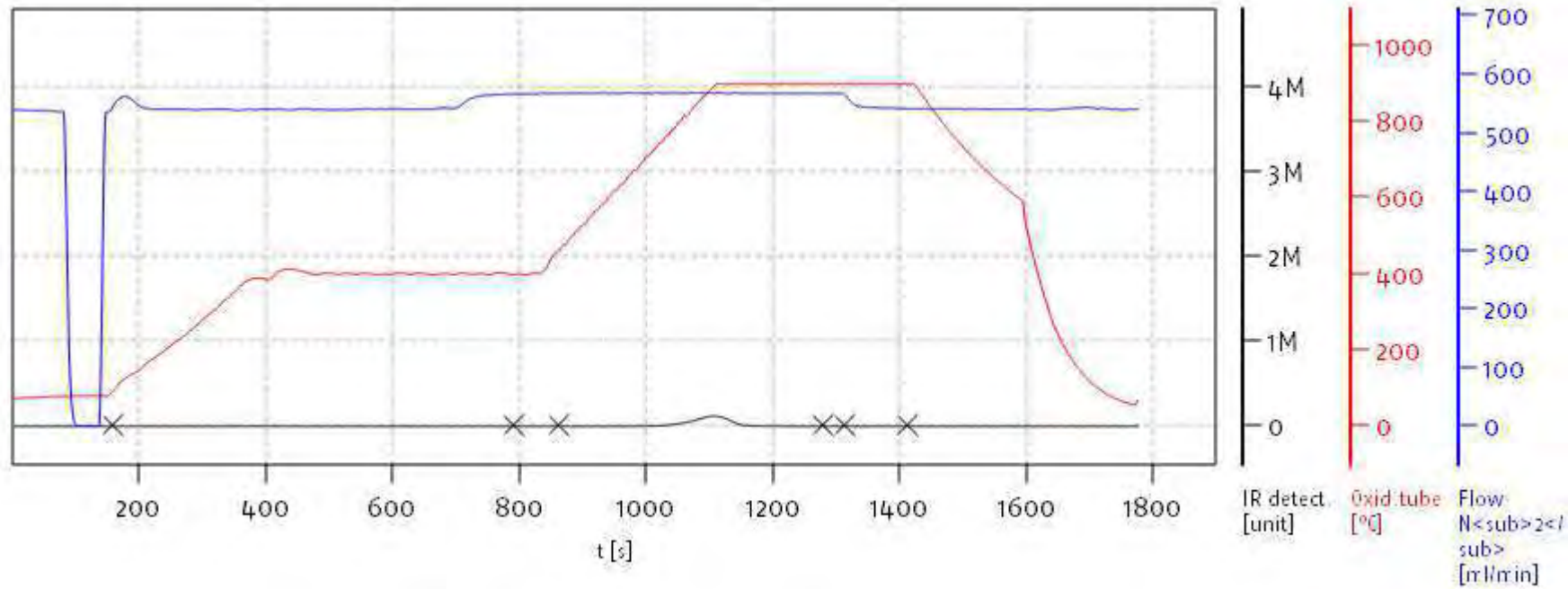
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
13	13	SEQ-CALB	200.00	0.0040	1.00	CARBON	4/26/2022 5:30 PM	0.010	0.258	0.268	bl,C1u,C2u	7 070	323 151	663	1.0000	1.0048



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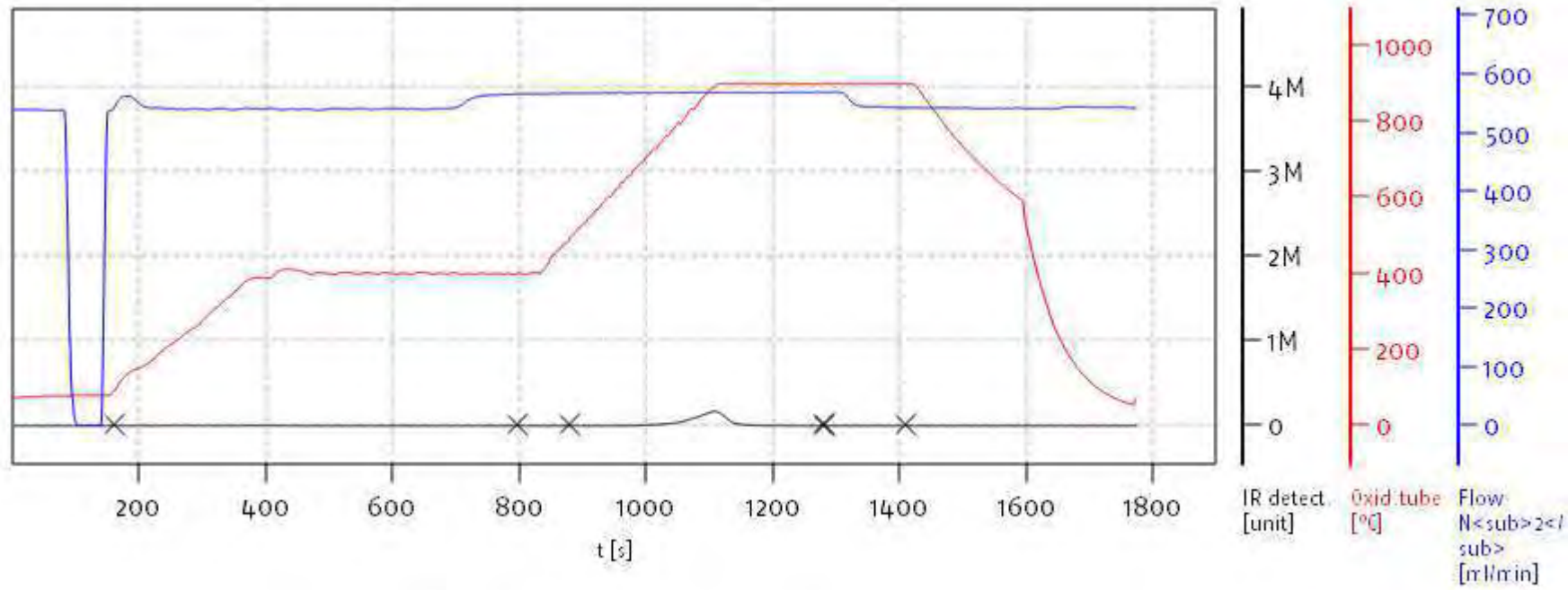
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
14	14	SEQ-CALC	200.00	0.0048	1.00	CARBON	4/26/2022 6:00 PM	0.015	0.324	0.339	bl,C2u	13 785	411 879	575	1.0000	0.9917



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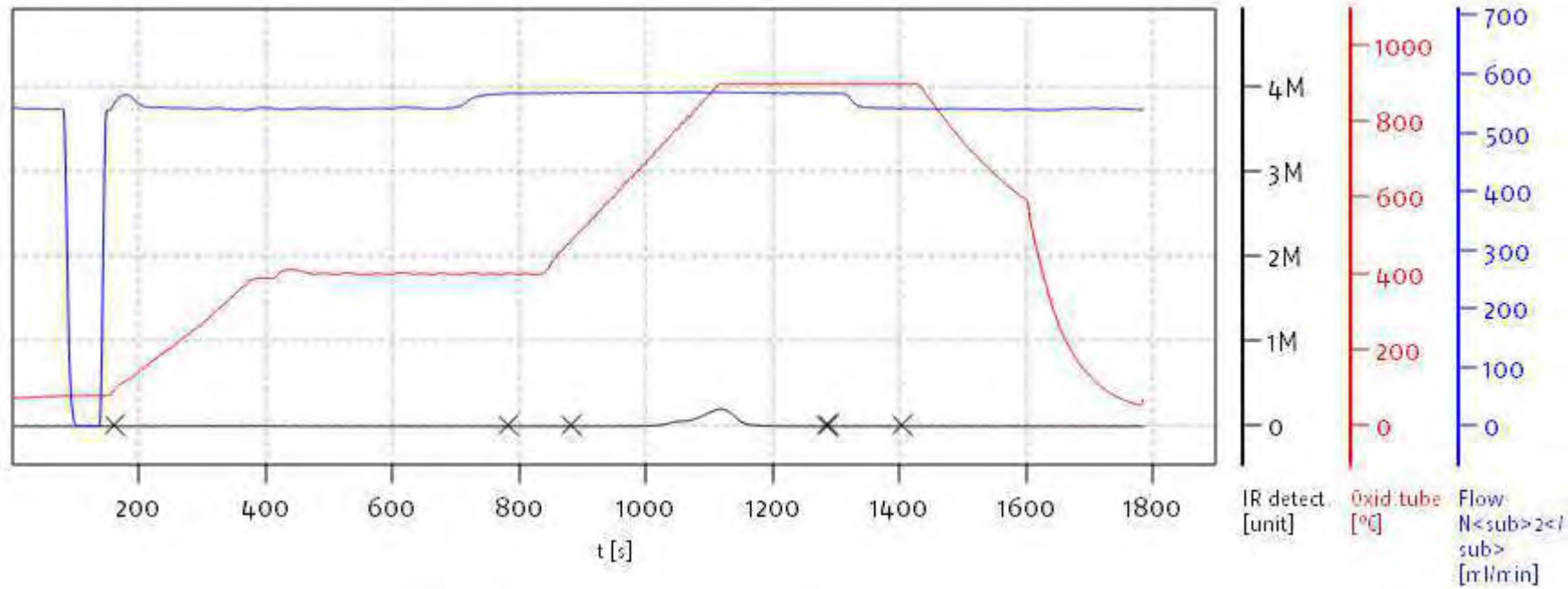
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
15	15	SEQ-CALD	200.00	0.0069	1.00	CARBON	4/26/2022 6:30 PM	0.019	0.444	0.463	bl,C2u	18 465	553 540	263	1.0000	1.0129



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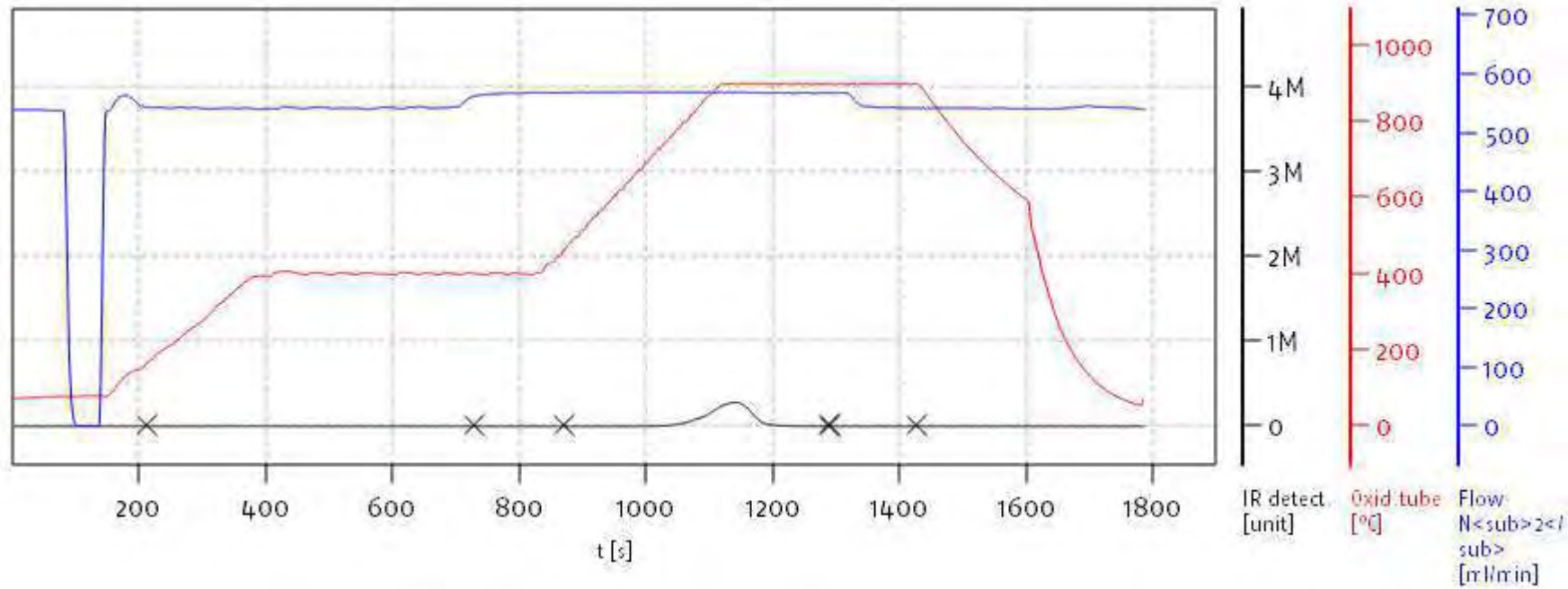
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
16	16	SEQ-CALE	200.00	0.0101	1.00	CARBON	4/26/2022 7:00 PM	0.009	0.600	0.609	bl,C1u,C2u	5 485	839 878	536	1.0000	0.9036



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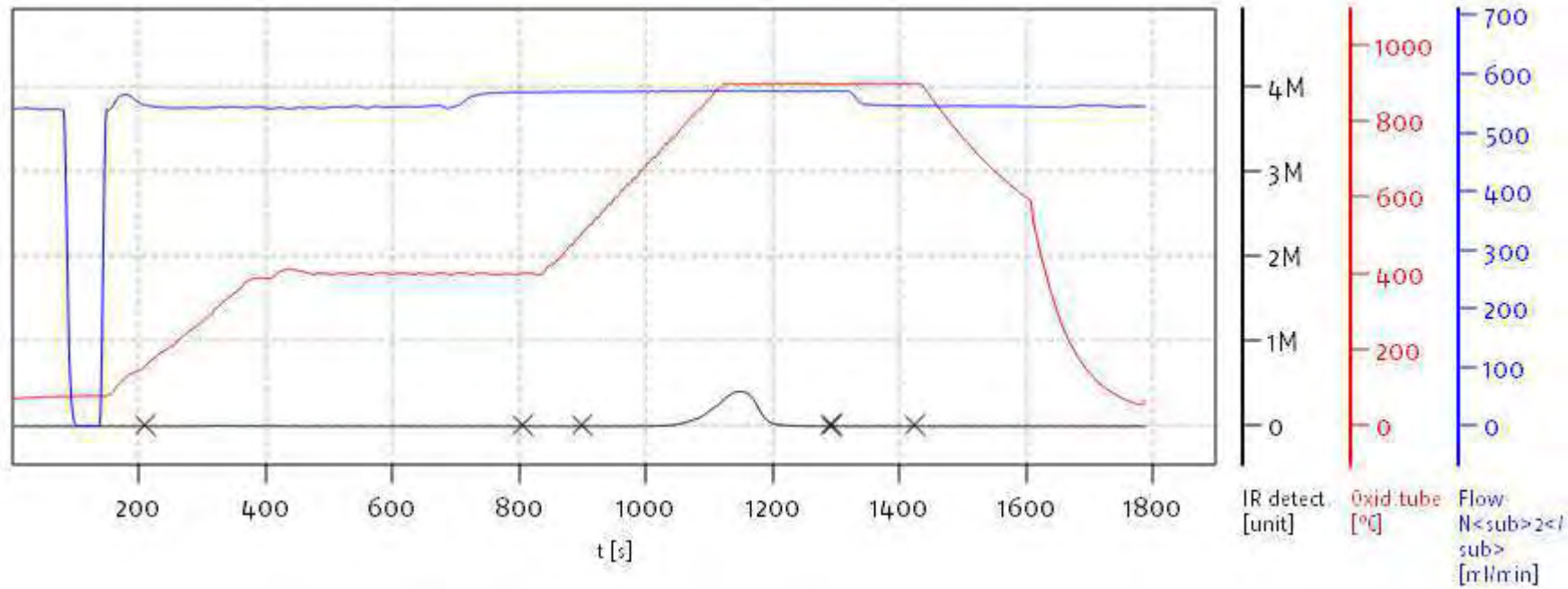
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soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
17	17	SEQ-CALF	200.00	0.0149	1.00	CARBON	4/26/2022 7:31 PM	0.019	0.906	0.925	bl,C2u	17 439	1 236 200	814	1.0000	0.9279



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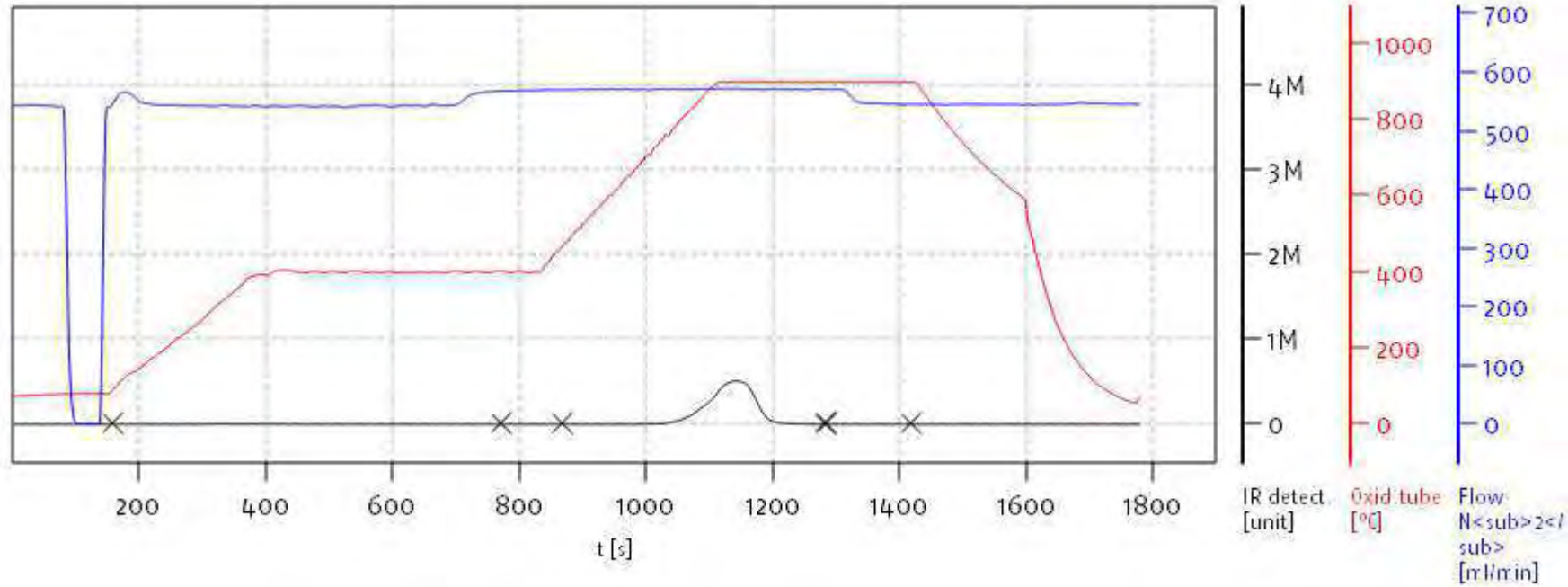
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
18	18	SEQ-CALG	200.00	0.0198	1.00	CARBON	4/26/2022 8:01 PM	0.015	1.206	1.221	bl,C2u	12 557	1 639 190	1 295	1.0000	0.9320



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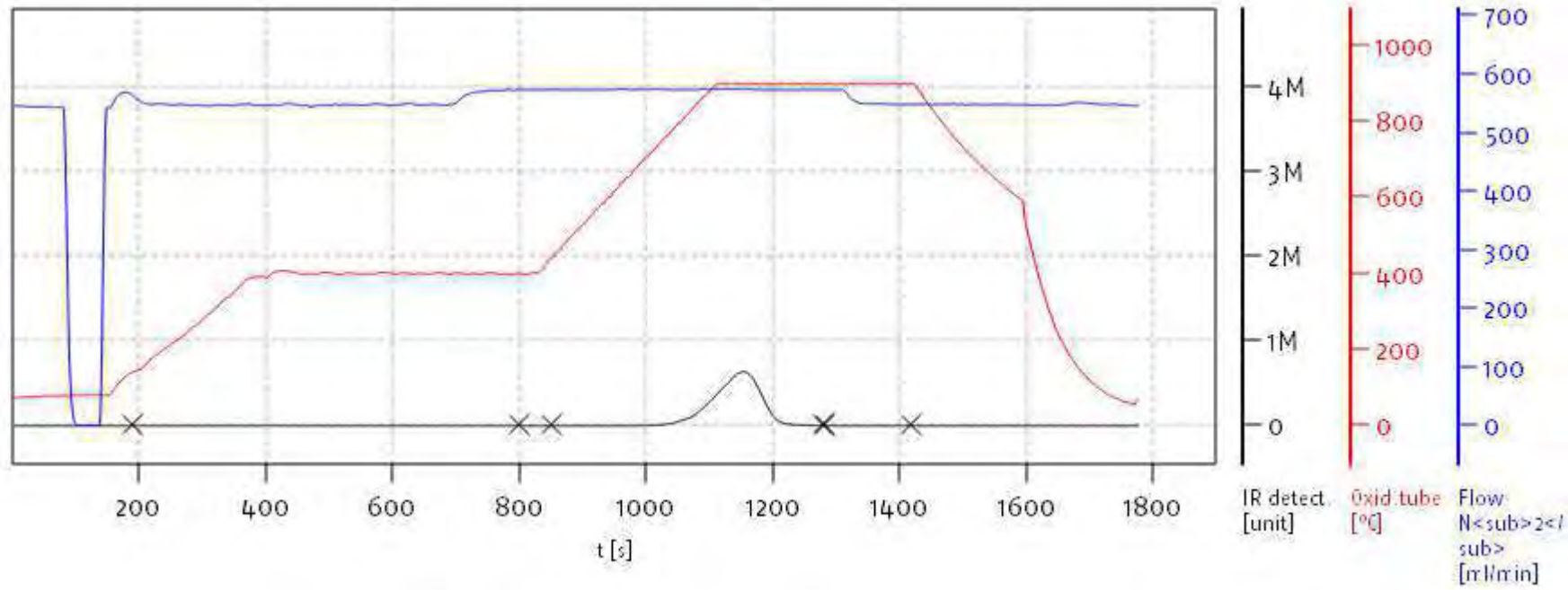
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soliTOC V2.0.2 (31015f9) 2018-11-19
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
19	19	SEQ-CALH	200.00	0.0250	1.00	CARBON	4/26/2022 8:31 PM	0.009	1.524	1.533	bl,C1u,C2u	4 029	2 063 890	2 225	1.0000	0.9357



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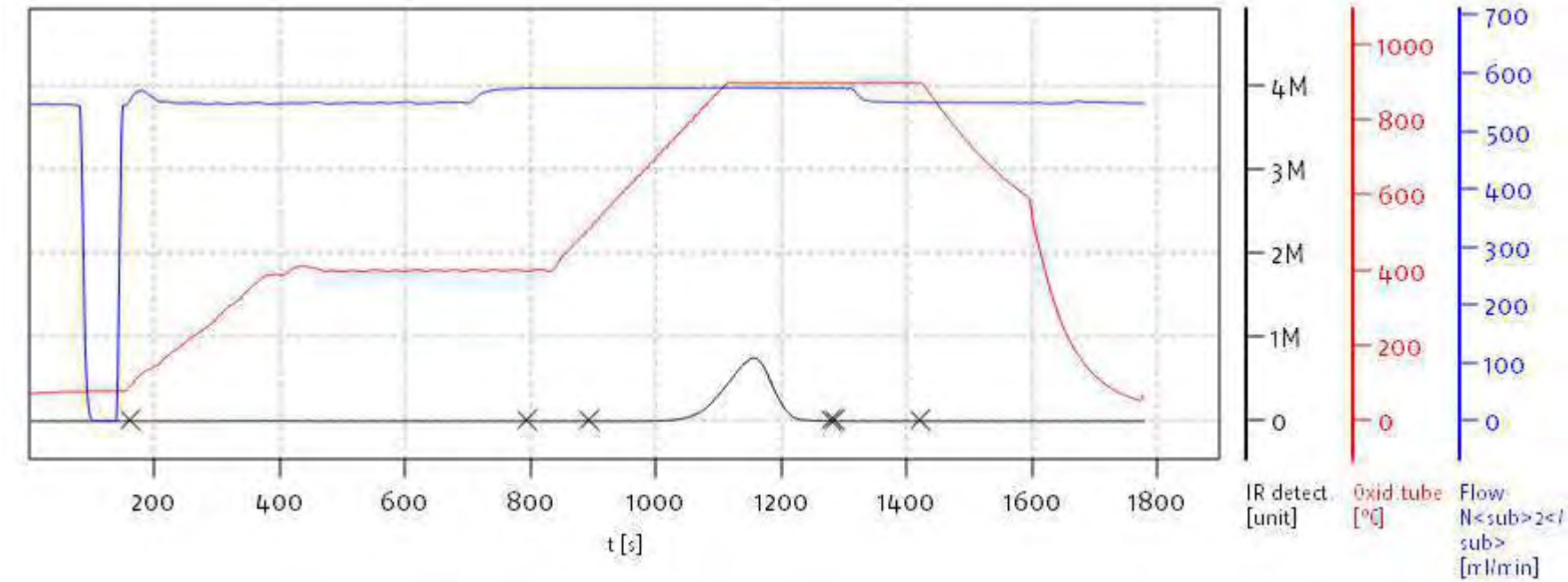
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soliTOC V2.0.2 (31015f9) 2018-11-19
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Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
20	20	SEQ-CALI	200.00	0.0303	1.00	CARBON	4/26/2022 9:01 PM	0.017	1.800	1.817	bl,C2u	13 926	2 495 900	2 903	1.0000	0.9140



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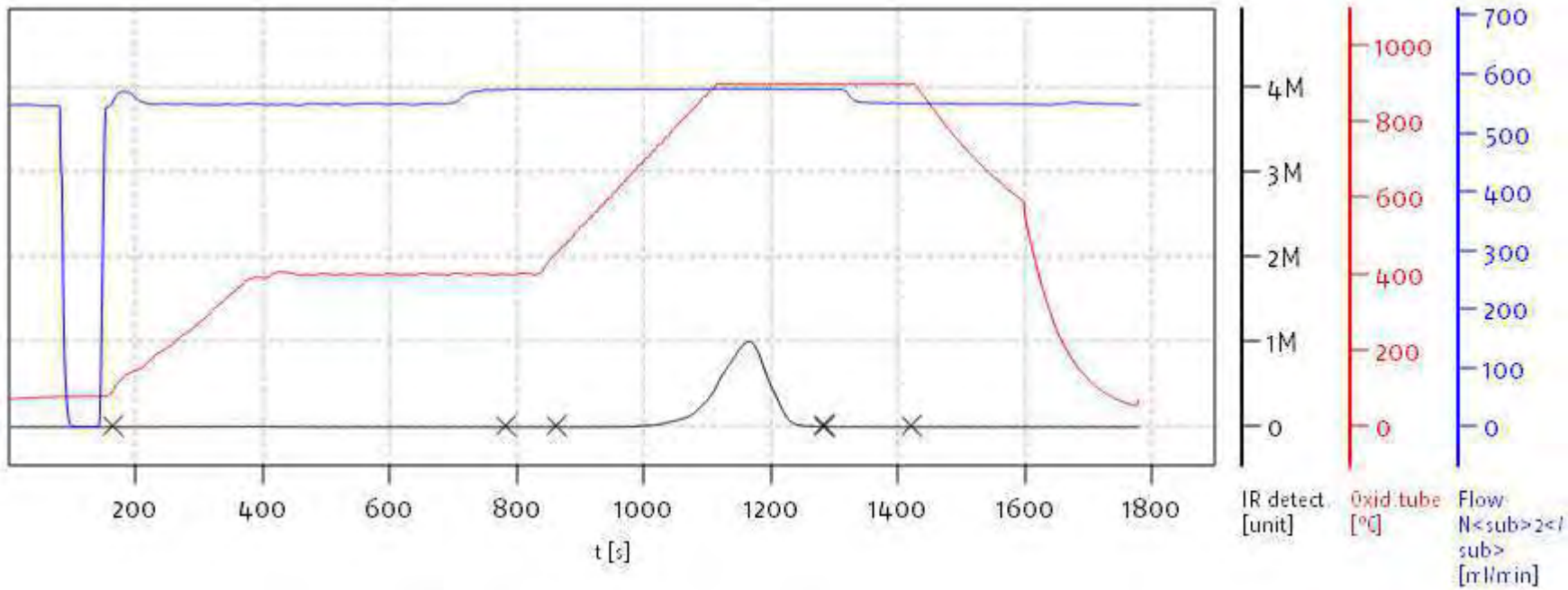
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
21	21	SEQ-CALJ	200.00	0.0415	1.00	CARBON	4/26/2022 9:31 PM	0.031	2.400	2.431	bl,C2u	28 786	3 482 530	5 351	1.0000	0.8737



Name:

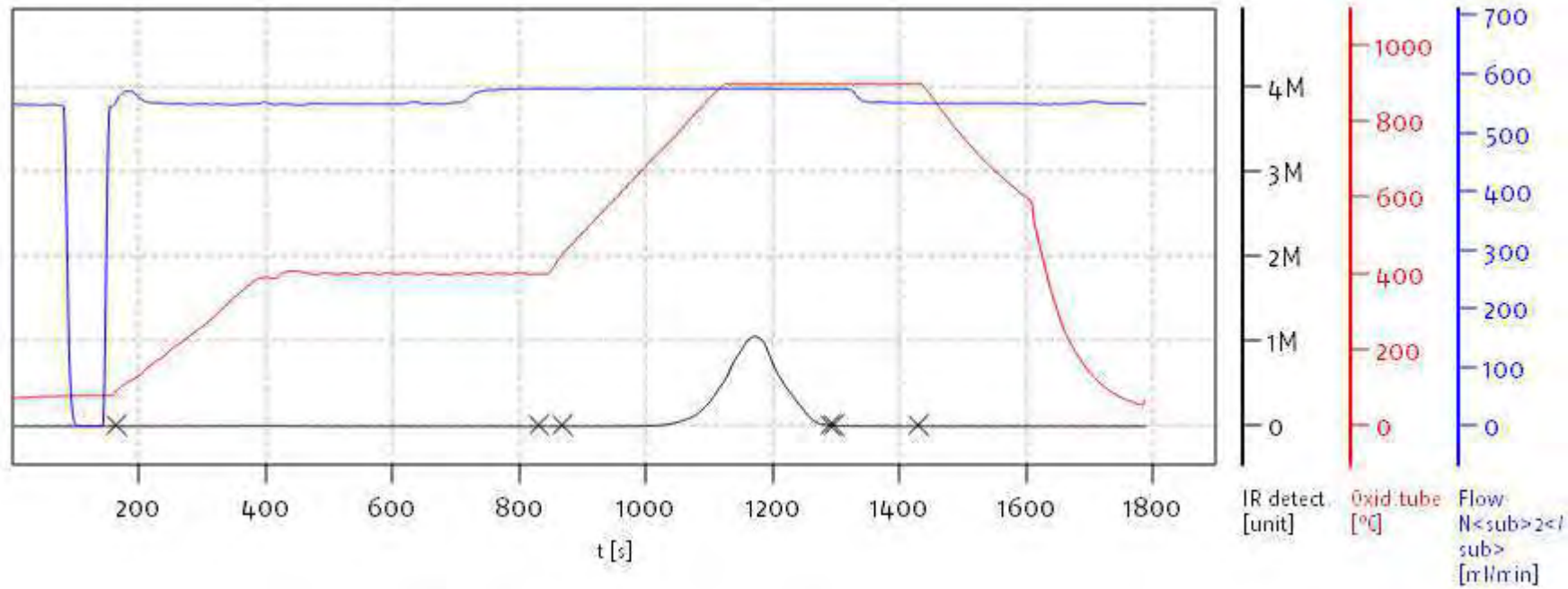
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
22	22	SEQ-CALK	200.00	0.0497	1.00	CARBON	4/26/2022 10:01 PM	0.031	3.012	3.043	bl	23 732	4 105 830	9 736	1.0000	0.9301



Name:

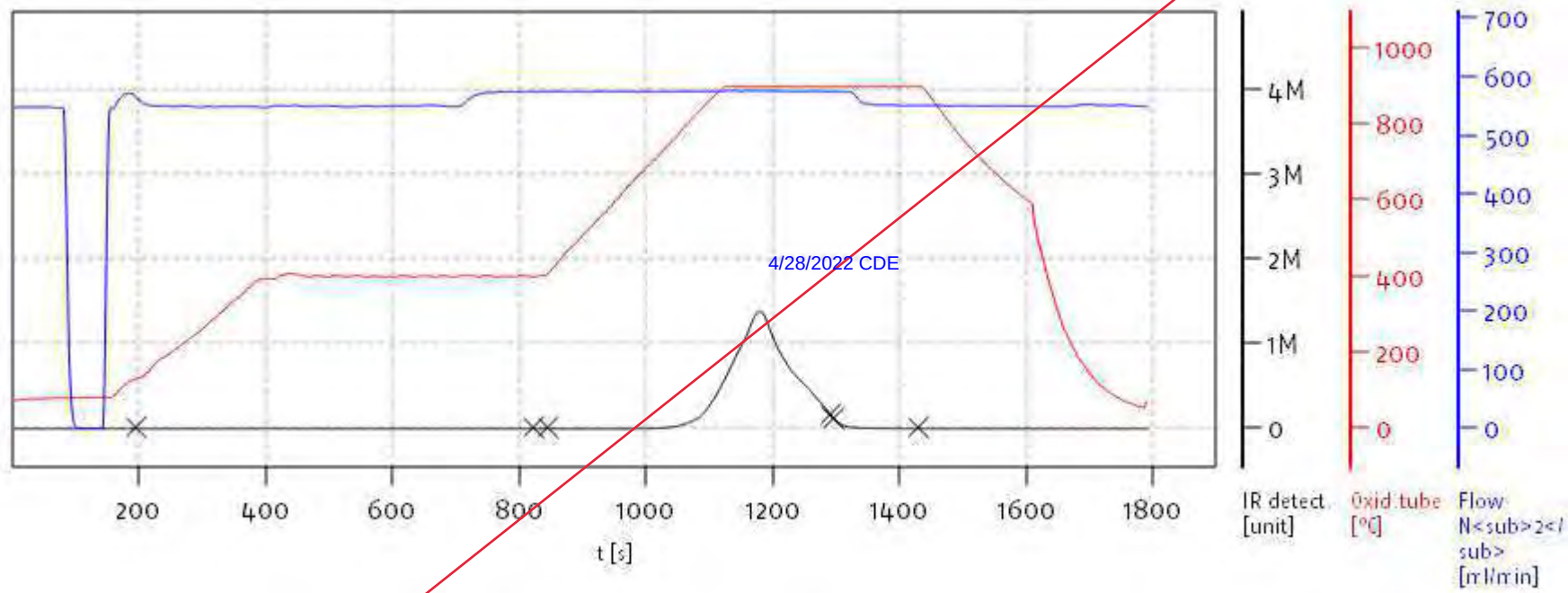
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/26/2022 10:31 PM	0.005	3.805	3.810	bl,C1u	3 605	5 648 620	71 970	1.0000	0.9443



Name:

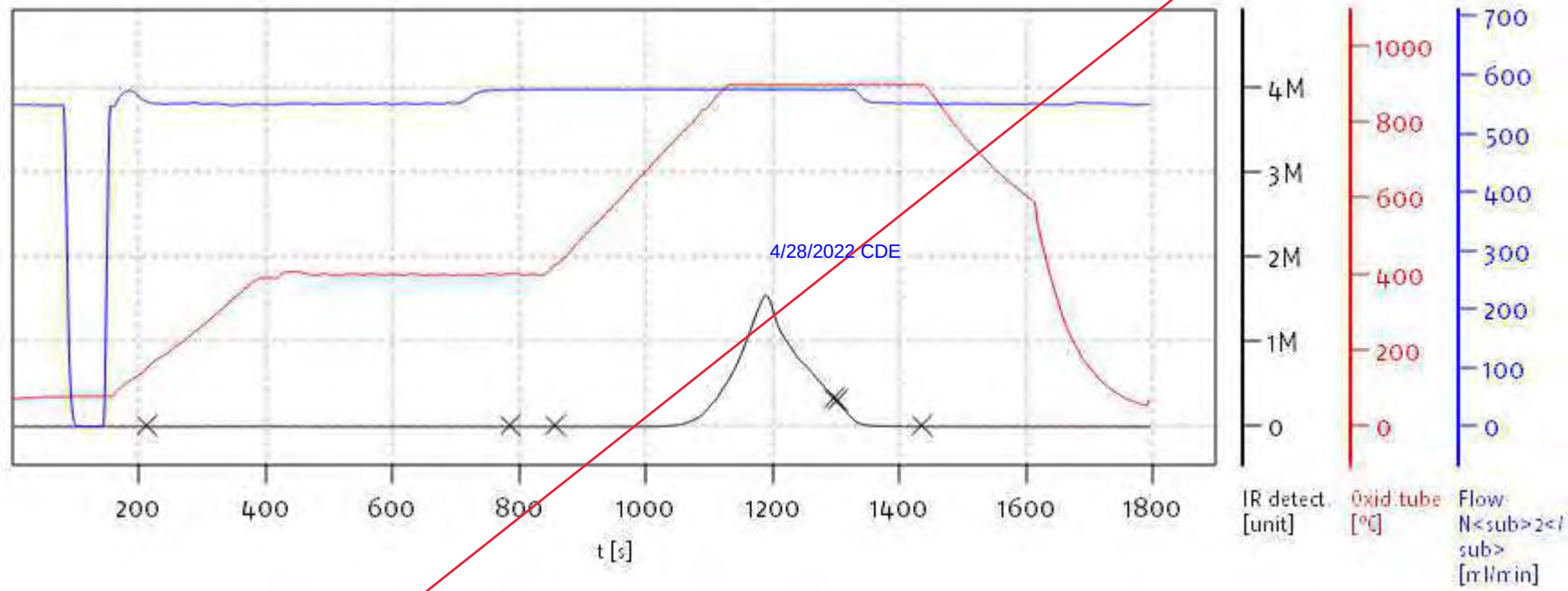
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/26/2022 11:02 PM	0.010	4.637	4.647	bl	10 023	6 397 530	228 171	1.0000	0.9539



Name:

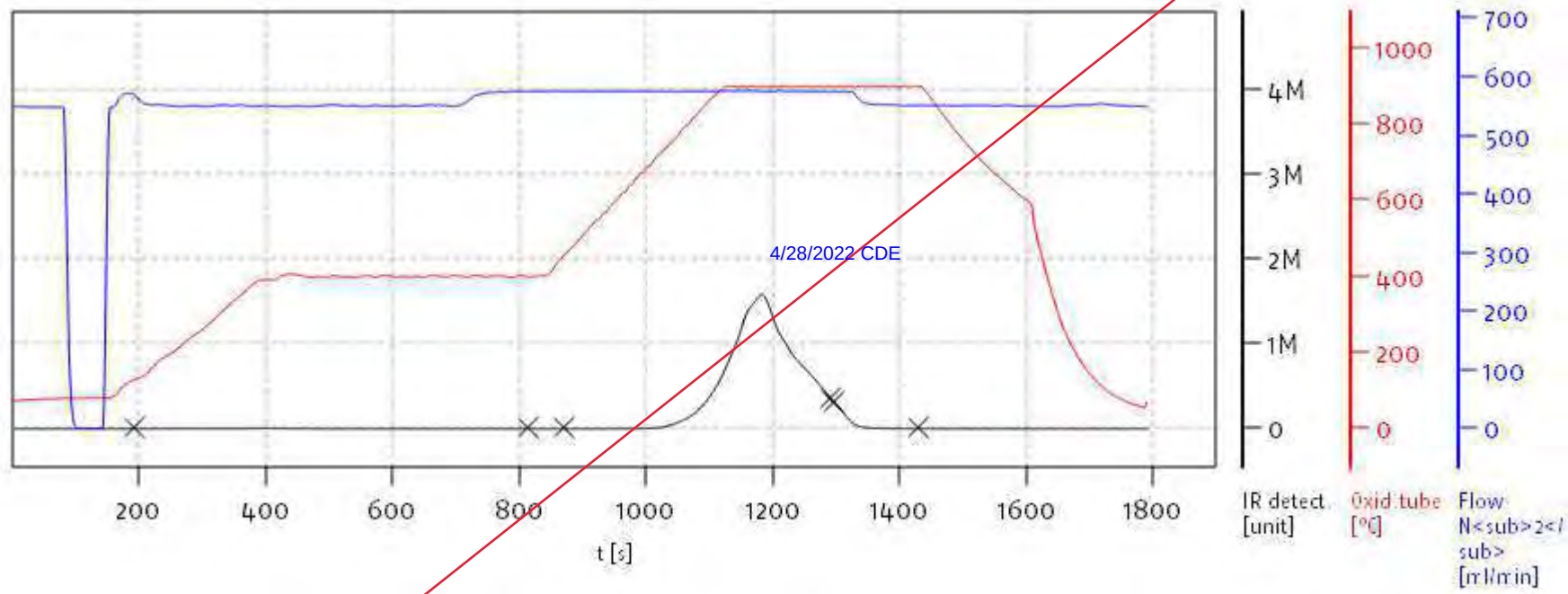
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Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/26/2022 11:32 PM	0.020	5.219	5.239	bl	23 354	7 186 580	239 986	1.0000	0.9540



Name:

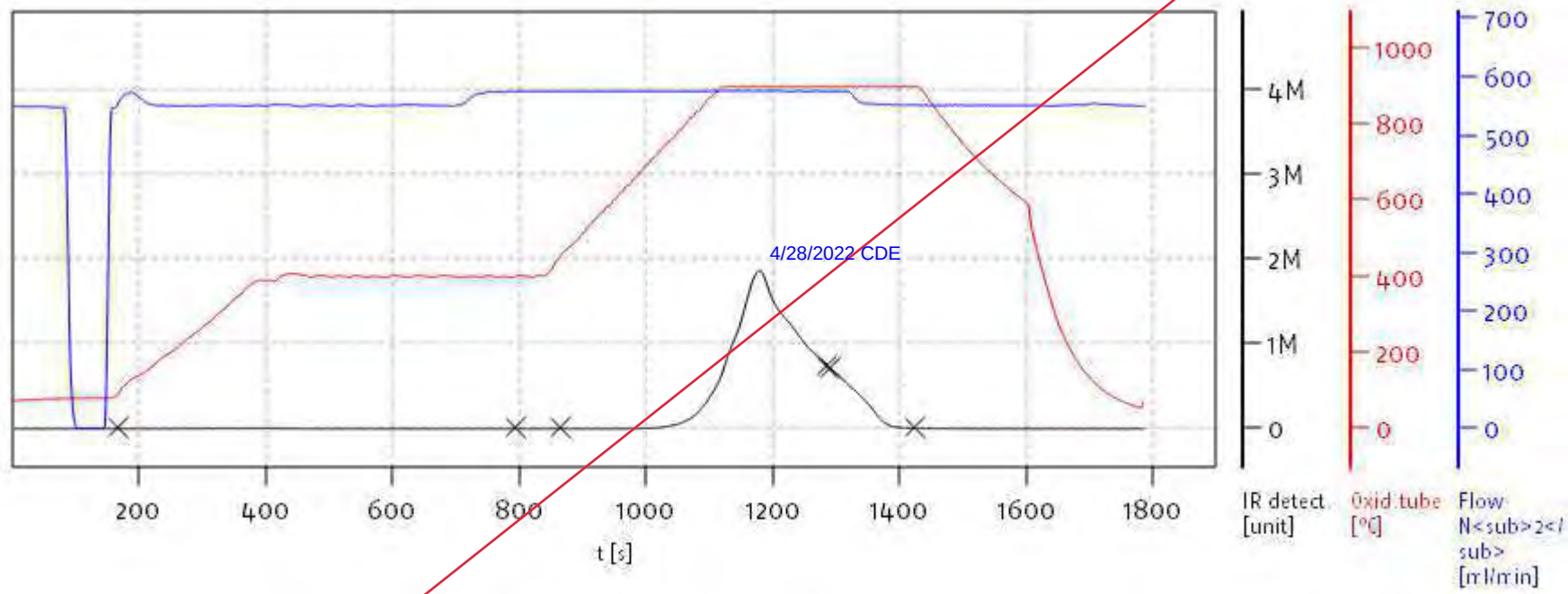
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 12:02 AM	0.019	7.915	7.934	bl,C3o	21 248	8 544 610	1 334 580	1.0000	1.0714



Name:

Access: soliTOC superuser

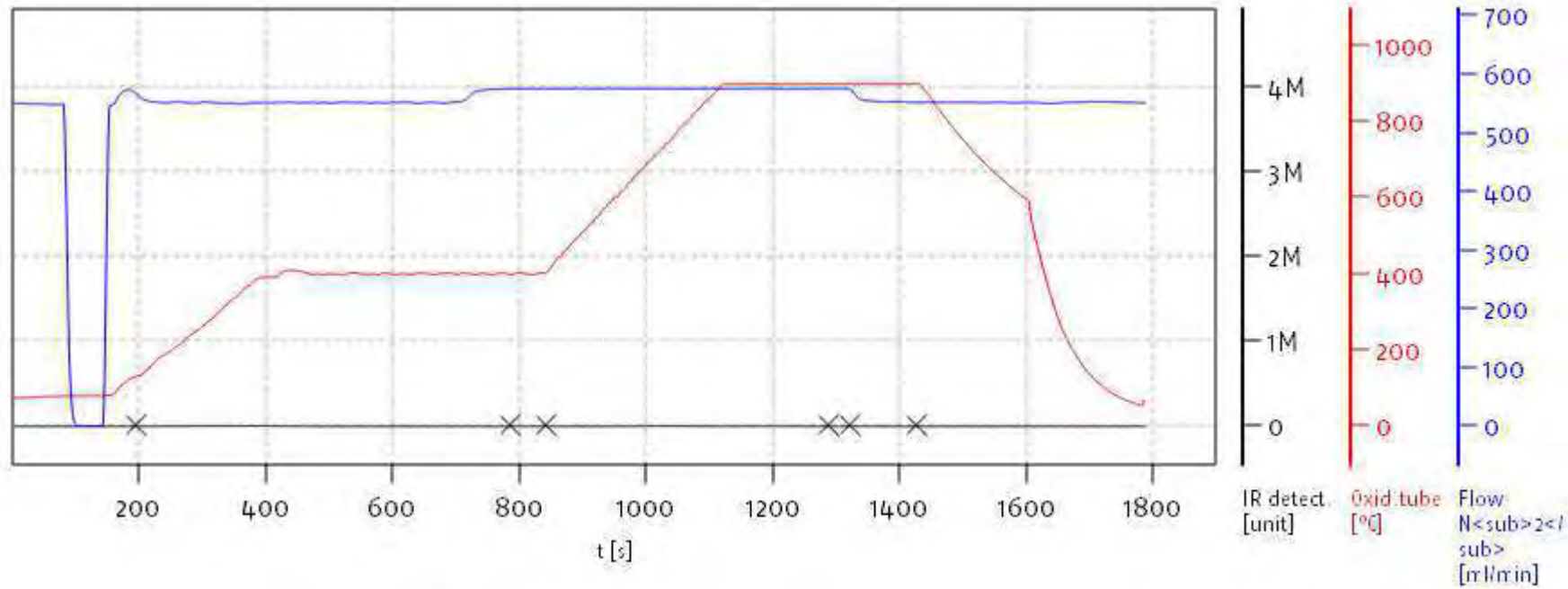
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

elementar
EXCELLENCE IN ELEMENTS

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
27	27	BLANK	1.00		1.00	CARBON	4/27/2022 12:32 AM	0.000	0.000	0.000	bl	29 766	19 596	1 205	1.0000	0.9007



Name:

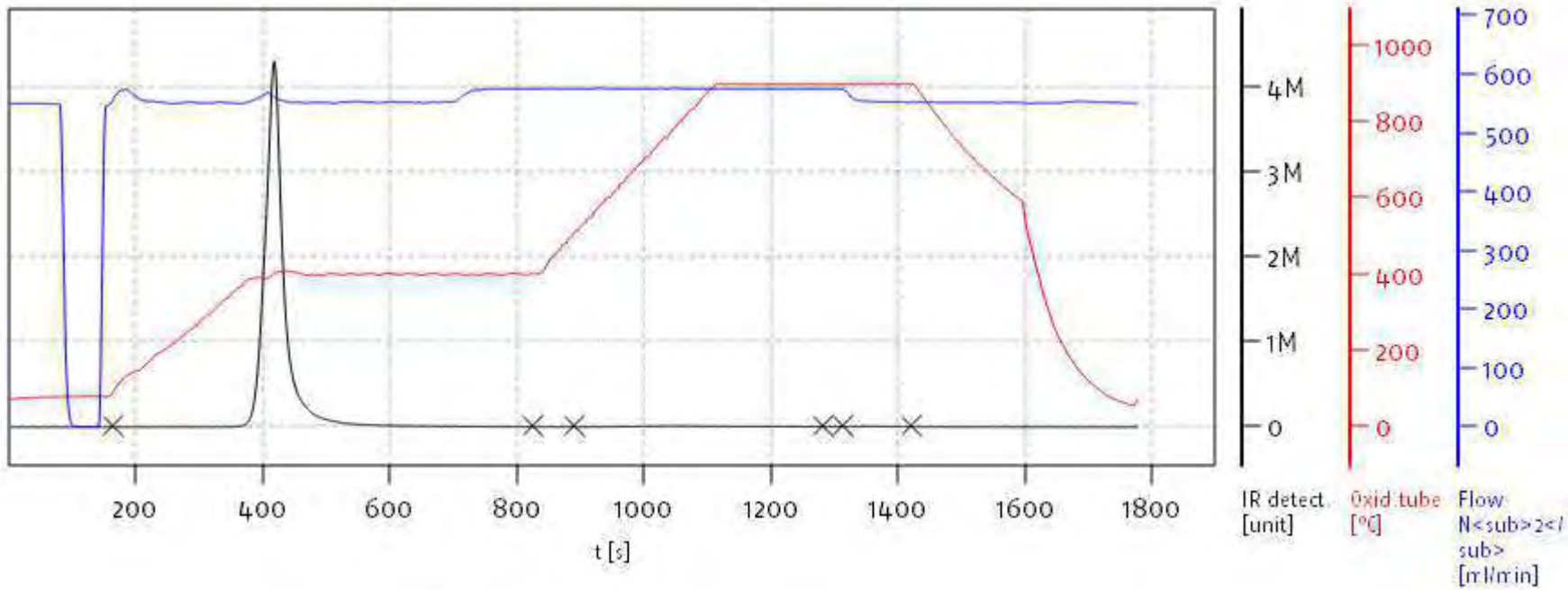
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
28	28	Dfactor	19.00		1.00	CARBON	4/27/2022 1:02 AM	44.678	0.893	45.571	bl	5 588 680	104 999	25 384	0.9581	1.0000



Name:

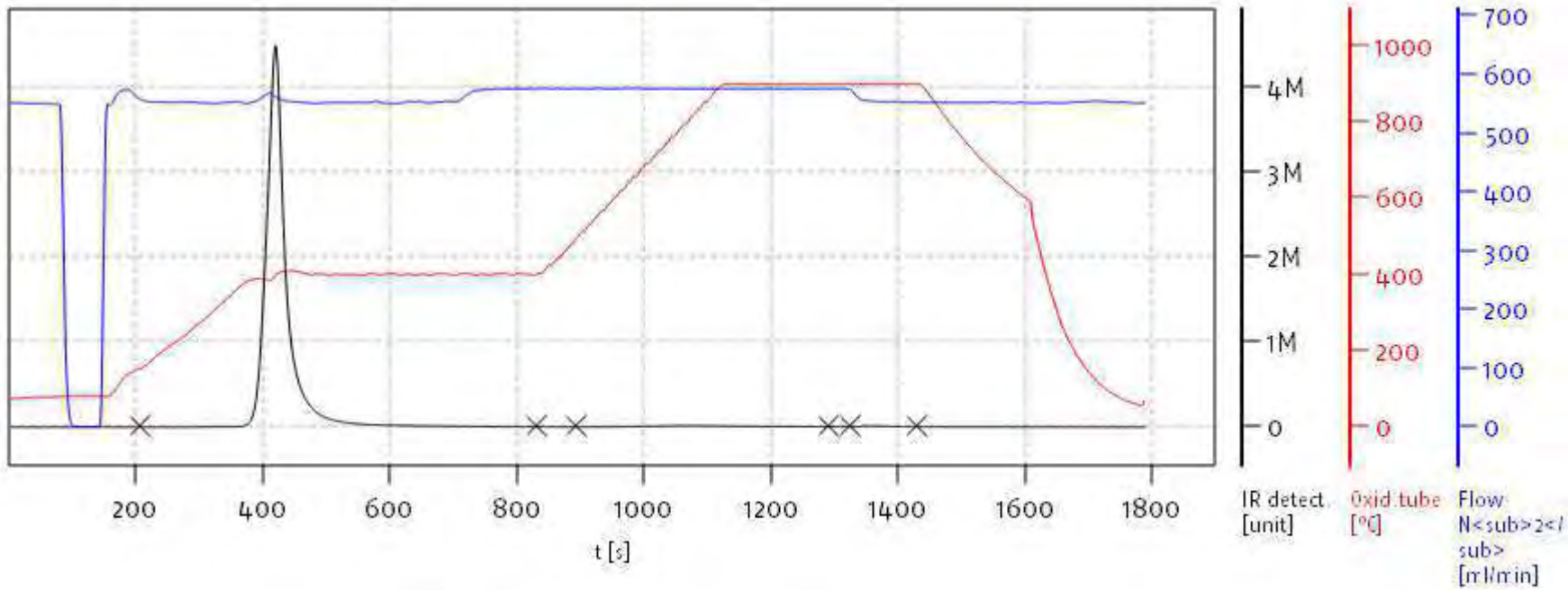
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
29	29	Dfactor	20.80		1.00	CARBON	4/27/2022 1:32 AM	44.694	0.937	45.631	bl	6 076 750	120 961	30 224	0.9647	1.0000



Name:

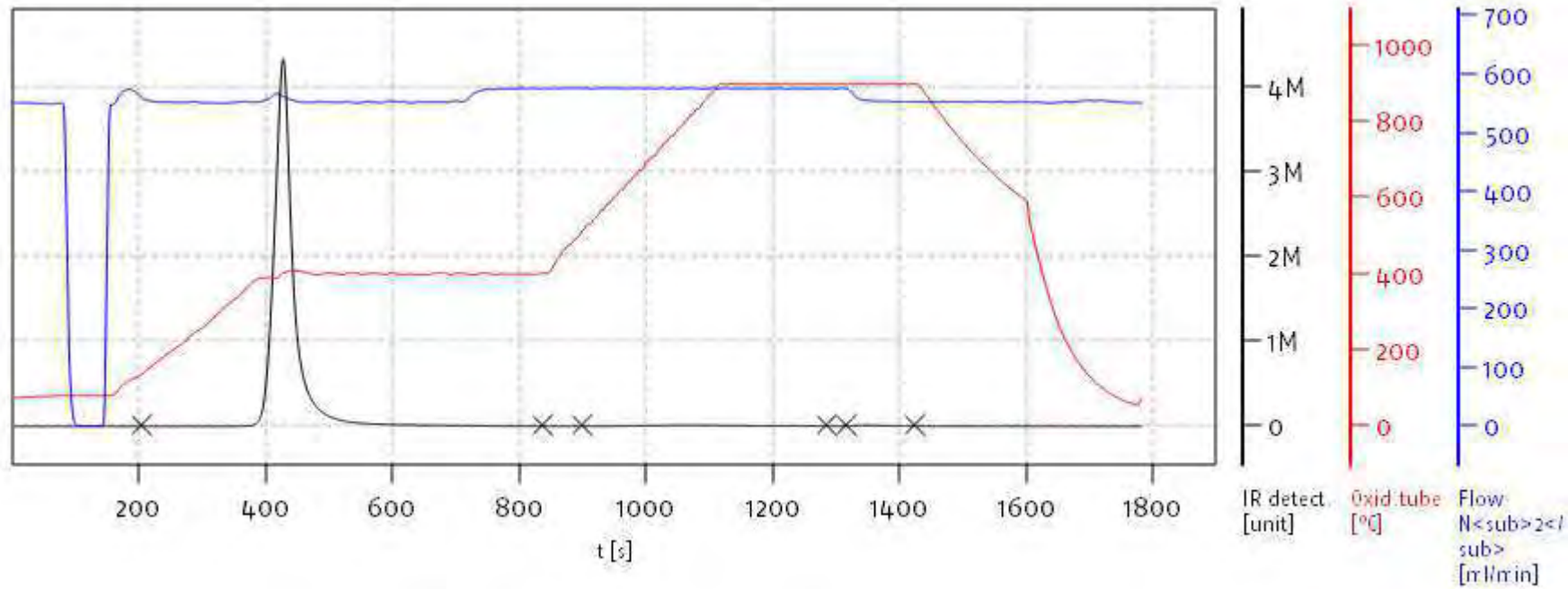
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
30	30	SEQ-ICV1	19.40		1.00	CARBON	4/27/2022 2:03 AM	44.964	0.742	45.706	bl	5 722 450	98 735	27 054	0.9614	0.9007



Name:

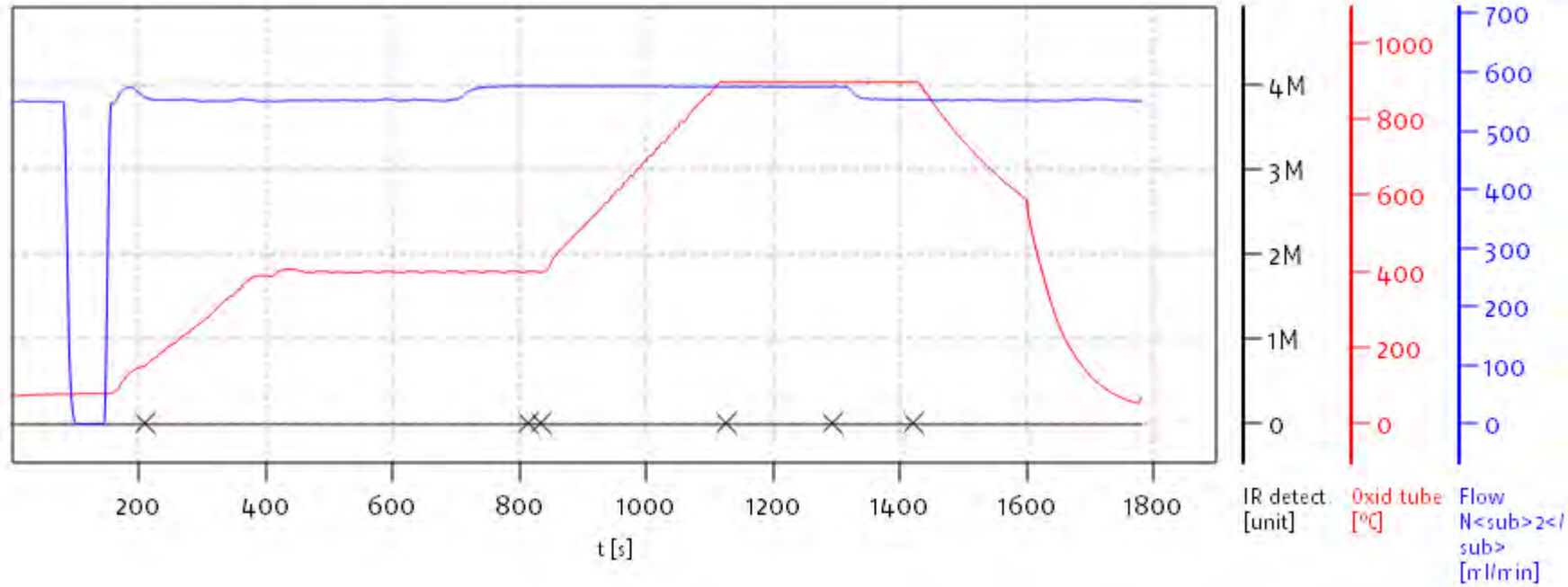
Access: soliTOC superuser

Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
31	31	SEQ-ICB1	501.10		1.00	CARBON	4/27/2022 2:33 AM	0.002	0.001	0.003	bl,C1u,C3u,C2u	2 158	225	165	0.9614	0.9007



Name:

Access: soliTOC superuser

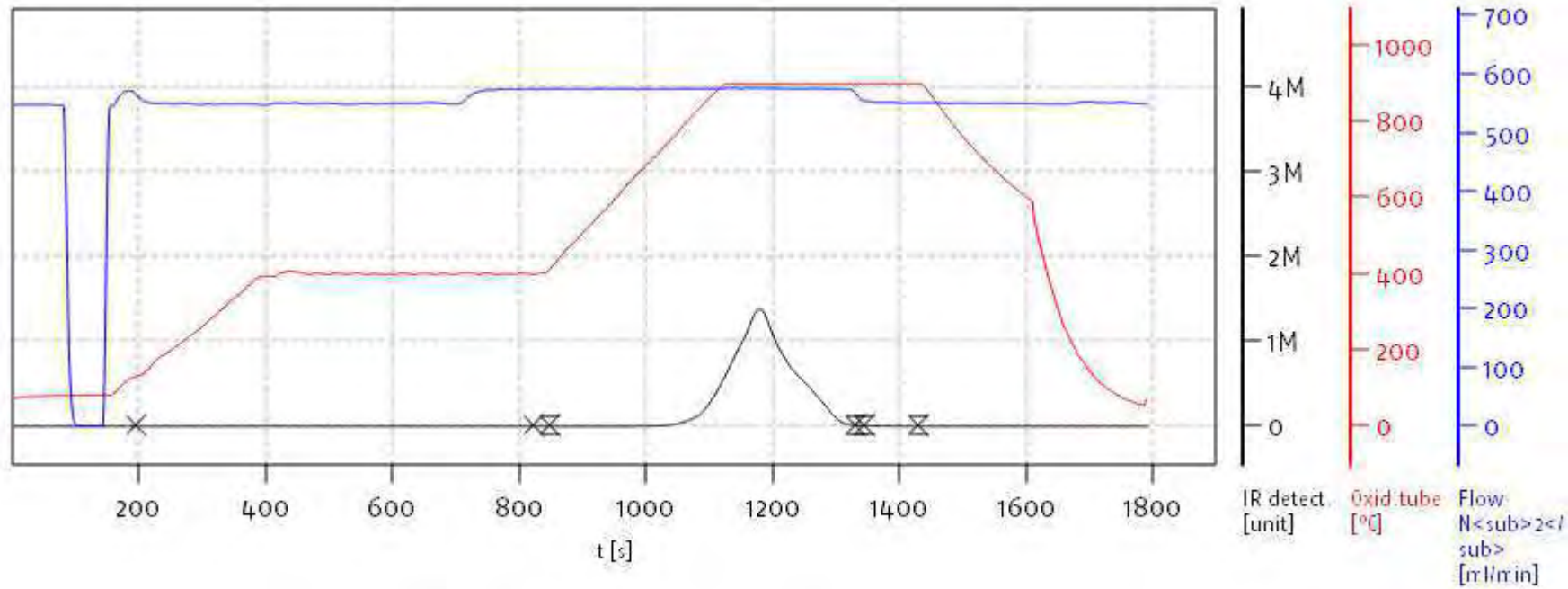
Date: Wed Apr 27 11:07:12 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
23	23	SEQ-CALL	200.00	0.0698	1.00	CARBON	4/27/2022 11:08 AM	0.005	3.917	3.922	bl,C1u	3 605	**5 260 365**	**0**	1.0000	0.9443



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

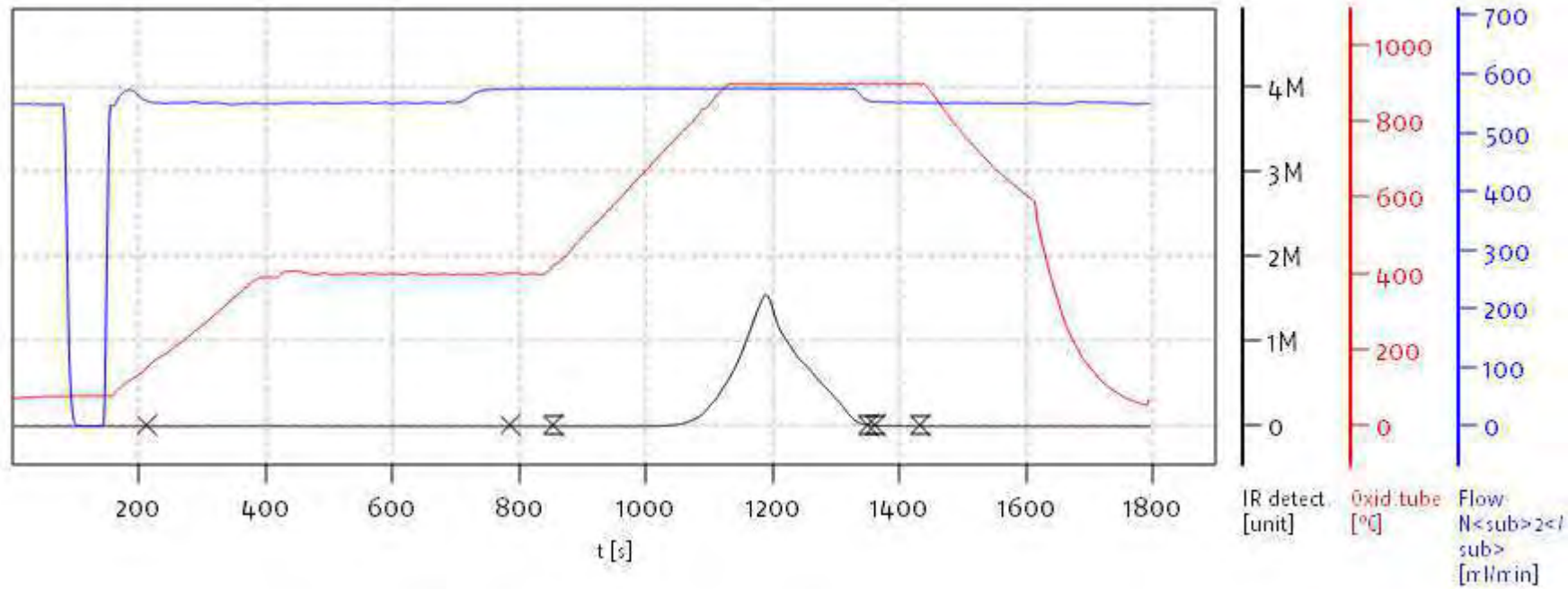
elementar
EXCELLENCE IN ELEMENTS

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

Analytical Resources, Incorporated
Analytical Chemists and Consultants

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
24	24	SEQ-CALM	200.00	0.0803	1.00	CARBON	4/27/2022 11:08 AM	0.010	4.637	4.647	bl	10 023	**6 164 833**	**0**	1.0000	0.9539



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

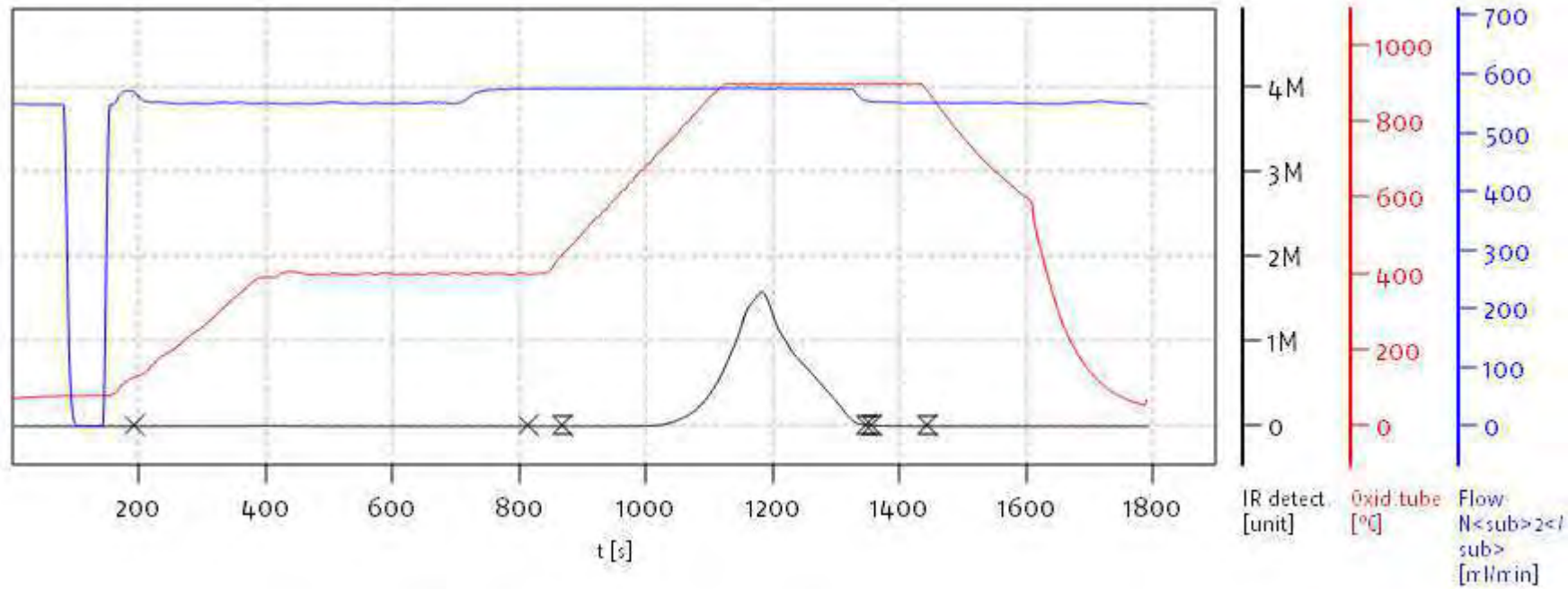
elementar
EXCELLENCE IN ELEMENTS

soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
25	25	SEQ-CALN	200.00	0.0901	1.00	CARBON	4/27/2022 11:09 AM	0.020	5.219	5.239	bl	23 354	**6 937 833**	**0**	1.0000	0.9540



Name:

Access: soliTOC superuser

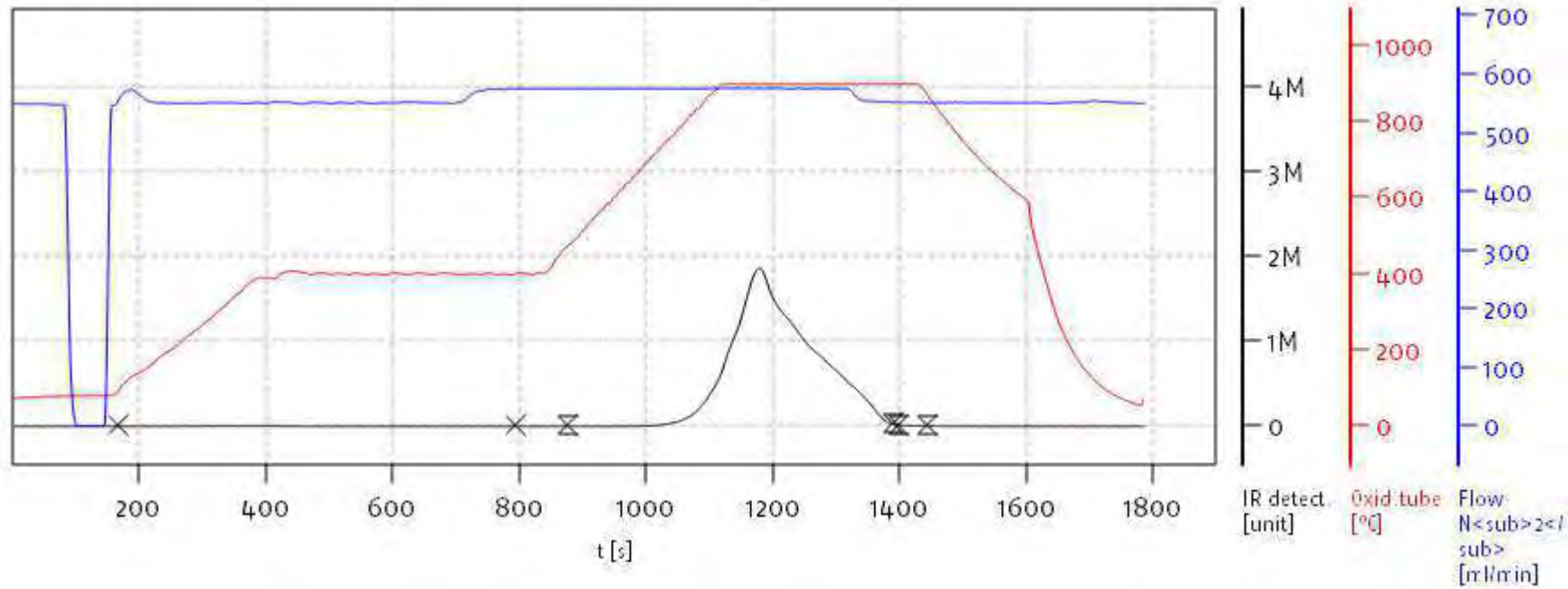
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Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Soli TOC Cube, Carbon
Balance: BAL3
Analyst: DOE

	Pos.	Name	Weight [mg]	Memo	Dilut. Factor	Method	Date Time	TOC [%]	TIC900 [%]	TC [%]	Info	TOC400 Area	TIC900 Area	ROC Area	TOC400 Factor	TIC900 Factor
26	26	SEQ-CALO	200.00	0.1200	1.00	CARBON	4/27/2022 11:09 AM	0.019	7.915	7.934	bl,C3o	21 248	9 370 139	0	1.0000	1.0714



Name:

Access: soliTOC superuser

Date: Wed Apr 27 11:10:16 2022

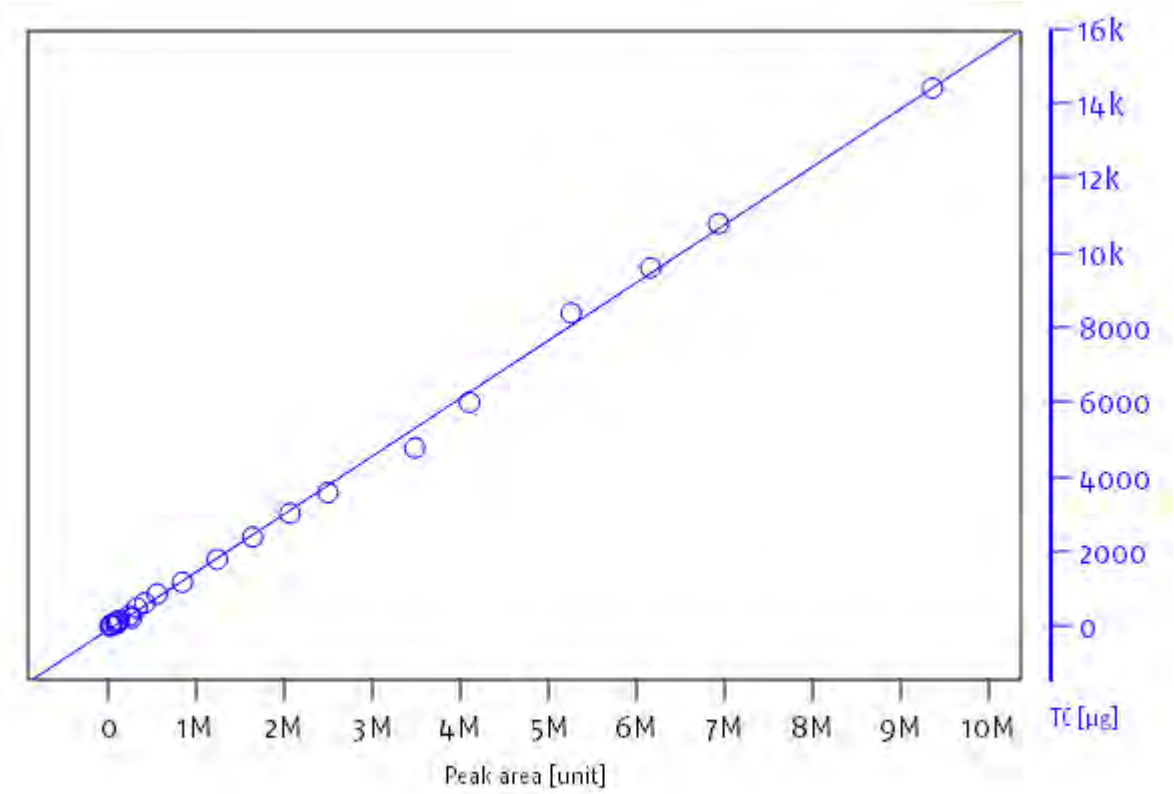
soliTOC V2.0.2 (31015f9) 2018-11-19
Serial No: 0300.181017
Mode CCC

Document: 042622 DOE CALIBRATION from: --.--.-- (modified)

Calibration parameters TC, Whole range

a	-4.107546e-02
b	+1.548032e-06
c	+0.000000e+00
d	+0.000000e+00
e	+0.000000e+00
r	0.998372
r_old	0.998372
Proc.-SD	166.070255 µg

Calibration graph TC, Whole range



INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SKD0371
Date Analyzed: 04/27/22 02:33

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SKD0371-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	

INSTRUMENT BLANKS
EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Sequence: SLE0117
Date Analyzed: 05/06/23 16:47

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C
SLE0117-ICB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB1	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB2	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB3	Total Organic Carbon	0.003	0.02	0.02	%	
SLE0117-CCB4	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB5	Total Organic Carbon	0.00	0.02	0.02	%	
SLE0117-CCB6	Total Organic Carbon	0.00	0.02	0.02	%	

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SKD0371

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SKD0371-ICV1	Total Organic Carbon	44.446	43.7	98.3	%	EPA 9060A m
	Total Carbon	44.446	44.1	99.2	%	EPA 9060A m
	Total Inorganic Carbon	0.0000	0.40		%	EPA 9060A m
	% Soot	0.0000	0.004		%	EPA 9060A m

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Instrument ID: TOC Cube
Calibration: FD00070
Control Limt: +/- 10.00%
Sequence: SLE0117

Lab Sample ID	Analyte	True	Found	%R	Units	Method
SLE0117-ICV1	Total Organic Carbon	44.446	43.7	98.2	%	EPA 9060A m
SLE0117-CCV1	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV2	Total Organic Carbon	44.446	43.8	98.6	%	EPA 9060A m
SLE0117-CCV3	Total Organic Carbon	44.446	44.8	101	%	EPA 9060A m
SLE0117-CCV4	Total Organic Carbon	44.446	43.7	98.4	%	EPA 9060A m
SLE0117-CCV5	Total Organic Carbon	44.446	43.5	98.0	%	EPA 9060A m
SLE0117-CCV6	Total Organic Carbon	44.446	43.5	97.8	%	EPA 9060A m

* Values outside of QC limits

STANDARD REFERENCE MATERIAL RECOVERY

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Laboratory ID: BLE0201-SRM1
Batch: BLE0201
Initial/Final: 0.3105 g / 0.3105 g
Preparation: No Prep Wet Chem
Analyzed: 05/06/2023 20:49
Standard ID: L000790
Expires: 05/19/2024
Standard Lot#: NA
Description: 1941B - Organics in Marine Sediment (Conv

ANALYTE	TRUE (% wet)	FOUND (% wet)	MDL	MRL	Q	SRM % REC.	QC LIMITS REC.
Total Organic Carbon	2.9900	2.98	0.02	0.02		99.8	80 - 120

* Values outside of QC limits

HOLDING TIME SUMMARY

Analysis: EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-24G:0-10 23E0156-01	03/20/23 11:06	05/05/23 14:20	05/06/23 12:10	47	180	05/07/23 21:38			
SED-23G:0-10 23E0156-02	03/20/23 11:42	05/05/23 14:20	05/06/23 12:10	47	180	05/07/23 22:08			
SED-22G:0-10 23E0156-03	03/20/23 11:58	05/05/23 14:20	05/06/23 12:10	47	180	05/07/23 23:39			
SED-21G:0-10 23E0156-04	03/20/23 12:16	05/05/23 14:20	05/06/23 12:10	46	180	05/08/23 00:09			
SED-20G:0-10 23E0156-05	03/20/23 13:38	05/05/23 14:20	05/06/23 12:10	46	180	05/08/23 00:40			
SED-18G:0-10 23E0156-06	03/20/23 14:08	05/05/23 14:20	05/06/23 12:10	46	180	05/08/23 01:10			
SED-19G:0-10 23E0156-07	03/20/23 14:27	05/05/23 14:20	05/06/23 12:10	46	180	05/08/23 01:41			

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

EPA 9060A m

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument: TOC Cube

Analyte	MDL	RL	Units
Total Organic Carbon	0.02	0.02	%

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1941b

Organics in Marine Sediment

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. Information values are also provided for total organic carbon (TOC), total carbon, hydrogen, and nitrogen. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Certified Mass Fraction Values: Certified mass fraction values for PAHs, PCB congeners, and chlorinated pesticides are provided in Table 1 through Table 3. The certified values for the PAHs, PCB congeners, and chlorinated pesticides are based on the agreement of results obtained at NIST from two or more chemically independent analytical techniques along with results from an interlaboratory comparison study [1]. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1].

Reference Mass Fraction Values: Reference mass fraction values for additional PAHs (some in combination), additional PCB congeners, and additional chlorinated pesticides are provided in Table 4 through Table 7. Reference values for alkylated PAH groups are provided in Table 8 and for selected hopanes and steranes in Table 9. A reference value for total organic carbon is provided in Table 10. Reference values are noncertified values that are the best estimate of the true value; however, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods [1].

Information Mass Fraction Values: Information mass fraction values are provided in Table 11 for carbon, hydrogen, and nitrogen. An information value is considered to be a value that will be of use to the SRM user, but insufficient information is available to assess the uncertainty associated with the value [1]. Information values cannot be used to establish metrological traceability.

Expiration of Certification: The certification of **SRM 1941b** is valid, within the measurement uncertainty specified, until **01 October 2020**, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Handling, Storage, and Use"). This certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet or register online) will facilitate notification.

Coordination of the technical measurements leading to the certification of this material was under the leadership of M.M. Schantz and S.A. Wise of the NIST Chemical Sciences Division.

Analytical measurements for the certification of SRM 1941b were performed at NIST by J.R. Kucklick, B.J. Porter, D.L. Poster, M.M. Schantz, P. Schubert, S. Tutschku, and L.L. Yu of the NIST Chemical Sciences Division.

Carlos A. Gonzalez, Chief
Chemical Sciences Division

Gaithersburg, MD 20899
Certificate Issue Date: 16 January 2015

Robert L. Watters, Jr., Director
Office of Reference Materials

Measurements for TOC were provided by a commercial laboratory and T.L. Wade of the Geochemical and Environmental Research Group, Texas A&M University (College Station, TX). The carbon, hydrogen, and nitrogen data were provided by a commercial laboratory. Results for the PAHs, PCBs, and chlorinated pesticides from 38 laboratories (see Appendix A) that participated in an interlaboratory comparison exercise coordinated by NIST were used. Results for the alkylated PAH groups, hopanes, and steranes from 33 laboratories (see Appendix B) that participated in another interlaboratory comparison exercise coordinated by NIST were also used.

Collection and preparation of SRM 1941b were performed by M.P. Cronise and C.N. Fales of the NIST Office of Reference Materials and B.J. Porter and M.M. Schantz of the NIST Chemical Sciences Division. The sediment material was collected with the assistance of G.G. Lauenstein, J. Collier, and J. Lewis (National Oceanic and Atmospheric Administration, Silver Spring, MD).

Consultation on the statistical design of the experimental work and evaluation of the data were provided by S.D. Leigh and J.H. Yen of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

Handling: This material is naturally occurring marine sediment from an urban area and may contain constituents of unknown toxicities; therefore, caution and care should be exercised during its handling and use.

Storage: SRM 1941b must be stored in its original bottle at temperatures less than 30 °C and away from direct sunlight.

Use: Prior to removal of subsamples for analysis, the contents of the bottle should be mixed. The mass fractions of constituents in SRM 1941b are reported on a dry-mass basis. The SRM, as received, contains a mass fraction of approximately 2.4 % moisture (see "Conversion to Dry-Mass Basis"). The sediment sample should be dried to a constant mass before weighing for analysis; or a separate subsample of the sediment should be removed from the bottle at the time of analysis and dried to determine the mass fraction on a dry-mass basis. If the constituents of interest are volatile, then the moisture must be determined with a separate subsample.

PREPARATION AND ANALYSIS[1]

Sample Collection and Preparation: The sediment used to prepare this SRM was collected from the Chesapeake Bay at the mouth of the Baltimore (MD) Harbor near the Francis Scott Key Bridge (39°12.3'N and 76°31.4'W). This location is very near the site where SRM 1941 and SRM 1941a were collected. The sediment was collected using a Kynar-coated modified Van Veen-type grab sampler. A total of approximately 3300 kg of wet sediment was collected from the site. The sediment was freeze-dried, sieved at 150 μm (100 % passing), homogenized in a cone blender, radiation sterilized (^{60}Co), and then packaged in screw-capped amber glass bottles each containing approximately 50 g.

Conversion to Dry-Mass Basis: The results for the constituents in SRM 1941b are reported on a dry-mass basis; however, the material "as received" contains residual moisture. The amount of moisture in SRM 1941b was determined by measuring the mass loss after freeze-drying subsamples of 1.1 g to 1.3 g for four days at 1 Pa with a –10 °C shelf temperature and a –50 °C condenser temperature. The moisture content in SRM 1941b at the time of the certification analyses was 2.39 % ± 0.08 % (95 % confidence level). Analytical results for the organic constituents were determined on an as-received basis and then converted to a dry-mass basis by dividing by the conversion factor of 0.9761 (gram dry mass per gram as-received mass).

Polycyclic Aromatic Hydrocarbons: The general approach used for the value assignment of the PAHs in SRM 1941b was similar to that reported in detail elsewhere [2]. The approach consisted of combining results from analyses using various combinations of different extraction techniques and solvents, clean-up/isolation procedures, and chromatographic separation and detection techniques: Soxhlet extraction and pressurized-fluid extraction (PFE) using dichloromethane (DCM) or a hexane/acetone mixture, cleanup of the extracts using solid-phase extraction (SPE) or normal-phase liquid chromatography (LC), followed by analysis using the following techniques: (1) reversed-phase liquid chromatography with fluorescence detection (LC-FL) analysis of the total PAH fraction, (2) reversed-phase

[1] Certain commercial equipment, instruments or materials are identified in this certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards

LC-FL analysis of isomeric PAH fractions isolated by normal-phase LC (i.e., multidimensional LC), (3) gas chromatography/mass spectrometry (GC/MS) analysis of the PAH fraction on three stationary phases of different selectivity, i.e., a 5 % (all column compositions are given as mole fractions in %) phenyl-substituted methylpolysiloxane phase, a 50 % phenyl-substituted methylpolysiloxane phase, and a relatively non-polar proprietary phase.

Three sets of GC/MS results, designated as GC/MS (I), GC/MS (II), and GC/MS (III), were obtained using three columns with different selectivities for the separation of PAHs. For GC/MS (I) analyses, duplicate subsamples of approximately 1 g from ten bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 2 % DCM in hexane (all solvent concentrations are given as volume fractions in %). The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5 MS, J&W Scientific, Folsom, CA). The GC/MS (II) analyses were performed using 5 g subsamples from six bottles of SRM 1941b. These samples were extracted using PFE with DCM. The high molecular mass compounds were removed from the extracts using size exclusion chromatography (SEC) with a preparative-scale divinylbenzene-polystyrene column (10 μm particle size with 10 nm diameter pores), and the sulfur was removed from the extracts by adding copper powder. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The analysis was by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17 MS, J&W Scientific). For the GC/MS (III), 9 g subsamples from six bottles of SRM 1941b were Soxhlet-extracted for 18 h with 250 mL of a mixture of 50 % hexane/50 % acetone. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific).

Two sets of LC-FL results, designated as LC-FL (total) and LC-FL (isomer), were used in the certification process. For the LC-FL (total), subsamples of approximately 1 g from six bottles of SRM 1941b were extracted using PFE with a mixture of 50 % hexane/50 % acetone. The extracts were concentrated and then processed through an aminopropylsilane SPE cartridge using 2 % DCM in hexane to obtain the total PAH fraction. For the LC-FL (isomer), a 5 g subsample from the six bottles was extracted using PFE with DCM and processed through an aminopropylsilane SPE cartridge using 10 % DCM in hexane; the PAH fraction was then fractionated further on a semi-preparative aminopropylsilane column (μBondapak NH_2, 9 mm i.d. × 30 cm, Waters Associates, Milford, MA) to isolate isomeric PAH fractions as described previously [3–6]. The total PAH fraction and the isomeric PAH fractions were analyzed using a 5 μm particle-size polymeric octadecylsilane (C_{18}) column (4.6 mm i.d. × 25 cm, Hypersil-PAH, Keystone Scientific, Inc., Bellefonte, PA) with wavelength-programmed fluorescence detection [4,5].

For the GC/MS and LC-FL measurements described above, selected perdeuterated PAHs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PAHs in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

Homogeneity Assessment for PAHs: The homogeneity of SRM 1941b was assessed by analyzing duplicate samples of approximately 1 g from ten bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described above for GC/MS (I). No statistically significant differences among bottles were observed for the PAHs at this sample size.

PAH Isomers of Molecular Mass 300 and 302: For the determination of the molecular mass 300 and 302 isomers, three subsamples of approximately 5 g each were extracted using PFE with DCM. The extracts were then concentrated with a solvent change to hexane and passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-17MS, J&W Scientific). Perdeuterated dibenzo[*a,i*]pyrene was added to the sediment prior to extraction for use as an internal standard [8].

PCBs and Chlorinated Pesticides: The general approach used for the determination of PCBs and chlorinated pesticides in SRM 1941b consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques. Techniques and solvents included Soxhlet extraction and PFE using DCM or a hexane/acetone mixture.

clean-up/isolation using SPE or LC, followed by analysis using GC/MS and gas chromatography with electron capture detection (GC-ECD) on two columns with different selectivity for the separation of PCBs and chlorinated pesticides. The analytical methods are described in detail elsewhere [2].

Six sets of results were obtained and designated as GC-ECD (I) A and B, GC/MS (I) A and B, GC/MS (II), and Interlaboratory Comparison Exercise. For the GC-ECD (I) analyses, approximately 10 g subsamples from six bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur, and SEC, as described above, was used to remove the high molecular mass compounds. The concentrated extract was then fractionated on a semi-preparative aminopropylsilane column to isolate two fractions containing: (1) the PCBs and lower-polarity pesticides and (2) the more polar pesticides. GC-ECD analyses of the two fractions were performed on two columns of different selectivities for PCB separations: 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5, J&W Scientific), and a 0.25 mm × 60 m fused silica capillary column with a non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The results from the 5 % phenyl phase are designated as GC-ECD (IA) and the results from the proprietary phase are designated as GC-ECD (IB). For the GC-ECD analyses, two PCB congeners that are not significantly present in the sediment extract (PCB 103 and PCB 198 [9,10]) and endosulfan I-d_4, 4,4'-DDE-d_8, 4,4'-DD-d_8, and 4,4'-DDT-d_8 were added to the sediment prior to extraction for use as internal standards for quantification purposes.

Two sets of results were obtained by GC/MS. For GC/MS (I), approximately 9 g subsamples from six bottles were Soxhlet- extracted with a mixture of 50 % hexane/50 % acetone for approximately 18 h. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS with two ionization modes, electron impact (EI) and negative ion chemical ionization (NICI). The GC/MS EI method, GC/MS (IA), used a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 μm film thickness; DB-XLB, J&W Scientific). The GC/MS NICI method, GC/MS (IB), used a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 μm film thickness; DB-5MS, J&W Scientific). The GC/MS (II) results were obtained in the same manner as the GC/MS (IA) analyses except that three subsamples were Soxhlet-extracted with DCM for approximately 18 h. For the GC/MS analyses, selected carbon-13 labeled PCB congeners and chlorinated pesticides were added to the sediment prior to extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [7]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PCB congeners and chlorinated pesticides in SRM 1941b. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest.

The reference value for PCB 77 was determined from a separate fraction. The samples were extracted and processed as for GC-ECD (I) above. The first (PCB and lower-polarity pesticide) fraction from the semi-preparative aminopropylsilane column was further fractionated using a Cosmosil PYE (pyrenylethyl group bonded) column (5 μm particle size, 4.6 mm i.d. × 25 cm ; Phenomenex, Torrance, CA) [11]. Three fractions were collected: the first fraction contained the pesticides and multi-*ortho* PCBs, the second fraction contained the polychlorinated naphthalenes, non-*ortho* PCB congeners, and some mono-*ortho* PCB congeners, and the third fraction removed the residual planar compounds from the column. The second fraction was analyzed by GC/MS NICI using the same column as GC/MS (IB) above. Carbon-13 labeled PCB 77 was used as an internal standard for quantification purposes.

Alkylated PAH Groups, Hopanes, and Steranes: SRM 1941b was used in an interlaboratory comparison exercise in 2011 [12]. Results from 33 laboratories that participated in this exercise were used in the determination of the reference values for alkylated PAH groups, hopanes, and steranes in SRM 1941b. Note that not all laboratories returned data for each analyte. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure the analytes of interest. For the alkylated PAHs, the majority of the laboratories (>90 %) used the parent PAH for determination of the response factor for the corresponding alkylated group.

Total Organic Carbon (TOC): Two laboratories provided results for TOC using similar procedures. Briefly, subsamples of approximately 200 mg were reacted with 6 mol/L hydrochloric acid and rinsed with deionized water prior to combustion in a gas fusion furnace. The carbon monoxide and carbon dioxide produced were measured and compared to a blank for calculation of the percent TOC. Each laboratory analyzed subsamples from three bottles of SRM 1941b. One of the laboratories also analyzed three subsamples from three bottles of SRM 1941b for carbon, hydrogen, and nitrogen.

Table 1. Certified Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
Naphthalene[b,c,d,e,f,g]	848	±	95[h]
Fluorene[b,c,d,e,f,g]	85	±	15[h]
Phenanthrene[b,c,d,e,f,g]	406	±	44[h]
Anthracene[b,c,d,e,f,g]	184	±	18[h]
3-Methylphenanthrene[b,c,d]	105	±	13[h]
2-Methylphenathrene[b,c,d]	128	±	14[h]
1-Methylphenanthrene[b,c,d,g]	73.2	±	5.9[h]
Fluoranthene[b,c,d,e,f,g]	651	±	50[h]
Pyrene[b,c,d,e,f,g]	581	±	39[h]
Benz[*a*]anthracene[b,c,d,e,f,g]	335	±	25[h]
Chrysene[d,f]	291	±	31[h]
Triphenylene[d,f]	108	±	5[i]
Benzo[*b*]fluoranthene[c,e]	453	±	21[h]
Benzo[*k*]fluoranthene[b,c,d,e]	225	±	18[h]
Benzo[*e*]pyrene[b,c,d,g]	325	±	25[h]
Benzo[*a*]pyrene[b,c,d,f,g]	358	±	17[h]
Perylene[b,c,d,f,g]	397	±	45[h]
Benzo[*ghi*]perylene[b,c,d,f,g]	307	±	45[h]
Indeno[1,2,3-*cd*]pyrene[b,c,d,f,g]	341	±	57[h]
Dibenz[*a,j*]anthracene[b,c,d,f]	48.9	±	4.6[h]
Dibenz[*a,c*]anthracene[c,f]	36.7	±	5.2[h]
Dibenz[*a,h*]anthracene[c,f]	53	±	10[h]
Benzo[*b*]chrysene[b,c,d,f]	53	±	12[h]
Picene[b,c,d]	46.6	±	4.7[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[e] LC-FL (total) of total PAH fraction after PFE with DCM.
[f] LC-FL (isomer) of isomeric PAH fractions after PFE with DCM.
[g] 1999 Interlaboratory Comparison Study [7] with 21 to 29 laboratories submitting data for each PAH.
[h] Certified values are weighted means of the results from two to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[i] The certified value is an unweighted mean of the results from two analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the value is metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 2. Certified Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b] (µg/kg)		
PCB	8	(2,4'-Dichlorobiphenyl)[c,d,e,f,g]	1.65	±	0.19[h]
PCB	18	(2,2',5-Trichlorobiphenyl)[c,d,e,f,g]	2.39	±	0.29[h]
PCB	28	(2,4,4'-Trichlorobiphenyl)[c,d,e,f,g]	4.52	±	0.57[h]
PCB	31	(2,4',5-Trichlorobiphenyl)[c,e,f]	3.18	±	0.41[h]
PCB	44	(2,2'3,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	3.85	±	0.20[i]
PCB	49	(2,2'4,5'-Tetrachlorobiphenyl)[c,d,e,f]	4.34	±	0.28[i]
PCB	52	(2,2',5,5'-Tetrachlorobiphenyl)[c,d,e,f,g]	5.24	±	0.28[i]
PCB	66	(2,3',4,4'-Tetrachlorobiphenyl)[c,e,f,g,j]	4.96	±	0.53[i]
PCB	87	(2,2',3,4,5'-Pentachlorobiphenyl)[c,d,f,j]	1.14	±	0.16[h]
PCB	95	(2,2',3,5',6-Pentachlorobiphenyl)[c,e,f,g]	3.93	±	0.62[i]
PCB	99	(2,2',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g]	2.90	±	0.36[i]
PCB	101	(2,2',4,5,5'-Pentachlorobiphenyl)[c,e,f,g,j]	5.11	±	0.34[i]
PCB	105	(2,3,3',4,4'-Pentachlorobiphenyl)[c,d,e,f,g,j]	1.43	±	0.10[i]
PCB	110	(2,3,3',4',6-Pentachlorobiphenyl)[c,e,f,j]	4.62	±	0.36[i]
PCB	118	(2,3',4,4',5-Pentachlorobiphenyl)[c,d,e,f,g,j]	4.23	±	0.19[i]
PCB	128	(2,2',3,3',4,4'-Hexachlorobiphenyl)[c,d,e,f,g,j]	0.696	±	0.044[i]
PCB	138	(2,2',3,4,4',5'-Hexachlorobiphenyl)[c,e,f,j]	3.60	±	0.28[i]
PCB	149	(2,2',3,4',5',6-Hexachlorobiphenyl)[c,d,e,j]	4.35	±	0.26[h]
PCB	153	(2,2',4,4',5,5'-Hexachlorobiphenyl)[c,d,e,f,g,j]	5.47	±	0.32[i]
PCB	156	(2,3,3',4,4',5-Hexachlorobiphenyl)[c,d,e,f,j]	0.507	±	0.090[h]
PCB	170	(2,2',3,3',4,4',5-Heptachlorobiphenyl)[c,d,e,f,g,j]	1.35	±	0.09[i]
PCB	180	(2,2',3,4,4',5,5'-Heptachlorobiphenyl)[c,d,e,f,g,j]	3.24	±	0.51[i]
PCB	183	(2,2',3,4,4',5',6-Heptachlorobiphenyl)[c,d,e,j]	0.979	±	0.087[h]
PCB	187	(2,2',3,4',5,5',6-Heptachlorobiphenyl)[c,d,e,f,g,j]	2.17	±	0.22[i]
PCB	194	(2,2',3,3',4,4',5,5'-Octachlorobiphenyl)[c,d,e,j]	1.04	±	0.06[h]
PCB	195	(2,2',3,3',4,4',5,6-Octachlorbiphenyl)[c,e,g,j]	0.645	±	0.060[i]
PCB	201	(2,2',3,3',4,5',6,6'-Octachlorobiphenyl)[c,e,j]	0.777	±	0.034[h]
PCB	206	(2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)[c,e,f,g,j]	2.42	±	0.19[i]
PCB	209	Decachlorobiphenyl[c,d,e,f,g,j]	4.86	±	0.45[i]

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform to IUPAC rules, except PCB 201. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 201 is listed as PCB 200.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[g] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each PCB congener.

[h] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[i] Certified values are weighted means of the results from three to six analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[j] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

Table 3. Certified Mass Fraction Values for Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a] (µg/kg)
Hexachlorobenzene[b,c,d,e]	5.83 ± 0.38[f]
cis-Chlordane[b,c,d,e,g]	0.85 ± 0.11[h]
trans-Chlordane[b,c,e]	0.566 ± 0.093[f]
cis-Nonachlor[b,e,g]	0.378 ± 0.053[h]
trans-Nonachlor[b,c,d,e,g]	0.438 ± 0.073[f]
4,4'-DDE[b,d,e,g]	3.22 ± 0.28[h]
4,4'-DDD[b,d,e,g]	4.66 ± 0.46[h]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[e] 1999 Interlaboratory Comparison Study [7] with 13 to 31 laboratories submitting data for each pesticide.
[f] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the constituent listed and the values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[g] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.
[h] Certified values are weighted means of the results from three to five analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed and the values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 4. Reference Mass Fraction Values for PAHs in SRM 1941b

PAHs	Mass Fractions[a] (µg/kg)		
1-Methylnaphthalene[b,c,d,e]	127	±	14[f]
2-Methylnaphthalene[b,c,d,e]	276	±	53[f]
2,6-Dimethylnaphthalene[b,c,d,e]	75.9	±	4.5[f]
2,3,5-Trimethylnaphthalene[b,c,d,e]	25.5	±	5.1[f]
Biphenyl[b,c,d,e]	74.0	±	8.0[f]
Acenaphthylene[b,c,d,e]	53.3	±	6.4[f]
Acenaphthene[b,c,d,e]	38.4	±	5.2[f]
9-Methylphenanthrene[c]	63.5	±	2.5[g]
4-Methylphenanthrene and 9-Methylphenanthrene[b,d]	80.1	±	4.8[f]
2-Methylanthracene[c,d]	36	±	15[f]
8-Methylfluoranthene[b]	49.5	±	2.7[g]
7-Methylfluoranthene[b]	45.4	±	1.5[g]
1-Methylfluoranthene[b]	42.4	±	2.1[g]
3-Methylfluoranthene[b]	28.8	±	1.3[g]
2-Methylpyrene[b]	78.7	±	4.0[g]
4-Methylpyrene[b]	66.4	±	2.6[g]
1-Methylpyrene[b]	52.5	±	2.3[g]
Acephenanthrene[d]	30.5	±	1.9[g]
Benzo[*c*]phenanthrene[b,c,d]	58	±	15[f]
Benzo[*a*]fluoranthene[b,c,d]	73	±	18[f]
Benzo[*j*]fluoranthene[c]	217	±	5[g]
Indeno[1,2,3-*cd*]fluoranthene[d]	9.63	±	0.34[g]
Pentaphene[d]	25.3	±	1.0[g]

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[c] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.
[d] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.
[e] 1999 Interlaboratory Comparison Study [7] with 14 to 26 laboratories submitting data for each PAH.
[f] Reference values are weighted means of the results from two to four analytical methods [13]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of PAHs listed as determined by the methods indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[g] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for the associated degrees of freedom (19 for footnote b and 5 for footnotes c and d) and 95 % confidence level for each analyte. The measurand is the total mass fraction of the PAHs listed as determined by the method indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

Table 5. Reference Mass Fraction Values for PAHs of Molecular Mass 300 and 302 in SRM 1941b

PAHs of Molecular Mass 300 and 302	Mass Fractions[a,b,c] (µg/kg)		
Coronene	72.6	±	4.7
Dibenzo[*b,e*]fluoranthene	10.3	±	0.3
Naphtho[1,2-*b*]fluoranthene	91.0	±	3.1
Naphtho[1,2-*k*]fluoranthene and Naphtho[2,3-*j*]fluoranthene	79.8	±	2.5
Naphtho[2,3-*b*]fluoranthene	23.5	±	0.3
Dibenzo[*b,k*]fluoranthene	95.6	±	3.1
Dibenzo[*a,k*]fluoranthene	26.6	±	0.4
Dibenzo[*j,l*]fluoranthene	63.8	±	1.8
Dibenzo[*a,l*]pyrene	11.1	±	1.0
Naphtho[2,3-*k*]fluoranthene	10.7	±	0.6
Naphtho[1,2-*a*]pyrene	16.7	±	1.4
Naphtho[2,3-*e*]pyrene	33.2	±	2.3
Dibenzo[*a,e*]pyrene	76.1	±	3.6
Naphtho[2,1-*a*]pyrene	59.2	±	1.8
Dibenzo[*e,i*]pyrene	35.0	±	2.4
Naphtho[2,3-*a*]pyrene	16.5	±	0.6
Benzo[*b*]perylene	38.2	±	1.2
Dibenzo[*a,i*]pyrene	25.5	±	1.0
Dibenzo[*a,h*]pyrene	6.94	±	0.29

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for two degrees of freedom and 95 % confidence level for each analyte. The measurand is the total mass fraction of the constituent listed as determined by the method indicted. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.

[c] GC/MS on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM [8].

Table 6. Reference Mass Fraction Values for PCB Congeners[a] in SRM 1941b

PCB Congeners			Mass Fractions[b,c] (µg/kg)		
PCB	45	(2,2',3,6-Tetrachlorobiphenyl)[d,e]	0.73	±	0.12
PCB	56	(2,3,3',4'-Tetrachlorobiphenyl)[d,f,g]	1.21	±	0.11
PCB	63	(2,3,4',5-Tetrachlorobiphenyl)[e,f,g]	0.213	±	0.040
PCB	70	(2,3',4',5-Tetrachlorobiphenyl)[e,f,g]	4.99	±	0.29
PCB	74	(2,4,4',5-Tetrachlorobiphenyl)[e,f,g]	2.04	±	0.15
PCB	77	(3,3',4,4'-Tetrachlorobiphenyl)[h]	0.31	±	0.03
PCB	107	(2,3,3',4',5-Pentachlorobiphenyl)[d,e,f,g]	0.628	±	0.028
PCB	132	(2,2',3,3',4,6'-Hexachlorobiphenyl)[d,f,g]	1.28	±	0.27
PCB	146	(2,2',3,4',5,5'-Hexachlorobiphenyl)[e,f,g]	1.22	±	0.12
PCB	158	(2,3,3',4,4',6-Hexachlorobiphenyl)[d,e,f,g]	0.65	±	0.15
PCB	163	(2,3,3',4',5,6-Hexachlorobiphenyl)[e,f,g]	1.28	±	0.06
PCB	174	(2,2',3,3',4,5,6'-Heptachlorobiphenyl)[d,e,f,g]	1.51	±	0.39
PCB	193	(2,3,3',4',5,5',6-Heptachlorobiphenyl)[d,e,f,g]	0.292	±	0.075

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [9] and later revised by Schulte and Malisch [10] to conform with IUPAC rules, except PCB 107. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 107 is listed as PCB 108.

[b] Mass fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] For these PCB congeners except PCB 77, the reference values are unweighted means of the results from two to four analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled within-method variance following the ISO/JCGM Guide [14,15]. For PCB 77, the reference value is the mean of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to two degrees of freedom and 95 % confidence level for PCB 77. The measurand is the total mass fraction of the PCB Congeners listed as determined by the method or methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as microgram per kilogram on a dry-mass basis.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[h] GC/MS NICI on a 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (I) fractionated using a PYE column.

Table 7. Reference Mass Fraction Values for Selected Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions[a,b] (µg/kg)		
2,4'-DDE[c,d]	0.38	±	0.12
4,4'-DDT[e,f]	1.12	±	0.42

[a] Mass Fractions reported on dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference values are unweighted means of the results from two analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [16] with a pooled, within-method variance following the ISO/JCGM Guide [14,15]. The measurand is the total mass fraction of the chlorinated pesticides listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).
[d] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).
[e] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.
[f] 1999 Interlaboratory Comparison Study [7] with 10 laboratories submitting data for 4,4'-DDT.

Table 8. Reference Mass Fraction Values for Alkylated PAH Groups in SRM 1941b

Alkylated PAH Group	Mass Fraction[a,b] (µg/kg)		
C2-decalins	18	±	5
C4-decalins	41	±	4
C2-naphthalenes	187	±	53
C3-naphthalenes	158	±	42
C1-benzothiophenes	25	±	14
C2-benzothiophenes	20	±	11
C3-benzothiophenes	22	±	13
C4-benzothiophenes	18	±	5
C1-fluorenes	57	±	18
C2-fluorenes	122	±	43
C3-fluorenes	128	±	31
C1-phenanthrenes/anthracenes	313	±	99
C2-phenanthrenes/anthracenes	247	±	62
C3-phenanthrenes/anthracenes	165	±	46
C4-phenanthrenes/anthracenes	87	±	36
C1-dibenzothiophenes	54	±	13
C2-dibenzothiophenes	91	±	18
C3-dibenzothiophenes	84	±	15
C4-dibenzothiophenes	57	±	13
C1-fluoranthenes/pyrenes	252	±	48
C2-fluoranthenes/pyrenes	205	±	38
C3-fluoranthenes/pyrenes	102	±	22
C4-fluoranthenes/pyrenes	121	±	59
C1-benzanthraces/chrysenes/triphenylenes	208	±	43
C2-benzanthraces/chrysenes/triphenylenes	120	±	24
C3-benzanthraces/chrysenes/triphenylenes	73	±	31
C4-benzanthraces/chrysenes/triphenylenes	41	±	11

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the alkylated PAH groups listed as determined by the interlaboratory study methods. The values listed are metrologically traceable to the SI unit of mass fraction, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 9. Reference Mass Fraction Values for Hopanes and Steranes in SRM 1941b

Hopane or Sterane	Mass Fraction[a,b] (µg/kg)
17α(H)-22,29,30-Trisnorhopane	54 ± 18
17α(H)-21β(H)-30-Norhopane	137 ± 21
17α(H)-21β(H)-30-Hopane	215 ± 44
17α(H)-21β(H)-22R-Homohopane	44 ± 10
17α(H)-21β(H)-22S-Homohopane	48 ± 13
5α(H)-14α(H),17α(H)-Cholestane 20R	41 ± 11
5α(H)-14β(H),17β(H)-Cholestane 20R	27 ± 6
5α(H)-14β(H),17β(H)-24-Methylcholestane 20R	21 ± 8
5α(H)-14α(H),17α(H)-24-Ethylcholestane 20R	19 ± 5
5α(H)-14β(H),17β(H)-24-Ethylcholestane 20R	41 ± 9

[a] The reference mass fraction value reported on a dry-mass basis is the median of results using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the median, and the coverage factor, $k = 2$. The measurand is the total mass fraction of the constituent listed as determined by the methods used during the interlaboratory study. The values are metrologically traceable to the SI unit of mass, expressed as micrograms per kilogram on a dry-mass basis.
[b] Data from the interlaboratory study [12].

Table 10. Reference Mass Fraction Value for Total Organic Carbon in SRM 1941b

Total Organic Carbon (TOC)	2.99 % ± 0.24 %[a,b]

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.
[b] The reference value for total organic carbon is a weighted mean value from routine measurements made by two laboratories [21]. The uncertainty listed is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance. The reporting follows the ISO/JCGM Guides [2]. The measurand is the total mass fraction of TOC listed as determined by the methods indicted. The values listed are metrologically traceable to the SI unit of mass, expressed as a percent on a dry-mass basis.

Table 11. Information Mass Fraction Values for Carbon, Hydrogen, and Nitrogen in SRM 1941b

Elements	Mass Fractions[a] (%)
Carbon	3.3
Hydrogen	1.2
Nitrogen	<0.5

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.

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Certificate Revision History: 16 January 2015 (Corrected IUPAC name for PCB-56 and PCB-107; editorial changes); 10 June 2014 (Units corrected from mg/kg to µg/kg in Tables 8 and 9; editorial changes); 10 April 2012 (Reference value added for alkylated PAH groups, hopanes, and steranes; extension of certification period; editorial changes); 16 August 2004 (Reference values for the butyl tins removed; editorial changes); 15 July 2002 (Original certificate date).

Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

APPENDIX A

The laboratories listed below performed measurements that contributed to the certification of PAHs, PCBs, and chlorinated pesticides in SRM 1941b Organics in Marine Sediment.

Arthur D. Little, Inc; Cambridge, MA
Axys Analytical Services; Sidney, BC, Canada
B & B Laboratories; College Station, TX
Battelle Ocean Sciences; Duxbury, MA
Bedford Institute of Oceanography; Dartmouth, NS, Canada
California Department of Fish and Game; Rancho Cordova, CA
Central Contra Costa Sanitary District; Martinez, CA
Chesapeake Biological Laboratory; Solomons, MD
Centro de Investigacionies Energeticas Medioambientales y Tecnologicas; Madrid, Spain
City of Los Angeles Environmental Monitoring Division; Playa del Rey, CA
City of San Jose Environmental Services Department; San Jose, CA
Columbia Analytical Services; Kelso, WA
East Bay Municipal Utility District; Oakland, CA
Florida Department of Environmental Protection; Tallahassee, FL
Manchester Environmental Laboratory; Port Orchard, WA
Murray State University; Murray, KY
Massachusetts Water Resources Authority Central Lab; Winthrop, MA
National Research Council of Canada; Ottawa, Ontario, Canada
National Oceanic and Atmospheric Association (NOAA), National Marine Fisheries Service (NMFS), Auke Bay Laboratory; Juneau, AK
NOAA, National Ocean Service/Center for Coastal Environmental Health and Biomolecular Research; Charleston, SC
NOAA, NMFS, Sandy Hook Marine Laboratory; Highlands, NJ
NOAA, NMFS, Northwest Fisheries Science Center; Seattle, WA
Orange County Sanitation District; Fountain Valley, CA
Philip Analytical Services; Burlington, Ontario, Canada
Serv de Hidrografia Naval; Buenos Aires, Argentina
Skidaway Institute of Technology; Savannah, GA
Southwest Laboratory of Oklahoma; Broken Arrow, OK
Severn Trent Knoxville Laboratory; Knoxville, TN
Texas A&M University, Geochemical and Environmental Research Group; College Station, TX
Texas Parks and Wildlife Department; San Marcos, TX
University of California at Los Angeles, Institute of Geophysics and Planetary Physics; Los Angeles, CA
University of Connecticut, Environmental Research Institute; Storrs, CT
University of Rhode Island, Graduate School of Oceanography; Narragansett, RI
US Department of Agriculture, Environmental Chemistry Laboratory; Beltsville, MD
US Environmental Protection Agency, Atlantic Ecology Division; Narragansett, RI
US Geological Survey, National Water Quality Laboratory; Denver, CO
Woods Hole Group Environmental Lab; Raynham, MA
Wright State University; Dayton, OH

APPENDIX B

The laboratories listed below performed measurements that contributed to the certification of alkylated PAH groups, hopanes, and steranes in SRM 1941b Organics in Marine Sediment.

Alpha Analytical, Inc.; Mansfield, MA
Analytical Resources, Inc.; Tukwila, WA
Axys Analytical Services; Sydney, BC, Canada
Battelle Analytical & Environmental Chemistry Laboratory; Duxbury, MA
Center for Laboratory Sciences; Pasco, WA
Columbia Analytical Services; Jacksonville, FL
Columbia Analytical Services; Rochester, NY
Columbia Analytical Services, Kelso, WA
Florida Department of Environmental Protection; Tallahassee, FL
Florida International University; North Miami, FL
Michigan Department of Natural Resources and Environment; Lansing, MI
Mississippi State Chemical Laboratory; Mississippi State, MS
NIST; Charleston, SC
NIST; Gaithersburg, MD
NOAA/NCCOS/NOS; Charleston, SC
NOAA/NMFS/Alaska Fisheries Science Center; Juneau, AK
NY State Department of Health; Albany, NY
Pace Analytical Services, Inc. Minneapolis; Minneapolis, MN
RJ Lee Group, Inc; Monroeville, PA
TDI/B&B Laboratories, Inc.; College Station, TX
TestAmerica Laboratories; Mobile, AL
TestAmerica Laboratories; West Sacramento, CA
TestAmerica Laboratories; University Park, IL
TestAmerica Laboratories; Schriever, LA
TestAmerica Laboratories; Edison, NJ
TestAmerica Laboratories; Knoxville, TN
TestAmerica Laboratories; Pittsburgh, PA
TestAmerica Laboratories; South Burlington, VT
TestAmerica Laboratories; Tacoma, WA
US Army Engineer Research and Development Center; Vicksburg, MS
USGS Columbia Environmental Research Center; Columbia, MO
University of Iowa, State Hygienic Laboratory; Iowa City, IO
Washington State Public Health Laboratories; Shoreline, WA

NIST

Date of Issue:
31 March 2014

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 1941b
SRM Name: Organics in Marine Sediment
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is marine sediment collected at the mouth of the Baltimore (MD) Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements
Symbol
No Symbol/Pictogram

Signal Word
Not applicable.

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Marine sediment

Other Designations: Sediment.

This material is naturally occurring marine sediment from an urban area. The material contains trace amounts of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and should be handled with care. Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Marine Sediment	Not available	Not available	100

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:
Suitable: Use extinguishing media appropriate for surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. Handling and Storage

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handling in accordance with all current regulations and standards.

8. Exposure Controls and Personal Protection

Exposure Limits: No occupational exposure limits have been established for marine sediment. This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure. The exposure limits for Particulates Not Otherwise Regulated (PNOR) are applicable.

OSHA (PEL): 15 mg/m^3 (TWA, total particulates not otherwise regulated)
OSHA (PEL) 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

NIOSH (REL): 10 mg/m^3 (TWA, total particulates not otherwise regulated, 8 h)
NIOSH (REL): 5 mg/m^3 (TWA, respirable particulates not otherwise regulated)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):	amorphous powder
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not applicable
Melting point/freezing point (°C):	not available
Specific Gravity (water=1)	not available
Vapor Pressure (mmHg):	not applicable
Vapor Density (air = 1):	not applicable
Viscosity (cP):	not applicable
Solubility(ies):	not available
Partition coefficient (n-octanol/water):	not available
Particle Size:	<150 µm

Thermal Stability Properties:

Autoignition Temperature (°C):	not available
Thermal Decomposition (°C):	not available
Initial boiling point and boiling range (°C):	not available
Explosive Limits, LEL (Volume %):	not available
Explosive Limits, UEL (Volume %):	not available
Flash Point (°C):	not available
Flammability (solid, gas):	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: None listed.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: __X__ Inhalation __X__ Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Generated dust may cause irritation if inhaled.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Generated dust may cause irritation.

Skin Contact: May cause mechanical irritation.

Eye Contact: May cause mechanical irritation.

Ingestion: No data available.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified; no data available.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/ Eye irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes __X__ No
Marine sediment is not listed by NTP, IARC or OSHA as a carcinogen.

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:
California Proposition 65: Not listed.

U.S. TSCA Inventory: Not listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 31 March 2014

Sources: 29 CFR Occupational Health and Safety Office (OSHA) 1910.1000, *Limits for Air Contaminants*, Table Z-1; available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992 (accessed Mar 2014).

Center for Disease Control (CDC) NIOSH Pocket Guide to Chemical Hazards, *Particulates not otherwise regulated*; available at http://www.cdc.gov/niosh/npg/npgd0480.html (accessed Mar 2014).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or Internet at http://www.nist.gov/srm.

Bill to:	68455	Ship to:	68456
	DAVE MITCHELL ANALYTICAL RESOURCES INC 4611 S 134TH PLACE SUITE 100 TUKWILA, WA 98168-3240 1 (206)695-6205		DAVE MITCHELL ANALYTICAL RESOURCES INC 4611 S 134TH PLACE SUITE 100 TUKWILA, WA 98168-3240 1 (206)695-6205

Ship via	UPS Ground	Description		Ship from	
Salesmen	MCMIDM2	Instructions		Blanket	
Contact	DAVE MITCHELL	Pro#		Truck#	

Order discrepancies (other than back ordered items) must be reported to our Customer Relations Department at 301-975-6776 within 5 days of receipt of shipment or this order will be considered complete. NIST SRMs/RMs are generally not returnable - with the exception of defective goods or shipments made in error by NIST. To return a SRM/RM, please call for instructions and a Return SRM/RM Authorization Number before shipment. Returns WILL NOT BE ACCEPTED without prior authorization.

Order	UOM	Ship	UOM	B/O	UOM	Item	Description
1	EACH	1	EACH	0	EACH	1941B	Organics in Marine Sediment
						Total qty:	1 / EACH
							NOT FOR HUMAN CONSUMPTION, LABORATORY USE ONLY.

9/21/16
04:04 PM

1700101

Picked by	
Packed by	
# of pieces	
Weight	

MP Biomedicals, LLC

29525 Fountain Parkway
Solon, Ohio 44139

Telephone: 440/337-1200
Toll Free: 800/854-0530

Fax: 440/337-1180
web: www.mpbio.com

Certificate of Analysis

Product Description: Microcrystalline Cellulose Powder_
Catalog Number: 191499_
Lot: Q9483_

Formula: $(C_6H_{10}O_5)n$	**Formula Weight:** N/A
CAS #: 9004-34-6	**Storage:** 15 - 30°C
Physical Description: White Powder	

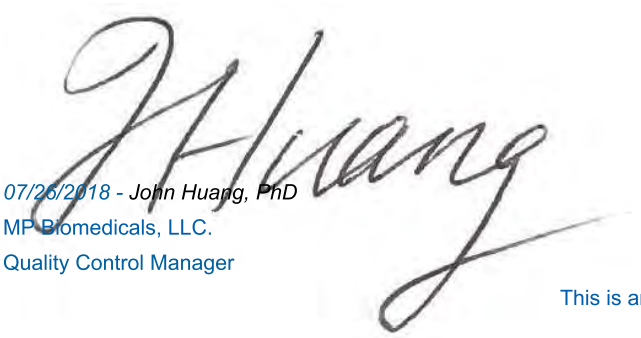
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
Particle Size/Mesh +60 mesh +200 mesh	Wt % <8% >45%	 <1% 55%
pH	5 - 7	6.73
Residue on Ignition	<0.05%	<0.05%
Water Soluble Substances	<12.0 mg/5 g	4.5 mg/5 g
Heavy Metals	<10 ppm	<10 ppm

H001822
Microcrystalline Cellulose Powder (TOC)
Expires 11/30/2022
Prepared By Casey English 2/22/2019

Identification A & B: Passes
Bulk Density: 0.29 g/ml
Bulk Density (graduated cylinder): 0.31 g/ml
Conductivity: 18 µS/cm
Starch: Negative
Ether Soluble Substances: 0.01%
Total Aerobic microbial Count: 100 cfu/g
Total Mold and Yeast Count: 20 cfu/g
Staphylococcus aureus: Absent/1 g
Pseudomonas aeruginosa: Absent/1 g
E. coli: Absent/1 g
Salmonella: Absent/10 g
Particle size:

- 450 mesh: 77%
- d10: 37 um
- d50: 139 um
- d90: 271 um

TUP: <9/600 cm^2
Degree of brightness: >88%
Powder flow-angle of repose: <42°
Recommended Retest Date: 11/30/2022



07/26/2018 - *John Huang, PhD*
MP Biomedicals, LLC.
Quality Control Manager

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mailto:biotech@mpbio.com
http://www.mpbio.com
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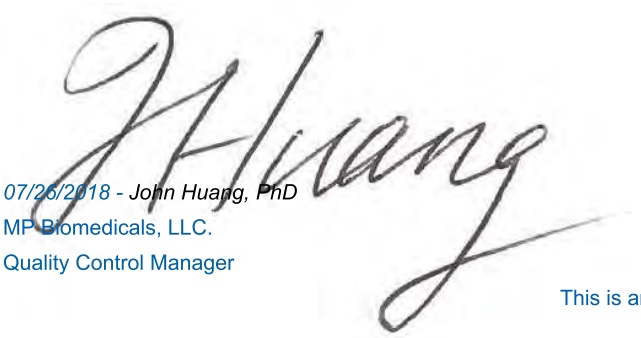
Test	Specification	Result
Identity Test	Passes	Passes
Purity	97.0 - 102.0%	97.0 - 102.0%
Moisture	<5.0%	3.4%
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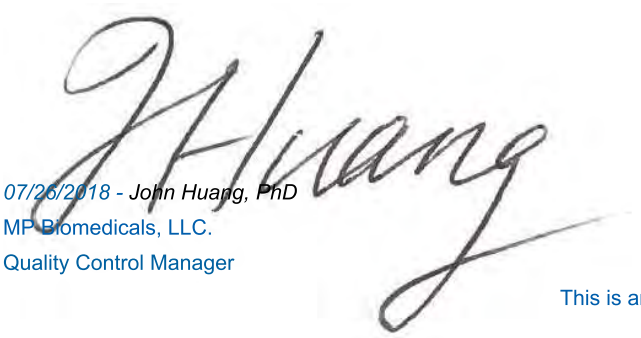
Test	Specification	Result
Identity Test	Passes	Passes
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Moisture	<5.0%	3.4%
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pH	5 - 7	6.73
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Technical Service: 1-800-279-5490 (440-337-1200) Customer Service: 1-800-854-0530 (440-337-1200)

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-24G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-01 A	SDG:	23E0156
Sampled:	03/20/23 11:06	Prepared:	05/08/23 13:06	File ID:	
% Solids:	43.07	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	43.07	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-23G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-02 A	SDG:	23E0156
Sampled:	03/20/23 11:42	Prepared:	05/08/23 13:06	File ID:	
% Solids:	40.27	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	40.27	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-22G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-03 A	SDG:	23E0156
Sampled:	03/20/23 11:58	Prepared:	05/08/23 13:06	File ID:	
% Solids:	49.09	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	49.09	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-21G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-04 A	SDG:	23E0156
Sampled:	03/20/23 12:16	Prepared:	05/08/23 13:06	File ID:	
% Solids:	44.90	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	44.90	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-20G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-05 A	SDG:	23E0156
Sampled:	03/20/23 13:38	Prepared:	05/08/23 13:06	File ID:	
% Solids:	63.62	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	63.62	1	0.04	0.04	

Analytical Resources, LLC
Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-18G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-06 A	SDG:	23E0156
Sampled:	03/20/23 14:08	Prepared:	05/08/23 13:06	File ID:	
% Solids:	55.22	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	55.22	1	0.04	0.04	

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Analytical Chemists and Consultants

Form I
INORGANIC ANALYSIS DATA SHEET
SM 2540 G-11

SED-19G:0-10

Laboratory:	Analytical Resources, LLC				
Client:	Friedman & Bruya Inc.				
Project:	Port of Friday Harbor				
Matrix:	Sediment	Laboratory ID:	23E0156-07 A	SDG:	23E0156
Sampled:	03/20/23 14:27	Prepared:	05/08/23 13:06	File ID:	
% Solids:	49.60	Preparation:	No Prep Wet Chem	Analyzed:	05/08/23 13:08
Batch:	BLE0230	Sequence:		Initial/Final:	5 g Wet / 5 g
Instrument:	BAL2			Calibration:	

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	49.60	1	0.04	0.04	

PREPARATION BATCH SUMMARY

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0230 Batch Matrix: Solid
Preparation: No Prep Wet Chem

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-24G:0-10	23E0156-01		05/08/23 13:06	
SED-23G:0-10	23E0156-02		05/08/23 13:06	
SED-22G:0-10	23E0156-03		05/08/23 13:06	
SED-21G:0-10	23E0156-04		05/08/23 13:06	
SED-20G:0-10	23E0156-05		05/08/23 13:06	
SED-18G:0-10	23E0156-06		05/08/23 13:06	
SED-19G:0-10	23E0156-07		05/08/23 13:06	
Blank	BLE0230-BLK1		05/08/23 13:06	

TOTAL SOLIDS/VOLATILE SOLIDS (TS / TVS) BENCHSHEET for Solid samples

Method: PSEP 1986, SM2540, EPA 160.1

(dry at 104 (12-24 hr) then combust at 550 (30 min))

Batch:	BLE0230
Date:	5/8/2023 13:08
Analyst:	UW

Instrumentation			
Drying Ovens:	12	**Analytical Balance:**	BAL2
Muffle Furnace:	2		

Batch drying time				**Oven Temps, °C**	
record times as mm/dd/yy hh:mm		TS (%) calculated as:		Start Temp	103
date/time in oven:	5/8/2023 14:34	Final dry wt (g) = (Dry Wt - Tare Wt)		Dry Cycle 1	103
date/time out:	5/9/2023 8:45	TS = (Final Dry Wt)/ (grams Sample-Tare)		Dry Cycle 2	
elapsed hrs =	18.2	OK		Dry Cycle 3	

TVS (mg/kg dry wt) calculated as:
Final ash wt (g) = (min ash wt - tare wt)
TVS (mg/kg) = [(Dry wt-Ash wt)/ (dry weight)] *1,000,000
if ash wt > dry wt, "Chk for Err"
if dry wt-ash wt < 0.001 g, "< (1/dry wt)*1,000,000

Balance Calibration Check

Record weights to 4 places										
Cal Weight ID:		CV-02	CV-02	CV-02	CV-02	CV-02		CV-02	CV-02	CV-02
Date & Time:		5/8/23 13:10	5/8/23 13:18	5/9/23 9:12						
Cal Wt (g):	10.0000	10.0000	10.0000	10.0000						
		Cal OK!	Cal OK!	Cal OK!						

Sample ID	Dish #	Tare Wt. (g)	Dish & Sample (g)	Dry Wt 104C (grams) 1	2	3	dry Wt (g)	TS (%)	Notes	ASH WT 550C (grams) 1	2	3	Ash Wt (g)	TVS (mg/kg)	(%)	Notes
BLE0230-BLK1	1	0.7988	0.0000	0.7987			-0.0001	0.01%								
23E0148-01	2	0.8061	7.4724	5.7132			4.9071	73.61%								
BLE0230-DUP1	3	0.8165	9.3341	7.2135			6.3970	75.10%	RPD=2							
BLE0230-DUP2	4	0.7812	8.0676	6.3211			5.5399	76.03%	RSD=1.6							
23E0148-02	5	0.7888	7.0616	5.3222			4.5334	72.27%								
23E0148-03	6	0.8156	7.2626	4.3341			3.5185	54.58%								
23E0148-04	7	0.7911	6.0021	3.9775			3.1864	61.15%								
23E0148-05	8	0.7941	6.9578	3.6257			2.8316	45.94%								
23E0148-06	9	0.7966	9.3822	5.3686			4.5720	53.25%								
23E0148-07	10	0.8020	8.2302	4.9042			4.1022	55.22%								
23E0148-08	11	0.8165	7.1570	4.2931			3.4766	54.83%								
23E0148-09	12	0.8366	6.9676	4.0212			3.1846	51.94%								
23E0148-10	13	0.8203	6.7735	4.1229			3.3026	55.48%								
23E0148-11	14	0.7856	8.3342	5.9281			5.1425	68.13%								
23E0148-12	15	0.7910	9.4251	6.6589			5.8679	67.96%								
23E0148-13	16	0.8467	8.2742	5.6866			4.8399	65.16%								
23E0156-01	17	0.8090	8.0014	3.9066			3.0976	43.07%								
23E0156-02	18	0.8359	7.7488	3.6195			2.7836	40.27%								
23E0156-03	19	0.8130	7.7601	4.2232			3.4102	49.09%								
23E0156-04	20	0.8170	7.3864	3.7664			2.9494	44.90%								
23E0156-05	21	0.8121	8.2455	5.5413			4.7292	63.62%								
23E0156-06	22	0.8220	7.0456	4.2587			3.4367	55.22%								
23E0156-07	23	0.8086	9.5710	5.1544			4.3458	49.60%								

Form I

METHOD BLANK DATA SHEET

SM 2540 G-11

TotalAnalytes

Blank

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Batch: BLE0230
Laboratory ID: BLE0230-BLK1
Prepared: 05/08/23 13:06
Matrix: Solid
Preparation: No Prep Wet Chem
Analyzed: 05/08/23 13:08
Sequence:
Calibration:
Instrument: BAL2

CAS NO.	Analyte	Concentration (%)	Dilution Factor	MDL	MRL	Q
	Total Solids	ND	1	0.04	0.04	U

HOLDING TIME SUMMARY

Analysis: SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-24G:0-10 23E0156-01	03/20/23 11:06	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-23G:0-10 23E0156-02	03/20/23 11:42	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-22G:0-10 23E0156-03	03/20/23 11:58	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-21G:0-10 23E0156-04	03/20/23 12:16	05/05/23 14:20	05/08/23 13:06	49	180	05/08/23 13:08	49	180	
SED-20G:0-10 23E0156-05	03/20/23 13:38	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	49	180	
SED-18G:0-10 23E0156-06	03/20/23 14:08	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	49	180	
SED-19G:0-10 23E0156-07	03/20/23 14:27	05/05/23 14:20	05/08/23 13:06	48	180	05/08/23 13:08	49	180	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

SM 2540 G-11

Laboratory: Analytical Resources, LLC
SDG: 23E0156
Client: Friedman & Bruya Inc.
Project: Port of Friday Harbor
Matrix: Solid
Instrument:

Analyte	MDL	RL	Units
Total Solids	0.04	0.04	%

Analytical Resources, LLC
Analytical Chemists and Consultants

17 January 2025

Peter Leon
Leon Environmental, LLC
8047 Burke Ave N.
Seattle, WA 98103

RE: Port of Friday Harbor 2023

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23J0690	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC



Susan Dunnihoo, Director, Client Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

23E0146/23J0690

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303388	D-229

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon										Notes
SED-07C:0-1		3/22/2023	729	sediment	1	x										
~~SED-07C:1-3~~		~~3/22/2023~~	~~729~~	~~sediment~~	~~1~~	~~x~~										No further sample at F&B. Use container at ARI. ME 5/5/23
SED-08C:0-1		3/22/2023	807	sediment	1	x										
SED-08C:1-3		3/22/2023	807	sediment	1	x										
SED-09C:0-1		3/22/2023	833	sediment	1	x										
SED-09C:1-3		3/22/2023	833	sediment	1	x										
SED-12C:0-1		3/22/2023	925	sediment	1	x										
SED-26C:0-1		3/22/2023	1038	sediment	1	x										
SED-26C:1-3		3/22/2023	1038	sediment	1	x										
SED-25C:0-1		3/22/2023	1119	sediment	1	x										
SED-25C:1-3		3/22/2023	1119	sediment	1	x										
SED-10C:0-1		3/23/2023	817	sediment	1	x										
SED-10C:1-3		3/23/2023	817	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:		Matthew Beard		5/8/23	1420
Relinquished by:					
Received by:					

23E0158 / 23J4694

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
ARI

PROJECT NAME/NO.	PO #
303388	D-229

REMARKS

Replacement volume for TOC.
Frozen prior to subcontract

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon										Notes
SED-11C:0-1		3/23/2023	729	sediment	1	x										
SED-11C:1-3		3/23/2023	842	sediment	1	x										
SED-DUP3C		3/23/2023	1200	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:				5/5/23	1450
Relinquished by:					
Received by:					

23E0149/23J0690 SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER ARI	
PROJECT NAME/NO. 303373	PO # D-221
REMARKS Replacement volume for TOC. Frozen prior to subcontract	

TURNAROUND TIME
Standard TAT
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Total Organic Carbon										Notes
SED-07G:0-10		3/20/2023	1002	sediment	1	x										
SED-11G:0-10		3/20/2023	924	sediment	1	x										
SED-14G:0-10		3/20/2023	1011	sediment	1	x										
SED-15G:0-10		3/20/2023	1242	sediment	1	x										
SED-03G:0-10		3/20/2023	1315	sediment	1	x										
SED-01G:0-10		3/20/2023	1445	sediment	1	x										
SED-01C:0-1		3/20/2023	1151	sediment	1	x										
SED-05C:0-1		3/21/2023	1244	sediment	1	x										
SED-05G:0-10		3/21/2023	1310	sediment	1	x										
SED-03C:0-1		3/21/2023	1442	sediment	1	x										
SED-14C:0-1		3/21/2023	1553	sediment	1	x										
SED-14C:1-3		3/21/2023	1553	sediment	1	x										
SED-DUPC		3/21/2023	1200	sediment	1	x										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/5/23	
Received by:					
Relinquished by:					
Received by:					

23IC934/23J0690

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Peter Leon

Company Leon Environmental

Address 8047 Burke Ave N

City, State, ZIP Seattle, WA 98103

SUBCONTRACTER	
ARI	
PROJECT NAME/NO.	PO #
Port of Friday Harbor Jensen's Marina	
REMARKS	
Samples Frozen--EIM EDD	

TURNAROUND TIME
☒ Standard TAT
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	grain size	Total Solids									Notes
SED-26C:1-3		3/22/2023	1038	sediment	1		x									
SED-27C:0-1		3/22/2023	1324	sediment	1		x									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	9/28/23	1600
Received by:		Roun	ARI	9/29/23	1445
Relinquished by:					
Received by:					

Re: ARI data status (D/F, TBT, TOC, TS)

Michael Erdahl <merdahl@friedmanandbruya.com>
Thu 10/26/2023 10:53 AM

To:Sue Dunnihoo <limsadm@arilabs.com>;Peter Leon <peter@leon-environmental.com>
Cc:Robert Brenner <brenner@leon-environmental.com>;Michael Cecil <cecil@leon-environmental.com>

Hello Sue,

That is my handwriting from when I split the sample the last time. I can tell from what is left here, that is actually sample SED-26C:3-5. Can you please amend the report and log that in for the tests that Peter requested? All reports and invoice should go directly to Peter and Leon Environmental.

Michael Erdahl
Senior Project Manager
Friedman and Bruya
(206) 285-8282 x 247
(206) 446-5926 (cell)
This message is private or privileged. If you are not the person or party for whom this message is intended, we apologize for the mistake and please forward us a note that this message was received in error. Do not copy or forward this message to any other party and please delete it from your records.

From: Sue Dunnihoo
Sent: Thursday, October 26, 2023 10:17 AM
To: Peter Leon ; Michael Erdahl
Cc: Robert Brenner ; Michael Cecil
Subject: Re: ARI data status (D/F, TBT, TOC, TS)

Here are photos of the samples. CoC is correct.

Sue

** UPDATED - I will be working part-time remotely Nov 2-21***

*** NOTE - TATs are running 3 to 6 weeks depending on analysis ***

Susan D. Dunnihoo
She/her/hers

Analytical Resources, LLC

(206) 695-6207 office
sue.dunnihoo@arilabs.com

www.arilabs.com

From: Michael Erdahl <merdahl@friedmanandbruya.com>
Sent: Thursday, October 26, 2023 8:35 AM
To: Sue Dunnihoo <limsadm@arilabs.com>; Peter Leon <peter@leon-environmental.com>
Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: Re: ARI data status (D/F, TBT, TOC, TS)

Hello Sue,

Will you please have your people review the label for sample SED-26C:1-3 on this COC? That should have been sample SED-26C:3-5 that was sent to you. I think it is a typo on the COC.

Michael Erdahl
Senior Project Manager
Friedman and Bruya
(206) 285-8282 x 247
(206) 446-5926 (cell)
This message is private or privileged. If you are not the person or party for whom this message is intended, we apologize for the mistake and please forward us a note that this message was received in error. Do not copy or forward this message to any other party and please delete it from your records.

From: Sue Dunnihoo
Sent: Wednesday, October 25, 2023 3:40 PM
To: Peter Leon ; Michael Erdahl
Cc: Robert Brenner ; Michael Cecil
Subject: Re: ARI data status (D/F, TBT, TOC, TS)

The only two samples I find under Leon are SED-26C:1-3 and 27C:0-1, received Sept 28.

I see nothing else from FB in September or October.

Sue

** UPDATED - I will be working part-time remotely Nov 2-21***

*** NOTE - TATs are running 3 to 6 weeks depending on analysis ***

Susan D. Dunnihoo
She/her/hers

Analytical Resources, LLC

(206) 695-6207 office
sue.dunnihoo@arilabs.com

www.arilabs.com

From: Michael Erdahl <merdahl@friedmanandbruya.com>
Sent: Wednesday, October 25, 2023 3:31 PM
To: Sue Dunnihoo <limsadm@arilabs.com>; Peter Leon <peter@leon-environmental.com>
Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: Re: ARI data status (D/F, TBT, TOC, TS)

Hello Sue,

Sample SED-26C:3-5 was sent to you toward the end of September from us, but with Leon Environmental listed as the firm to send the report/invoice to.

Michael Erdahl
Senior Project Manager
Friedman and Bruya
(206) 285-8282 x 247
(206) 446-5926 (cell)
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From: Sue Dunnihoo
Sent: Wednesday, October 25, 2023 12:53 PM
To: Peter Leon ; Michael Erdahl
Cc: Robert Brenner ; Michael Cecil
Subject: Re: PoFH: ARI data status (D/F, TBT, TOC, TS)

Sorry, it's been crazy over here and I'm fighting a bug.

I do not have SED-26C:3-5 here, only 0-1 and 1-3.

Sue

** UPDATED - I will be working part-time remotely Nov 2-21***

*** NOTE - TATs are running 3 to 6 weeks depending on analysis ***

Susan D. Dunnihoo
She/her/hers

Analytical Resources, LLC

(206) 695-6207 office
sue.dunnihoo@arilabs.com

www.arilabs.com

From: Peter Leon <peter@leon-environmental.com>
Sent: Monday, October 23, 2023 1:11 PM
To: Sue Dunnihoo <limsadm@arilabs.com>; Michael Erdahl <merdahl@friedmanandbruya.com>
Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: PoFH: ARI data status (D/F, TBT, TOC, TS)

Team,

Michael's comment about previously-completed TS and TOC analyses is at least partially (if not fully) correct. I've updated the table I sent previously with data we have in hand as of Sue's 10/12 transmittal (TS data).

Data in hand is marked as "complete".
Data requested, but not including in our current data table is marked as "X".

Sample	Total Solids	TOC	D/F	TBT
SED-07C:0-1	complete	complete	X	

SED-08C:1-3	complete	complete	X	
SED-11C:0-1	complete	complete		X
SED-14C:0-1	complete	complete	X	
SED-26C:1-3	complete	complete	X	
SED-26C:3-5	X	X		X
SED-27C:0-1	complete	X	X	X

Thanks,

Peter Leon
Principal Scientist
206.948.5366

LEON Environmental, LLC

www.leon-environmental.com

From: Sue Dunnihoo <limsadm@arilabs.com>
Sent: Monday, October 16, 2023 9:12 AM
To: Peter Leon <peter@leon-environmental.com>; Michael Erdahl <merdahl@friedmanandbruya.com>
Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: Re: D/F, TBT, TOC, TS sample transfer to ARI

Thank you! I was only looking back to recent deliveries.

Hopefully all still frozen. (We had some issues with that earlier this year!)

Sue

** UPDATED - I will be working part-time remotely Nov 2-21***

*** NOTE - TATs are running 3 to 6 weeks depending on analysis ***

Susan D. Dunnihoo
She/her/hers

Analytical Resources, LLC

(206) 695-6207 office
sue.dunnihoo@arilabs.com

www.arilabs.com

From: Michael Erdahl <merdahl@friedmanandbruya.com>
Sent: Monday, October 16, 2023 9:09 AM
To: Sue Dunnihoo <limsadm@arilabs.com>; Peter Leon <peter@leon-environmental.com>

Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: Re: D/F, TBT, TOC, TS sample transfer to ARI

Hello Sue,

My records show that you have received all of these samples, but they were under our name. The rest were delivered in March under F&B projects 303388 and 303373. The two reports are from when we sent you additional frozen volume for the TOC analysis when the holding time expired.

NOTE: I show that these samples have all been analyzed for total solids and TOC. I'm thinking the only tests they should be logged in for are D/F and TBT. Peter, please confirm since I don't want to change your directive without your say-so. I have attached the reports with that information.

Michael Erdahl
Senior Project Manager
Friedman and Bruya
(206) 285-8282 x 247
(206) 446-5926 (cell)
This message is private or privileged. If you are not the person or party for whom this message is intended, we apologize for the mistake and please forward us a note that this message was received in error. Do not copy or forward this message to any other party and please delete it from your records.

From: Sue Dunnihoo
Sent: Monday, October 16, 2023 8:36 AM
To: Peter Leon ; Michael Erdahl
Cc: Robert Brenner ; Michael Cecil
Subject: Re: PoFH: D/F, TBT, TOC, TS sample transfer to ARI

I'm not sure what 'all the samples' entails.

I have the two samples received from FBI requesting total solids.

Nothing else listed for either Leon or FBI since September 1 received.

Sue

** UPDATED - I will be working part-time remotely Nov 2-21***

*** NOTE - TATs are running 3 to 6 weeks depending on analysis ***

Susan D. Dunnihoo
She/her/hers

Analytical Resources, LLC

(206) 695-6207 office
sue.dunnihoo@arilabs.com

www.arilabs.com

From: Peter Leon <peter@leon-environmental.com>
Sent: Friday, October 13, 2023 3:33 PM
To: Michael Erdahl <merdahl@friedmanandbruya.com>; Sue Dunnihoo <limsadm@arilabs.com>; Sue Dunnihoo <limsadm@arilabs.com>
Cc: Robert Brenner <brenner@leon-environmental.com>; Michael Cecil <cecil@leon-environmental.com>
Subject: PoFH: D/F, TBT, TOC, TS sample transfer to ARI

Hi Sue and Michael,

Please confirm that FBI transferred all TS, TOC, D/F, and TBT archived samples to ARI.

For your reference, attached please find the sample plan I prepared for our field team to track samples, jars, etc. (I couldn't oversee this field event, so Rusty was in charge of sample processing and John Nakayama was in charge of sample collection). FYI, Rusty noted previously that he didn't have enough 16 oz jars, so he filled two (2) 8 oz jars for some samples.

I've also attached a figure showing sample type and location.

Please note that I updated the attached plan from the original version I gave to the field team, because we added a new location (SED-27) after encountering refusal at ~3.5' at SED-12.

Most of the samples transferred to ARI should be archived. The table below reiterates the additional analyses I asked ARI to complete (based on Ecology authorization).

Sample	Total Solids	TOC	D/F	TBT
SED-07C:0-1	X	X	X	
SED-08C:1-3	X	X	X	
SED-11C:0-1	X	X		X
SED-14C:0-1	X	X	X	
SED-26C:1-3	X	X	X	
SED-26C:3-5	X	X		X
SED-27C:0-1	X	X	X	X

Thanks,

Peter Leon
Principal Scientist
206.948.5366

LEON Environmental, LLC

www.leon-environmental.com

From: Peter Leon
Sent: Wednesday, September 27, 2023 3:02 PM
To: Michael Erdahl <merdahl@friedmanandbruya.com>; Sue Dunnihoo <limsadm@arilabs.com>; sue.dunnihoo@arilabs.com
Cc: brenner@leon-environmental.com; Michael Cecil <cecil@leon-environmental.com>
Subject: PoFH: D/F, TBT, TOC sample transfer to ARI

Hi Michael and Sue,

Thank you both for your assistance as I've responded to Port concerns about chemistry costs. Per our prior conversations, I'd like to work directly with ARI for the analyses they've been performing previously via

subcontract to FBI. Based on our conversation, I understand that these include:

- Dioxins/furans
- TBT, and
- TOC

Michael, please transfer these samples to ARI for archive and potential analyses.

Via separate emails, I will identify specific samples to initiate testing for:

- D/F, TBT, and TOC (via ARI), and
- Hg and PCBs (via FBI)

Thanks,

Peter Leon
Principal Scientist
206.948.5366

LEON Environmental, LLC

www.leon-environmental.com

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Please take our 5 minute Online Customer Survey

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Analytical Chemists and Consultants
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Analytical Resources, LLC

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman and Bruya Project Name: 303373

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 23E0148 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1420 3.6°C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 30049208

Cooler Accepted by: MP Date: 05/05/23 Time: 1420

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: PIB Date: 5/5/23 Time: 14:49 Labels checked by: PIB

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman and Bruya Project Name: 303388

COC No(s): NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 23E0152 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1420 3.6 °C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 300 9708

Cooler Accepted by: MP Date: 05/05/23 Time: 1420

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: PZB Date: 5/5/23 Time: 15:57 Labels checked by: PZB

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Leon Env. Project Name: Port of Friday Harbor Jensen's marina

COC No(s): NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 23J0934 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.1°

Time 1448

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 9708

Cooler Accepted by: R Date: 9/28/23 Time: 1448

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: Date: 9/30/23 Time: 10:08 Labels checked by:

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Leon Environmental, LLC	Project: Port of Friday Harbor 2023	
8047 Burke Ave N.	Project Number: [none]	**Reported:**
Seattle, WA 98103	Project Manager: Peter Leon	01/17/2025 15:13

ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Sample ID	Matrix	Date Sampled	Date Received
23J0690-01	SED-07C:0-1	Solid	03/22/23 07:29	05/05/23 14:20
23J0690-02	SED-08C:1-3	Solid	03/22/23 08:07	05/05/23 14:20
23J0690-03	SED-11C:0-1	Solid	03/23/23 07:29	05/05/23 14:20
23J0690-04	SED-14C:0-1	Solid	03/21/23 15:53	05/05/23 14:20
23J0690-05	SED-26C:3-5	Solid	03/22/23 10:38	05/05/23 14:20
23J0690-06	SED-27C:0-1	Solid	03/22/23 13:24	05/05/23 14:20
23J0690-07	SED-26C:1-3	Solid	03/22/23 10:38	05/05/23 14:20

Leon Environmental, LLC	Project: Port of Friday Harbor 2023	
8047 Burke Ave N.	Project Number: [none]	**Reported:**
Seattle WA, 98103	Project Manager: Peter Leon	17-Jan-2025 15:13

Case Narrative

Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023
Work Order: 23J0690

Sample receipt

Samples as listed on the preceding page(s) were pulled from frozen archive and logged under ARI work order 23J0690, per instructions from the client on October 23, 2023. For details regarding sample receipt, please refer to the original Cooler Receipt Forms.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries were within control limits. The relative percent differences (RPD) outside of control limits are flagged on the summary sheet.

Dioxin/Furans - EPA Method 1613

The sample(s) were extracted and analyzed within the recommended holding times. Analysis was performed using an application specific column developed by Restek. The RTX-Dioxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

Initial and continuing calibrations were within method requirements.

Labeled internal standard areas were within limits.

The cleanup surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits except for 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,6,7,8-HpCDD, OCDD and low-level EMPC response for OCDF. Associated positive results have been "B"-flagged.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Leon Environmental, LLC	Project: Port of Friday Harbor 2023	
8047 Burke Ave N.	Project Number: [none]	**Reported:**
Seattle WA, 98103	Project Manager: Peter Leon	17-Jan-2025 15:13

Case Narrative

QUALIFIERS AND NOTES

Qualifier	Definition
X	Indicates possible CDPE interference.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
J	Estimated concentration value detected below the reporting limit.
H	Hold time violation - Hold time was exceeded.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SED-11C:0-1

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270E-SIM
Butyl Tins

Laboratory:	Analytical Resources, LLC				
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-03 A	SDG:	23J0690
Sampled:	03/23/23 07:29	Prepared:	11/03/23 09:14	File ID:	N1223111508.D
% Solids:	67.04	Preparation:	EPA 3546 (Microwave)	Analyzed:	11/15/23 13:07
Batch:	BLK0004	Sequence:	SLK0217	Initial/Final:	7.49 g Wet / 0.5 mL
Instrument:	NT12	Column:	ZB-5MS	Calibration:	GI00071
Cleanups:	Silica Gel				

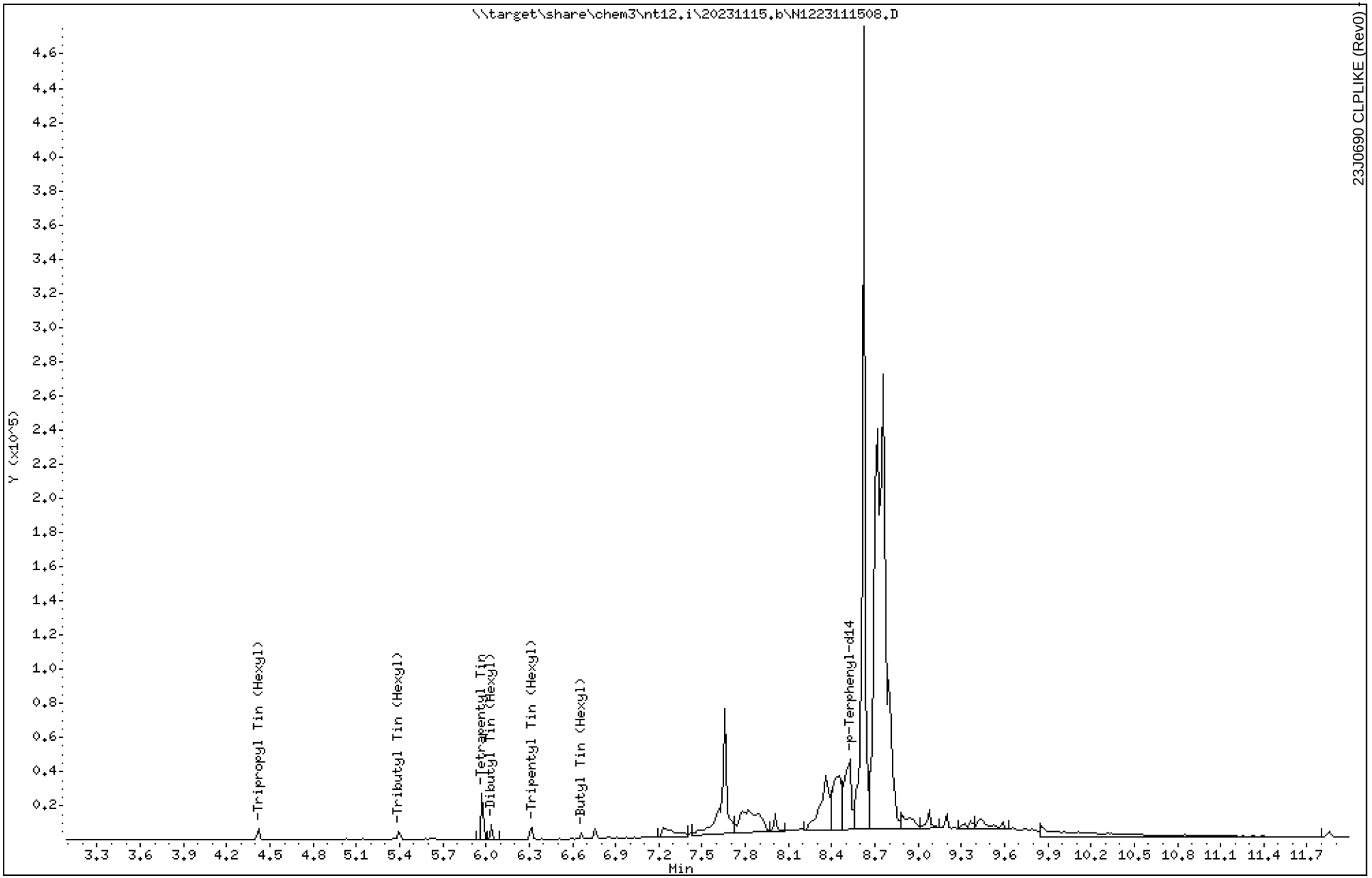
CAS NO.	COMPOUND	DILUTION	CONC: (ug/kg dry)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	26.7		0.448	3.84
14488-53-0	Dibutyltin Ion	1	23.3		1.72	5.76
78763-54-9	Butyltin Ion	1	7.32		1.88	4.06
1461-25-2	Tetrabutyltin	1	4.98	U	4.98	4.98

SURROGATES	ADDED: (ug/kg dry)	FOUND: (ug/kg dry)	% REC	QC LIMITS	Q
Tripentyltin	44.985	33.7	75.0	30 - 160	
Tripropyltin	43.559	22.9	52.7	30 - 160	

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111508.D
Date : 15-NOV-2023 13:07
Client ID:
Sample Info: 23J0690-03

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



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Date : 15-NOV-2023 13:07

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-03

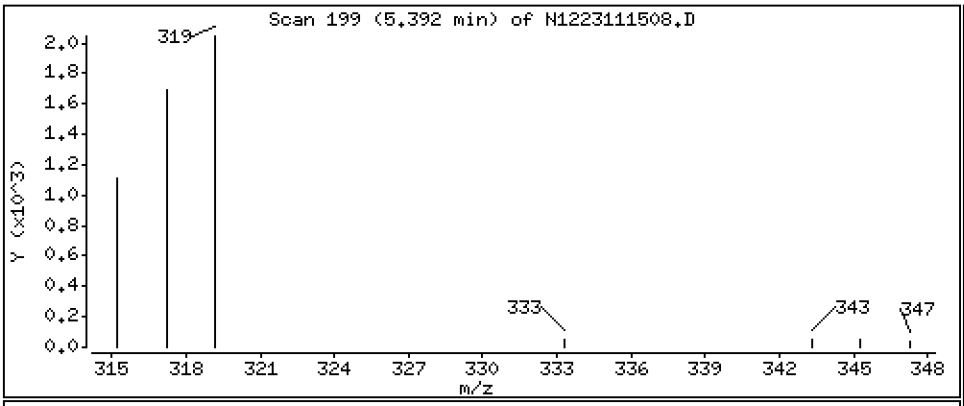
Operator: JZ

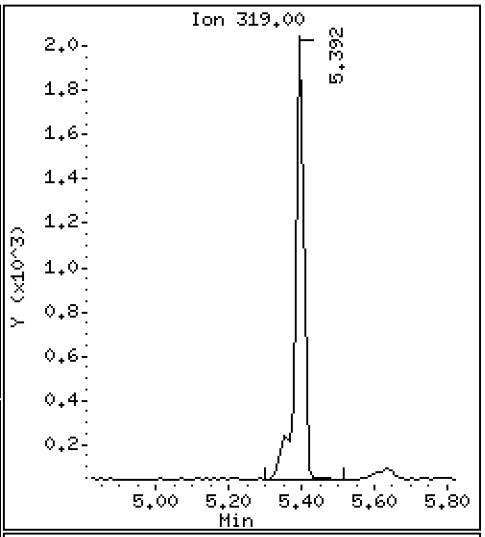
Column phase: ZB-5msi

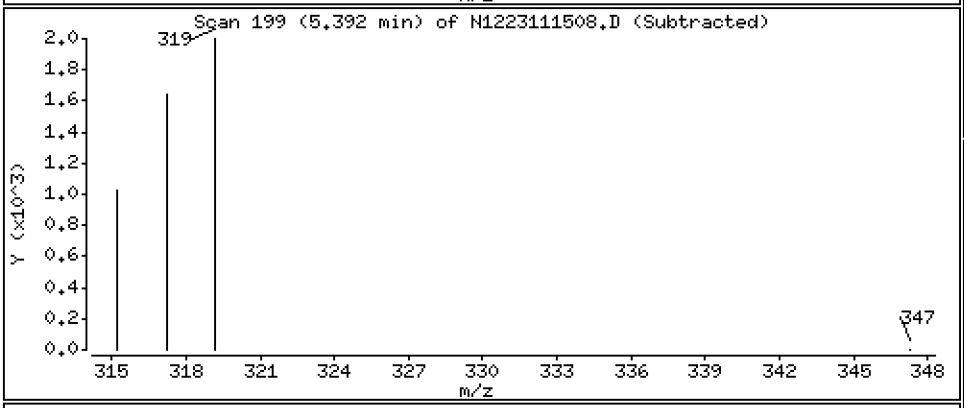
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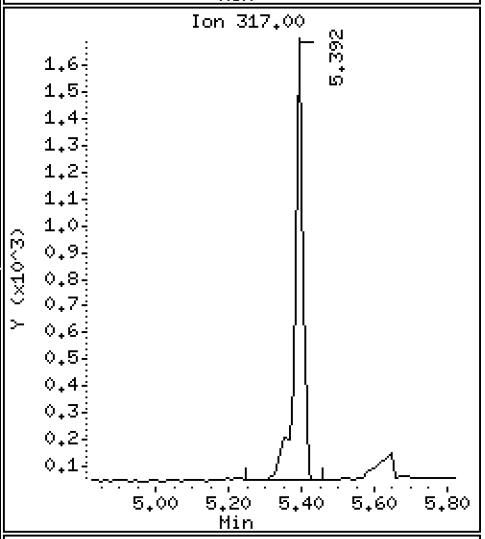
3 Tributyl Tin (Hexyl)

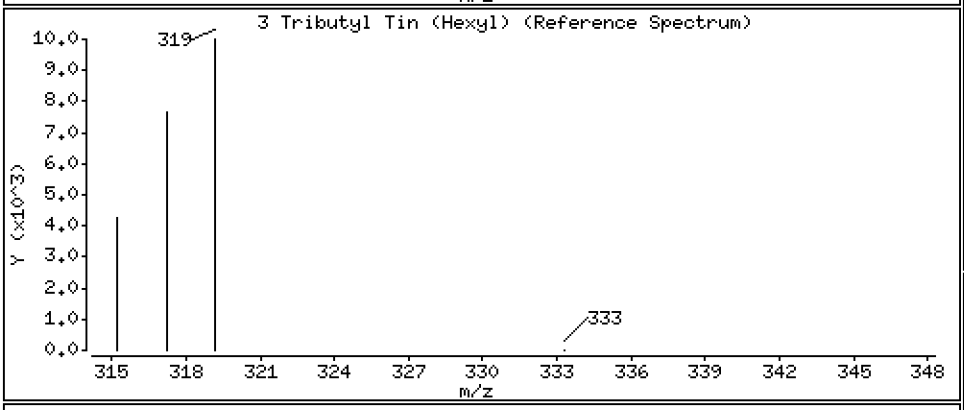
Concentration: 0.3474 ug/mL

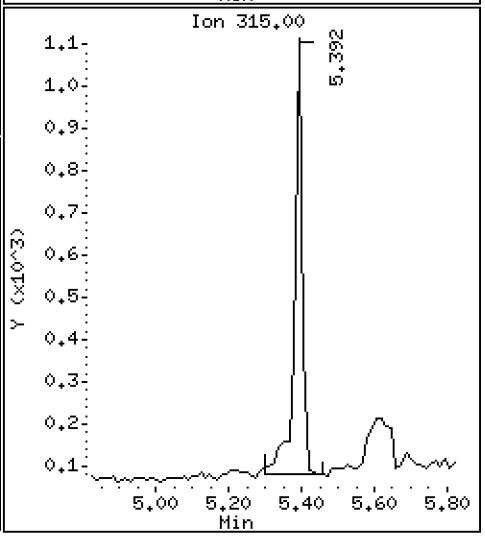


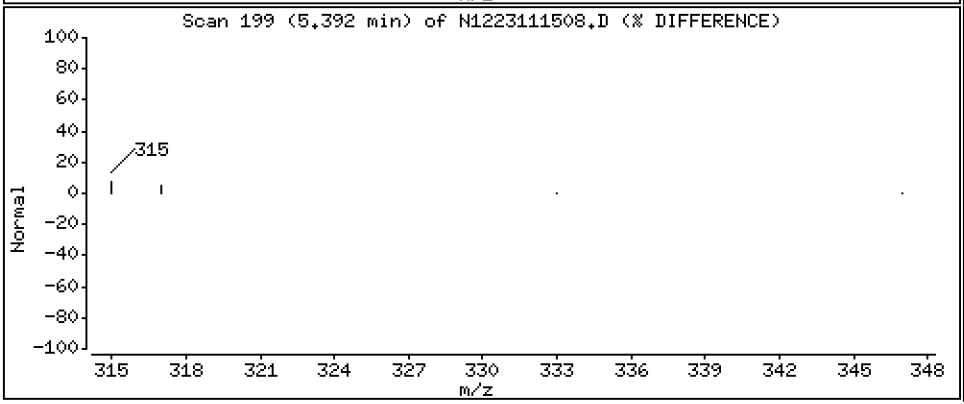












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111508.D

Date : 15-NOV-2023 13:07

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-03

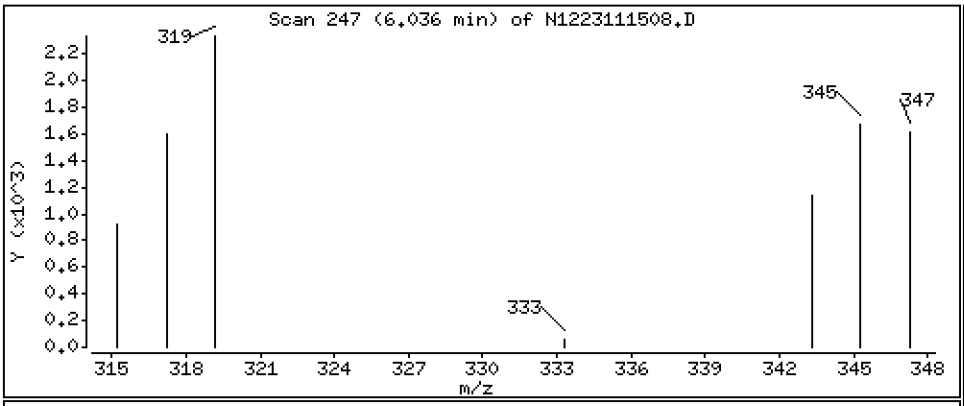
Operator: JZ

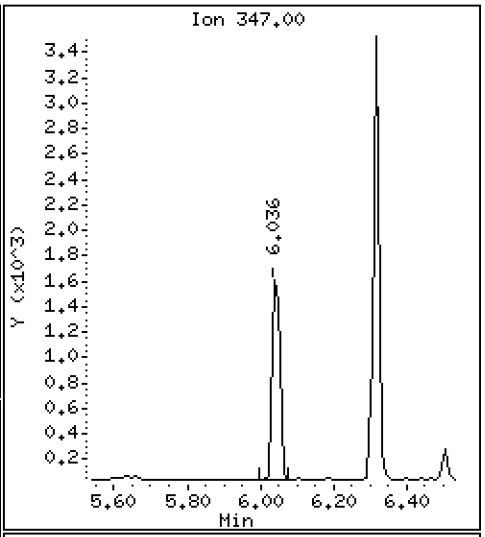
Column phase: ZB-5msi

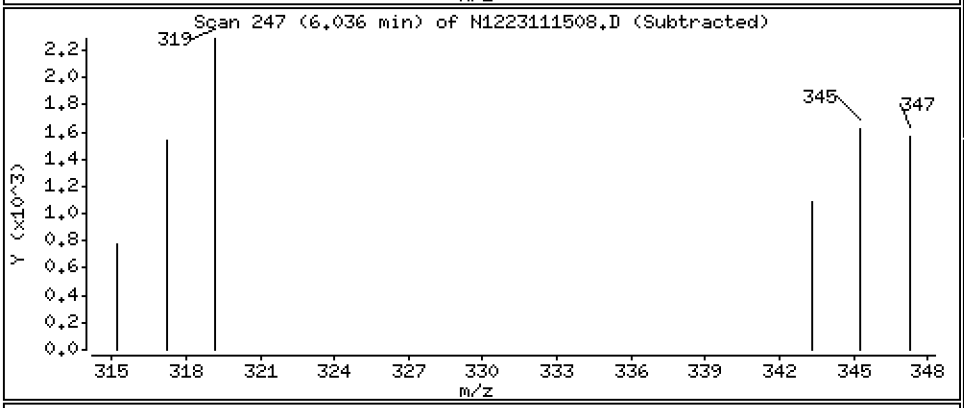
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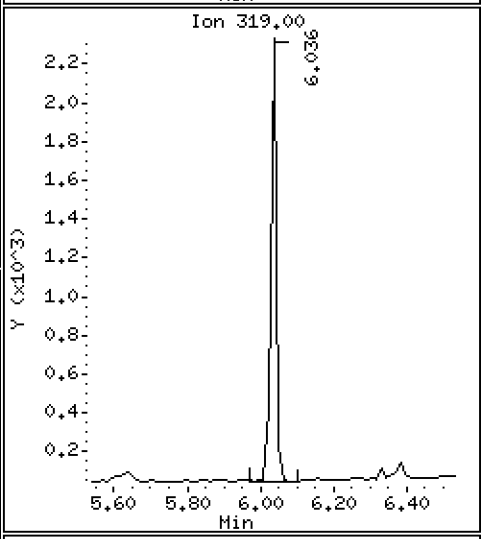
5 Dibutyl Tin (Hexyl)

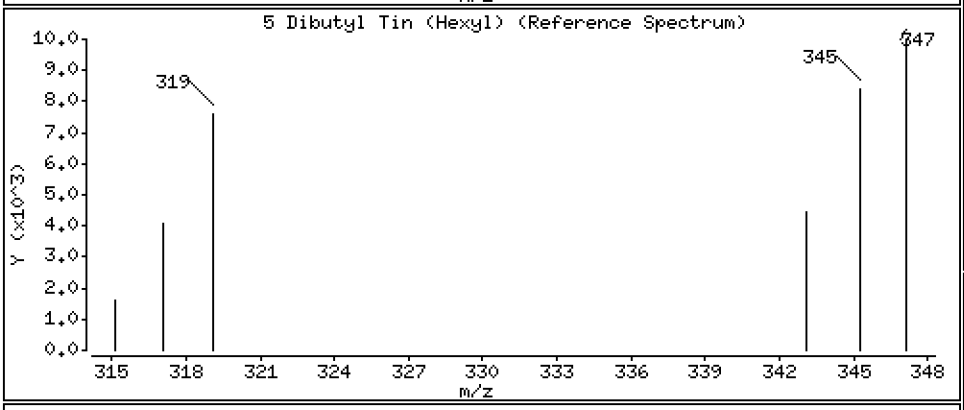
Concentration: 0.4041 ug/mL

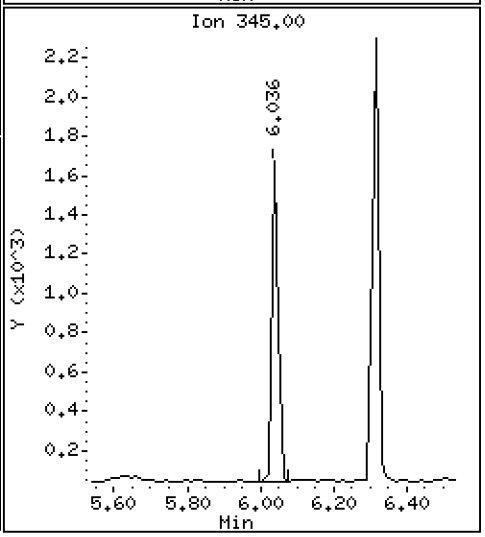


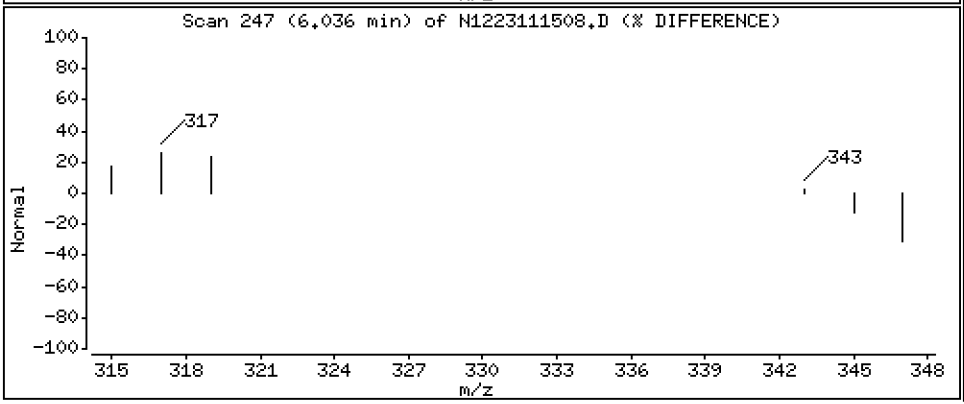












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111508.D

Date : 15-NOV-2023 13:07

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-03

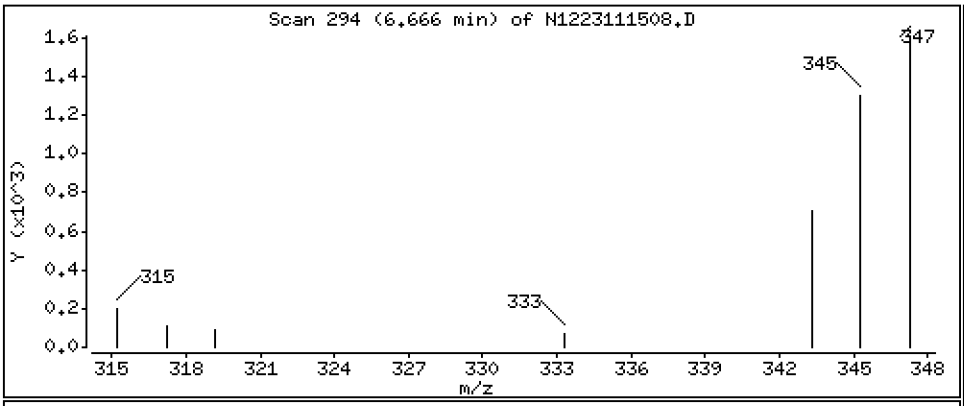
Operator: JZ

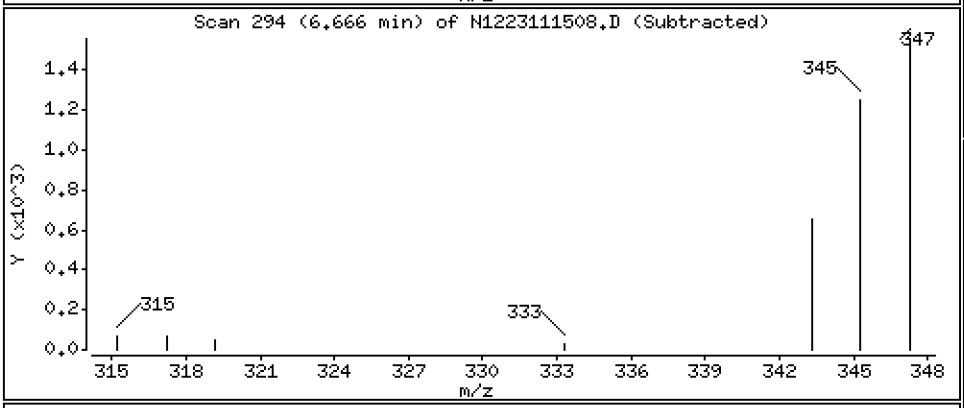
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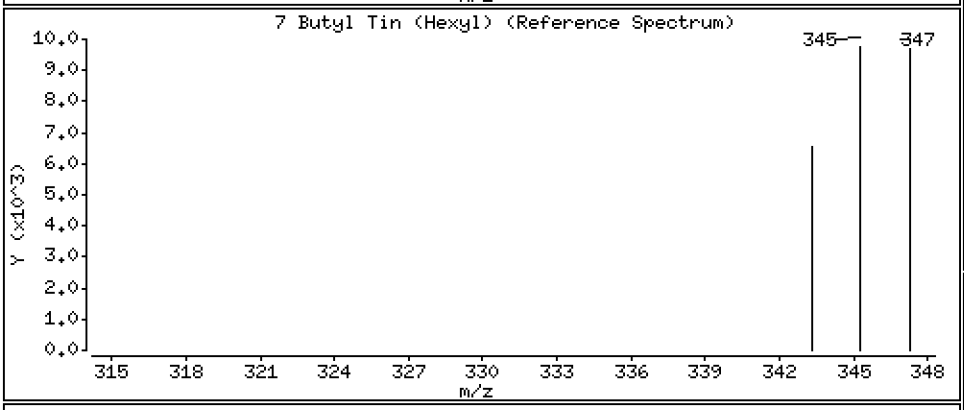
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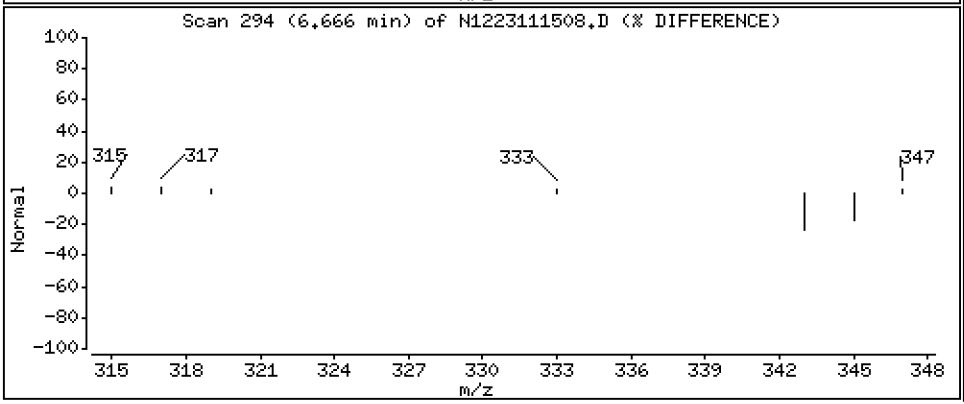
7 Butyl Tin (Hexyl)

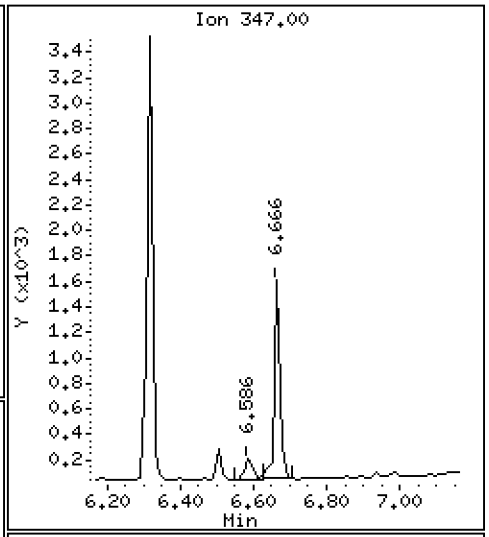
Concentration: 0.1803 ug/mL

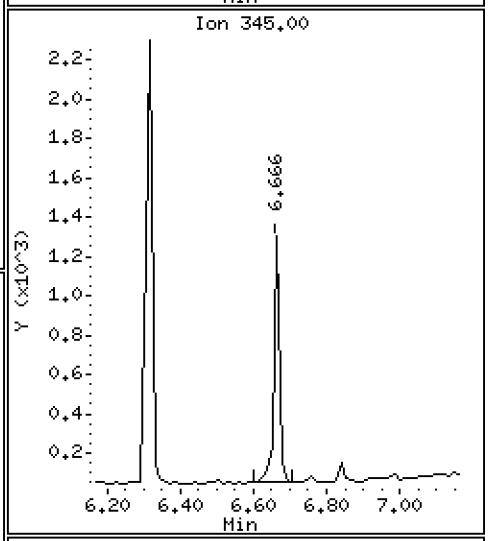


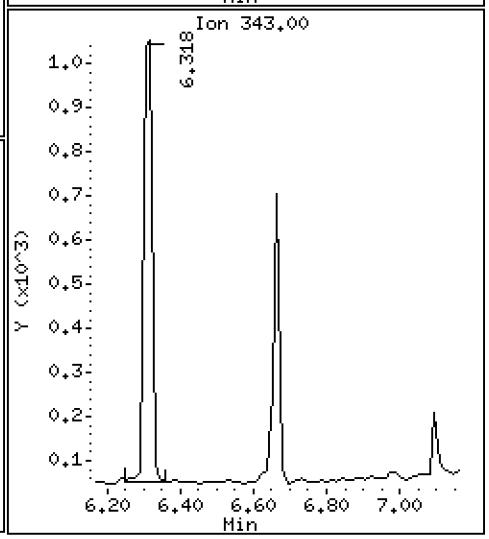












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111508.D
Lab Smp Id: 23J0690-03
Inj Date : 15-NOV-2023 13:07
Operator : JZ   Inst ID: nt12.i
Smp Info : 23J0690-03
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 8
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.422	4.387	(0.741)	3986	0.30955	0.3095
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	5.392	5.325	(0.903)	3311	0.34741	0.3474
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	35538	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.036	6.036	(0.708)	2431	0.40409	0.4041
$	6 Tripentyl Tin (Hexyl)	347	6.317	6.304	(0.741)	3778	0.42569	0.4257
	7 Butyl Tin (Hexyl)	347	6.666	6.666	(0.781)	1641	0.18030	0.1803
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	33856	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111508.D
Lab Smp Id: 23J0690-03
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	35538	-3.42
8 p-Terphenyl-d14	37742	18871	75484	33856	-10.30

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111508.D

Lab ID: 23J0690-03
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 13:07

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.903	0.892	0.0112	Tributyl Tin (Hexyl)
0.741	0.735	0.0058	Tripropyl Tin (Hexyl)

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

SED-26C:3-5

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270E-SIM
Butyl Tins

Laboratory:	Analytical Resources, LLC				
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-05 A	SDG:	23J0690
Sampled:	03/22/23 10:38	Prepared:	11/03/23 09:14	File ID:	N1223111509.D
% Solids:	78.85	Preparation:	EPA 3546 (Microwave)	Analyzed:	11/15/23 13:25
Batch:	BLK0004	Sequence:	SLK0217	Initial/Final:	6.35 g Wet / 0.5 mL
Instrument:	NT12	Column:	ZB-5MS	Calibration:	GI00071
Cleanups:	Silica Gel				

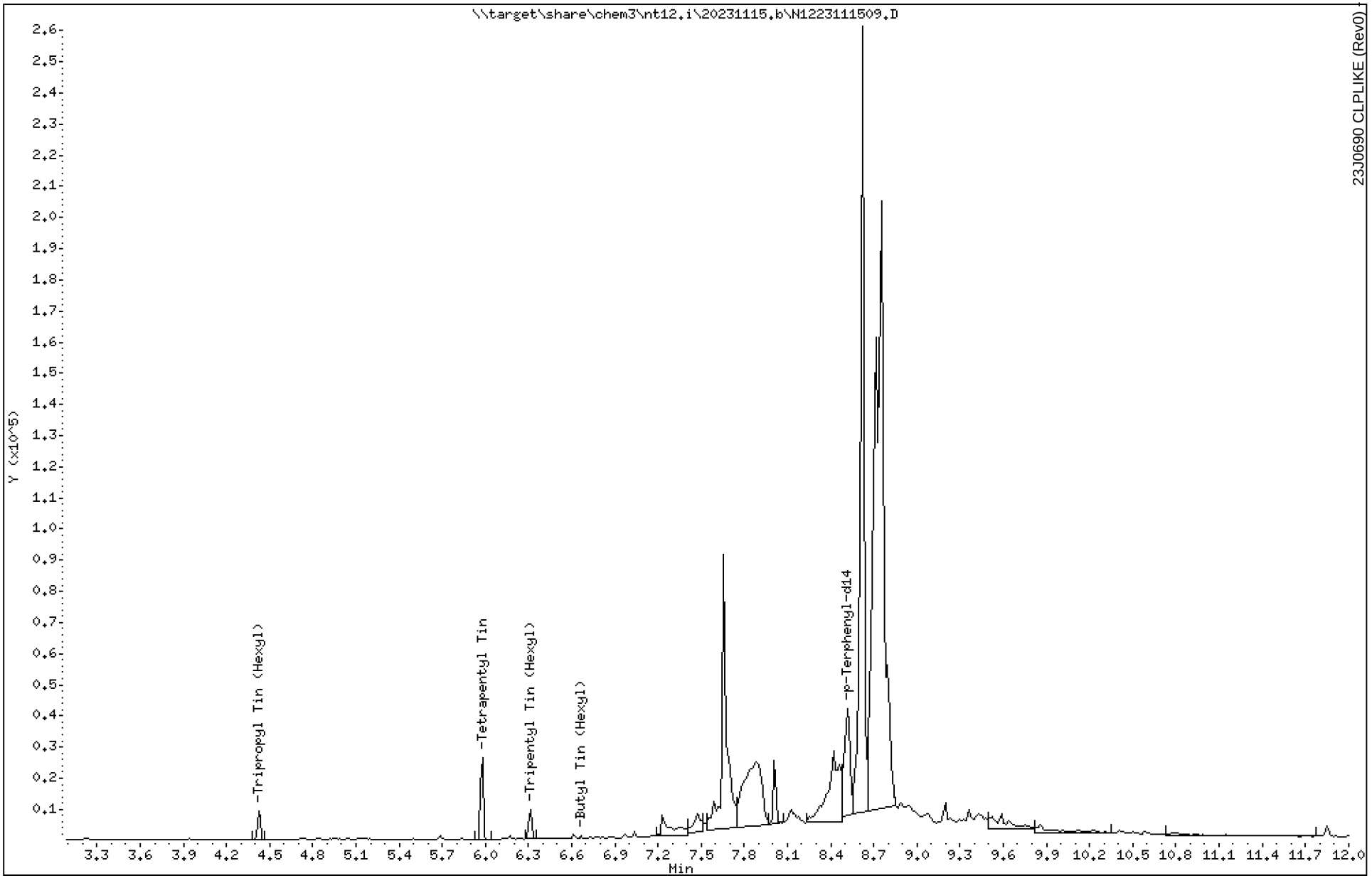
CAS NO.	COMPOUND	DILUTION	CONC: (ug/kg dry)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	3.85	U	0.449	3.85
14488-53-0	Dibutyltin Ion	1	5.77	U	1.73	5.77
78763-54-9	Butyltin Ion	1	1.97	J	1.89	4.07
1461-25-2	Tetrabutyltin	1	4.99	U	4.99	4.99

SURROGATES	ADDED: (ug/kg dry)	FOUND: (ug/kg dry)	% REC	QC LIMITS	Q
Tripentyltin	45.115	53.5	119	30 - 160	
Tripropyltin	43.685	33.6	76.8	30 - 160	

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111509.D
Date : 15-NOV-2023 13:25
Client ID:
Sample Info: 23J0690-05

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111509.D

Date : 15-NOV-2023 13:25

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-05

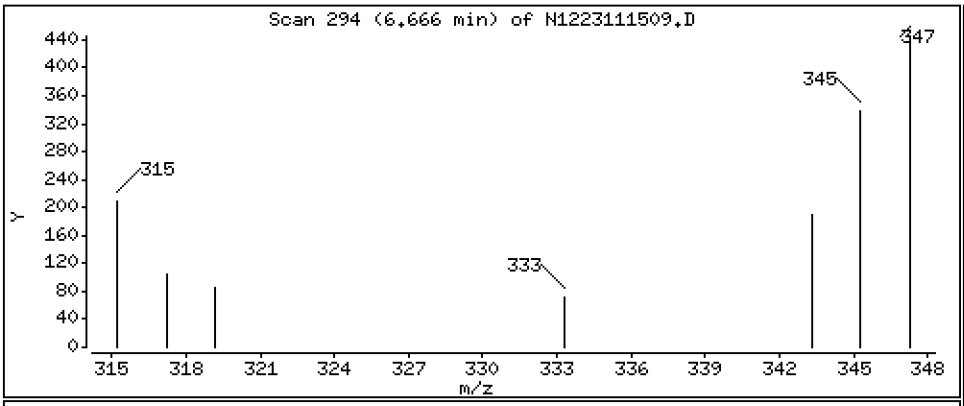
Operator: JZ

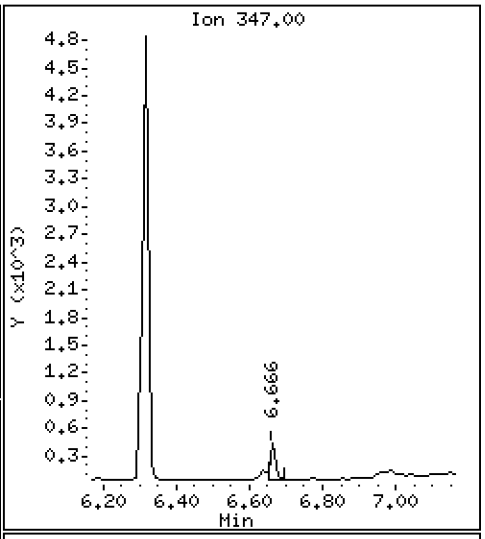
Column phase: ZB-5msi

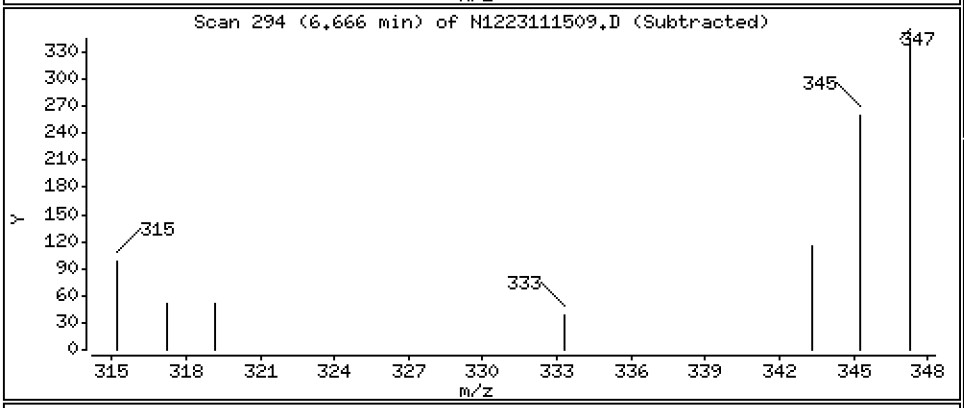
Column diameter: 0.25

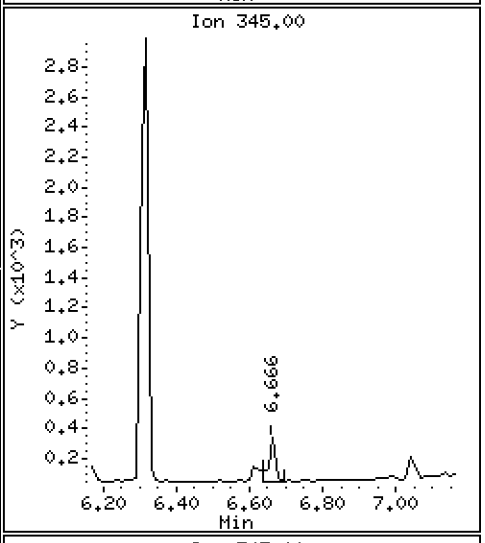
7 Butyl Tin (Hexyl)

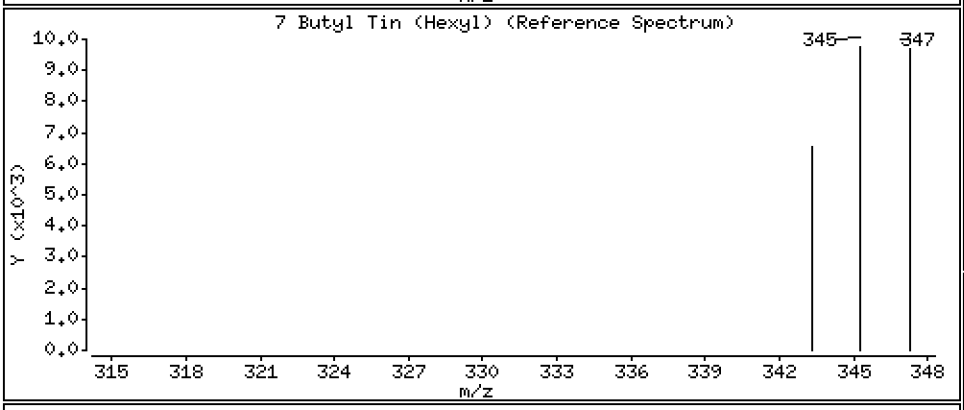
Concentration: 0.04842 ug/mL

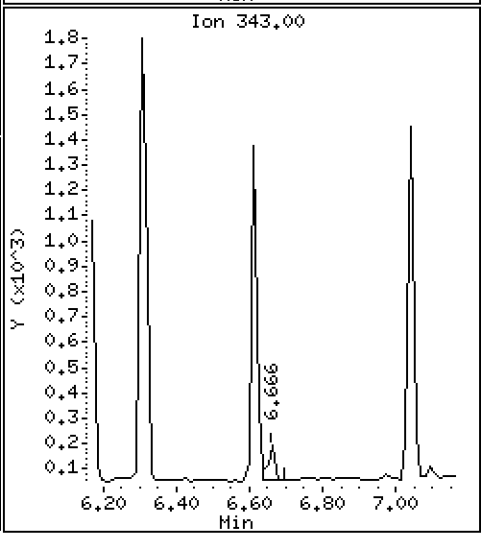


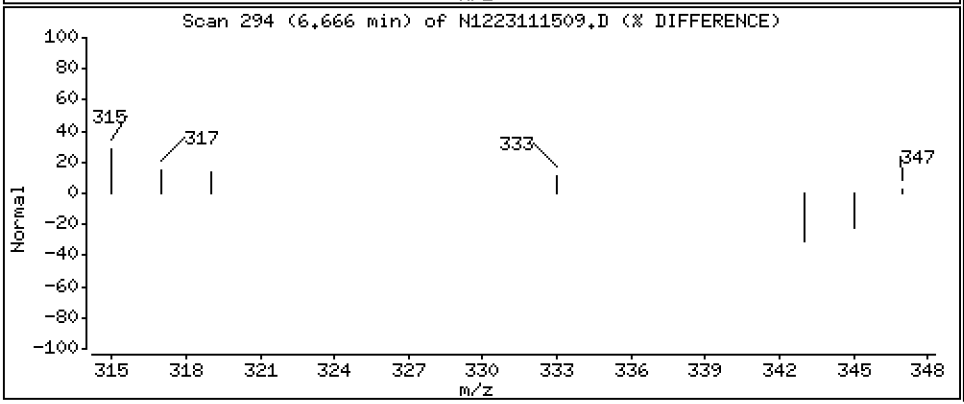












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111509.D
Lab Smp Id: 23J0690-05
Inj Date : 15-NOV-2023 13:25
Operator : JZ   Inst ID: nt12.i
Smp Info : 23J0690-05
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.422	4.387	(0.739)	5908	0.45157	0.4516
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.					
*	4 Tetrapentyl Tin	333	5.982	5.969	(1.000)	36108	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.317	6.304	(0.741)	5494	0.67358	0.6736
	7 Butyl Tin (Hexyl)	347	6.666	6.666	(0.781)	405	0.04842	0.04842
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	31115	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111509.D
Lab Smp Id: 23J0690-05
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	36108	-1.87
8 p-Terphenyl-d14	37742	18871	75484	31115	-17.56

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.98	0.22
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111509.D

Lab ID: 23J0690-05
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 13:25

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Analytical Resources, LLC
Analytical Chemists and Consultants

SED-27C:0-1

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270E-SIM
Butyl Tins

Laboratory:	Analytical Resources, LLC				
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-06 A	SDG:	23J0690
Sampled:	03/22/23 13:24	Prepared:	11/03/23 09:14	File ID:	N1223111510.D
% Solids:	71.93	Preparation:	EPA 3546 (Microwave)	Analyzed:	11/15/23 13:42
Batch:	BLK0004	Sequence:	SLK0217	Initial/Final:	6.96 g Wet / 0.5 mL
Instrument:	NT12	Column:	ZB-5MS	Calibration:	GI00071
Cleanups:	Silica Gel				

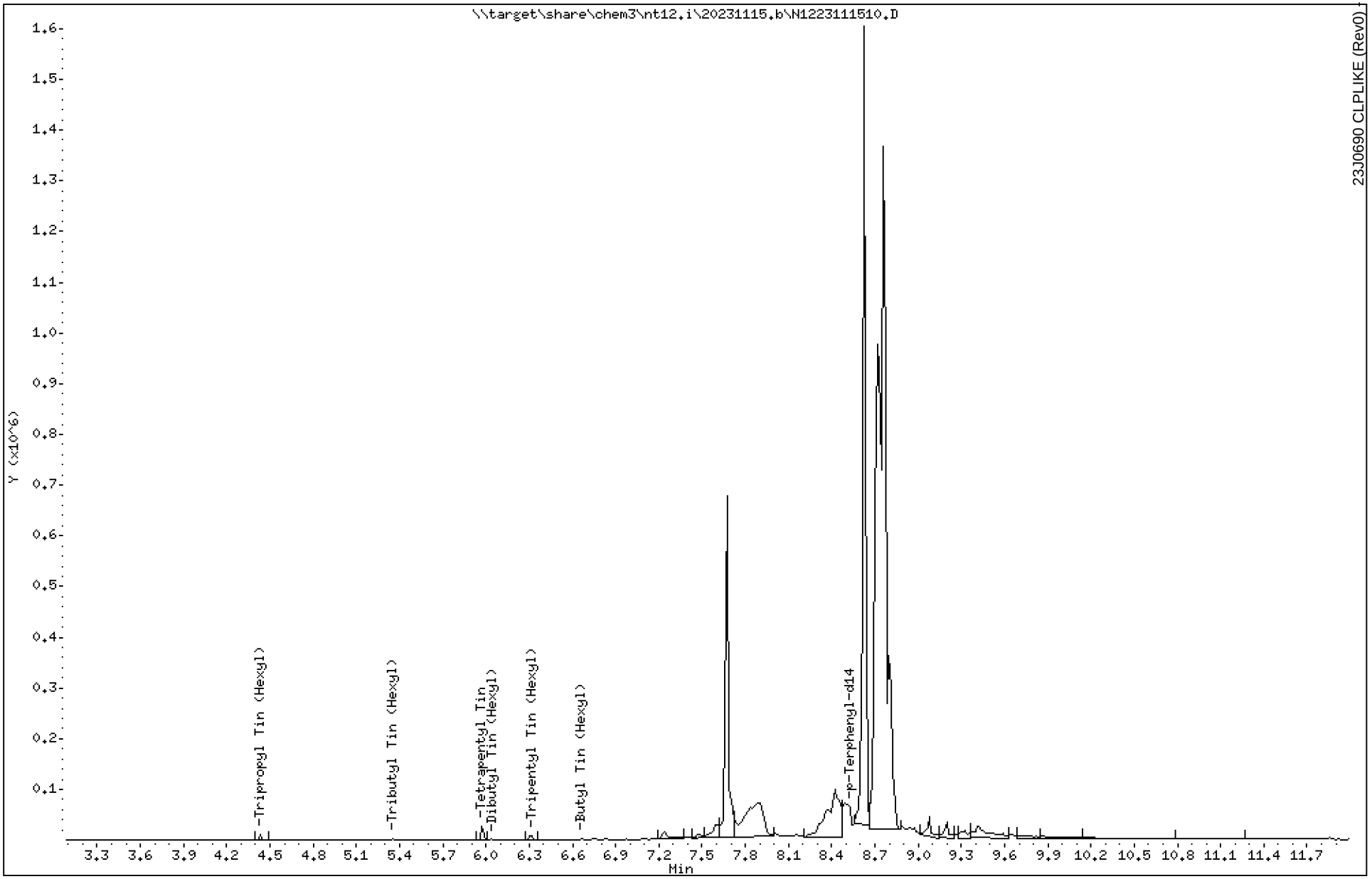
CAS NO.	COMPOUND	DILUTION	CONC: (ug/kg dry)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	9.84		0.449	3.85
14488-53-0	Dibutyltin Ion	1	6.84		1.73	5.77
78763-54-9	Butyltin Ion	1	4.35		1.89	4.07
1461-25-2	Tetrabutyltin	1	4.99	U	4.99	4.99

SURROGATES	ADDED: (ug/kg dry)	FOUND: (ug/kg dry)	% REC	QC LIMITS	Q
Tripentyltin	45.119	46.6	103	30 - 160	
Tripropyltin	43.689	31.9	73.1	30 - 160	

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111510.D
Date : 15-NOV-2023 13:42
Client ID:
Sample Info: 23J0690-06

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111510.D

Date : 15-NOV-2023 13:42

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-06

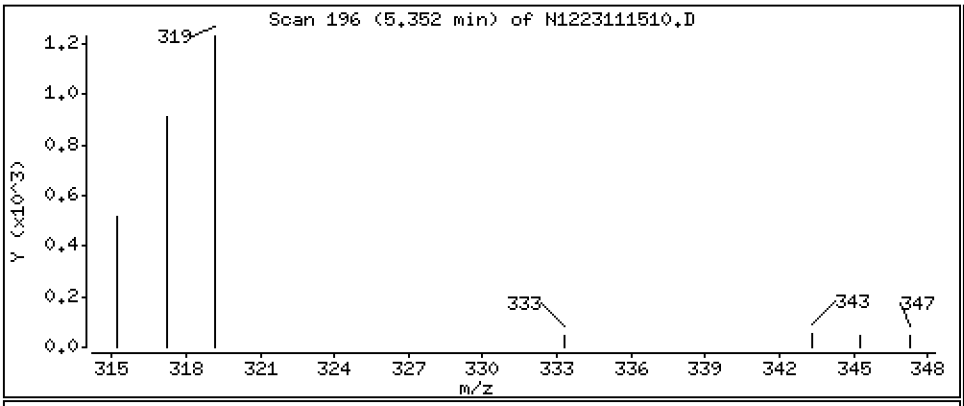
Operator: JZ

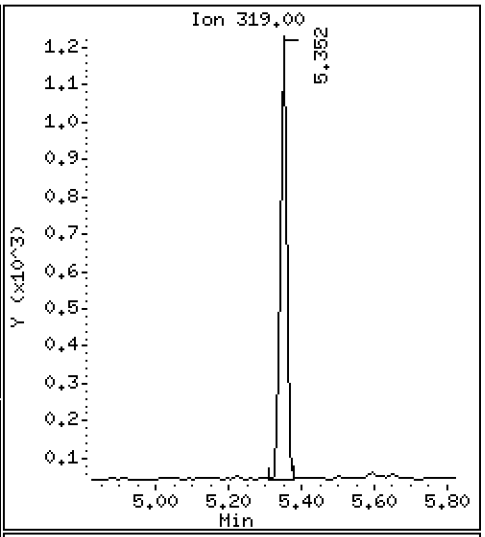
Column phase: ZB-5msi

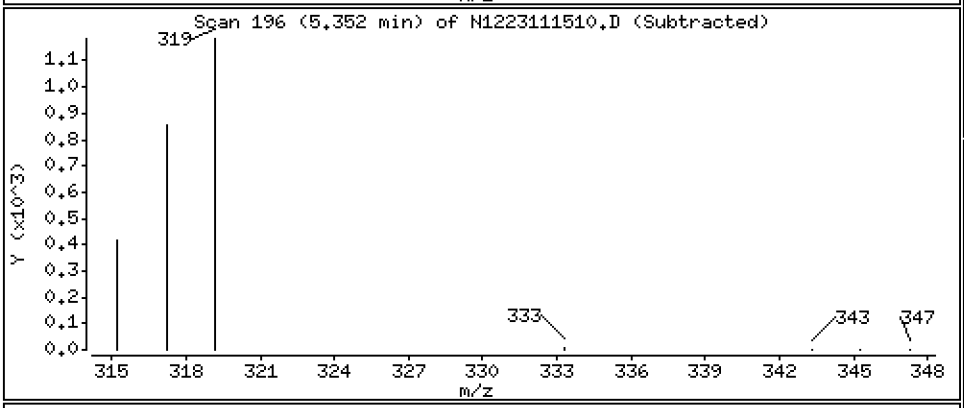
Column diameter: 0.25

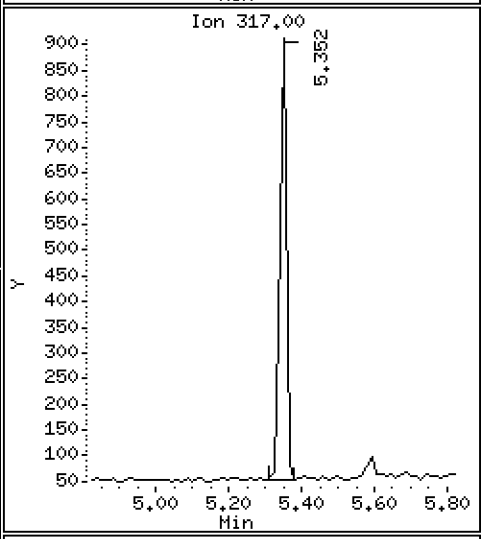
3 Tributyl Tin (Hexyl)

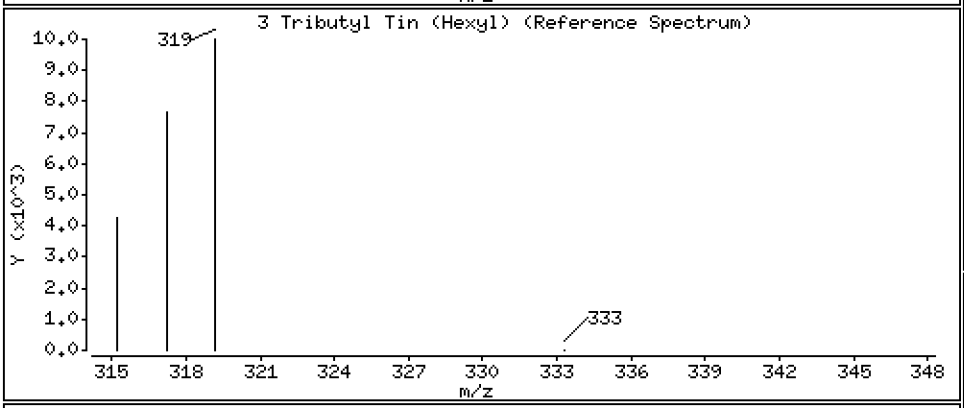
Concentration: 0.1274 ug/mL

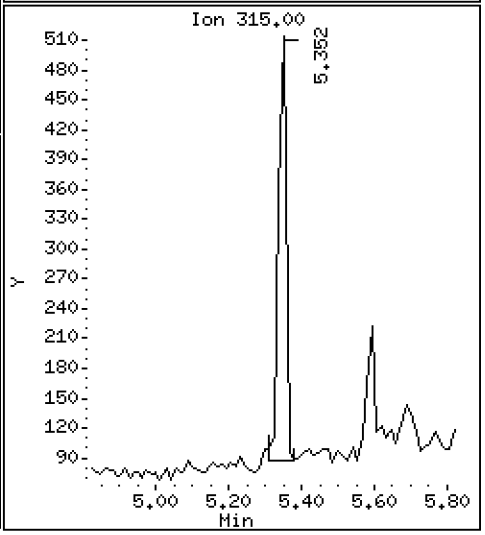


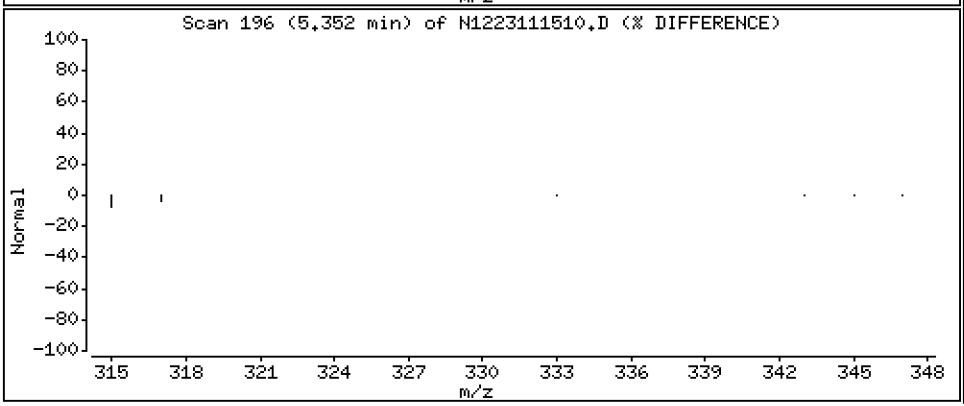












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111510.D

Date : 15-NOV-2023 13:42

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-06

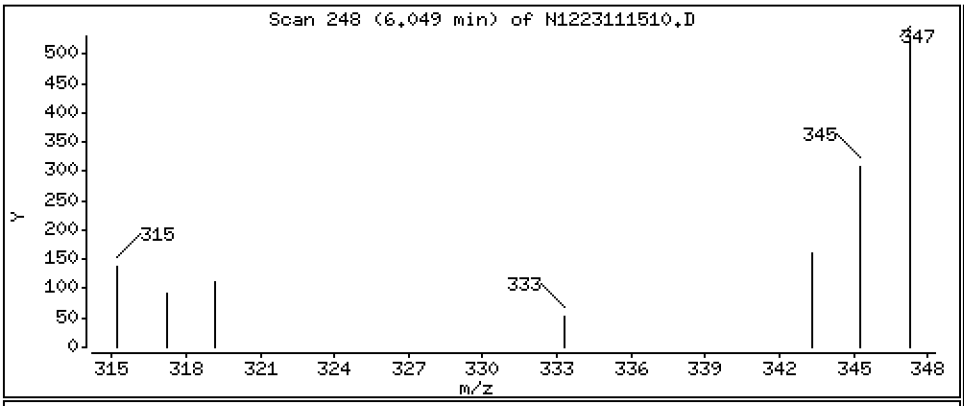
Operator: JZ

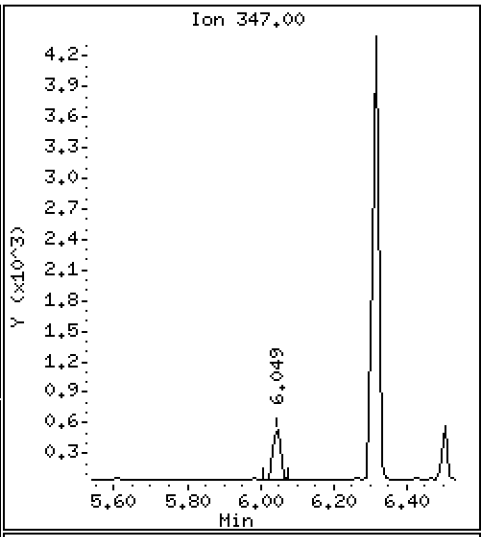
Column phase: ZB-5msi

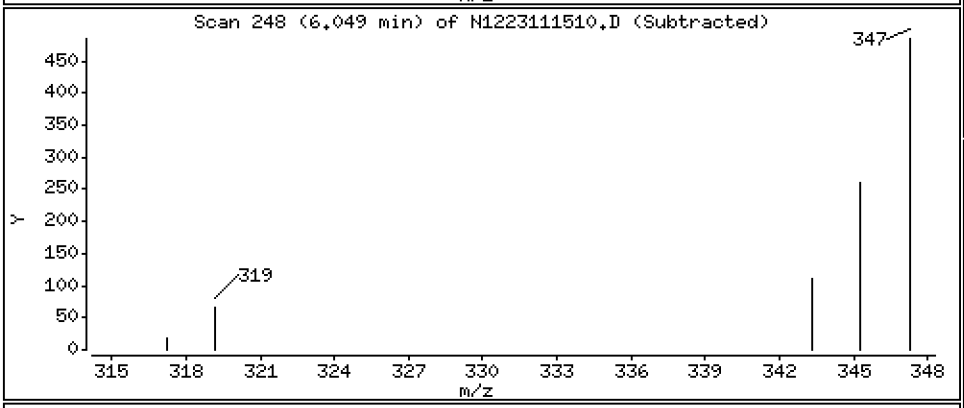
Column diameter: 0.25

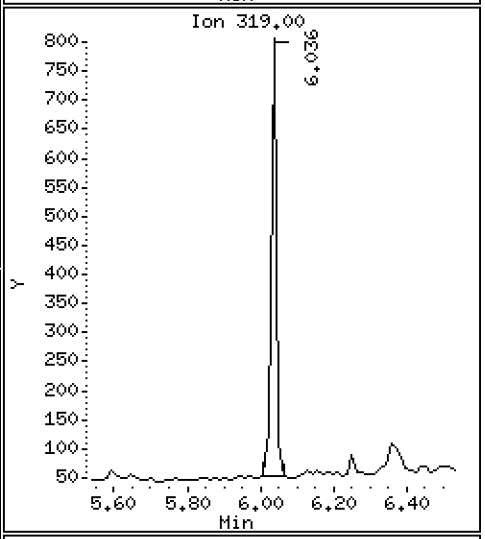
5 Dibutyl Tin (Hexyl)

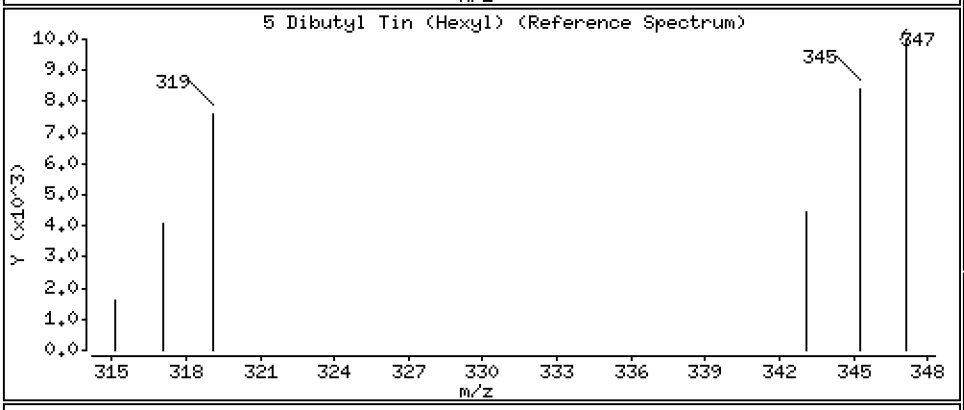
Concentration: 0.1185 ug/mL

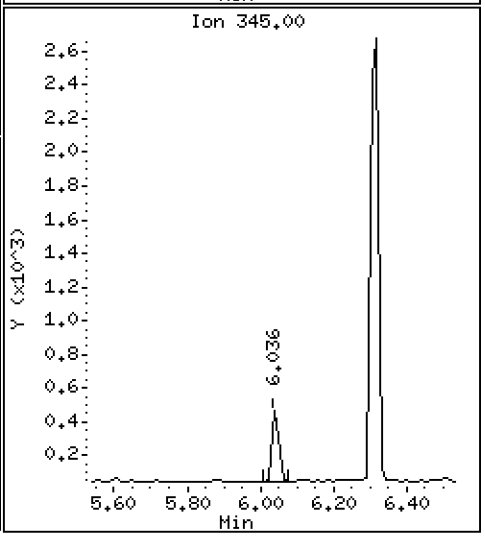


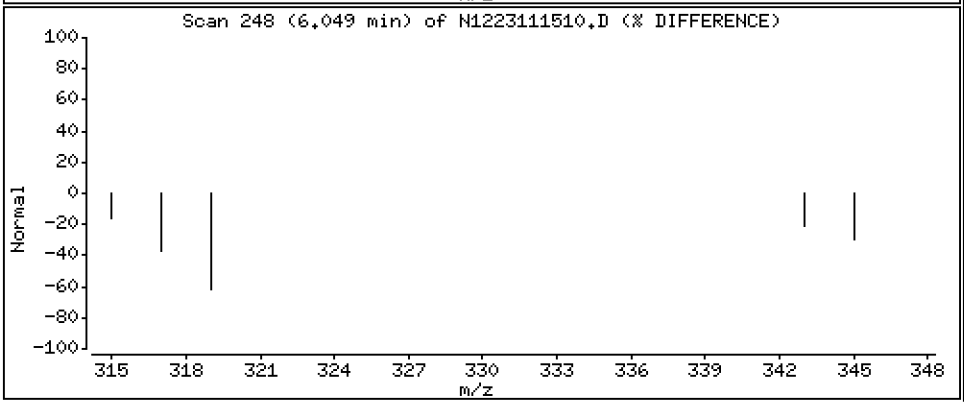












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111510.D

Date : 15-NOV-2023 13:42

Client ID:

Instrument: nt12.i

Sample Info: 23J0690-06

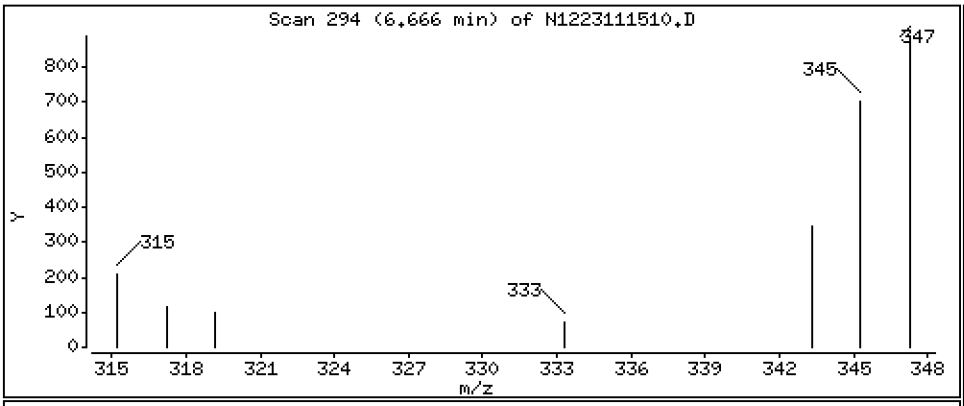
Operator: JZ

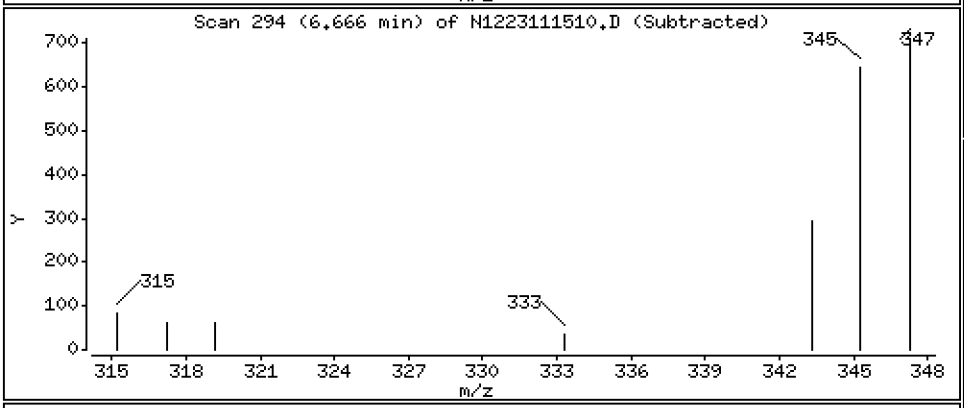
Column phase: ZB-5msi

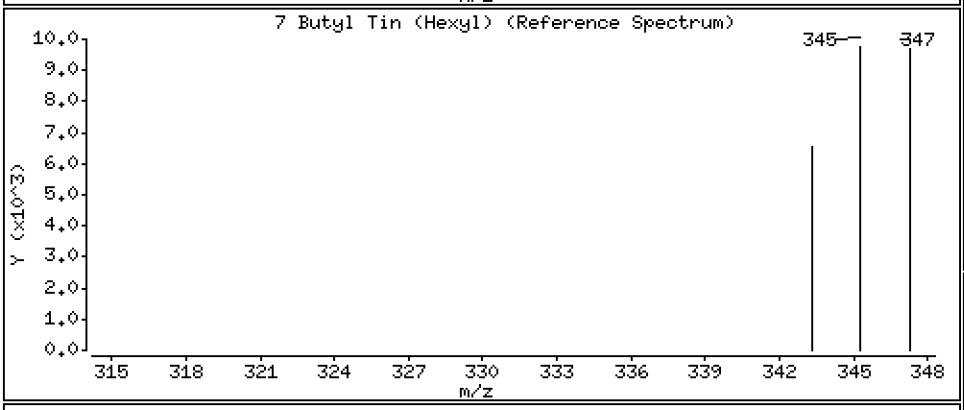
Column diameter: 0.25

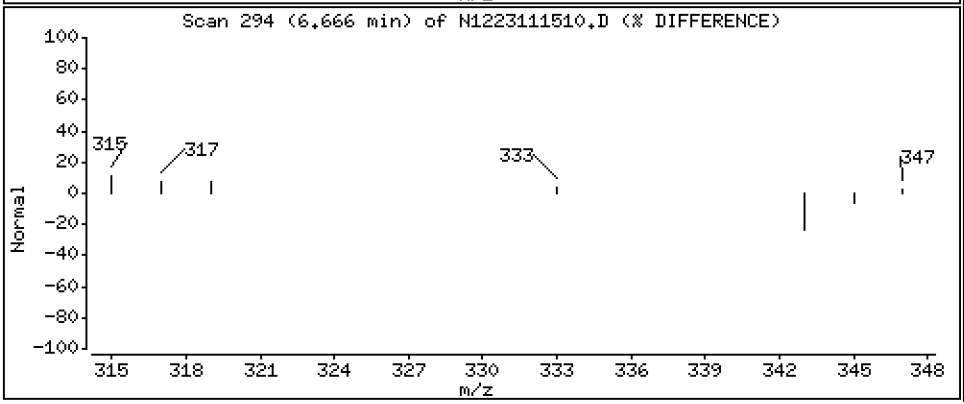
7 Butyl Tin (Hexyl)

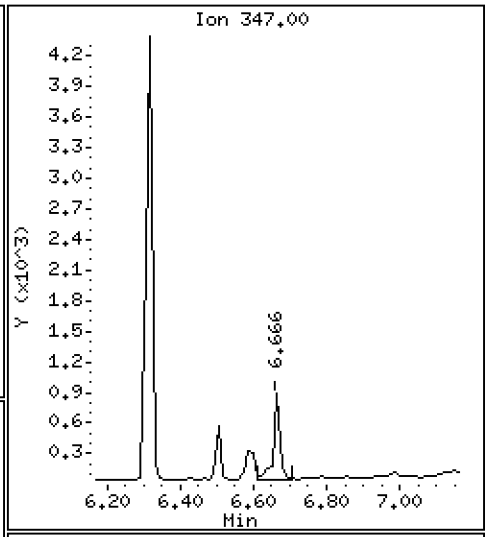
Concentration: 0.1067 ug/mL

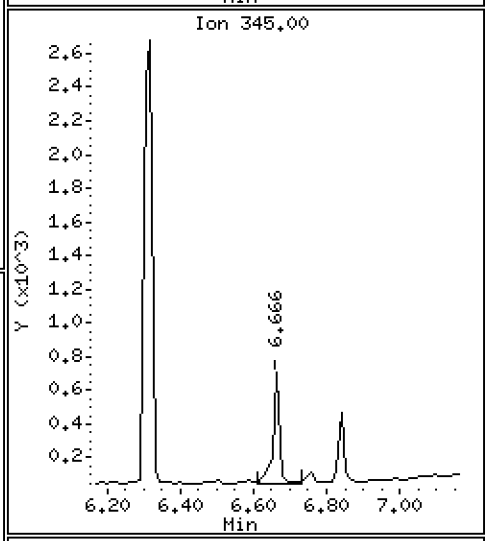


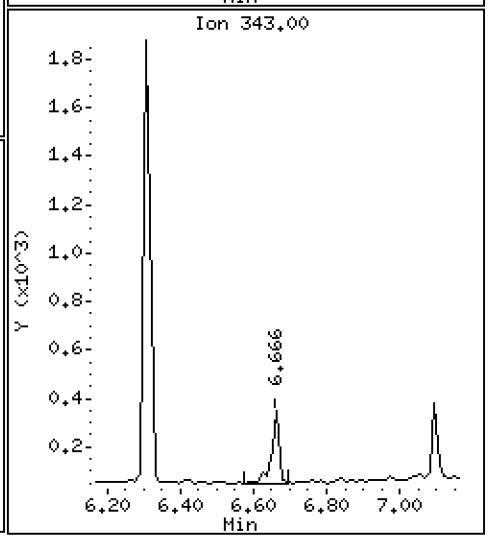












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111510.D
Lab Smp Id: 23J0690-06
Inj Date : 15-NOV-2023 13:42
Operator : JZ   Inst ID: nt12.i
Smp Info : 23J0690-06
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 10
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.433	4.387	(0.743)	5770	0.42978	0.4298
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	5.352	5.325	(0.897)	1266	0.12741	0.1274
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	37052	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.049	6.036	(0.709)	733	0.11848	0.1185
$	6 Tripentyl Tin (Hexyl)	347	6.317	6.304	(0.741)	5352	0.58640	0.5864
	7 Butyl Tin (Hexyl)	347	6.666	6.666	(0.781)	999	0.10673	0.1067(M)
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	34817	0.20000	

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111510.D
Lab Smp Id: 23J0690-06
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	37052	0.69
8 p-Terphenyl-d14	37742	18871	75484	34817	-7.75

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111510.D

Lab ID: 23J0690-06
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 13:42

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.743	0.735	0.0077	Tripropyl Tin (Hexyl)

RRT check based on Ccal File: N1223111502.D

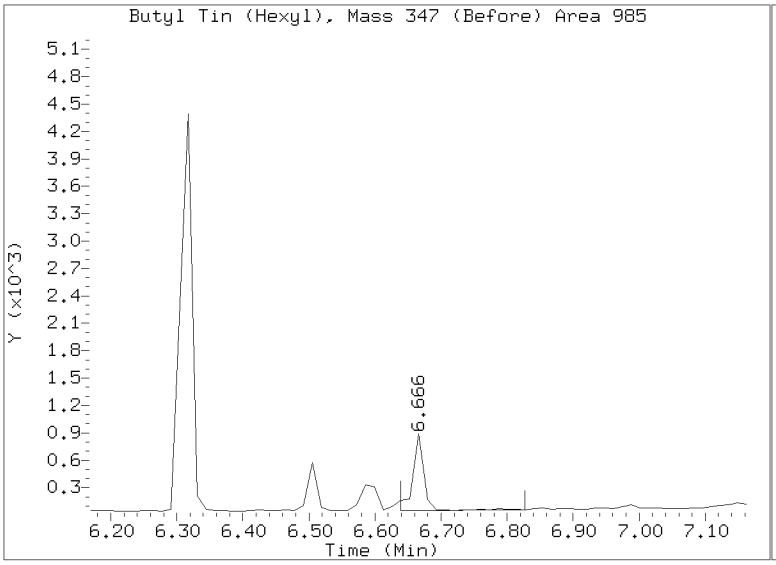
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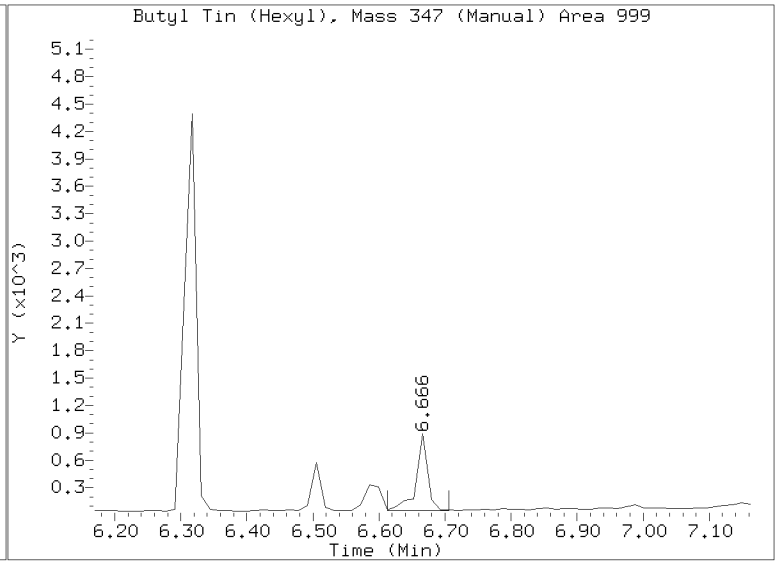
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20231115.b/N1223111510.D
Injection Date: 15-NOV-2023 13:42
Lab ID:23J0690-06 Client ID:
Report Date: 11/15/2023 15:37





PREPARATION BATCH SUMMARY

EPA 8270E-SIM

Laboratory: Analytical Resources, LLC
SDG: 23J0690
Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023
Batch: BLK0004 Batch Matrix: Solid
Preparation: EPA 3546 (Microwave)

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-11C:0-1	23J0690-03	N1223111508.D	11/03/23 09:14	
SED-26C:3-5	23J0690-05	N1223111509.D	11/03/23 09:14	
SED-27C:0-1	23J0690-06	N1223111510.D	11/03/23 09:14	
Blank	BLK0004-BLK1	N1223111504.D	11/03/23 09:14	
LCS	BLK0004-BS1	N1223111506.D	11/03/23 09:14	
LCS Dup	BLK0004-BSD1	N1223111507.D	11/03/23 09:14	
MRL Check	BLK0004-MRL1	N1223111505.D	11/03/23 09:14	

Analytical Resources, LLC
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BLK0004

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT only)
8270E-SIM Butyl Tins in Solid

Matrix: Solid **Date Prepared:** 11/03/23 **Balance ID:** B146462614 **Set Up By:** CRD 11/1/23

WO Comments

23J0690: Copy/Relog from 23E0152/23E0148/23I0934. Reference sample for dioxins billed at sample rates. Dioxin duplicates required billed at sample rate. Solid matrix QC included N/C for other tests <G> Samples may have limited vol. for requested analysis </G>
23J0767: <E> MS/MSD/LCS/LCSD </E> < M> Ms/MSD, Post spike for failed QC, SRM</M> <C> SRM TOC, run one sample in triplicate for conv anayses and MS/MSD</C>

Analysis: 8270E-SIM Butyl Tins

Lab Number & Container	% Solids	Initial (g) Target Dry: 5 (Wet) Actual	Actual Wet Wt (g)	Final Effective Vol (mL)		Vol (mL) to Lab		Extraction Comments
23J0690-03 A	67.0	(7.46)	7.49	0.5	0.5	0.5	0.5	
23J0690-05 A	78.9	(6.34)	6.35	0.5		0.5		
23J0690-06 A	71.9	(6.95)	6.96	0.5		0.5		
23J0767-01 B	62.5	(8.00)	8.06	0.5		0.5		
23J0767-02 B	64.0	(7.82)	7.82	0.5		0.5		

Batch QC

Lab Number	% Solids	Initial (g) Target Dry: 5 (Wet) Actual	Actual Wet Wt (g)	Final Effective Vol (mL)		Vol (mL) to Lab		Extraction Comments
BLK0004-BLK1	100.0	(5.00)	5.00	0.5	0.5	0.5	0.5	
BLK0004-BS1	100.0	(5.00)	5.00	0.5		0.5		
BLK0004-BSD1	100.0	(5.00)	5.00	0.5		0.5		
BLK0004-MRL1	100.0	(5.00)	5.00	0.5		0.5		
BLK0004-MS1	64.0	(7.82)	7.82	0.5		0.5		Use 23J0767-02
BLK0004-MSD1	64.0	(7.82)	7.82	0.5		0.5		Use 23J0767-02

RT
11/03/23 11/03/23 PL 11/13/23 11/03/23 9:14
Client ID verified By Date Preparation Reviewed By Date Extraction Date and Time
11/03/23

Printed: 11/1/2023 9:54:24AM

Analytical Resources, LLC
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BLK0004

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT only)
8270E-SIM Butyl Tins in Solid

WO Comments

23J0690: Copy/Relog from 23E0152/23E0148/2310934. Reference sample for dioxins billed at sample rates. Dioxin duplicates required billed at sample rate. Solid matrix QC included N/C for other tests <G> Samples may have limited vol. for requested analysis </G>
23J0767: <E> MS/MSD/LCS/LCSD </E> < M> Ms/MSD, Post spike for failed QC, SRM</M> <C> SRM TOC, run one sample in triplicate for conv anayses and MS/MSD</C>

Prep Steps

Microwave
(1) 2 3
RT 11/03/23
CT
Analyst/Date

TurboVap Hexane Exchange (15 mL)
1 2 3 (4) 5
MN 11/3/23
Analyst/Date

Derivitization (Vortex + Heating)
MN 11/3/23
Analyst/Date

(REQ) Hydrolisys (~4mL) Vortex
PL 11/13/23
Analyst/Date

(REQ) SPE (1mL)
PL 11/13/23
Analyst/Date

TurboVap Post SPE
1 (2) 3 4 5
PL 11/13/23
Analyst/Date

Vialing
PL 11/13/23
Analyst/Date

Reagents Used

Station/Reagent	Standard ID
Microwave Analyst: CT/RT Date: 11/03/23	
Hexane	L011778
Neutral Glass Wool	L011958
0.10% Tropolone in Methylene Chloride	L011674
Anhydrous Sodium Sulfate	L012534
Vialing/HexMgBr Addition Analyst: MN Date: 11/3/23	
(Turbovap exchange): Hexane:	L011778
HexylMagnesiumBromide	L008711
Hydrolysis/Silica/Final Vialing Analyst: PL Date: 11/13/2023	
Silica Gel (SPE) Dart (EPH)	L010268
1:1 HCL/DI H2O	L012535
Anhydrous Sodium Sulfate	L011996
(Final Vialing):Hexane	L012649

Surrogates & Spike Standards Used

Type	Vial ID / Standard ID	Vol uL	Analyst	Witness
Surrogate 2.5µg/mL	L L008690 Exp Date: 12/15/2023	100µL	RT	CT
Spike 2.5µg/mL	8 K011887 Exp Date: 12/15/2023	100µL	RT	CT
QLS Spike 0.5µg/mL	QLS 3 K011886 Exp Date: 12/15/2023	40µL	RT	CT

MANUALLY ENTER EXPIRATION DATES!

(V) indicates a virtual standard combining two or more physical standards. In these cases the Standard ID refers to the virtual standard, not the parent standards.

If a Standard ID is missing, but should be present, check the standard definition in Element LIMS to be sure Standard Info 6 has the correct letter or number designator matching the vial designator inthe Standard ID column. If it is correct, check the batch and bench sheet in Element LIMS to be sure the correct standards are selected for surrogate(s) and spike(s).

Analytical Resources, ~~Incorporated~~ LLC
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

Extraction Parameter: TBT Batch Number: BLK0004

Element Batch:T/S BJ0934 Work Order(s): 23J0767

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☑ No Anomalies (standard soil/wet sediment/sand/gravel)= 01-02	RA 10/31/23
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☐ Rocks (%+size)?	
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☑ Other (Details)= Previously Frozen	RA 10/31/23
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☑ Other Notes/Comments= (Note problems, concerns, corrective actions).	
1351, MS1, MSD1, 690-03, & 767-01 almost went dry post derivitization	MW 11/3/23
☑ Share Samples Y / (N)	
☑ Multiple Jars Y / (N)	RA 10/31/23
☐ Sample Pre-Screens indicate analyte activity=	RA 10/31/23
☐ Sample weights/volumes reduced based on Pre-Screen=	

Analytical Resources, LLC
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BLK0004

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT only)
8270E-SIM Butyl Tins in Solid

WO Comments

23J0690: Copy/Relog from 23E0152/23E0148/23I0934. Reference sample for dioxins billed at sample rates. Dioxin duplicates required billed at sample rate. Solid matrix QC included N/C for other tests <G> Samples may have limited vol. for requested analysis </G>
23J0767: <E> MS/MSD/LCS/LCSD </E> < M> Ma/MSD, Post spike for failed QC, SRM</M> <C> SRM TOC, run one sample in triplicate for conv anayses and MS/MSD</C>

Prep Instructions	
SPECIAL INSTRUCTIONS: NOTE: TBT Extractions must be completed within 48 hours! 1. Blanks = Solvent Only (NO Sulfate). 2. Weigh samples into 100mL beakers-dry with Sodium Sulfate. 3. Pre-Rinse microwave vessel with 0.10% Tropolone in DCM. 4. Transfer soil to microwave vessel. 5. Add 0.10% Tropolone in DCM to vessel until solvent is 1" above soil layer after homogenization). 6. Add surr/spike. 7. Microwave on appropriate power setting determined by # of samples. 8. After microwave-Re-homogenize while hot then let cool 15 min. In cold water bath. Re-homogenize while cool. 9. Decant into 0.10% tropione rinsed turbo tube with small Funnel containing glass wool and 1" sodium sulfate. 10. Add (2) 10mL Hexane rinses to vessel and transfer to turbo tube. VIALING 11. TurboVap to ~2mL and exchange with 15 mL of Hexane - mix well. 12. TurboVap to ~3mL-Transfer with Hexane to 40mL VOA vial. 13. Derivitize with 1 pipet HexMgBr (Mix by hand) then Vortex for 10 seconds then place vials on KD water bath until warm. Repeat vortex and heating 3 times.Then let sit overnite. 14. Hydrolisys: Add 2 pipets of 1:1 HCL. Vortex for 30 sec. Draw off/discard HCL (bottom layer). Add 1 pipet of 1:1 HCL and ~5mL DI H2O. Vortex for 30 sec. Draw off/discard H20 (bottom layer). Add ~5mL DI H2O. Vortex for 30 sec. Draw off/discard H2O (bottom layer). 15. Add sodium sulfate and Let sit 15min. 16. Transfer to culture tube and TurboVap to 1mL. 17. SPE Clean with EPH darts 18. TurboVap 19. Vial in hexane. 20. NOTE: DERIVITIZATIONS MUST BE DONE IN THE HOOD TO PROTECT FROM POTENTIAL CHEMICAL REACTIONS, ODORS AND FUMES. A. Need Total Solids Y / N B. Archive/Freeze Y / N	

CLEANUP BATCH SUMMARY

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Cleanup Batch:	CLK0085	Cleanup Type:	Silica Gel
Cleanup Method:	EPA 3630C Silica Gel Cleanup - uL	Analysis:	EPA 8270E-SIM

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
SED-26C:3-5	23J0690-05	N1223111509.D	11/13/2023	
MRL Check	BLK0004-MRL1	N1223111505.D	11/13/2023	
LCS Dup	BLK0004-BSD1	N1223111507.D	11/13/2023	
LCS	BLK0004-BS1	N1223111506.D	11/13/2023	
SED-27C:0-1	23J0690-06	N1223111510.D	11/13/2023	
SED-11C:0-1	23J0690-03	N1223111508.D	11/13/2023	
Blank	BLK0004-BLK1	N1223111504.D	11/13/2023	

Form I

METHOD BLANK DATA SHEET

EPA 8270E-SIM

Blank

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Solid	Laboratory ID:	BLK0004-BLK1	File ID:	N1223111504.D
Sampled:	N/A	Prepared:	11/03/23 09:14	Analyzed:	11/15/23 11:56
Solids:		Preparation:	EPA 3546 (Microwave)	Initial/Final:	5 g / 0.5 mL
Batch:	BLK0004	Sequence:	SLK0217	Calibration:	GI00071
Instrument:	NT12	Column:	ZB-5MS	Cleanups:	Silica Gel

CAS NO.	COMPOUND	DILUTION	CONC: (ug/kg wet)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	3.86	U	0.450	3.86
14488-53-0	Dibutyltin Ion	1	5.78	U	1.73	5.78
78763-54-9	Butyltin Ion	1	4.08	U	1.89	4.08
1461-25-2	Tetrabutyltin	1	5.00	U	5.00	5.00

SURROGATES	ADDED: (ug/kg wet)	FOUND: (ug/kg wet)	% REC	QC LIMITS	Q
Tripentyltin	45.178	37.2	82.3	30 - 160	
Tripropyltin	43.746	30.8	70.3	30 - 160	

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111504.D

Page 1

Date : 15-NOV-2023 11:56

Client ID:

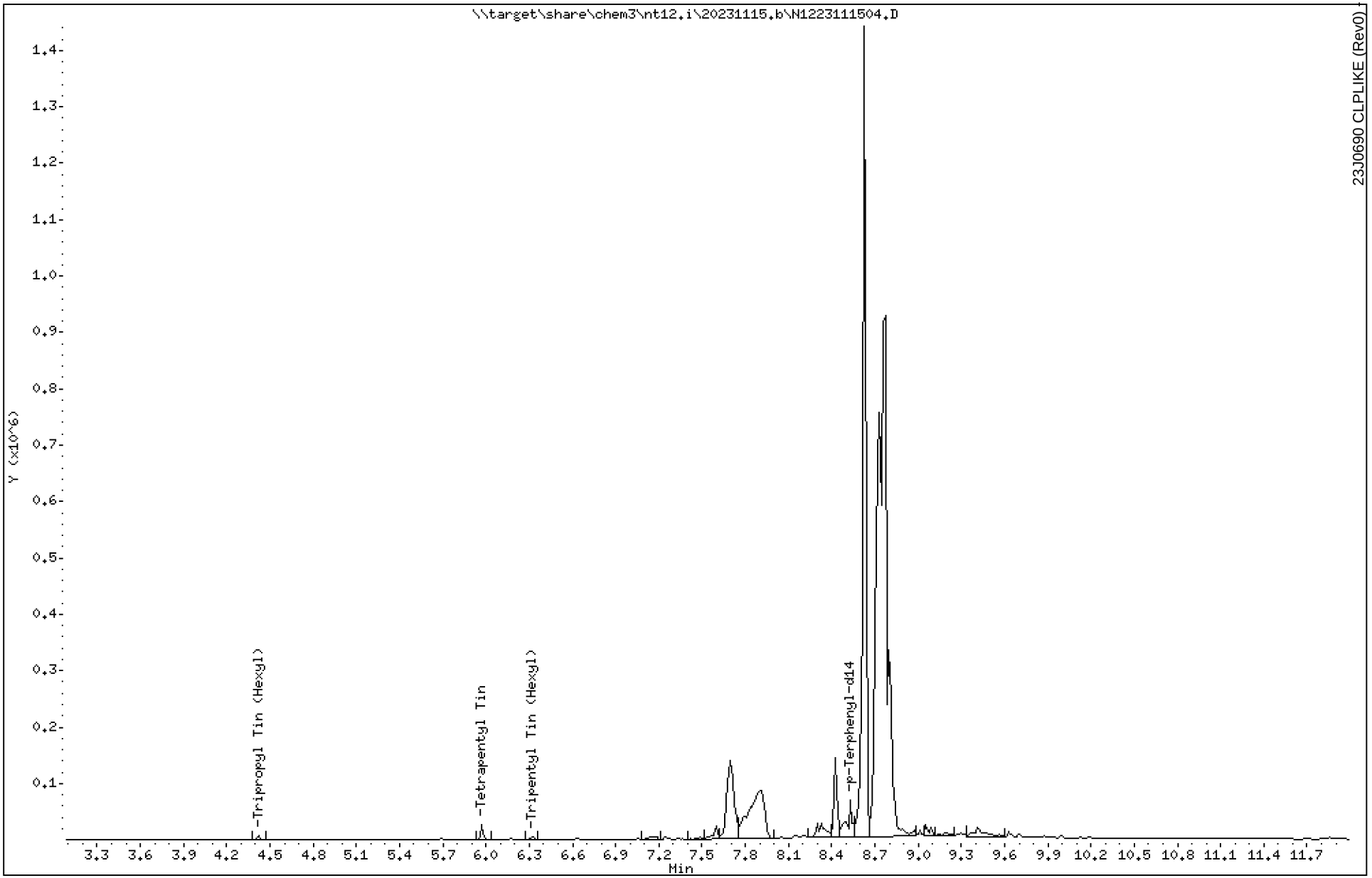
Instrument: nt12.i

Sample Info: BLK0004-BLK1,

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111504.D
Lab Smp Id: BLK0004-BLK1
Inj Date : 15-NOV-2023 11:56
Operator : JZ   Inst ID: nt12.i
Smp Info : BLK0004-BLK1,
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 4
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	CONCENTRATIONS FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.422	4.387	(0.741)	5021	0.41333	0.4133
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.					
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	33526	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.317	6.304	(0.741)	4328	0.46727	0.4673
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	35334	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111504.D
Lab Smp Id: BLK0004-BLK1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	33526	-8.89
8 p-Terphenyl-d14	37742	18871	75484	35334	-6.38

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111504.D

Lab ID: BLK0004-BLK1
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 11:56

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.741	0.735	0.0058	Tripropyl Tin (Hexyl)

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

LCS / LCS DUPLICATE RECOVERY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Matrix:	Solid	Analyzed:	11/15/23 12:33
Batch:	BLK0004	Laboratory ID:	BLK0004-BS1
Preparation:	EPA 3546 (Microwave)	Sequence Name:	LCS
Initial/Final:	5 g / 0.5 mL		

COMPOUND	SPIKE ADDED (ug/kg wet)	LCS CONCENTRATION (ug/kg wet)	Q	LCS % REC. #	QC LIMITS REC.
Tributyltin Ion	44.6	40.6		91.2	30 - 160
Dibutyltin Ion	38.4	32.9		85.8	30 - 160
Butyltin Ion	31.2	25.7		82.4	30 - 160

* Indicates values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Matrix:	Solid	Analyzed:	11/15/23 12:50
Batch:	BLK0004	Laboratory ID:	BLK0004-BSD1
Preparation:	EPA 3546 (Microwave)	Sequence Name:	LCS Dup
Initial/Final:	5 g / 0.5 mL		

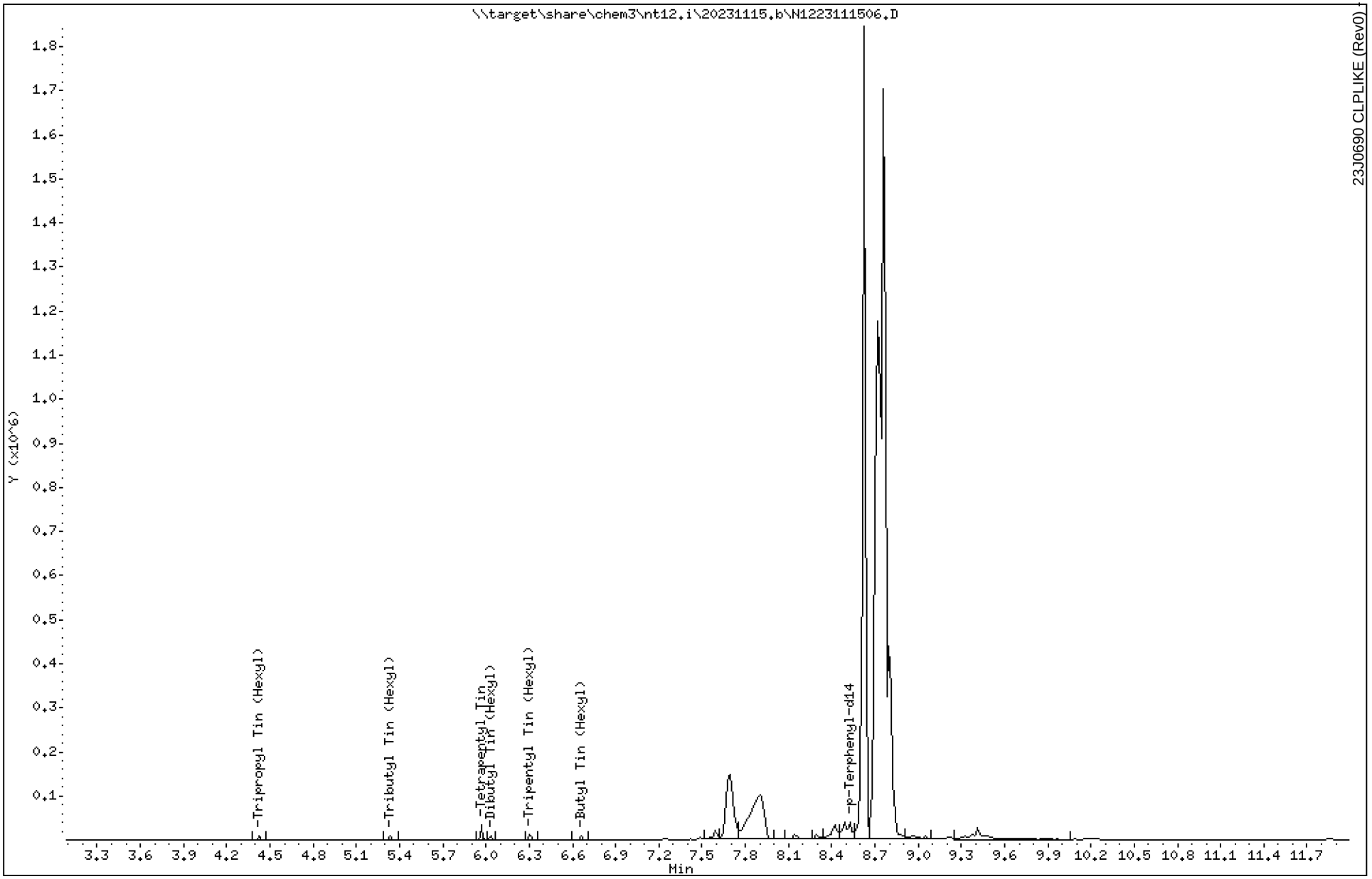
COMPOUND	SPIKE ADDED (ug/kg wet)	LCSD CONCENTRATION (ug/kg wet)	Q	LCSD % REC. #	% RPD #		QC LIMITS RPD	QC LIMITS REC.
Tributyltin Ion	44.6	28.0	*	62.8	36.8	*	30	30 - 160
Dibutyltin Ion	38.4	22.5	*	58.6	37.7	*	30	30 - 160
Butyltin Ion	31.2	19.8		63.6	25.7		30	30 - 160

* Indicates values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111506.D
Date : 15-NOV-2023 12:33
Client ID:
Sample Info: BLK0004-BS1,

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111506.D

Date : 15-NOV-2023 12:33

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BS1,

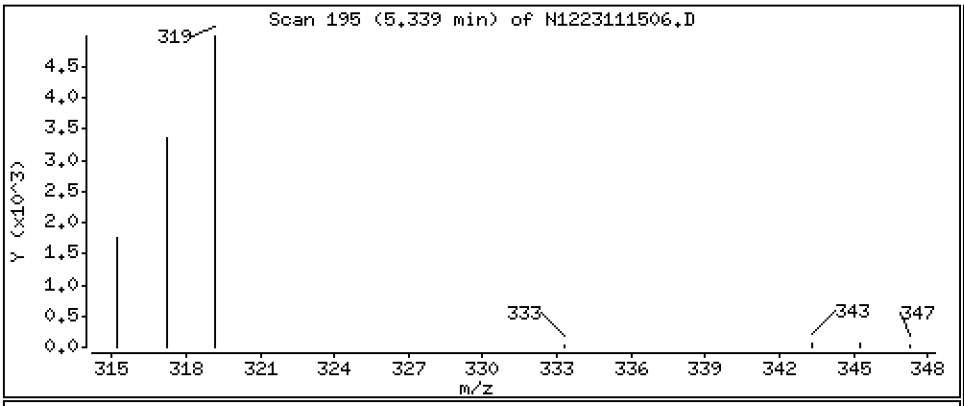
Operator: JZ

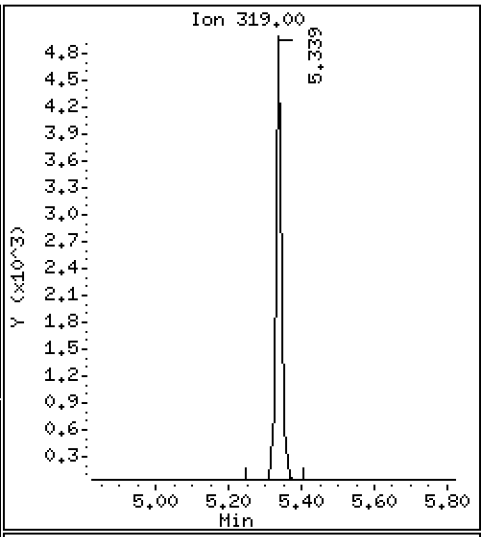
Column phase: ZB-5msi

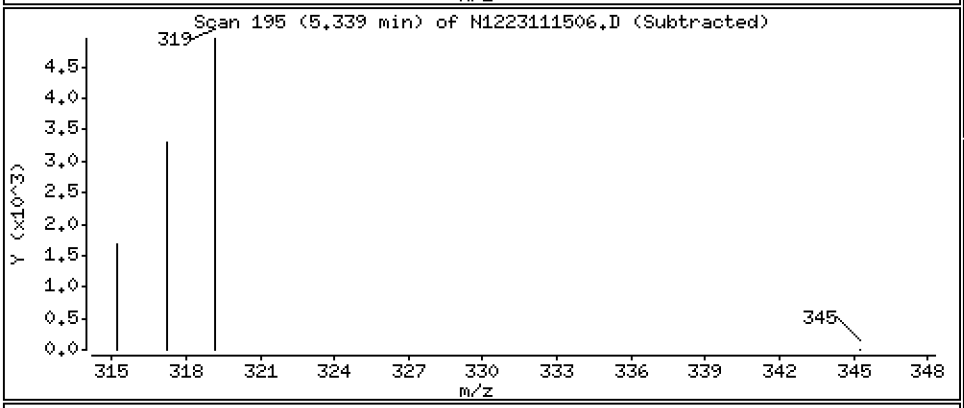
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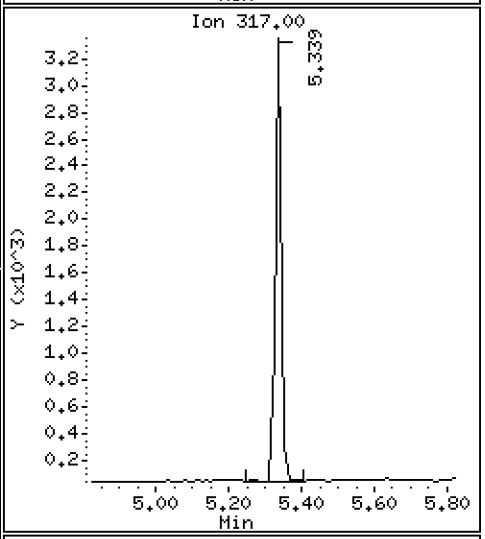
3 Tributyl Tin (Hexyl)

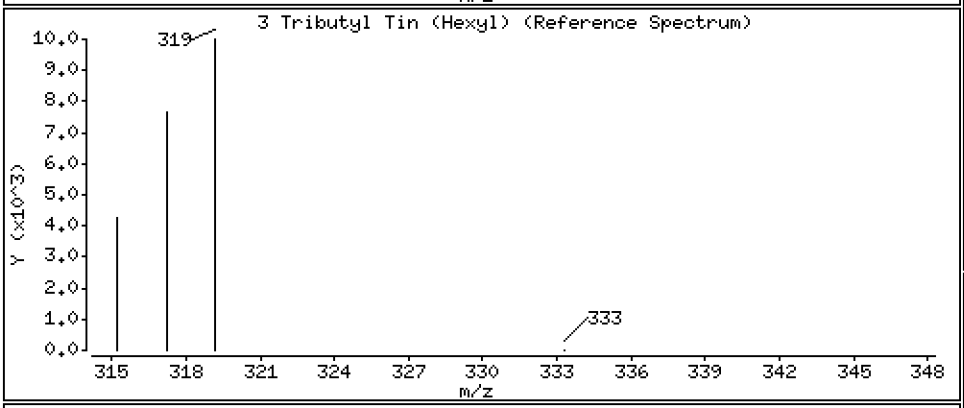
Concentration: 0.5256 ug/mL

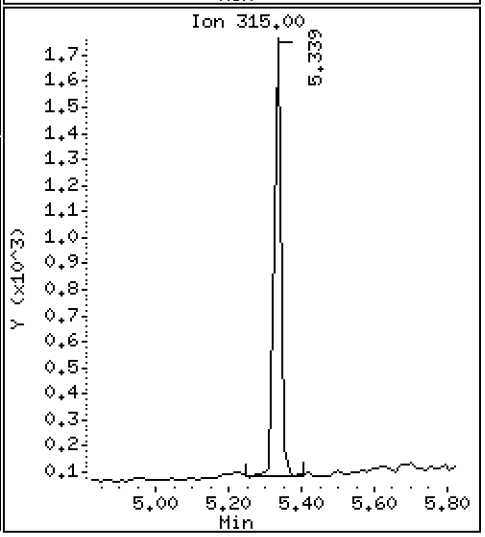


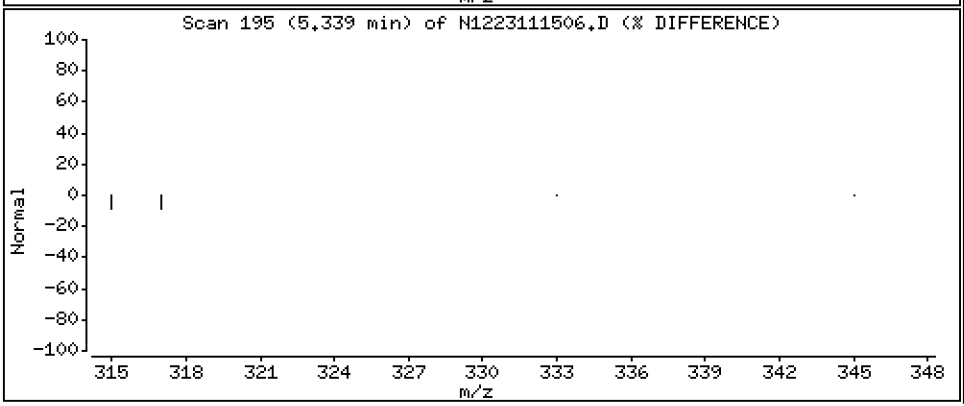












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111506.D

Date : 15-NOV-2023 12:33

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BS1,

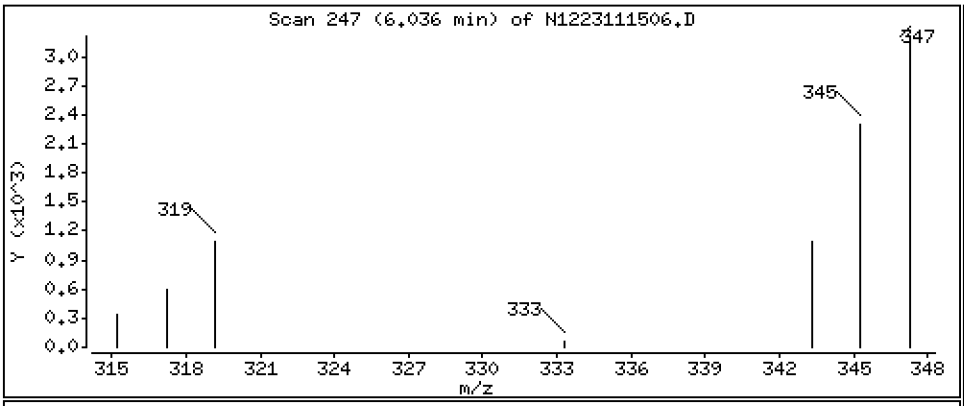
Operator: JZ

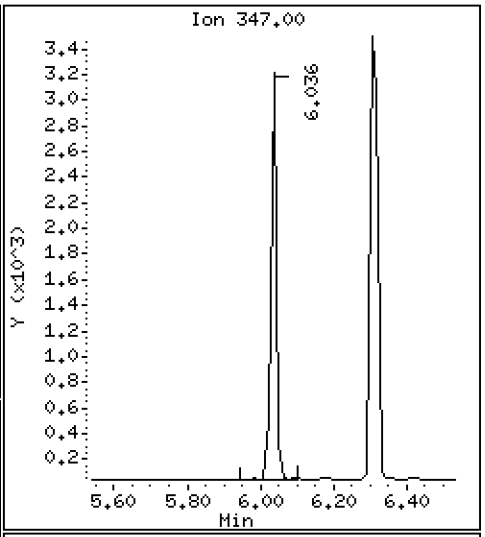
Column phase: ZB-5msi

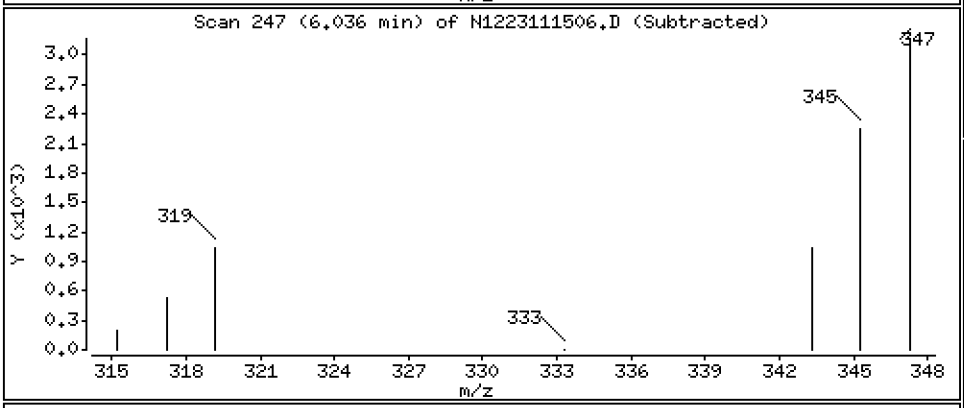
Column diameter: 0.25

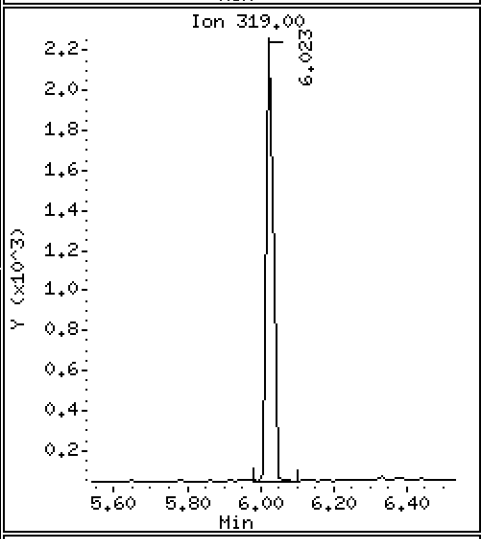
5 Dibutyl Tin (Hexyl)

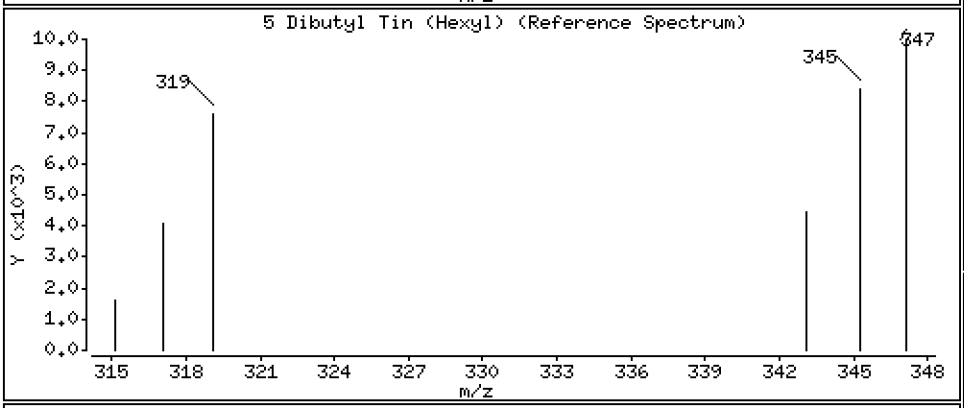
Concentration: 0.5691 ug/mL

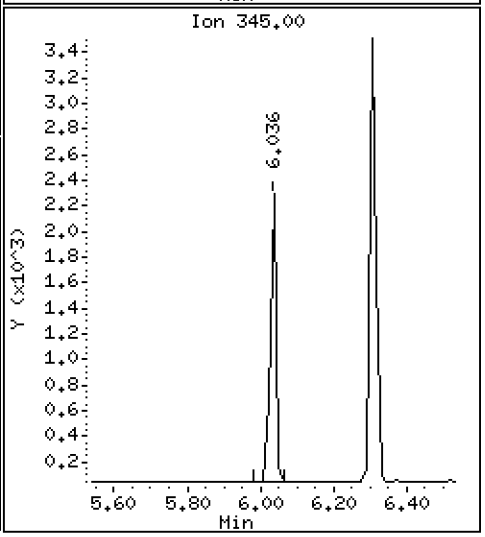


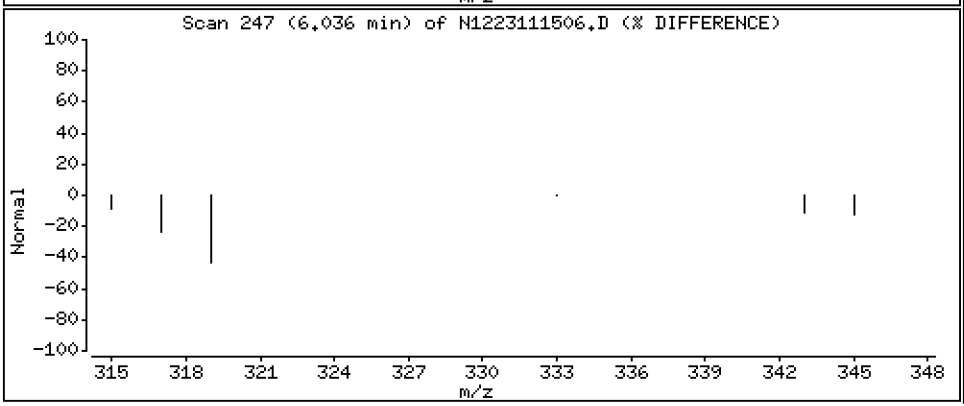












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111506.D

Date : 15-NOV-2023 12:33

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BS1,

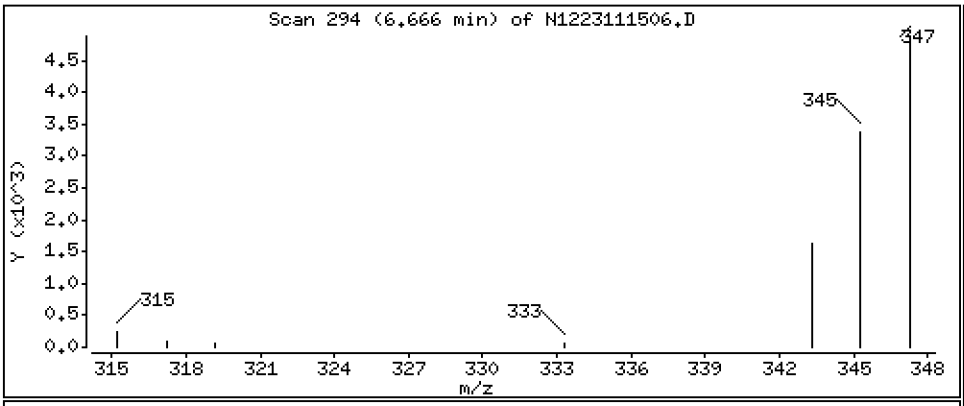
Operator: JZ

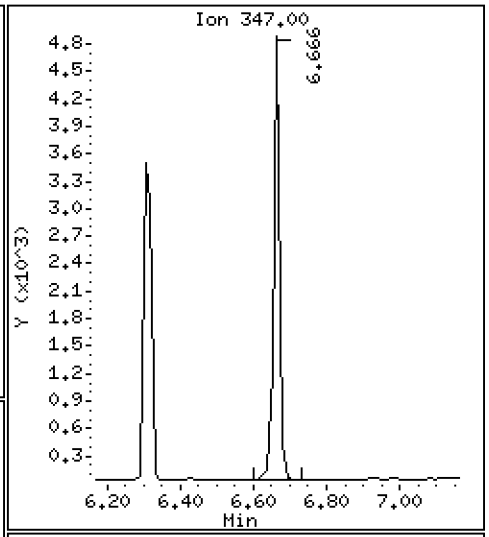
Column phase: ZB-5msi

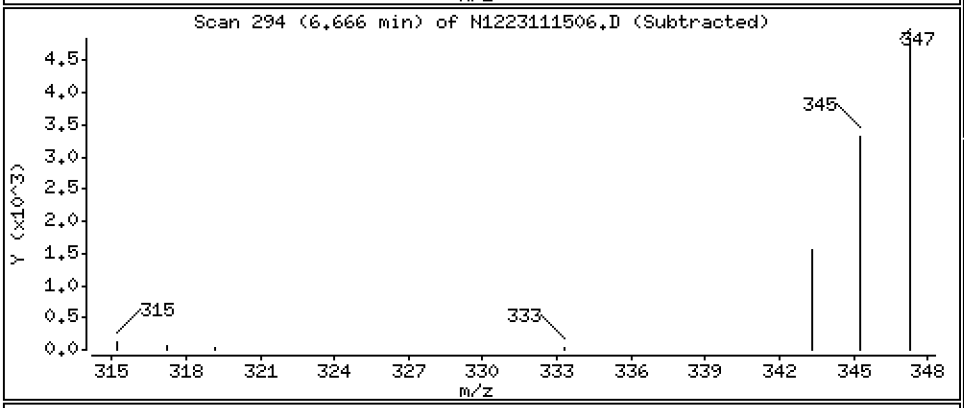
Column diameter: 0.25

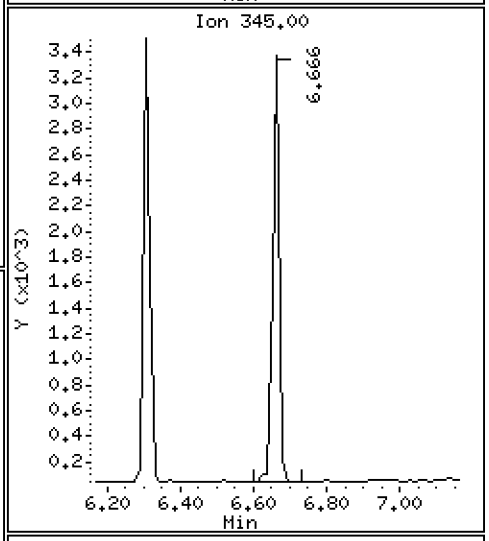
7 Butyl Tin (Hexyl)

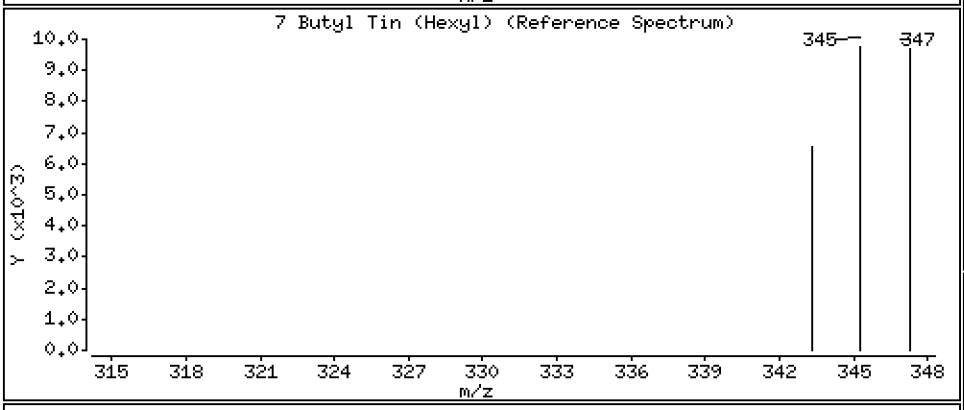
Concentration: 0.6287 ug/mL

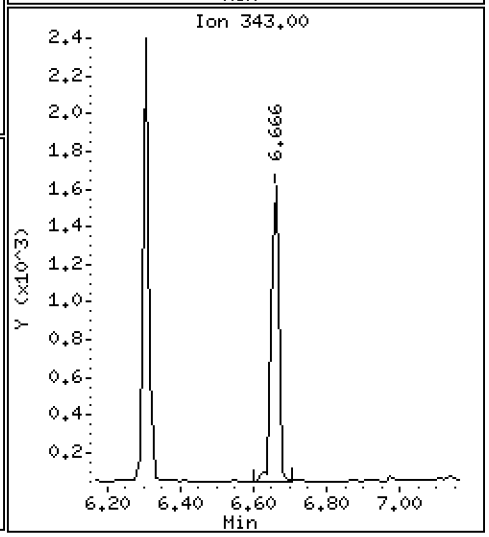


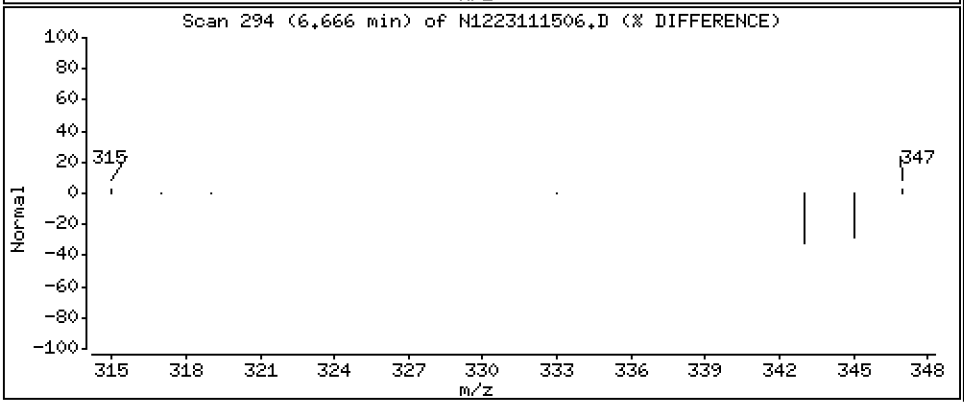












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111506.D
Lab Smp Id: BLK0004-BS1
Inj Date : 15-NOV-2023 12:33
Operator : JZ   Inst ID: nt12.i
Smp Info : BLK0004-BS1,
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 6
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.422	4.387	(0.741)	6012	0.46101	0.4610
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	5.338	5.325	(0.894)	5073	0.52559	0.5256
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	35991	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.035	6.036	(0.708)	3163	0.56908	0.5691
$	6 Tripentyl Tin (Hexyl)	347	6.304	6.304	(0.739)	5295	0.64578	0.6458
	7 Butyl Tin (Hexyl)	347	6.666	6.666	(0.781)	5287	0.62875	0.6287
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	31279	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111506.D
Lab Smp Id: BLK0004-BS1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	35991	-2.19
8 p-Terphenyl-d14	37742	18871	75484	31279	-17.12

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111506.D

Lab ID: BLK0004-BS1
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 12:33

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.741	0.735	0.0058	Tripropyl Tin (Hexyl)

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

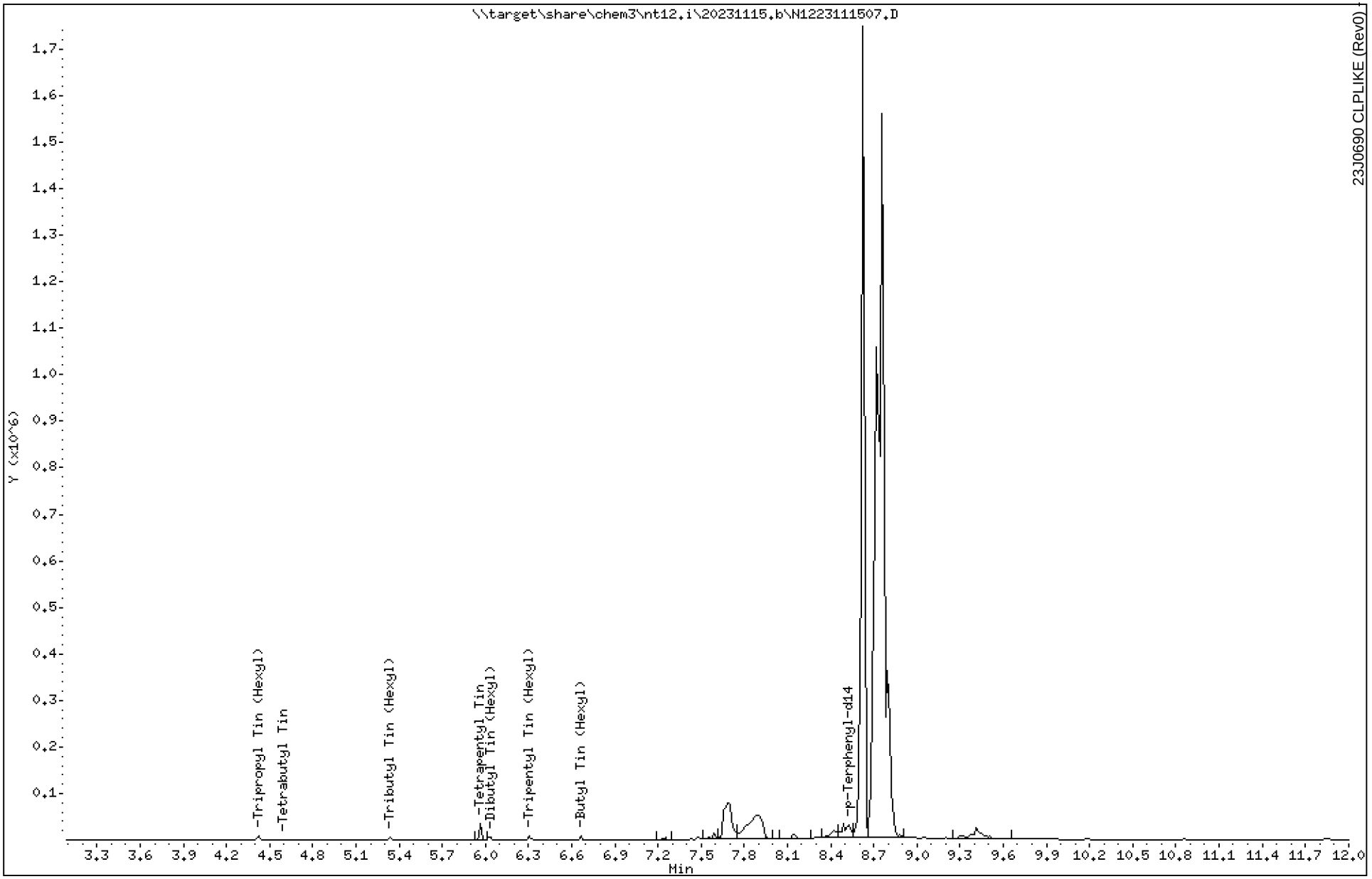
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111507.D
Date : 15-NOV-2023 12:50
Client ID:
Sample Info: BLK0004-BSD1,

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111507.D

Date : 15-NOV-2023 12:50

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BSD1,

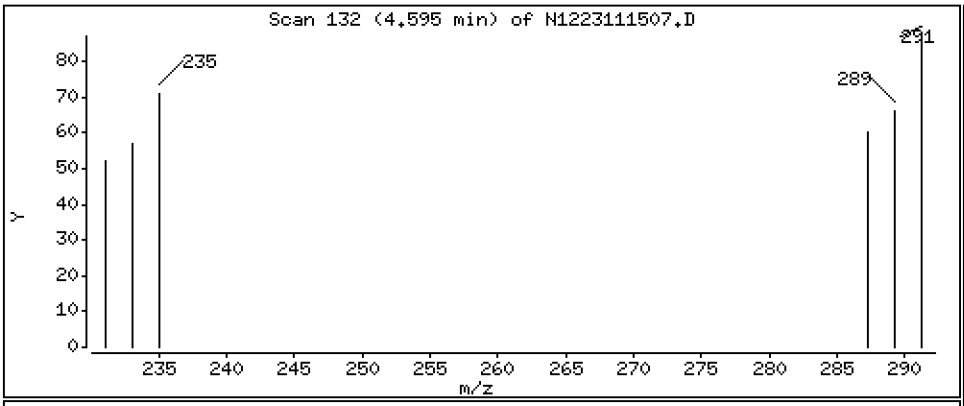
Operator: JZ

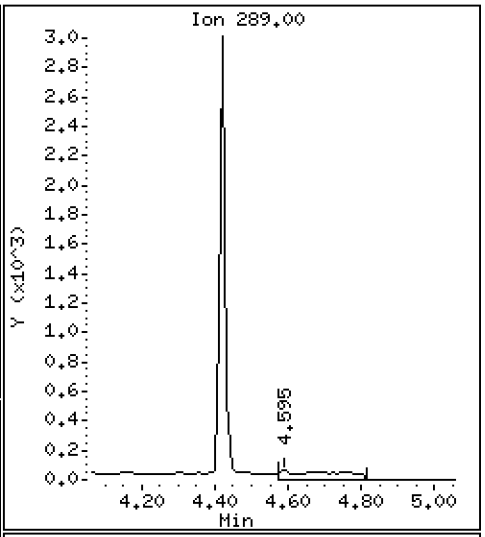
Column phase: ZB-5msi

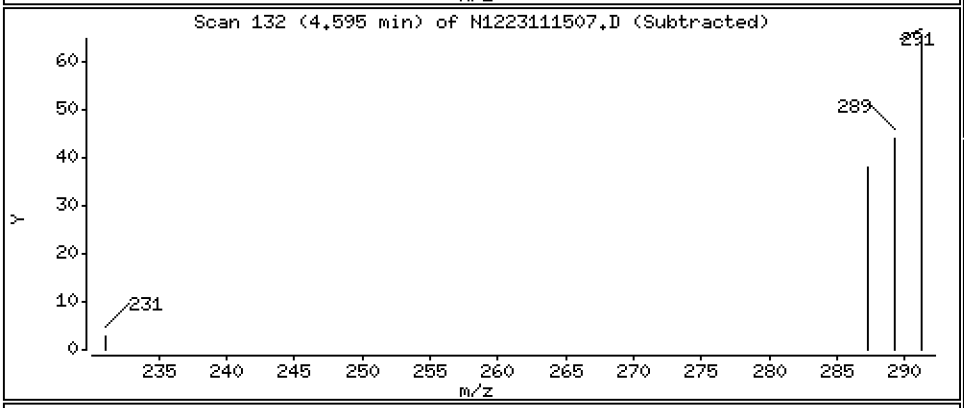
Column diameter: 0.25

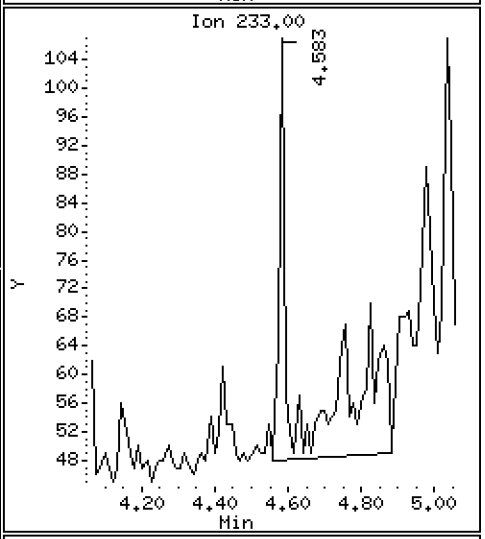
2 Tetrabutyl Tin

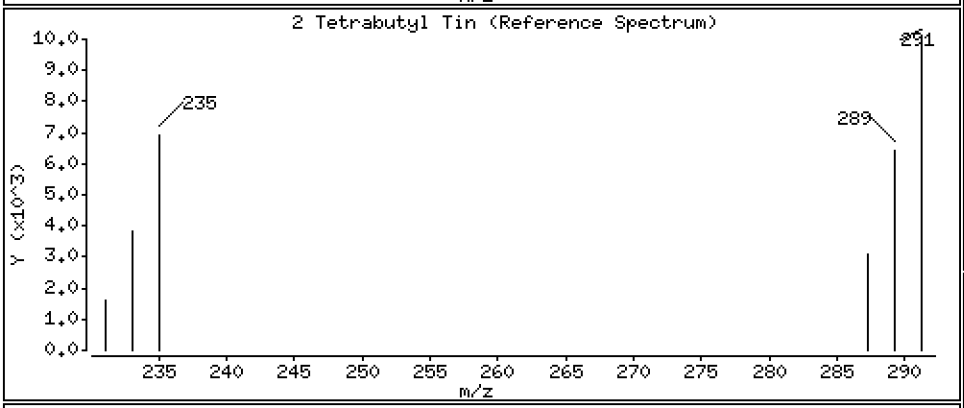
Concentration: 0.05319 ug/mL

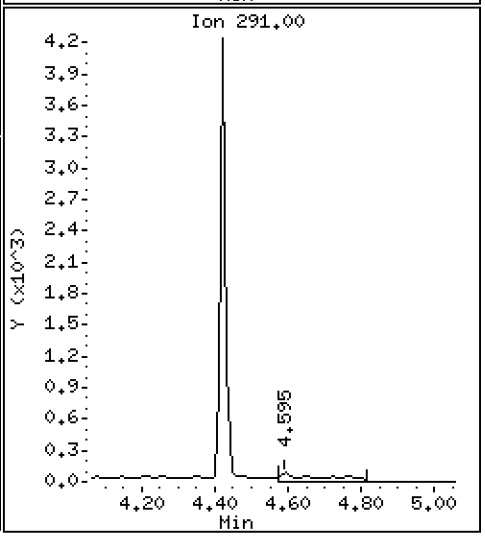


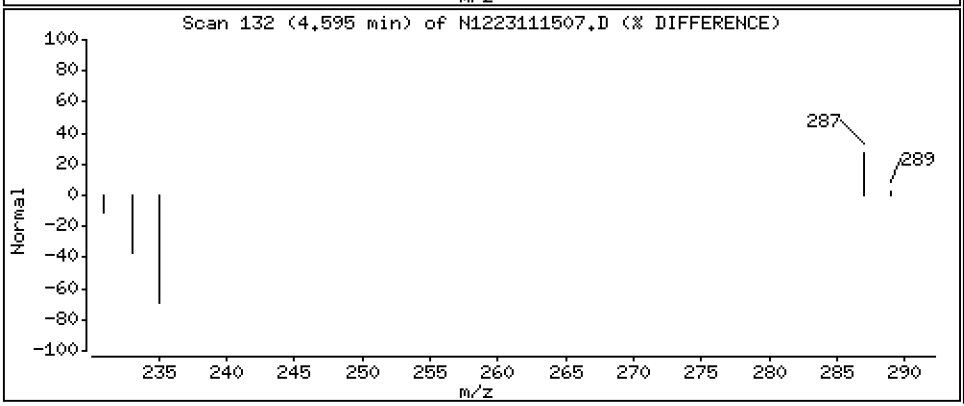












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111507.D

Date : 15-NOV-2023 12:50

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BSD1,

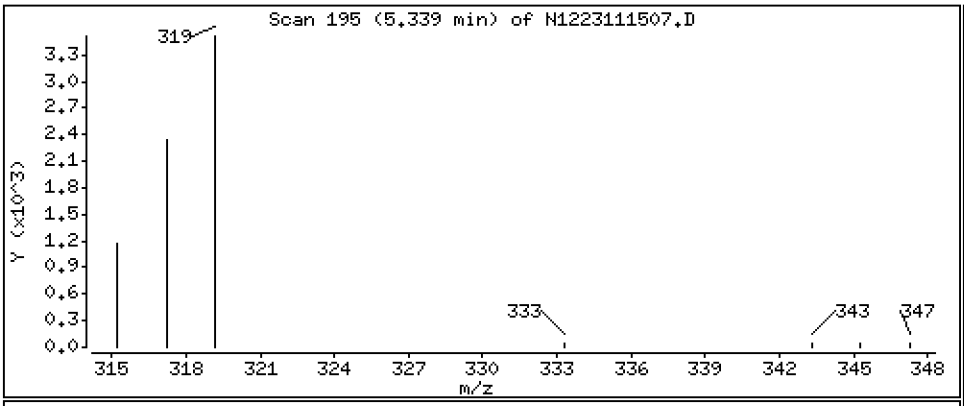
Operator: JZ

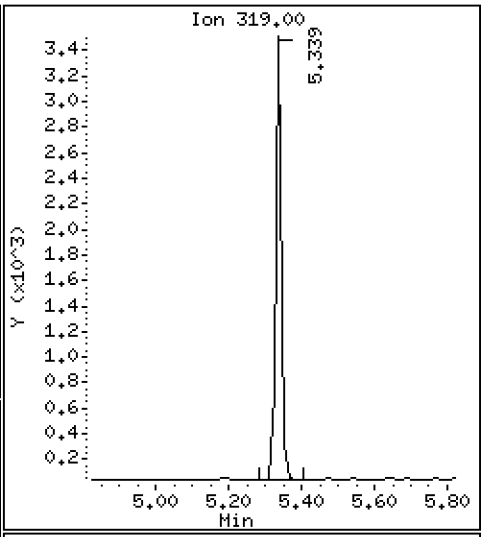
Column phase: ZB-5msi

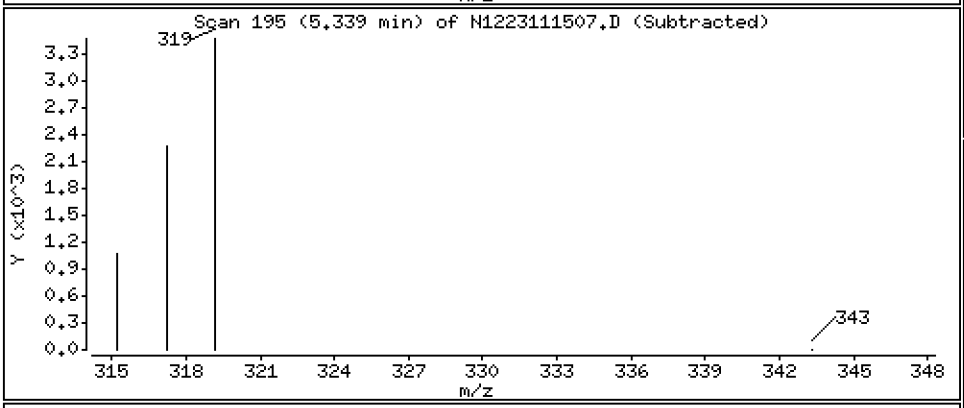
Column diameter: 0.25

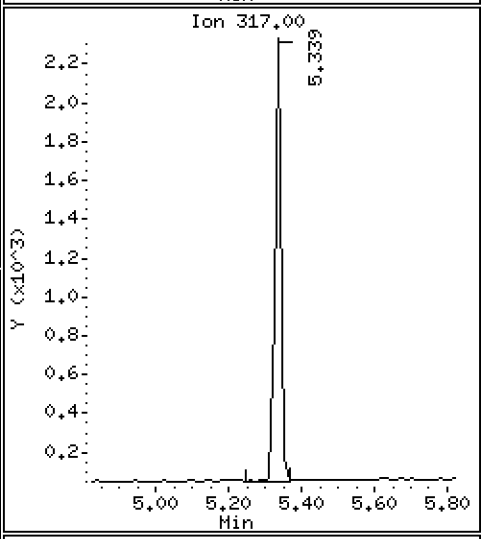
3 Tributyl Tin (Hexyl)

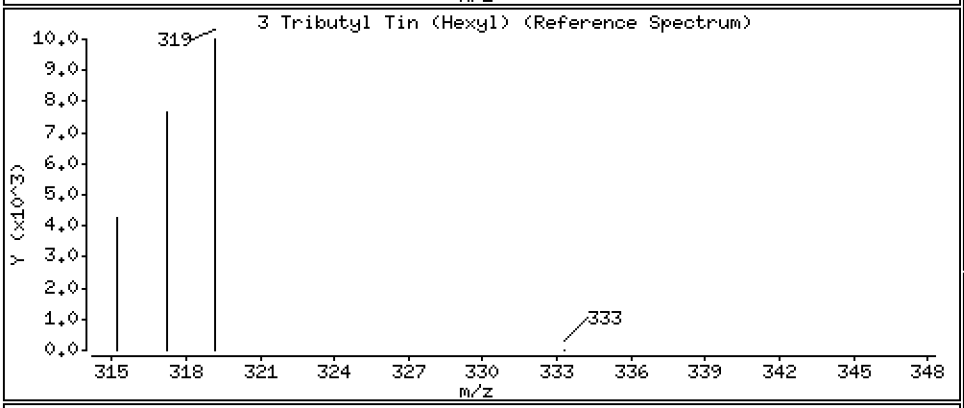
Concentration: 0.3622 ug/mL

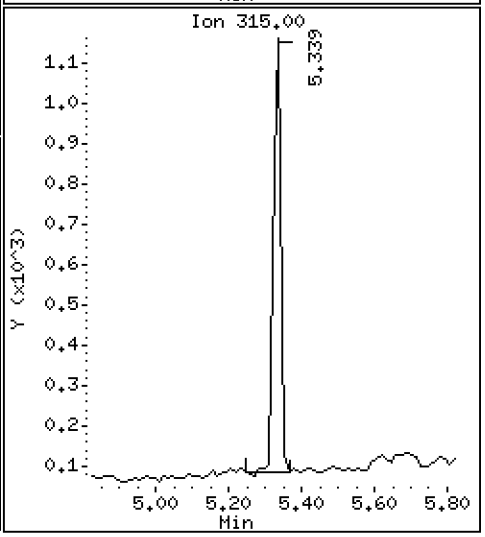


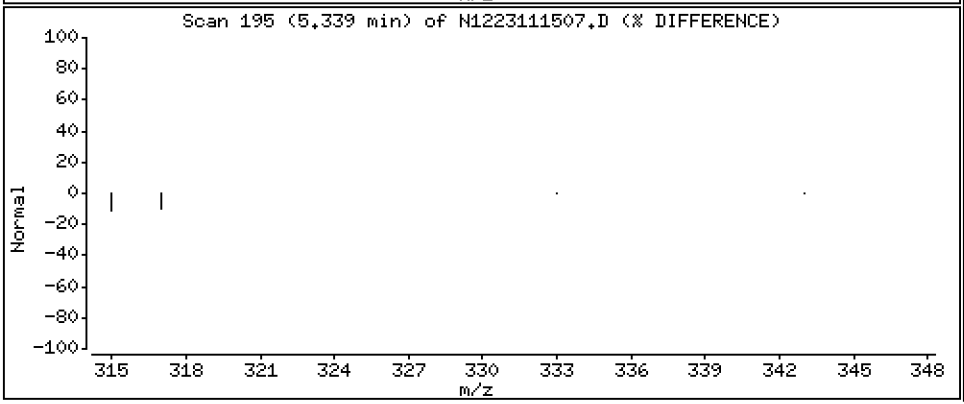












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111507.D

Date : 15-NOV-2023 12:50

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BSD1,

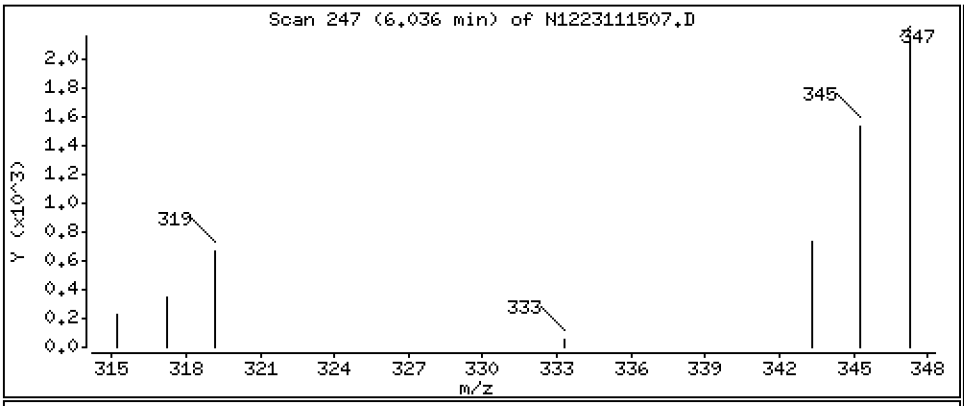
Operator: JZ

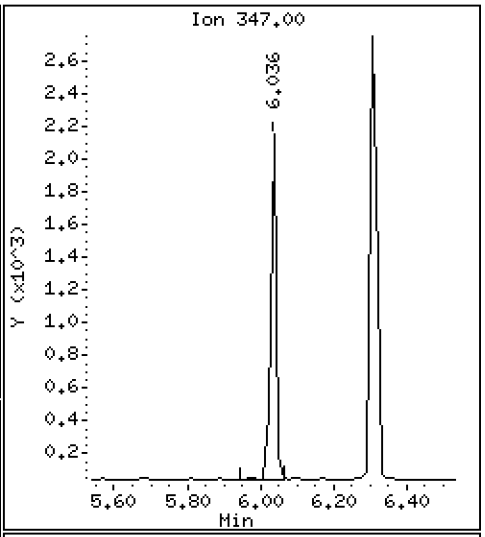
Column phase: ZB-5msi

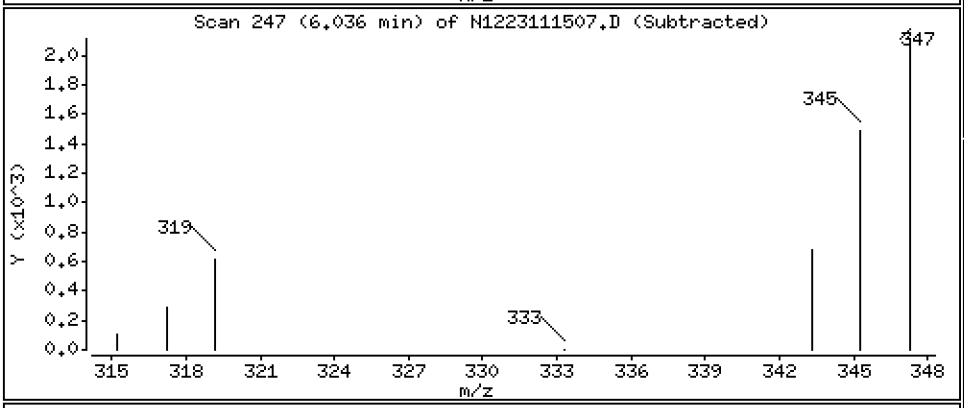
Column diameter: 0.25

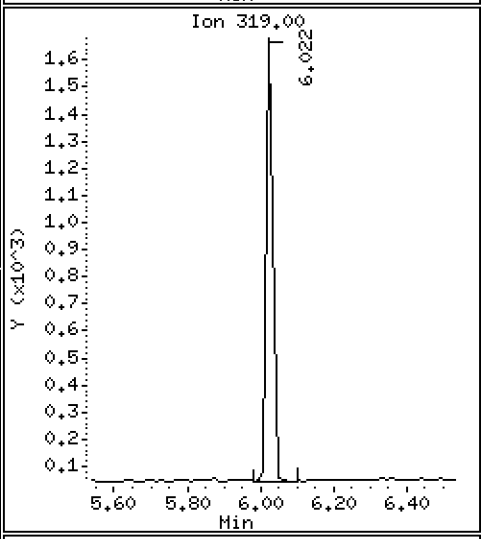
5 Dibutyl Tin (Hexyl)

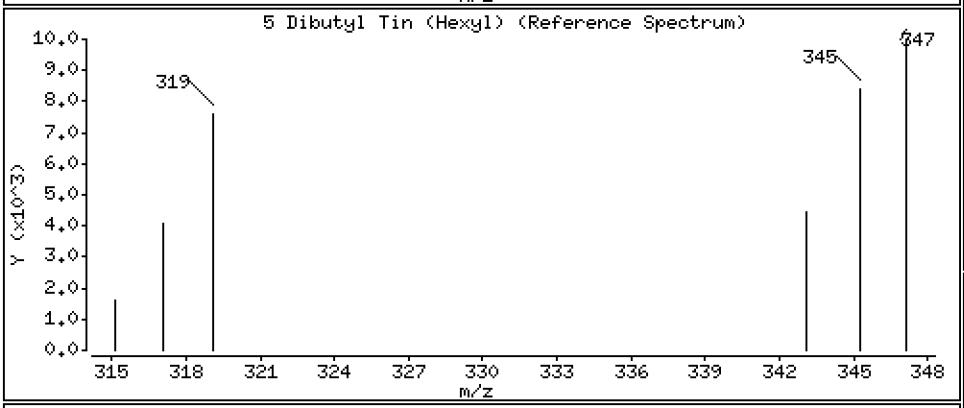
Concentration: 0.3887 ug/mL

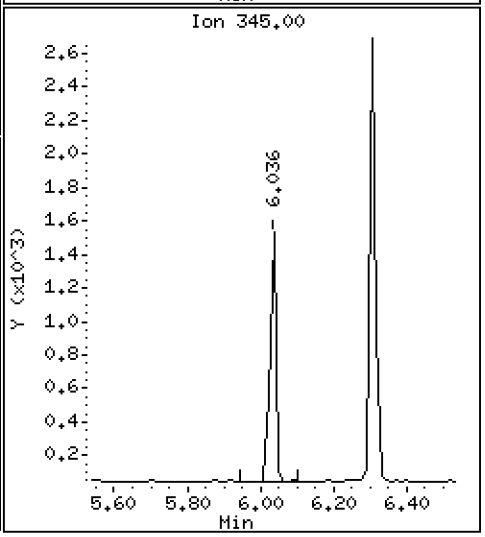


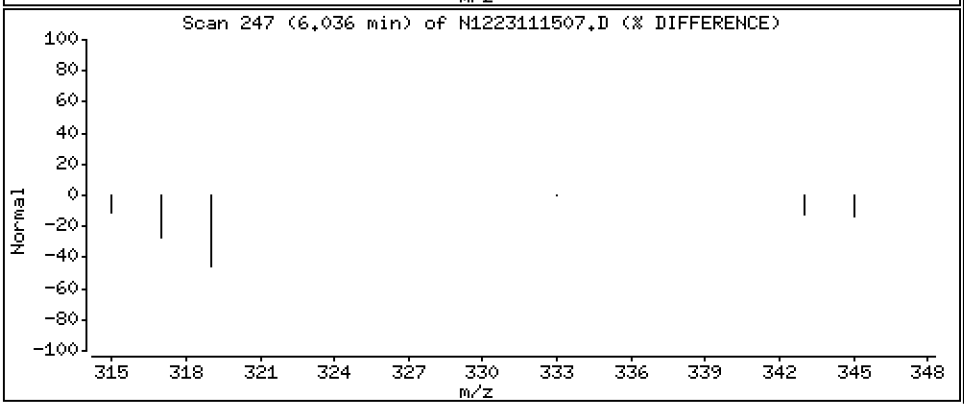












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111507.D

Date : 15-NOV-2023 12:50

Client ID:

Instrument: nt12.i

Sample Info: BLK0004-BSD1,

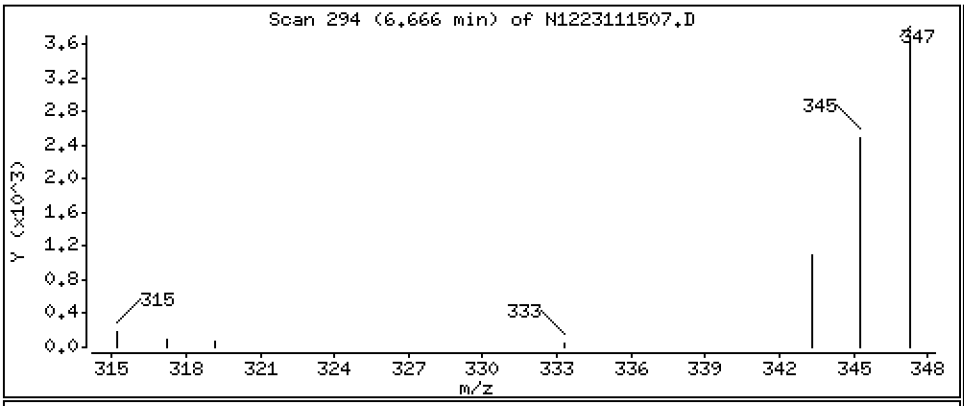
Operator: JZ

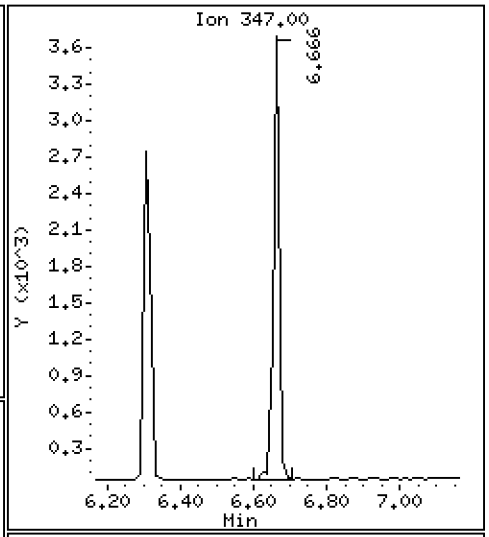
Column phase: ZB-5msi

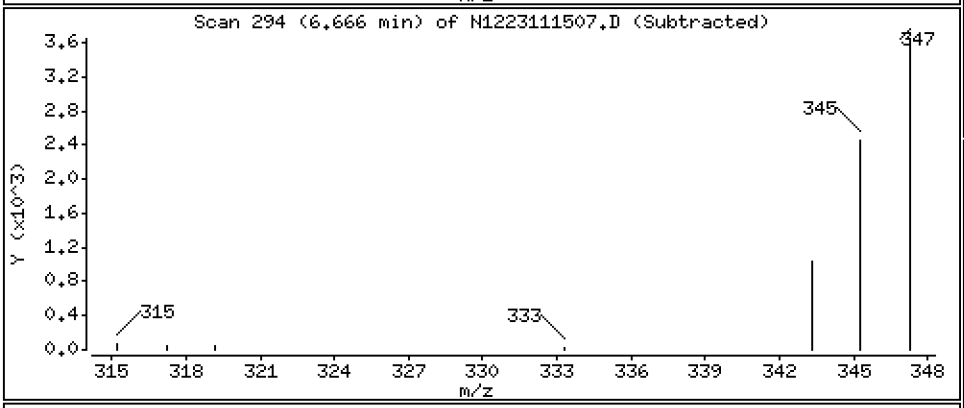
Column diameter: 0.25

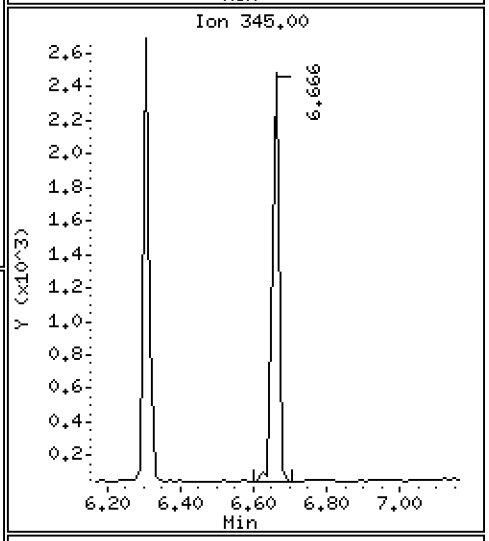
7 Butyl Tin (Hexyl)

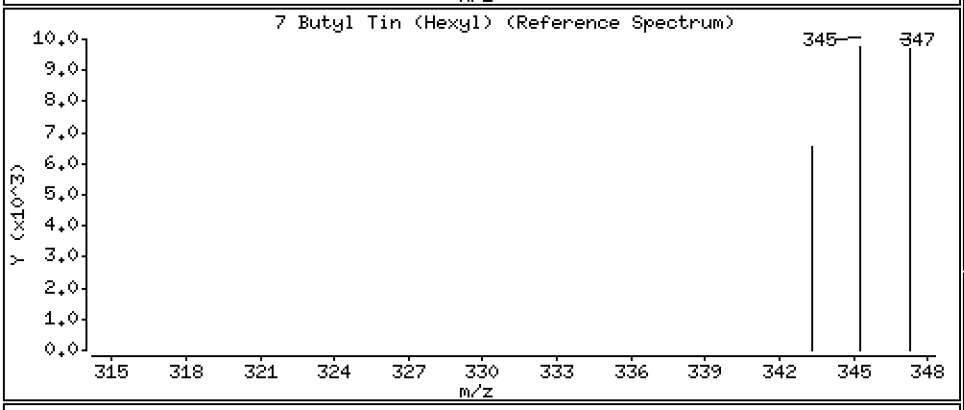
Concentration: 0.4854 ug/mL

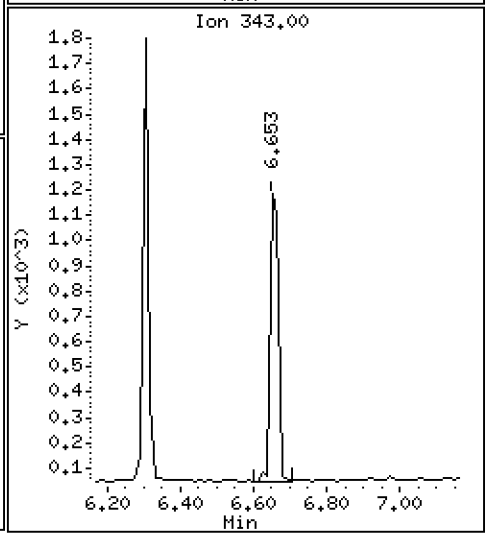


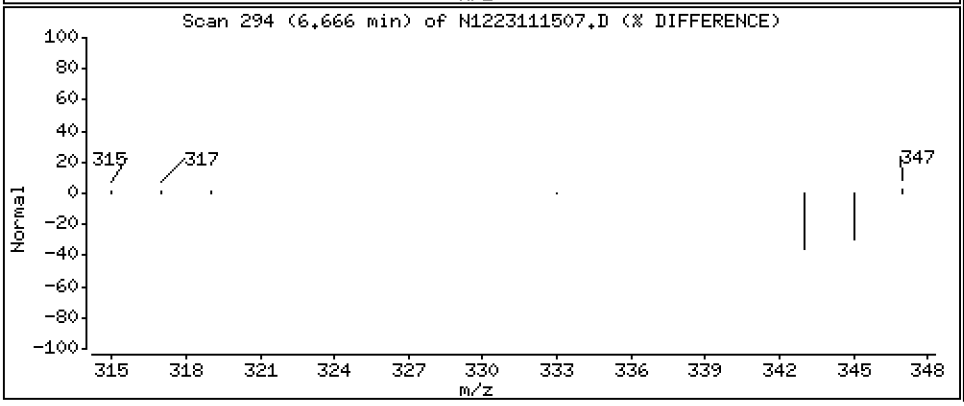












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111507.D
Lab Smp Id: BLK0004-BSD1
Inj Date : 15-NOV-2023 12:50
Operator : JZ   Inst ID: nt12.i
Smp Info : BLK0004-BSD1,
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 7
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.422	4.387	(0.741)	4236	0.31742	0.3174
	2 Tetrabutyl Tin	289	4.594	4.560	(0.770)	687	0.05319	0.05319
	3 Tributyl Tin (Hexyl)	319	5.338	5.325	(0.894)	3577	0.36215	0.3622
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	36830	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.035	6.036	(0.708)	2143	0.38869	0.3887
$	6 Tripentyl Tin (Hexyl)	347	6.304	6.304	(0.739)	3693	0.45406	0.4541
	7 Butyl Tin (Hexyl)	347	6.665	6.666	(0.781)	4049	0.48543	0.4854
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	31027	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111507.D
Lab Smp Id: BLK0004-BSD1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	36830	0.09
8 p-Terphenyl-d14	37742	18871	75484	31027	-17.79

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111507.D

Lab ID: BLK0004-BSD1
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 12:50

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.770	0.764	0.0058	Tetrabutyl Tin
0.741	0.735	0.0058	Tripropyl Tin (Hexyl)

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Analytical Resources, LLC
Analytical Chemists and Consultants

MASS SPECTROMETER
INSTRUMENT PERFORMANCE CHECK
EPA 8270E-SIM

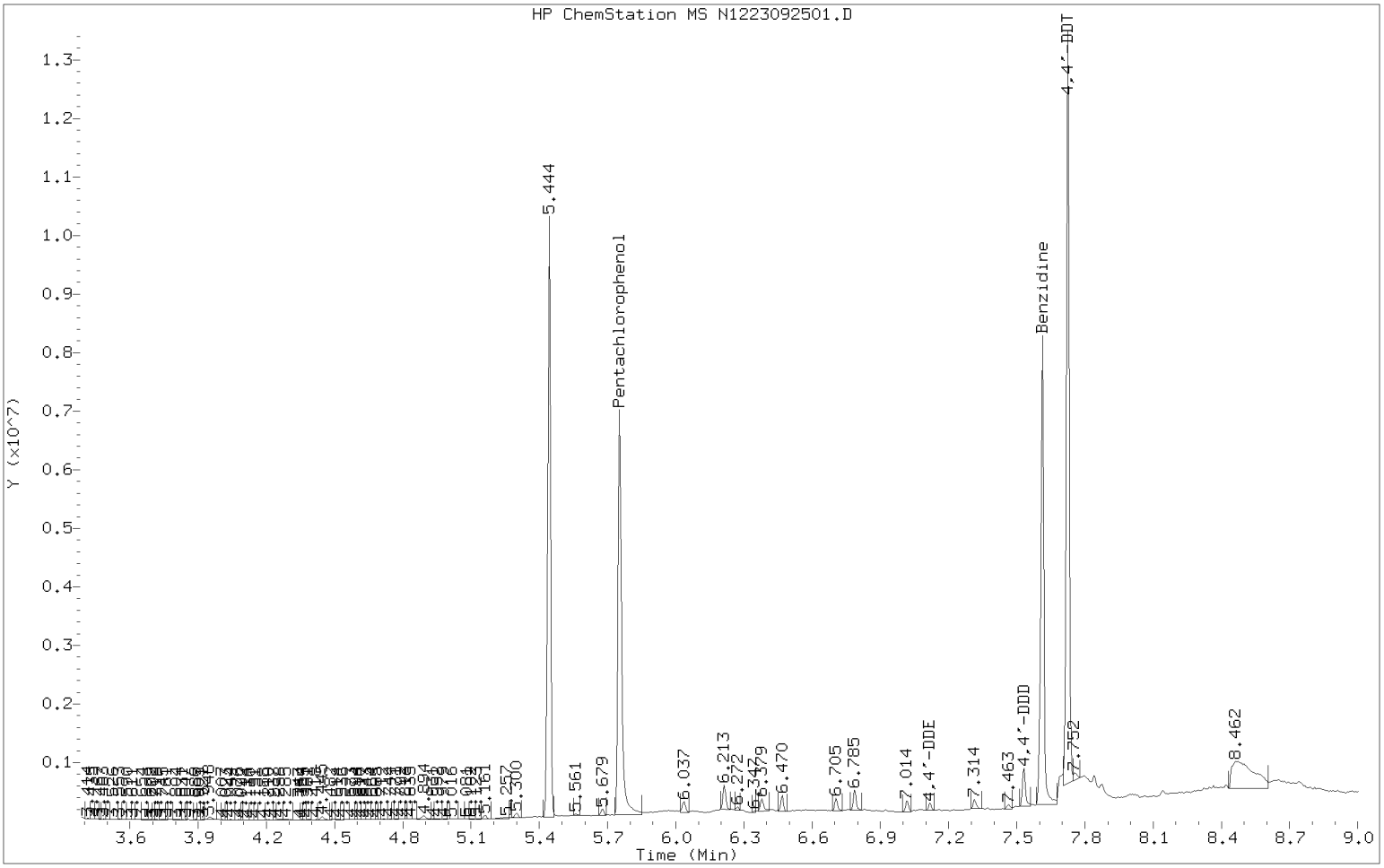
Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Lab File ID:	N1223092501.D	Injection Date:	09/25/23
Instrument ID:	NT12	Injection Time:	09:54
Sequence:	SLI0375	Lab Sample ID:	SLI0375-TUN1

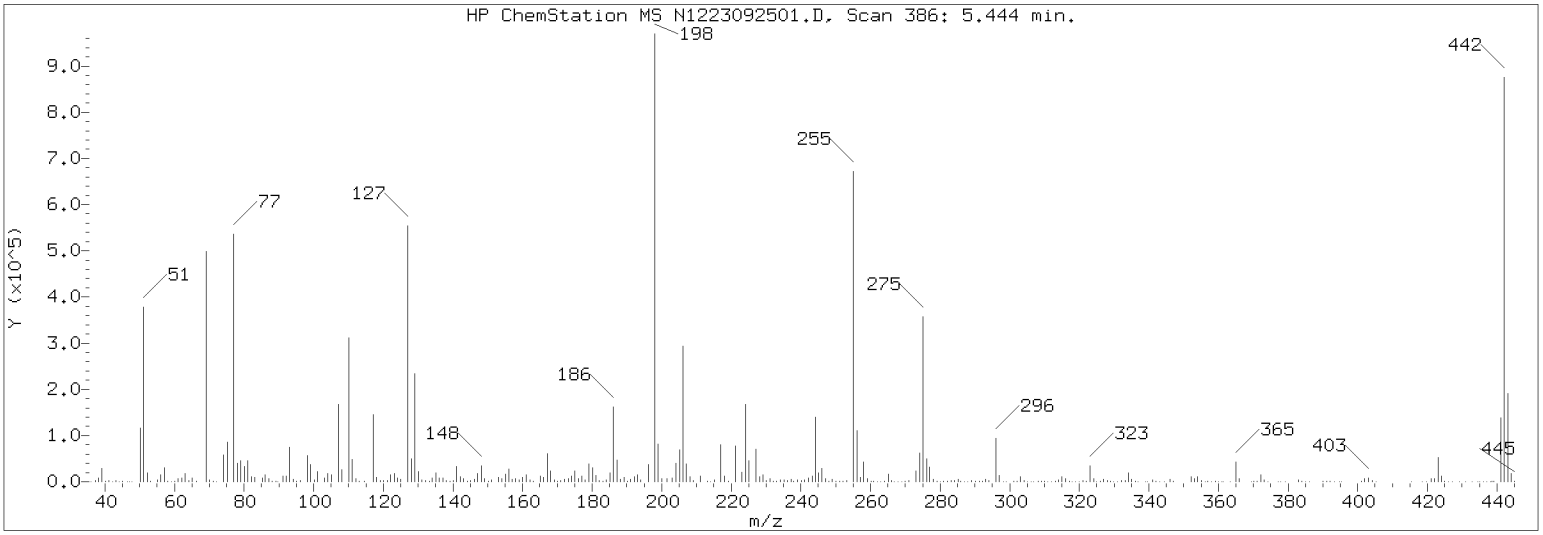
m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
68	Less than 2% of 69	0	PASS
69	Less than 100% of 198	49.3	PASS
70	Less than 2% of 69	0.718	PASS
197	Less than 2% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7.69	PASS
365	1 - 100% of 198	4.54	PASS
441	Less than 150% of 443	72.9	PASS
442	1 - 200% of 198	95.1	PASS
443	15 - 24% of 442	21.4	PASS
4,4'-DDD	Less than 20% of 4,4'-DDT		
4,4'-DDE	Less than 20% of 4,4'-DDT		
4,4'-DDT	Base peak, 100% relative abundance		

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
MS Tune	SLI0375-TUN1	N1223092501.D	09/25/2023	9:54
Initial Cal Blank	SLI0375-ICB1	N1223092502.D	09/25/2023	10:12
Cal Standard	SLI0375-CAL1	N1223092503.D	09/25/2023	10:34
Cal Standard	SLI0375-CAL2	N1223092504.D	09/25/2023	10:52
Cal Standard	SLI0375-CAL3	N1223092505.D	09/25/2023	11:09
Cal Standard	SLI0375-CAL4	N1223092506.D	09/25/2023	11:26
Cal Standard	SLI0375-CAL5	N1223092507.D	09/25/2023	11:44
Cal Standard	SLI0375-CAL6	N1223092508.D	09/25/2023	12:02
Secondary Cal Check	SLI0375-SCV1	N1223092509.D	09/25/2023	12:34

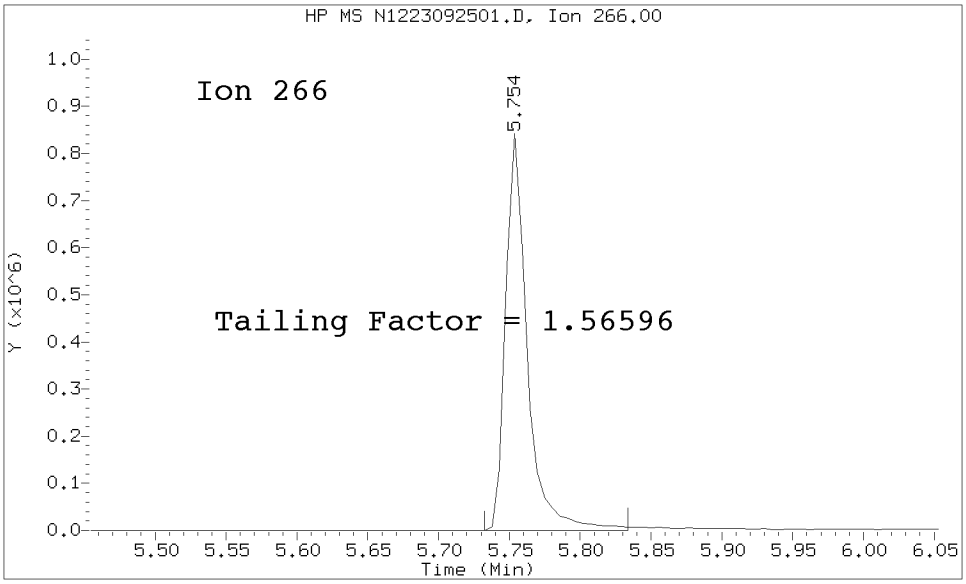
DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

Datafile Analyzed: /20230925.b/tune.b/N1223092501.D/N1223092501.D
Method Used: \20230925.b\tune.b\DFTPP.m Inst: nt12
Injection Date: 25-SEP-2023 09:54 Operator: JZ
Sample Info: SLI0375-TUN1 DFTPP230925
Report Date: 09/25/2023 13:35



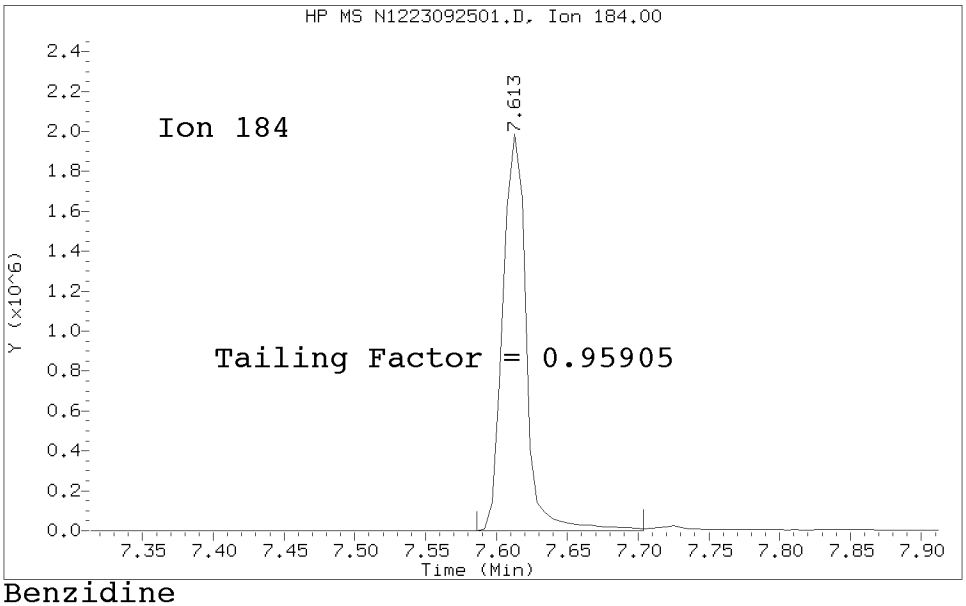


Datafile Analyzed: /20230925.b/tune.b/N1223092501.D/N1223092501.D
Method Used: \20230925.b\tune.b\DFTPP.m\sw846ddt.m Inst: nt12
Injection Date: 25-SEP-2023 09:54 Operator: JZ
Sample Info: DFTPP230925
Report Date: 09/25/2023 13:35



Pentachlorophenol
==========
Exp. RT = 5.758
Found RT = 5.754

Tail Factor = 1.566 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 7.628
Found RT = 7.613

Tail Factor = 0.959 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	1.5659631	2.000	PASS
Benzidine	0.9590517	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	1627295			N/A
4,4-DDE	12334	0.8	20.0	PASS
4,4-DDD	135936	7.7	20.0	PASS
4,4-DDD + DDE	148270	8.4	20.0	PASS

Tuning Sample, nt12.i/20230925.b/tune.b/N1223092501.D, *** PASSED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	37.75
68	Less than 2.00% of mass 69	0.00 (0.00)
69	Mass 69 relative abundance	49.34
70	Less than 2.00% of mass 69	0.35 (0.72)
127	10.00 - 80.00% of mass 198	54.62
197	Less than 2.00% of mass 198	0.00
199	5.00 - 9.00% of mass 198	7.69
275	10.00 - 60.00% of mass 198	36.59
365	Greater than 1.00% of mass 198	4.54
441	0.01 - 24.00% of mass 442	14.86 (15.63)
442	50.00 - 200.00% of mass 198	95.10
443	15.00 - 24.00% of mass 442	20.38 (21.43)

Data File: N1223092501.D
Spectrum: Avg. Scans 385-387 (5.44), Background Scan 380
Location of Maximum: 198.00
Number of points: 364

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	318	141.00	23344	238.00	918	333.00	2394
37.00	1638	142.00	8187	239.00	2322	334.00	15866
38.00	2511	143.00	4831	240.00	1828	335.00	4350
39.00	22456	144.00	1343	241.00	3154	336.00	549
40.00	1133	145.00	1479	242.00	7144	337.00	86
41.00	1048	146.00	4586	243.00	6347	339.00	150
42.00	381	147.00	12025	244.00	105752	340.00	284
43.00	186	148.00	25520	245.00	13825	341.00	2908
44.00	467	149.00	5163	246.00	21192	342.00	605
45.00	548	150.00	1174	247.00	4412	344.00	150
46.00	189	151.00	3206	248.00	1134	345.00	55
48.00	206	152.00	386	249.00	3820	346.00	4740
50.00	89288	153.00	7332	250.00	910	347.00	1156
51.00	278144	154.00	5321	251.00	856	348.00	66
52.00	14548	155.00	12435	252.00	976	350.00	165
53.00	527	156.00	19400	253.00	1843	351.00	478
55.00	2412	157.00	4201	255.00	514624	352.00	7955
56.00	9566	158.00	4801	256.00	82640	353.00	5261
57.00	21208	159.00	3679	257.00	6315	354.00	7914
58.00	1093	160.00	7349	258.00	32272	355.00	1164
59.00	148	161.00	10419	259.00	4737	358.00	243
60.00	237	162.00	2772	260.00	732	359.00	646
61.00	4461	163.00	776	261.00	845	360.00	111
62.00	6018	164.00	277	262.00	333	361.00	477
63.00	14244	165.00	8349	263.00	398	362.00	61
64.00	1563	166.00	5046	264.00	477	363.00	75
65.00	6188	167.00	44672	265.00	13811	365.00	33480
66.00	576	168.00	17816	266.00	2000	366.00	5149
69.00	363520	169.00	3291	268.00	288	367.00	146
70.00	2610	170.00	1323	269.00	375	369.00	146
71.00	205	171.00	2090	270.00	634	370.00	735
72.00	181	172.00	3824	271.00	1431	371.00	1693
74.00	43000	173.00	4849	272.00	64	372.00	12430
75.00	62568	174.00	9624	273.00	18296	373.00	3298
77.00	387264	175.00	16290	274.00	45784	374.00	432
78.00	28616	176.00	4896	275.00	269568	377.00	458
79.00	32560	177.00	8798	276.00	37760	378.00	114
80.00	24664	178.00	2037	277.00	23712	379.00	156
81.00	31520	179.00	31528	278.00	3748	381.00	61
82.00	7361	180.00	21088	279.00	726	383.00	3461
83.00	6249	181.00	10103	280.00	331	384.00	868
84.00	4	182.00	1815	281.00	246	385.00	213
85.00	6284	183.00	1015	282.00	532	390.00	1391
86.00	9829	184.00	2739	283.00	2293	391.00	1295
87.00	4694	185.00	15296	284.00	1417	392.00	829
88.00	1397	186.00	120472	285.00	4482	393.00	206
89.00	1014	187.00	34768	286.00	865	395.00	247
90.00	72	188.00	4056	287.00	138	396.00	67
91.00	7437	189.00	8427	288.00	398	397.00	146

92.00	3786	190.00	1221	289.00	1210	401.00	830
93.00	53560	191.00	3585	290.00	789	402.00	5026
94.00	3312	192.00	9579	291.00	589	403.00	6536
95.00	846	193.00	10290	292.00	1193	404.00	2284
96.00	2141	194.00	2810	293.00	4445	405.00	371
98.00	41080	196.00	27472	294.00	1349	408.00	58
99.00	27840	198.00	736768	296.00	73960	409.00	56
100.00	1386	199.00	56648	297.00	10733	410.00	146
101.00	15797	200.00	5262	298.00	662	413.00	105
102.00	574	201.00	4857	299.00	297	415.00	372
103.00	6272	202.00	313	300.00	77	416.00	75
104.00	12363	203.00	5874	301.00	1048	417.00	78
105.00	10460	204.00	30616	302.00	1482	418.00	68
107.00	123024	205.00	52560	303.00	8109	419.00	102
108.00	19016	206.00	216960	304.00	2583	420.00	96
110.00	222656	207.00	28792	305.00	404	421.00	5472
111.00	34144	208.00	7785	306.00	65	422.00	5068
112.00	5039	209.00	2494	307.00	189	423.00	41536
113.00	1245	210.00	2108	308.00	1276	424.00	8751
114.00	739	211.00	8964	309.00	1027	425.00	892
117.00	107608	213.00	754	310.00	968	426.00	135
118.00	8289	214.00	168	311.00	290	427.00	172
119.00	1283	215.00	2488	312.00	190	429.00	9
120.00	1597	216.00	1786	313.00	798	430.00	106
121.00	104	217.00	59296	314.00	3542	431.00	112
122.00	10173	218.00	7603	315.00	8403	433.00	186
123.00	12773	219.00	447	316.00	5081	434.00	129
124.00	5672	221.00	53968	317.00	1077	435.00	279
125.00	4667	223.00	13647	318.00	105	436.00	278
127.00	402432	224.00	126944	319.00	209	437.00	204
128.00	35424	225.00	33528	320.00	288	438.00	1084
129.00	172032	226.00	927	321.00	2344	439.00	952
130.00	16464	227.00	52160	322.00	1430	441.00	109504
131.00	2872	228.00	7616	323.00	25704	442.00	700672
132.00	1698	229.00	11237	324.00	4682	443.00	150144
133.00	1291	230.00	1383	325.00	573	444.00	13649
134.00	5302	231.00	5028	326.00	689	445.00	633
135.00	14036	232.00	864	327.00	4884	470.00	59
136.00	5746	233.00	801	328.00	2174	494.00	78
137.00	6538	234.00	3855	329.00	340		
138.00	1223	235.00	3748	330.00	260		
139.00	1418	236.00	2567	331.00	263		
140.00	1086	237.00	4396	332.00	1860		

INITIAL CALIBRATION DATA

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Calibration:	GI00071	Instrument:	NT12
Calibration Date:	09/25/2023	Column (1):	ZB-5MS

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
Tributyltin Ion	0.03865	0.5776907	0.1546	0.575312	0.3865	0.5373051	0.773	0.4644276	1.546	0.5436013	3.092	0.5198113
Dibutyltin Ion	0.0578	3.444782E-02	0.2312	3.750214E-02	0.578	3.549941E-02	1.156	3.041421E-02	2.312	3.752816E-02	4.624	3.784236E-02
Butyltin Ion	0.0408	4.866599E-02	0.1632	5.403461E-02	0.408	5.232009E-02	0.816	0.0457058	1.632	5.855067E-02	3.264	6.331952E-02
Tetrabutyltin	0.05	0.8367854	0.2	0.7680414	0.5	0.6871191	1	0.592891	2	0.6708884	4	0.6522248
Tripentyltin	0.07959	4.954406E-02	0.31836	5.487408E-02	0.7959	5.053742E-02	1.5918	4.511115E-02	3.1836	0.0550166	6.3672	5.948288E-02
Tripropyltin	0.037215	0.8571214	0.14886	0.7977059	0.37215	0.7212027	0.7443	0.6261683	1.4886	0.6934786	2.9772	0.6524057

INITIAL CALIBRATION DATA

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Calibration:	GI00071	Instrument:	NT12
Calibration Date:	09/25/2023	Column (1):	ZB-5MS

COMPOUND	Mean RRF	RRF RSD	Linear COD	Quad COD	Limit Type & Limit	Q
Tributyltin Ion	0.536358	7.8			RSD (15)	
Dibutyltin Ion	3.553902E-02	8.0			RSD (15)	
Butyltin Ion	5.376611E-02	12.0			RSD (15)	
Tetrabutyltin	0.701325	12.4			RSD (15)	
Tripentyltin	0.0524277	9.6			RSD (15)	
Tripropyltin	0.7246804	12.2			RSD (15)	

Analytical Resources, LLC
Analytical Chemists and Consultants

ANALYSIS SEQUENCE

SLI0375

Instrument: NT12
Calibration ID: GI00071

Printed: 9/25/2023 7:19:45PM

Lab Number	Analysis	Container	Order	Position	STD ID	ISTD ID	Client	Comments
SLI0375-TUN1	QC		1		L005045			
SLI0375-ICB1	QC		2			L004084		
SLI0375-CAL1	QC		3		L002070	L004084		
SLI0375-CAL2	QC		4		L002071	L004084		
SLI0375-CAL3	QC		5		L002072	L004084		
SLI0375-CAL4	QC		6		L002073	L004084		
SLI0375-CAL5	QC		7		L002074	L004084		
SLI0375-CAL6	QC		8		L002075	L004084		
SLI0375-SCV1	QC		9		L004613	L004084		

Samples Loaded By Date

Data Processed By Date

INTERNAL STANDARD SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20230925.b

	Time	Filename	LabID	ClientId	DF					
1	0954	N1223092501.D	SLI0375-TUN1		1	NO ISTDS FOUND				
2	1012	N1223092502.D	SLI0375-ICB1		1	6.08	54202	8.66	59475	
3	1034	N1223092503.D	SLI0375-CAL1		1	6.08	53108	8.66	59220	
4	1052	N1223092504.D	SLI0375-CAL2		1	6.08	55622	8.66	58370	
5	1109	N1223092505.D	SLI0375-CAL3		1	6.08	57271	8.65	61032	
6	1126	N1223092506.D	SLI0375-CAL4		1	6.08	55113	8.65	59196	
7	1144	N1223092507.D	SLI0375-CAL5		1	6.08	59849	8.65	59931	
8	1202	N1223092508.D	SLI0375-CAL6		1	6.08	63600	8.65	60828	
9	1234	N1223092509.D	SLI0375-SCV1		1	6.08	57693	8.66	61184	

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20230925.b

ARI Job No.: SLI0 Method: TBT20230925.m Instrument: nt12.i Date: 25-SEP-2023

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
1012	N1223092502.D	SLI0375-ICB1		1	NO MANUAL INTEGRATION
1034	N1223092503.D	SLI0375-CAL1		1	NO MANUAL INTEGRATION
1052	N1223092504.D	SLI0375-CAL2		1	NO MANUAL INTEGRATION
1109	N1223092505.D	SLI0375-CAL3		1	NO MANUAL INTEGRATION
1126	N1223092506.D	SLI0375-CAL4		1	NO MANUAL INTEGRATION
1144	N1223092507.D	SLI0375-CAL5		1	NO MANUAL INTEGRATION
1202	N1223092508.D	SLI0375-CAL6		1	NO MANUAL INTEGRATION
1234	N1223092509.D	SLI0375-SCV1		1	NO MANUAL INTEGRATION

Security Status Report

Date: 25-Sep-2023 19:23

N1223092501.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092502.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092503.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092504.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092505.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092506.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092507.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092508.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092509.D	Data Locked	jianqing, 25-Sep-2023 19:23

23J0690 CLPLIKE (Rev0) - Page 84 of 1248

ARI Labs, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 25-SEP-2023 10:34
End Cal Date : 25-SEP-2023 12:02
Quant Method : ISTD
Origin : Disabled
Target Version : 4.14
Integrator : HP RTE
Method file : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Last Edit : 25-Sep-2023 13:48 nt12.i
Curve Type : Average

Calibration File Names:
Level 1: \\target\share\chem3\nt12.i\20230925.b\N1223092503.D
Level 2: \\target\share\chem3\nt12.i\20230925.b\N1223092504.D
Level 3: \\target\share\chem3\nt12.i\20230925.b\N1223092505.D
Level 4: \\target\share\chem3\nt12.i\20230925.b\N1223092506.D
Level 5: \\target\share\chem3\nt12.i\20230925.b\N1223092507.D
Level 6: \\target\share\chem3\nt12.i\20230925.b\N1223092508.D

Compound	0.05000 Level 1	0.20000 Level 2	0.50000 Level 3	1.000 Level 4	2.000 Level 5	4.000 Level 6	___ RRF	% RSD
2 Tetrabutyl Tin	0.83679	0.76804	0.68712	0.59289	0.67089	0.65222	0.70133	12.446
3 Tributyl Tin (Hexyl)	0.57769	0.57531	0.53731	0.46443	0.54360	0.51981	0.53636	7.789
5 Dibutyl Tin (Hexyl)	0.03445	0.03750	0.03550	0.03041	0.03753	0.03784	0.03554	8.015
7 Butyl Tin (Hexyl)	0.04867	0.05403	0.05232	0.04571	0.05855	0.06332	0.05377	11.976
$ 1 Tripropyl Tin (Hexyl)	0.85712	0.79771	0.72120	0.62617	0.69348	0.65241	0.72468	12.154
$ 6 Tripentyl Tin (Hexyl)	0.04954	0.05487	0.05054	0.04511	0.05502	0.05948	0.05243	9.646

ARI Labs, Inc.
RETENTION TIME SUMMARY REPORT

Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Batch File: \\target\share\chem3\nt12.i\20230925.b
Inst ID: nt12.i

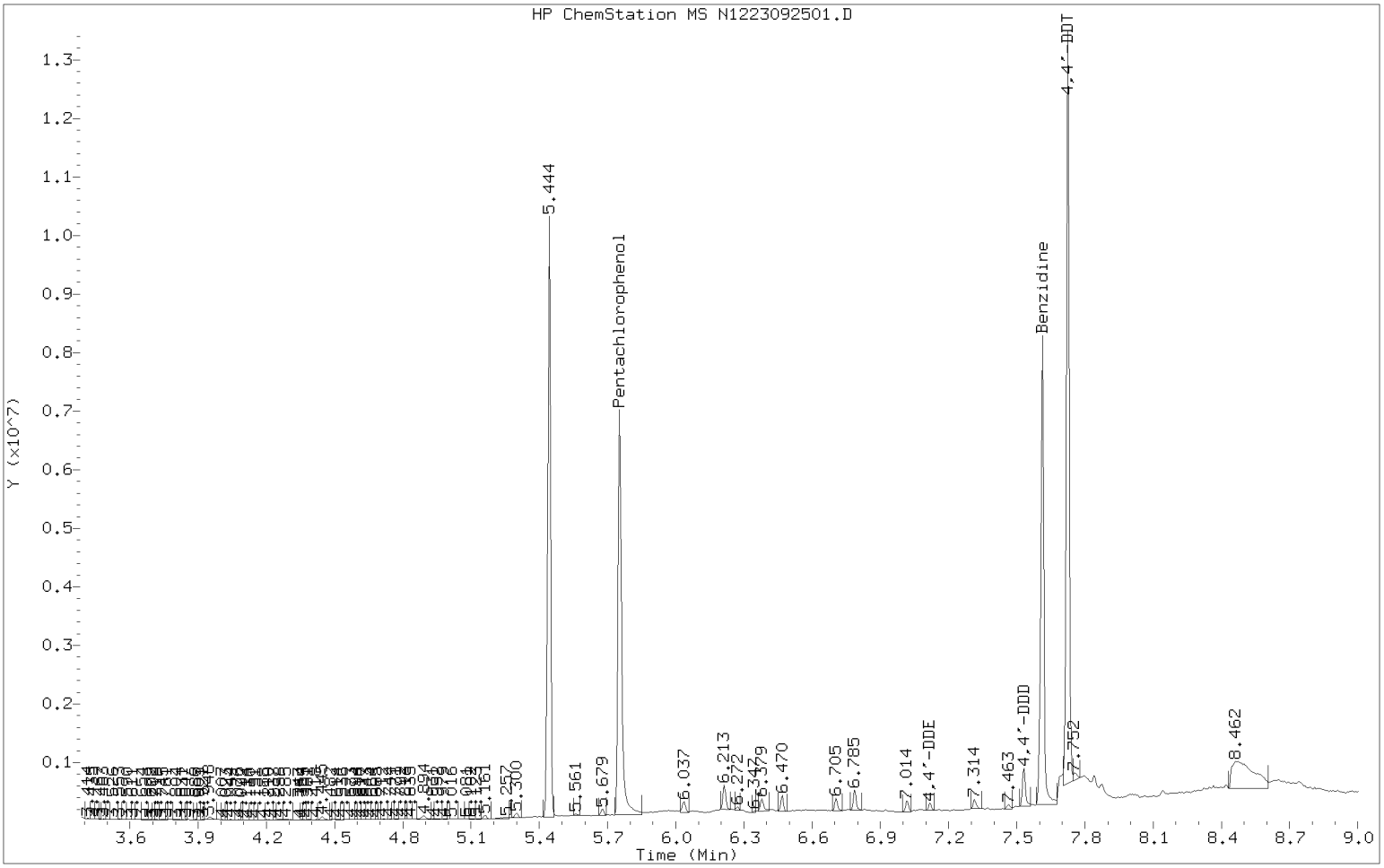
ID:	RT01	RT02	RT03	RT04	RT05	RT06
FILENAME:	N1223092503	N1223092504	N1223092505	N1223092506	N1223092507	N1223092508
INJ.DATE:	25-SEP-2023	25-SEP-2023	25-SEP-2023	25-SEP-2023	25-SEP-2023	25-SEP-2023
INJ.TIME:	10:34	10:52	11:09	11:26	11:44	12:02

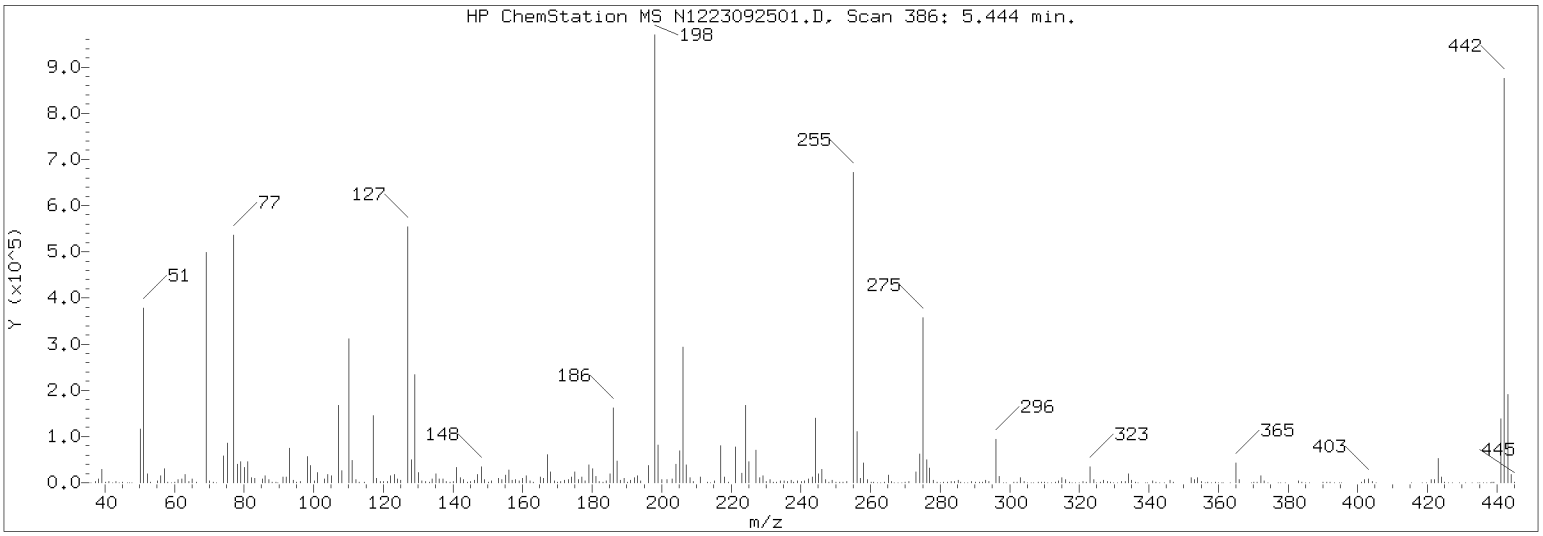
Compound	RT01	RT02	RT03	RT04	RT05	RT06	EXPEC RT	RT WINDOW	AVG RT	STD DEV
$ 1 Tripropyl Tin (Hexyl)	4.480	4.480	4.480	4.480	4.480	4.480	4.480	4.390-4.569	4.480	0.000
2 Tetrabutyl Tin	4.664	4.664	4.664	4.664	4.664	4.664	4.664	4.571-4.757	4.664	0.000
3 Tributyl Tin (Hexyl)	5.433	5.433	5.433	5.433	5.433	5.433	5.433	5.324-5.541	5.433	0.000
* 4 Tetrapentyl Tin	6.076	6.076	6.076	6.076	6.076	6.076	6.076	5.955-6.198	6.076	0.000
5 Dibutyl Tin (Hexyl)	6.143	6.143	6.143	6.143	6.143	6.143	6.143	6.020-6.266	6.143	0.000
$ 6 Tripentyl Tin (Hexyl)	6.425	6.425	6.425	6.425	6.425	6.425	6.425	6.296-6.553	6.425	0.000
7 Butyl Tin (Hexyl)	6.787	6.773	6.773	6.773	6.773	6.787	6.773	6.638-6.909	6.778	0.007
* 8 p-Terphenyl-d14	8.664	8.664	8.651	8.651	8.651	8.651	8.651	8.478-8.824	8.655	0.007

Reviewer 1 _____ Date:_____
Reviewer 2 _____ Date:_____

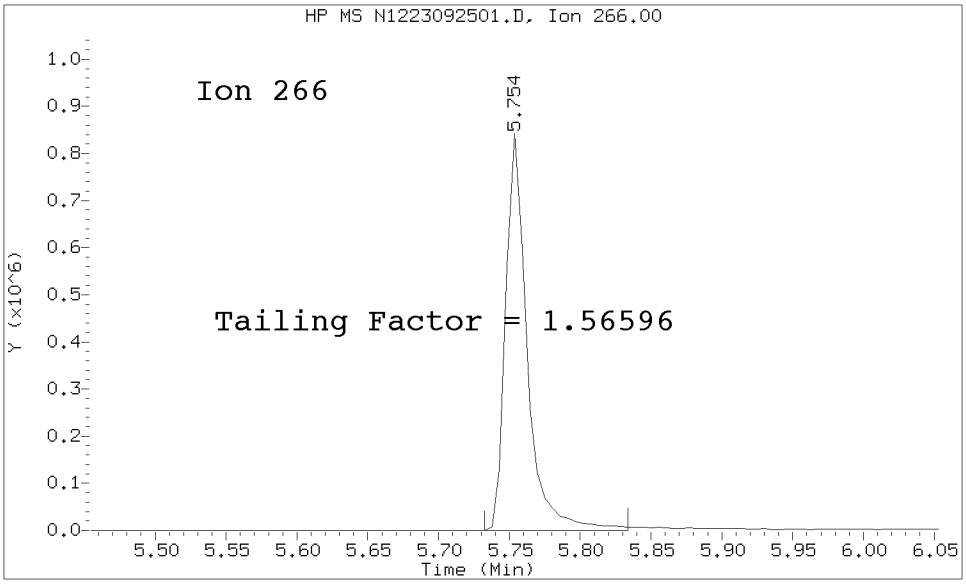
DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

Datafile Analyzed: /20230925.b/tune.b/N1223092501.D/N1223092501.D
Method Used: \20230925.b\tune.b\DFTPP.m Inst: nt12
Injection Date: 25-SEP-2023 09:54 Operator: JZ
Sample Info: SLI0375-TUN1 DFTPP230925
Report Date: 09/25/2023 13:35



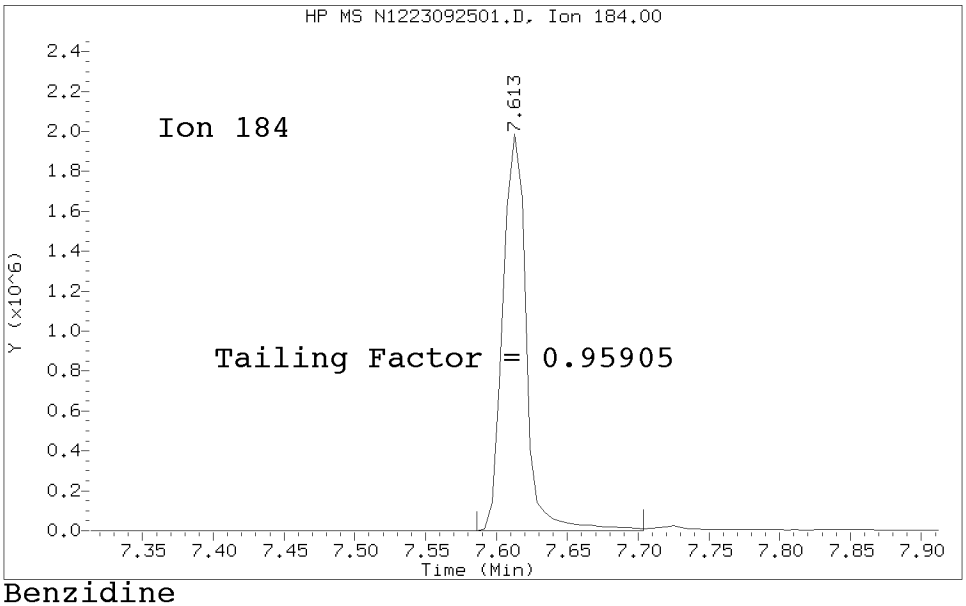


Datafile Analyzed: /20230925.b/tune.b/N1223092501.D/N1223092501.D
Method Used: \20230925.b\tune.b\DFTPP.m\sw846ddt.m Inst: nt12
Injection Date: 25-SEP-2023 09:54 Operator: JZ
Sample Info: DFTPP230925
Report Date: 09/25/2023 13:35



Pentachlorophenol
==========
Exp. RT = 5.758
Found RT = 5.754

Tail Factor = 1.566 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 7.628
Found RT = 7.613

Tail Factor = 0.959 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	1.5659631	2.000	PASS
Benzidine	0.9590517	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	1627295			N/A
4,4-DDE	12334	0.8	20.0	PASS
4,4-DDD	135936	7.7	20.0	PASS
4,4-DDD + DDE	148270	8.4	20.0	PASS

Tuning Sample, nt12.i/20230925.b/tune.b/N1223092501.D, *** PASSED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	37.75
68	Less than 2.00% of mass 69	0.00 (0.00)
69	Mass 69 relative abundance	49.34
70	Less than 2.00% of mass 69	0.35 (0.72)
127	10.00 - 80.00% of mass 198	54.62
197	Less than 2.00% of mass 198	0.00
199	5.00 - 9.00% of mass 198	7.69
275	10.00 - 60.00% of mass 198	36.59
365	Greater than 1.00% of mass 198	4.54
441	0.01 - 24.00% of mass 442	14.86 (15.63)
442	50.00 - 200.00% of mass 198	95.10
443	15.00 - 24.00% of mass 442	20.38 (21.43)

Data File: N1223092501.D
Spectrum: Avg. Scans 385-387 (5.44), Background Scan 380
Location of Maximum: 198.00
Number of points: 364

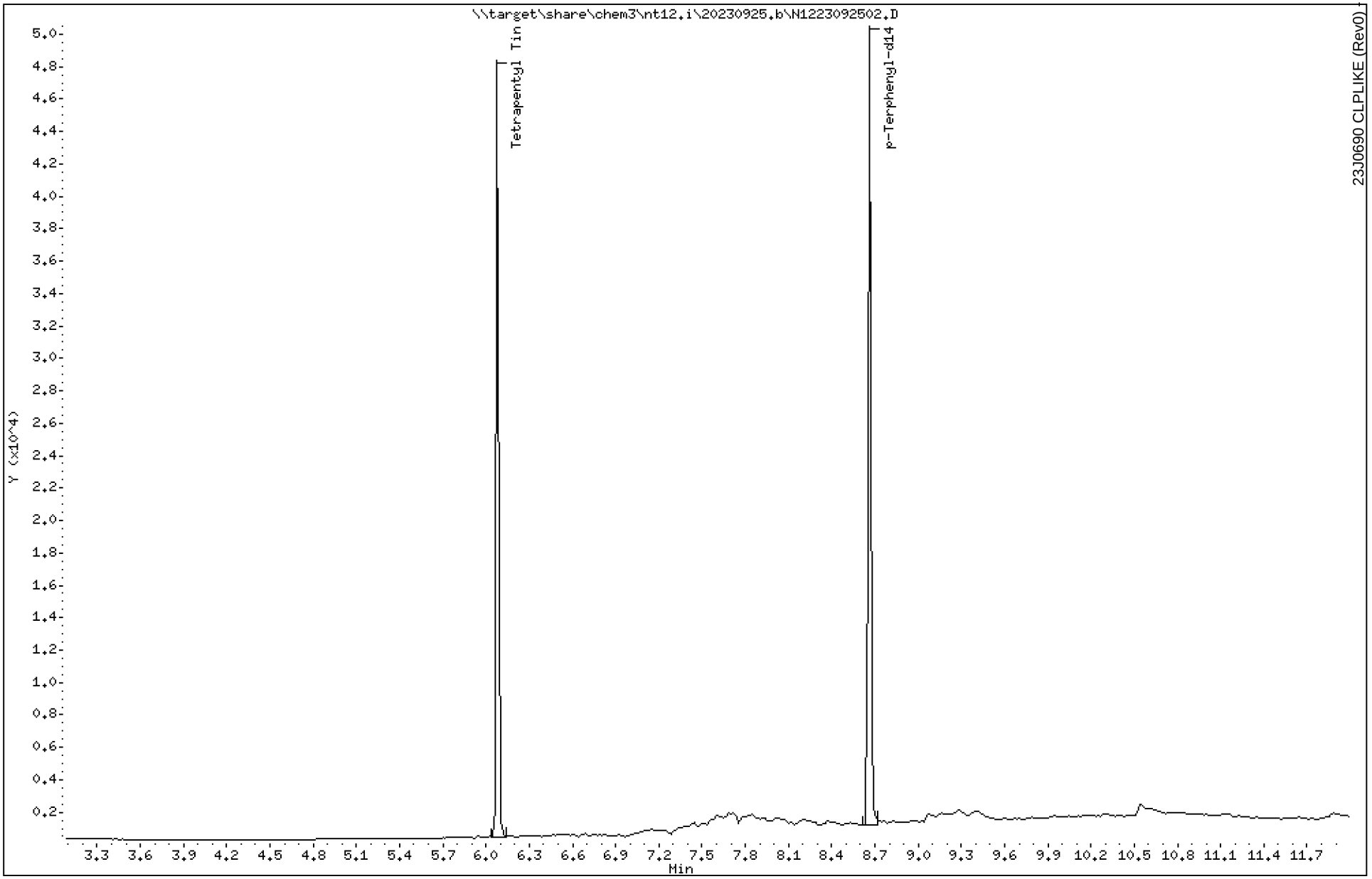
m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	318	141.00	23344	238.00	918	333.00	2394
37.00	1638	142.00	8187	239.00	2322	334.00	15866
38.00	2511	143.00	4831	240.00	1828	335.00	4350
39.00	22456	144.00	1343	241.00	3154	336.00	549
40.00	1133	145.00	1479	242.00	7144	337.00	86
41.00	1048	146.00	4586	243.00	6347	339.00	150
42.00	381	147.00	12025	244.00	105752	340.00	284
43.00	186	148.00	25520	245.00	13825	341.00	2908
44.00	467	149.00	5163	246.00	21192	342.00	605
45.00	548	150.00	1174	247.00	4412	344.00	150
46.00	189	151.00	3206	248.00	1134	345.00	55
48.00	206	152.00	386	249.00	3820	346.00	4740
50.00	89288	153.00	7332	250.00	910	347.00	1156
51.00	278144	154.00	5321	251.00	856	348.00	66
52.00	14548	155.00	12435	252.00	976	350.00	165
53.00	527	156.00	19400	253.00	1843	351.00	478
55.00	2412	157.00	4201	255.00	514624	352.00	7955
56.00	9566	158.00	4801	256.00	82640	353.00	5261
57.00	21208	159.00	3679	257.00	6315	354.00	7914
58.00	1093	160.00	7349	258.00	32272	355.00	1164
59.00	148	161.00	10419	259.00	4737	358.00	243
60.00	237	162.00	2772	260.00	732	359.00	646
61.00	4461	163.00	776	261.00	845	360.00	111
62.00	6018	164.00	277	262.00	333	361.00	477
63.00	14244	165.00	8349	263.00	398	362.00	61
64.00	1563	166.00	5046	264.00	477	363.00	75
65.00	6188	167.00	44672	265.00	13811	365.00	33480
66.00	576	168.00	17816	266.00	2000	366.00	5149
69.00	363520	169.00	3291	268.00	288	367.00	146
70.00	2610	170.00	1323	269.00	375	369.00	146
71.00	205	171.00	2090	270.00	634	370.00	735
72.00	181	172.00	3824	271.00	1431	371.00	1693
74.00	43000	173.00	4849	272.00	64	372.00	12430
75.00	62568	174.00	9624	273.00	18296	373.00	3298
77.00	387264	175.00	16290	274.00	45784	374.00	432
78.00	28616	176.00	4896	275.00	269568	377.00	458
79.00	32560	177.00	8798	276.00	37760	378.00	114
80.00	24664	178.00	2037	277.00	23712	379.00	156
81.00	31520	179.00	31528	278.00	3748	381.00	61
82.00	7361	180.00	21088	279.00	726	383.00	3461
83.00	6249	181.00	10103	280.00	331	384.00	868
84.00	4	182.00	1815	281.00	246	385.00	213
85.00	6284	183.00	1015	282.00	532	390.00	1391
86.00	9829	184.00	2739	283.00	2293	391.00	1295
87.00	4694	185.00	15296	284.00	1417	392.00	829
88.00	1397	186.00	120472	285.00	4482	393.00	206
89.00	1014	187.00	34768	286.00	865	395.00	247
90.00	72	188.00	4056	287.00	138	396.00	67
91.00	7437	189.00	8427	288.00	398	397.00	146

92.00	3786	190.00	1221	289.00	1210	401.00	830
93.00	53560	191.00	3585	290.00	789	402.00	5026
94.00	3312	192.00	9579	291.00	589	403.00	6536
95.00	846	193.00	10290	292.00	1193	404.00	2284
96.00	2141	194.00	2810	293.00	4445	405.00	371
98.00	41080	196.00	27472	294.00	1349	408.00	58
99.00	27840	198.00	736768	296.00	73960	409.00	56
100.00	1386	199.00	56648	297.00	10733	410.00	146
101.00	15797	200.00	5262	298.00	662	413.00	105
102.00	574	201.00	4857	299.00	297	415.00	372
103.00	6272	202.00	313	300.00	77	416.00	75
104.00	12363	203.00	5874	301.00	1048	417.00	78
105.00	10460	204.00	30616	302.00	1482	418.00	68
107.00	123024	205.00	52560	303.00	8109	419.00	102
108.00	19016	206.00	216960	304.00	2583	420.00	96
110.00	222656	207.00	28792	305.00	404	421.00	5472
111.00	34144	208.00	7785	306.00	65	422.00	5068
112.00	5039	209.00	2494	307.00	189	423.00	41536
113.00	1245	210.00	2108	308.00	1276	424.00	8751
114.00	739	211.00	8964	309.00	1027	425.00	892
117.00	107608	213.00	754	310.00	968	426.00	135
118.00	8289	214.00	168	311.00	290	427.00	172
119.00	1283	215.00	2488	312.00	190	429.00	9
120.00	1597	216.00	1786	313.00	798	430.00	106
121.00	104	217.00	59296	314.00	3542	431.00	112
122.00	10173	218.00	7603	315.00	8403	433.00	186
123.00	12773	219.00	447	316.00	5081	434.00	129
124.00	5672	221.00	53968	317.00	1077	435.00	279
125.00	4667	223.00	13647	318.00	105	436.00	278
127.00	402432	224.00	126944	319.00	209	437.00	204
128.00	35424	225.00	33528	320.00	288	438.00	1084
129.00	172032	226.00	927	321.00	2344	439.00	952
130.00	16464	227.00	52160	322.00	1430	441.00	109504
131.00	2872	228.00	7616	323.00	25704	442.00	700672
132.00	1698	229.00	11237	324.00	4682	443.00	150144
133.00	1291	230.00	1383	325.00	573	444.00	13649
134.00	5302	231.00	5028	326.00	689	445.00	633
135.00	14036	232.00	864	327.00	4884	470.00	59
136.00	5746	233.00	801	328.00	2174	494.00	78
137.00	6538	234.00	3855	329.00	340		
138.00	1223	235.00	3748	330.00	260		
139.00	1418	236.00	2567	331.00	263		
140.00	1086	237.00	4396	332.00	1860		

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092502.D
Date : 25-SEP-2023 10:12
Client ID:
Sample Info: IBL230925

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092502.D
Lab Smp Id: SLI0375-ICB1
Inj Date : 25-SEP-2023 10:12
Operator : JZ   Inst ID: nt12.i
Smp Info : IBL230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:48 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 2
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	Compound Not Detected.					
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.					
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	54202	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	Compound Not Detected.					
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	59475	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092502.D
Lab Smp Id: SLI0375-ICB1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	54202	-1.65
8 p-Terphenyl-d14	59196	29598	118392	59475	0.47

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092502.D

Lab ID: SLI0375-ICB1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 10:12

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

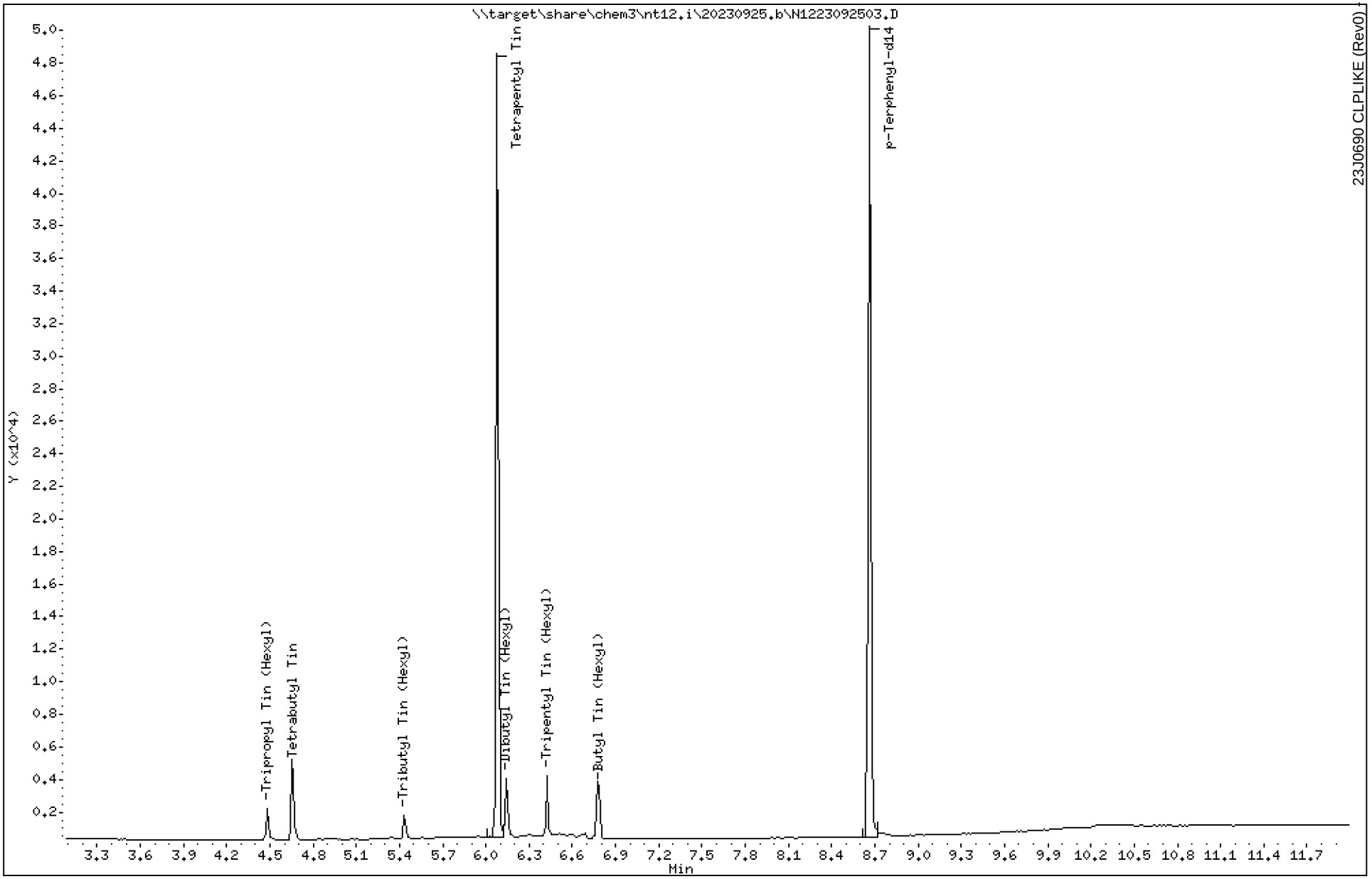
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092503.D
Date : 25-SEP-2023 10:34
Client ID:
Sample Info: IC005230925

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092503.D
Lab Smp Id: SLI0375-CAL1
Inj Date : 25-SEP-2023 10:34
Operator : JZ   Inst ID: nt12.i
Smp Info : IC005230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:36 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 11:26   Cal File: N1223092506.D
Als bottle: 3   Calibration Sample, Level: 1
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	1138	0.05000	0.05914
	2 Tetrabutyl Tin	289	4.664	4.663	(0.768)	1111	0.05000	0.05966
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	767	0.05000	0.05385
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	53108	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.709)	1020	0.10000	0.09693
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	1467	0.10000	0.09450
	7 Butyl Tin (Hexyl)	347	6.786	6.773	(0.783)	1441	0.10000	0.09051(H)
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	59220	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092503.D
Lab Smp Id: SLI0375-CAL1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	53108	-3.64
8 p-Terphenyl-d14	59196	29598	118392	59220	0.04

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092503.D

Lab ID: SLI0375-CAL1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 10:34

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

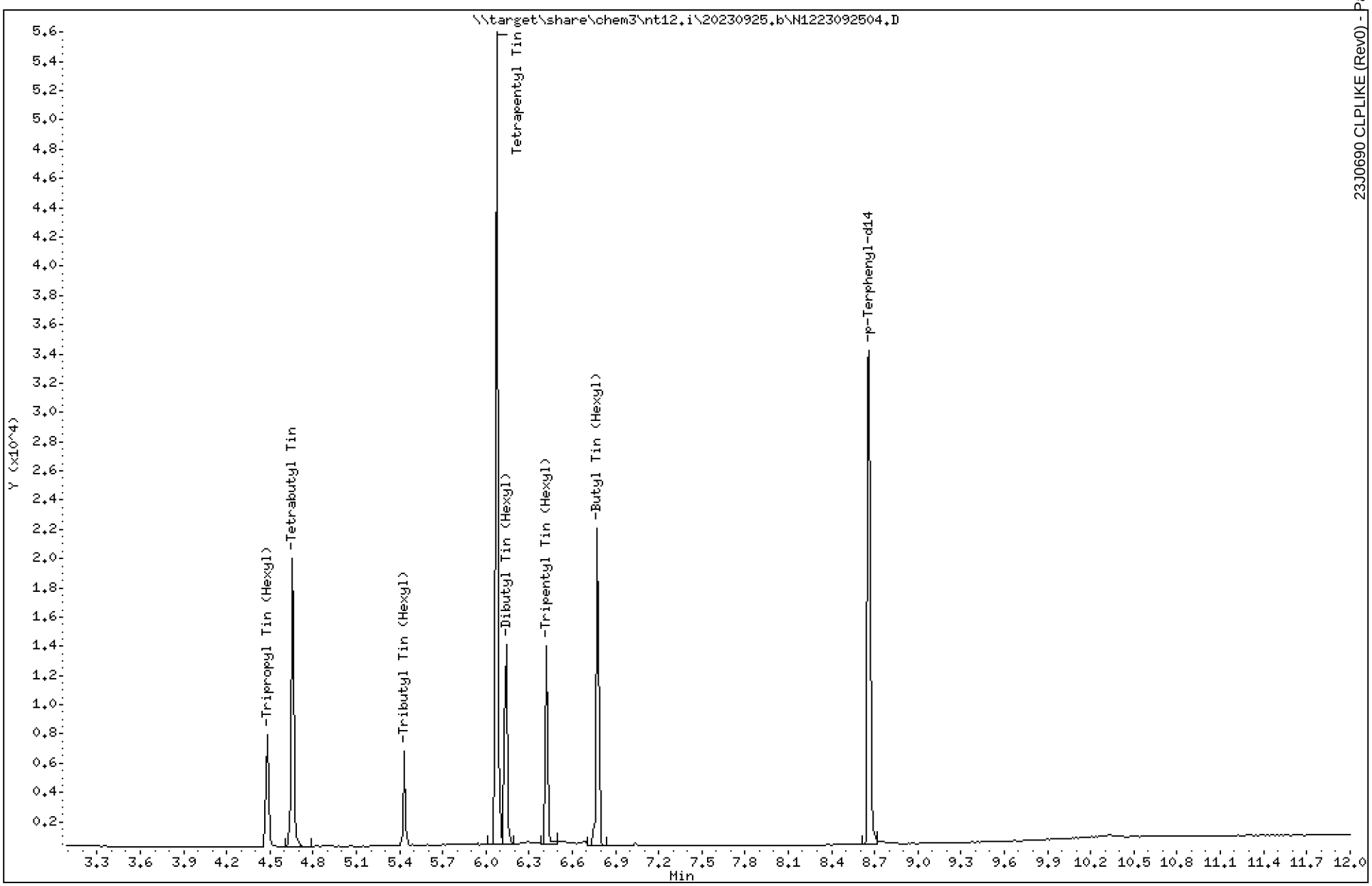
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092504.D
Date : 25-SEP-2023 10:52
Client ID:
Sample Info: IC02230925

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



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ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092504.D
Lab Smp Id: SLI0375-CAL2
Inj Date : 25-SEP-2023 10:52
Operator : JZ   Inst ID: nt12.i
Smp Info : IC02230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:36 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 10:34   Cal File: N1223092503.D
Als bottle: 4   Calibration Sample, Level: 2
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	4437	0.20000	0.2202
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	4272	0.20000	0.2190
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	3200	0.20000	0.2145
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	55622	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.709)	4378	0.40000	0.4221
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	6406	0.40000	0.4187
	7 Butyl Tin (Hexyl)	347	6.773	6.773	(0.782)	6308	0.40000	0.4020(H)
*	8 p-Terphenyl-d14	244	8.663	8.650	(1.000)	58370	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092504.D
Lab Smp Id: SLI0375-CAL2
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	55622	0.92
8 p-Terphenyl-d14	59196	29598	118392	58370	-1.40

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092504.D

Lab ID: SLI0375-CAL2
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 10:52

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

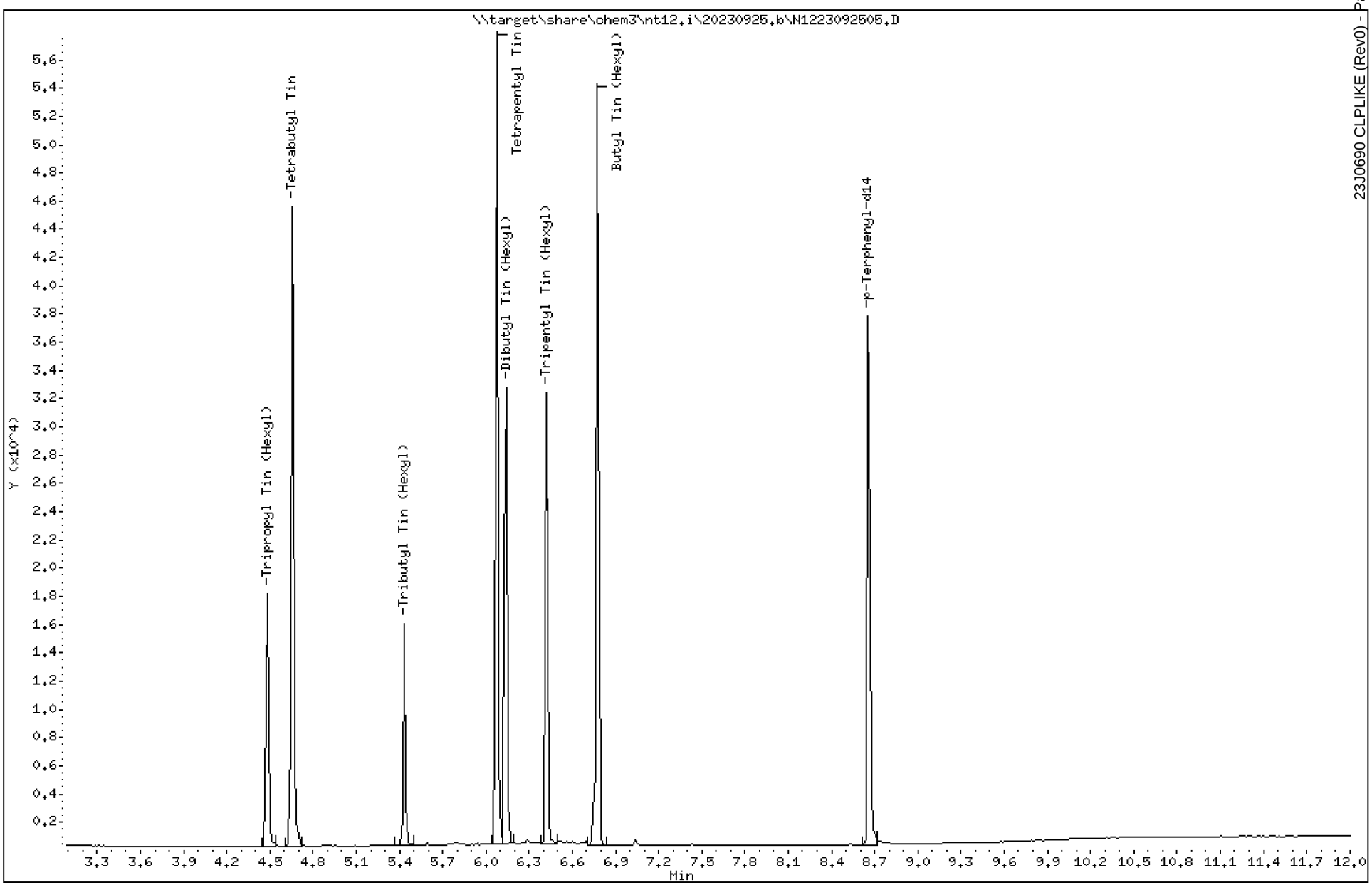
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092505.D
Date : 25-SEP-2023 11:09
Client ID:
Sample Info: IC05230925

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



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ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092505.D
Lab Smp Id: SLI0375-CAL3
Inj Date : 25-SEP-2023 11:09
Operator : JZ   Inst ID: nt12.i
Smp Info : IC05230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:36 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 10:52   Cal File: N1223092504.D
Als bottle: 5   Calibration Sample, Level: 3
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	10326	0.50000	0.4976
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	9838	0.50000	0.4899
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	7693	0.50000	0.5009
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	57271	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.710)	10833	1.00000	0.9989
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.743)	15422	1.00000	0.9639
	7 Butyl Tin (Hexyl)	347	6.773	6.773	(0.783)	15966	1.00000	0.9731(H)
*	8 p-Terphenyl-d14	244	8.650	8.650	(1.000)	61032	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092505.D
Lab Smp Id: SLI0375-CAL3
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	57271	3.92
8 p-Terphenyl-d14	59196	29598	118392	61032	3.10

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.65	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092505.D

Lab ID: SLI0375-CAL3
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 11:09

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092506.D

Page 1

Date : 25-SEP-2023 11:26

Client ID:

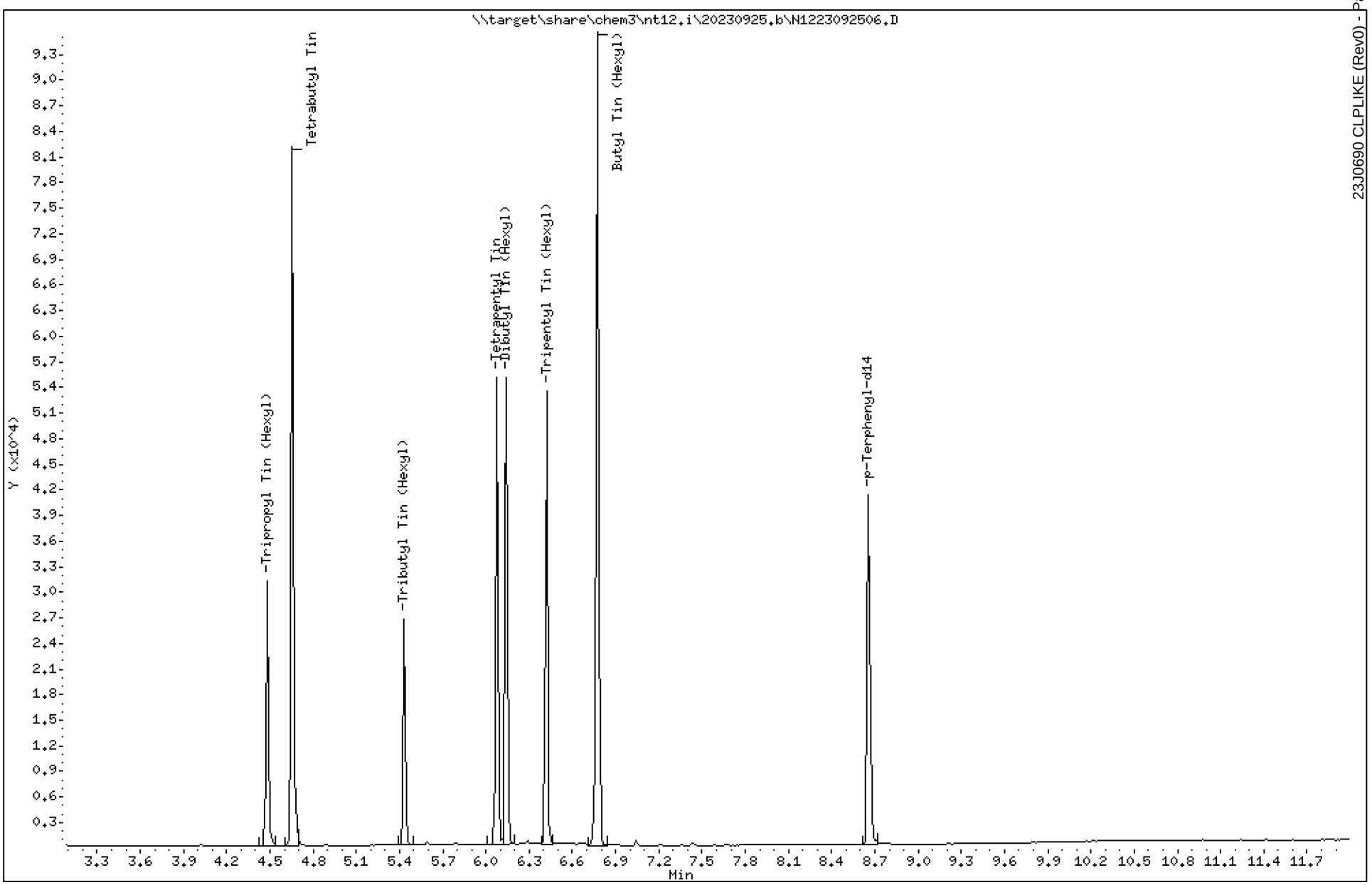
Instrument: nt12.i

Sample Info: IC1230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



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ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092506.D
Lab Smp Id: SLI0375-CAL4
Inj Date : 25-SEP-2023 11:26
Operator : JZ   Inst ID: nt12.i
Smp Info : IC1230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:37 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 11:09   Cal File: N1223092505.D
Als bottle: 6   Calibration Sample, Level: 4
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	17255	1.00000	0.8641
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	16338	1.00000	0.8454
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	12798	1.00000	0.8659
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	55113	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.710)	18004	2.00000	1.712
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.743)	26704	2.00000	1.721
	7 Butyl Tin (Hexyl)	347	6.773	6.773	(0.783)	27056	2.00000	1.700(H)
*	8 p-Terphenyl-d14	244	8.650	8.650	(1.000)	59196	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092506.D
Lab Smp Id: SLI0375-CAL4
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	55113	0.00
8 p-Terphenyl-d14	59196	29598	118392	59196	0.00

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.65	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092506.D

Lab ID: SLI0375-CAL4
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 11:26

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

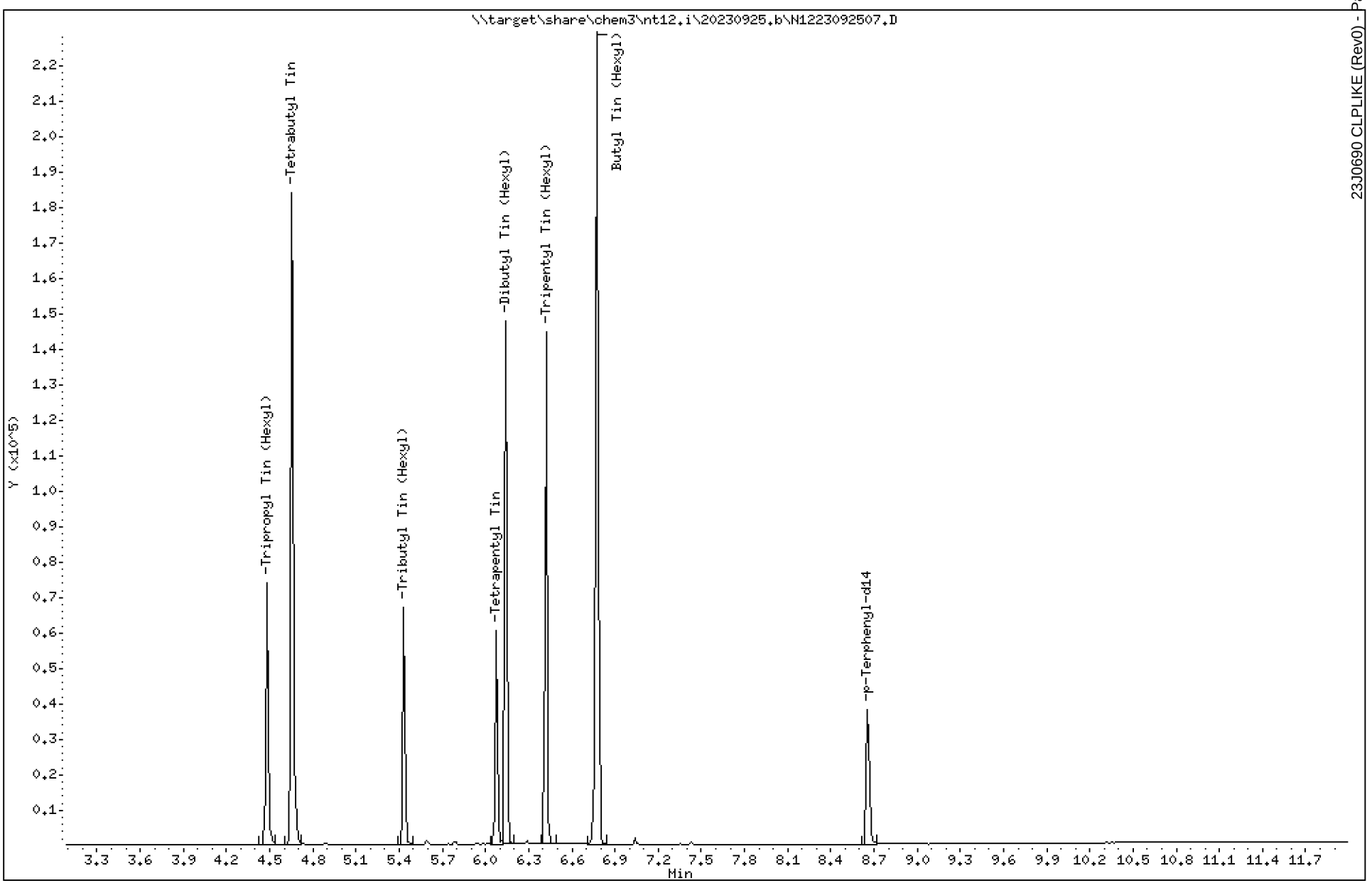
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092507.D
Date : 25-SEP-2023 11:44
Client ID:
Sample Info: IC2230925

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092507.D
Lab Smp Id: SLI0375-CAL5
Inj Date : 25-SEP-2023 11:44
Operator : JZ   Inst ID: nt12.i
Smp Info : IC2230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:37 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 11:26   Cal File: N1223092506.D
Als bottle: 7   Calibration Sample, Level: 5
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	41504	2.00000	1.914
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	40152	2.00000	1.913
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	32534	2.00000	2.027
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	59849	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.710)	44982	4.00000	4.224
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.743)	65944	4.00000	4.198
	7 Butyl Tin (Hexyl)	347	6.773	6.773	(0.783)	70180	4.00000	4.356(H)
*	8 p-Terphenyl-d14	244	8.650	8.650	(1.000)	59931	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092507.D
Lab Smp Id: SLI0375-CAL5
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	59849	8.59
8 p-Terphenyl-d14	59196	29598	118392	59931	1.24

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.65	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092507.D

Lab ID: SLI0375-CAL5
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 11:44

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092508.D

Page 1

Date : 25-SEP-2023 12:02

Client ID:

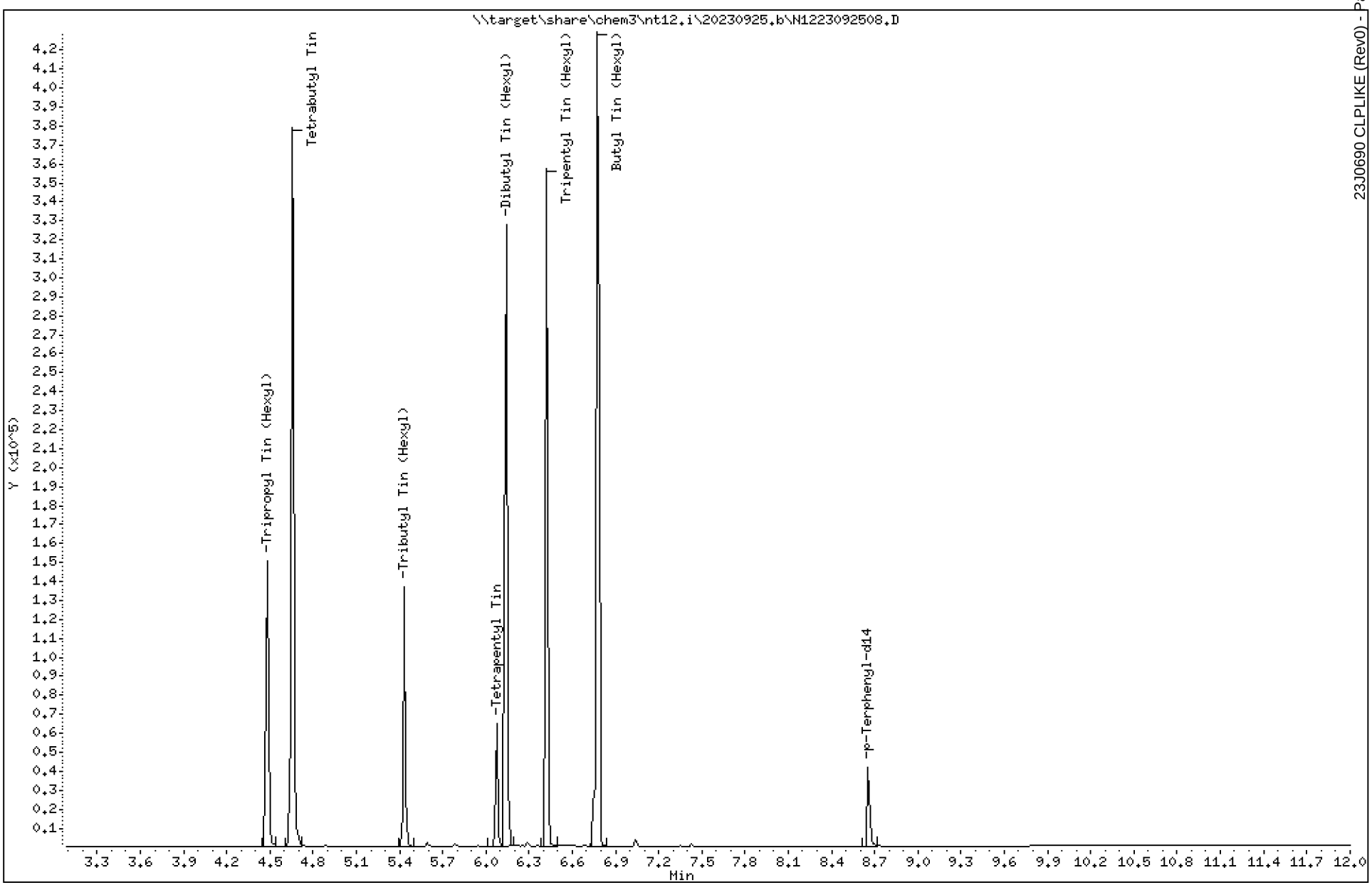
Instrument: nt12.i

Sample Info: IC4230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



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ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092508.D
Lab Smp Id: SLI0375-CAL6
Inj Date : 25-SEP-2023 12:02
Operator : JZ   Inst ID: nt12.i
Smp Info : IC4230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:37 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 11:44   Cal File: N1223092507.D
Als bottle: 8   Calibration Sample, Level: 6
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

		QUANT SIG					AMOUNTS	
	Compounds	MASS	RT	EXP RT	REL RT	RESPONSE	CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.479	4.479	(0.737)	82986	4.00000	3.601
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	82963	4.00000	3.720
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	66120	4.00000	3.877
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	63600	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.143	6.143	(0.710)	92075	8.00000	8.518
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.743)	144729	8.00000	9.077
	7 Butyl Tin (Hexyl)	347	6.786	6.773	(0.785)	154064	8.00000	9.421(H)
*	8 p-Terphenyl-d14	244	8.650	8.650	(1.000)	60828	0.20000	

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092508.D
Lab Smp Id: SLI0375-CAL6
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	63600	15.40
8 p-Terphenyl-d14	59196	29598	118392	60828	2.76

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.65	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092508.D

Lab ID: SLI0375-CAL6
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 12:02

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

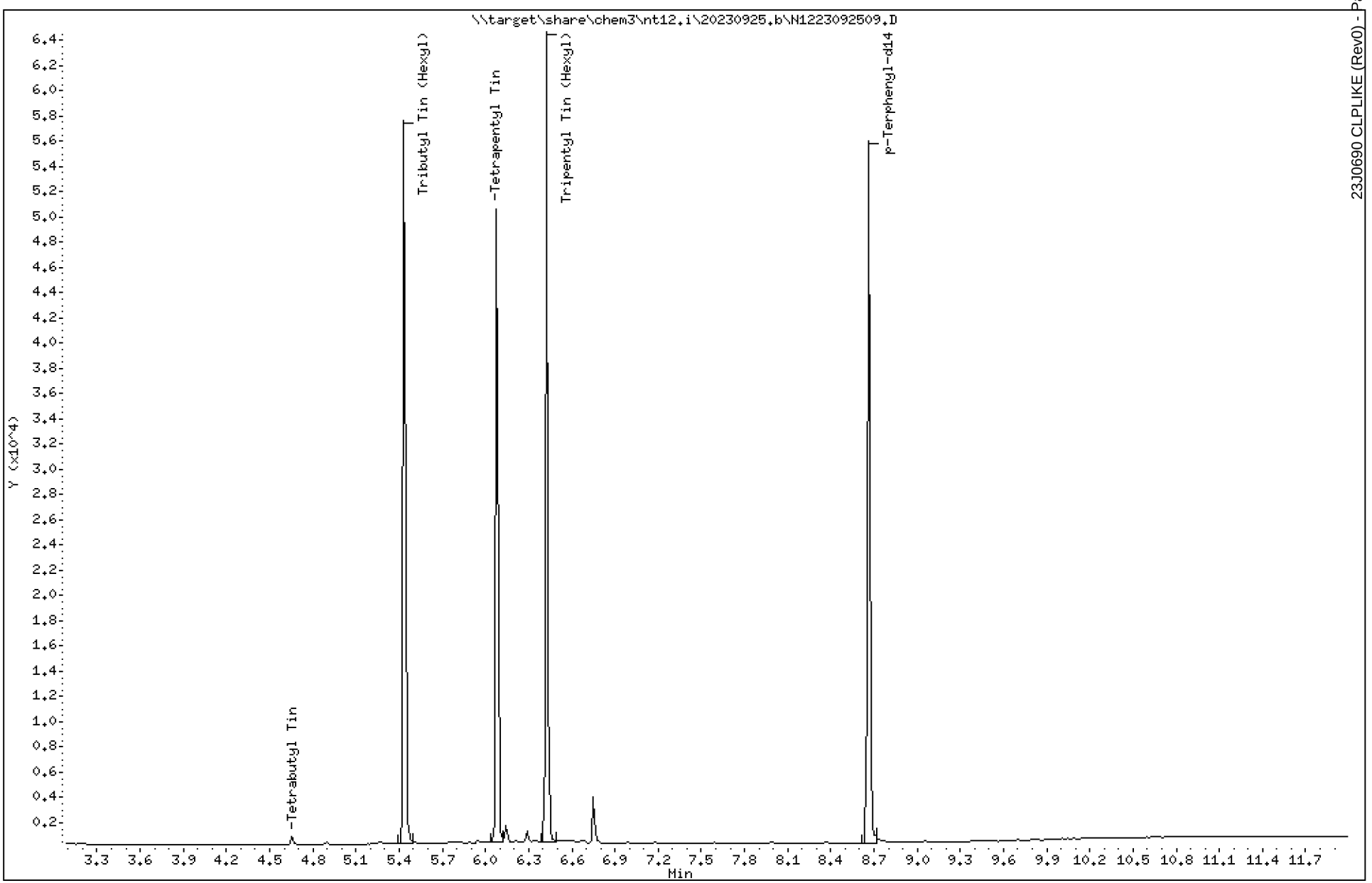
Instrument: nt12.i

Sample Info: SCV230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



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Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

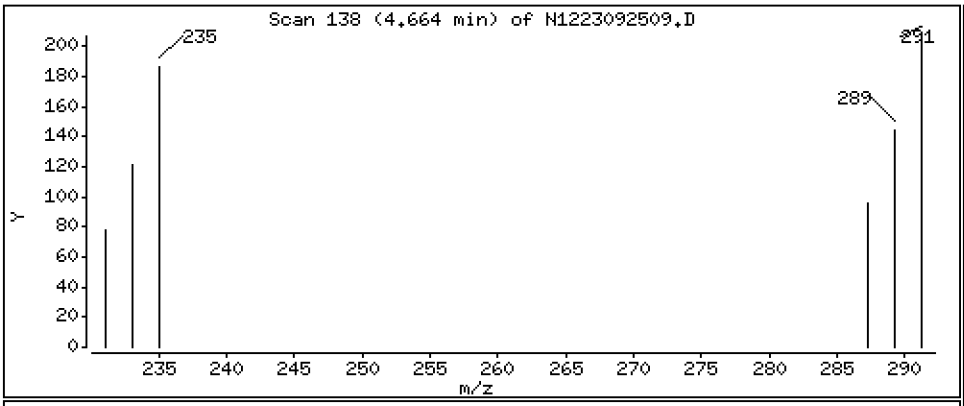
Operator: JZ

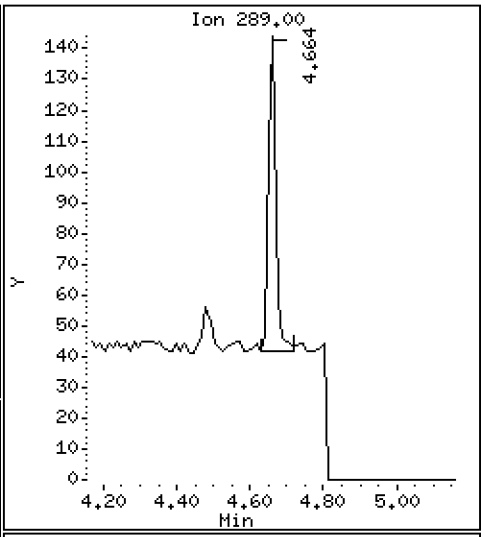
Column phase: ZB-5msi

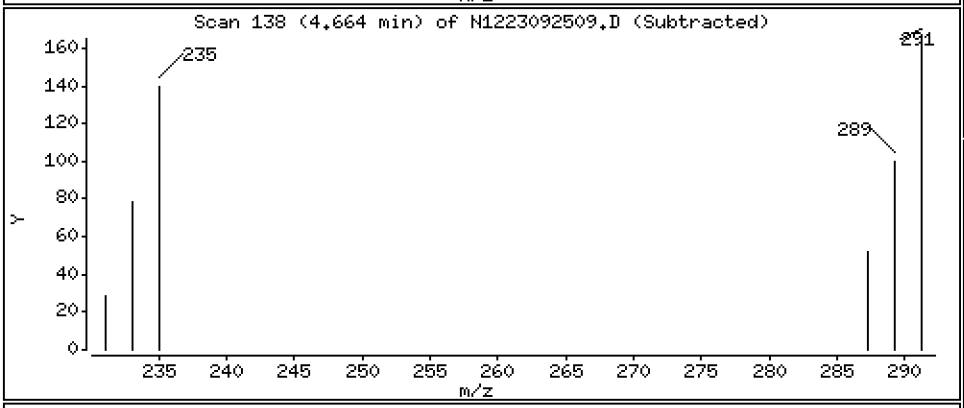
Column diameter: 0.25

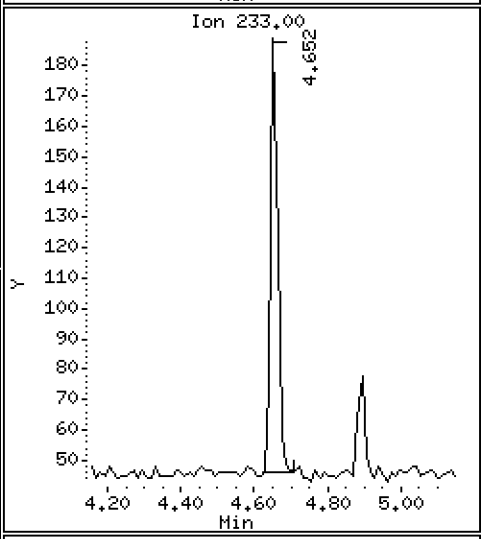
2 Tetrabutyl Tin

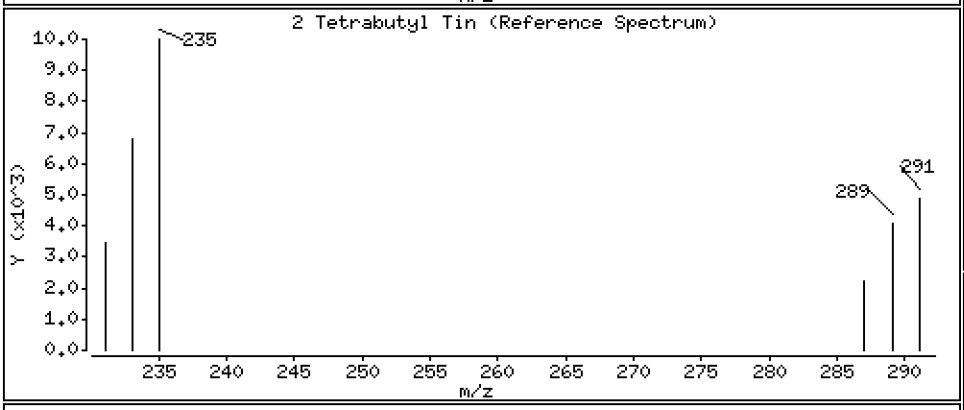
Concentration: 0.006772 ug/mL

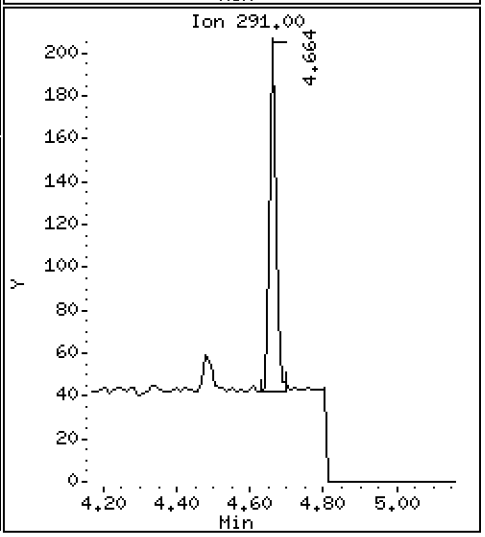


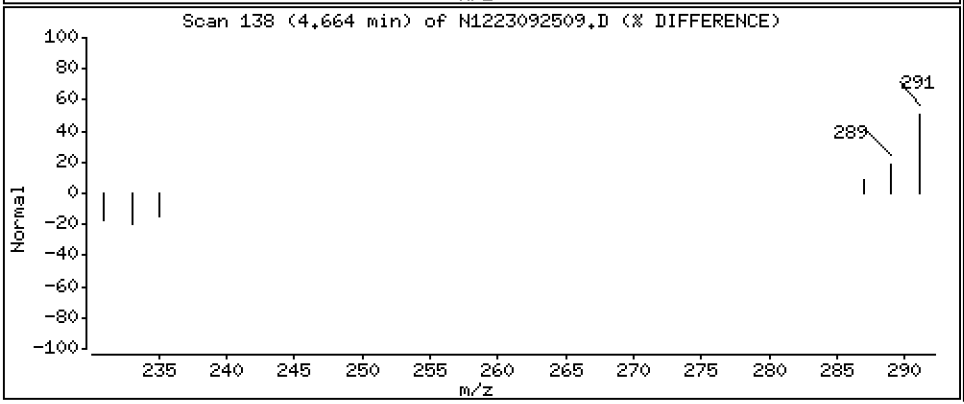












Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

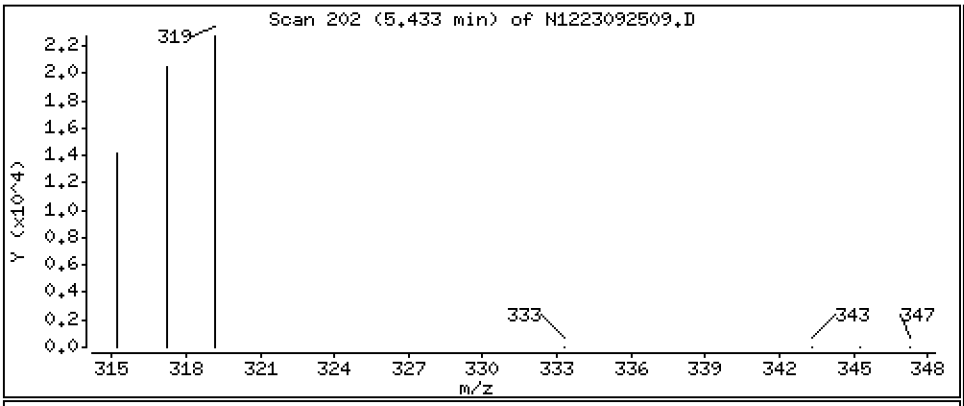
Operator: JZ

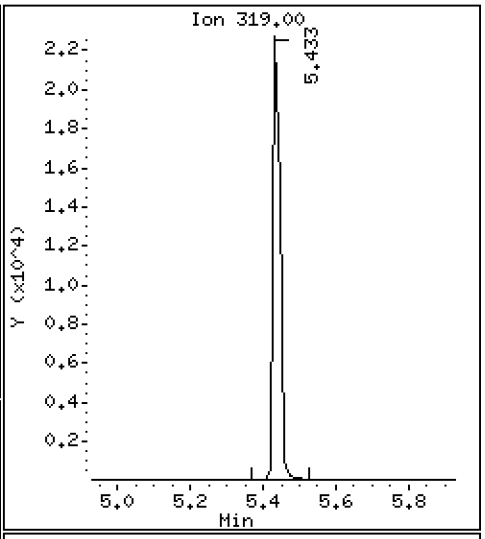
Column phase: ZB-5msi

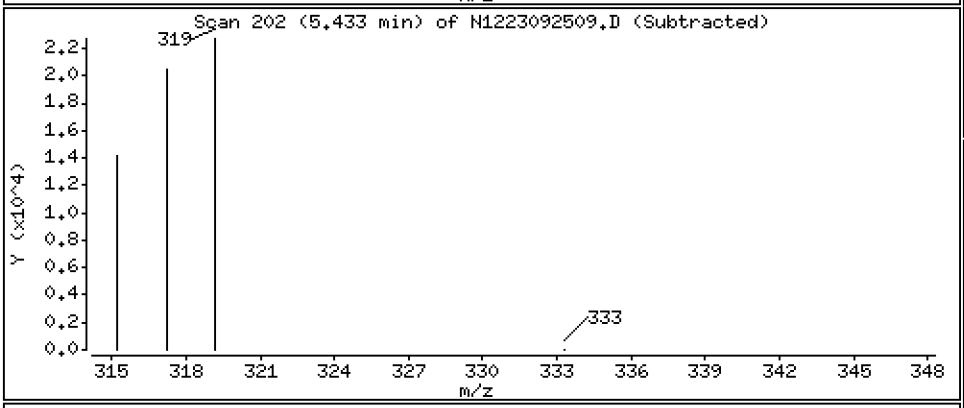
Column diameter: 0.25

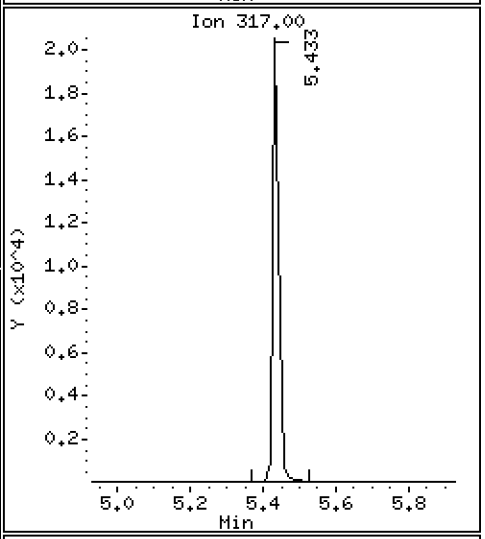
3 Tributyl Tin (Hexyl)

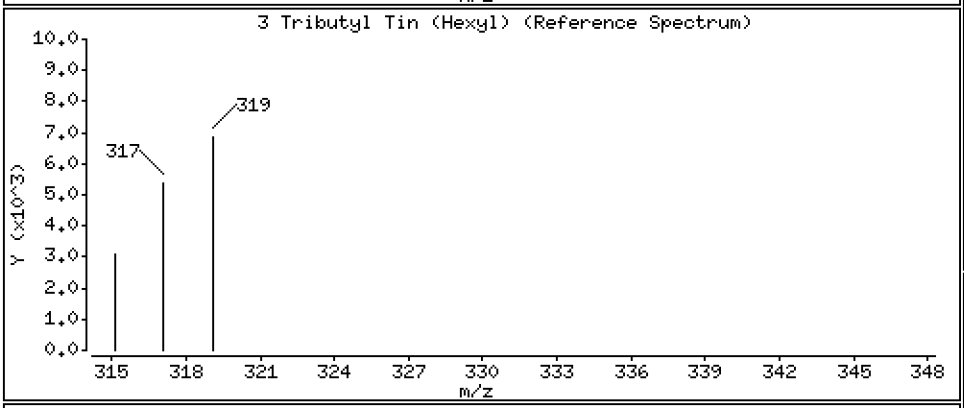
Concentration: 2.062 ug/mL

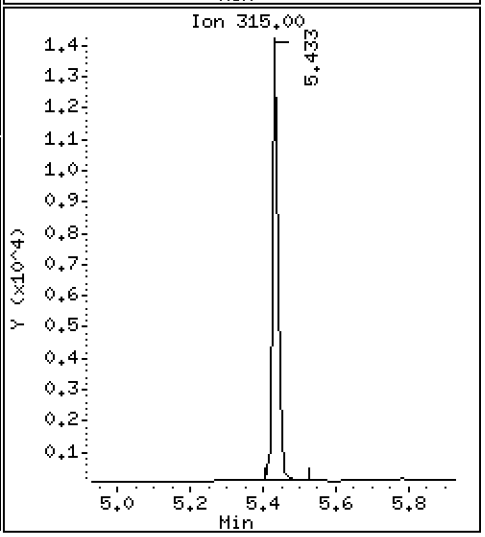


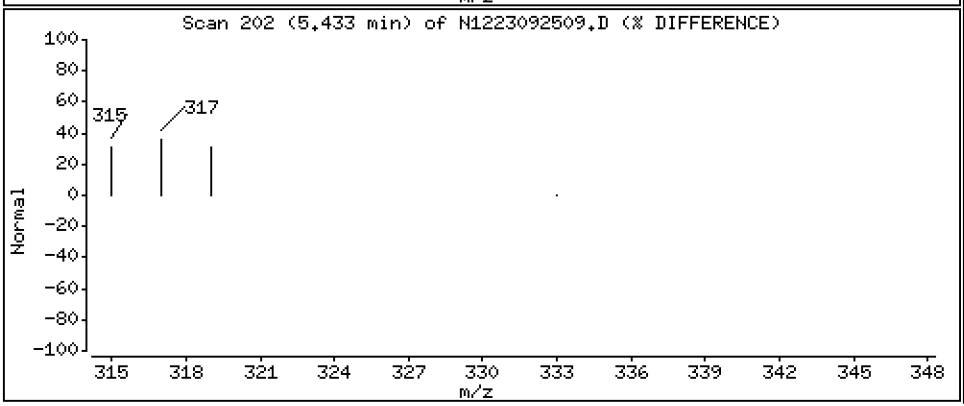












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092509.D
Lab Smp Id: SLI0375-SCV1
Inj Date : 25-SEP-2023 12:34
Operator : JZ   Inst ID: nt12.i
Smp Info : SCV230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:48 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	Compound Not Detected.					
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	137	0.00677	0.006772
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	31902	2.06191	2.062
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	57693	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	26056	1.62457	1.625
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	61184	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092509.D
Lab Smp Id: SLI0375-SCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	57693	4.68
8 p-Terphenyl-d14	59196	29598	118392	61184	3.36

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092509.D

Lab ID: SLI0375-SCV1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 12:34

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

SECOND-SOURCE CALIBRATION VERIFICATION

EPA 8270E-SIM

Laboratory: Analytical Resources, LLC
SDG: 23J0690
Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023
Calibration: GI00071
Laboratory ID: SLI0375-SCV1
Sequence: SLI0375
Sequence Name: Second source
Standard ID: L004613

ANALYTE	EXPECTED (ug/mL)	FOUND (ug/mL)	% DRIFT	QC LIMIT
Tributyltin Ion	1.5460	1.59	3.1	20.00
Tripentyltin	1.5918	1.29	-18.8	20.00

* Indicates values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Page 1

Date : 25-SEP-2023 12:34

Client ID:

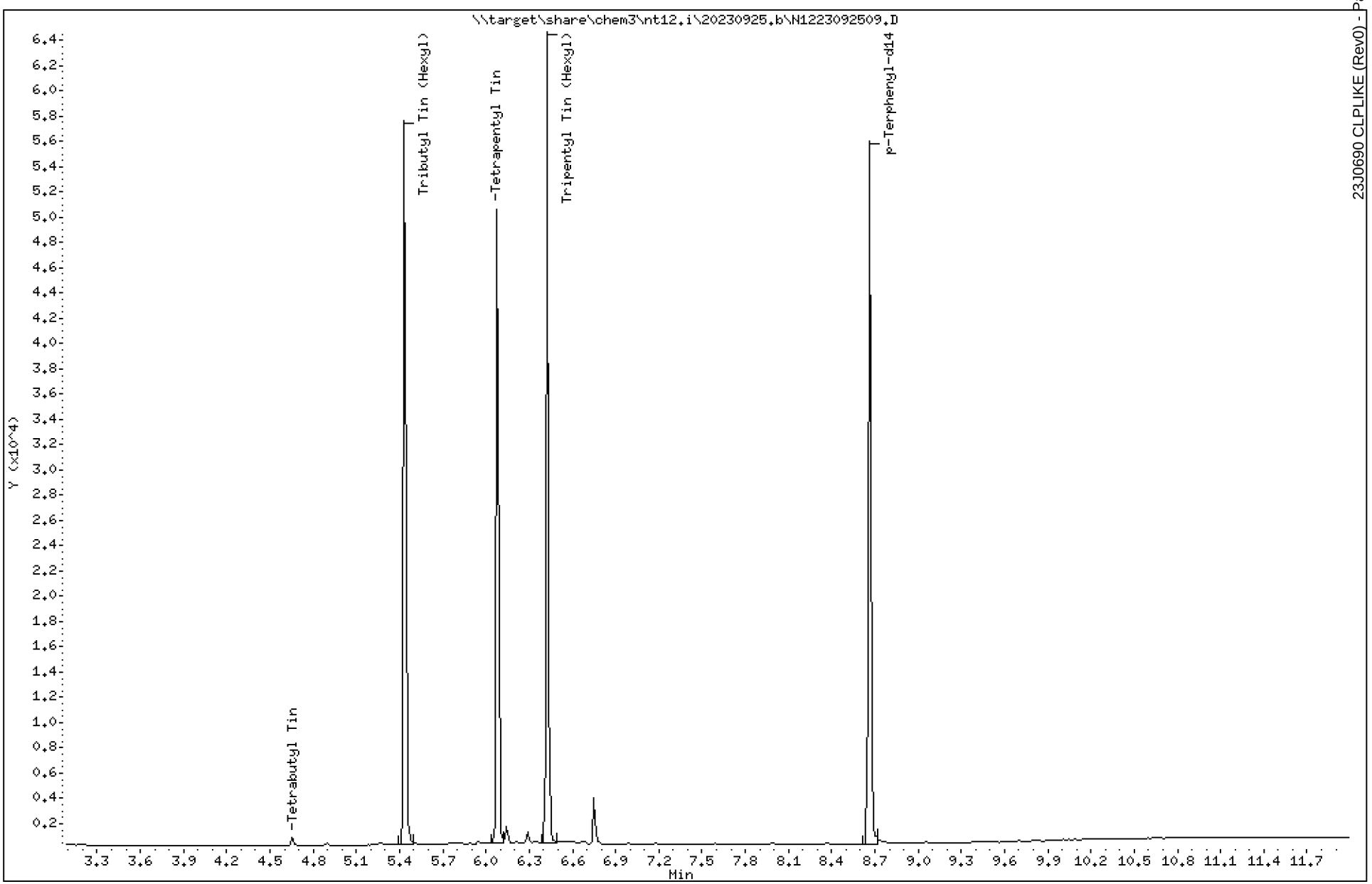
Instrument: nt12.i

Sample Info: SCV230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



23J0690 CLPLIKE (Rev0) - Page 127 of 1248

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

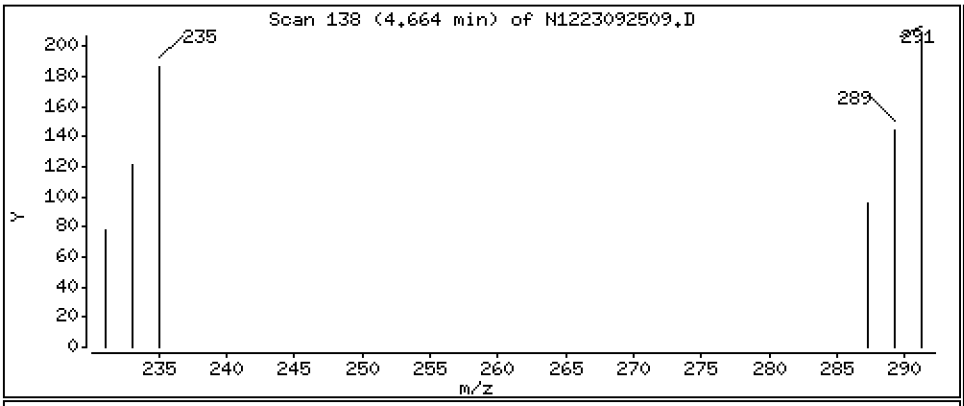
Operator: JZ

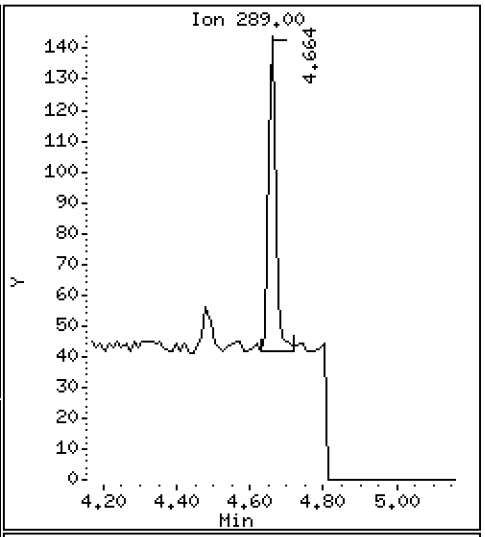
Column phase: ZB-5msi

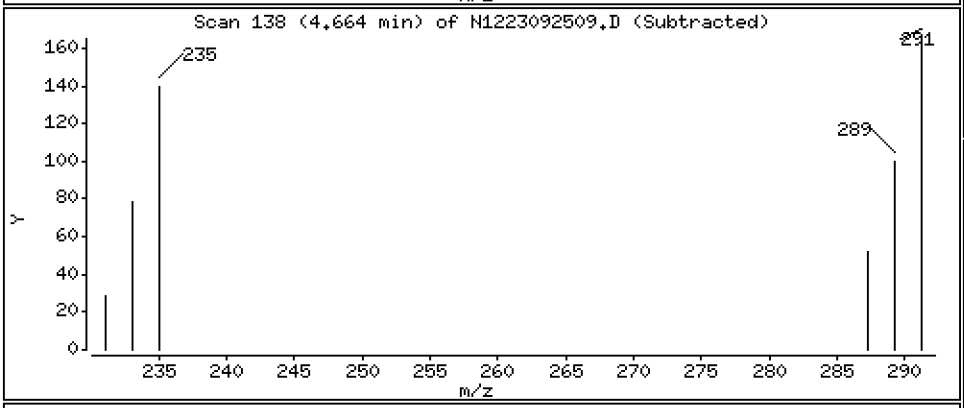
Column diameter: 0.25

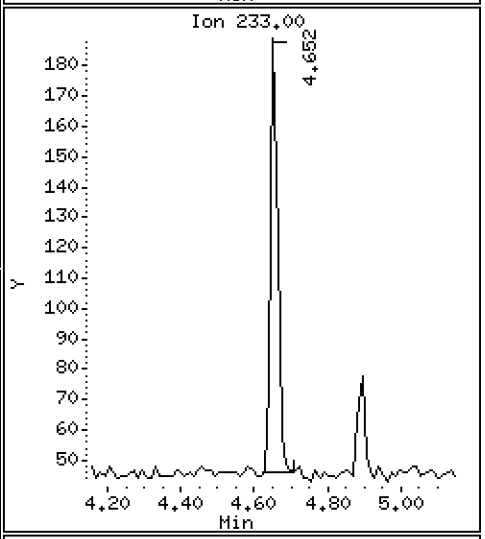
2 Tetrabutyl Tin

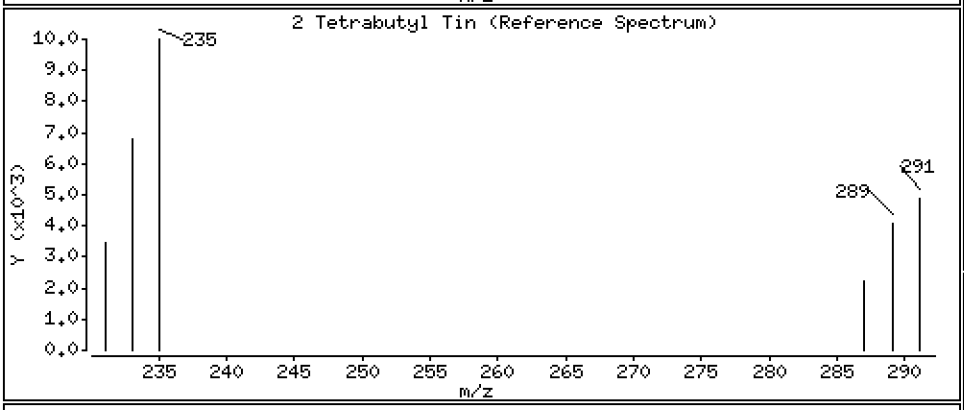
Concentration: 0.006772 ug/mL

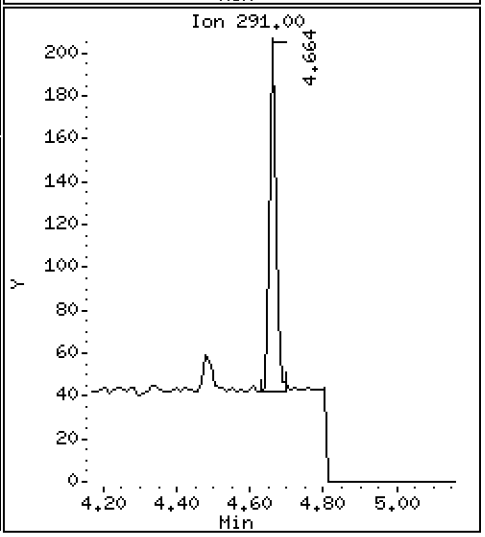


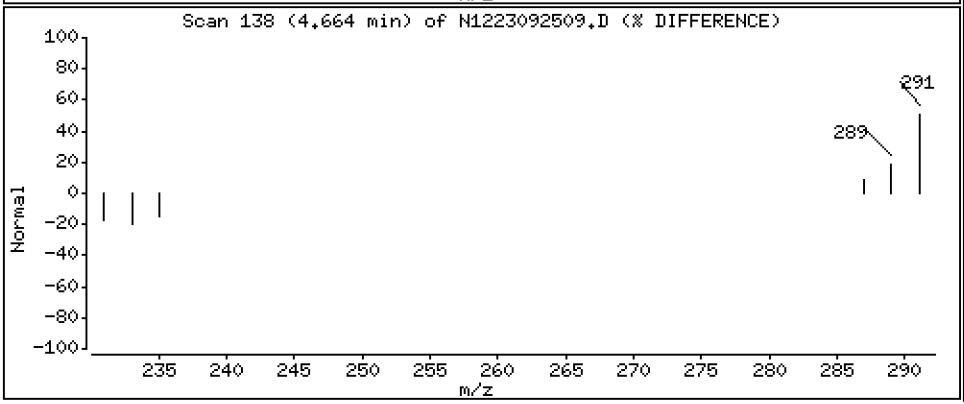












Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

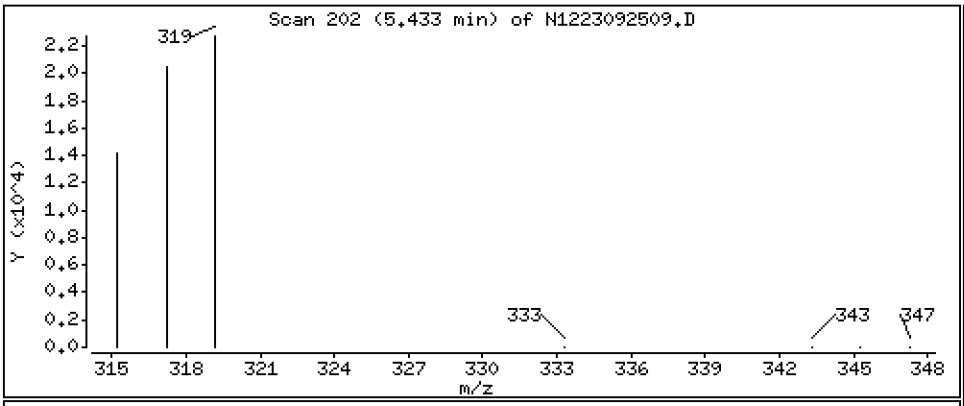
Operator: JZ

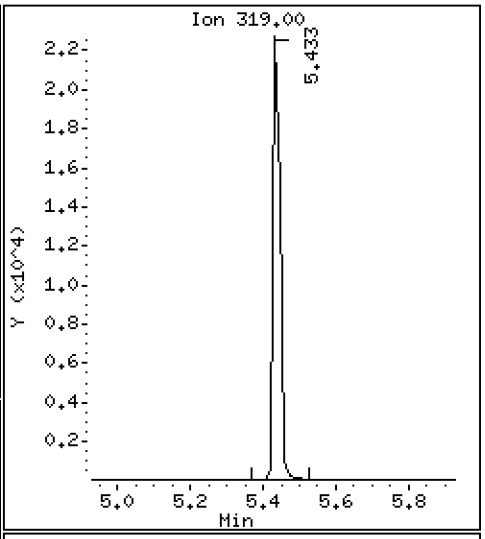
Column phase: ZB-5msi

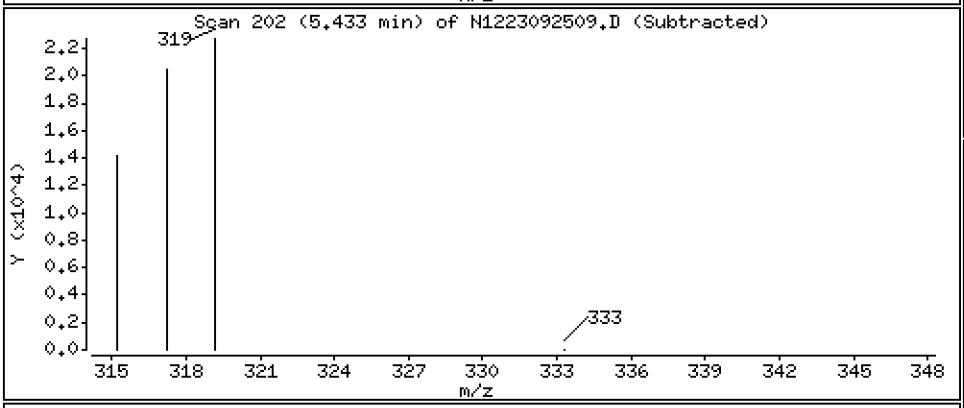
Column diameter: 0.25

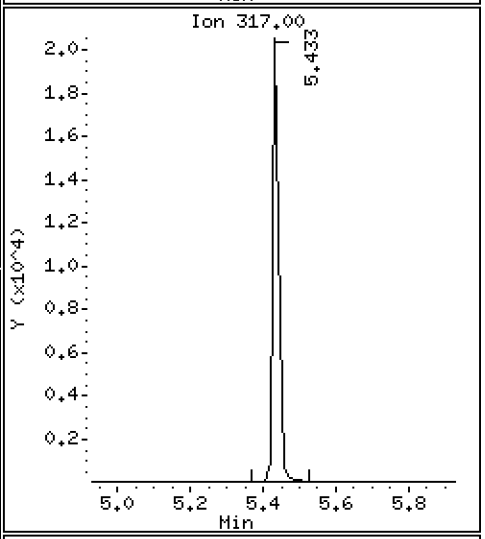
3 Tributyl Tin (Hexyl)

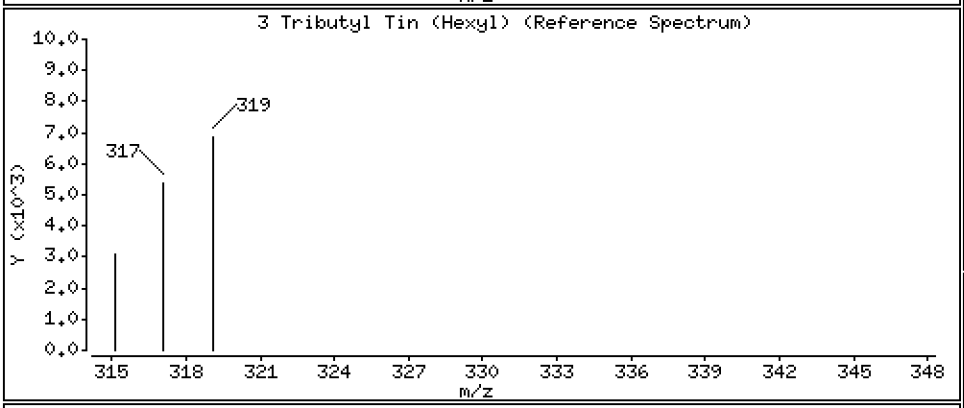
Concentration: 2.062 ug/mL

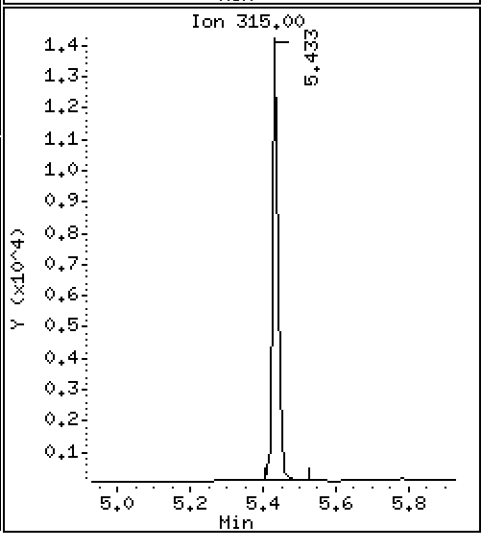


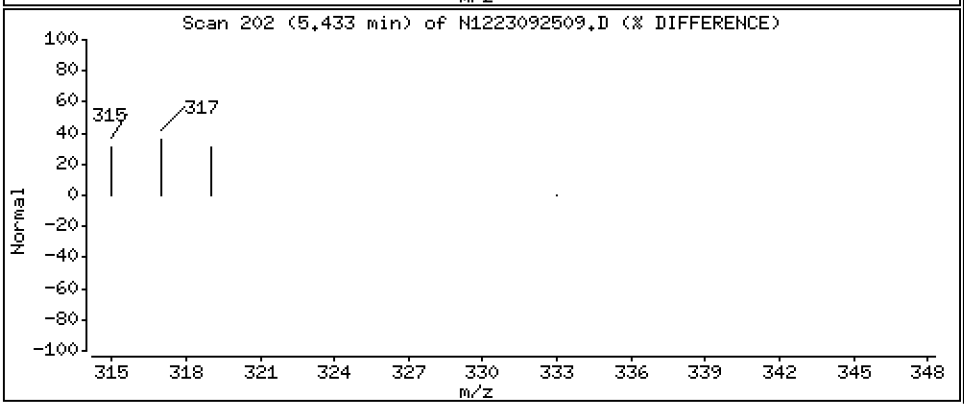












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092509.D
Lab Smp Id: SLI0375-SCV1
Inj Date : 25-SEP-2023 12:34
Operator : JZ   Inst ID: nt12.i
Smp Info : SCV230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:48 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	Compound Not Detected.					
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	137	0.00677	0.006772
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	31902	2.06191	2.062
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	57693	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	26056	1.62457	1.625
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	61184	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092509.D
Lab Smp Id: SLI0375-SCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	57693	4.68
8 p-Terphenyl-d14	59196	29598	118392	61184	3.36

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092509.D

Lab ID: SLI0375-SCV1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 12:34

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

SECOND-SOURCE CALIBRATION VERIFICATION

EPA 8270E-SIM

Laboratory: Analytical Resources, LLC
SDG: 23J0690
Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023
Calibration: GI00071
Laboratory ID: SLI0375-SCV1
Sequence: SLI0375
Standard ID: L004613

ANALYTE	EXPECTED (ug/mL)	FOUND (ug/mL)	% DRIFT	QC LIMIT
Tributyltin Ion	1.5460	1.59	3.1	20.00
Tripentyltin	1.5918	1.29	-18.8	20.00

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

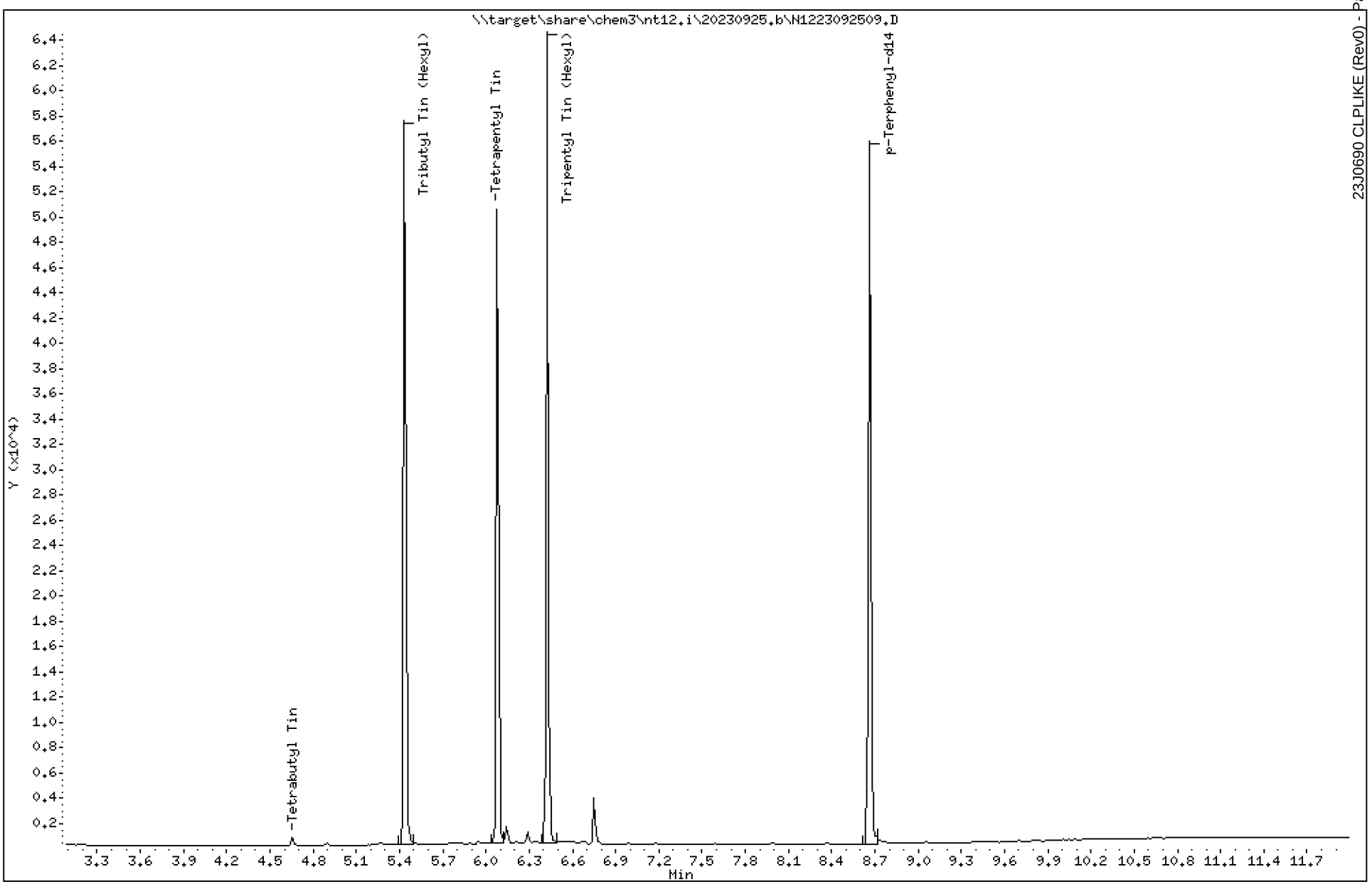
Instrument: nt12.i

Sample Info: SCV230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

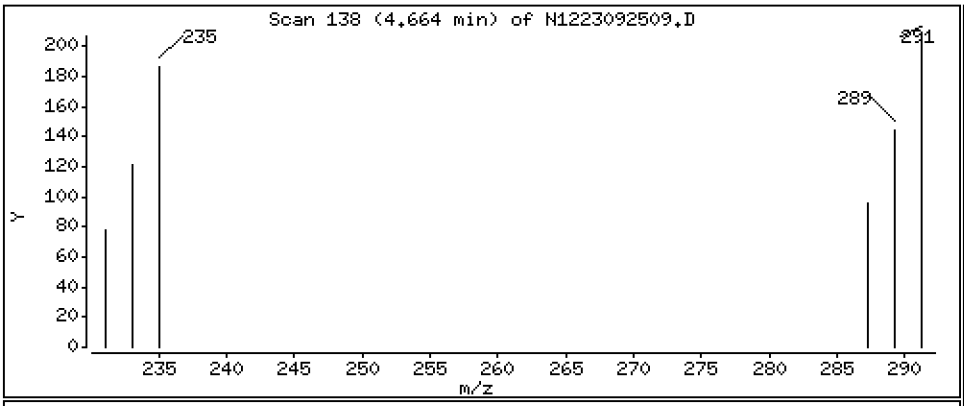
Operator: JZ

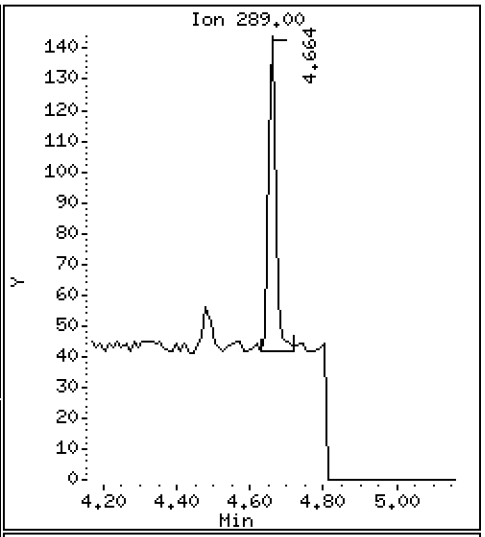
Column phase: ZB-5msi

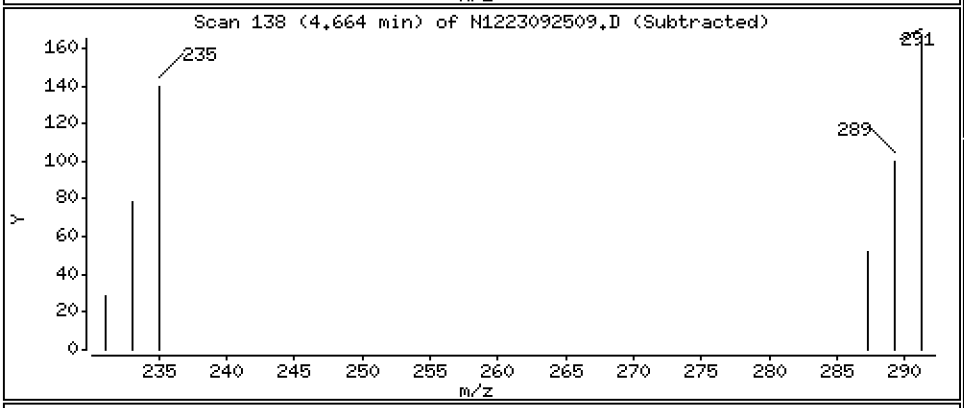
Column diameter: 0.25

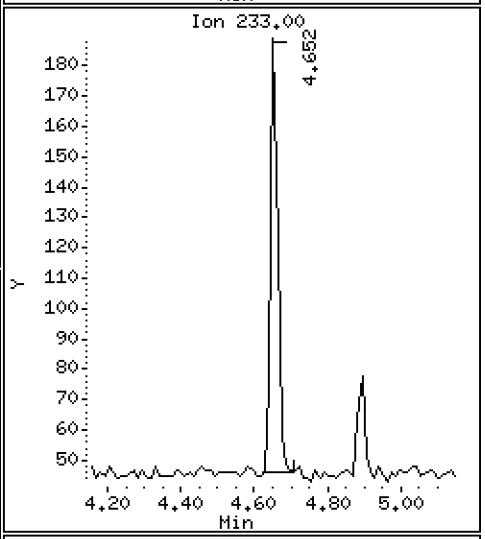
2 Tetrabutyl Tin

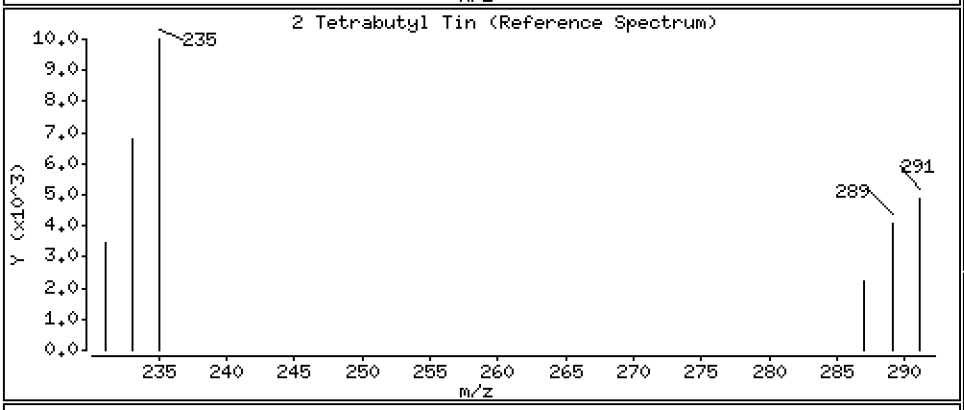
Concentration: 0.006772 ug/mL

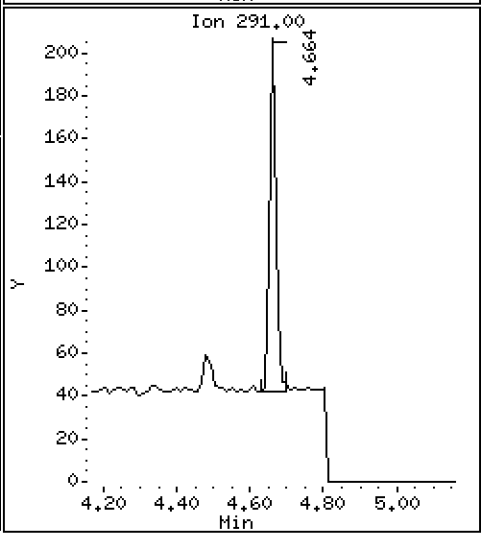


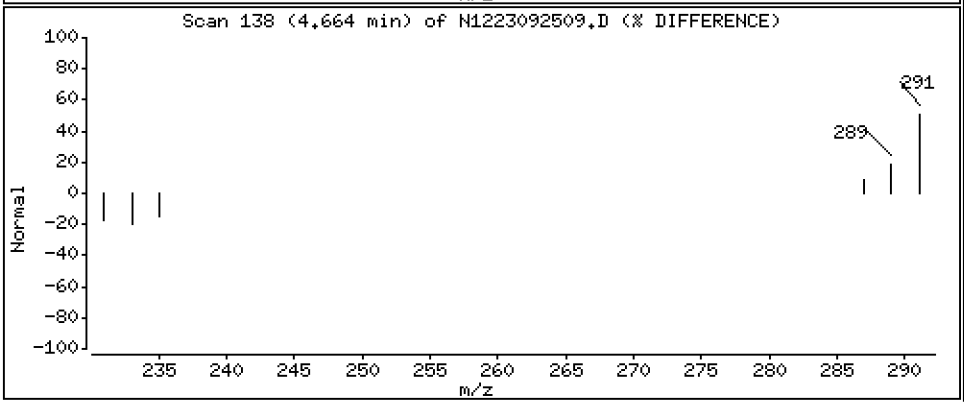












Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

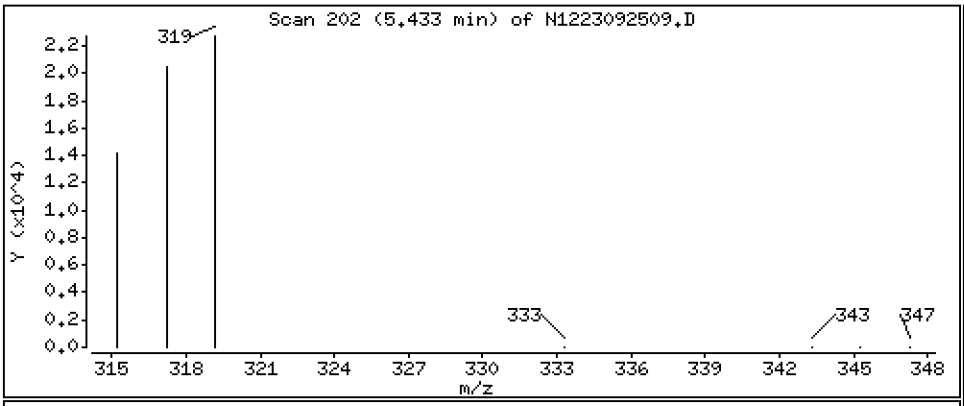
Operator: JZ

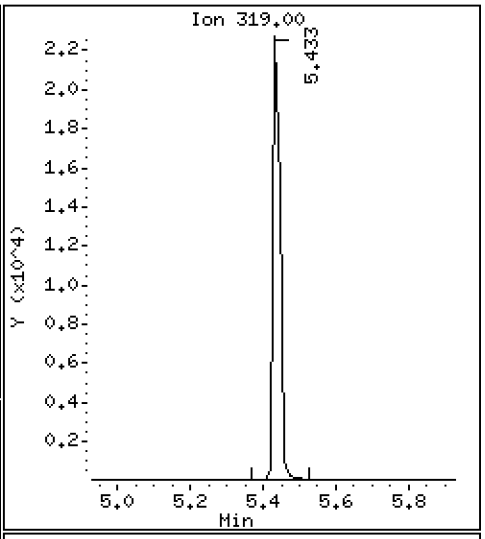
Column phase: ZB-5msi

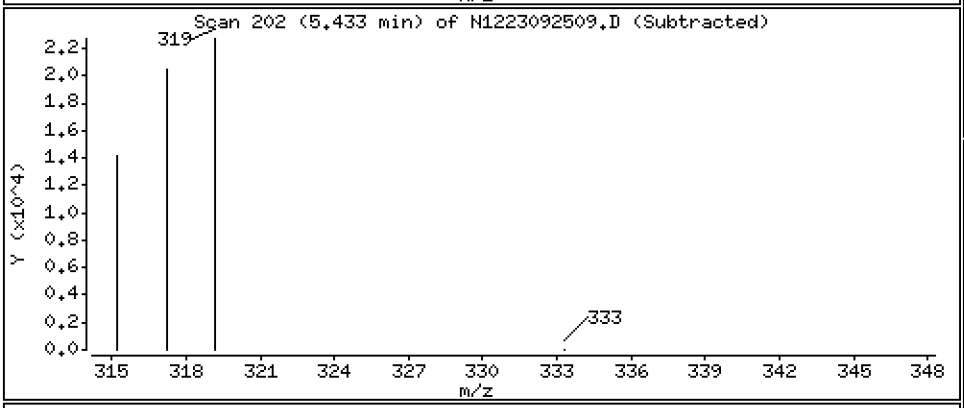
Column diameter: 0.25

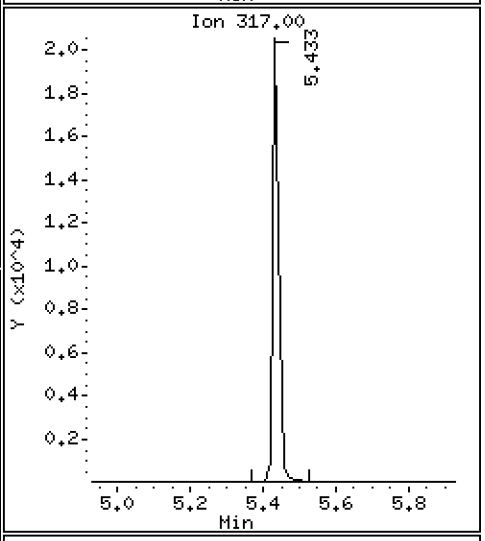
3 Tributyl Tin (Hexyl)

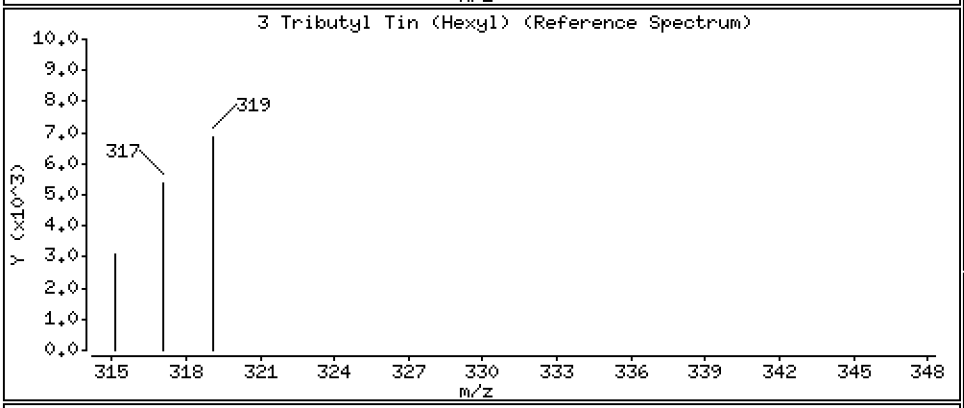
Concentration: 2.062 ug/mL

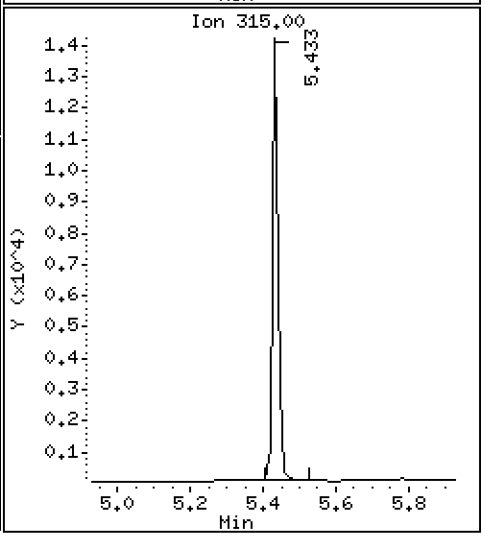


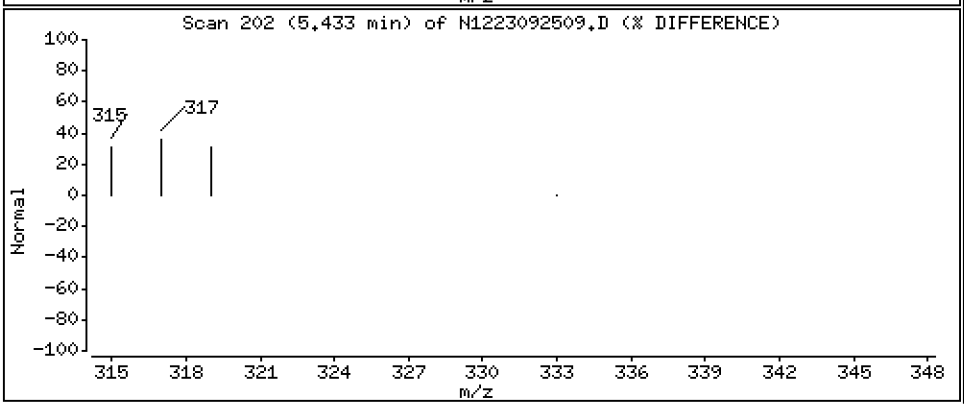












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092509.D
Lab Smp Id: SLI0375-SCV1
Inj Date : 25-SEP-2023 12:34
Operator : JZ   Inst ID: nt12.i
Smp Info : SCV230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:48 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	Compound Not Detected.					
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	137	0.00677	0.006772
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	31902	2.06191	2.062
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	57693	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	26056	1.62457	1.625
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	61184	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092509.D
Lab Smp Id: SLI0375-SCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	57693	4.68
8 p-Terphenyl-d14	59196	29598	118392	61184	3.36

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092509.D

Lab ID: SLI0375-SCV1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 12:34

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Analytical Resources, LLC
Analytical Chemists and Consultants

INITIAL CALIBRATION CHECK
EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Instrument ID:	NT12	Calibration:	GI00071
Lab File ID:	N1223111502.D	Calibration Date:	09/25/2023
Sequence:	SLK0217	Injection Date:	11/15/23
Lab Sample ID:	SLK0217-ICV1	Injection Time:	10:33
Sequence Name:	Initial Cal Check		

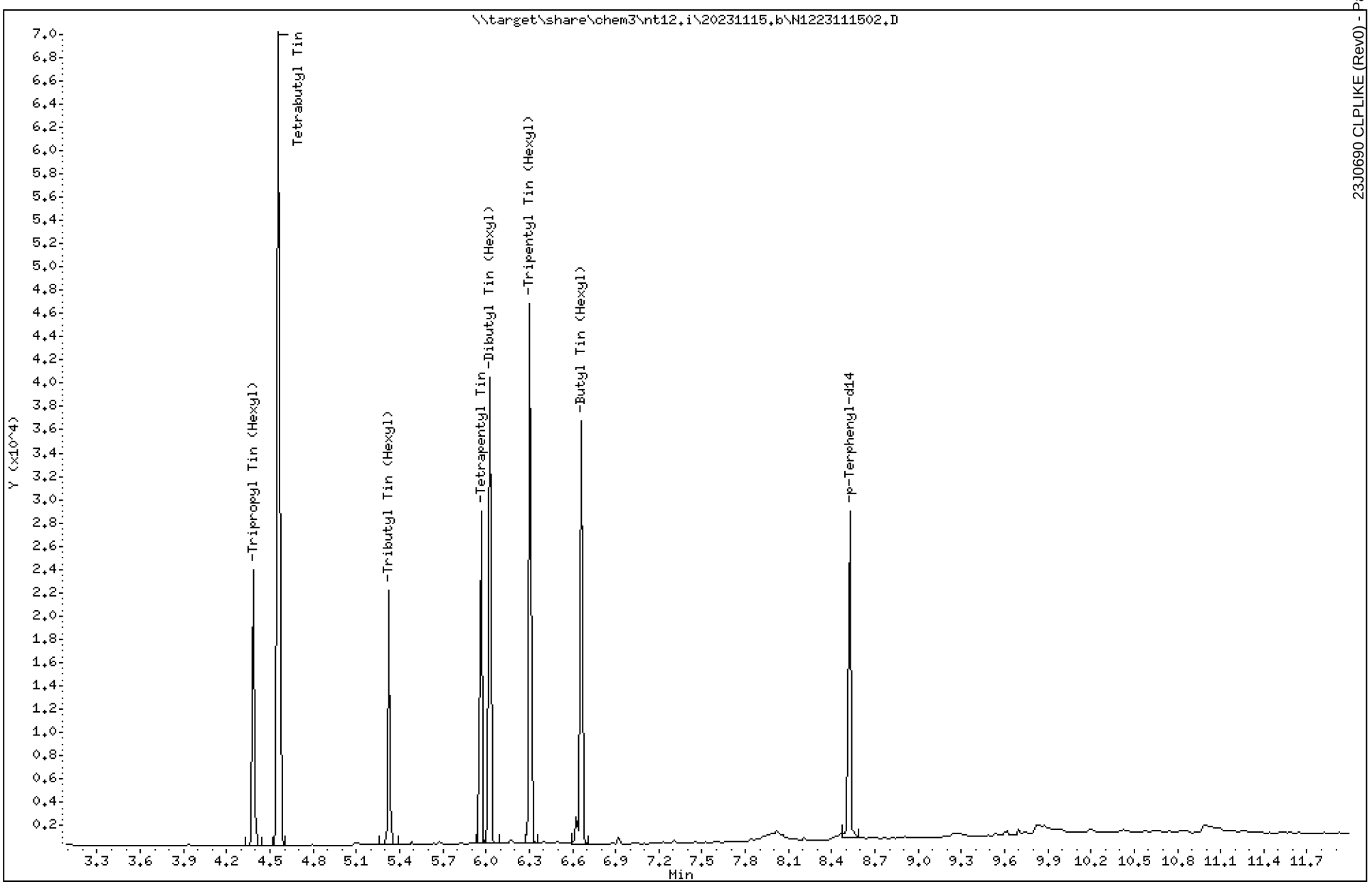
		CONC. (ug/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN	ICV	LIMIT
Tributyltin Ion	A	0.77300	0.787	0.5363580	0.5460228	0.01	1.8	+/-20
Dibutyltin Ion	A	1.1560	1.06	0.0355390	0.0325341	0.01	-8.5	+/-20
Butyltin Ion	A	0.81600	0.839	0.0537661	0.0552753	0.01	2.8	+/-20
Tetrabutyltin	A	1.0000	0.944	0.7013250	0.6619018	0.01	-5.6	+/-20
Tripentyltin	A	1.5918	1.46	0.0524277	0.0481718	0.01	-8.1	+/-20
Tripropyltin	A	0.74430	0.736	0.7246804	0.7161997	0.01	-1.2	+/-20
Tetrapentyltin	A	2.0000	2.00	28713.5800	1.0000		0.0	
p-Terphenyl-d14	A	0.20000	0.200	298814.2000	1.0000		0.0	

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111502.D
Date : 15-NOV-2023 10:33
Client ID:
Sample Info: ICV231115

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



23J0690 CLPLIKE (Rev0) - Page 141 of 1248

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111502.D
Lab Smp Id: SLK0217-ICV1
Inj Date : 15-NOV-2023 10:33
Operator : JZ   Inst ID: nt12.i
Smp Info : ICV231115
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 10:56 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 2   Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.387	4.387	(0.735)	13177	1.00000	0.9883
	2 Tetrabutyl Tin	289	4.560	4.560	(0.764)	12178	1.00000	0.9438
	3 Tributyl Tin (Hexyl)	319	5.325	5.325	(0.892)	10046	1.00000	1.018
*	4 Tetrapentyl Tin	333	5.969	5.969	(1.000)	36797	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.036	6.036	(0.708)	12279	2.00000	1.831
$	6 Tripentyl Tin (Hexyl)	347	6.304	6.304	(0.739)	18181	2.00000	1.838
	7 Butyl Tin (Hexyl)	347	6.666	6.666	(0.781)	20862	2.00000	2.056
*	8 p-Terphenyl-d14	244	8.530	8.530	(1.000)	37742	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111502.D
Lab Smp Id: SLK0217-ICV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 13-NOV-2023
Calibration Time: 15:06
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	36797	-33.23
8 p-Terphenyl-d14	59196	29598	118392	37742	-36.24

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111502.D

Lab ID: SLK0217-ICV1
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 10:33

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

No RRT check. Ccal file.

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Q-FLAG SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20231115.b

Instrument: nt12.i Date: 15-NOV-2023 Method: 20231115.b\TBT20230925.m

INITIAL CAL: 25-SEP-2023

Compound	%RSD or R^2
NO Q-FLAGS	

ICV CAL: N1223111502.D 15-NOV-2023 10:33

Compound	%D
NO Q-FLAGS	

Analytical Resources, LLC
Analytical Chemists and Consultants

SECOND-SOURCE
CONTINUING CALIBRATION CHECK
EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Instrument ID:	NT12	Calibration:	GI00071
Lab File ID:	N1223092509.D	Calibration Date:	09/25/2023
Sequence:	SLI0375	Injection Date:	09/25/23
Lab Sample ID:	SLI0375-SCV1	Injection Time:	12:34
Sequence Name:	Second source		

		CONC. (ug/mL)		RESPONSE FACTOR (RRF)			% DRIFT/DIFF	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN	CCV	LIMIT
Tributyltin Ion	A	1.5460	1.59	0.5363580	0.5529615	0.01	3.1	+/-20
Tripentyltin	A	1.5918	1.29	0.0524277	0.0425863	0.01	-18.8	+/-20

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

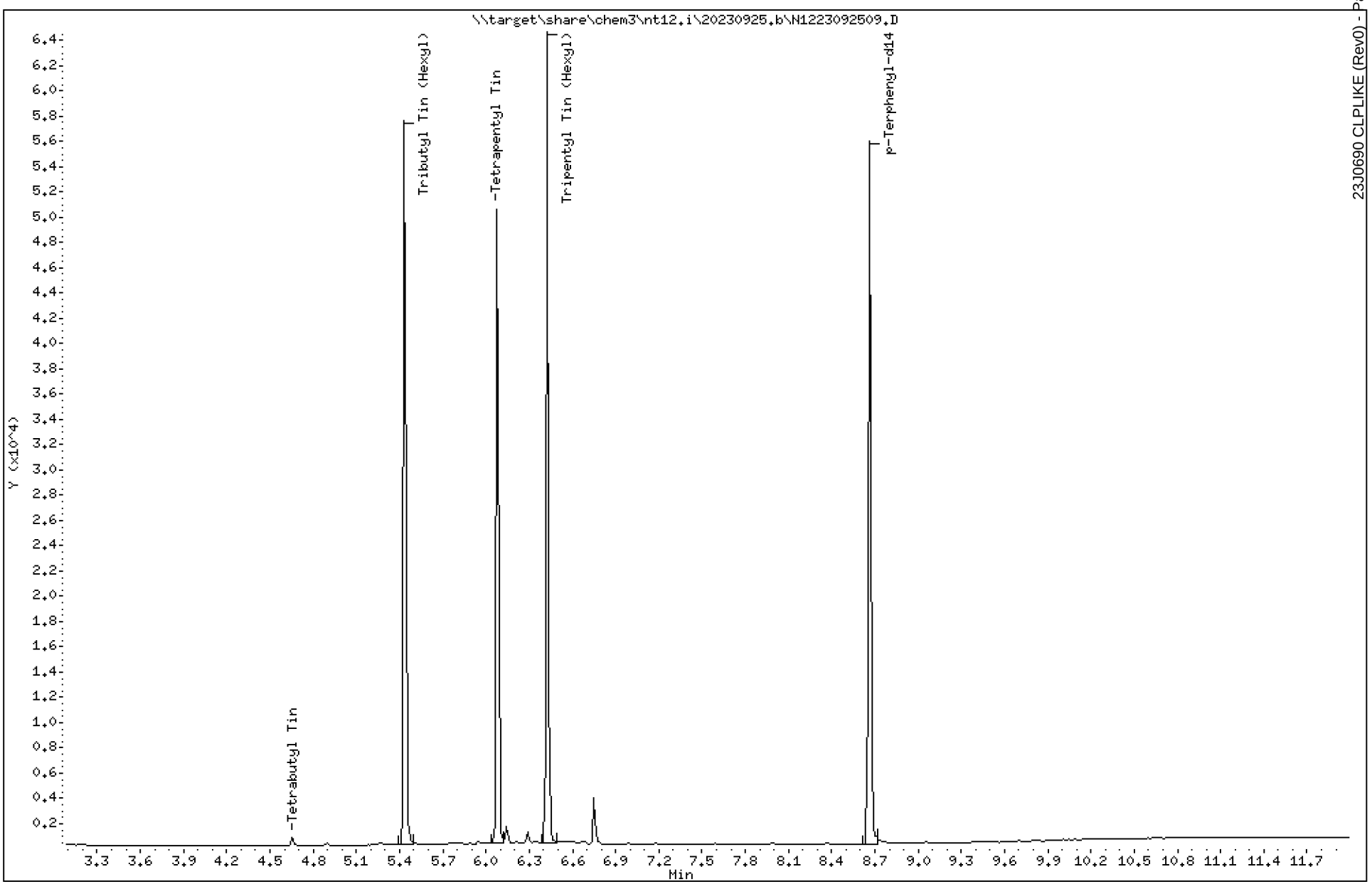
Instrument: nt12.i

Sample Info: SCV230925

Operator: JZ

Column phase: ZB-5msi

Column diameter: 0.25



Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

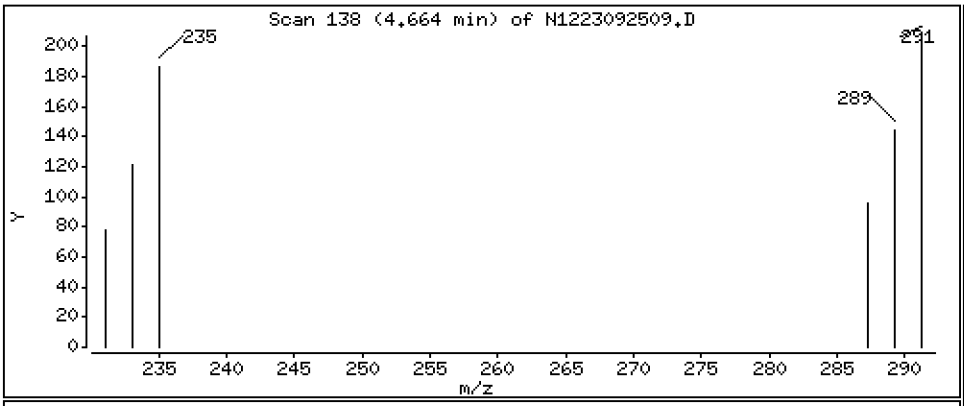
Operator: JZ

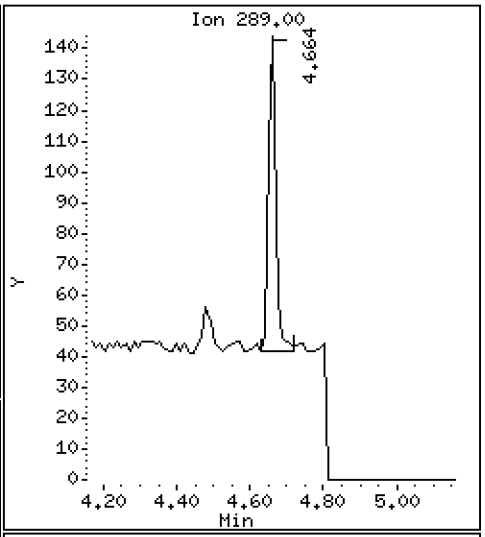
Column phase: ZB-5msi

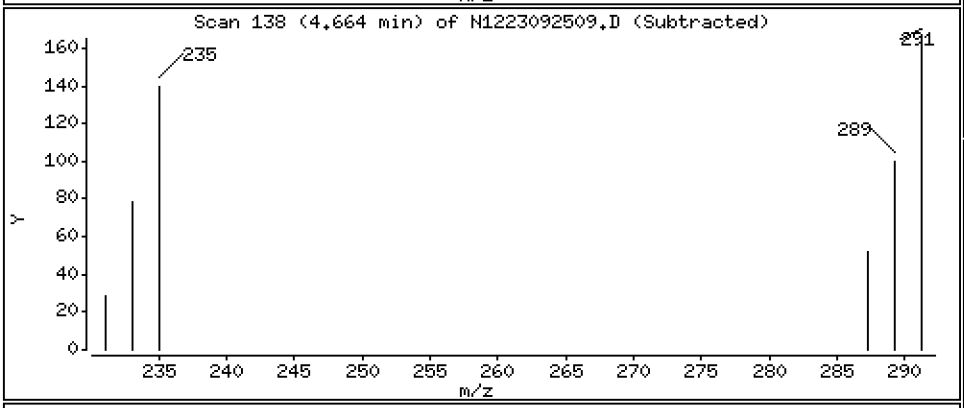
Column diameter: 0.25

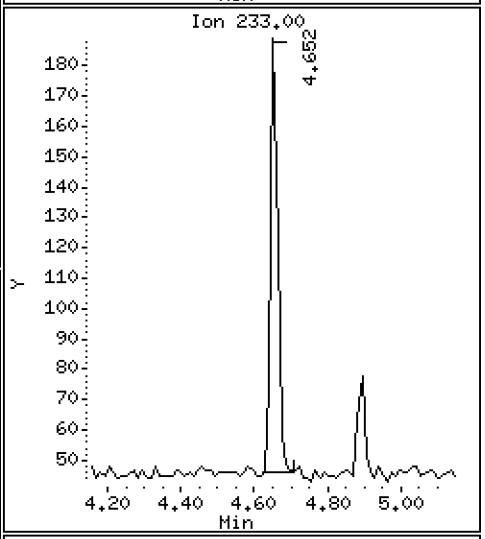
2 Tetrabutyl Tin

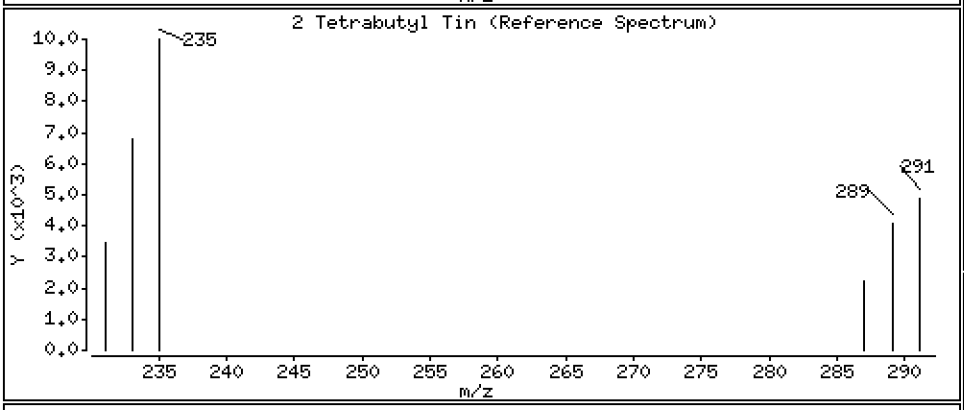
Concentration: 0.006772 ug/mL

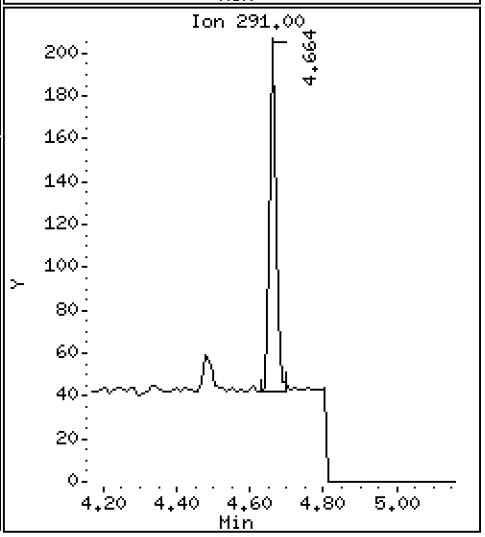


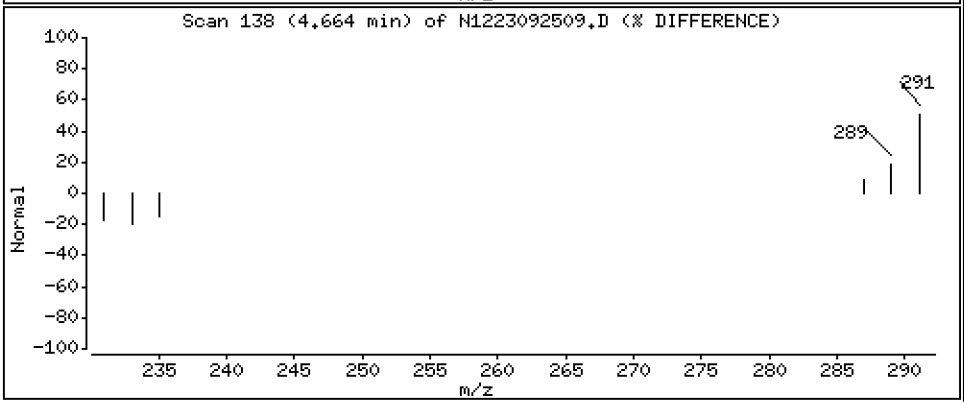












Data File: \\target\share\chem3\nt12.i\20230925.b\N1223092509.D

Date : 25-SEP-2023 12:34

Client ID:

Instrument: nt12.i

Sample Info: SCV230925

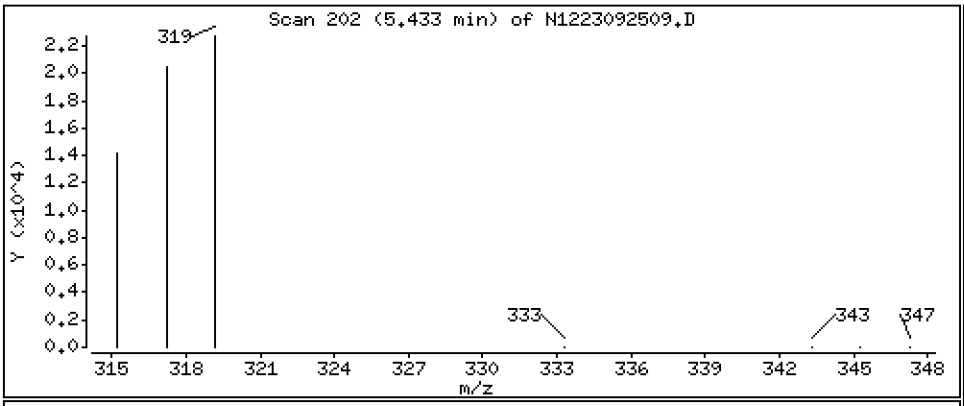
Operator: JZ

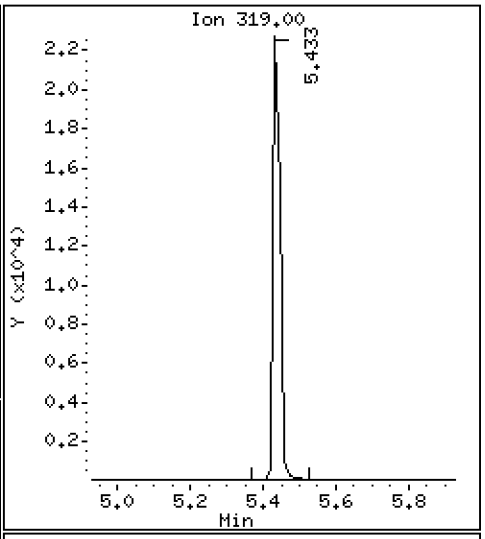
Column phase: ZB-5msi

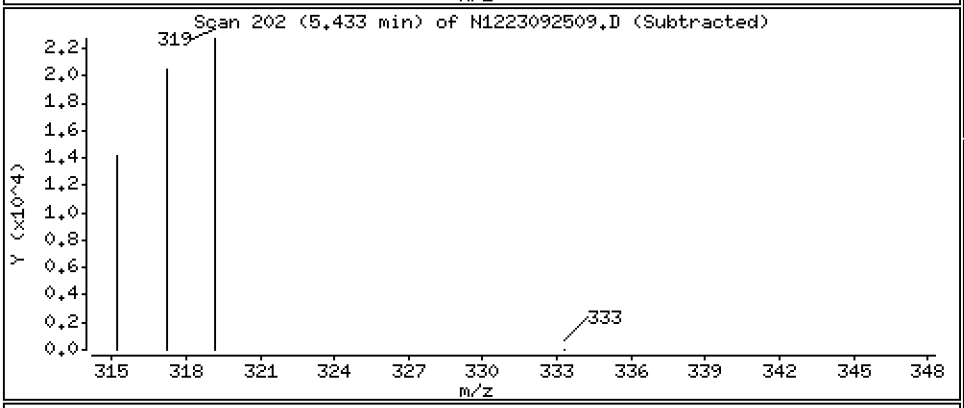
Column diameter: 0.25

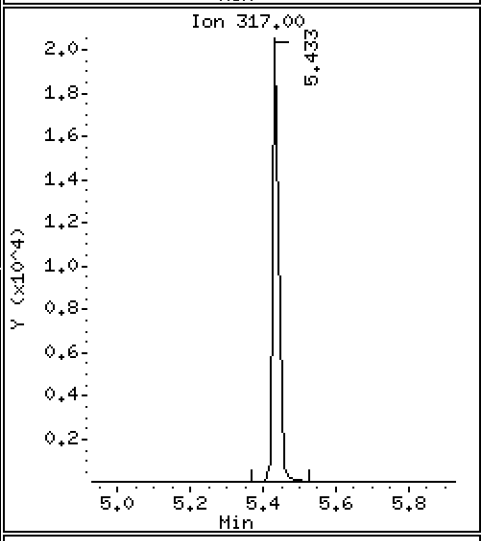
3 Tributyl Tin (Hexyl)

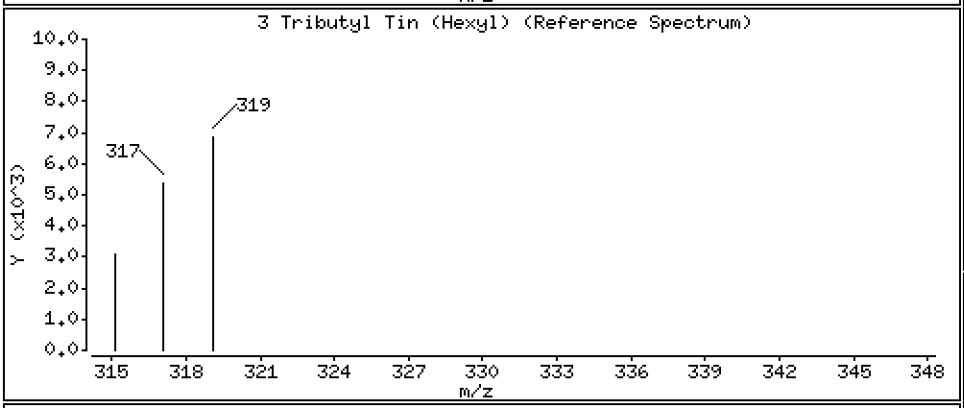
Concentration: 2.062 ug/mL

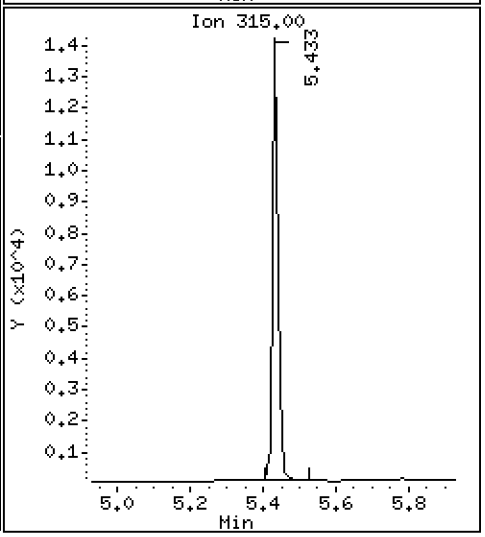


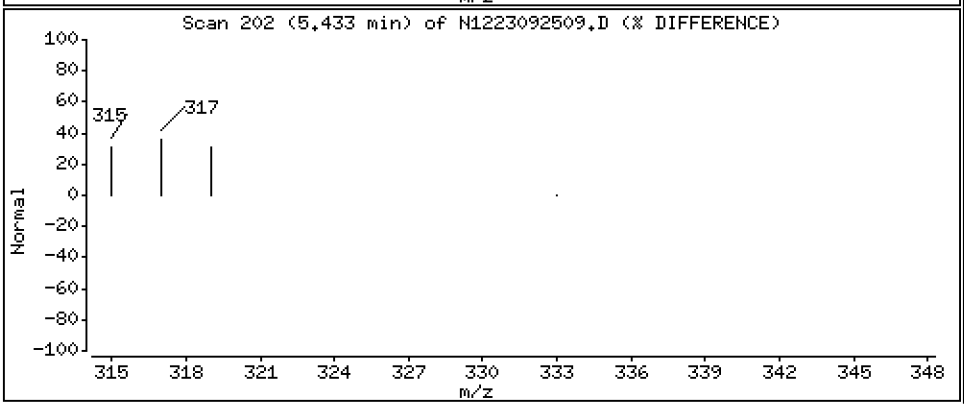












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20230925.b\N1223092509.D
Lab Smp Id: SLI0375-SCV1
Inj Date : 25-SEP-2023 12:34
Operator : JZ   Inst ID: nt12.i
Smp Info : SCV230925
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Meth Date : 25-Sep-2023 13:48 nt12.i   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	CONCENTRATIONS FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	Compound Not Detected.					
	2 Tetrabutyl Tin	289	4.663	4.663	(0.768)	137	0.00677	0.006772
	3 Tributyl Tin (Hexyl)	319	5.432	5.432	(0.894)	31902	2.06191	2.062
*	4 Tetrapentyl Tin	333	6.076	6.076	(1.000)	57693	2.00000	
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.					
$	6 Tripentyl Tin (Hexyl)	347	6.424	6.424	(0.742)	26056	1.62457	1.625
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.					
*	8 p-Terphenyl-d14	244	8.664	8.650	(1.000)	61184	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223092509.D
Lab Smp Id: SLI0375-SCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20230925.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 25-SEP-2023
Calibration Time: 11:26
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	55113	27557	110226	57693	4.68
8 p-Terphenyl-d14	59196	29598	118392	61184	3.36

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.08	5.58	6.58	6.08	-0.00
8 p-Terphenyl-d14	8.65	8.15	9.15	8.66	0.15

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223092509.D

Lab ID: SLI0375-SCV1
nt12.i, 20230925.b\TBT20230925.m,   25-SEP-2023 12:34

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223092506.D

On Column LOD for nt12.i, 20230925.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

Analytical Resources, LLC
Analytical Chemists and Consultants

CONTINUING CALIBRATION CHECK

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Instrument ID:	NT12	Calibration:	GI00071
Lab File ID:	N1223111515.D	Calibration Date:	09/25/2023
Sequence:	SLK0217	Injection Date:	11/15/23
Lab Sample ID:	SLK0217-CCV1	Injection Time:	15:41
Sequence Name:	Calibration Check		

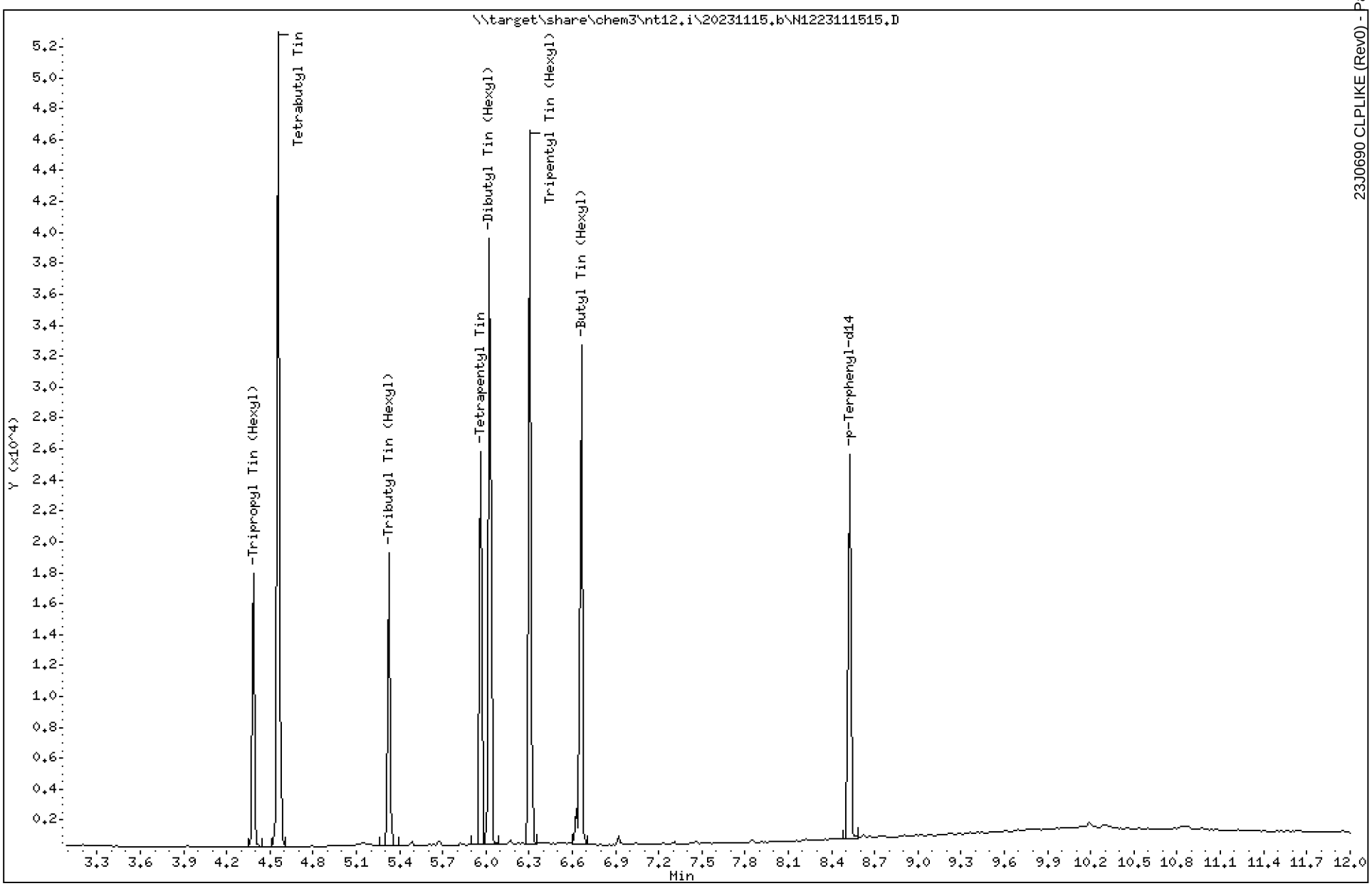
		CONC. (ug/mL)		RESPONSE FACTOR (RRF)			% DRIFT/DIFF	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN	CCV	LIMIT
Tributyltin Ion	A	0.77300	0.720	0.5363580	0.4994623	0.01	-6.9	+/-50
Dibutyltin Ion	A	1.1560	1.13	0.0355390	0.0346383	0.01	-2.5	+/-50
Butyltin Ion	A	0.81600	0.935	0.0537661	0.0616143	0.01	14.6	+/-50
Tetrabutyltin	A	1.0000	0.856	0.7013250	0.6003662	0.01	-14.4	+/-50
Tripentyltin	A	1.5918	1.62	0.0524277	0.0534899	0.01	2.0	+/-50
Tripropyltin	A	0.74430	0.650	0.7246804	0.6326833	0.01	-12.7	+/-50

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111515.D
Date : 15-NOV-2023 15:41
Client ID:
Sample Info: CCV231115,

Instrument: nt12.i
Operator: JZ
Column diameter: 0.25

Column phase: ZB-5msi



Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111515.D

Date : 15-NOV-2023 15:41

Client ID:

Instrument: nt12.i

Sample Info: CCV231115,

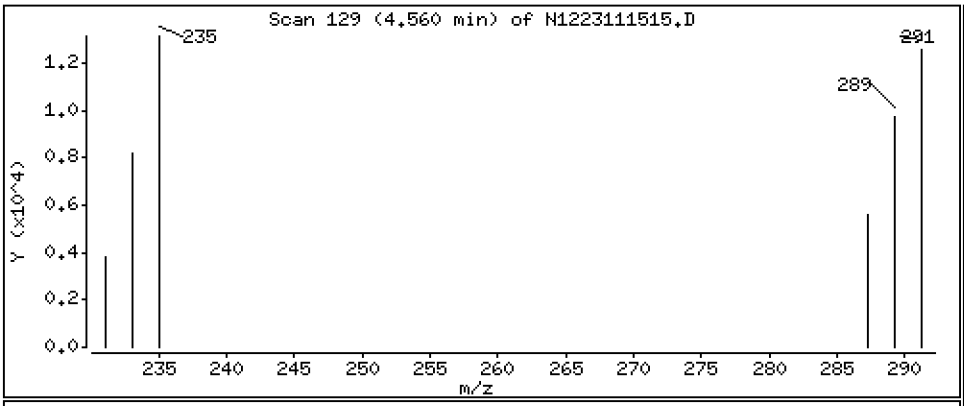
Operator: JZ

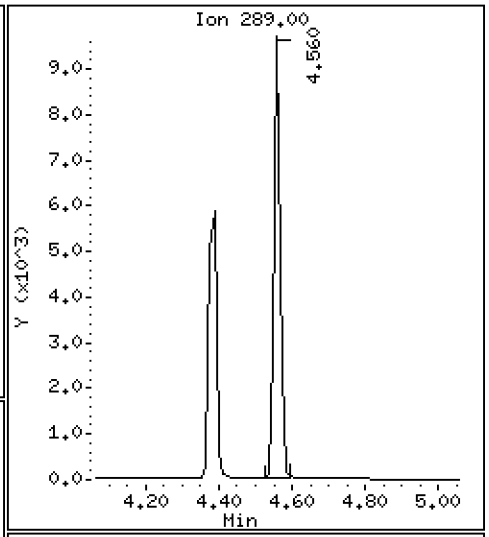
Column phase: ZB-5msi

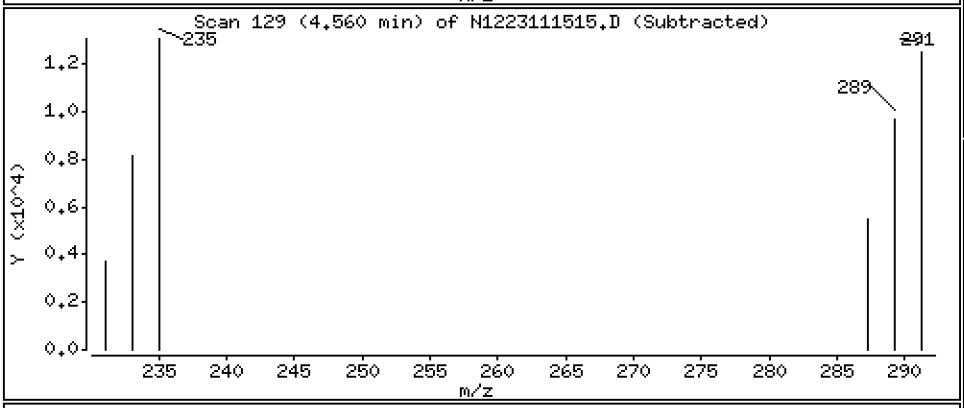
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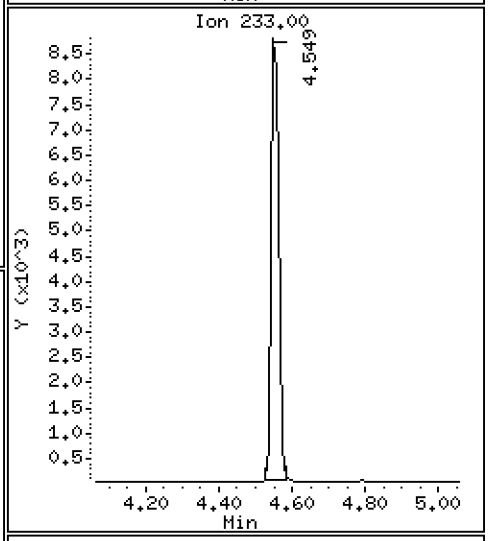
2 Tetrabutyl Tin

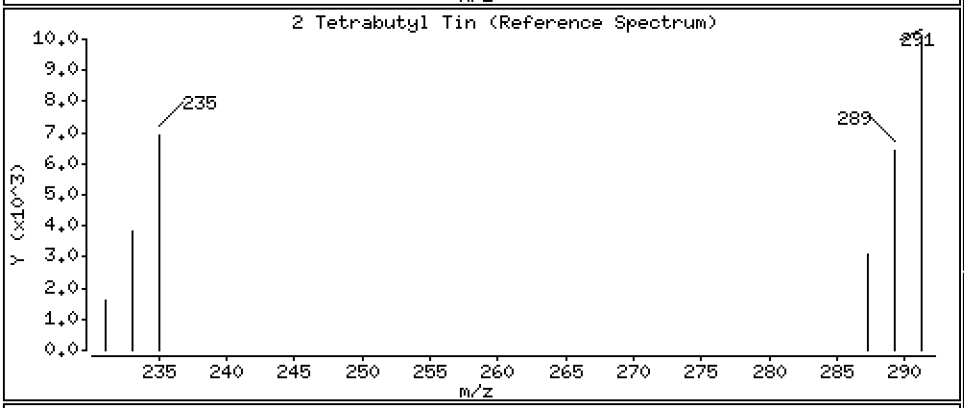
Concentration: 0.8560 ug/mL

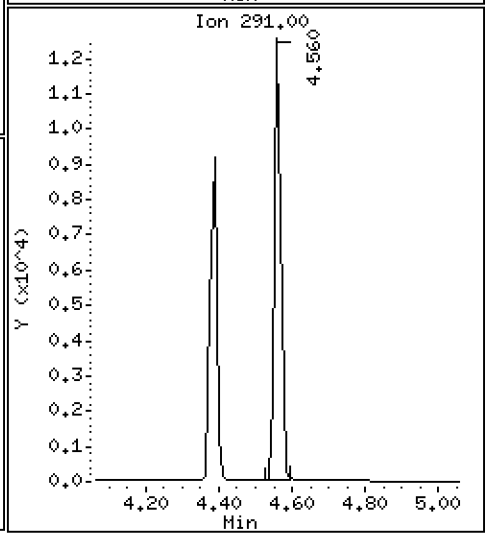


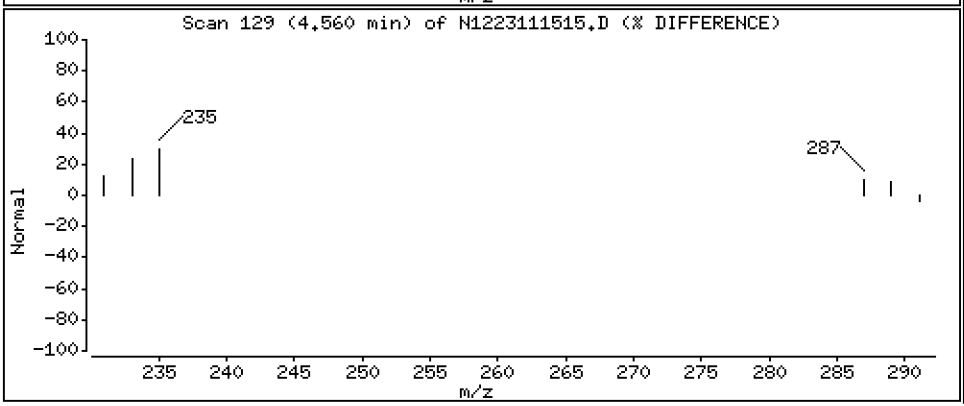












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111515.D

Date : 15-NOV-2023 15:41

Client ID:

Instrument: nt12.i

Sample Info: CCV231115,

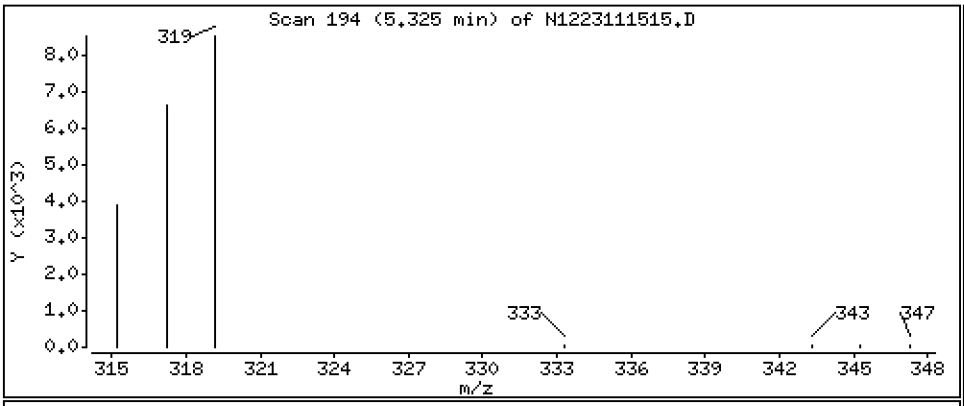
Operator: JZ

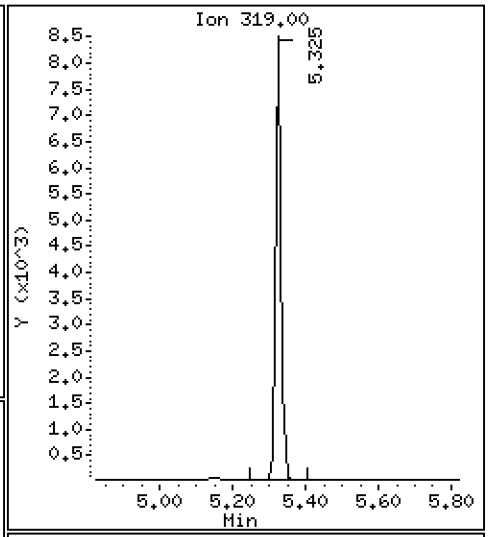
Column phase: ZB-5msi

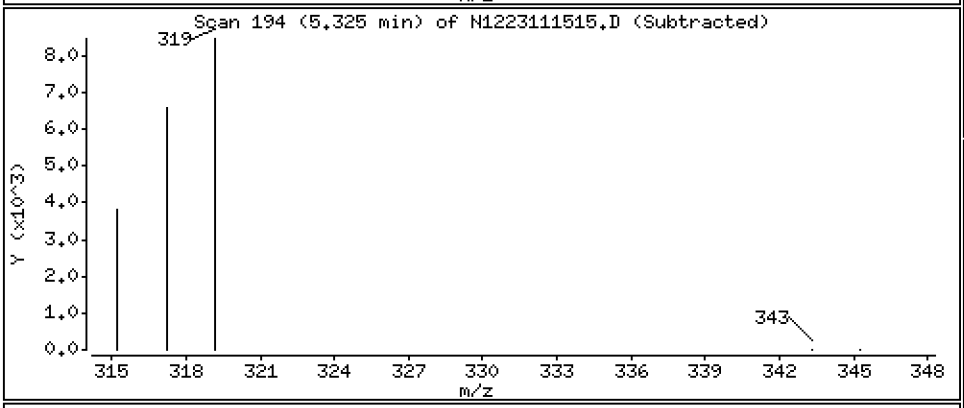
Column diameter: 0.25

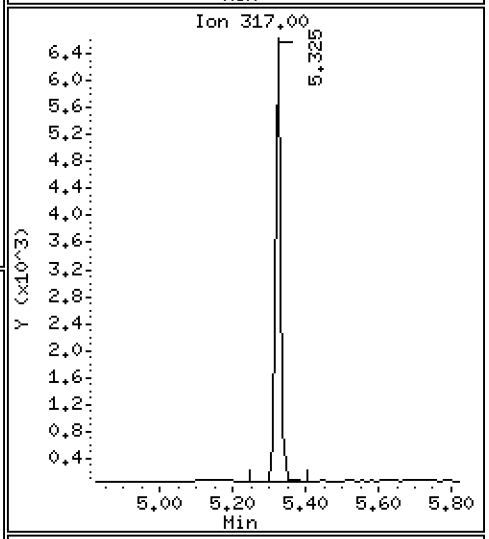
3 Tributyl Tin (Hexyl)

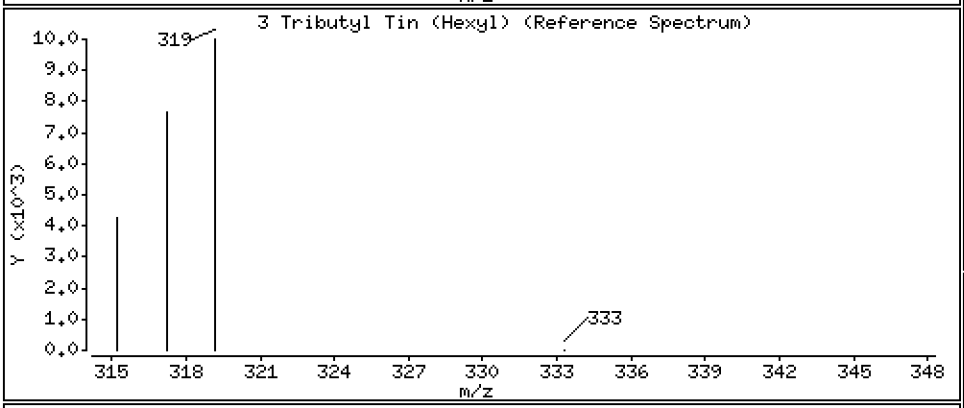
Concentration: 0.9312 ug/mL

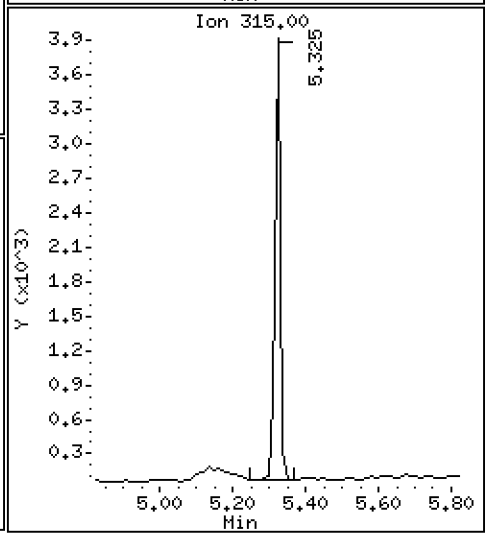


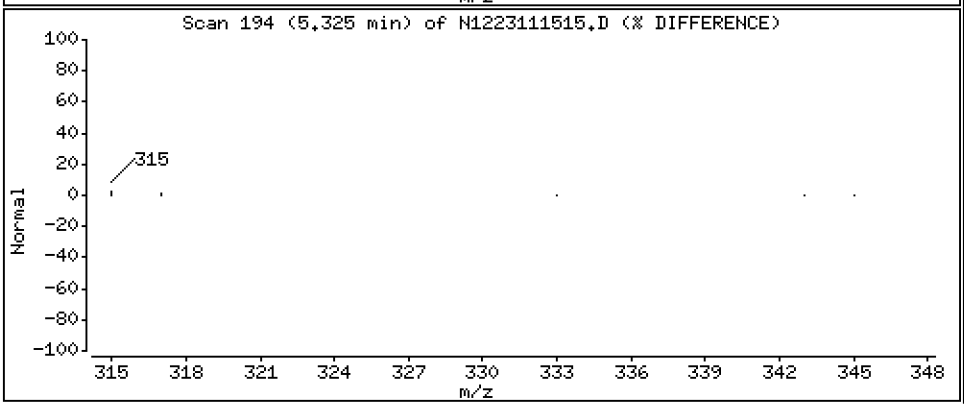












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111515.D

Date : 15-NOV-2023 15:41

Client ID:

Instrument: nt12.i

Sample Info: CCV231115,

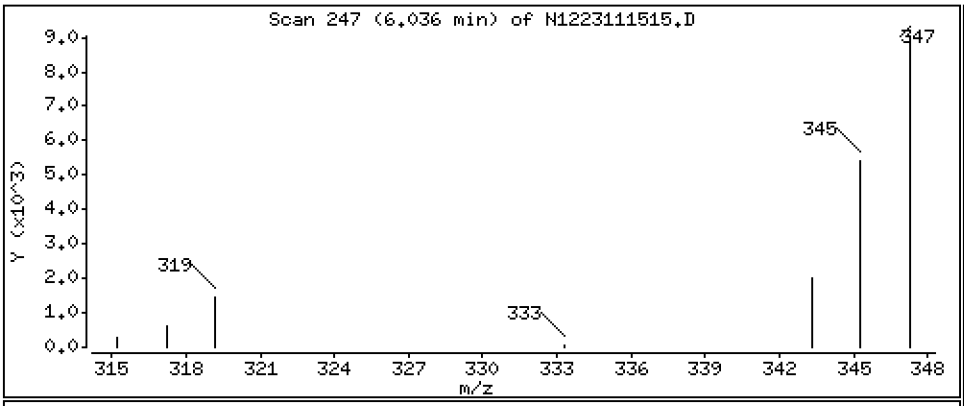
Operator: JZ

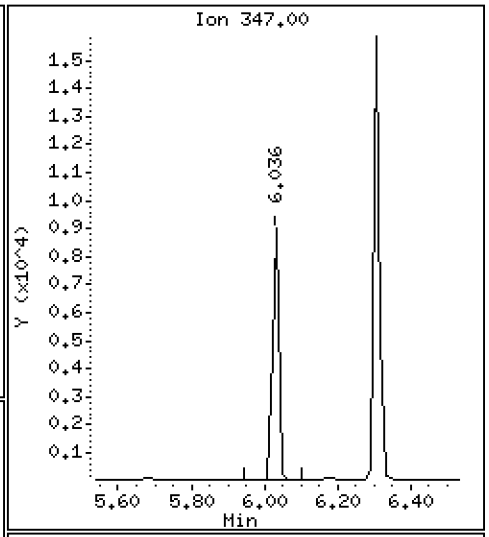
Column phase: ZB-5msi

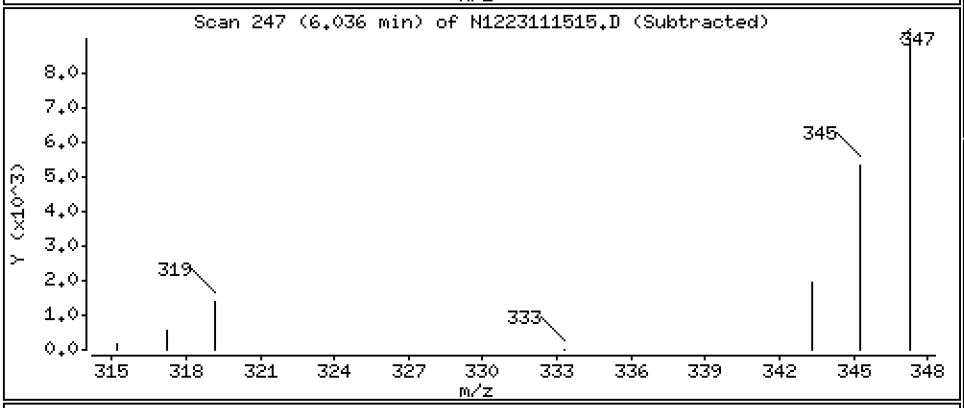
Column diameter: 0.25

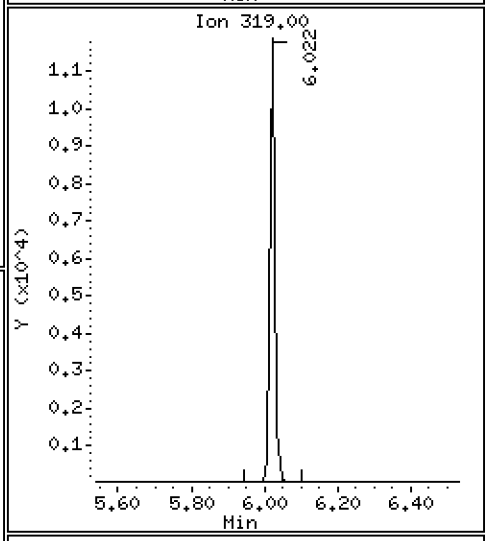
5 Dibutyl Tin (Hexyl)

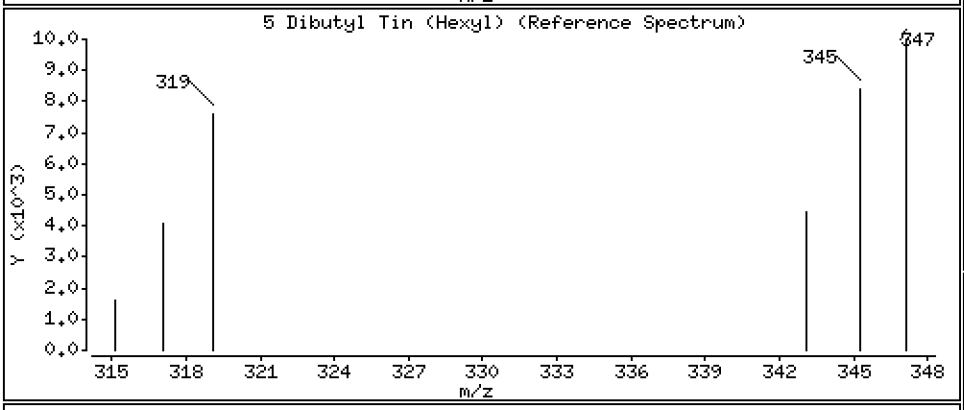
Concentration: 1.949 ug/mL

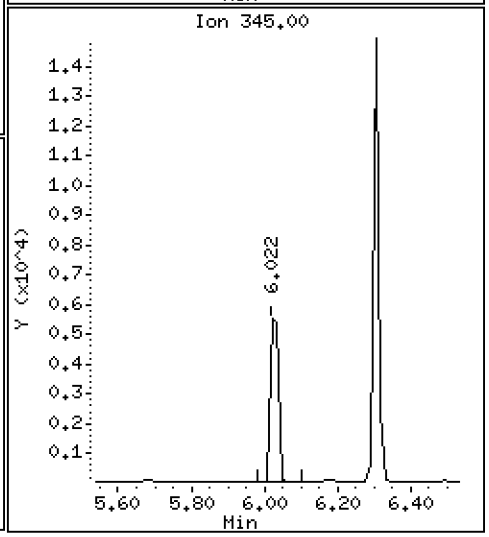


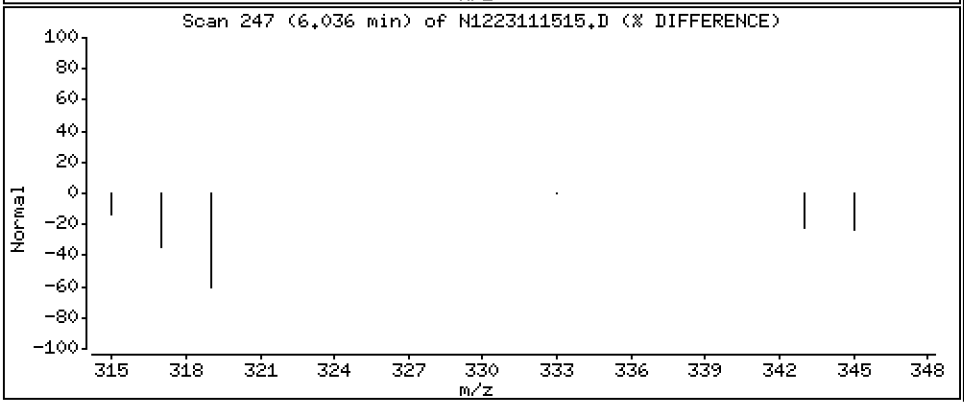












Data File: \\target\share\chem3\nt12.i\20231115.b\N1223111515.D

Date : 15-NOV-2023 15:41

Client ID:

Instrument: nt12.i

Sample Info: CCV231115,

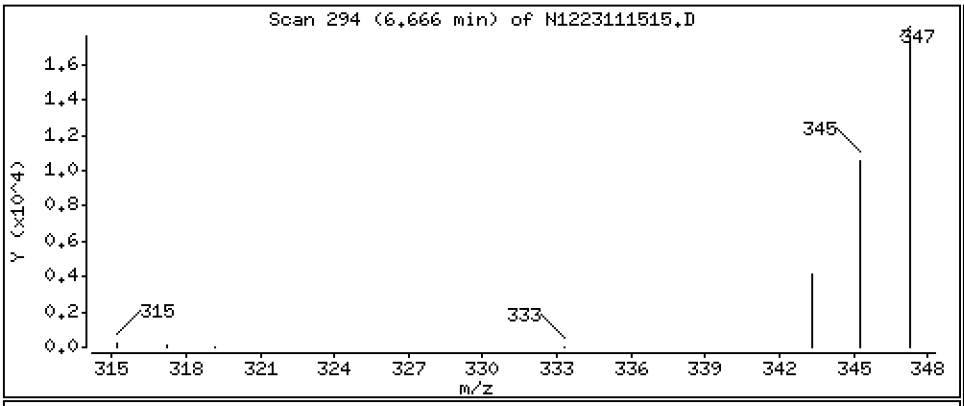
Operator: JZ

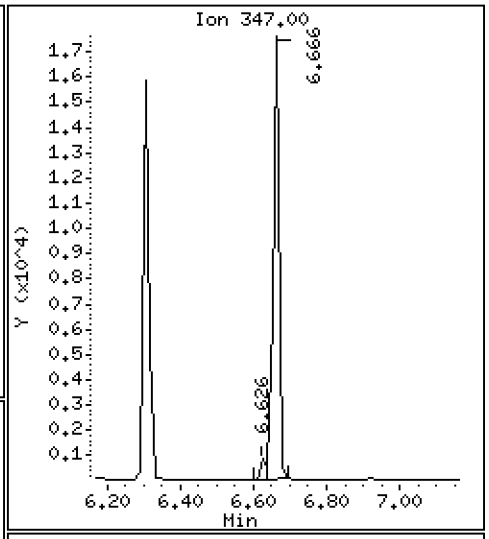
Column phase: ZB-5msi

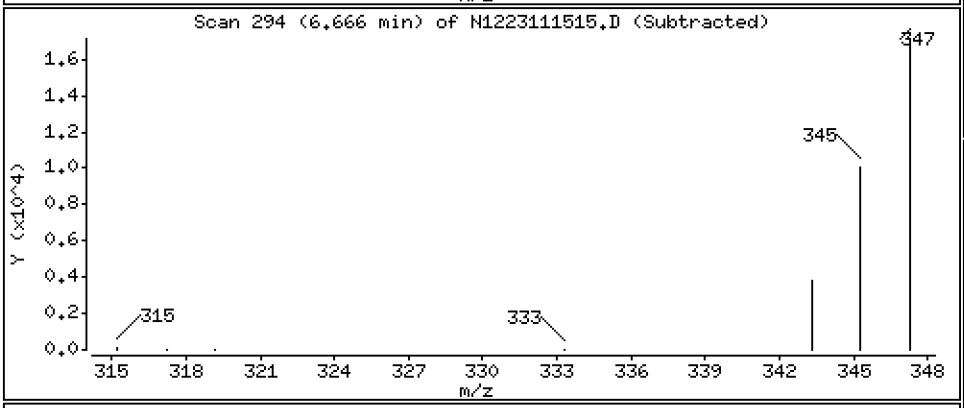
Column diameter: 0.25

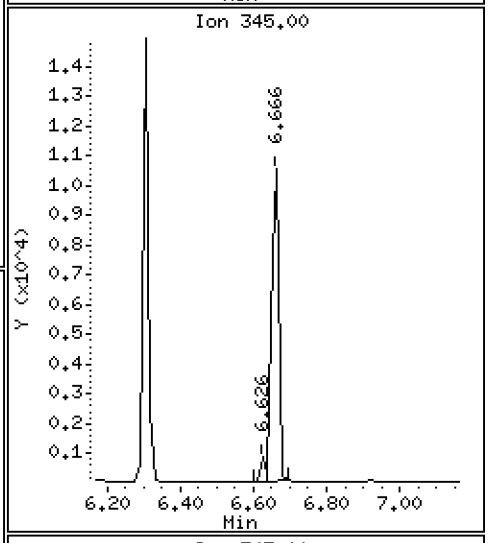
7 Butyl Tin (Hexyl)

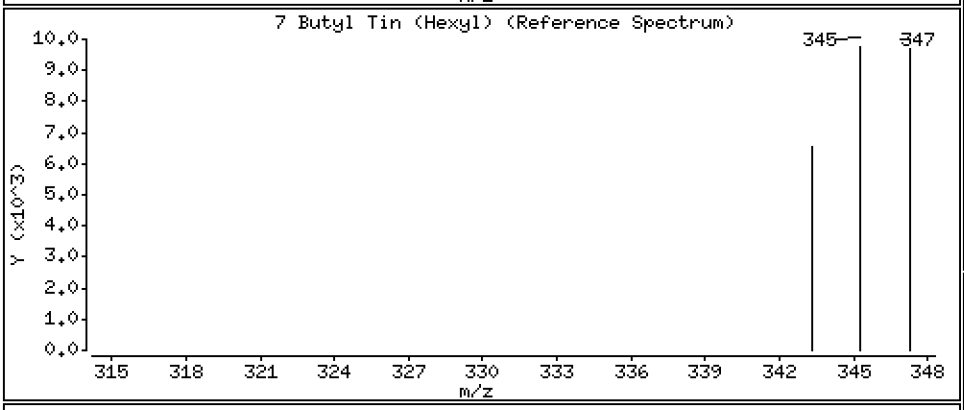
Concentration: 2.292 ug/mL

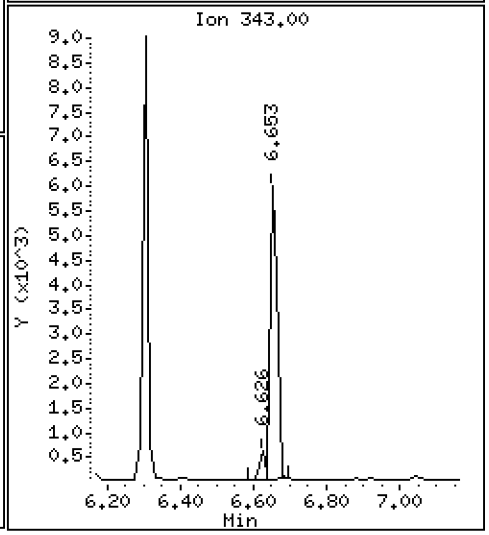


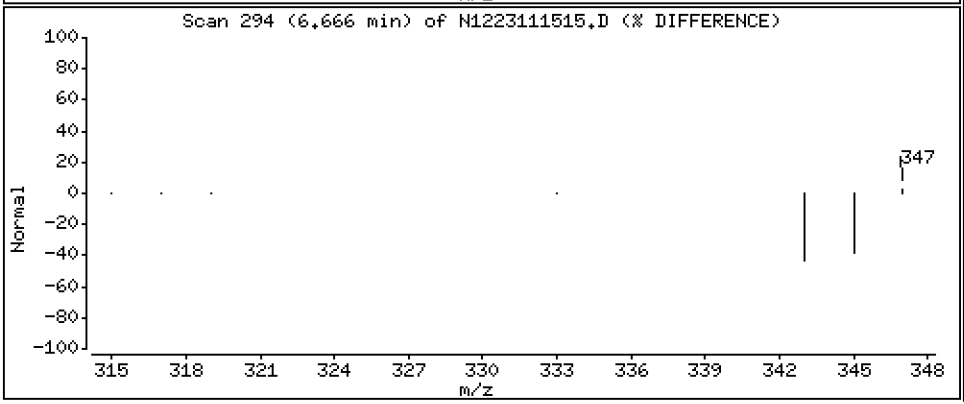












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20231115.b\N1223111515.D
Lab Smp Id: SLK0217-CCV1
Inj Date : 15-NOV-2023 15:41
Operator : JZ   Inst ID: nt12.i
Smp Info : CCV231115,
Misc Info : 23-
Comment   : 2 ul Injection
Method   : \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Meth Date : 15-Nov-2023 13:55 jianqing   Quant Type: ISTD
Cal Date : 25-SEP-2023 12:02   Cal File: N1223092508.D
Als bottle: 15
Dil Factor: 1.00000
Integrator: HP RTE   Compound Sublist: sedmdl.sub
Target Version: 4.14
Processing Host: JIANQINGZ-20191

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.387	4.387	(0.735)	10885	0.87305	0.8731
	2 Tetrabutyl Tin	289	4.560	4.560	(0.764)	10329	0.85605	0.8560
	3 Tributyl Tin (Hexyl)	319	5.325	5.325	(0.892)	8593	0.93121	0.9312
*	4 Tetrapentyl Tin	333	5.968	5.969	(1.000)	34409	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.035	6.036	(0.708)	11166	1.94931	1.949
$	6 Tripentyl Tin (Hexyl)	347	6.303	6.304	(0.739)	17243	2.04052	2.041
	7 Butyl Tin (Hexyl)	347	6.665	6.666	(0.781)	19862	2.29194	2.292
*	8 p-Terphenyl-d14	244	8.529	8.530	(1.000)	32236	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: N1223111515.D
Lab Smp Id: SLK0217-CCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt12.i\20231115.b\TBT20230925.m
Misc Info: 23-

Calibration Date: 15-NOV-2023
Calibration Time: 10:33
Level:
Sample Type:

Test Mode:
Use Last Continuing Calibrator.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	36797	18399	73594	34409	-6.49
8 p-Terphenyl-d14	37742	18871	75484	32236	-14.59

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	5.97	5.47	6.47	5.97	-0.00
8 p-Terphenyl-d14	8.53	8.03	9.03	8.53	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - N1223111515.D

Lab ID: SLK0217-CCV1
nt12.i, 20231115.b\TBT20230925.m,   15-NOV-2023 15:41

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

RRT check based on Ccal File: N1223111502.D

On Column LOD for nt12.i, 20231115.b\TBT20230925.m, sedmdl.sub = 0.0000

Exception: Tripropyl Tin (Hexyl) (Surr) 0.0010

* Only compounds listed in the work order have been verified by the analyst *

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLI0375	Instrument:	NT12
		Calibration:	GI00071

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
MS Tune	SLI0375-TUN1	N1223092501.D	NA	09/25/23 09:54
IBL	SLI0375-ICB1	N1223092502.D	NA	09/25/23 10:12
TBT I-CAL	SLI0375-CAL1	N1223092503.D	NA	09/25/23 10:34
TBT I-CAL	SLI0375-CAL2	N1223092504.D	NA	09/25/23 10:52
TBT I-CAL	SLI0375-CAL3	N1223092505.D	NA	09/25/23 11:09
TBT I-CAL	SLI0375-CAL4	N1223092506.D	NA	09/25/23 11:26
TBT I-CAL	SLI0375-CAL5	N1223092507.D	NA	09/25/23 11:44
TBT I-CAL	SLI0375-CAL6	N1223092508.D	NA	09/25/23 12:02
Second source	SLI0375-SCV1	N1223092509.D	NA	09/25/23 12:34

Analytical Resources, LLC
Analytical Chemists and Consultants

ANALYSIS SEQUENCE

SLI0375

Instrument: NT12
Calibration ID: GI00071

Printed: 9/25/2023 7:19:45PM

Lab Number	Analysis	Container	Order	Position	STD ID	ISTD ID	Client	Comments
SLI0375-TUN1	QC		1		L005045			
SLI0375-ICB1	QC		2			L004084		
SLI0375-CAL1	QC		3		L002070	L004084		
SLI0375-CAL2	QC		4		L002071	L004084		
SLI0375-CAL3	QC		5		L002072	L004084		
SLI0375-CAL4	QC		6		L002073	L004084		
SLI0375-CAL5	QC		7		L002074	L004084		
SLI0375-CAL6	QC		8		L002075	L004084		
SLI0375-SCV1	QC		9		L004613	L004084		

Samples Loaded By Date

Data Processed By Date

INTERNAL STANDARD SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20230925.b

	Time	Filename	LabID	ClientId	DF					
1	0954	N1223092501.D	SLI0375-TUN1		1	NO ISTDS FOUND				
2	1012	N1223092502.D	SLI0375-ICB1		1	6.08	54202	8.66	59475	
3	1034	N1223092503.D	SLI0375-CAL1		1	6.08	53108	8.66	59220	
4	1052	N1223092504.D	SLI0375-CAL2		1	6.08	55622	8.66	58370	
5	1109	N1223092505.D	SLI0375-CAL3		1	6.08	57271	8.65	61032	
6	1126	N1223092506.D	SLI0375-CAL4		1	6.08	55113	8.65	59196	
7	1144	N1223092507.D	SLI0375-CAL5		1	6.08	59849	8.65	59931	
8	1202	N1223092508.D	SLI0375-CAL6		1	6.08	63600	8.65	60828	
9	1234	N1223092509.D	SLI0375-SCV1		1	6.08	57693	8.66	61184	

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20230925.b

ARI Job No.: SLI0 Method: TBT20230925.m Instrument: nt12.i Date: 25-SEP-2023

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
1012	N1223092502.D	SLI0375-ICB1		1	NO MANUAL INTEGRATION
1034	N1223092503.D	SLI0375-CAL1		1	NO MANUAL INTEGRATION
1052	N1223092504.D	SLI0375-CAL2		1	NO MANUAL INTEGRATION
1109	N1223092505.D	SLI0375-CAL3		1	NO MANUAL INTEGRATION
1126	N1223092506.D	SLI0375-CAL4		1	NO MANUAL INTEGRATION
1144	N1223092507.D	SLI0375-CAL5		1	NO MANUAL INTEGRATION
1202	N1223092508.D	SLI0375-CAL6		1	NO MANUAL INTEGRATION
1234	N1223092509.D	SLI0375-SCV1		1	NO MANUAL INTEGRATION

Security Status Report

Date: 25-Sep-2023 19:23

N1223092501.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092502.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092503.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092504.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092505.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092506.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092507.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092508.D	Data Locked	jianqing, 25-Sep-2023 19:23
N1223092509.D	Data Locked	jianqing, 25-Sep-2023 19:23

Analytical Resources, LLC
Analytical Chemists and Consultants

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLK0217	Instrument:	NT12
		Calibration:	GI00071

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
MS Tune	SLK0217-TUN1	N1223111501.D	NA	11/15/23 10:01
Initial Cal Check	SLK0217-ICV1	N1223111502.D	NA	11/15/23 10:33
Instrument Blank	SLK0217-IBL1	N1223111503.D	NA	11/15/23 11:34
Blank	BLK0004-BLK1	N1223111504.D	Solid	11/15/23 11:56
MRL Check	BLK0004-MRL1	N1223111505.D	Solid	11/15/23 12:15
LCS	BLK0004-BS1	N1223111506.D	Solid	11/15/23 12:33
LCS Dup	BLK0004-BSD1	N1223111507.D	Solid	11/15/23 12:50
SED-11C:0-1	23J0690-03	N1223111508.D	Solid	11/15/23 13:07
SED-26C:3-5	23J0690-05	N1223111509.D	Solid	11/15/23 13:25
SED-27C:0-1	23J0690-06	N1223111510.D	Solid	11/15/23 13:42
ZZZZZ	23J0767-01	N1223111511.D	Solid	11/15/23 13:59
ZZZZZ	23J0767-02	N1223111512.D	Solid	11/15/23 14:16
Calibration Check	SLK0217-CCV1	N1223111515.D	NA	11/15/23 15:41

Analytical Resources, LLC
Analytical Chemists and Consultants

ANALYSIS SEQUENCE

SLK0217

Instrument: NT12
Calibration ID: GI00071

Printed: 11/16/2023 3:52:42PM

Lab Number	Analysis	Container	Order	Position	STD ID	ISTD ID	Client	Comments
SLK0217-TUN1	QC		1		L005045			
SLK0217-ICV1	QC		2		L002073	L004084		
SLK0217-IBL1	QC		3			L004084		
BLK0004-BLK1	QC		4			L004084		
BLK0004-MRL1	QC		5			L004084		
BLK0004-BS1	QC		6			L004084		
BLK0004-BSD1	QC		7			L004084		
23J0690-03	8270E-SIM Butyl Tins	A 01	8			L004084	Leon Environmental, LLC	
23J0690-05	8270E-SIM Butyl Tins	A 01	9			L004084	Leon Environmental, LLC	
23J0690-06	8270E-SIM Butyl Tins	A 01	10			L004084	Leon Environmental, LLC	
23J0767-01	8270E-SIM Butyl Tins	B 01	11			L004084	Moffatt & Nichol (Vancouver)	
23J0767-02	8270E-SIM Butyl Tins	B 01	12			L004084	Moffatt & Nichol (Vancouver)	
BLK0004-MS1	QC		13			L004084		
BLK0004-MSD1	QC		14			L004084		
SLK0217-CCV1	QC		15		L002073	L004084		

Samples Loaded By Date

Data Processed By Date

INTERNAL STANDARD SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20231115.b

	Time	Filename	LabID	ClientId	DF				
1	1001	N1223111501.D	SLK0217-TUN1		1	NO ISTDS FOUND			
2	1033	N1223111502.D	SLK0217-ICV1		1	5.97	36797	8.53	37742
3	1134	N1223111503.D	SLK0217-IBL1		1	5.97	27393	8.53	27503
4	1156	N1223111504.D	BLK0004-BLK1		1	5.97	33526	8.53	35334
5	1215	N1223111505.D	BLK0004-MRL1		1	5.97	34640	8.53	31060
6	1233	N1223111506.D	BLK0004-BS1		1	5.97	35991	8.53	31279
7	1250	N1223111507.D	BLK0004-BSD1		1	5.97	36830	8.53	31027
8	1307	N1223111508.D	23J0690-03		1	5.97	35538	8.53	33856
9	1325	N1223111509.D	23J0690-05		1	5.98	36108	8.53	31115
10	1342	N1223111510.D	23J0690-06		1	5.97	37052	8.53	34817
11	1359	N1223111511.D	23J0767-01		1	5.98	38433	8.53	36155
12	1416	N1223111512.D	23J0767-02		1	6.00	42891	8.53	36222
13	1434	N1223111513.D	BLK0004-MS1		1	6.00	36697	8.53	31634
14	1451	N1223111514.D	BLK0004-MSD1		1	6.00	40093	8.53	36686
15	1541	N1223111515.D	SLK0217-CCV1		1	5.97	34409	8.53	32236

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20231115.b

ARI Job No.: SLK0 Method: TBT20230925.m Instrument: nt12.i Date: 15-NOV-2023

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
1033	N1223111502.D	SLK0217-ICV1		1	NO MANUAL INTEGRATION
1134	N1223111503.D	SLK0217-IBL1		1	NO MANUAL INTEGRATION
1156	N1223111504.D	BLK0004-BLK1		1	NO MANUAL INTEGRATION
1215	N1223111505.D	BLK0004-MRL1		1	Dibutyl Tin (Hexyl),
1233	N1223111506.D	BLK0004-BS1		1	NO MANUAL INTEGRATION
1250	N1223111507.D	BLK0004-BSD1		1	NO MANUAL INTEGRATION
1307	N1223111508.D	23J0690-03		1	NO MANUAL INTEGRATION
1325	N1223111509.D	23J0690-05		1	NO MANUAL INTEGRATION
1342	N1223111510.D	23J0690-06		1	Butyl Tin (Hexyl),
1359	N1223111511.D	23J0767-01		1	Dibutyl Tin (Hexyl),
1416	N1223111512.D	23J0767-02		1	Butyl Tin (Hexyl),
1434	N1223111513.D	BLK0004-MS1		1	Tributyl Tin (Hexyl), Tripropyl Tin (Hexyl),
1451	N1223111514.D	BLK0004-MSD1		1	Tributyl Tin (Hexyl), Tripropyl Tin (Hexyl),
1541	N1223111515.D	SLK0217-CCV1		1	NO MANUAL INTEGRATION

Security Status Report

Date: 16-Nov-2023 16:08

N1223111501.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111502.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111503.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111504.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111505.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111506.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111507.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111508.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111509.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111510.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111511.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111512.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111513.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111514.D	Data Locked	jianqing, 16-Nov-2023 16:08
N1223111515.D	Data Locked	jianqing, 16-Nov-2023 16:08

SURROGATE RECOVERY AND RT SUMMARY
EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG/WO:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLI0375	Instrument:	NT12
Calibration:	GI00071	Calibration Date:	09/25/2023

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
SLI0375-ICB1 (Water)			Lab File ID: N1223092502.D			Analyzed: 09/25/23 10:12		
Tripentyltin			30 - 160		6.424	-6.4240	N/A	
Tripropyltin			30 - 160		4.479	-4.4790	N/A	
SLI0375-SCV1 (Water)			Lab File ID: N1223092509.D			Analyzed: 09/25/23 12:34		
Tripentyltin	1.5918	81.2	80 - 120	6.424	6.424	0.0000	N/A	

SURROGATE RECOVERY AND RT SUMMARY
EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG/WO:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLK0217	Instrument:	NT12
Calibration:	GI00071	Calibration Date:	09/25/2023

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
SLK0217-ICV1 (Solid)			Lab File ID: N1223111502.D			Analyzed: 11/15/23 10:33		
Tripentyltin	1.5918	91.9	80 - 120	6.304	6.424	-0.1200	N/A	
Tripropyltin	0.74430	98.8	80 - 120	4.387	4.479	-0.0920	N/A	
SLK0217-IBL1 (Solid)			Lab File ID: N1223111503.D			Analyzed: 11/15/23 11:34		
Tripentyltin			30 - 160		6.424	-6.4240	N/A	
Tripropyltin			30 - 160		4.479	-4.4790	N/A	
BLK0004-BLK1 (Solid)			Lab File ID: N1223111504.D			Analyzed: 11/15/23 11:56		
Tripentyltin	45.178	82.3	30 - 160	6.317	6.424	-0.1070	N/A	
Tripropyltin	43.746	70.3	30 - 160	4.422	4.479	-0.0570	N/A	
BLK0004-MRL1 (Solid)			Lab File ID: N1223111505.D			Analyzed: 11/15/23 12:15		
Tripentyltin	45.178	115	30 - 160	6.304	6.424	-0.1200	N/A	
Tripropyltin	43.746	82.5	30 - 160	4.422	4.479	-0.0570	N/A	
BLK0004-BS1 (Solid)			Lab File ID: N1223111506.D			Analyzed: 11/15/23 12:33		
Tripentyltin	45.178	114	30 - 160	6.304	6.424	-0.1200	N/A	
Tripropyltin	43.746	78.4	30 - 160	4.422	4.479	-0.0570	N/A	
BLK0004-BSD1 (Solid)			Lab File ID: N1223111507.D			Analyzed: 11/15/23 12:50		
Tripentyltin	45.178	80.0	30 - 160	6.304	6.424	-0.1200	N/A	
Tripropyltin	43.746	54.0	30 - 160	4.422	4.479	-0.0570	N/A	
23J0690-03 (Solid)			Lab File ID: N1223111508.D			Analyzed: 11/15/23 13:07		
Tripentyltin	44.985	75.0	30 - 160	6.317	6.424	-0.1070	N/A	
Tripropyltin	43.559	52.7	30 - 160	4.422	4.479	-0.0570	N/A	
23J0690-05 (Solid)			Lab File ID: N1223111509.D			Analyzed: 11/15/23 13:25		
Tripentyltin	45.115	119	30 - 160	6.317	6.424	-0.1070	N/A	
Tripropyltin	43.685	76.8	30 - 160	4.422	4.479	-0.0570	N/A	
23J0690-06 (Solid)			Lab File ID: N1223111510.D			Analyzed: 11/15/23 13:42		
Tripentyltin	45.119	103	30 - 160	6.317	6.424	-0.1070	N/A	
Tripropyltin	43.689	73.1	30 - 160	4.433	4.479	-0.0460	N/A	

SURROGATE RECOVERY AND RT SUMMARY
EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG/WO:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLK0217	Instrument:	NT12
Calibration:	GI00071	Calibration Date:	09/25/2023

Surrogate Compound	Spike Level ug/mL	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
SLK0217-CCV1 (Solid)			Lab File ID: N1223111515.D			Analyzed: 11/15/23 15:41		
Tripentyltin	1.5918	102	50 - 150	6.303	6.424	-0.1210	N/A	
Tripropyltin	0.74430	87.3	50 - 150	4.387	4.479	-0.0920	N/A	

Analytical Resources, LLC
Analytical Chemists and Consultants

INTERNAL STANDARD AREA AND RT SUMMARY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLI0375	Instrument:	NT12
		Calibration:	GI00071

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Initial Cal Blank (SLI0375-ICB1)		(Water)		Lab File ID: N1223092502.D				Analyzed: 09/25/23 10:12	
Tetrapentyltin	54202	6.076	55113	6.076	98	50 - 200	0.000	+/-0.50	
p-Terphenyl-d14	59475	8.664	59196	8.65	100	50 - 200	0.014	+/-0.50	
Secondary Cal Check (SLI0375-SCV1)		(Water)		Lab File ID: N1223092509.D				Analyzed: 09/25/23 12:34	
Tetrapentyltin	57693	6.076	55113	6.076	105	50 - 200	0.000	+/-0.50	
p-Terphenyl-d14	61184	8.664	59196	8.65	103	50 - 200	0.014	+/-0.50	

Analytical Resources, LLC
Analytical Chemists and Consultants

INTERNAL STANDARD AREA AND RT SUMMARY

EPA 8270E-SIM

Laboratory:	Analytical Resources, LLC	SDG:	23J0690
Client:	Leon Environmental, LLC	Project:	Port of Friday Harbor 2023
Sequence:	SLK0217	Instrument:	NT12
		Calibration:	GI00071

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Initial Cal Check (SLK0217-ICV1)		(Solid)		Lab File ID: N1223111502.D				Analyzed: 11/15/23 10:33	
Tetrapentyltin	36797	5.969	36797	5.969	100	50 - 200	0.000	+/-0.50	
p-Terphenyl-d14	37742	8.53	37742	8.53	100	50 - 200	0.000	+/-0.50	
Instrument Blank (SLK0217-IBL1)		(Solid)		Lab File ID: N1223111503.D				Analyzed: 11/15/23 11:34	
Tetrapentyltin	27393	5.968	36797	5.969	74	50 - 200	-0.001	+/-0.50	
p-Terphenyl-d14	27503	8.53	37742	8.53	73	50 - 200	0.000	+/-0.50	
Blank (BLK0004-BLK1)		(Solid)		Lab File ID: N1223111504.D				Analyzed: 11/15/23 11:56	
Tetrapentyltin	33526	5.968	36797	5.969	91	50 - 200	-0.001	+/-0.50	
MRL Check (BLK0004-MRL1)		(Solid)		Lab File ID: N1223111505.D				Analyzed: 11/15/23 12:15	
Tetrapentyltin	34640	5.968	36797	5.969	94	50 - 200	-0.001	+/-0.50	
LCS (BLK0004-BS1)		(Solid)		Lab File ID: N1223111506.D				Analyzed: 11/15/23 12:33	
Tetrapentyltin	35991	5.968	36797	5.969	98	50 - 200	-0.001	+/-0.50	
LCS Dup (BLK0004-BSD1)		(Solid)		Lab File ID: N1223111507.D				Analyzed: 11/15/23 12:50	
Tetrapentyltin	36830	5.968	36797	5.969	100	50 - 200	-0.001	+/-0.50	
SED-11C:0-1 (23J0690-03)		(Solid)		Lab File ID: N1223111508.D				Analyzed: 11/15/23 13:07	
Tetrapentyltin	35538	5.968	36797	5.969	97	50 - 200	-0.001	+/-0.50	
p-Terphenyl-d14	33856	8.529	37742	8.53	90	50 - 200	-0.001	+/-0.50	
SED-26C:3-5 (23J0690-05)		(Solid)		Lab File ID: N1223111509.D				Analyzed: 11/15/23 13:25	
Tetrapentyltin	36108	5.982	36797	5.969	98	50 - 200	0.013	+/-0.50	
p-Terphenyl-d14	31115	8.529	37742	8.53	82	50 - 200	-0.001	+/-0.50	
SED-27C:0-1 (23J0690-06)		(Solid)		Lab File ID: N1223111510.D				Analyzed: 11/15/23 13:42	
Tetrapentyltin	37052	5.968	36797	5.969	101	50 - 200	-0.001	+/-0.50	
p-Terphenyl-d14	34817	8.529	37742	8.53	92	50 - 200	-0.001	+/-0.50	
Calibration Check (SLK0217-CCV1)		(Water)		Lab File ID: N1223111515.D				Analyzed: 11/15/23 15:41	
Tetrapentyltin	34409	5.968	36797	5.969	94	50 - 200	-0.001	+/-0.50	
p-Terphenyl-d14	32236	8.529	37742	8.53	85	50 - 200	-0.001	+/-0.50	

HOLDING TIME SUMMARY

Analysis: EPA 8270E-SIM

Laboratory: Analytical Resources, LLC
SDG: 23J0690
Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
SED-11C:0-1 23J0690-03	03/23/23 07:29	05/05/23 14:20	11/03/23 09:14	225	365	11/15/23 13:07	12	40	
SED-26C:3-5 23J0690-05	03/22/23 10:38	05/05/23 14:20	11/03/23 09:14	225	365	11/15/23 13:25	12	40	
SED-27C:0-1 23J0690-06	03/22/23 13:24	05/05/23 14:20	11/03/23 09:14	225	365	11/15/23 13:42	12	40	

* Indicates hold time exceedance.

METHOD DETECTION AND REPORTING LIMITS

EPA 8270E-SIM

Laboratory: Analytical Resources, LLC
SDG: 23J0690
Client: Leon Environmental, LLC
Project: Port of Friday Harbor 2023
Matrix: Solid
Instrument: NT12

Analyte	MDL	RL	Units
Tributyltin Ion	1.93	3.86	ug/kg
Dibutyltin Ion	4.33	5.78	ug/kg
Butyltin Ion	3.06	4.08	ug/kg
Tetrabutyltin	5.00	5.00	ug/kg

Alfa Aesar

Certificate of analysis

Tri-n-propyltin chloride, 95%

Stock Number: 41459
Lot Number: K21Q046

Analysis

Appearance	Clear oil
Purity (based on Sn analysis)	≥ 97 %
Sn_{Th}	41.88 %
Sn_{Ex}	40.75 %

Certified by:

Quality Control

B001537
Tripropyltin (Chloride)-NEAT
Expires 2/19/2029
Prepared By Van Spohn 11/20/2012

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ThermoFisher SCIENTIFIC

Appendix 20.1

ALTERNATE CERTIFICATE OF ANALYSIS

The manufacturer of the below chemical was unable to provide a Certificate of Analysis at the time of request by ARI.

Date Requested from Manufacturer: NA

Chemical: N-Butyltin-Chloride

Manufacturer: Alfa

Product #: C22E-on label

Lot #: NA

Purity: 95%

Analyst: VB

B001538
N-Butyltin Chloride-NEAT
Solvent / Lot: na
Prep: 11/20/2012 by VS
Exp. 2/19/2029
Location:

Certificate of Analysis

Product Name:	Dibutyltin dichloride
Product Description:	96%
Product Brand:	Sigma-Aldrich
Product Number:	205494
Molecular Weight:	303.84
Molecular Formula:	$(CH_3CH_2CH_2CH_2)_2SnCl_2$
CAS Number:	683-18-1

TEST	SPECIFICATION	LOT 09116AN RESULTS
APPEARANCE	MOIST WHITE TO OFF-WHITE CRYSTALS	MOIST OFF-WHITE CRYSTALS
INFRARED SPECTRUM	CONFORMS TO STRUCTURE AND STANDARD AS	CONFORMS TO STRUCTURE AND STANDARD AS
** **	ILLUSTRATED ON PAGE 1145D OF EDITION I,	ILLUSTRATED ON PAGE 1145D OF EDITION I,
** **	VOLUME 2 OF "THE ALDRICH LIBRARY OF FT-IR	VOLUME 2 OF "THE ALDRICH LIBRARY OF FT-IR
** **	SPECTRA".	SPECTRA".
TITRATION	95.5%-104.5%(WITH AGNO3 AFTER O2 COMBUSTION)	100.8 % (WITH AGNO3 AFTER OXYGEN COMBUSTION)
GAS LIQUID	95.5% (MINIMUM)	98.5 %

Barbara Rajzer, Supervisor
Quality Control
Milwaukee, Wisconsin USA

B001539
Dibutyltin (Dichloride)-NEAT
Expires 2/19/2029
Prepared By Van Spohn 11/20/2012

Appendix 20.1

ALTERNATE CERTIFICATE OF ANALYSIS

The manufacturer of the below chemical was unable to provide a Certificate of Analysis at the time of request by ARI.

Date Requested from Manufacturer: NA

Chemical: Tributyltin - Chloride

Manufacturer: Strem

Product #: 93-5056

Lot #: B1054021

Purity: 8/27/13 - 96%

Analyst: VP

B001540
Tributyltin Chloride-NEAT
Solvent / Lot: na
Prep: 11/20/2012 by VS
Exp: 2/19/2029
Location:

Certificate of Analysis

SIGMA-ALDRICH

Product Name	Tetrabutyltin, technical grade, 93%
Product Number	T6008
Product Brand	ALDRICH
CAS Number	1461-25-2
Molecular Formula	$(CH_3CH_2CH_2CH_2)_4Sn$
Molecular Weight	347.17

TEST	SPECIFICATION	LOT 00729TW RESULTS
APPEARANCE		COLORLESS LIQUID
REFRACTIVE INDEX AT		1.4740
INFRARED SPECTRUM		CONFORMS TO STRUCTURE AND STANDARD AS ILLUSTRATED ON PAGE 1144B OF EDITION I, VOLUME 2 OF "THE ALDRICH LIBRARY OF FT-IR SPECTRA".
GAS LIQUID		96.0 %

Barbara Rajzer, Supervisor
Quality Control
Milwaukee, Wisconsin USA

Certificate of Analysis

SIGMA-ALDRICH

Product Name	Butyltin trichloride, 95%
Product Number	201057
Product Brand	ALDRICH
CAS Number	1118-46-3
Molecular Formula	$CH_3(CH_2)_3SnCl_3$
Molecular Weight	282.18

TEST	SPECIFICATION	LOT 05509DF RESULTS
APPEARANCE	COLORLESS TO BROWN LIQUID	COLORLESS LIQUID
REFRACTIVE INDEX AT		1.5227
INFRARED SPECTRUM	CONFORMS TO STRUCTURE.	CONFORMS TO STRUCTURE AND STANDARD AS ILLUSTRATED ON PAGE 1145C OF EDITION I, VOLUME 2 OF "THE ALDRICH LIBRARY OF FT-IR SPECTRA".
TITRATION	94.0-106.0% (WITH AGNO3 AFTER O2 COMBUSTION)	98.1 % (WITH AGNO3 AFTER OXYGEN COMBUSTION)
GAS LIQUID	94.0% (MINIMUM)	99.9 %



Barbara Rajzer, Supervisor
Quality Control
Milwaukee, Wisconsin USA

Analytical Standard Record

Standard ID: B001688

Printed: 12/2/2020 10:31:13AM

Description:	Hexyltributyl Tin-Neat	Expires:	04-Mar-2029
Standard Type:	Calibration Standa	Prepared:	19-Mar-2013
Solvent:	NA	Prepared By:	Van Spohn
Final Volume (mls):	1	Department:	Organics
Vials:	1	Last Edit:	23-Nov-2013 14:53 by VTS
Vendor:	Aldrich	Lot #:	11421E4
Vendor Catalog #:			

Comments

NO I NUMBER-mass conversion to Tributyltin ion set at .773

Analyte	CAS Number	Concentration	Units
Tributyltin Ion	36643-28-4	773000	ug/mL

Reviewed By Date

Analytical Standard Record

Standard ID: B001689 **Printed: 12/2/2020 10:32:44AM**

Description:	Hexyltripropyl Tin-Neat	Expires:	04-Mar-2029
Standard Type:	Calibration Standa	Prepared:	19-Mar-2013
Solvent:	NA	Prepared By:	Van Spohn
Final Volume (mls):	1	Department:	Organics
Vials:	1	Last Edit:	23-Nov-2013 14:56 by VTS
Vendor:	NA	Lot #:	NA
Vendor Catalog #:			

Comments

I2702-mass conversion to Tripropyl tin set at .7443

Analyte	CAS Number	Concentration	Units
Tripropyltin	761-44-4	744300	ug/mL

Reviewed By Date

Analytical Standard Record

Standard ID: B001690

Printed: 12/2/2020 10:34:10AM

Description:	Hexyltripentyl Tin-Neat	Expires:	04-Mar-2029
Standard Type:	Calibration Standa	Prepared:	19-Mar-2013
Solvent:	NA	Prepared By:	Van Spohn
Final Volume (mls):	1	Department:	Organics
Vials:	1	Last Edit:	23-Nov-2013 15:04 by VTS
Vendor:	Aldrich	Lot #:	01601CF
Vendor Catalog #:			

Comments

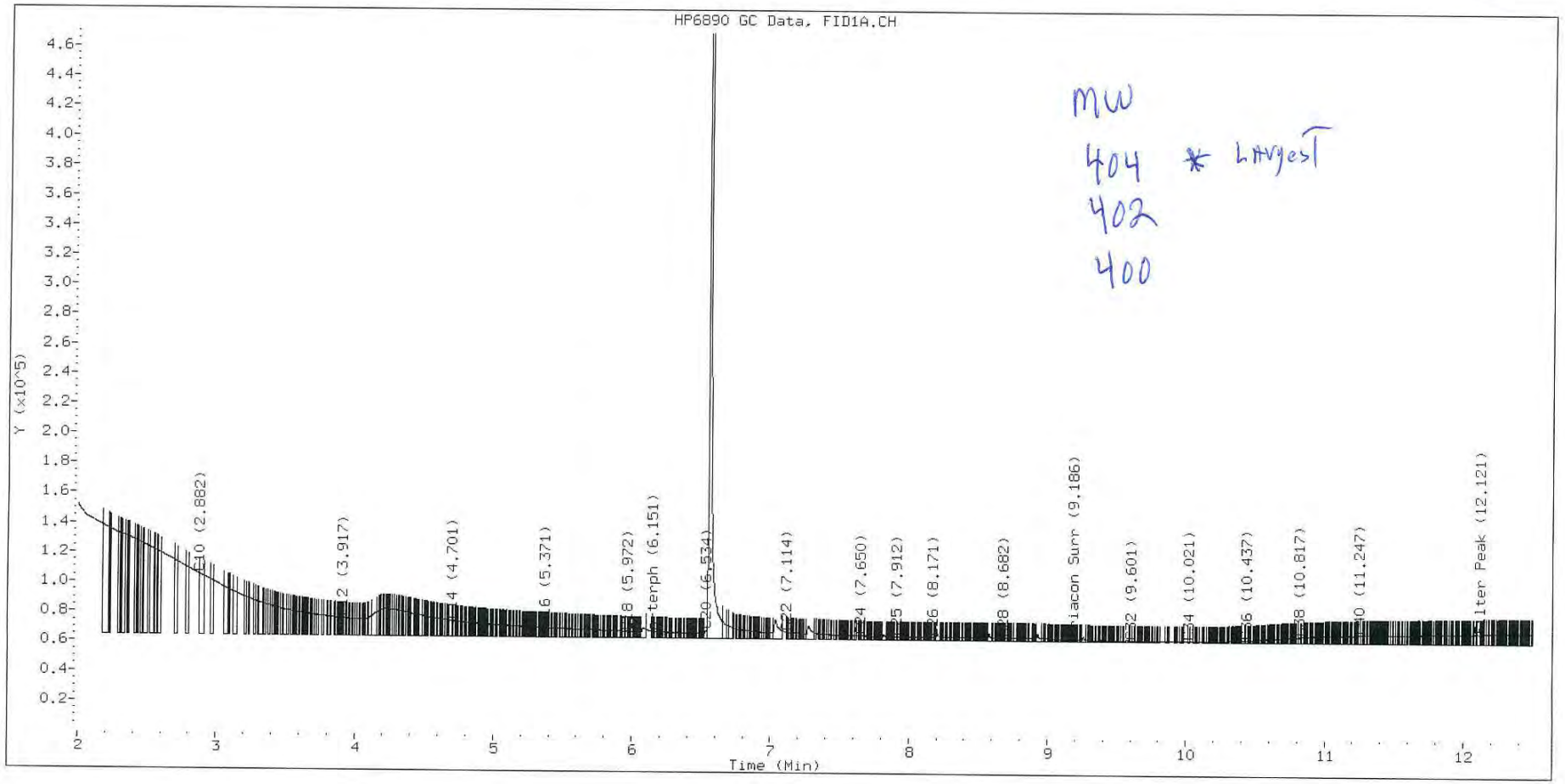
NO I NUMBER-mass conversion set at .7959

Analyte	CAS Number	Concentration	Units
Tripentyltin	41784-41-2	795900	ug/mL

Reviewed By Date

ALDRICH Dibutyl dichloride
LOT 09116AN 96%

Datafile: FID4A, 20210104.b/421A0409.D Dibutyl



MW
404 * Largest
402
400

J 000051
(Dibutyltin neat)

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Certified Reference Material

This product is included in Phenova's ISO/IEC 17025 and ISO Guide 34 Scopes of Accreditation

Catalog No.:	AL0-101291	**Lot Number:**	CL11000
Description:	GC/MS Tuning Mix	**Certification Date:**	May 9, 2014
Storage:	4 °C	**Expiration Date:**	December 31, 2023
Provided As:	1 mL in 2 mL Ampoule in Methylene chloride	**Revision Date:**	August 5, 2015

Andrea L Gill

Andrea Gill, Certified Reference Materials Manager

Component	CAS #	Certified Value µg/mL	Expanded Uncertainty (%)
Benzidine	92-87-5	1000	± 0.208%
Decafluorotriphenylphosphine (DFTPP)	5074-71-5	1000	± 0.057%
4,4'-DDT	50-29-3	1000	± 0.056%
Pentachlorophenol	87-86-5	1000	± 0.061%

LOT 1648

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Certificate No. 2427.02

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ilac-MRA ACCREDITED
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Certified Reference Material

This product is included in Phenova's ISO/IEC 17025 and ISO Guide 34 Scopes of Accreditation

Catalog No.: AL0-101291
Description: GC/MS Tuning Mix
Storage: 4 °C
Provided As: 1 mL in 2 mL Ampoule in Methylene chloride

Lot Number: CL11000
Certification Date: May 9, 2014
Expiration Date: December 31, 2023
Revision Date: August 5, 2015

Andrea L Gill

Andrea Gill, Certified Reference Materials Manager

Component	CAS #	Certified Value µg/mL	Expanded Uncertainty (%)
Benzidine	92-87-5	1000	± 0.208%
Decafluorotriphenylphosphine (DFTPP)	5074-71-5	1000	± 0.057%
4,4'-DDT	50-29-3	1000	± 0.056%
Pentachlorophenol	87-86-5	1000	± 0.061%

LOT 1648

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Certificate No. 2427.02

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1. Quality Document: This Certificate of Analysis has been created in accordance with ISO Guide 31[1] and ISO Guide 35.[2]

2. Quality Standards: Phenova is accredited by A2LA to ISO Guide 34[3] and ISO/IEC 17025[4] as a producer of Certified Reference Materials and Reference Materials. This ensures that our manufacturing processes have been accredited to and meet strict international standards.

3. Intended Use: The product is manufactured for use in the calibration and calibration verification of chromatographic instrumentation performed in routine laboratory analysis.

4. Instruction: Visually inspect the solution inside the ampoule for any un-dissolved material. If particulate is visible, sonicate the unopened ampoule until material is fully dissolved. Dilute as required, use only class A glassware and diluents compatible with all certified analytes in the mixture.

5. Hazardous Situation: The product is intended for use by experienced professional personnel. A Material Safety Data Sheet (MSDS) is available at www.phenomenex.com/mysupport.

6. Level of Homogeneity: The product has been certified to guarantee the certified values and their uncertainties at a volume of 2 µL.

7. Certified Value: Certified Value is based upon gravimetric and volumetric preparation using calibrated balances and Class A glassware.

8. Raw Materials and Purity: Phenova reference standard products are prepared from the highest quality starting materials. The purity of this material was verified using an ISO/IEC Guide 17025 methodology.

9. Expanded Uncertainty: The expanded uncertainty (uCRM) as stated is determined in accordance with ISO/IEC Guide 98[5] and ISO Guide 35 incorporating Type A standard uncertainty at a 95% confidence level. The uncertainty contains elements of manufacturing (uM), homogeneity analysis (uH) and long-term stability testing (uLTS). The uncertainty is calculated based on the root-sum-of-squares equation times a coverage factor (k=2).

$$uCRM = k\sqrt{uM^2 + uH^2 + uLTS^2}$$

Transport conditions (short-term stability) have been tested such that there is no contribution to the uncertainty reported. The expanded uncertainty applies to the product as received.

10. Metrological Traceability: The property value (certified value and its uncertainty) are traceable through an unbroken chain of calibration to the SI base unit kg through a NIST traceable weight in accordance with ISO Guide 34. This is achieved through calibration of balances, verification of weights, use of national methodology for glassware calibration and product homogeneity and stability testing utilizing an ISO/IEC Guide 17025 methodology.

11. Values Obtained During Product Testing: This product is subjected to verification, homogeneity and stability testing using an ISO/IEC Guide 17025 chromatographic methodology. All values obtained during testing meet criteria in accordance with ISO Guide 34.

12. Period of Validity: The Certified Values and their uncertainties are guaranteed until the expiration date. This product will be monitored during the period of validity and customers notified of any significant changes in stability.

References:

[1] ISO Guide 31:2000(E) – Reference Materials – Contents of Certificates and Labels.
[2] ISO Guide 35:2006(E) – Reference Material – General and Statistical Principles for Certification.
[3] ISO Guide 34:2009(E) – General Requirements for the Competence of Reference Material Producers.
[4] ISO/IEC Guide 17025:2005(E) – General Requirements for the Competence of Testing and Calibration Laboratories.
[5] ISO/IEC Guide 98-3:2008(E) – Uncertainty of Measurement – Part 3: Guide to Expression of Uncertainty in Measurement (GUM: 1995)

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Bellefonte, PA 16823-8812
Tel: 1-814-353-1300
Fax: 1-814-353-1309

www.restek.com

Certificate of Analysis

chromatographic plus

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 31477 **Lot No.:** A0191853

Description : Tripentyltin Chloride Mixture

Tripentyltin Chloride Std 2000µg/mL, Methylene Chloride, 1mL/ampul

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : November 30, 2025 **Storage:** 10°C or colder

Ship: Ambient

Elution Order	Compound	CAS #	Percent Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)
1	Tripentyltin chloride	3342-67-4	94%	2,015.4 µg/mL	+/- 18.7418 µg/mL
Solvent:	Methylene chloride	75-09-2	99%		

Specific Reference Material Notes:

Derivatization in the sample preparation of this standard is required for internal acceptance testing as a result the acceptance criteria is ±15%.

L002508
Tripentyltin chloride mix
Solvent / Lot: Methylene chloride
Prep: 3/7/2023 by JZ
Exp: 11/30/2025
Location:

3/8/23

General Reference Material Notes

Expiration Notes:

- Expiration date valid for unopened ampul stored in compliance with the recommended conditions.
- Uncertainty, concentration, and expiration of the RM are based on the unopened product being stored according to the recommended condition found in the storage field.

Purity Notes:

- Purity and/or chemical identity are determined by one or more of the following techniques: GC/FID, HPLC, GC/μECD, GC/MS, LC/MS, RI, and/or melting point.
- Compounds with a listed purity of less than 99% have been weight corrected to compensate for impurities and/or salts. A correction factor is used to calculate the amount of compound necessary to achieve the desired concentration of the parent compound in solution.
- Purity of isomeric compounds is reported as the sum of the isomers.
- Purity values are rounded to the nearest whole number.

Uncertainty Value Notes:

- Uncertainties are determined using data from balances and glassware, raw material purity, and, when significant, equipment tolerances or calibration results.

Manufacturing Notes:

- Concentration is based upon gravimetric preparation using either a balance whose calibration has been verified daily using NIST traceable weights, and/or dilutions with Class A glassware.

Handling Notes:

- Stability of the unopened product, when stored in compliance with the recommended conditions, is guaranteed through the expiration displayed on the product label and certificate. Contact Restek for additional opened product stability information, with the knowledge/understanding that open product stability is subject to the specific handling and environmental conditions to which the product is exposed. For your convenience Restek supplies deactivated vials with most standards packed in 2mL ampules. Larger volume deactivated vials are available through Restek as a custom ordered item. Additionally, Restek sells DMDCS for the purpose of glassware deactivation as catalog number 31861, which includes complete instructions.

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Cert. No. 3031.01

Date Received: _____

Certificate of Analysis

Catalog No.:	Lot No.:	Storage:	Solvent:	Exp. Date:	Description:
110760-01	469898	≤ -10 °C	Hexane	12-Dec-2024	Hexyl Derivatives of Tributyltin & Tripentyltin Solution, 1,000 mg/L, 1 ml

Compound	CAS No.	Purity (%)	Neat Material Lot No.	Concentration	
tripentyltin (as hexyl derivative)	3342-67-4	95	1988.237.1P	998.1 ± 28.8	mg/L
tributyltin (as hexyl derivative)	1461-22-9	97	934.29.1P	1017 ± 17.83	mg/L

L 3412

Certified By: _____

Kerry Robinson

Manufacture Date 8-Dec-2021

Follow all storage requirements, keep tightly closed when not in use, and use good laboratory practices when handling.
This Reference Material was manufactured, produced, and/or certified under a quality management system that is accredited to ISO 9001:2015.

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values listed are determined gravimetricly.

The stated uncertainty is the expanded uncertainty with a coverage factor of two to give a 95% confidence level.

Analytical Resources, LLC
Analytical Chemists and Consultants

SED-07C:0-1

Form 1
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-01 A	File ID:	23121437
Sampled:	03/22/23 07:29	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 20:28
% Solids:	80.40	Preparation:	EPA 1613	Initial/Final:	12.57 g Wet / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.974	0.655-0.886	0.284	0.989	0.656	ng/kg	EMPC, X, J
1746-01-6	2,3,7,8-TCDD	1	0.808	0.655-0.886	0.160	0.989	0.566	ng/kg	J
57117-41-6	1,2,3,7,8-PeCDF	1		1.318-1.783	0.307	0.989	ND	ng/kg	U
57117-31-4	2,3,4,7,8-PeCDF	1		1.318-1.783	0.298	0.989	ND	ng/kg	U
40321-76-4	1,2,3,7,8-PeCDD	1		1.318-1.783	0.281	0.989	ND	ng/kg	U
70648-26-9	1,2,3,4,7,8-HxCDF	1		1.054-1.426	0.219	0.989	ND	ng/kg	U
57117-44-9	1,2,3,6,7,8-HxCDF	1		1.054-1.426	0.225	0.989	ND	ng/kg	U
60851-34-5	2,3,4,6,7,8-HxCDF	1	1.316	1.054-1.426	0.241	0.989	1.01	ng/kg	
72918-21-9	1,2,3,7,8,9-HxCDF	1		1.054-1.426	0.306	0.989	ND	ng/kg	U
39227-28-6	1,2,3,4,7,8-HxCDD	1		1.054-1.426	0.253	0.989	ND	ng/kg	U
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.275	1.054-1.426	0.264	0.989	1.16	ng/kg	
19408-74-3	1,2,3,7,8,9-HxCDD	1	1.940	1.054-1.426	0.296	0.989	0.789	ng/kg	EMPC, J
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	1.024	0.893-1.208	0.331	0.989	29.9	ng/kg	B
55673-89-7	1,2,3,4,7,8,9-HpCDF	1		0.893-1.208	0.529	0.989	ND	ng/kg	U
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	0.950	0.893-1.208	0.399	2.47	31.5	ng/kg	B
39001-02-0	OCDF	1	0.845	0.757-1.024	0.457	2.47	19.3	ng/kg	B
3268-87-9	OCDD	1	0.841	0.757-1.024	0.999	9.89	216	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.989	1.41	ng/kg
41903-57-5	Total TCDD	1	0.000			0.989	0.566	ng/kg
30402-15-4	Total PeCDF	1	0.000			0.989	5.33	ng/kg
36088-22-9	Total PeCDD	1	0.000			0.989	ND	ng/kg
55684-94-1	Total HxCDF	1	0.000			0.989	14.1	ng/kg
34465-46-8	Total HxCDD	1	0.000			0.989	11.8	ng/kg
38998-75-3	Total HpCDF	1	0.000			0.989	52.2	ng/kg
37871-00-4	Total HpCDD	1	0.000			0.989	102	ng/kg

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 1.61

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 1.85

SED-07C:0-1

Form 2

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Sediment	Laboratory ID:	23J0690-01	File ID:	23121437
Sampled:	03/22/23 07:29	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 20:28
Solids Wt%:	80.40	Preparation:	EPA 1613	Initial/Final:	12.57 g / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.752	0.655-0.886	0.156	58.4	24 - 169 %	
13C12-2,3,7,8-TCDD		0.799	0.655-0.886	0.262	73.6	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.483	1.318-1.783	0.258	60.3	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.508	1.318-1.783	0.273	60.4	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.585	1.318-1.783	0.371	76.4	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.520	0.434-0.587	0.251	64.6	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.506	0.434-0.587	0.204	55.9	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.516	0.434-0.587	0.250	58.1	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.512	0.434-0.587	0.287	59.2	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.239	1.054-1.426	0.308	77.6	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.220	1.054-1.426	0.255	66.8	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.453	0.374-0.506	0.256	52.8	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.434	0.374-0.506	0.333	52.0	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.092	0.893-1.208	0.392	70.6	23 - 140 %	
13C12-OCDD		0.889	0.757-1.024	0.426	56.2	17 - 157 %	
37Cl4-2,3,7,8-TCDD		328.000		0.084	90.9	35 - 197 %	

* Values outside of QC limits

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:25 Pacific Standard Time

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
2378-TCDF	25.407	1.002	4.409e2	4.529e2	0.903	0.974	0.770	1054	929	7.31e3	6.19e3	6.9	6.7	YES	bd	bb	0.331
12378-PeCDF					0.923		1.550	851	804								
23478-PeCDF					0.991		1.550	851	804								
123478-HxCDF					1.128		1.240	586	543								
234678-HxCDF	35.487	1.000	5.095e2	3.872e2	1.081	1.316	1.240	586	543	7.03e3	5.08e3	12.0	9.4	NO	bb	bb	0.510
123678-HxCDF					1.032		1.240	586	543								
123789-HxCDF					0.988		1.240	586	543								
1234678-HpCDF	38.395	1.000	1.186e4	1.158e4	1.164	1.024	1.050	593	827	1.86e5	1.91e5	314.6	230.5	NO	bd	bd	15.105
1234789-HpCDF					1.104		1.050	593	827								
OCDF	44.682	1.006	4.631e3	5.479e3	1.130	0.845	0.890	479	518	5.64e4	6.60e4	117.9	127.4	NO	bb	bd	9.774
2378-TCDD	26.028	1.001	3.614e2	4.476e2	1.243	0.808	0.770	561	622	4.52e3	5.91e3	8.1	9.5	NO	bb	bd	0.286
12378-PeCDD					1.150		1.550	881	477								
123478-HxCDD					0.960		1.240	564	692								
123678-HxCDD	35.755	1.001	5.754e2	4.512e2	0.883	1.275	1.240	564	692	9.39e3	7.61e3	16.7	11.0	NO	dd	bb	0.586
123789-HxCDD	36.133	1.011	4.112e2	2.119e2	0.804	1.940	1.240	564	692	5.40e3	4.51e3	9.6	6.5	YES	bb	bb	0.398
1234678-HpCDD	39.866	1.001	1.057e4	1.112e4	1.200	0.950	1.050	704	740	1.64e5	1.67e5	233.5	225.5	NO	bb	bb	15.896
OCDD	44.454	1.000	4.833e4	5.745e4	1.059	0.841	0.890	1144	897	5.94e5	6.87e5	519.4	765.7	NO	bb	bd	109.181
13C-2378-TCDF	25.365	1.007	1.282e5	1.704e5	1.835	0.752	0.770	1223	915	1.97e6	2.62e6	1607.8	2864.5	NO	bb	bb	58.376
13C-12378-PeCDF	29.504	1.171	1.381e5	9.313e4	1.377	1.483	1.550	1190	1456	2.07e6	1.36e6	1740.8	931.2	NO	bd	bd	60.273
13C-23478-PeCDF	30.841	1.224	1.318e5	8.740e4	1.301	1.508	1.550	1190	1456	2.00e6	1.34e6	1681.1	917.9	NO	bb	bb	60.431
13C-123478-HxCDF	34.473	0.954	6.171e4	1.187e5	1.091	0.520	0.510	864	1003	9.28e5	1.81e6	1073.4	1804.1	NO	bd	bd	64.567
13C-123678-HxCDF	34.618	0.958	6.440e4	1.274e5	1.340	0.506	0.510	864	1003	9.69e5	1.93e6	1121.1	1921.4	NO	db	db	55.859
13C-234678-HxCDF	35.498	0.983	5.534e4	1.073e5	1.093	0.516	0.510	864	1003	8.74e5	1.69e6	1010.7	1687.8	NO	bb	bb	58.064
13C-123789-HxCDF	36.535	1.011	4.890e4	9.550e4	0.952	0.512	0.510	864	1003	7.50e5	1.47e6	867.4	1467.1	NO	bb	bb	59.230
13C-1234678-HpCDF	38.384	1.063	4.156e4	9.179e4	0.985	0.453	0.440	740	980	6.81e5	1.48e6	920.2	1509.4	NO	bd	bb	52.849
13C-1234789-HpCDF	40.568	1.123	3.050e4	7.025e4	0.756	0.434	0.440	740	980	4.37e5	1.03e6	590.0	1052.6	NO	bb	bb	52.033
13C-1234-TCDD	25.195	0.000	1.233e5	1.554e5	1.000	0.793	0.770	1242	927	1.96e6	2.46e6	1576.5	2651.2	NO	bb	bb	100.000
13C-2378-TCDD	26.000	1.032	1.011e5	1.265e5	1.110	0.799	0.770	1242	927	1.57e6	1.96e6	1266.1	2118.6	NO	bb	bb	73.609
13C-12378-PeCDD	31.098	1.234	9.838e4	6.208e4	0.754	1.585	1.550	1382	701	1.53e6	9.49e5	1105.5	1353.1	NO	bb	bb	76.385
13C-123478-HxCDD	35.621	0.986	1.056e5	8.520e4	0.960	1.239	1.240	839	1183	1.70e6	1.37e6	2022.9	1158.6	NO	bd	bd	77.574
13C-123678-HxCDD	35.732	0.989	1.090e5	8.933e4	1.159	1.220	1.240	839	1183	1.76e6	1.45e6	2091.9	1222.7	NO	db	db	66.792
13C-1234678-HpCDD	39.843	1.103	5.937e4	5.437e4	0.629	1.092	1.050	878	808	9.36e5	8.69e5	1065.1	1074.6	NO	bb	bb	70.552
13C-OCDD	44.435	1.230	8.613e4	9.691e4	0.635	0.889	0.890	841	1009	1.08e6	1.20e6	1283.0	1189.9	NO	bb	bb	112.496
13C-123789-HxCDD	36.122	0.000	1.406e5	1.156e5	1.000	1.217	1.240	839	1183	2.23e6	1.84e6	2651.9	1553.2	NO	bb	bb	100.000
37CL-2378-TCDD	26.014	1.033	1.174e5		1.157			721		1.83e6		2535.1			bb		36.379

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:25 Pacific Standard Time

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
1368-TCDF					1.170		0.770	1054	929								
1289-TCDF	26.777	1.056	2.404e2	1.358e2	0.847	1.770	0.770	1054	929	4.40e3	3.49e3	4.2	3.8	YES	bb	bd	0.149
13468-PECDF	26.805	0.909	3.426e3	2.372e3	1.241	1.444	1.550	656	655	5.25e4	3.26e4	80.0	49.9	NO	bb	bb	2.020
12389-PECDF	31.833	1.079	2.559e2	3.954e2	0.880	0.647	1.550	851	804	7.34e3	4.91e3	8.6	6.1	YES	db	bd	0.320
123468-HXCDF	32.813	0.952	8.604e2	9.056e2	1.206	0.950	1.240	586	543	1.36e4	1.25e4	23.2	23.1	YES	db	db	0.812
1368-TCDD					1.181		0.770	561	622								
1289-TCDD					0.963		0.770	561	622								
12479-PECDD	28.413	0.914	3.677e2	2.962e2	2.166	1.241	1.550	881	477	5.57e3	4.65e3	6.3	9.7	YES	bd	bb	0.191
12389-PECDD					1.326		1.550	881	477								
124679-HXCDD	33.593	0.943	3.561e3	2.905e3	1.127	1.226	1.240	564	692	5.47e4	4.72e4	97.1	68.1	NO	bb	bb	3.009
1234679-HPCDD	38.841	0.975	2.562e4	2.698e4	1.303	0.950	1.050	704	740	4.29e5	4.57e5	610.0	617.4	NO	bb	bb	35.502
Total-tetrafurans			9.192e2		0.973			1054		1.39e4							0.713
Total-penta1			3.426e3					656		5.25e4							2.020
Total-pentafurans			8.817e2		0.931			851		1.31e4							0.671
Total-hexafurans			7.443e3		1.087			586		1.15e5							7.123
Total-heptafurans			1.958e4		1.134			593		3.10e5							26.396
Total-Furans			3.688e4		1.053			1054		5.61e5							46.697
Total-tetradioxins			3.614e2		1.129			561		4.52e3							0.286
Total-pentadioxins			0.000e0		1.548			881		0.00e0							
Total-hexadioxins			6.403e3		0.943			564		8.69e4							5.987
Total-heptadioxins			3.619e4		1.251			704		5.94e5							51.398
Total-Dioxins			9.129e4		1.182			561		1.28e6							166.853
Total-TEQ			1.282e5					561		1.84e6							213.550
FUNCTION1 PFK			2.964e3					224579		2.10e5							
FUNCTION2 PFK			1.717e6					99037		1.40e7							0.000
FUNCTION3 PFK			1.687e6					170838		5.58e6							0.000
FUNCTION4 PFK			1.697e5					130099		4.64e6							
FUNCTION5 PFK			0.000e0					85619		0.00e0							
FUNCTION1 HXCD...			2.592e3					527		4.22e4							0.000
FUNCTION1 HPCD...																	
FUNCTION2 HPCD...			4.935e2					497		8.07e3							0.000
FUNCTION3 OCDPE			1.011e2					379		3.47e3							0.000
FUNCTION4 NCDPE			1.023e3					368		1.66e4							0.000
FUNCTION5 DCDPE			0.000e0					259		0.00e0							

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

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TF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.29	3.557e2	4.457e2	0.973	0.80	0.77	4.9	YES	NO	bb	bb	0.276
2	Total-tetrafurans	27.29	9.611e1	1.164e2	0.973	0.83	0.77	1.8	NO	NO	bb	bd	0.073
3	Total-tetrafurans	25.76	4.674e2	5.915e2	0.973	0.79	0.77	6.4	YES	NO	db	db	0.364

PP

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	13468-PECDF	26.81	3.426e3	2.372e3	1.241	1.44	1.55	80.0	YES	NO	bb	bb	2.020

PF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-pentafurans	28.58	6.758e2	4.067e2	0.931	1.66	1.55	11.6	YES	NO	db	bb	0.516
2	Total-pentafurans	30.59	2.059e2	1.194e2	0.931	1.72	1.55	3.8	YES	NO	dd	bb	0.155

HF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-hexafurans	33.03	3.392e3	2.529e3	1.087	1.34	1.24	89.7	YES	NO	bb	bb	3.207
2	234678-HxCDF	35.49	5.095e2	3.872e2	1.081	1.32	1.24	12.0	YES	NO	bb	bb	0.510
3	Total-hexafurans	33.87	3.542e3	2.745e3	1.087	1.29	1.24	94.4	YES	NO	bb	bb	3.406

HPF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-heptafurans	39.05	7.726e3	7.256e3	1.134	1.06	1.05	208.1	YES	NO	bb	bb	11.291
2	1234678-HpCDF	38.40	1.186e4	1.158e4	1.164	1.02	1.05	314.6	YES	NO	bd	bd	15.105

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Furans,TF,PP,PF,HF,HPF,OF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.29	3.557e2	4.457e2	0.973	0.80	0.77	4.9	YES	NO	bb	bb	0.276
2	Total-tetrafurans	27.29	9.611e1	1.164e2	0.973	0.83	0.77	1.8	NO	NO	bb	bd	0.073
3	Total-tetrafurans	25.76	4.674e2	5.915e2	0.973	0.79	0.77	6.4	YES	NO	db	db	0.364
4	Total-pentafurans	28.58	6.758e2	4.067e2	0.931	1.66	1.55	11.6	YES	NO	db	bb	0.516
5	Total-pentafurans	30.59	2.059e2	1.194e2	0.931	1.72	1.55	3.8	YES	NO	dd	bb	0.155
6	Total-hexafurans	33.03	3.392e3	2.529e3	1.087	1.34	1.24	89.7	YES	NO	bb	bb	3.207
7	234678-HxCDF	35.49	5.095e2	3.872e2	1.081	1.32	1.24	12.0	YES	NO	bb	bb	0.510
8	Total-hexafurans	33.87	3.542e3	2.745e3	1.087	1.29	1.24	94.4	YES	NO	bb	bb	3.406
9	Total-heptafurans	39.05	7.726e3	7.256e3	1.134	1.06	1.05	208.1	YES	NO	bb	bb	11.291
10	1234678-HpCDF	38.40	1.186e4	1.158e4	1.164	1.02	1.05	314.6	YES	NO	bd	bd	15.105
11	OCDF	44.68	4.631e3	5.479e3	1.130	0.85	0.89	117.9	YES	NO	bb	bd	9.774
12	13468-PECDF	26.81	3.426e3	2.372e3	1.241	1.44	1.55	80.0	YES	NO	bb	bb	2.020

TD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	2378-TCDD	26.03	3.614e2	4.476e2	1.243	0.81	0.77	8.1	YES	NO	bb	bd	0.286

PD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

HD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	123678-HxCDD	35.75	5.754e2	4.512e2	0.883	1.28	1.24	16.7	YES	NO	dd	bb	0.586
2	Total-hexadioxins	34.74	2.267e3	2.123e3	0.943	1.07	1.24	40.3	YES	NO	bd	bd	2.392
3	124679-HXCDD	33.59	3.561e3	2.905e3	1.127	1.23	1.24	97.1	YES	NO	bb	bb	3.009

HPD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234678-HpCDD	39.87	1.057e4	1.112e4	1.200	0.95	1.05	233.5	YES	NO	bb	bb	15.896
2	1234679-HPCDD	38.84	2.562e4	2.698e4	1.303	0.95	1.05	610.0	YES	NO	bb	bb	35.502

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Dioxins,TD,PD,HD,HPD,OD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	2378-TCDD	26.03	3.614e2	4.476e2	1.243	0.81	0.77	8.1	YES	NO	bb	bd	0.286
2	123678-HxCDD	35.75	5.754e2	4.512e2	0.883	1.28	1.24	16.7	YES	NO	dd	bb	0.586
3	Total-hexadioxins	34.74	2.267e3	2.123e3	0.943	1.07	1.24	40.3	YES	NO	bd	bd	2.392
4	124679-HXCDD	33.59	3.561e3	2.905e3	1.127	1.23	1.24	97.1	YES	NO	bb	bb	3.009
5	1234678-HpCDD	39.87	1.057e4	1.112e4	1.200	0.95	1.05	233.5	YES	NO	bb	bb	15.896
6	1234679-HPCDD	38.84	2.562e4	2.698e4	1.303	0.95	1.05	610.0	YES	NO	bb	bb	35.502
7	OCDD	44.45	4.833e4	5.745e4	1.059	0.84	0.89	519.4	YES	NO	bb	bd	109.181

TotalTEQ,Furans,Dioxins

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.29	3.557e2	4.457e2	0.973	0.80	0.77	4.9	YES	NO	bb	bb	0.276
2	Total-tetrafurans	27.29	9.611e1	1.164e2	0.973	0.83	0.77	1.8	NO	NO	bb	bd	0.073
3	Total-tetrafurans	25.76	4.674e2	5.915e2	0.973	0.79	0.77	6.4	YES	NO	db	db	0.364
4	Total-pentafurans	28.58	6.758e2	4.067e2	0.931	1.66	1.55	11.6	YES	NO	db	bb	0.516
5	Total-pentafurans	30.59	2.059e2	1.194e2	0.931	1.72	1.55	3.8	YES	NO	dd	bb	0.155
6	Total-hexafurans	33.03	3.392e3	2.529e3	1.087	1.34	1.24	89.7	YES	NO	bb	bb	3.207
7	234678-HxCDF	35.49	5.095e2	3.872e2	1.081	1.32	1.24	12.0	YES	NO	bb	bb	0.510
8	Total-hexafurans	33.87	3.542e3	2.745e3	1.087	1.29	1.24	94.4	YES	NO	bb	bb	3.406
9	Total-heptafurans	39.05	7.726e3	7.256e3	1.134	1.06	1.05	208.1	YES	NO	bb	bb	11.291
10	1234678-HpCDF	38.40	1.186e4	1.158e4	1.164	1.02	1.05	314.6	YES	NO	bd	bd	15.105
11	OCDF	44.68	4.631e3	5.479e3	1.130	0.85	0.89	117.9	YES	NO	bb	bd	9.774
12	13468-PECDF	26.81	3.426e3	2.372e3	1.241	1.44	1.55	80.0	YES	NO	bb	bb	2.020
13	2378-TCDD	26.03	3.614e2	4.476e2	1.243	0.81	0.77	8.1	YES	NO	bb	bd	0.286
14	123678-HxCDD	35.75	5.754e2	4.512e2	0.883	1.28	1.24	16.7	YES	NO	dd	bb	0.586
15	Total-hexadioxins	34.74	2.267e3	2.123e3	0.943	1.07	1.24	40.3	YES	NO	bd	bd	2.392
16	124679-HXCDD	33.59	3.561e3	2.905e3	1.127	1.23	1.24	97.1	YES	NO	bb	bb	3.009
17	1234678-HpCDD	39.87	1.057e4	1.112e4	1.200	0.95	1.05	233.5	YES	NO	bb	bb	15.896
18	1234679-HPCDD	38.84	2.562e4	2.698e4	1.303	0.95	1.05	610.0	YES	NO	bb	bb	35.502
19	OCDD	44.45	4.833e4	5.745e4	1.059	0.84	0.89	519.4	YES	NO	bb	bd	109.181

PFK1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 PFK	23.71	2.964e3					0.9	NO		bb		

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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 PFK	27.81	1.356e5					24.4	YES		dd		0.000
2	FUNCTION2 PFK	27.72	3.485e5					27.4	YES		bd		0.000
3	FUNCTION2 PFK	30.05	3.296e3					1.1	NO		bb		0.000
4	FUNCTION2 PFK	29.83	1.152e4					1.5	NO		db		0.000
5	FUNCTION2 PFK	29.75	9.524e3					2.1	NO		bd		0.000
6	FUNCTION2 PFK	29.66	5.777e2					0.5	NO		bb		0.000
7	FUNCTION2 PFK	29.38	3.586e3					1.2	NO		bb		0.000
8	FUNCTION2 PFK	29.13	1.019e3					0.5	NO		bb		0.000
9	FUNCTION2 PFK	29.03	7.857e3					1.8	NO		db		0.000
10	FUNCTION2 PFK	28.95	1.943e3					0.8	NO		bd		0.000
11	FUNCTION2 PFK	28.86	5.999e3					0.8	NO		bb		0.000
12	FUNCTION2 PFK	28.75	2.413e3					1.1	NO		db		0.000
13	FUNCTION2 PFK	28.62	3.557e4					4.7	YES		dd		0.000
14	FUNCTION2 PFK	28.57	2.010e4					4.9	YES		dd		0.000
15	FUNCTION2 PFK	28.52	1.823e4					6.1	YES		dd		0.000
16	FUNCTION2 PFK	28.46	5.558e4					8.5	YES		dd		0.000
17	FUNCTION2 PFK	28.17	3.792e5					16.6	YES		dd		0.000
18	FUNCTION2 PFK	28.01	6.193e5					20.9	YES		dd		0.000
19	FUNCTION2 PFK	31.89	7.372e2					0.7	NO		bb		0.000
20	FUNCTION2 PFK	31.77	2.509e3					1.1	NO		bb		0.000
21	FUNCTION2 PFK	31.61	1.499e3					0.7	NO		bb		0.000
22	FUNCTION2 PFK	31.40	3.214e3					1.2	NO		db		0.000
23	FUNCTION2 PFK	31.31	7.467e3					1.3	NO		dd		0.000
24	FUNCTION2 PFK	31.16	1.153e4					1.5	NO		bd		0.000
25	FUNCTION2 PFK	31.04	7.662e2					0.5	NO		bb		0.000
26	FUNCTION2 PFK	30.87	1.004e3					0.6	NO		bb		0.000
27	FUNCTION2 PFK	30.74	1.479e3					0.9	NO		db		0.000
28	FUNCTION2 PFK	30.72	1.136e4					1.8	NO		bd		0.000
29	FUNCTION2 PFK	30.61	2.590e3					1.1	NO		bb		0.000
30	FUNCTION2 PFK	30.52	9.935e2					0.5	NO		bb		0.000
31	FUNCTION2 PFK	30.45	3.408e3					1.1	NO		bb		0.000
32	FUNCTION2 PFK	30.23	8.444e2					0.8	NO		bb		0.000
33	FUNCTION2 PFK	30.17	2.823e3					0.8	NO		bb		0.000
34	FUNCTION2 PFK	30.09	1.301e3					0.7	NO		bb		0.000
35	FUNCTION2 PFK	32.36	1.710e3					0.8	NO		bb		0.000
36	FUNCTION2 PFK	31.98	1.414e3					0.5	NO		bb		0.000

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

PFK3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 PFK	35.81	6.116e5					8.5	YES		bb		0.000
2	FUNCTION3 PFK	35.44	1.053e6					20.2	YES		bb		0.000
3	FUNCTION3 PFK	33.74	1.628e4					2.4	NO		db		0.000
4	FUNCTION3 PFK	33.69	5.635e3					1.5	NO		bd		0.000

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 PFK	39.24	9.319e2					0.6	NO		db		
2	FUNCTION4 PFK	39.21	4.179e3					1.1	NO		bd		
3	FUNCTION4 PFK	38.67	7.024e3					1.4	NO		bb		
4	FUNCTION4 PFK	38.38	5.408e3					1.2	NO		bb		
5	FUNCTION4 PFK	38.16	8.107e3					1.7	NO		db		
6	FUNCTION4 PFK	38.07	7.746e3					1.7	NO		bd		
7	FUNCTION4 PFK	38.01	1.300e4					1.9	NO		bb		
8	FUNCTION4 PFK	37.62	5.851e3					1.3	NO		bb		
9	FUNCTION4 PFK	42.42	2.223e3					0.8	NO		db		
10	FUNCTION4 PFK	42.37	5.134e3					1.3	NO		bd		
11	FUNCTION4 PFK	42.13	4.187e3					0.8	NO		bb		
12	FUNCTION4 PFK	42.04	6.313e3					0.9	NO		bb		
13	FUNCTION4 PFK	41.87	5.761e3					1.5	NO		bb		
14	FUNCTION4 PFK	41.61	3.430e3					1.1	NO		bb		
15	FUNCTION4 PFK	40.97	1.576e3					0.6	NO		bb		
16	FUNCTION4 PFK	40.89	5.403e3					1.3	NO		bb		
17	FUNCTION4 PFK	40.67	8.079e3					1.7	NO		bb		
18	FUNCTION4 PFK	40.51	2.789e3					0.9	NO		bb		
19	FUNCTION4 PFK	40.45	1.581e4					2.2	NO		bb		
20	FUNCTION4 PFK	40.29	4.260e3					0.7	NO		bb		
21	FUNCTION4 PFK	40.17	4.031e3					0.7	NO		bb		
22	FUNCTION4 PFK	39.78	1.559e4					2.0	NO		bb		
23	FUNCTION4 PFK	39.67	4.926e3					1.3	NO		bb		
24	FUNCTION4 PFK	39.52	4.280e3					1.2	NO		bb		
25	FUNCTION4 PFK	42.87	3.569e3					1.0	NO		bb		
26	FUNCTION4 PFK	42.72	8.633e3					1.4	NO		bb		
27	FUNCTION4 PFK	42.63	4.804e3					1.0	NO		bb		
28	FUNCTION4 PFK	42.57	3.399e3					1.1	NO		bb		
29	FUNCTION4 PFK	42.49	2.559e3					1.1	NO		bb		
30	FUNCTION4 PFK	42.45	6.744e2					0.5	NO		bb		

PFK5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

ETHERS1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 HXCD...	26.42	2.388e2					10.2	YES		bb		0.000
2	FUNCTION1 HXCD...	25.76	6.315e2					20.2	YES		bb		0.000
3	FUNCTION1 HXCD...	25.53	2.693e2					7.0	YES		db		0.000
4	FUNCTION1 HXCD...	25.39	2.953e2					9.4	YES		bd		0.000
5	FUNCTION1 HXCD...	24.74	1.479e2					4.1	YES		bb		0.000
6	FUNCTION1 HXCD...	23.40	5.612e2					16.3	YES		bb		0.000
7	FUNCTION1 HXCD...	22.38	1.881e2					6.8	YES		bb		0.000
8	FUNCTION1 HXCD...	21.97	2.599e2					6.1	YES		bb		0.000

ETHERS2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 HPCD...	31.82	1.108e2					4.6	YES		bb		0.000
2	FUNCTION2 HPCD...	28.56	3.827e2					11.6	YES		bb		0.000

ETHERS4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 OCDPE	32.71	1.011e2					9.1	YES		bb		0.000

ETHERS5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 NCDPE	38.07	1.023e3					45.3	YES		bb		0.000

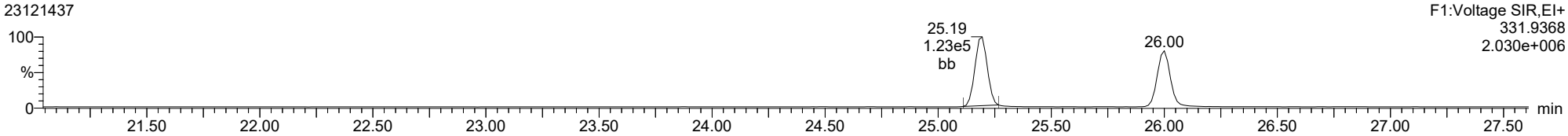
ETHERS6

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1													

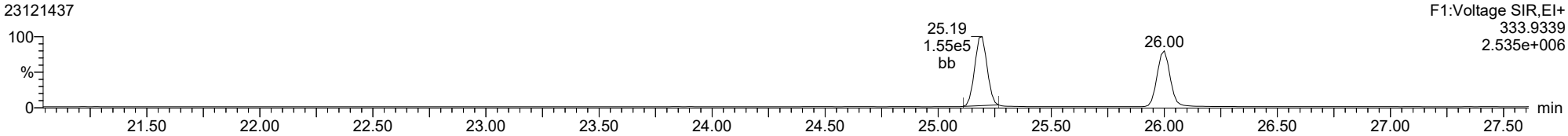
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ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

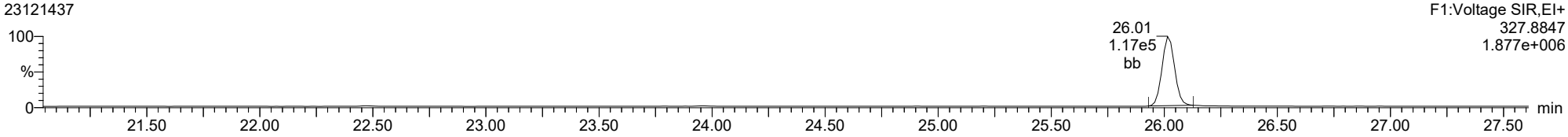
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13C-1234-TCDD

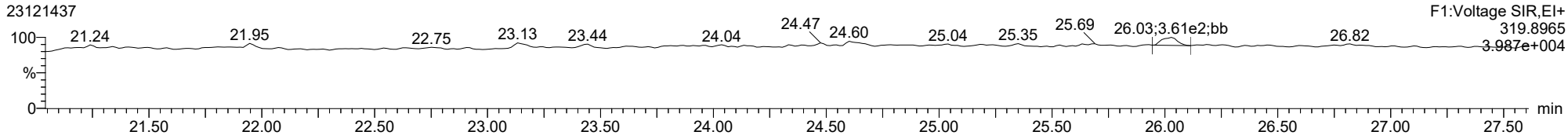


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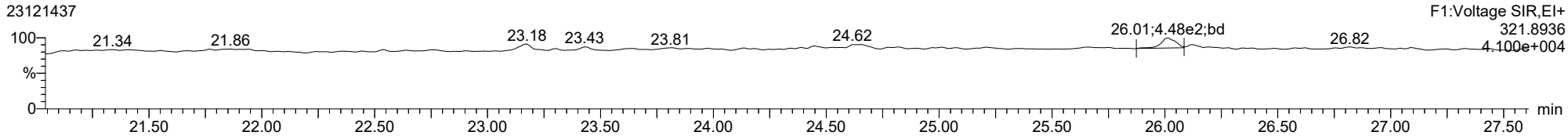


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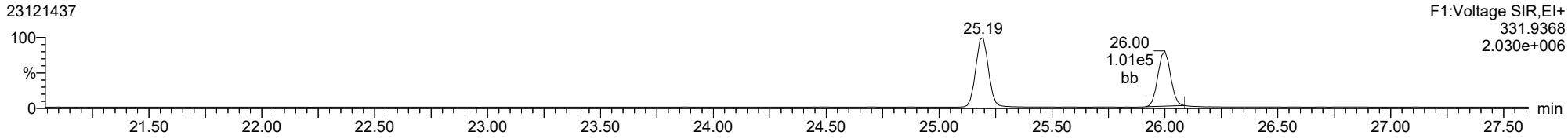
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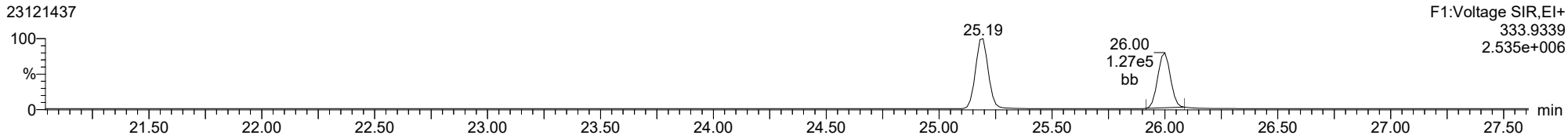
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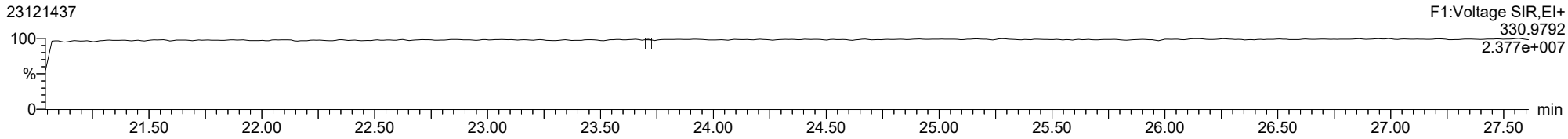
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13C-2378-TCDD

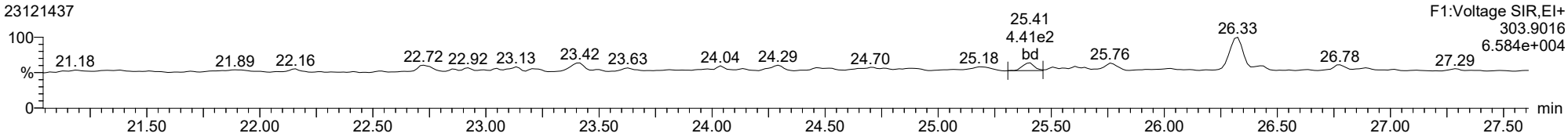


FUNCTION1 PFK

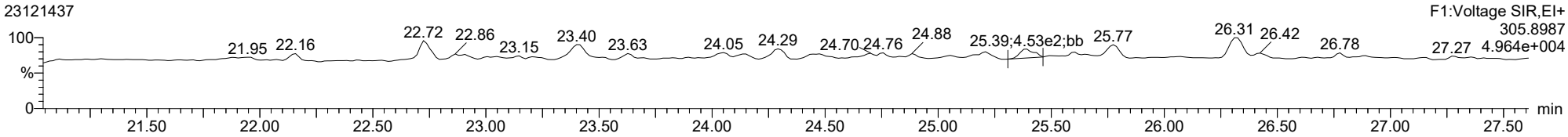


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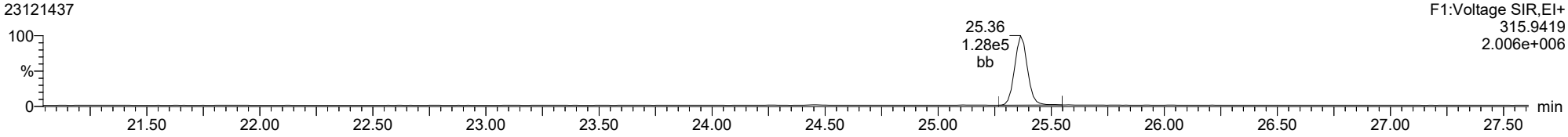
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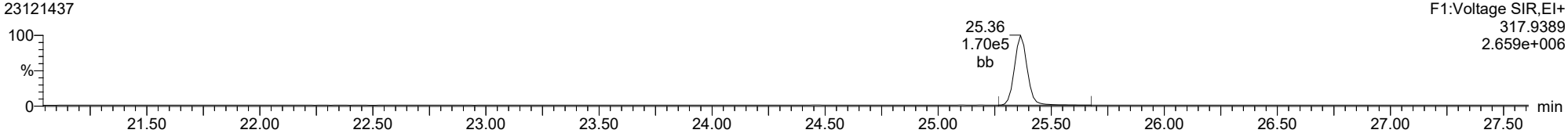
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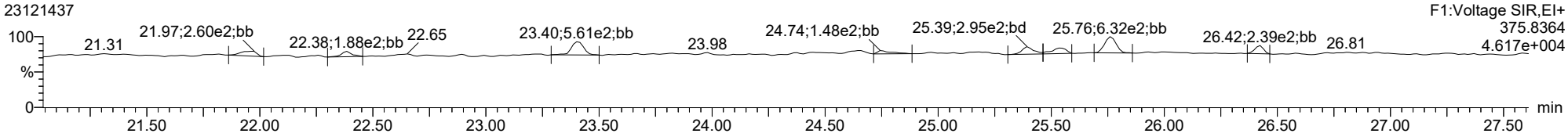
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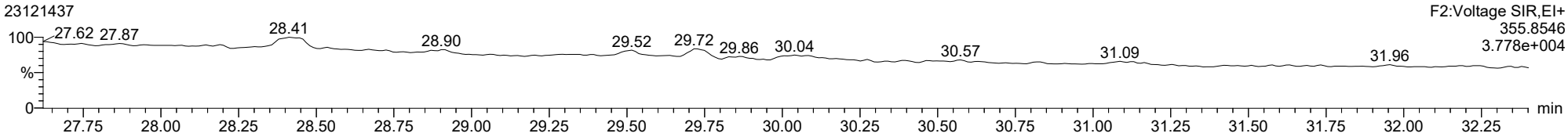


FUNCTION1 HXCDPE

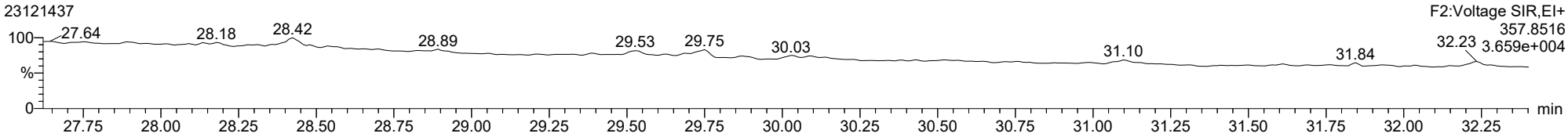


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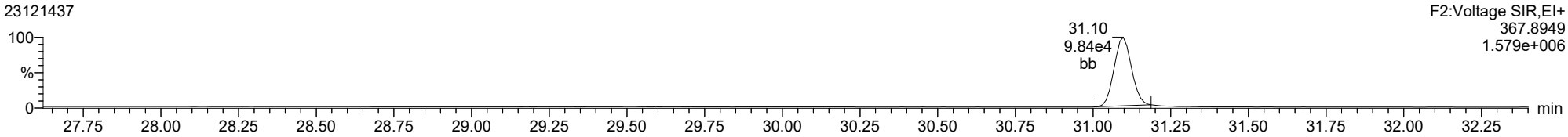
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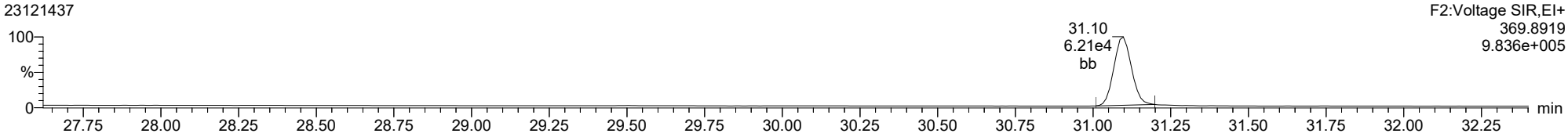
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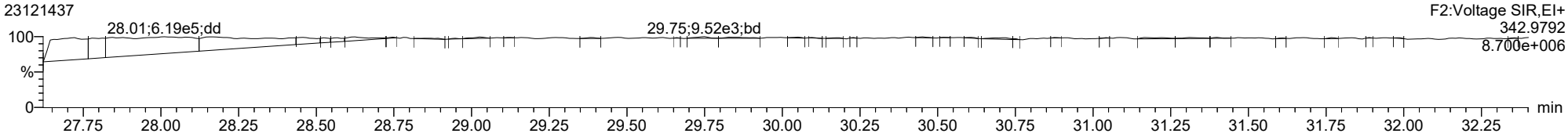
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13C-12378-PeCDD

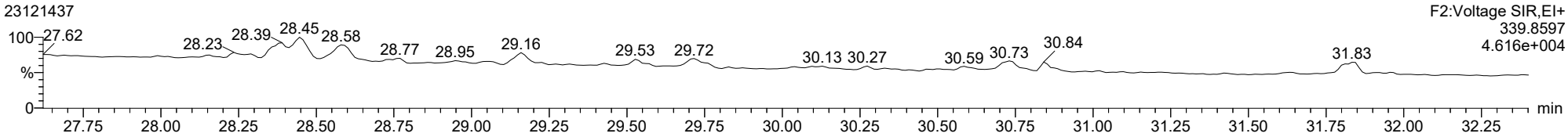


FUNCTION2 PFK

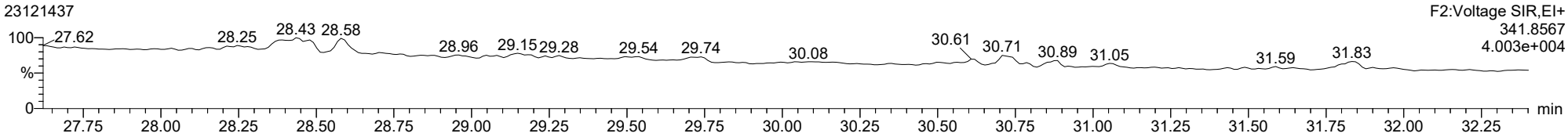


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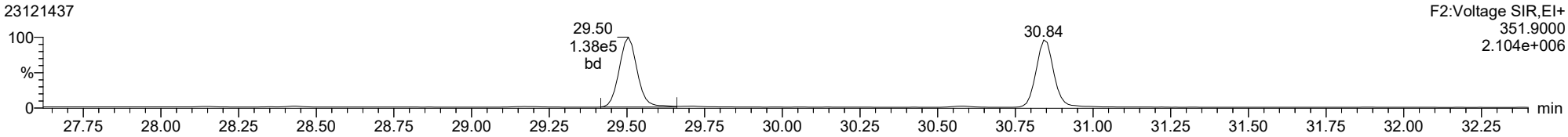
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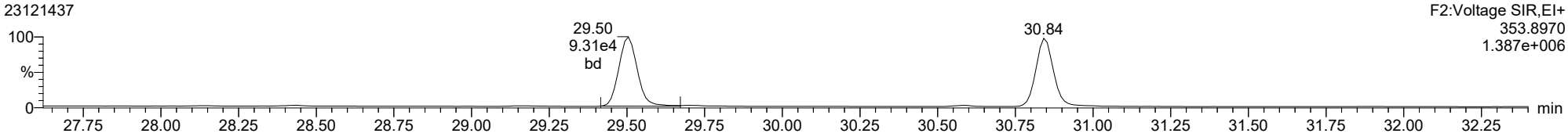
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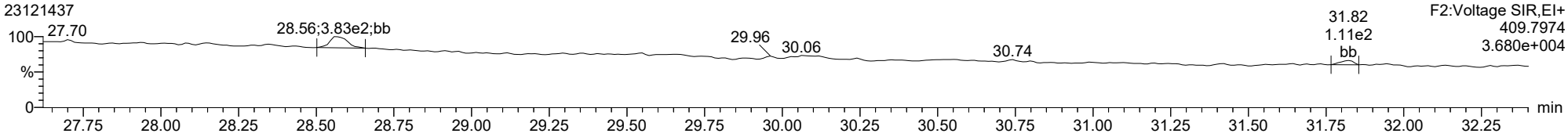
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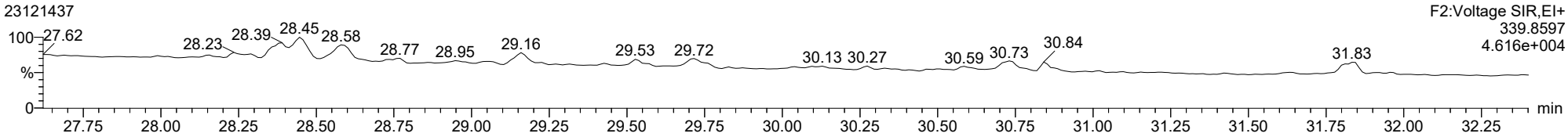


FUNCTION2 HPCDPE

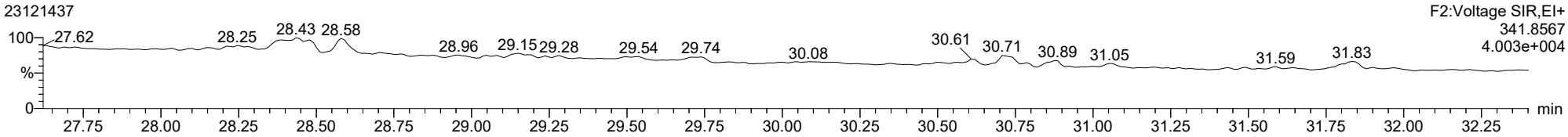


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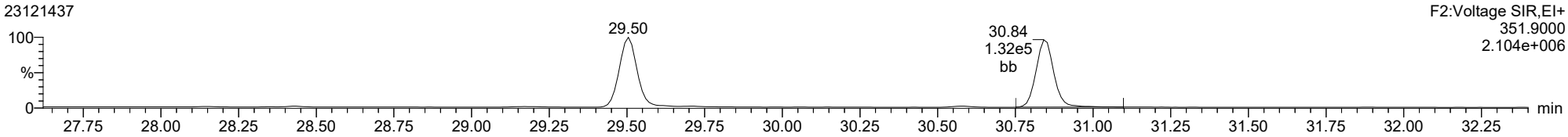
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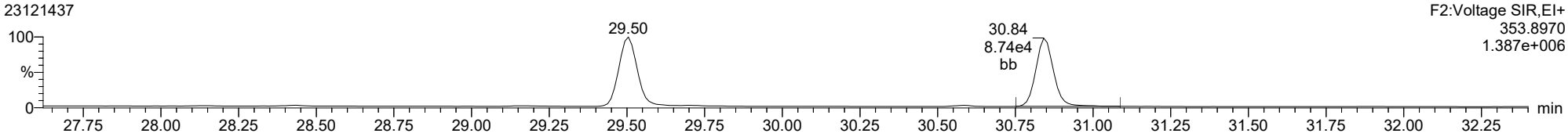
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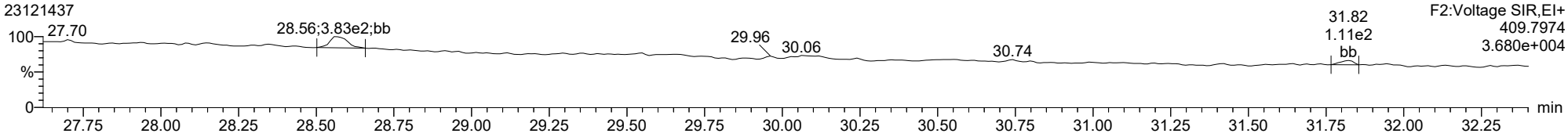
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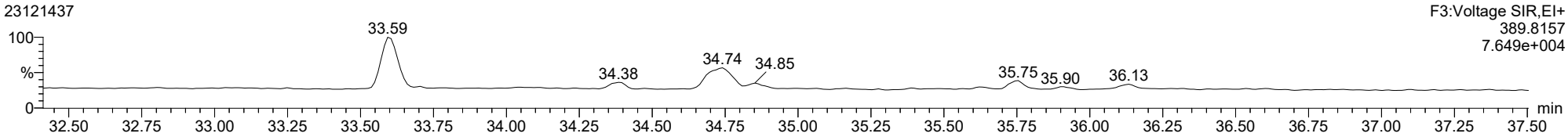


FUNCTION2 HPCDPE

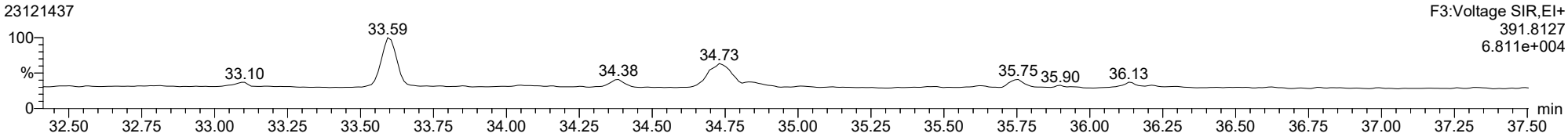


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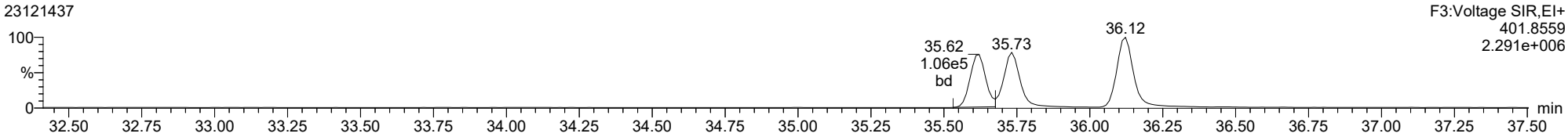
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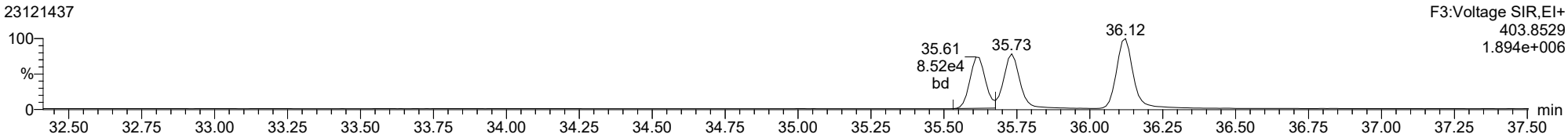
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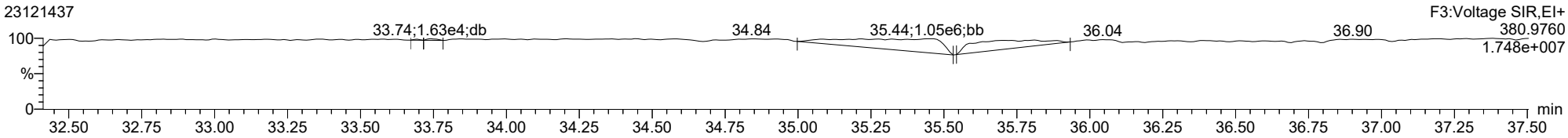
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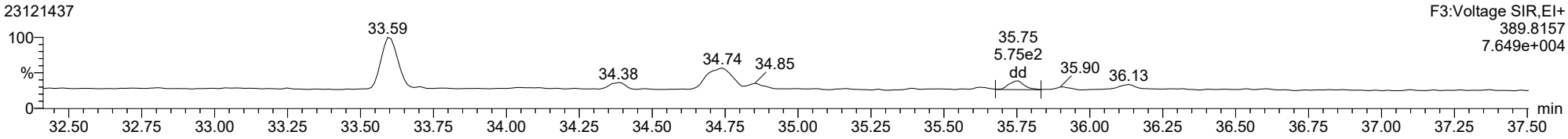
FUNCTION3 PFK



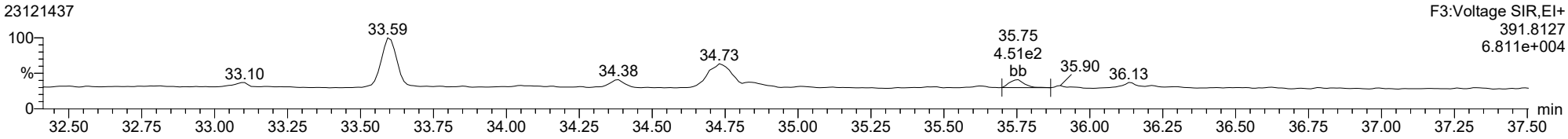
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ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

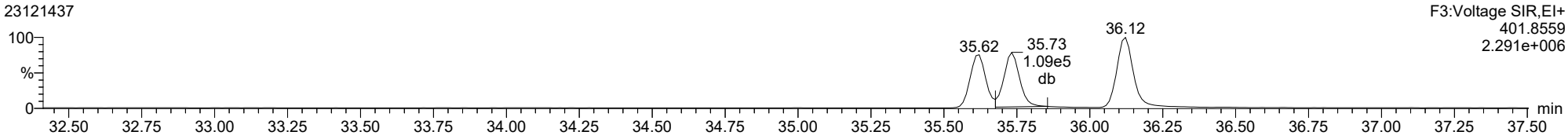
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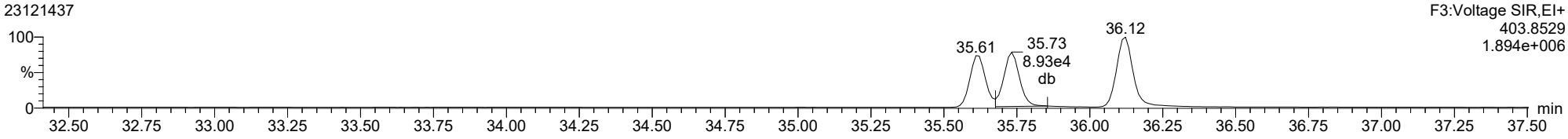
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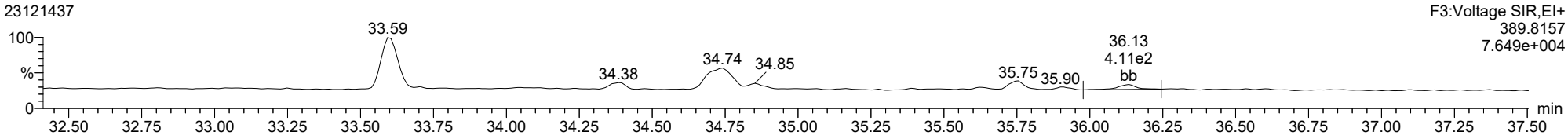
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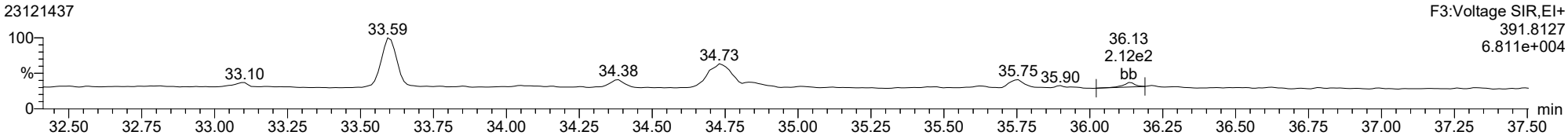
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ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

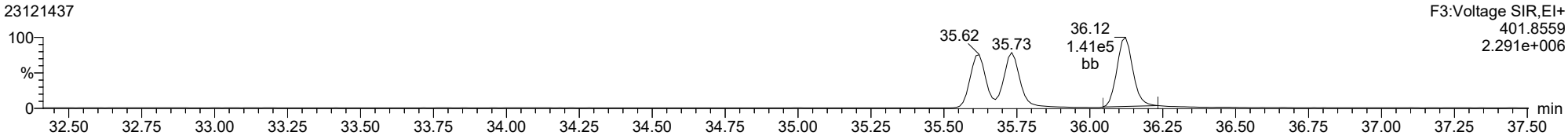
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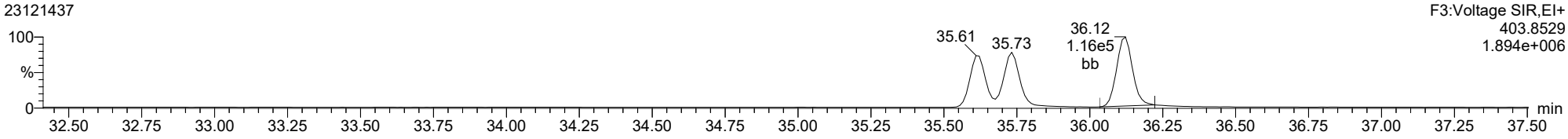
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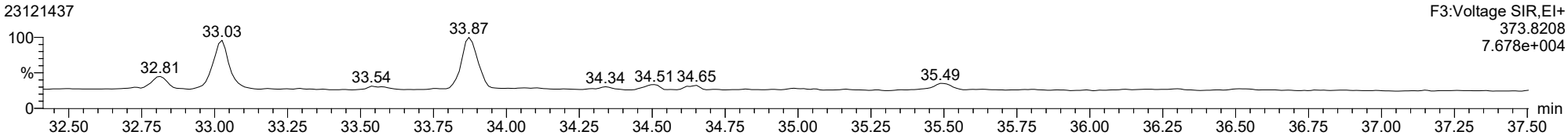


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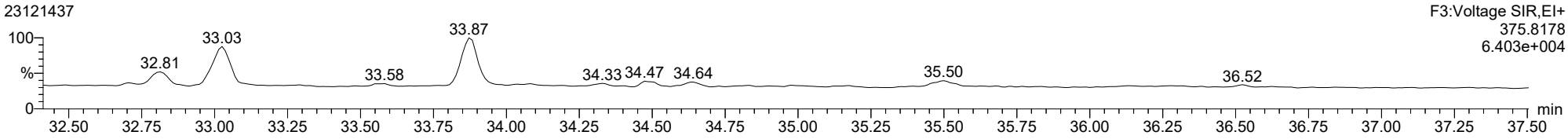


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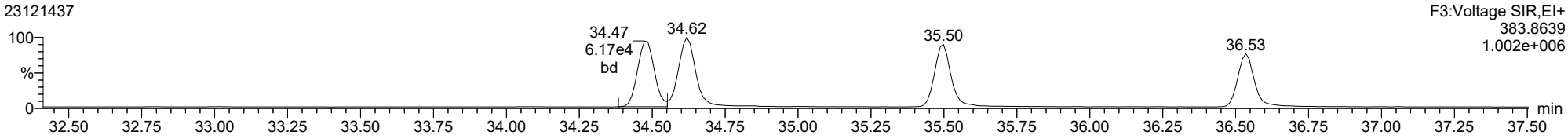
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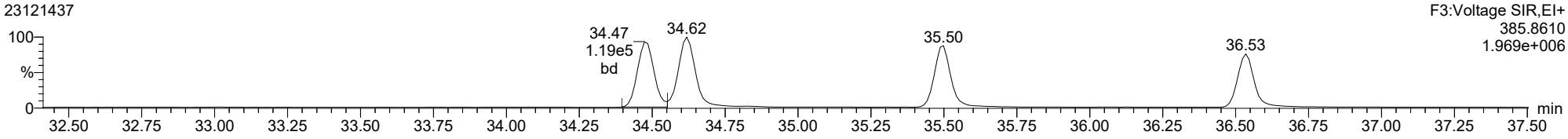
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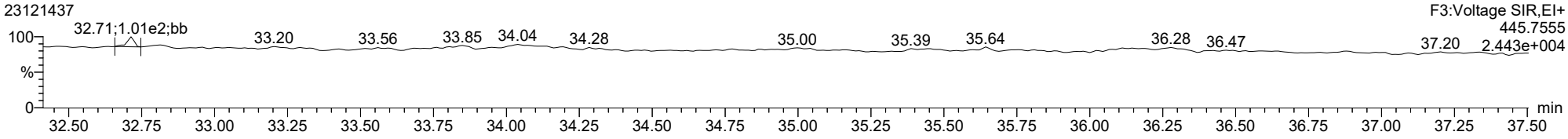
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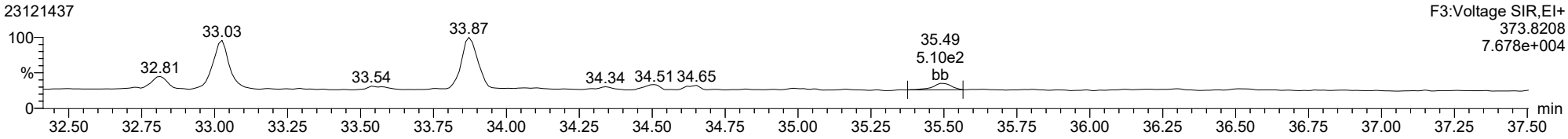


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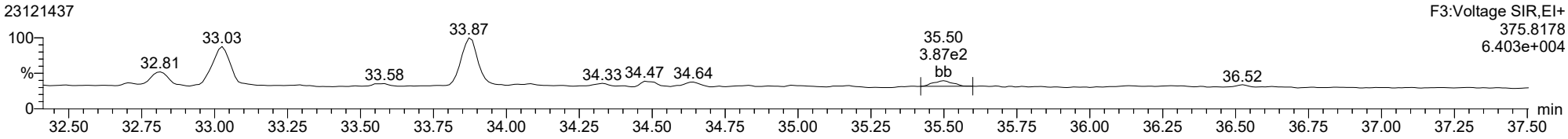


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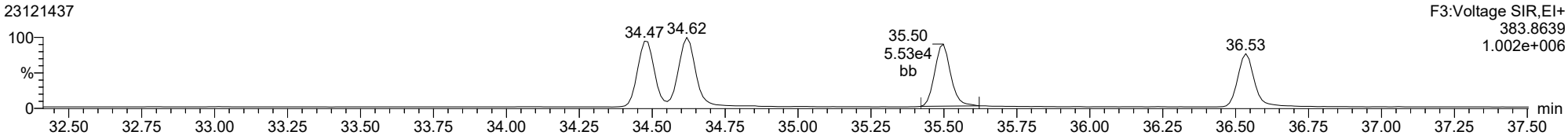
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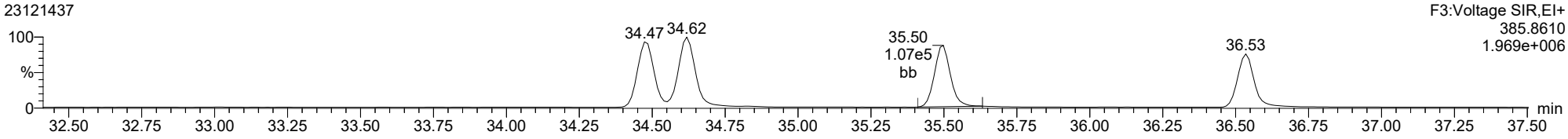
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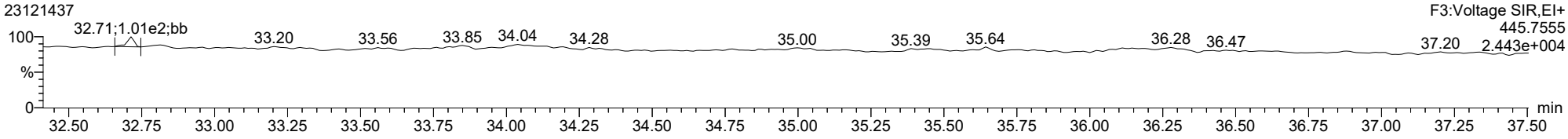
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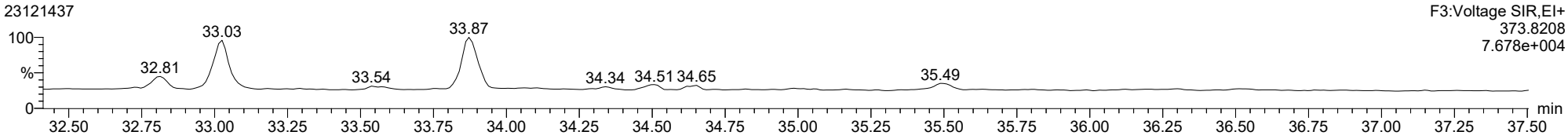


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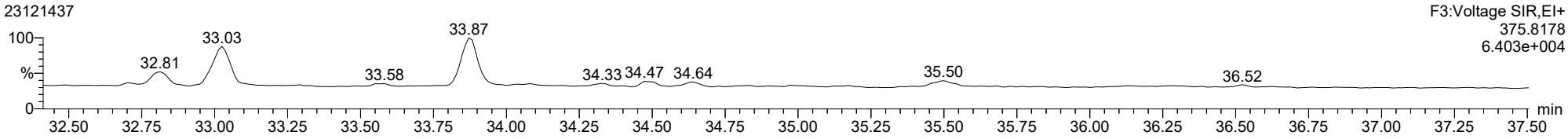


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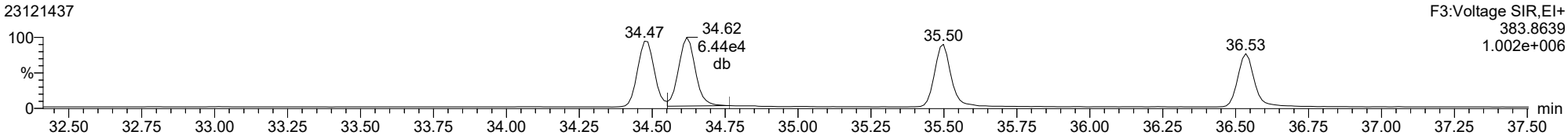
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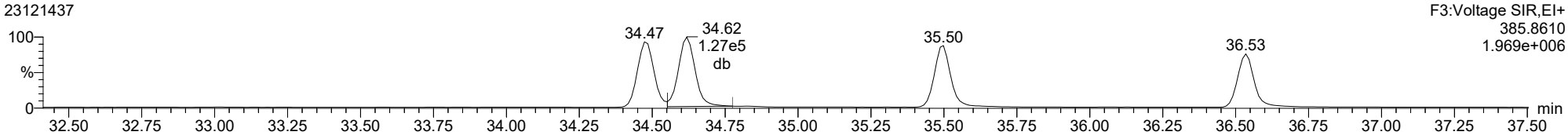
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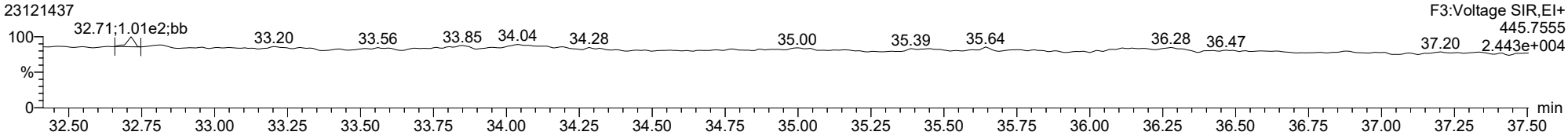
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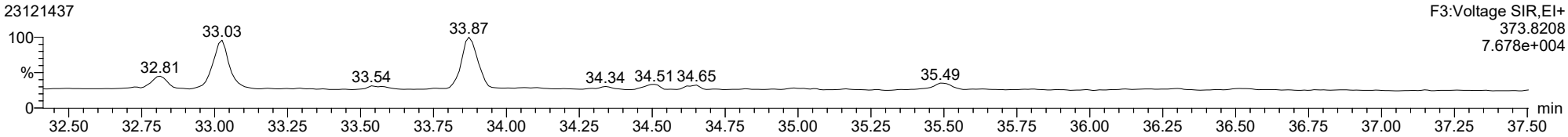


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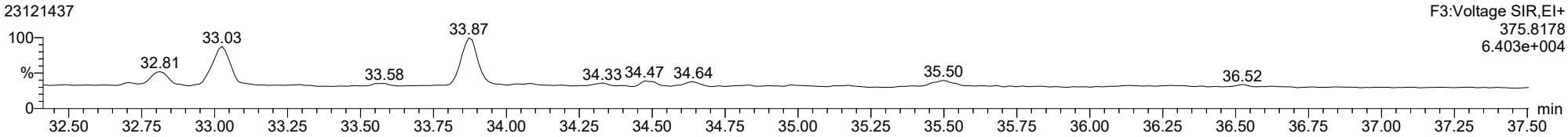


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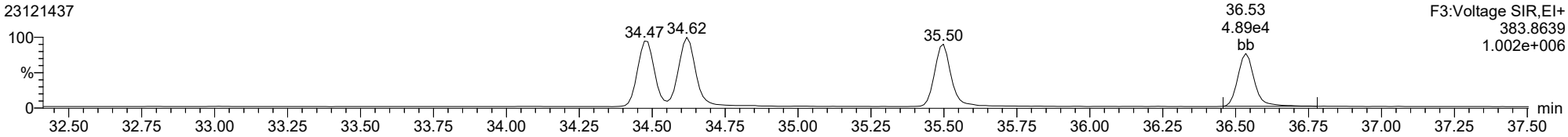
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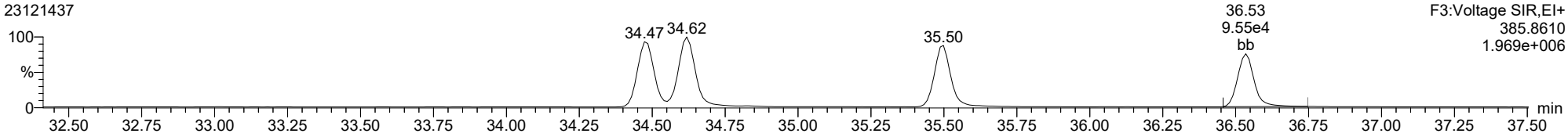
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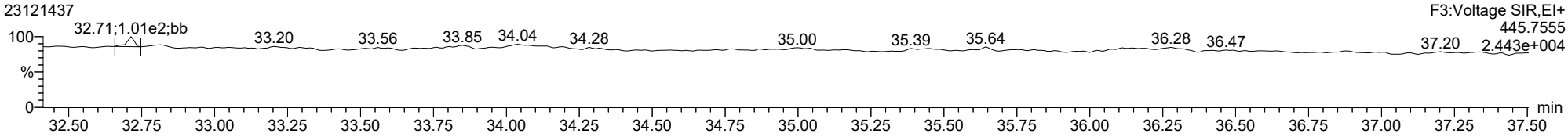
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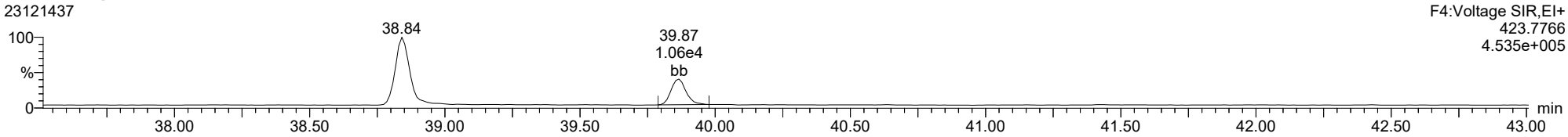


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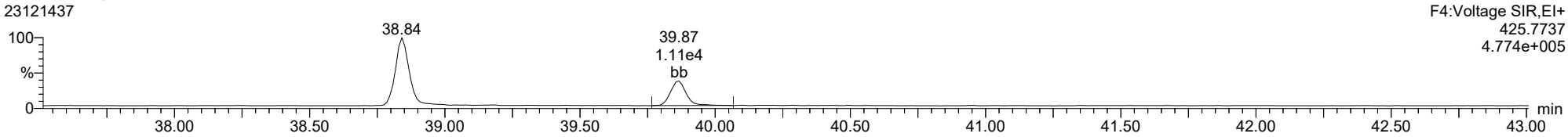


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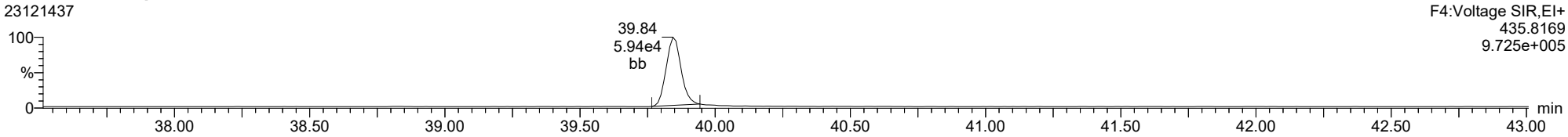
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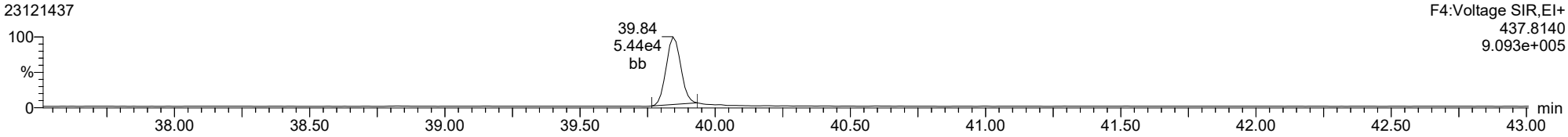
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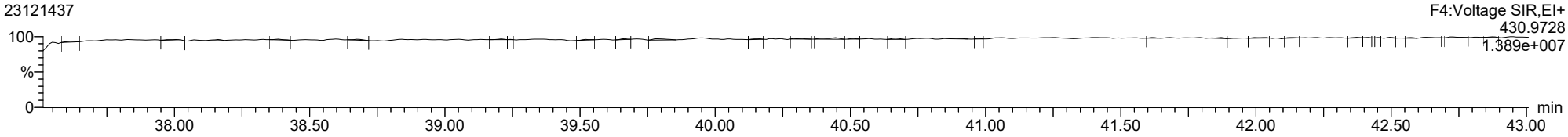
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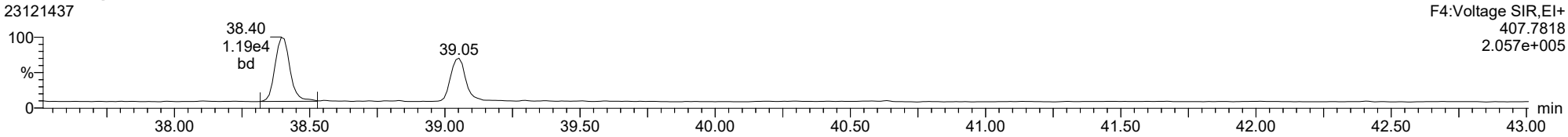


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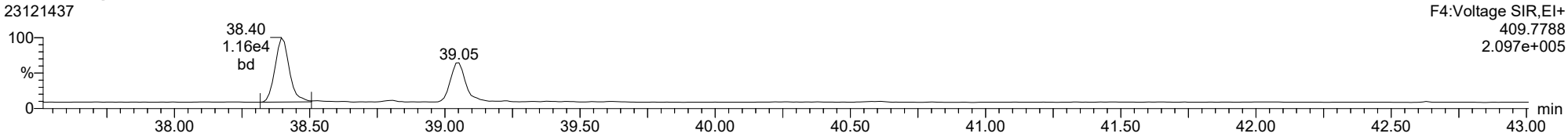


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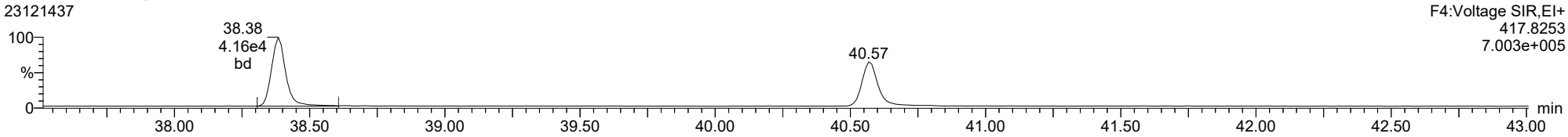
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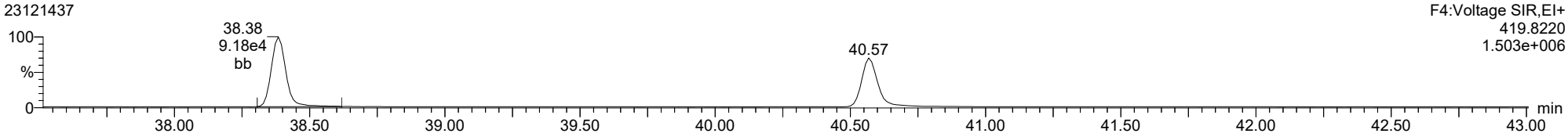
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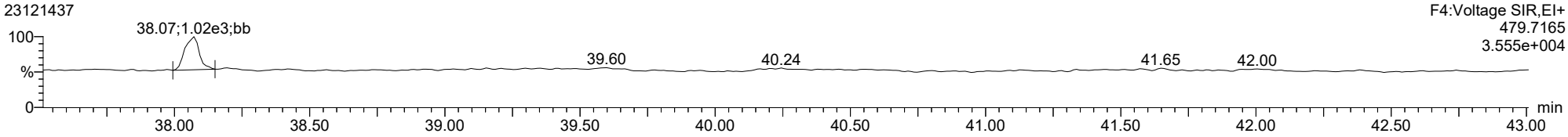
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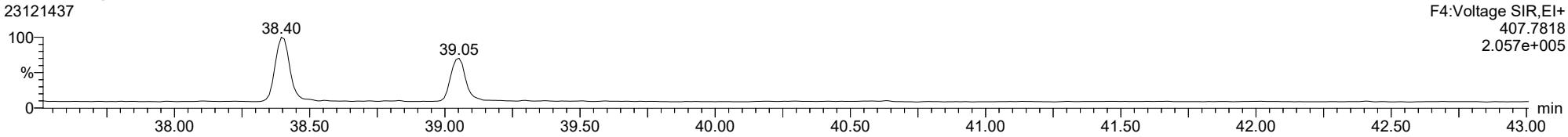


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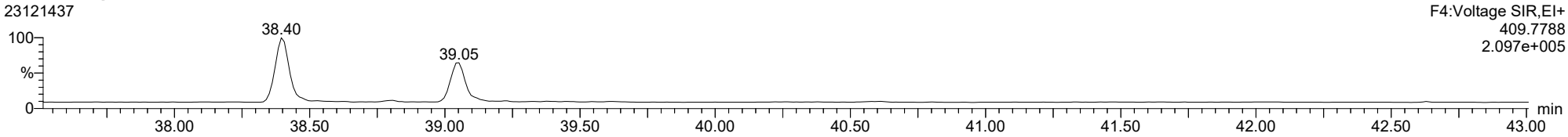


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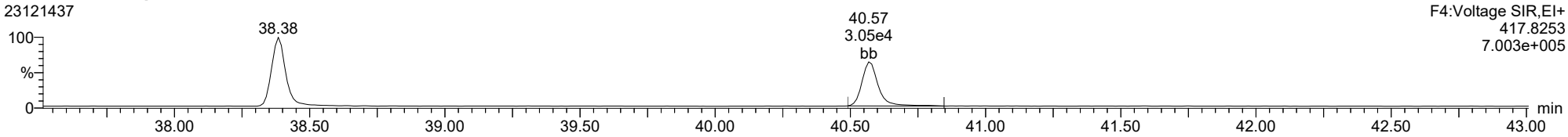
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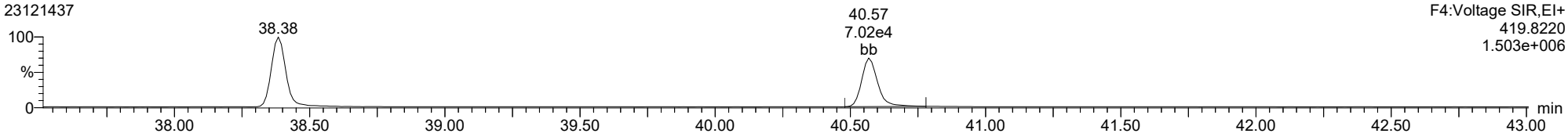
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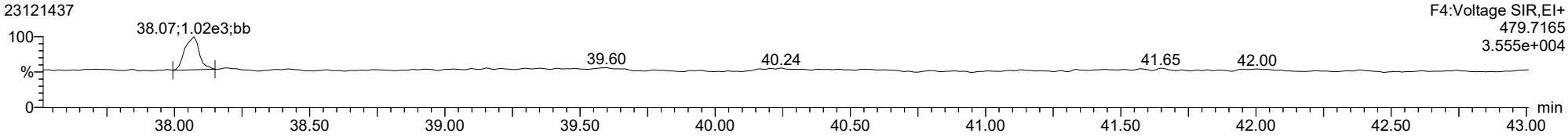
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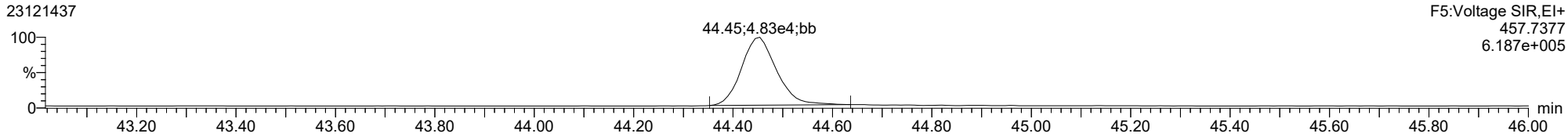


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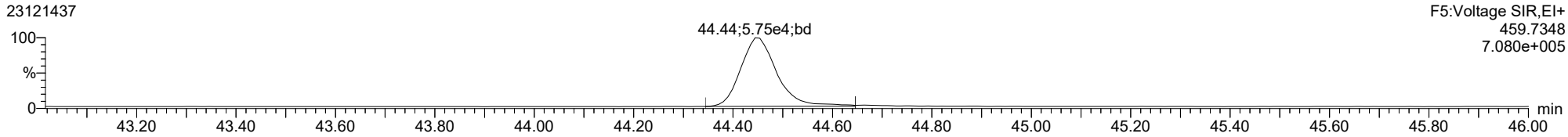


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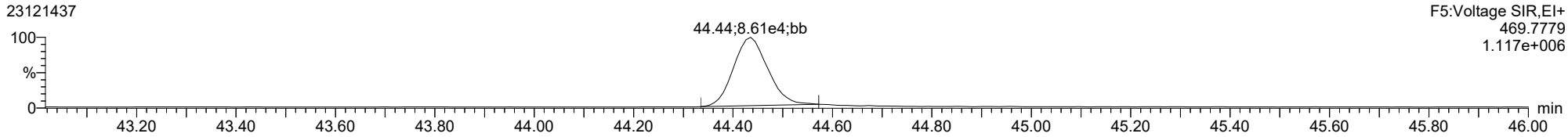
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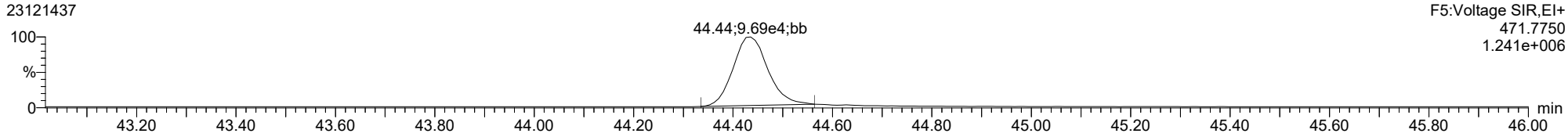
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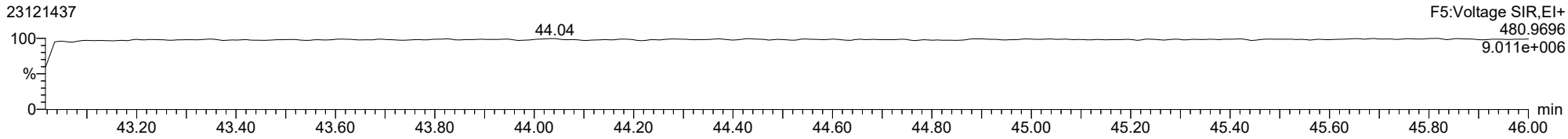
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13C-OCDD



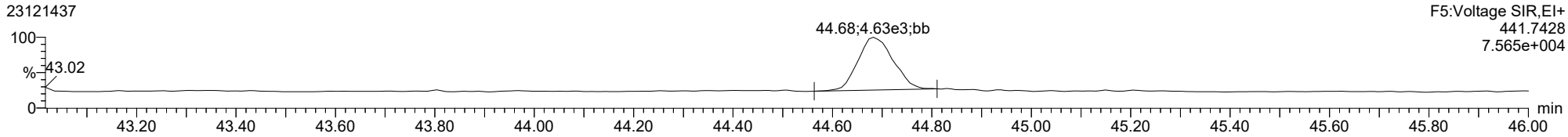
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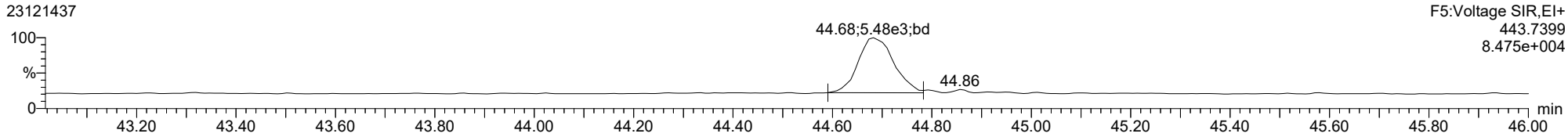
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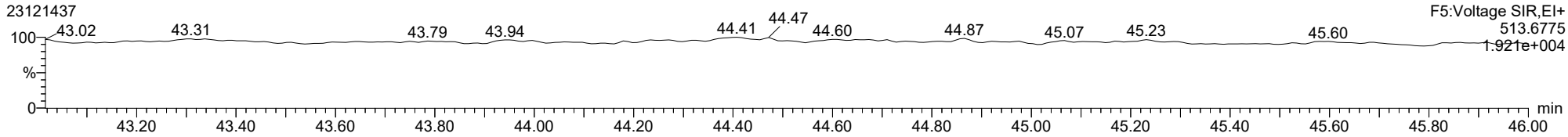
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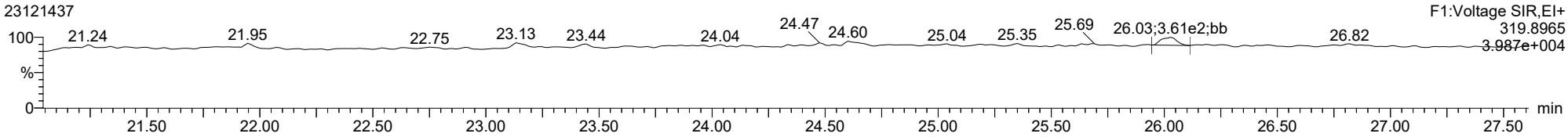


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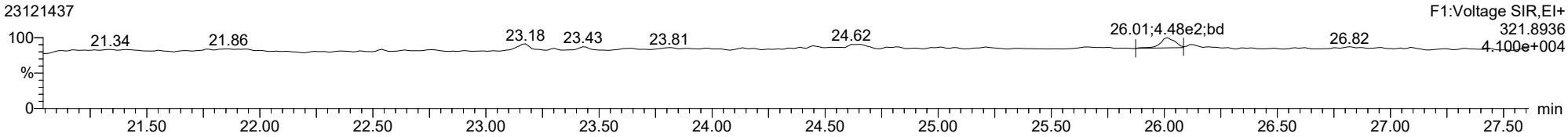


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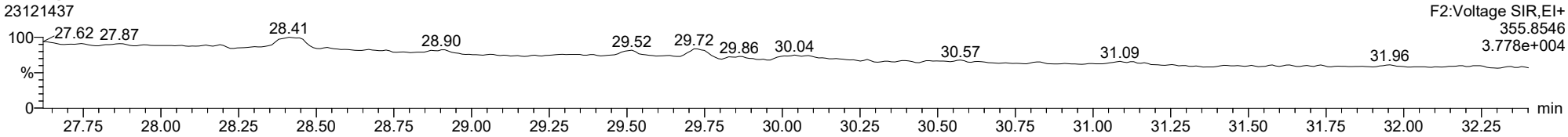
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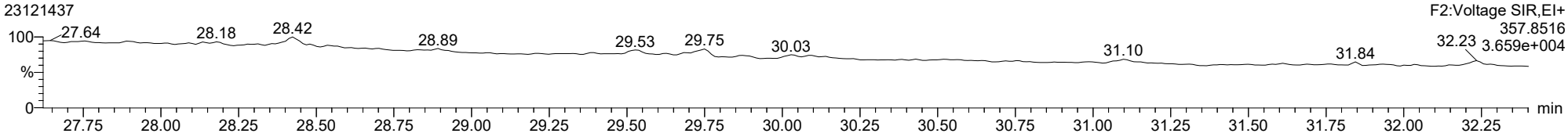
Total-tetradioxins



Total-pentadioxins

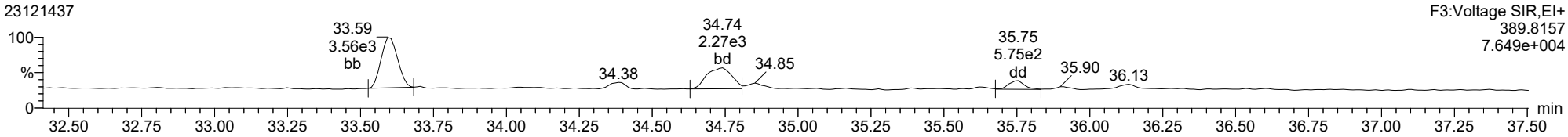


Total-pentadioxins

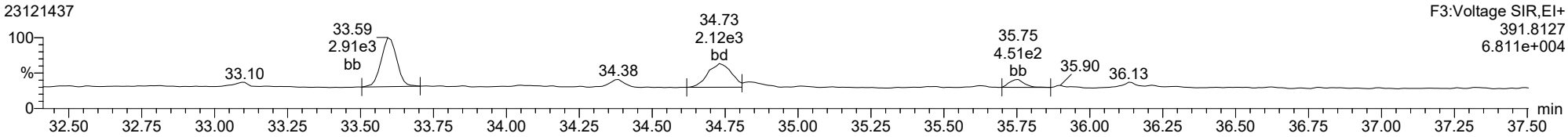


ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

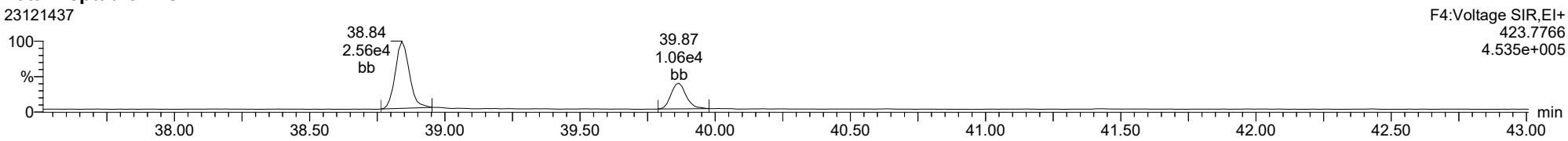
Total-hexadioxins



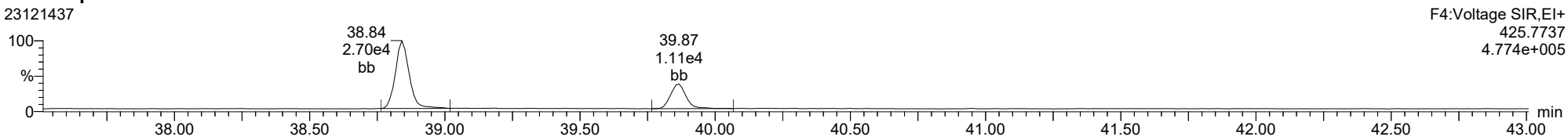
Total-hexadioxins



Total-heptadioxins



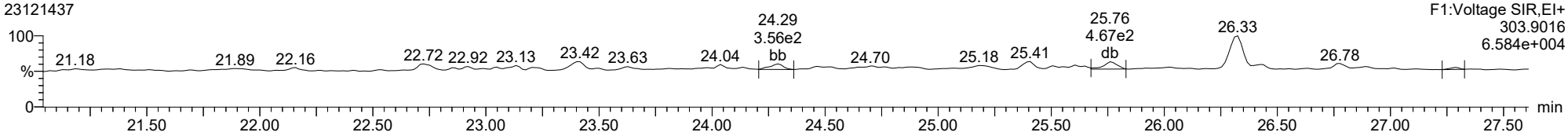
Total-heptadioxins



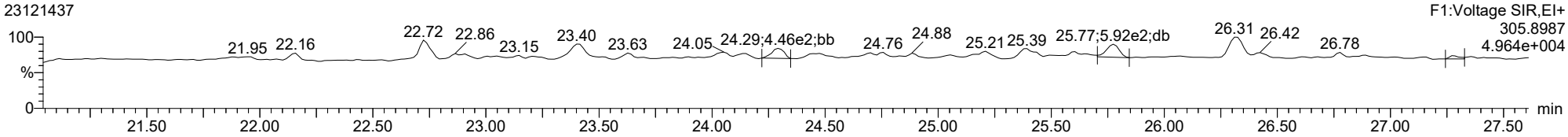
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Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:25 Pacific Standard Time

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

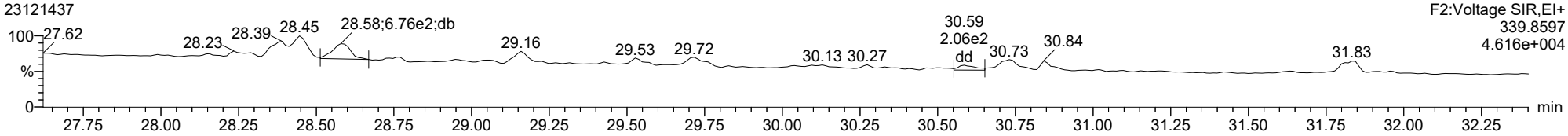
Total-tetrafurans



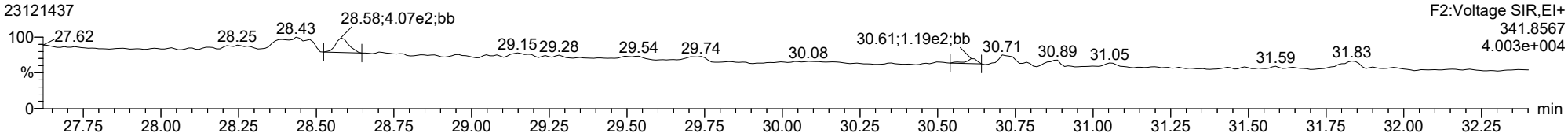
Total-tetrafurans



Total-pentafurans



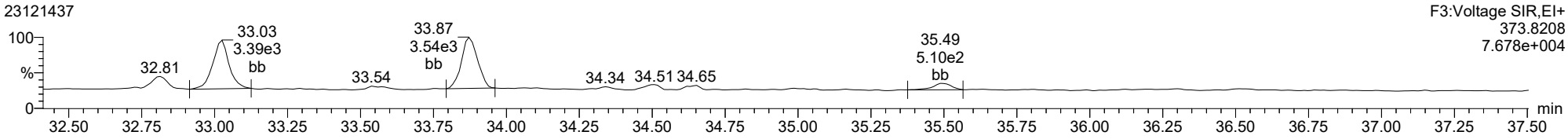
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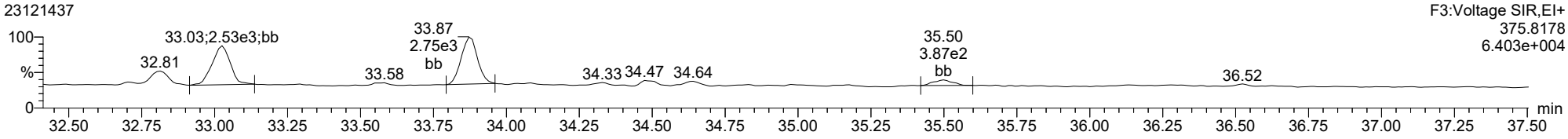
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Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:25 Pacific Standard Time

ID: 23J0690-01, Name: 23121437, Date: 15-Dec-2023, Time: 20:28:50, Conditions: AUTOSPEC01, User: pk

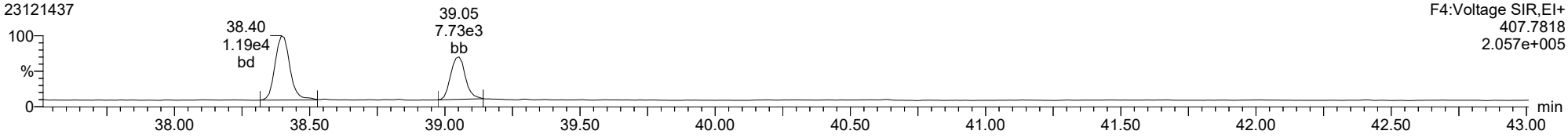
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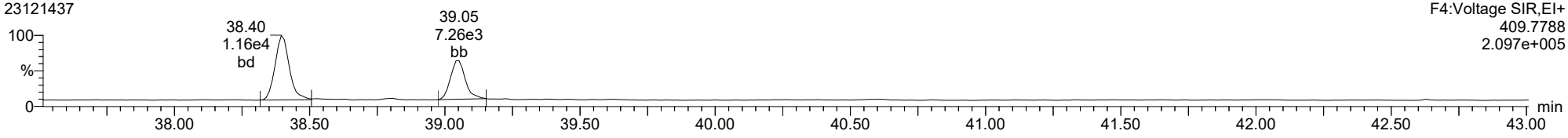
Total-hexafurans



Total-heptafurans



Total-heptafurans



SED-08C:1-3

Form 1
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-02 A	File ID:	23121438
Sampled:	03/22/23 08:07	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 21:17
% Solids:	72.43	Preparation:	EPA 1613	Initial/Final:	13.87 g Wet / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.966	0.655-0.886	0.346	0.995	0.910	ng/kg	X, EMPC, J
1746-01-6	2,3,7,8-TCDD	1		0.655-0.886	0.119	0.995	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1	1.164	1.318-1.783	0.348	0.995	0.609	ng/kg	EMPC, J
57117-31-4	2,3,4,7,8-PeCDF	1	2.427	1.318-1.783	0.349	0.995	0.936	ng/kg	EMPC, J
40321-76-4	1,2,3,7,8-PeCDD	1	0.644	1.318-1.783	0.212	0.995	0.319	ng/kg	EMPC, J
70648-26-9	1,2,3,4,7,8-HxCDF	1	1.383	1.054-1.426	0.187	0.995	0.945	ng/kg	J
57117-44-9	1,2,3,6,7,8-HxCDF	1	1.596	1.054-1.426	0.189	0.995	0.869	ng/kg	EMPC, J
60851-34-5	2,3,4,6,7,8-HxCDF	1	1.342	1.054-1.426	0.199	0.995	1.28	ng/kg	
72918-21-9	1,2,3,7,8,9-HxCDF	1	0.750	1.054-1.426	0.249	0.995	0.475	ng/kg	EMPC, J
39227-28-6	1,2,3,4,7,8-HxCDD	1	1.174	1.054-1.426	0.188	0.995	0.293	ng/kg	J
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.089	1.054-1.426	0.199	0.995	1.38	ng/kg	
19408-74-3	1,2,3,7,8,9-HxCDD	1	1.189	1.054-1.426	0.221	0.995	0.880	ng/kg	J
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	1.013	0.893-1.208	0.195	0.995	10.3	ng/kg	B
55673-89-7	1,2,3,4,7,8,9-HpCDF	1	0.961	0.893-1.208	0.323	0.995	0.655	ng/kg	J
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	1.055	0.893-1.208	0.510	2.49	57.1	ng/kg	B
39001-02-0	OCDF	1	0.973	0.757-1.024	0.449	2.49	15.7	ng/kg	B
3268-87-9	OCDD	1	0.897	0.757-1.024	1.01	9.95	415	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.995	5.35	ng/kg	
41903-57-5	Total TCDD	1	0.000			0.995	1.00	ng/kg	
30402-15-4	Total PeCDF	1	0.000			0.995	4.02	ng/kg	
36088-22-9	Total PeCDD	1	0.000			0.995	ND	ng/kg	
55684-94-1	Total HxCDF	1	0.000			0.995	12.6	ng/kg	
34465-46-8	Total HxCDD	1	0.000			0.995	22.0	ng/kg	
38998-75-3	Total HpCDF	1	0.000			0.995	25.7	ng/kg	
37871-00-4	Total HpCDD	1	0.000			0.995	225	ng/kg	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 2.13
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 2.19

SED-08C:1-3

Form 2

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Sediment	Laboratory ID:	23J0690-02	File ID:	23121438
Sampled:	03/22/23 08:07	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 21:17
Solids Wt%:	72.43	Preparation:	EPA 1613	Initial/Final:	13.87 g / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.754	0.655-0.886	0.112	55.7	24 - 169 %	
13C12-2,3,7,8-TCDD		0.788	0.655-0.886	0.159	70.8	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.475	1.318-1.783	0.257	60.3	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.502	1.318-1.783	0.272	59.2	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.607	1.318-1.783	0.204	74.6	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.514	0.434-0.587	0.288	61.0	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.526	0.434-0.587	0.235	53.9	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.520	0.434-0.587	0.288	57.3	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.505	0.434-0.587	0.331	57.6	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.223	1.054-1.426	0.283	74.9	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.189	1.054-1.426	0.235	64.5	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.434	0.374-0.506	0.245	50.5	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.415	0.374-0.506	0.319	48.5	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.053	0.893-1.208	0.299	67.1	23 - 140 %	
13C12-OCDD		0.885	0.757-1.024	0.340	53.3	17 - 157 %	
37Cl4-2,3,7,8-TCDD		328.000		0.063	82.9	35 - 197 %	

* Values outside of QC limits

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:38 Pacific Standard Time

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
2378-TCDF	25.393	1.002	6.028e2	6.243e2	0.903	0.966	0.770	1395	906	7.24e3	8.67e3	5.2	9.6	YES	dd	bd	0.457
12378-PeCDF	29.516	1.001	3.660e2	3.144e2	0.923	1.164	1.550	955	970	7.29e3	4.92e3	7.6	5.1	YES	bb	bb	0.306
23478-PeCDF	30.875	1.001	7.385e2	3.043e2	0.991	2.427	1.550	955	970	9.30e3	5.26e3	9.7	5.4	YES	db	bd	0.470
123478-HxCDF	34.485	1.001	5.808e2	4.198e2	1.128	1.383	1.240	465	519	9.88e3	6.11e3	21.2	11.8	NO	dd	bd	0.475
234678-HxCDF	35.510	1.001	7.005e2	5.221e2	1.081	1.342	1.240	465	519	9.63e3	6.13e3	20.7	11.8	NO	bb	bb	0.642
123678-HxCDF	34.618	1.000	5.623e2	3.523e2	1.032	1.596	1.240	465	519	8.12e3	5.72e3	17.5	11.0	YES	db	db	0.437
123789-HxCDF	36.513	1.000	1.555e2	2.074e2	0.988	0.750	1.240	465	519	2.84e3	3.28e3	6.1	6.3	YES	bb	bb	0.239
1234678-HpCDF	38.384	1.000	4.224e3	4.172e3	1.164	1.013	1.050	423	458	7.32e4	6.68e4	173.1	145.9	NO	bd	bb	5.161
1234789-HpCDF	40.590	1.001	1.834e2	1.908e2	1.104	0.961	1.050	423	458	2.12e3	4.04e3	5.0	8.8	NO	MM	MM	0.329
OCDF	44.674	1.006	4.188e3	4.303e3	1.130	0.973	0.890	452	562	4.94e4	5.25e4	109.2	93.4	NO	bd	bb	7.902
2378-TCDD					1.243		0.770	442	448								
12378-PeCDD	31.076	1.000	1.177e2	1.828e2	1.150	0.644	1.550	464	586	2.74e3	3.34e3	5.9	5.7	YES	bd	bb	0.160
123478-HxCDD	35.621	1.000	1.537e2	1.309e2	0.960	1.174	1.240	536	439	3.68e3	2.41e3	6.9	5.5	NO	bd	bd	0.147
123678-HxCDD	35.744	1.001	6.717e2	6.167e2	0.883	1.089	1.240	536	439	1.17e4	1.02e4	21.8	23.2	NO	db	dd	0.695
123789-HxCDD	36.123	1.011	3.974e2	3.343e2	0.804	1.189	1.240	536	439	6.39e3	5.60e3	11.9	12.7	NO	bb	bb	0.442
1234678-HpCDD	39.855	1.001	2.096e4	1.987e4	1.200	1.055	1.050	1009	906	3.13e5	2.96e5	309.7	327.0	NO	bb	bb	28.696
OCDD	44.445	1.000	9.917e4	1.105e5	1.059	0.897	0.890	1015	1116	1.17e6	1.31e6	1155.1	1170.1	NO	bd	bd	208.316
13C-2378-TCDF	25.351	1.007	1.277e5	1.694e5	1.835	0.754	0.770	881	757	1.89e6	2.51e6	2142.1	3316.4	NO	bb	bb	55.738
13C-12378-PeCDF	29.493	1.171	1.437e5	9.739e4	1.377	1.475	1.550	1618	1204	2.13e6	1.45e6	1318.1	1206.5	NO	bd	bd	60.293
13C-23478-PeCDF	30.830	1.224	1.344e5	8.946e4	1.301	1.502	1.550	1618	1204	2.00e6	1.30e6	1235.2	1082.8	NO	bb	bb	59.217
13C-123478-HxCDF	34.463	0.954	6.342e4	1.235e5	1.091	0.514	0.510	1176	1241	9.47e5	1.88e6	805.2	1513.6	NO	bd	bd	61.029
13C-123678-HxCDF	34.607	0.958	6.997e4	1.329e5	1.340	0.526	0.510	1176	1241	1.04e6	1.98e6	883.0	1596.3	NO	db	db	53.913
13C-234678-HxCDF	35.487	0.983	6.024e4	1.158e5	1.093	0.520	0.510	1176	1241	9.36e5	1.80e6	795.5	1450.6	NO	bb	bb	57.341
13C-123789-HxCDF	36.523	1.011	5.170e4	1.023e5	0.952	0.505	0.510	1176	1241	8.03e5	1.56e6	682.9	1254.8	NO	bd	bd	57.627
13C-1234678-HpCDF	38.373	1.063	4.232e4	9.748e4	0.985	0.434	0.440	795	1059	7.02e5	1.58e6	882.8	1491.0	NO	bd	bd	50.548
13C-1234789-HpCDF	40.557	1.123	3.023e4	7.277e4	0.756	0.415	0.440	795	1059	4.33e5	9.94e5	544.4	938.9	NO	bb	bb	48.529
13C-1234-TCDD	25.181	0.000	1.287e5	1.618e5	1.000	0.795	0.770	922	485	2.11e6	2.63e6	2286.4	5424.7	NO	bb	bb	100.000
13C-2378-TCDD	25.986	1.032	1.006e5	1.276e5	1.110	0.788	0.770	922	485	1.58e6	2.01e6	1715.1	4144.5	NO	bb	bb	70.776
13C-12378-PeCDD	31.087	1.235	1.007e5	6.266e4	0.754	1.607	1.550	634	591	1.58e6	9.65e5	2494.5	1634.8	NO	bb	bb	74.597
13C-123478-HxCDD	35.610	0.986	1.110e5	9.079e4	0.960	1.223	1.240	912	1179	1.78e6	1.47e6	1950.9	1248.7	NO	bd	bd	74.867
13C-123678-HxCDD	35.721	0.989	1.141e5	9.598e4	1.159	1.189	1.240	912	1179	1.80e6	1.52e6	1971.2	1290.0	NO	db	db	64.533
13C-1234678-HpCDD	39.833	1.103	6.084e4	5.778e4	0.629	1.053	1.050	745	701	9.59e5	9.24e5	1288.0	1318.7	NO	bb	bb	67.128
13C-OCDD	44.426	1.230	8.929e4	1.009e5	0.635	0.885	0.890	738	924	1.12e6	1.27e6	1517.9	1369.5	NO	bb	bb	106.625
13C-123789-HxCDD	36.111	0.000	1.542e5	1.266e5	1.000	1.217	1.240	912	1179	2.52e6	2.02e6	2761.9	1717.4	NO	bb	bb	100.000
37CL-2378-TCDD	26.000	1.033	1.115e5		1.157			582		1.65e6		2839.9			bb		33.166

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
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ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
1368-TCDF	21.862	0.862	2.057e2	1.808e2	1.170	1.137	0.770	1395	906	3.32e3	4.65e3	2.4	5.1	YES	bb	bd	0.111
1289-TCDF					0.847		0.770	1395	906								
13468-PECDF	26.791	0.908	1.726e3	1.166e3	1.241	1.481	1.550	415	416	2.65e4	1.84e4	63.9	44.2	NO	db	db	0.967
12389-PECDF					0.880		1.550	955	970								
123468-HXCDF	32.791	0.952	9.176e2	6.246e2	1.206	1.469	1.240	465	519	1.48e4	9.95e3	31.8	19.2	YES	bb	bb	0.684
1368-TCDD	23.161	0.891	3.204e2	4.659e2	1.181	0.688	0.770	442	448	4.47e3	8.40e3	10.1	18.8	NO	bb	bb	0.292
1289-TCDD					0.963		0.770	442	448								
12479-PECDD	28.402	0.914	3.789e2	3.455e2	2.166	1.097	1.550	464	586	7.71e3	4.75e3	16.6	8.1	YES	bd	bd	0.205
12389-PECDD					1.326		1.550	464	586								
124679-HXCDD	33.593	0.943	5.647e3	4.765e3	1.127	1.185	1.240	536	439	8.21e4	7.32e4	153.1	166.5	NO	bb	bd	4.580
1234679-HPCDD	38.830	0.975	6.540e4	6.514e4	1.303	1.004	1.050	1009	906	1.07e6	1.05e6	1062.2	1164.0	NO	bb	bb	84.483
Total-tetrafurans			3.541e3		0.973			1395		5.13e4							2.685
Total-penta1			2.014e3					415		3.21e4							1.171
Total-pentafurans			1.117e3		0.931			955		1.76e4							0.850
Total-hexafurans			6.979e3		1.087			465		9.64e4							6.353
Total-heptafurans			9.622e3		1.134			423		1.56e5							12.909
Total-Furans			2.746e4		1.053			1395		4.03e5							31.869
Total-tetradioxins			5.700e2		1.129			442		7.43e3							0.502
Total-pentadioxins			0.000e0		1.548			464		0.00e0							
Total-hexadioxins			1.238e4		0.943			536		1.73e5							11.040
Total-heptadioxins			8.637e4		1.251			1009		1.38e6							113.180
Total-Dioxins			1.985e5		1.182			442		2.74e6							333.037
Total-TEQ			2.259e5					442		3.14e6							364.906
FUNCTION1 PFK			3.507e5					237596		7.67e6							
FUNCTION2 PFK			8.645e4					107487		2.71e6							0.000
FUNCTION3 PFK			5.254e5					148562		8.21e6							0.000
FUNCTION4 PFK			2.026e6					154934		2.15e7							
FUNCTION5 PFK			1.410e6					122159		1.88e7							
FUNCTION1 HXCD...			8.182e2					402		1.33e4							0.000
FUNCTION1 HPCD...																	
FUNCTION2 HPCD...			2.836e2					481		3.73e3							0.000
FUNCTION3 OCDPE			1.660e2					295		3.34e3							0.000
FUNCTION4 NCDPE			3.953e2					384		5.82e3							0.000
FUNCTION5 DCDPE			0.000e0					290		0.00e0							

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
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TF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	23.61	3.820e2	4.624e2	0.973	0.83	0.77	3.6	YES	NO	db	db	0.292
2	Total-tetrafurans	22.14	4.440e2	5.172e2	0.973	0.86	0.77	5.0	YES	NO	bb	bb	0.332
3	Total-tetrafurans	24.87	4.389e2	5.340e2	0.973	0.82	0.77	4.3	YES	NO	bd	bb	0.336
4	Total-tetrafurans	24.67	4.311e2	5.358e2	0.973	0.80	0.77	3.1	YES	NO	db	bb	0.334
5	Total-tetrafurans	24.28	6.652e2	7.627e2	0.973	0.87	0.77	7.3	YES	NO	dd	bb	0.494
6	Total-tetrafurans	24.12	3.629e2	4.535e2	0.973	0.80	0.77	5.0	YES	NO	dd	db	0.282
7	Total-tetrafurans	24.05	8.173e2	9.600e2	0.973	0.85	0.77	8.5	YES	NO	dd	dd	0.614

PP

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	13468-PECDF	26.79	1.726e3	1.166e3	1.241	1.48	1.55	63.9	YES	NO	db	db	0.967
2	Total-penta1	26.72	2.876e2	1.637e2		1.76	1.55	13.6	YES	NO	bd	bd	0.204

PF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-pentafurans	28.25	6.958e2	4.742e2	0.931	1.47	1.55	12.4	YES	NO	dd	dd	0.541
2	Total-pentafurans	29.71	4.213e2	2.476e2	0.931	1.70	1.55	6.1	YES	NO	bd	bb	0.309

HF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	234678-HxCDF	35.51	7.005e2	5.221e2	1.081	1.34	1.24	20.7	YES	NO	bb	bb	0.642
2	123478-HxCDF	34.48	5.808e2	4.198e2	1.128	1.38	1.24	21.2	YES	NO	dd	bd	0.475
3	Total-hexafurans	34.32	5.445e2	4.746e2	1.087	1.15	1.24	17.2	YES	NO	bd	bb	0.521
4	Total-hexafurans	33.87	2.440e3	1.762e3	1.087	1.38	1.24	75.1	YES	NO	bb	bb	2.148
5	Total-hexafurans	33.01	2.714e3	2.310e3	1.087	1.17	1.24	72.9	YES	NO	bb	bb	2.568

HPF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234789-HpCDF	40.59	1.834e2	1.908e2	1.104	0.96	1.05	5.0	YES	NO	MM	MM	0.329
2	Total-heptafurans	39.04	5.215e3	4.995e3	1.134	1.04	1.05	191.1	YES	NO	bd	bb	7.418
3	1234678-HpCDF	38.38	4.224e3	4.172e3	1.164	1.01	1.05	173.1	YES	NO	bd	bb	5.161

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Furans,TF,PP,PF,HF,HPF,OF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	23.61	3.820e2	4.624e2	0.973	0.83	0.77	3.6	YES	NO	db	db	0.292
2	Total-tetrafurans	22.14	4.440e2	5.172e2	0.973	0.86	0.77	5.0	YES	NO	bb	bb	0.332
3	Total-tetrafurans	24.87	4.389e2	5.340e2	0.973	0.82	0.77	4.3	YES	NO	bd	bb	0.336
4	Total-tetrafurans	24.67	4.311e2	5.358e2	0.973	0.80	0.77	3.1	YES	NO	db	bb	0.334
5	Total-tetrafurans	24.28	6.652e2	7.627e2	0.973	0.87	0.77	7.3	YES	NO	dd	bb	0.494
6	Total-tetrafurans	24.12	3.629e2	4.535e2	0.973	0.80	0.77	5.0	YES	NO	dd	db	0.282
7	Total-tetrafurans	24.05	8.173e2	9.600e2	0.973	0.85	0.77	8.5	YES	NO	dd	dd	0.614
8	Total-pentafurans	28.25	6.958e2	4.742e2	0.931	1.47	1.55	12.4	YES	NO	dd	dd	0.541
9	Total-pentafurans	29.71	4.213e2	2.476e2	0.931	1.70	1.55	6.1	YES	NO	bd	bb	0.309
10	234678-HxCDF	35.51	7.005e2	5.221e2	1.081	1.34	1.24	20.7	YES	NO	bb	bb	0.642
11	123478-HxCDF	34.48	5.808e2	4.198e2	1.128	1.38	1.24	21.2	YES	NO	dd	bd	0.475
12	Total-hexafurans	34.32	5.445e2	4.746e2	1.087	1.15	1.24	17.2	YES	NO	bd	bb	0.521
13	Total-hexafurans	33.87	2.440e3	1.762e3	1.087	1.38	1.24	75.1	YES	NO	bb	bb	2.148
14	Total-hexafurans	33.01	2.714e3	2.310e3	1.087	1.17	1.24	72.9	YES	NO	bb	bb	2.568
15	1234789-HpCDF	40.59	1.834e2	1.908e2	1.104	0.96	1.05	5.0	YES	NO	MM	MM	0.329
16	Total-heptafurans	39.04	5.215e3	4.995e3	1.134	1.04	1.05	191.1	YES	NO	bd	bb	7.418
17	1234678-HpCDF	38.38	4.224e3	4.172e3	1.164	1.01	1.05	173.1	YES	NO	bd	bb	5.161
18	OCDF	44.67	4.188e3	4.303e3	1.130	0.97	0.89	109.2	YES	NO	bd	bb	7.902
19	13468-PECDF	26.79	1.726e3	1.166e3	1.241	1.48	1.55	63.9	YES	NO	db	db	0.967
20	Total-penta1	26.72	2.876e2	1.637e2		1.76	1.55	13.6	YES	NO	bd	bd	0.204

TD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetradioxins	24.64	2.497e2	2.918e2	1.129	0.86	0.77	6.7	YES	NO	bb	bb	0.210
2	1368-TCDD	23.16	3.204e2	4.659e2	1.181	0.69	0.77	10.1	YES	NO	bb	bb	0.292

PD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

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HD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	123789-HxCDD	36.12	3.974e2	3.343e2	0.804	1.19	1.24	11.9	YES	NO	bb	bb	0.442
2	Total-hexadioxins	35.91	3.935e2	3.571e2	0.943	1.10	1.24	11.6	YES	NO	bb	db	0.386
3	123678-HxCDD	35.74	6.717e2	6.167e2	0.883	1.09	1.24	21.8	YES	NO	db	dd	0.695
4	123478-HxCDD	35.62	1.537e2	1.309e2	0.960	1.17	1.24	6.9	YES	NO	bd	bd	0.147
5	Total-hexadioxins	34.72	3.828e3	3.065e3	0.943	1.25	1.24	76.2	YES	NO	bd	bd	3.548
6	Total-hexadioxins	34.36	1.289e3	1.123e3	0.943	1.15	1.24	40.3	YES	NO	bb	bb	1.242
7	124679-HXCDD	33.59	5.647e3	4.765e3	1.127	1.18	1.24	153.1	YES	NO	bb	bd	4.580

HPD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234678-HpCDD	39.85	2.096e4	1.987e4	1.200	1.05	1.05	309.7	YES	NO	bb	bb	28.696
2	1234679-HPCDD	38.83	6.540e4	6.514e4	1.303	1.00	1.05	1062.2	YES	NO	bb	bb	84.483

Dioxins,TD,PD,HD,HPD,OD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetradioxins	24.64	2.497e2	2.918e2	1.129	0.86	0.77	6.7	YES	NO	bb	bb	0.210
2	1368-TCDD	23.16	3.204e2	4.659e2	1.181	0.69	0.77	10.1	YES	NO	bb	bb	0.292
3	123789-HxCDD	36.12	3.974e2	3.343e2	0.804	1.19	1.24	11.9	YES	NO	bb	bb	0.442
4	Total-hexadioxins	35.91	3.935e2	3.571e2	0.943	1.10	1.24	11.6	YES	NO	bb	db	0.386
5	123678-HxCDD	35.74	6.717e2	6.167e2	0.883	1.09	1.24	21.8	YES	NO	db	dd	0.695
6	123478-HxCDD	35.62	1.537e2	1.309e2	0.960	1.17	1.24	6.9	YES	NO	bd	bd	0.147
7	Total-hexadioxins	34.72	3.828e3	3.065e3	0.943	1.25	1.24	76.2	YES	NO	bd	bd	3.548
8	Total-hexadioxins	34.36	1.289e3	1.123e3	0.943	1.15	1.24	40.3	YES	NO	bb	bb	1.242
9	124679-HXCDD	33.59	5.647e3	4.765e3	1.127	1.18	1.24	153.1	YES	NO	bb	bd	4.580
10	1234678-HpCDD	39.85	2.096e4	1.987e4	1.200	1.05	1.05	309.7	YES	NO	bb	bb	28.696
11	1234679-HPCDD	38.83	6.540e4	6.514e4	1.303	1.00	1.05	1062.2	YES	NO	bb	bb	84.483
12	OCDD	44.44	9.917e4	1.105e5	1.059	0.90	0.89	1155.1	YES	NO	bd	bd	208.316

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TotalTEQ,Furans,Dioxins

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	23.61	3.820e2	4.624e2	0.973	0.83	0.77	3.6	YES	NO	db	db	0.292
2	Total-tetrafurans	22.14	4.440e2	5.172e2	0.973	0.86	0.77	5.0	YES	NO	bb	bb	0.332
3	Total-tetrafurans	24.87	4.389e2	5.340e2	0.973	0.82	0.77	4.3	YES	NO	bd	bb	0.336
4	Total-tetrafurans	24.67	4.311e2	5.358e2	0.973	0.80	0.77	3.1	YES	NO	db	bb	0.334
5	Total-tetrafurans	24.28	6.652e2	7.627e2	0.973	0.87	0.77	7.3	YES	NO	dd	bb	0.494
6	Total-tetrafurans	24.12	3.629e2	4.535e2	0.973	0.80	0.77	5.0	YES	NO	dd	db	0.282
7	Total-tetrafurans	24.05	8.173e2	9.600e2	0.973	0.85	0.77	8.5	YES	NO	dd	dd	0.614
8	Total-pentafurans	28.25	6.958e2	4.742e2	0.931	1.47	1.55	12.4	YES	NO	dd	dd	0.541
9	Total-pentafurans	29.71	4.213e2	2.476e2	0.931	1.70	1.55	6.1	YES	NO	bd	bb	0.309
10	234678-HxCDF	35.51	7.005e2	5.221e2	1.081	1.34	1.24	20.7	YES	NO	bb	bb	0.642
11	123478-HxCDF	34.48	5.808e2	4.198e2	1.128	1.38	1.24	21.2	YES	NO	dd	bd	0.475
12	Total-hexafurans	34.32	5.445e2	4.746e2	1.087	1.15	1.24	17.2	YES	NO	bd	bb	0.521
13	Total-hexafurans	33.87	2.440e3	1.762e3	1.087	1.38	1.24	75.1	YES	NO	bb	bb	2.148
14	Total-hexafurans	33.01	2.714e3	2.310e3	1.087	1.17	1.24	72.9	YES	NO	bb	bb	2.568
15	1234789-HpCDF	40.59	1.834e2	1.908e2	1.104	0.96	1.05	5.0	YES	NO	MM	MM	0.329
16	Total-heptafurans	39.04	5.215e3	4.995e3	1.134	1.04	1.05	191.1	YES	NO	bd	bb	7.418
17	1234678-HpCDF	38.38	4.224e3	4.172e3	1.164	1.01	1.05	173.1	YES	NO	bd	bb	5.161
18	OCDF	44.67	4.188e3	4.303e3	1.130	0.97	0.89	109.2	YES	NO	bd	bb	7.902
19	13468-PECDF	26.79	1.726e3	1.166e3	1.241	1.48	1.55	63.9	YES	NO	db	db	0.967
20	Total-penta1	26.72	2.876e2	1.637e2		1.76	1.55	13.6	YES	NO	bd	bd	0.204
21	Total-tetradioxins	24.64	2.497e2	2.918e2	1.129	0.86	0.77	6.7	YES	NO	bb	bb	0.210
22	1368-TCDD	23.16	3.204e2	4.659e2	1.181	0.69	0.77	10.1	YES	NO	bb	bb	0.292
23	123789-HxCDD	36.12	3.974e2	3.343e2	0.804	1.19	1.24	11.9	YES	NO	bb	bb	0.442
24	Total-hexadioxins	35.91	3.935e2	3.571e2	0.943	1.10	1.24	11.6	YES	NO	bb	db	0.386
25	123678-HxCDD	35.74	6.717e2	6.167e2	0.883	1.09	1.24	21.8	YES	NO	db	dd	0.695
26	123478-HxCDD	35.62	1.537e2	1.309e2	0.960	1.17	1.24	6.9	YES	NO	bd	bd	0.147
27	Total-hexadioxins	34.72	3.828e3	3.065e3	0.943	1.25	1.24	76.2	YES	NO	bd	bd	3.548
28	Total-hexadioxins	34.36	1.289e3	1.123e3	0.943	1.15	1.24	40.3	YES	NO	bb	bb	1.242
29	124679-HXCDD	33.59	5.647e3	4.765e3	1.127	1.18	1.24	153.1	YES	NO	bb	bd	4.580
30	1234678-HpCDD	39.85	2.096e4	1.987e4	1.200	1.05	1.05	309.7	YES	NO	bb	bb	28.696
31	1234679-HPCDD	38.83	6.540e4	6.514e4	1.303	1.00	1.05	1062.2	YES	NO	bb	bb	84.483
32	OCDD	44.44	9.917e4	1.105e5	1.059	0.90	0.89	1155.1	YES	NO	bd	bd	208.316

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Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:38 Pacific Standard Time

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PFK1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 PFK	21.64	1.323e4					1.5	NO		bb		
2	FUNCTION1 PFK	21.16	2.169e4					1.7	NO		bb		
3	FUNCTION1 PFK	26.52	6.246e3					0.8	NO		bd		
4	FUNCTION1 PFK	24.56	1.019e4					1.4	NO		bb		
5	FUNCTION1 PFK	24.36	8.440e3					0.8	NO		bb		
6	FUNCTION1 PFK	23.71	2.931e4					1.7	NO		bb		
7	FUNCTION1 PFK	23.61	1.735e4					1.5	NO		bb		
8	FUNCTION1 PFK	23.47	1.299e4					1.2	NO		bb		
9	FUNCTION1 PFK	22.89	5.247e3					1.0	NO		bb		
10	FUNCTION1 PFK	22.84	3.793e3					0.7	NO		bb		
11	FUNCTION1 PFK	22.69	1.419e3					0.4	NO		bb		
12	FUNCTION1 PFK	22.60	8.382e3					1.4	NO		db		
13	FUNCTION1 PFK	22.54	2.451e4					1.8	NO		bd		
14	FUNCTION1 PFK	22.38	2.869e4					1.9	NO		db		
15	FUNCTION1 PFK	22.34	2.858e4					2.2	NO		dd		
16	FUNCTION1 PFK	22.26	2.569e4					2.1	NO		bd		
17	FUNCTION1 PFK	22.16	2.346e4					1.8	NO		bb		
18	FUNCTION1 PFK	21.90	7.049e3					1.1	NO		bb		
19	FUNCTION1 PFK	27.53	1.151e4					1.4	NO		bb		
20	FUNCTION1 PFK	27.27	2.174e4					1.7	NO		db		
21	FUNCTION1 PFK	27.16	1.882e4					1.6	NO		bd		
22	FUNCTION1 PFK	27.02	1.676e4					1.0	NO		bb		
23	FUNCTION1 PFK	26.62	2.001e3					0.6	NO		bb		
24	FUNCTION1 PFK	26.57	3.556e3					0.9	NO		db		

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Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:38 Pacific Standard Time

ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 PFK	29.96	2.469e3					1.0	NO		bb		0.000
2	FUNCTION2 PFK	29.60	1.255e3					0.8	NO		bb		0.000
3	FUNCTION2 PFK	29.56	1.218e3					0.7	NO		bb		0.000
4	FUNCTION2 PFK	28.76	7.880e2					0.7	NO		bb		0.000
5	FUNCTION2 PFK	28.25	6.838e3					2.0	NO		bb		0.000
6	FUNCTION2 PFK	28.18	1.174e4					1.6	NO		bb		0.000
7	FUNCTION2 PFK	27.84	3.885e3					1.3	NO		bb		0.000
8	FUNCTION2 PFK	27.78	2.864e3					1.3	NO		bb		0.000
9	FUNCTION2 PFK	27.71	6.430e3					1.6	NO		bb		0.000
10	FUNCTION2 PFK	32.23	5.793e2					0.5	NO		bb		0.000
11	FUNCTION2 PFK	32.07	1.024e4					2.5	NO		bb		0.000
12	FUNCTION2 PFK	31.67	1.847e3					0.8	NO		bb		0.000
13	FUNCTION2 PFK	31.59	5.844e3					1.4	NO		bb		0.000
14	FUNCTION2 PFK	31.45	1.287e3					0.7	NO		bb		0.000
15	FUNCTION2 PFK	31.41	4.570e3					1.7	NO		bb		0.000
16	FUNCTION2 PFK	30.95	4.606e3					1.5	NO		db		0.000
17	FUNCTION2 PFK	30.91	5.203e3					1.9	NO		dd		0.000
18	FUNCTION2 PFK	30.88	4.109e3					1.5	NO		bd		0.000
19	FUNCTION2 PFK	30.25	6.466e3					1.0	NO		bb		0.000
20	FUNCTION2 PFK	30.16	4.204e3					1.1	NO		bb		0.000

ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

PFK3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 PFK	32.78	2.673e3					0.9	NO		bb		0.000
2	FUNCTION3 PFK	32.72	8.973e2					0.5	NO		bb		0.000
3	FUNCTION3 PFK	32.57	1.668e3					0.8	NO		bb		0.000
4	FUNCTION3 PFK	32.49	9.916e2					0.6	NO		bb		0.000
5	FUNCTION3 PFK	35.03	1.103e4					2.1	NO		bb		0.000
6	FUNCTION3 PFK	34.95	3.830e3					1.0	NO		db		0.000
7	FUNCTION3 PFK	34.86	6.193e4					3.3	YES		dd		0.000
8	FUNCTION3 PFK	34.74	3.345e4					3.7	YES		bd		0.000
9	FUNCTION3 PFK	34.55	7.261e4					4.2	YES		db		0.000
10	FUNCTION3 PFK	34.44	5.104e4					3.3	YES		dd		0.000
11	FUNCTION3 PFK	34.33	1.571e4					2.3	NO		bd		0.000
12	FUNCTION3 PFK	34.13	1.574e4					2.1	NO		db		0.000
13	FUNCTION3 PFK	34.03	2.987e4					2.9	NO		dd		0.000
14	FUNCTION3 PFK	33.98	9.543e3					1.4	NO		dd		0.000
15	FUNCTION3 PFK	33.91	6.453e3					1.5	NO		bd		0.000
16	FUNCTION3 PFK	33.63	1.444e4					2.3	NO		bb		0.000
17	FUNCTION3 PFK	33.30	7.740e2					0.5	NO		bb		0.000
18	FUNCTION3 PFK	33.26	1.545e3					0.7	NO		bb		0.000
19	FUNCTION3 PFK	32.91	1.580e4					1.7	NO		db		0.000
20	FUNCTION3 PFK	32.82	6.430e3					1.4	NO		bd		0.000
21	FUNCTION3 PFK	37.46	2.225e3					0.7	NO		bb		0.000
22	FUNCTION3 PFK	36.89	9.504e4					3.9	YES		bb		0.000
23	FUNCTION3 PFK	36.36	3.536e3					0.7	NO		bb		0.000
24	FUNCTION3 PFK	36.02	4.972e3					0.5	NO		bb		0.000
25	FUNCTION3 PFK	35.88	1.963e3					0.7	NO		bb		0.000
26	FUNCTION3 PFK	35.77	5.752e3					0.9	NO		bb		0.000
27	FUNCTION3 PFK	35.72	5.555e3					1.7	NO		bb		0.000
28	FUNCTION3 PFK	35.59	4.268e3					0.4	NO		bb		0.000
29	FUNCTION3 PFK	35.49	7.738e3					2.2	NO		db		0.000
30	FUNCTION3 PFK	35.44	2.726e4					3.9	YES		dd		0.000
31	FUNCTION3 PFK	35.39	6.264e3					1.5	NO		bd		0.000
32	FUNCTION3 PFK	35.13	4.395e3					1.0	NO		bb		0.000

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PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 PFK	37.76	2.554e5					18.5	YES		dd		
2	FUNCTION4 PFK	37.66	2.069e5					20.7	YES		dd		
3	FUNCTION4 PFK	37.62	3.987e5					23.1	YES		bd		
4	FUNCTION4 PFK	39.64	2.041e3					0.7	NO		db		
5	FUNCTION4 PFK	39.60	1.492e4					1.5	NO		dd		
6	FUNCTION4 PFK	39.50	3.614e3					0.8	NO		bd		
7	FUNCTION4 PFK	39.40	2.233e4					2.6	NO		db		
8	FUNCTION4 PFK	39.36	9.570e3					2.1	NO		dd		
9	FUNCTION4 PFK	39.32	1.624e4					2.4	NO		dd		
10	FUNCTION4 PFK	39.28	7.326e3					1.6	NO		dd		
11	FUNCTION4 PFK	39.18	2.043e4					2.1	NO		dd		
12	FUNCTION4 PFK	39.11	9.551e3					1.5	NO		dd		
13	FUNCTION4 PFK	39.04	2.032e4					2.3	NO		dd		
14	FUNCTION4 PFK	38.93	1.380e4					1.8	NO		bd		
15	FUNCTION4 PFK	38.65	7.329e3					1.1	NO		bb		
16	FUNCTION4 PFK	38.55	1.546e3					0.5	NO		bb		
17	FUNCTION4 PFK	38.44	9.442e3					1.5	NO		bb		
18	FUNCTION4 PFK	38.25	9.455e3					2.2	NO		db		
19	FUNCTION4 PFK	38.07	7.121e5					9.2	YES		dd		
20	FUNCTION4 PFK	41.49	4.503e3					1.6	NO		bb		
21	FUNCTION4 PFK	41.40	1.365e4					2.0	NO		bb		
22	FUNCTION4 PFK	41.23	4.927e3					1.0	NO		db		
23	FUNCTION4 PFK	41.18	2.060e4					2.3	NO		bd		
24	FUNCTION4 PFK	41.04	5.995e3					0.7	NO		bb		
25	FUNCTION4 PFK	40.98	4.548e2					0.3	NO		bb		
26	FUNCTION4 PFK	40.82	5.680e3					1.6	NO		bb		
27	FUNCTION4 PFK	40.76	8.290e3					1.5	NO		db		
28	FUNCTION4 PFK	40.70	5.447e3					1.1	NO		bd		
29	FUNCTION4 PFK	40.65	2.747e3					0.8	NO		bb		
30	FUNCTION4 PFK	40.60	4.260e3					1.1	NO		bb		
31	FUNCTION4 PFK	40.47	4.563e3					1.4	NO		db		
32	FUNCTION4 PFK	40.41	5.560e3					1.2	NO		bd		
33	FUNCTION4 PFK	40.36	2.105e3					0.8	NO		bb		
34	FUNCTION4 PFK	40.06	4.092e3					0.9	NO		bb		
35	FUNCTION4 PFK	39.71	5.729e3					0.9	NO		bb		
36	FUNCTION4 PFK	42.82	4.833e3					0.6	NO		bb		
37	FUNCTION4 PFK	42.73	1.101e4					2.0	NO		db		

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PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
38	FUNCTION4 PFK	42.67	1.796e4					2.2	NO		dd		
39	FUNCTION4 PFK	42.60	2.068e4					2.2	NO		dd		
40	FUNCTION4 PFK	42.55	6.788e3					1.5	NO		dd		
41	FUNCTION4 PFK	42.46	3.905e4					2.9	NO		bd		
42	FUNCTION4 PFK	42.33	2.348e4					2.2	NO		db		
43	FUNCTION4 PFK	42.26	7.429e3					1.4	NO		dd		
44	FUNCTION4 PFK	42.21	1.637e4					2.0	NO		bd		
45	FUNCTION4 PFK	42.12	1.011e4					1.5	NO		db		
46	FUNCTION4 PFK	42.03	3.712e3					1.0	NO		bd		
47	FUNCTION4 PFK	41.82	5.343e3					1.0	NO		bb		
48	FUNCTION4 PFK	41.74	1.039e4					1.1	NO		bb		
49	FUNCTION4 PFK	41.65	1.677e3					1.0	NO		bb		
50	FUNCTION4 PFK	41.58	7.759e3					0.9	NO		bb		

PFK5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION5 PFK	45.52	2.581e3					1.0	NO		bb		
2	FUNCTION5 PFK	45.34	2.725e3					1.1	NO		bb		
3	FUNCTION5 PFK	45.12	2.789e3					1.2	NO		bb		
4	FUNCTION5 PFK	44.66	6.006e3					1.4	NO		bb		
5	FUNCTION5 PFK	44.49	8.696e2					0.5	NO		bb		
6	FUNCTION5 PFK	44.38	5.771e3					1.6	NO		bb		
7	FUNCTION5 PFK	44.31	5.094e3					1.3	NO		db		
8	FUNCTION5 PFK	44.26	6.488e3					1.7	NO		bd		
9	FUNCTION5 PFK	43.87	3.340e3					1.0	NO		bb		
10	FUNCTION5 PFK	43.81	2.782e3					1.0	NO		bb		
11	FUNCTION5 PFK	43.44	2.617e5					14.1	YES		db		
12	FUNCTION5 PFK	43.27	3.653e5					21.7	YES		dd		
13	FUNCTION5 PFK	43.24	1.833e5					23.5	YES		dd		
14	FUNCTION5 PFK	43.16	1.136e5					26.5	YES		dd		
15	FUNCTION5 PFK	43.15	1.820e5					26.2	YES		dd		
16	FUNCTION5 PFK	43.09	2.640e5					28.8	YES		bd		
17	FUNCTION5 PFK	45.88	5.223e2					0.5	NO		bb		
18	FUNCTION5 PFK	45.82	5.676e2					0.5	NO		bb		

ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

ETHERS1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 HXCD...	25.75	1.228e2					6.9	YES		bb		0.000
2	FUNCTION1 HXCD...	25.53	1.349e2					5.8	YES		db		0.000
3	FUNCTION1 HXCD...	25.38	1.406e2					7.9	YES		bd		0.000
4	FUNCTION1 HXCD...	24.63	7.472e1					2.6	NO		bb		0.000
5	FUNCTION1 HXCD...	23.92	7.922e1					2.5	NO		bb		0.000
6	FUNCTION1 HXCD...	23.39	2.658e2					7.3	YES		bb		0.000

ETHERS2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 HPCD...	32.28	7.323e1					2.0	NO		bb		0.000
2	FUNCTION2 HPCD...	28.56	2.104e2					5.7	YES		bb		0.000

ETHERS4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 OCDPE	33.84	9.502e1					6.5	YES		bb		0.000
2	FUNCTION3 OCDPE	32.69	7.101e1					4.8	YES		bb		0.000

ETHERS5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 NCDPE	40.01	7.278e1					3.7	YES		bb		0.000
2	FUNCTION4 NCDPE	38.04	3.225e2					11.5	YES		bb		0.000

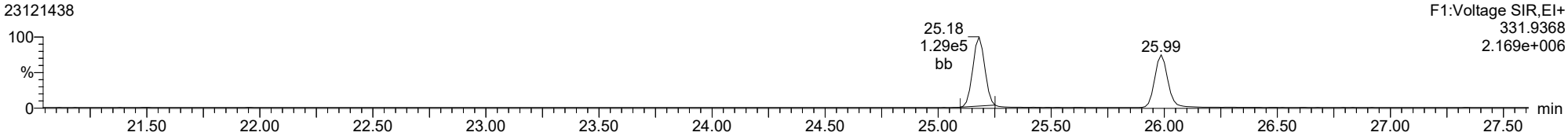
ETHERS6

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
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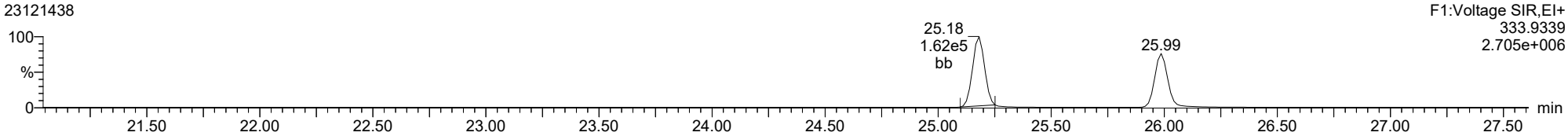
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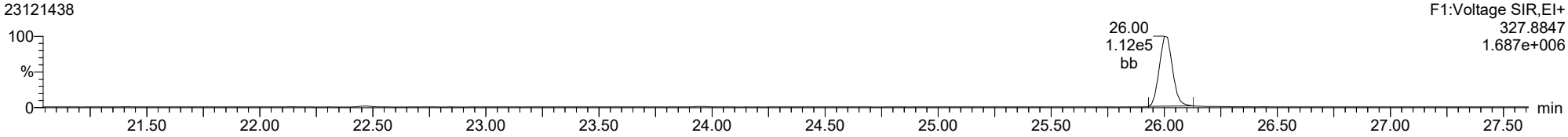
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13C-1234-TCDD

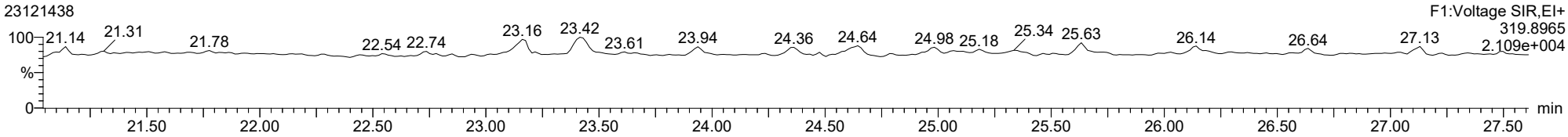


37CL-2378-TCDD

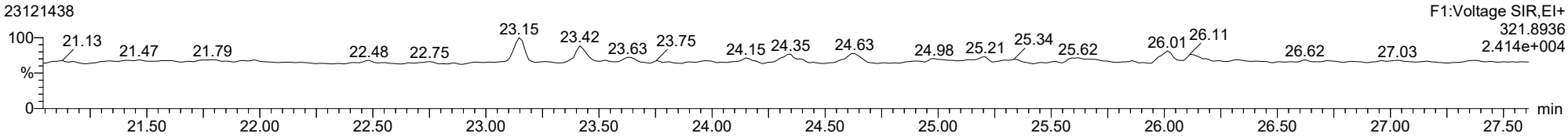


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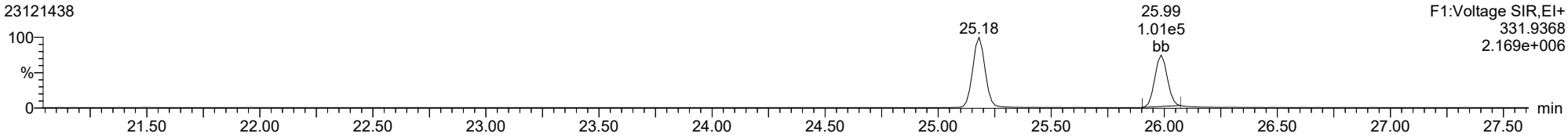
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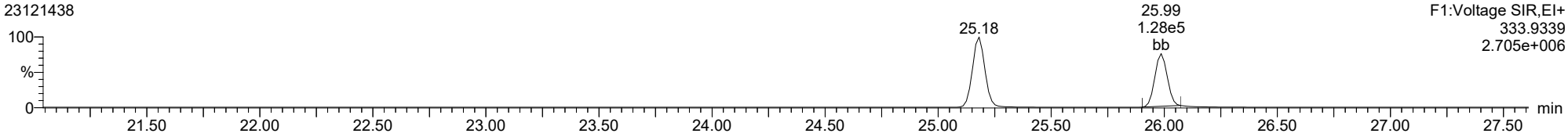
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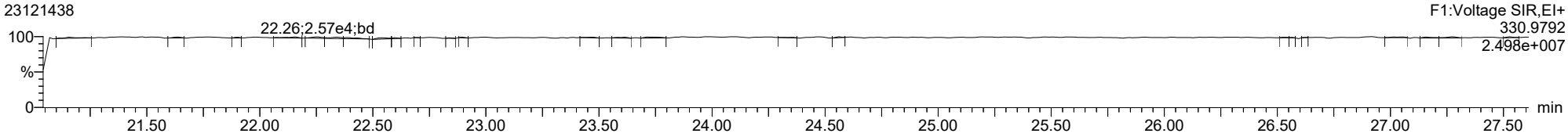
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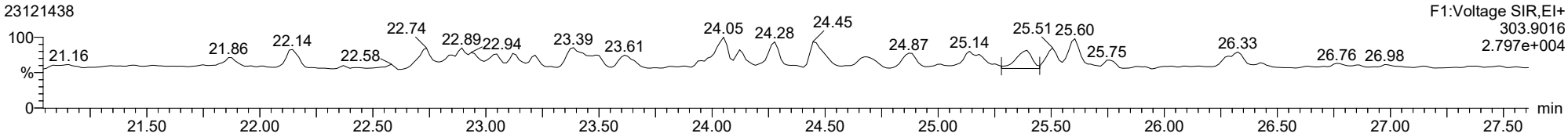
FUNCTION1 PFK



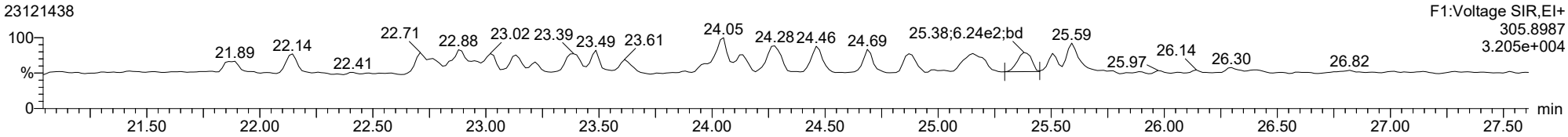
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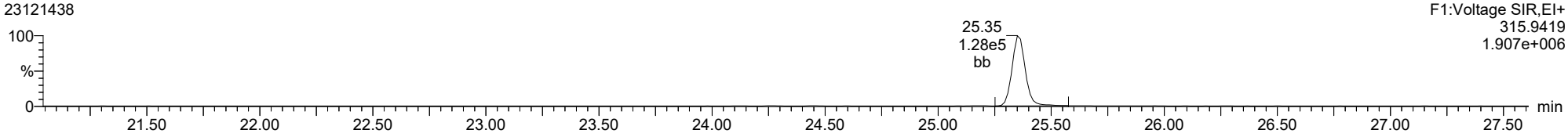
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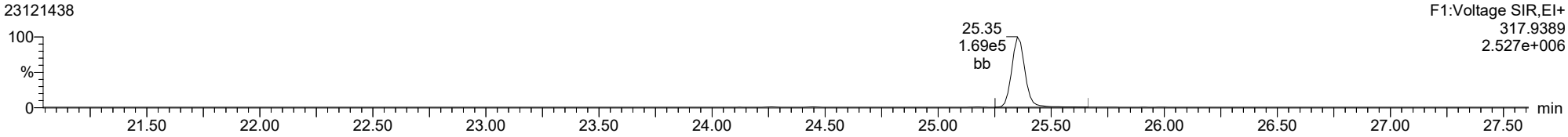
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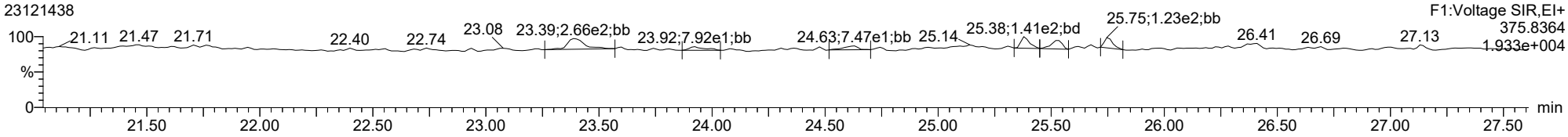
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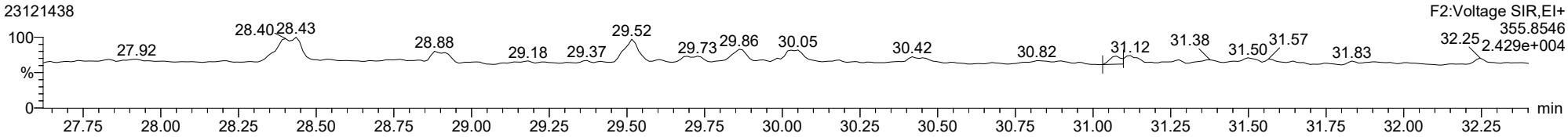


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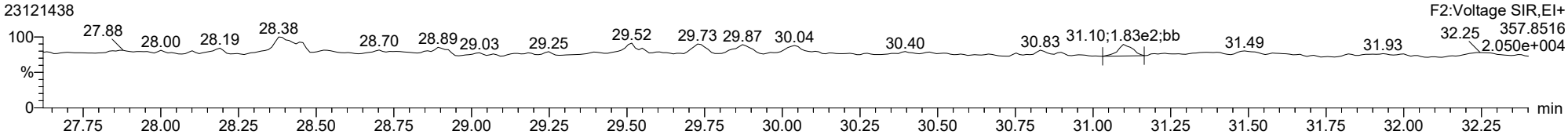


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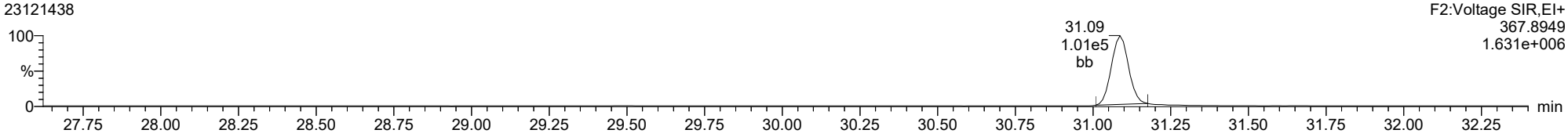
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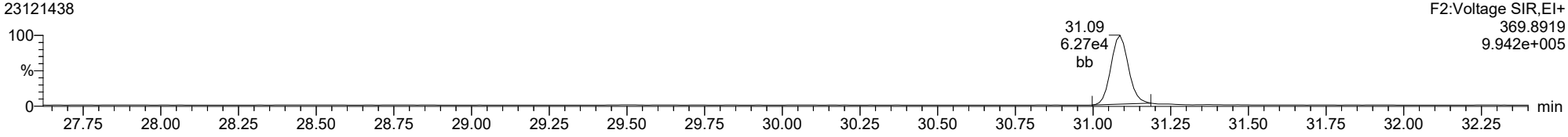
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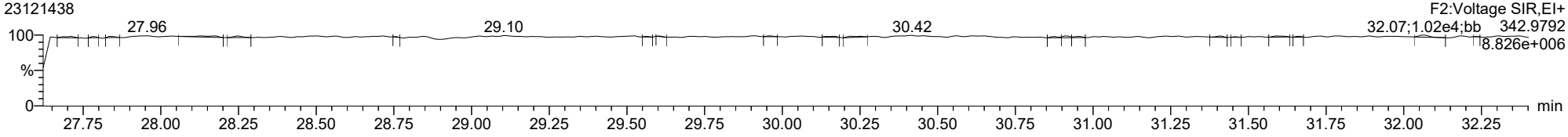
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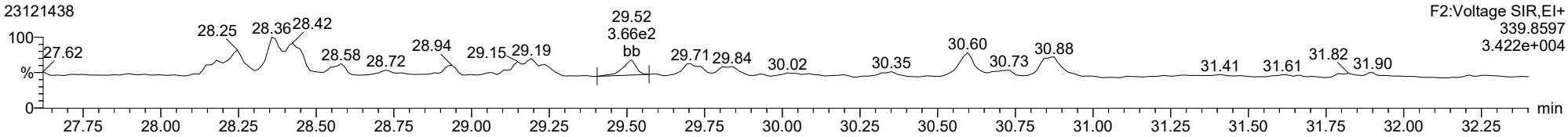


FUNCTION2 PFK

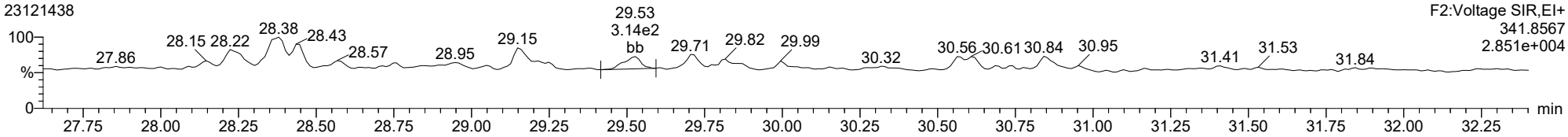


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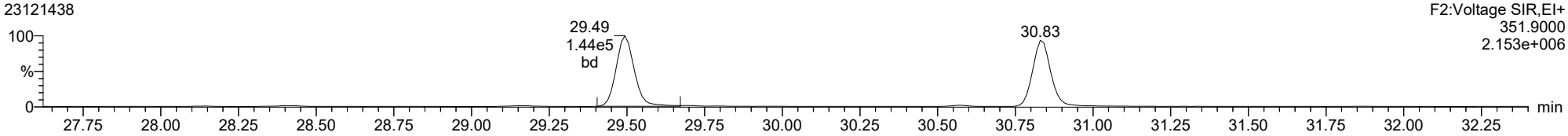
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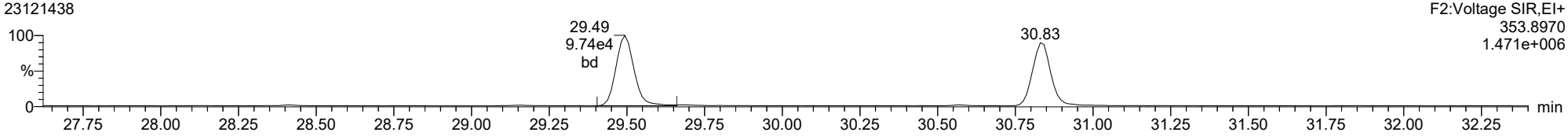
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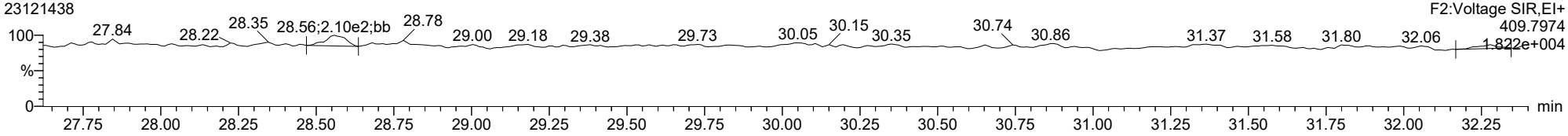
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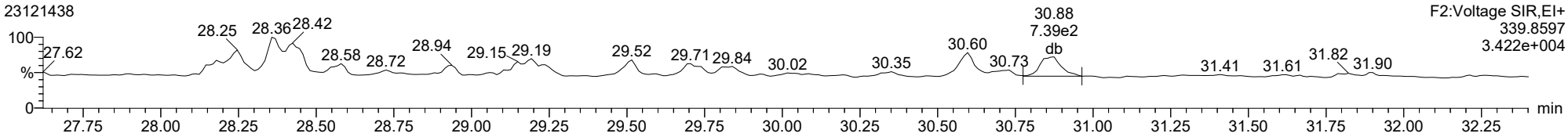


FUNCTION2 HPCDPE

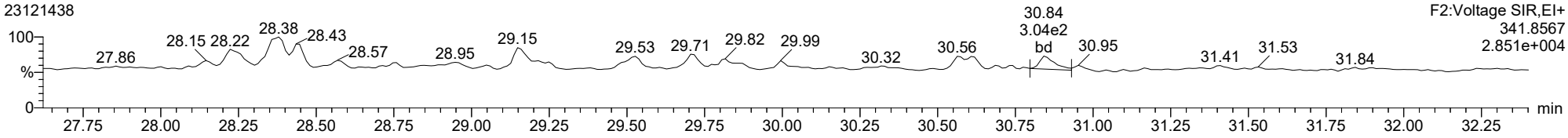


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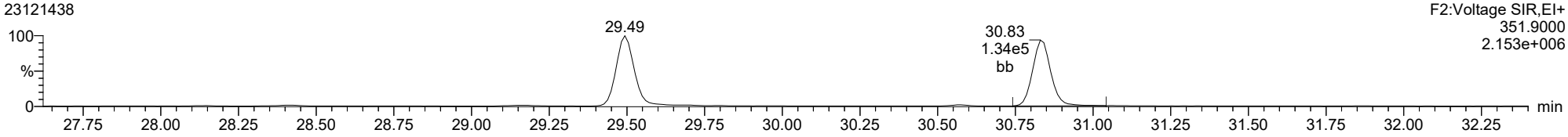
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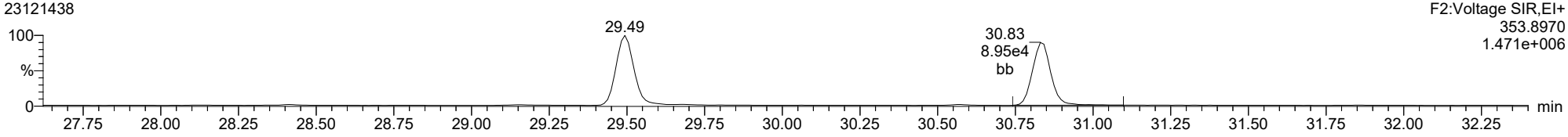
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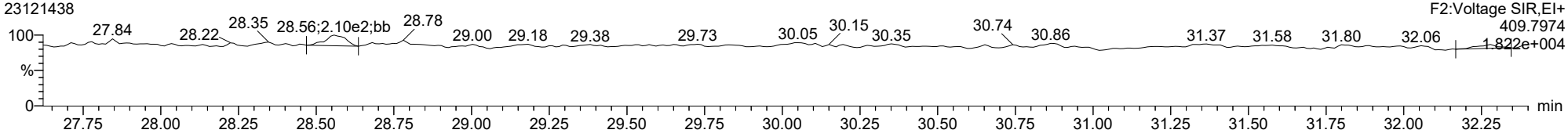
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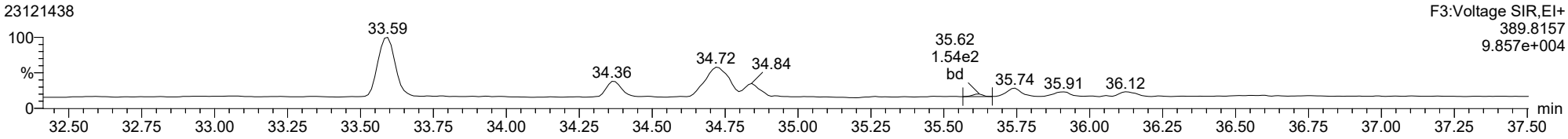


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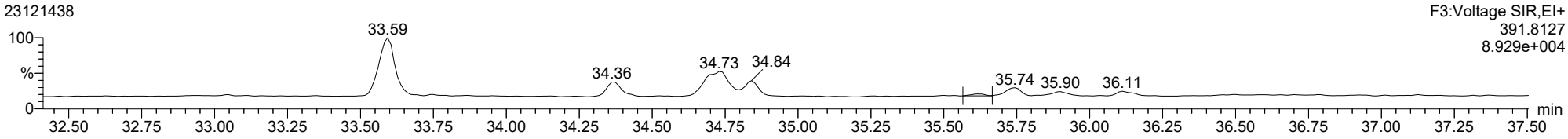


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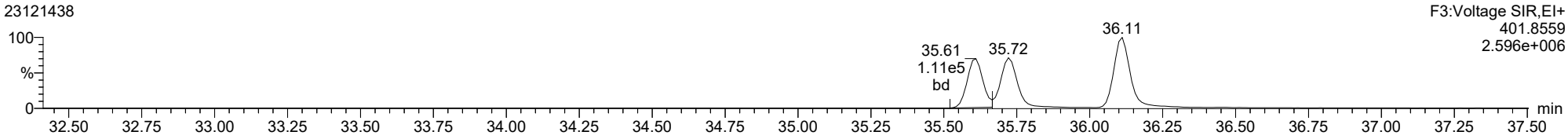
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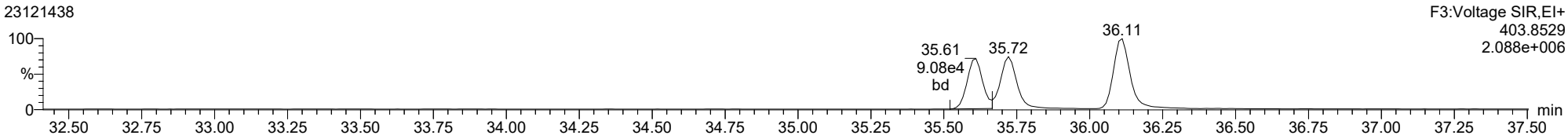
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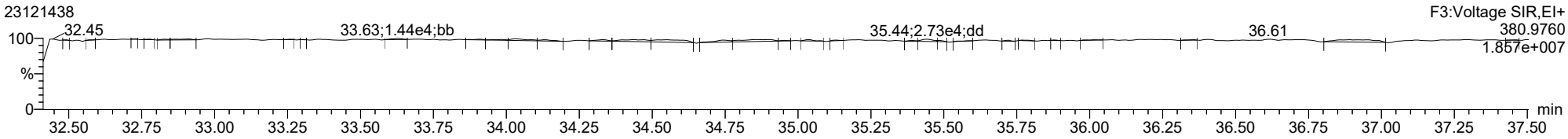
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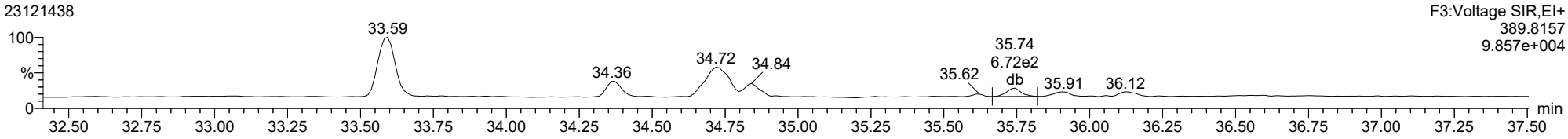
FUNCTION3 PFK



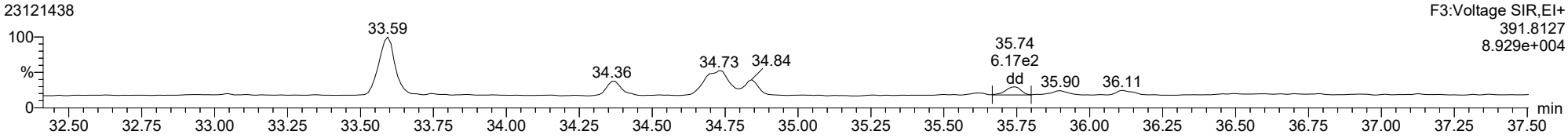
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ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

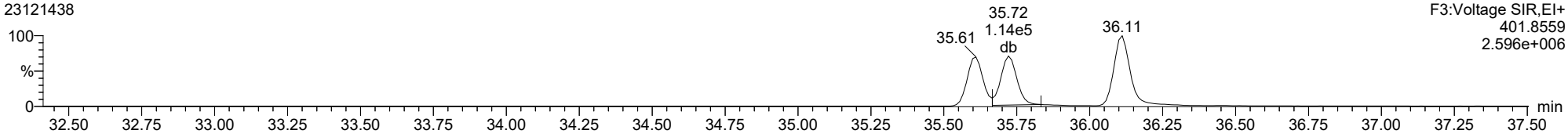
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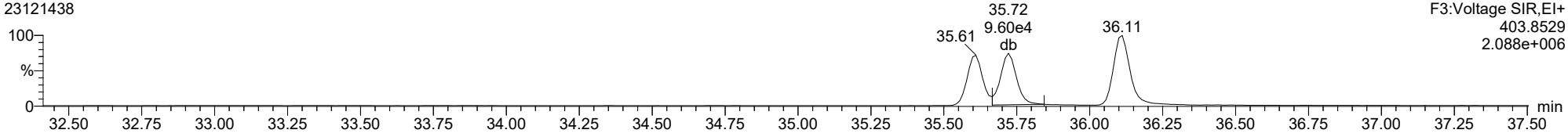
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13C-123678-HxCDD



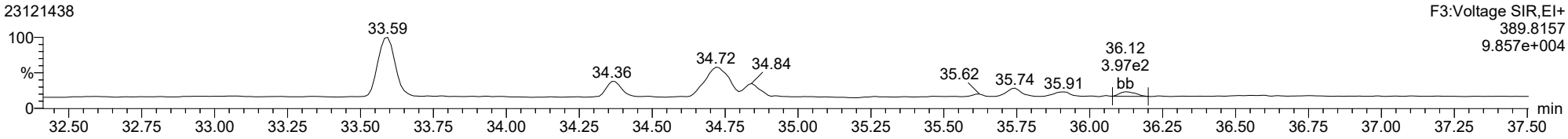
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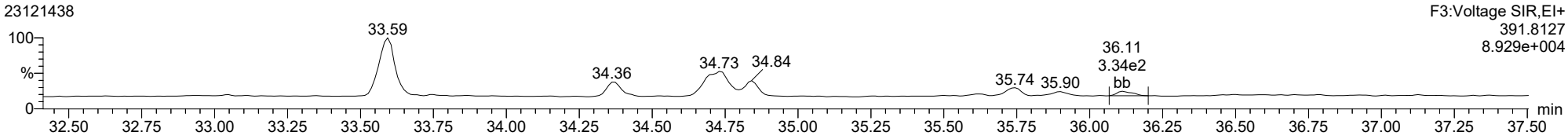
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ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

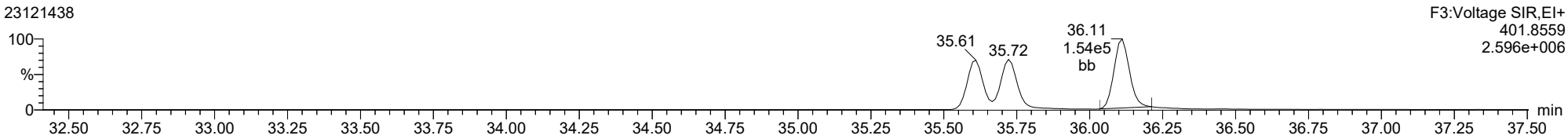
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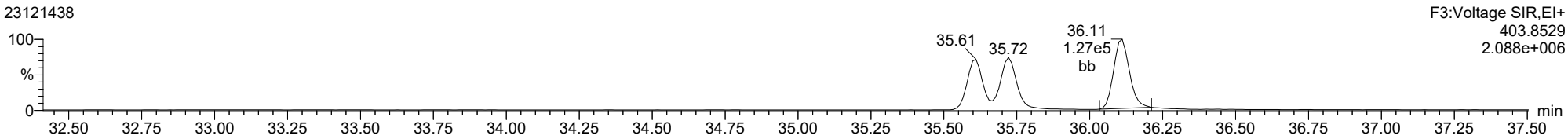
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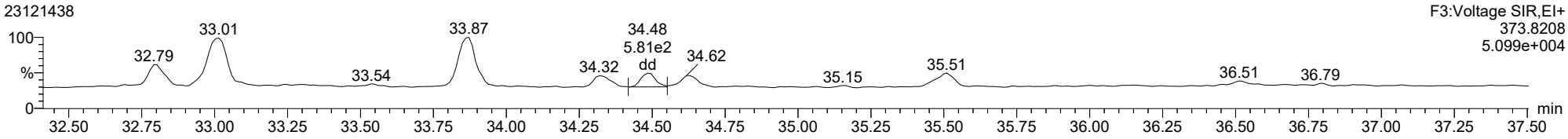


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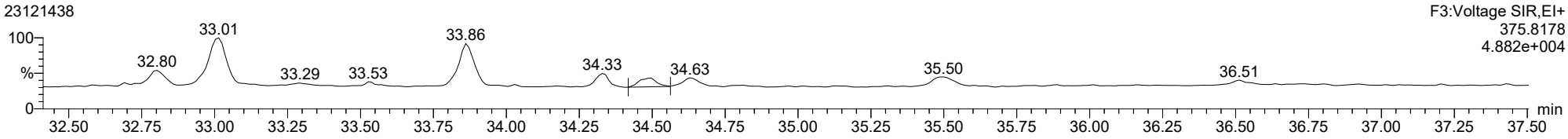


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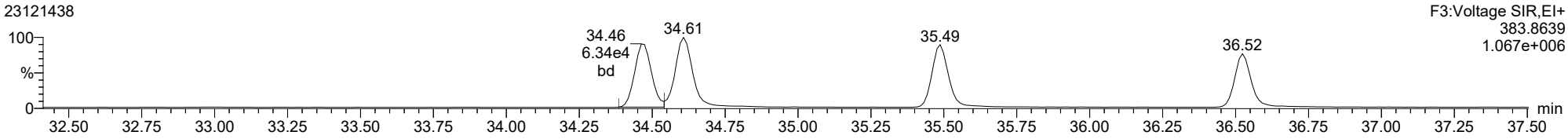
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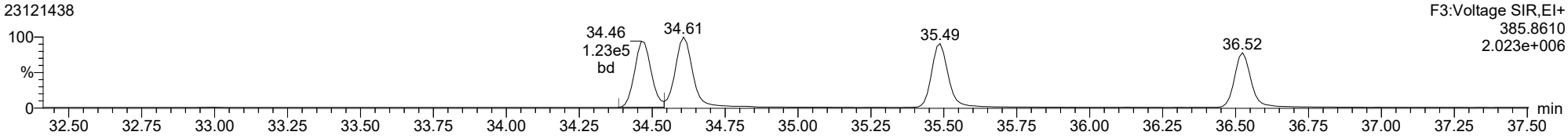
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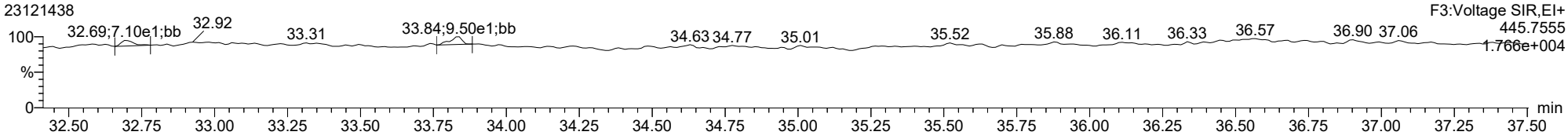
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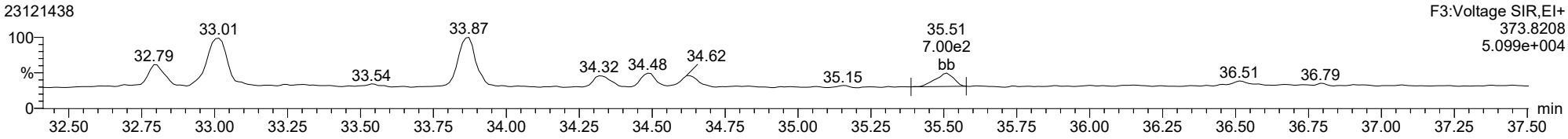


FUNCTION3 OCDPE

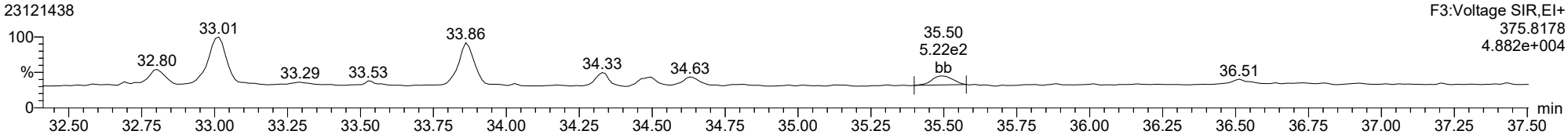


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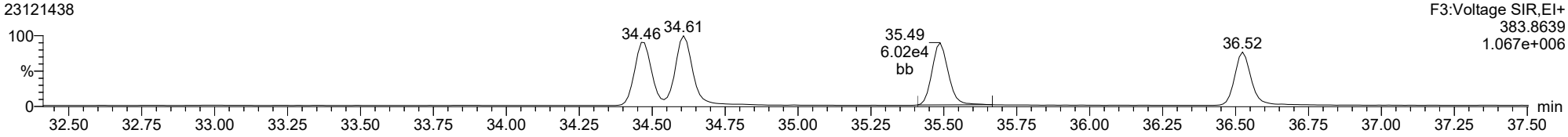
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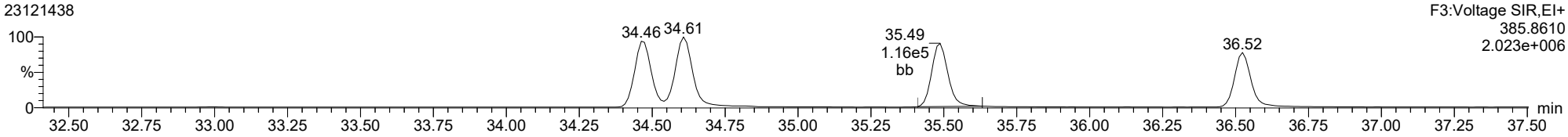
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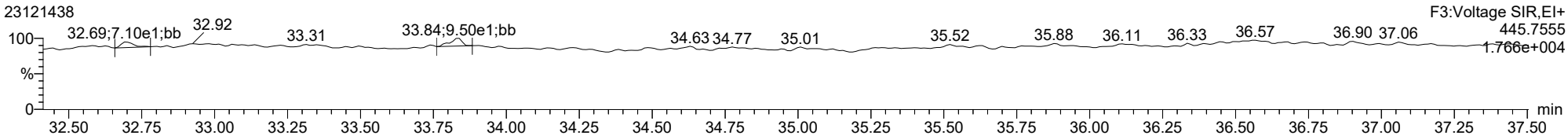
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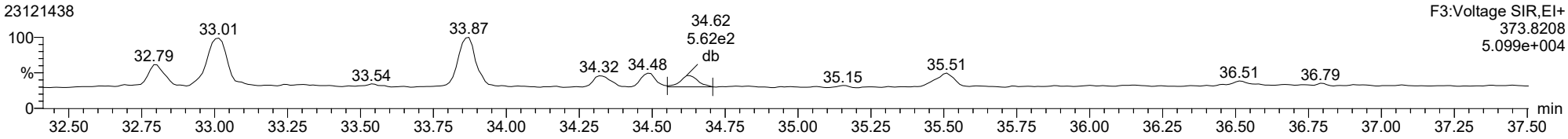


FUNCTION3 OCDPE

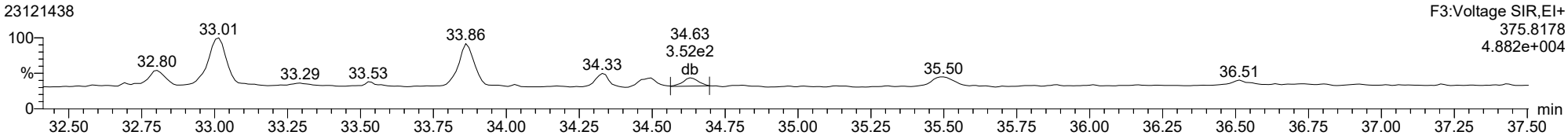


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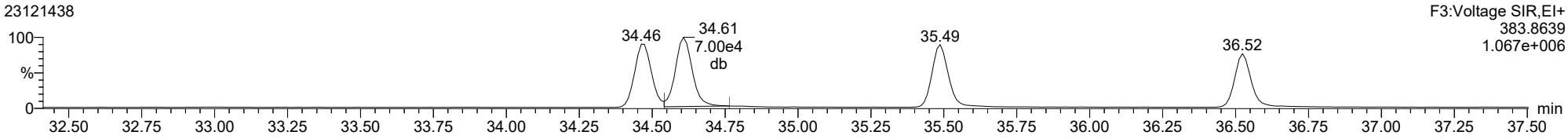
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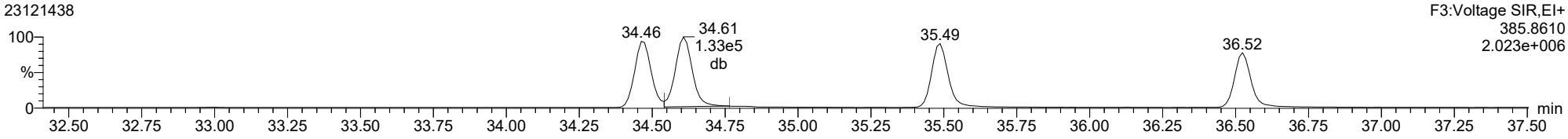
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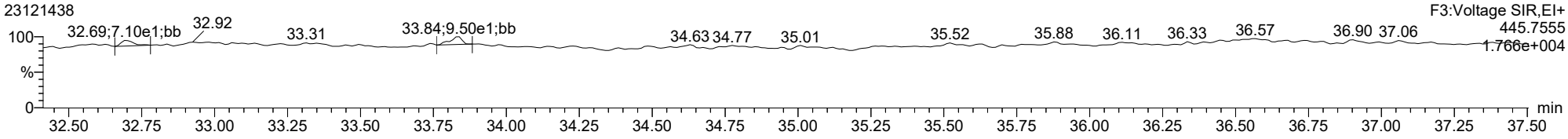
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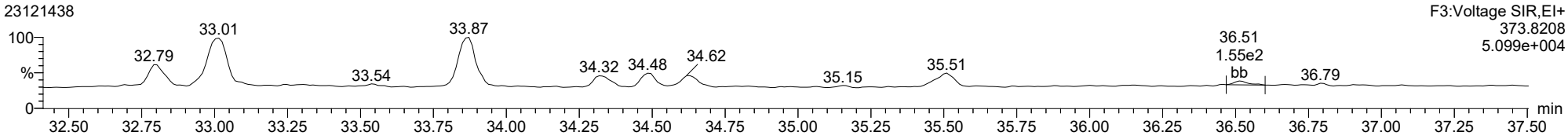


FUNCTION3 OCDPE

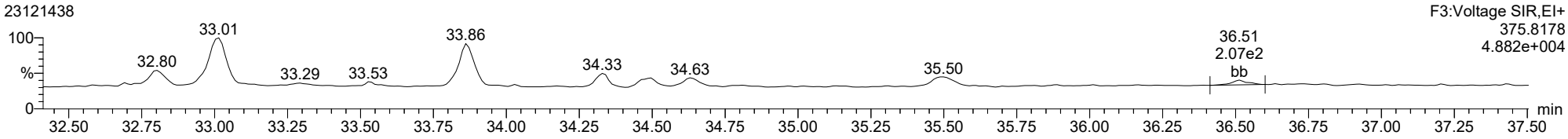


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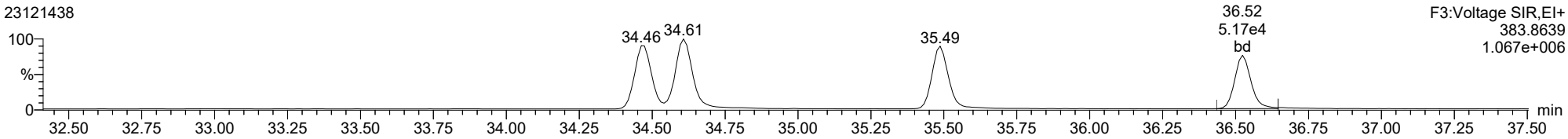
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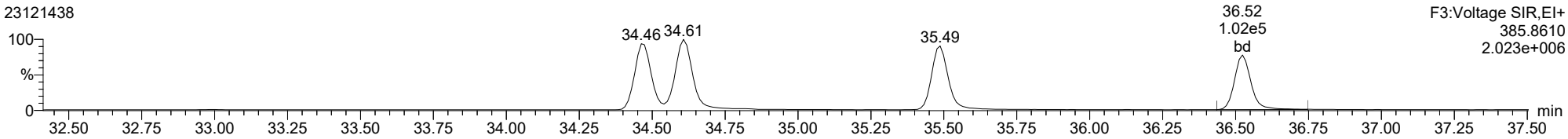
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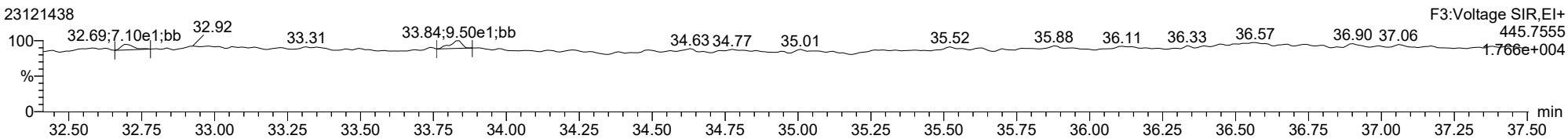
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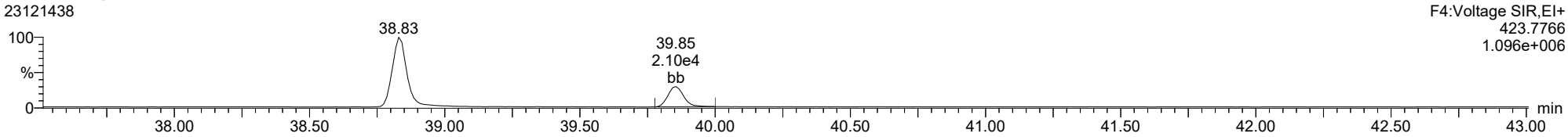


FUNCTION3 OCDPE

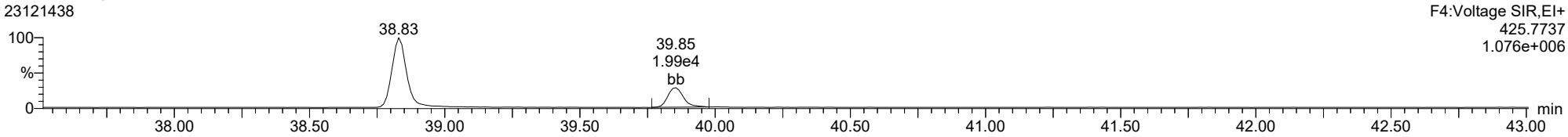


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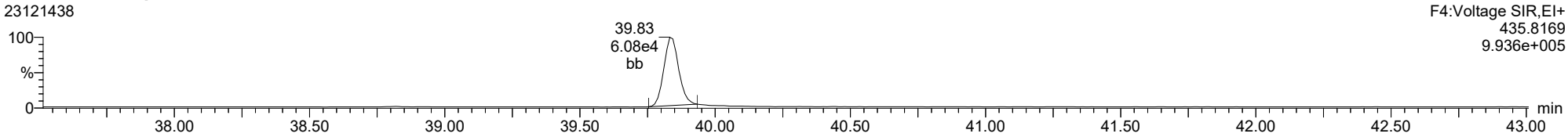
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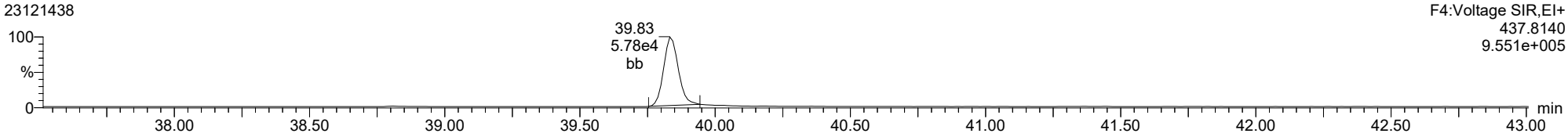
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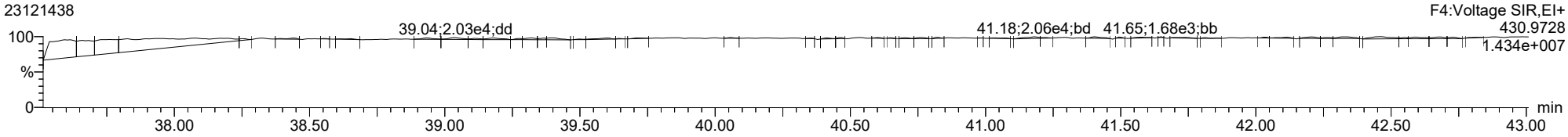
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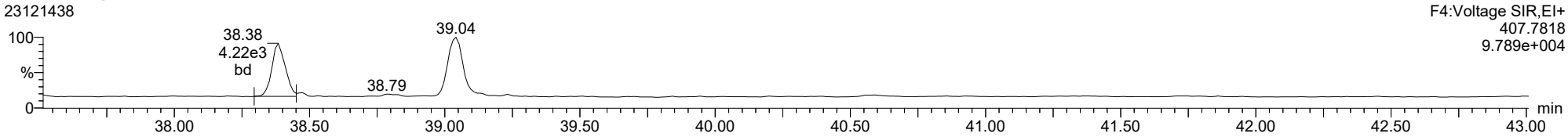


FUNCTION4 PFK

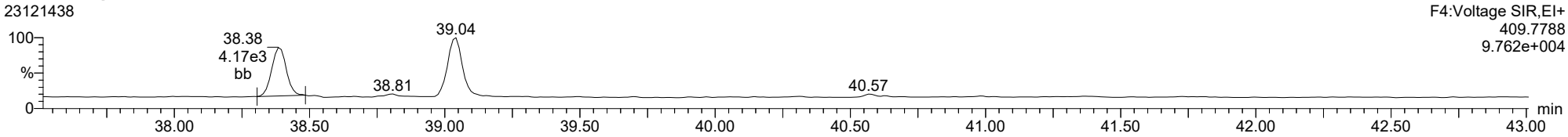


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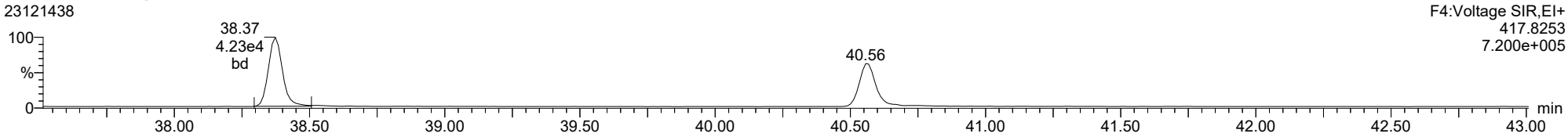
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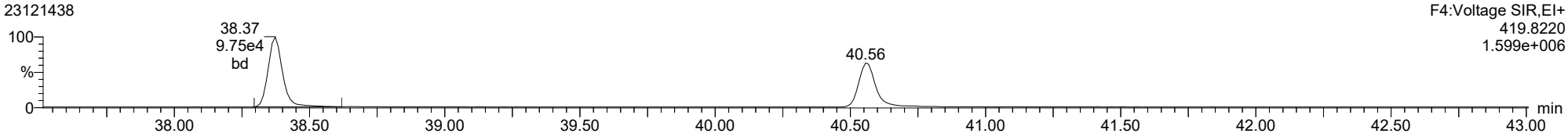
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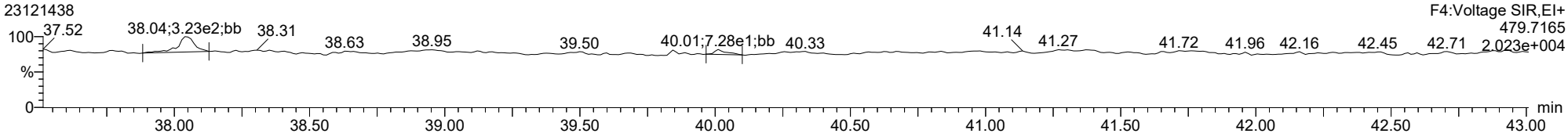
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13C-1234678-HpCDF

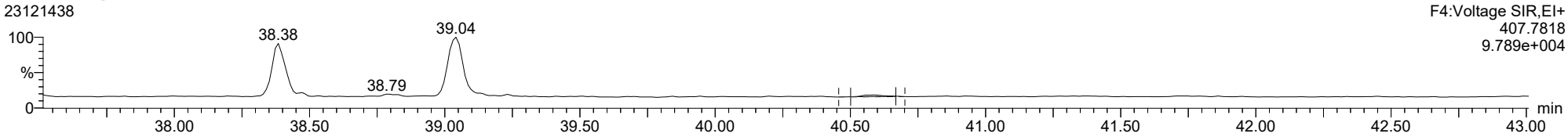


FUNCTION4 NCDPE

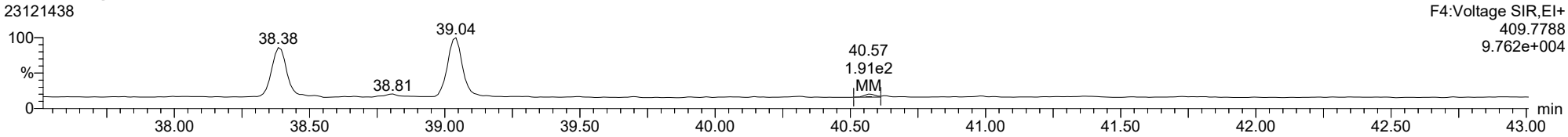


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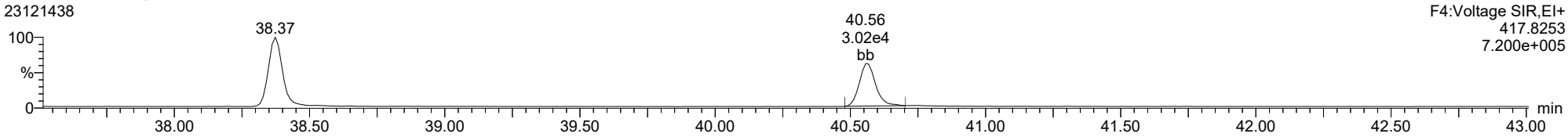
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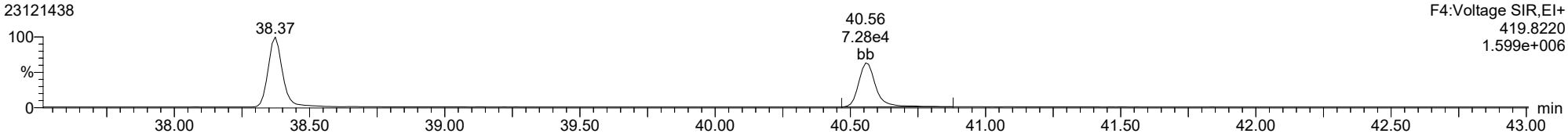
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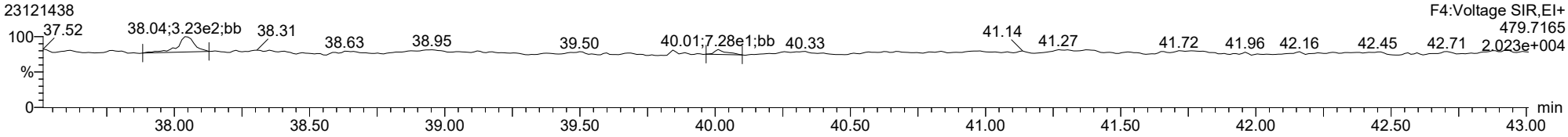
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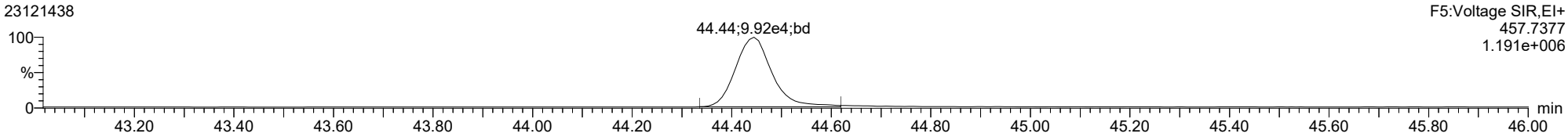


FUNCTION4 NCDPE

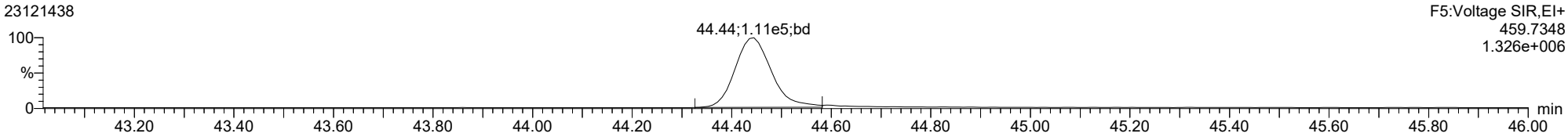


ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

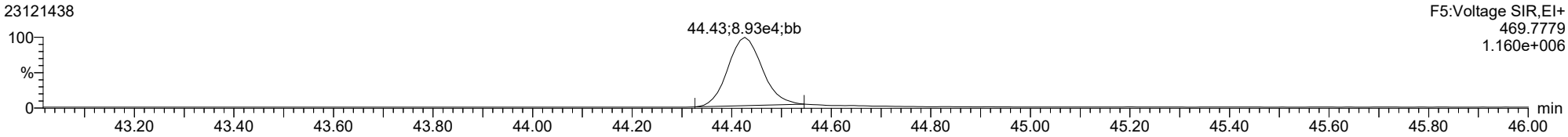
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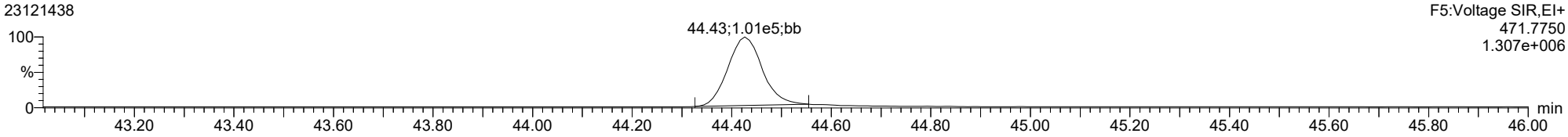
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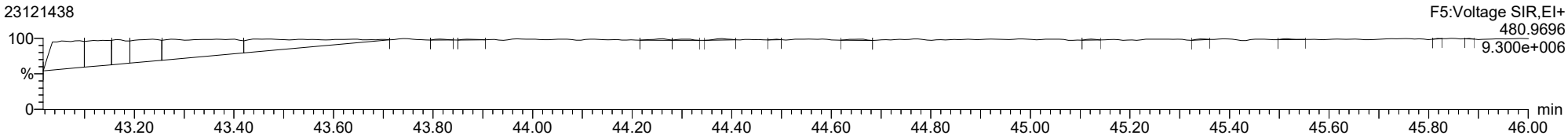
13C-OCDD



13C-OCDD

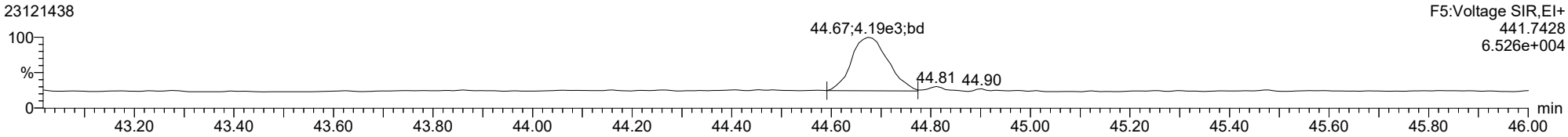


FUNCTION5 PFK

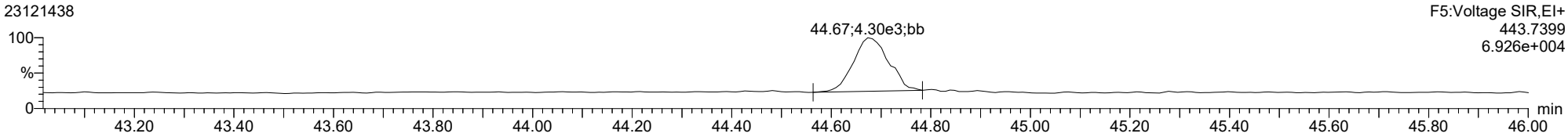


ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

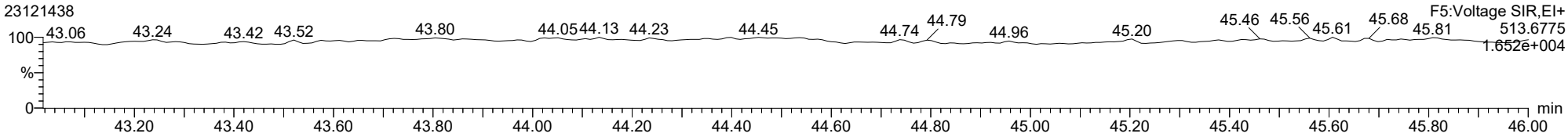
OCDF



OCDF



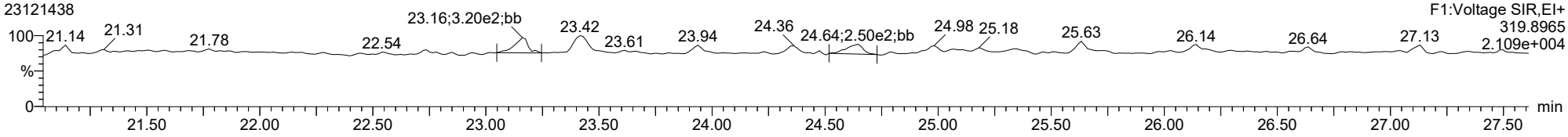
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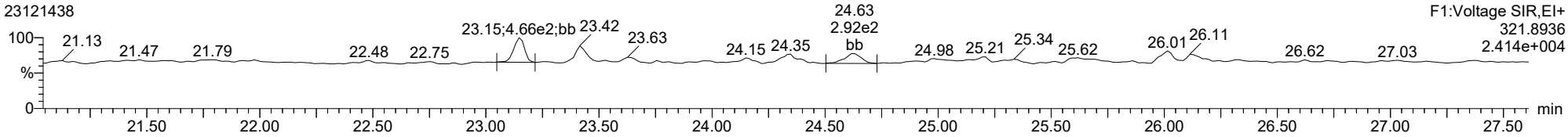
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Printed: Saturday, December 16, 2023 10:40:38 Pacific Standard Time

ID: 23J0690-02, Name: 23121438, Date: 15-Dec-2023, Time: 21:17:41, Conditions: AUTOSPEC01, User: pk

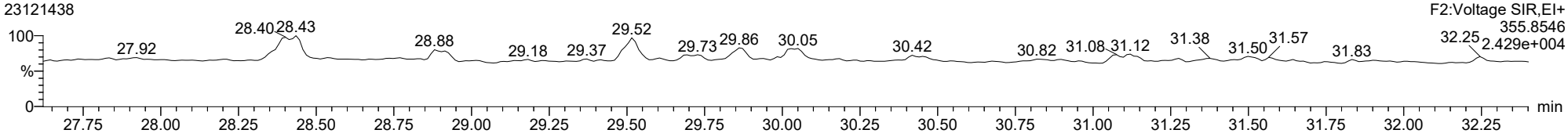
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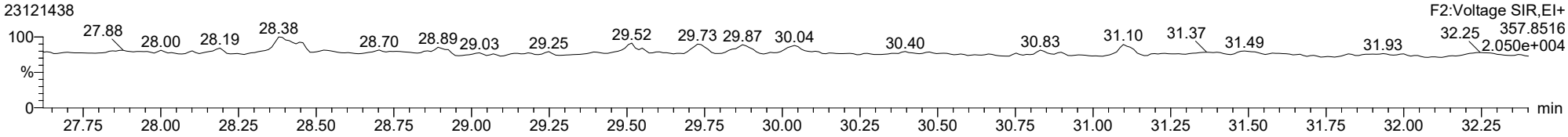
Total-tetradioxins



Total-pentadioxins

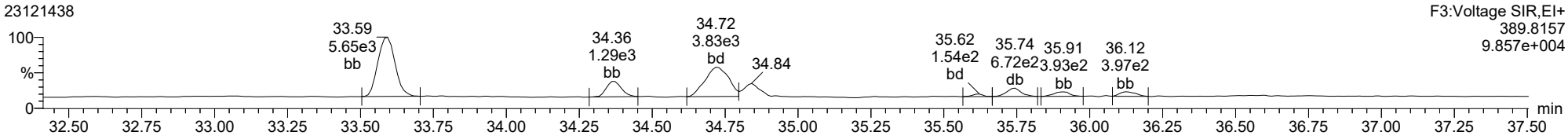


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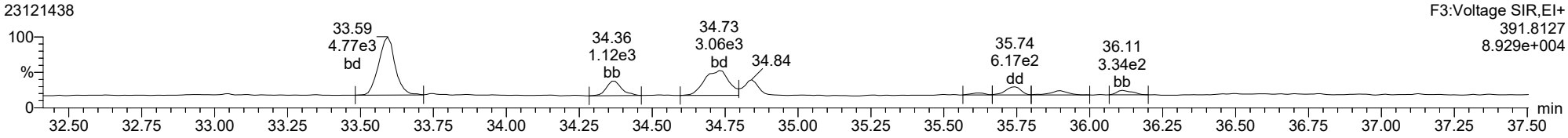


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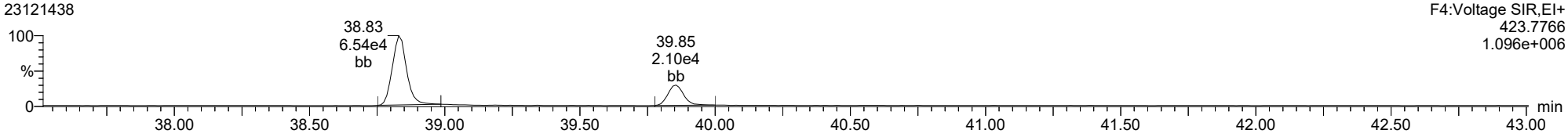
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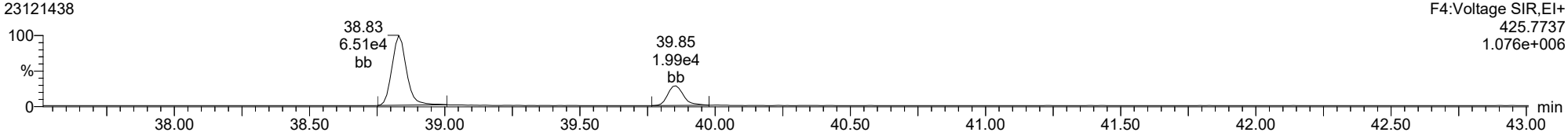
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Total-heptadioxins



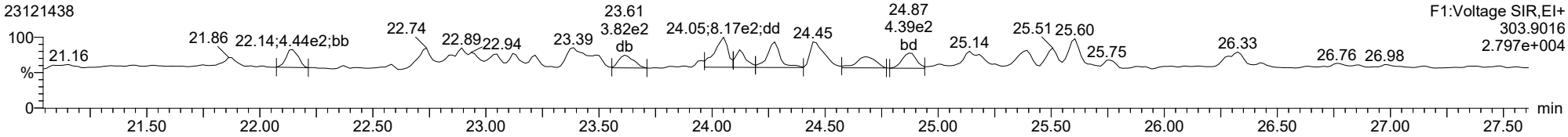
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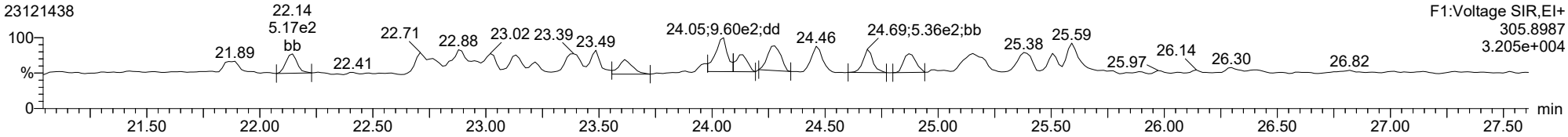
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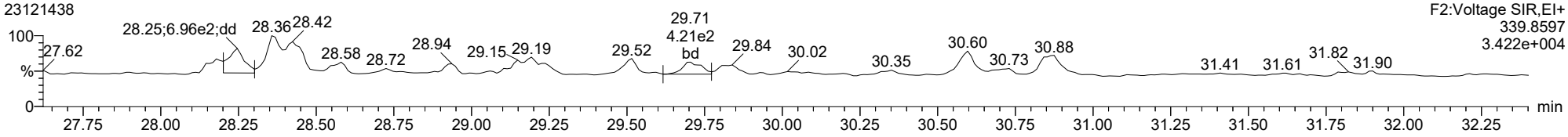
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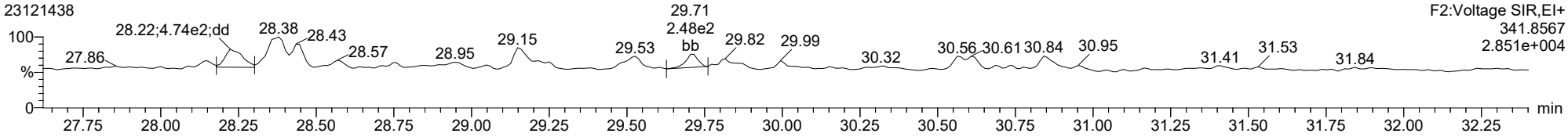
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Total-pentafurans

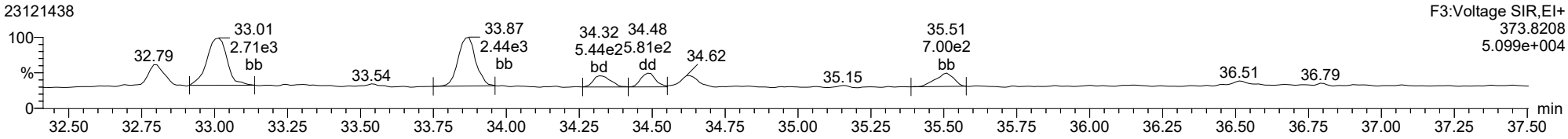


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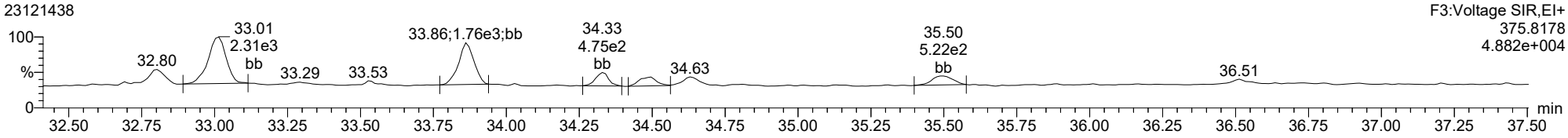


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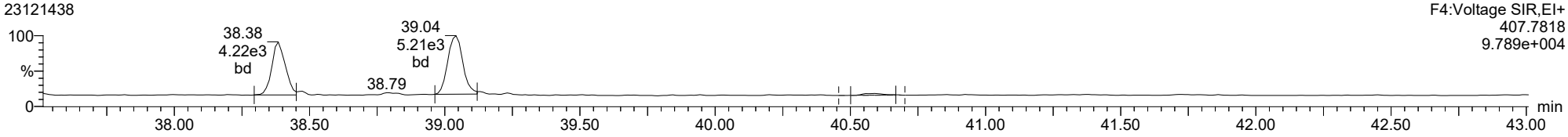
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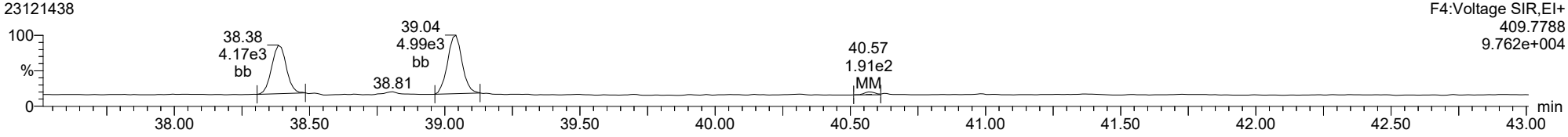
Total-hexafurans



Total-heptafurans



Total-heptafurans



SED-14C:0-1

Form 1
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-04 A	File ID:	23121439
Sampled:	03/21/23 15:53	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 22:06
% Solids:	69.49	Preparation:	EPA 1613	Initial/Final:	14.5 g Wet / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.805	0.655-0.886	0.248	0.992	1.02	ng/kg	X
1746-01-6	2,3,7,8-TCDD	1	0.601	0.655-0.886	0.106	0.992	0.198	ng/kg	EMPC, J
57117-41-6	1,2,3,7,8-PeCDF	1	1.064	1.318-1.783	0.209	0.992	0.550	ng/kg	EMPC, J
57117-31-4	2,3,4,7,8-PeCDF	1	1.531	1.318-1.783	0.197	0.992	0.494	ng/kg	J
40321-76-4	1,2,3,7,8-PeCDD	1	1.324	1.318-1.783	0.189	0.992	0.724	ng/kg	J
70648-26-9	1,2,3,4,7,8-HxCDF	1	0.948	1.054-1.426	0.156	0.992	0.977	ng/kg	EMPC, J
57117-44-9	1,2,3,6,7,8-HxCDF	1	1.364	1.054-1.426	0.167	0.992	0.898	ng/kg	J
60851-34-5	2,3,4,6,7,8-HxCDF	1	2.856	1.054-1.426	0.187	0.992	0.706	ng/kg	EMPC, J
72918-21-9	1,2,3,7,8,9-HxCDF	1	0.806	1.054-1.426	0.217	0.992	0.269	ng/kg	EMPC, J
39227-28-6	1,2,3,4,7,8-HxCDD	1	1.502	1.054-1.426	0.219	0.992	0.624	ng/kg	EMPC, J
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.313	1.054-1.426	0.242	0.992	3.57	ng/kg	
19408-74-3	1,2,3,7,8,9-HxCDD	1	1.387	1.054-1.426	0.264	0.992	1.95	ng/kg	
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	1.088	0.893-1.208	0.243	0.992	17.5	ng/kg	B
55673-89-7	1,2,3,4,7,8,9-HpCDF	1	1.168	0.893-1.208	0.367	0.992	0.918	ng/kg	J
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	0.958	0.893-1.208	0.458	2.48	95.7	ng/kg	B
39001-02-0	OCDF	1	0.942	0.757-1.024	0.429	2.48	32.6	ng/kg	B
3268-87-9	OCDD	1	0.863	0.757-1.024	0.950	9.92	761	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.992	3.00	ng/kg	
41903-57-5	Total TCDD	1	0.000			0.992	0.637	ng/kg	
30402-15-4	Total PeCDF	1	0.000			0.992	5.48	ng/kg	
36088-22-9	Total PeCDD	1	0.000			0.992	2.60	ng/kg	
55684-94-1	Total HxCDF	1	0.000			0.992	20.9	ng/kg	
34465-46-8	Total HxCDD	1	0.000			0.992	32.1	ng/kg	
38998-75-3	Total HpCDF	1	0.000			0.992	50.7	ng/kg	
37871-00-4	Total HpCDD	1	0.000			0.992	281	ng/kg	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 3.47
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 3.47

SED-14C:0-1

Form 2

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Sediment	Laboratory ID:	23J0690-04	File ID:	23121439
Sampled:	03/21/23 15:53	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 22:06
Solids Wt%:	69.49	Preparation:	EPA 1613	Initial/Final:	14.5 g / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.768	0.655-0.886	0.104	58.5	24 - 169 %	
13C12-2,3,7,8-TCDD		0.787	0.655-0.886	0.134	74.5	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.505	1.318-1.783	0.140	59.3	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.542	1.318-1.783	0.148	59.8	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.640	1.318-1.783	0.204	76.6	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.515	0.434-0.587	0.162	61.7	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	0.132	51.9	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.520	0.434-0.587	0.161	55.4	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.513	0.434-0.587	0.185	55.9	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.229	1.054-1.426	0.172	72.4	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.203	1.054-1.426	0.142	64.3	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.428	0.374-0.506	0.156	48.7	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.433	0.374-0.506	0.203	48.1	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.041	0.893-1.208	0.234	66.8	23 - 140 %	
13C12-OCDD		0.908	0.757-1.024	0.327	52.1	17 - 157 %	
37Cl4-2,3,7,8-TCDD		328.000		0.046	89.0	35 - 197 %	

* Values outside of QC limits

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
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Printed: Saturday, December 16, 2023 10:40:54 Pacific Standard Time

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
2378-TCDF	25.379	1.001	7.928e2	9.851e2	0.903	0.805	0.770	943	1207	1.17e4	1.49e4	12.5	12.4	NO	dd	bd	0.514
12378-PeCDF	29.516	1.000	3.848e2	3.618e2	0.923	1.064	1.550	545	862	7.37e3	5.77e3	13.5	6.7	YES	bb	bb	0.277
23478-PeCDF	30.875	1.001	4.148e2	2.709e2	0.991	1.531	1.550	545	862	5.62e3	5.21e3	10.3	6.0	NO	MM	bb	0.249
123478-HxCDF	34.496	1.001	6.460e2	6.813e2	1.128	0.948	1.240	601	495	9.21e3	1.00e4	15.3	20.3	YES	dd	dd	0.492
234678-HxCDF	35.498	1.000	6.128e2	2.146e2	1.081	2.856	1.240	601	495	8.14e3	4.84e3	13.6	9.8	YES	bb	MM	0.355
123678-HxCDF	34.640	1.001	6.652e2	4.878e2	1.032	1.364	1.240	601	495	1.04e4	7.35e3	17.3	14.9	NO	MM	db	0.452
123789-HxCDF	36.523	1.000	1.129e2	1.401e2	0.988	0.806	1.240	601	495	2.10e3	2.62e3	3.5	5.3	YES	bb	MM	0.136
1234678-HpCDF	38.395	1.000	9.108e3	8.370e3	1.164	1.088	1.050	764	510	1.45e5	1.39e5	189.8	272.0	NO	bb	bb	8.821
1234789-HpCDF	40.590	1.001	3.553e2	3.041e2	1.104	1.168	1.050	764	510	6.03e3	6.67e3	7.9	13.1	NO	MM	bd	0.463
OCDF	44.682	1.006	1.057e4	1.122e4	1.130	0.942	0.890	568	595	1.28e5	1.32e5	224.5	222.6	NO	bd	bb	16.413
2378-TCDD	26.000	1.001	1.374e2	2.287e2	1.243	0.601	0.770	620	391	2.44e3	4.01e3	3.9	10.3	YES	bd	bb	0.100
12378-PeCDD	31.109	1.000	4.927e2	3.723e2	1.150	1.324	1.550	638	484	7.19e3	5.02e3	11.3	10.4	NO	bb	bb	0.365
123478-HxCDD	35.643	1.000	4.474e2	2.978e2	0.960	1.502	1.240	568	864	6.41e3	6.30e3	11.3	7.3	YES	bd	bd	0.315
123678-HxCDD	35.766	1.001	2.385e3	1.816e3	0.883	1.313	1.240	568	864	3.70e4	3.33e4	65.1	38.5	NO	dd	db	1.800
123789-HxCDD	36.145	1.011	1.172e3	8.456e2	0.804	1.387	1.240	568	864	1.75e4	1.36e4	30.8	15.8	NO	db	bb	0.982
1234678-HpCDD	39.855	1.000	4.227e4	4.411e4	1.200	0.958	1.050	1053	1129	6.31e5	6.70e5	599.6	593.3	NO	bb	bd	48.236
OCDD	44.444	1.000	2.211e5	2.560e5	1.059	0.863	0.890	1390	1025	2.63e6	3.03e6	1892.8	2955.8	NO	bd	bd	383.577
13C-2378-TCDF	25.365	1.007	1.665e5	2.168e5	1.835	0.768	0.770	1050	803	2.48e6	3.19e6	2366.3	3967.2	NO	bd	bb	58.505
13C-12378-PeCDF	29.504	1.172	1.752e5	1.164e5	1.377	1.505	1.550	873	1002	2.61e6	1.74e6	2987.9	1735.5	NO	bd	bd	59.335
13C-23478-PeCDF	30.841	1.225	1.686e5	1.093e5	1.301	1.542	1.550	873	1002	2.60e6	1.69e6	2982.8	1685.6	NO	bb	bb	59.826
13C-123478-HxCDF	34.473	0.954	8.119e4	1.578e5	1.091	0.515	0.510	645	1079	1.26e6	2.47e6	1953.5	2292.1	NO	bd	bd	61.724
13C-123678-HxCDF	34.618	0.958	8.361e4	1.632e5	1.340	0.512	0.510	645	1079	1.28e6	2.50e6	1986.9	2315.5	NO	db	db	51.880
13C-234678-HxCDF	35.509	0.983	7.360e4	1.416e5	1.093	0.520	0.510	645	1079	1.11e6	2.09e6	1715.4	1939.6	NO	bb	bb	55.444
13C-123789-HxCDF	36.523	1.011	6.410e4	1.248e5	0.952	0.513	0.510	645	1079	1.03e6	2.04e6	1604.1	1889.1	NO	bb	bb	55.929
13C-1234678-HpCDF	38.384	1.062	5.100e4	1.193e5	0.985	0.428	0.440	681	819	8.03e5	1.88e6	1178.4	2294.8	NO	bd	bb	48.696
13C-1234789-HpCDF	40.568	1.123	3.898e4	9.014e4	0.756	0.433	0.440	681	819	5.65e5	1.28e6	828.8	1565.0	NO	bb	bd	48.124
13C-1234-TCDD	25.181	0.000	1.577e5	1.994e5	1.000	0.791	0.770	909	543	2.56e6	3.23e6	2816.6	5947.5	NO	bb	bb	100.000
13C-2378-TCDD	25.986	1.032	1.300e5	1.652e5	1.110	0.787	0.770	909	543	2.02e6	2.58e6	2223.5	4754.0	NO	bb	bb	74.516
13C-12378-PeCDD	31.097	1.235	1.280e5	7.810e4	0.754	1.640	1.550	651	845	1.91e6	1.18e6	2935.6	1396.5	NO	bb	bb	76.611
13C-123478-HxCDD	35.632	0.986	1.360e5	1.107e5	0.960	1.229	1.240	887	724	2.23e6	1.82e6	2517.9	2509.2	NO	bd	bd	72.395
13C-123678-HxCDD	35.743	0.989	1.444e5	1.201e5	1.159	1.203	1.240	887	724	2.18e6	1.86e6	2455.2	2567.0	NO	db	db	64.275
13C-1234678-HpCDD	39.843	1.103	7.614e4	7.313e4	0.629	1.041	1.050	721	721	1.21e6	1.12e6	1675.4	1558.3	NO	bb	bb	66.817
13C-OCDD	44.435	1.230	1.118e5	1.232e5	0.635	0.908	0.890	1055	975	1.36e6	1.55e6	1289.0	1584.9	NO	bb	bb	104.227
13C-123789-HxCDD	36.133	0.000	1.959e5	1.591e5	1.000	1.231	1.240	887	724	3.21e6	2.64e6	3622.3	3640.4	NO	bb	bb	100.000
37CL-2378-TCDD	26.014	1.033	1.472e5		1.157			517		2.28e6		4405.7			bb		35.619

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:40:54 Pacific Standard Time

ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
1368-TCDF	21.876	0.862	2.679e2	1.195e2	1.170	2.242	0.770	943	1207	3.64e3	1.89e3	3.9	1.6	YES	bb	bb	0.086
1289-TCDF					0.847		0.770	943	1207								
13468-PECDF	26.791	0.908	4.200e3	2.658e3	1.241	1.580	1.550	516	487	6.18e4	4.02e4	119.7	82.6	NO	bb	bb	1.895
12389-PECDF					0.880		1.550	545	862								
123468-HXCDF	32.802	0.952	2.035e3	1.685e3	1.206	1.208	1.240	601	495	3.31e4	2.78e4	55.2	56.1	NO	bb	bb	1.291
1368-TCDD	23.133	0.890	3.618e2	5.957e2	1.181	0.607	0.770	620	391	5.39e3	9.68e3	8.7	24.8	YES	bb	bb	0.275
1289-TCDD					0.963		0.770	620	391								
12479-PECDD	28.446	0.915	5.789e2	3.765e2	2.166	1.537	1.550	638	484	7.64e3	8.60e3	12.0	17.8	NO	db	MM	0.214
12389-PECDD					1.326		1.550	638	484								
124679-HXCDD	33.593	0.943	8.122e3	6.915e3	1.127	1.175	1.240	568	864	1.27e5	1.05e5	222.7	121.1	NO	bb	bb	5.410
1234679-HPCDD	38.830	0.975	9.033e4	9.083e4	1.303	0.995	1.050	1053	1129	1.51e6	1.47e6	1434.3	1300.1	NO	bb	bb	93.170
Total-tetrafurans			2.433e3		0.973			943		3.71e4							1.509
Total-penta1			4.200e3					516		6.18e4							1.895
Total-pentafurans			1.456e3		0.931			545		2.11e4							0.866
Total-hexafurans			1.460e4		1.087			601		2.24e5							10.521
Total-heptafurans			2.386e4		1.134			764		3.97e5							25.540
Total-Furans			5.712e4		1.053			943		8.69e5							56.744
Total-tetradioxins			4.503e2		1.129			620		7.60e3							0.321
Total-pentadioxins			2.484e3		1.548			638		3.94e4							1.308
Total-hexadioxins			2.215e4		0.943			568		3.02e5							16.197
Total-heptadioxins			1.326e5		1.251			1053		2.14e6							141.406
Total-Dioxins			3.788e5		1.182			620		5.12e6							542.810
Total-TEQ			4.359e5					620		5.99e6							599.554
FUNCTION1 PFK			3.829e5					263655		7.18e6							
FUNCTION2 PFK			2.532e6					100516		2.58e7							0.000
FUNCTION3 PFK			2.551e6					144420		8.94e6							0.000
FUNCTION4 PFK			0.000e0					139124		0.00e0							
FUNCTION5 PFK			1.565e5					106982		4.47e6							
FUNCTION1 HXCD...			1.468e3					470		2.35e4							0.000
FUNCTION1 HPCD...																	
FUNCTION2 HPCD...			3.923e2					473		6.44e3							0.000
FUNCTION3 OCDPE			2.816e2					303		5.27e3							0.000
FUNCTION4 NCDPE			3.582e2					378		5.40e3							0.000
FUNCTION5 DCDPE			0.000e0					385		0.00e0							

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
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Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811IClH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

TF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.05	4.073e2	5.022e2	0.973	0.81	0.77	6.2	YES	NO	dd	bd	0.244
2	Total-tetrafurans	25.59	5.346e2	6.323e2	0.973	0.85	0.77	7.5	YES	NO	dd	dd	0.313
3	Total-tetrafurans	25.51	3.357e2	4.790e2	0.973	0.70	0.77	7.6	YES	NO	dd	dd	0.218
4	2378-TCDF	25.38	7.928e2	9.851e2	0.903	0.80	0.77	12.5	YES	NO	dd	bd	0.514
5	Total-tetrafurans	24.14	3.625e2	4.622e2	0.973	0.78	0.77	5.4	YES	NO	dd	dd	0.221

PP

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	13468-PECDF	26.79	4.200e3	2.658e3	1.241	1.58	1.55	119.7	YES	NO	bb	bb	1.895

PF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-pentafurans	29.16	5.738e2	3.287e2	0.931	1.75	1.55	14.6	YES	NO	bd	bd	0.340
2	23478-PeCDF	30.87	4.148e2	2.709e2	0.991	1.53	1.55	10.3	YES	NO	MM	bb	0.249
3	Total-pentafurans	29.73	4.672e2	2.651e2	0.931	1.76	1.55	13.8	YES	NO	bb	bd	0.276

HF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	123678-HxCDF	34.64	6.652e2	4.878e2	1.032	1.36	1.24	17.3	YES	NO	MM	db	0.452
2	Total-hexafurans	33.87	6.337e3	4.963e3	1.087	1.28	1.24	159.2	YES	NO	bb	bb	4.672
3	Total-hexafurans	33.03	5.430e3	4.267e3	1.087	1.27	1.24	136.0	YES	NO	bb	bb	4.009
4	123468-HXCDF	32.80	2.035e3	1.685e3	1.206	1.21	1.24	55.2	YES	NO	bb	bb	1.291
5	Total-hexafurans	36.01	1.299e2	1.028e2	1.087	1.26	1.24	5.7	YES	NO	bb	bb	0.096

HPF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234789-HpCDF	40.59	3.553e2	3.041e2	1.104	1.17	1.05	7.9	YES	NO	MM	bd	0.463
2	Total-heptafurans	39.04	1.440e4	1.319e4	1.134	1.09	1.05	322.8	YES	NO	bd	bb	16.257
3	1234678-HpCDF	38.40	9.108e3	8.370e3	1.164	1.09	1.05	189.8	YES	NO	bb	bb	8.821

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Furans,TF,PP,PF,HF,HPF,OF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.05	4.073e2	5.022e2	0.973	0.81	0.77	6.2	YES	NO	dd	bd	0.244
2	Total-tetrafurans	25.59	5.346e2	6.323e2	0.973	0.85	0.77	7.5	YES	NO	dd	dd	0.313
3	Total-tetrafurans	25.51	3.357e2	4.790e2	0.973	0.70	0.77	7.6	YES	NO	dd	dd	0.218
4	2378-TCDF	25.38	7.928e2	9.851e2	0.903	0.80	0.77	12.5	YES	NO	dd	bd	0.514
5	Total-tetrafurans	24.14	3.625e2	4.622e2	0.973	0.78	0.77	5.4	YES	NO	dd	dd	0.221
6	Total-pentafurans	29.16	5.738e2	3.287e2	0.931	1.75	1.55	14.6	YES	NO	bd	bd	0.340
7	23478-PeCDF	30.87	4.148e2	2.709e2	0.991	1.53	1.55	10.3	YES	NO	MM	bb	0.249
8	Total-pentafurans	29.73	4.672e2	2.651e2	0.931	1.76	1.55	13.8	YES	NO	bb	bd	0.276
9	123678-HxCDF	34.64	6.652e2	4.878e2	1.032	1.36	1.24	17.3	YES	NO	MM	db	0.452
10	Total-hexafurans	33.87	6.337e3	4.963e3	1.087	1.28	1.24	159.2	YES	NO	bb	bb	4.672
11	Total-hexafurans	33.03	5.430e3	4.267e3	1.087	1.27	1.24	136.0	YES	NO	bb	bb	4.009
12	123468-HXCDF	32.80	2.035e3	1.685e3	1.206	1.21	1.24	55.2	YES	NO	bb	bb	1.291
13	Total-hexafurans	36.01	1.299e2	1.028e2	1.087	1.26	1.24	5.7	YES	NO	bb	bb	0.096
14	1234789-HpCDF	40.59	3.553e2	3.041e2	1.104	1.17	1.05	7.9	YES	NO	MM	bd	0.463
15	Total-heptafurans	39.04	1.440e4	1.319e4	1.134	1.09	1.05	322.8	YES	NO	bd	bb	16.257
16	1234678-HpCDF	38.40	9.108e3	8.370e3	1.164	1.09	1.05	189.8	YES	NO	bb	bb	8.821
17	OCDF	44.68	1.057e4	1.122e4	1.130	0.94	0.89	224.5	YES	NO	bd	bb	16.413
18	13468-PECDF	26.79	4.200e3	2.658e3	1.241	1.58	1.55	119.7	YES	NO	bb	bb	1.895

TD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetradioxins	25.21	1.140e2	1.575e2	1.129	0.72	0.77	3.2	YES	NO	bb	bb	0.081
2	Total-tetradioxins	23.43	3.364e2	4.624e2	1.129	0.73	0.77	9.1	YES	NO	bb	bb	0.240

PD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-pentadioxins	29.87	2.494e2	1.593e2	1.548	1.57	1.55	7.5	YES	NO	bb	db	0.128
2	Total-pentadioxins	29.74	4.292e2	2.968e2	1.548	1.45	1.55	11.1	YES	NO	bb	bd	0.228
3	Total-pentadioxins	29.53	4.899e2	3.037e2	1.548	1.61	1.55	12.2	YES	NO	bb	bb	0.249
4	Total-pentadioxins	28.90	2.443e2	1.555e2	1.548	1.57	1.55	7.7	YES	NO	bb	bb	0.125
5	12479-PECDD	28.45	5.789e2	3.765e2	2.166	1.54	1.55	12.0	YES	NO	db	MM	0.214
6	12378-PeCDD	31.11	4.927e2	3.723e2	1.150	1.32	1.55	11.3	YES	NO	bb	bb	0.365

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HD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	123789-HxCDD	36.14	1.172e3	8.456e2	0.804	1.39	1.24	30.8	YES	NO	db	bb	0.982
2	123678-HxCDD	35.77	2.385e3	1.816e3	0.883	1.31	1.24	65.1	YES	NO	dd	db	1.800
3	Total-hexadioxins	34.85	9.578e2	8.591e2	0.943	1.11	1.24	27.2	YES	NO	db	db	0.754
4	Total-hexadioxins	34.75	7.930e3	6.567e3	0.943	1.21	1.24	144.9	YES	NO	bd	bd	6.013
5	Total-hexadioxins	34.38	1.577e3	1.409e3	0.943	1.12	1.24	40.4	YES	NO	bb	bb	1.238
6	124679-HXCDD	33.59	8.122e3	6.915e3	1.127	1.17	1.24	222.7	YES	NO	bb	bb	5.410

HPD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234678-HpCDD	39.85	4.227e4	4.411e4	1.200	0.96	1.05	599.6	YES	NO	bb	bd	48.236
2	1234679-HPCDD	38.83	9.033e4	9.083e4	1.303	0.99	1.05	1434.3	YES	NO	bb	bb	93.170

Dioxins,TD,PD,HD,HPD,OD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetradioxins	25.21	1.140e2	1.575e2	1.129	0.72	0.77	3.2	YES	NO	bb	bb	0.081
2	Total-tetradioxins	23.43	3.364e2	4.624e2	1.129	0.73	0.77	9.1	YES	NO	bb	bb	0.240
3	Total-pentadioxins	29.87	2.494e2	1.593e2	1.548	1.57	1.55	7.5	YES	NO	bb	db	0.128
4	Total-pentadioxins	29.74	4.292e2	2.968e2	1.548	1.45	1.55	11.1	YES	NO	bb	bd	0.228
5	Total-pentadioxins	29.53	4.899e2	3.037e2	1.548	1.61	1.55	12.2	YES	NO	bb	bb	0.249
6	Total-pentadioxins	28.90	2.443e2	1.555e2	1.548	1.57	1.55	7.7	YES	NO	bb	bb	0.125
7	12479-PECDD	28.45	5.789e2	3.765e2	2.166	1.54	1.55	12.0	YES	NO	db	MM	0.214
8	12378-PeCDD	31.11	4.927e2	3.723e2	1.150	1.32	1.55	11.3	YES	NO	bb	bb	0.365
9	123789-HxCDD	36.14	1.172e3	8.456e2	0.804	1.39	1.24	30.8	YES	NO	db	bb	0.982
10	123678-HxCDD	35.77	2.385e3	1.816e3	0.883	1.31	1.24	65.1	YES	NO	dd	db	1.800
11	Total-hexadioxins	34.85	9.578e2	8.591e2	0.943	1.11	1.24	27.2	YES	NO	db	db	0.754
12	Total-hexadioxins	34.75	7.930e3	6.567e3	0.943	1.21	1.24	144.9	YES	NO	bd	bd	6.013
13	Total-hexadioxins	34.38	1.577e3	1.409e3	0.943	1.12	1.24	40.4	YES	NO	bb	bb	1.238
14	124679-HXCDD	33.59	8.122e3	6.915e3	1.127	1.17	1.24	222.7	YES	NO	bb	bb	5.410
15	1234678-HpCDD	39.85	4.227e4	4.411e4	1.200	0.96	1.05	599.6	YES	NO	bb	bd	48.236
16	1234679-HPCDD	38.83	9.033e4	9.083e4	1.303	0.99	1.05	1434.3	YES	NO	bb	bb	93.170
17	OCDD	44.44	2.211e5	2.560e5	1.059	0.86	0.89	1892.8	YES	NO	bd	bd	383.577

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TotalTEQ,Furans,Dioxins

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.05	4.073e2	5.022e2	0.973	0.81	0.77	6.2	YES	NO	dd	bd	0.244
2	Total-tetrafurans	25.59	5.346e2	6.323e2	0.973	0.85	0.77	7.5	YES	NO	dd	dd	0.313
3	Total-tetrafurans	25.51	3.357e2	4.790e2	0.973	0.70	0.77	7.6	YES	NO	dd	dd	0.218
4	2378-TCDF	25.38	7.928e2	9.851e2	0.903	0.80	0.77	12.5	YES	NO	dd	bd	0.514
5	Total-tetrafurans	24.14	3.625e2	4.622e2	0.973	0.78	0.77	5.4	YES	NO	dd	dd	0.221
6	Total-pentafurans	29.16	5.738e2	3.287e2	0.931	1.75	1.55	14.6	YES	NO	bd	bd	0.340
7	23478-PeCDF	30.87	4.148e2	2.709e2	0.991	1.53	1.55	10.3	YES	NO	MM	bb	0.249
8	Total-pentafurans	29.73	4.672e2	2.651e2	0.931	1.76	1.55	13.8	YES	NO	bb	bd	0.276
9	123678-HxCDF	34.64	6.652e2	4.878e2	1.032	1.36	1.24	17.3	YES	NO	MM	db	0.452
10	Total-hexafurans	33.87	6.337e3	4.963e3	1.087	1.28	1.24	159.2	YES	NO	bb	bb	4.672
11	Total-hexafurans	33.03	5.430e3	4.267e3	1.087	1.27	1.24	136.0	YES	NO	bb	bb	4.009
12	123468-HXCDF	32.80	2.035e3	1.685e3	1.206	1.21	1.24	55.2	YES	NO	bb	bb	1.291
13	Total-hexafurans	36.01	1.299e2	1.028e2	1.087	1.26	1.24	5.7	YES	NO	bb	bb	0.096
14	1234789-HpCDF	40.59	3.553e2	3.041e2	1.104	1.17	1.05	7.9	YES	NO	MM	bd	0.463
15	Total-heptafurans	39.04	1.440e4	1.319e4	1.134	1.09	1.05	322.8	YES	NO	bd	bb	16.257
16	1234678-HpCDF	38.40	9.108e3	8.370e3	1.164	1.09	1.05	189.8	YES	NO	bb	bb	8.821
17	OCDF	44.68	1.057e4	1.122e4	1.130	0.94	0.89	224.5	YES	NO	bd	bb	16.413
18	13468-PECDF	26.79	4.200e3	2.658e3	1.241	1.58	1.55	119.7	YES	NO	bb	bb	1.895
19	Total-tetradioxins	25.21	1.140e2	1.575e2	1.129	0.72	0.77	3.2	YES	NO	bb	bb	0.081
20	Total-tetradioxins	23.43	3.364e2	4.624e2	1.129	0.73	0.77	9.1	YES	NO	bb	bb	0.240
21	Total-pentadioxins	29.87	2.494e2	1.593e2	1.548	1.57	1.55	7.5	YES	NO	bb	db	0.128
22	Total-pentadioxins	29.74	4.292e2	2.968e2	1.548	1.45	1.55	11.1	YES	NO	bb	bd	0.228
23	Total-pentadioxins	29.53	4.899e2	3.037e2	1.548	1.61	1.55	12.2	YES	NO	bb	bb	0.249
24	Total-pentadioxins	28.90	2.443e2	1.555e2	1.548	1.57	1.55	7.7	YES	NO	bb	bb	0.125
25	12479-PECDD	28.45	5.789e2	3.765e2	2.166	1.54	1.55	12.0	YES	NO	db	MM	0.214
26	12378-PeCDD	31.11	4.927e2	3.723e2	1.150	1.32	1.55	11.3	YES	NO	bb	bb	0.365
27	123789-HxCDD	36.14	1.172e3	8.456e2	0.804	1.39	1.24	30.8	YES	NO	db	bb	0.982
28	123678-HxCDD	35.77	2.385e3	1.816e3	0.883	1.31	1.24	65.1	YES	NO	dd	db	1.800
29	Total-hexadioxins	34.85	9.578e2	8.591e2	0.943	1.11	1.24	27.2	YES	NO	db	db	0.754
30	Total-hexadioxins	34.75	7.930e3	6.567e3	0.943	1.21	1.24	144.9	YES	NO	bd	bd	6.013
31	Total-hexadioxins	34.38	1.577e3	1.409e3	0.943	1.12	1.24	40.4	YES	NO	bb	bb	1.238
32	124679-HXCDD	33.59	8.122e3	6.915e3	1.127	1.17	1.24	222.7	YES	NO	bb	bb	5.410
33	1234678-HpCDD	39.85	4.227e4	4.411e4	1.200	0.96	1.05	599.6	YES	NO	bb	bd	48.236
34	1234679-HPCDD	38.83	9.033e4	9.083e4	1.303	0.99	1.05	1434.3	YES	NO	bb	bb	93.170
35	OCDD	44.44	2.211e5	2.560e5	1.059	0.86	0.89	1892.8	YES	NO	bd	bd	383.577

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PFK1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 PFK	22.17	9.499e3					0.9	NO		bb		
2	FUNCTION1 PFK	21.86	1.889e3					0.5	NO		bb		
3	FUNCTION1 PFK	21.62	4.869e4					1.7	NO		db		
4	FUNCTION1 PFK	21.45	1.043e4					1.1	NO		bd		
5	FUNCTION1 PFK	21.23	2.141e4					2.6	NO		bb		
6	FUNCTION1 PFK	27.19	7.275e4					2.9	NO		db		
7	FUNCTION1 PFK	27.14	1.622e4					2.2	NO		bd		
8	FUNCTION1 PFK	26.34	3.196e4					1.2	NO		bb		
9	FUNCTION1 PFK	25.86	8.921e3					1.2	NO		bb		
10	FUNCTION1 PFK	24.97	2.278e4					1.6	NO		bb		
11	FUNCTION1 PFK	24.80	8.108e3					1.0	NO		bb		
12	FUNCTION1 PFK	24.69	5.145e3					0.7	NO		bb		
13	FUNCTION1 PFK	23.88	1.817e4					1.6	NO		db		
14	FUNCTION1 PFK	23.83	1.925e4					1.8	NO		bd		
15	FUNCTION1 PFK	23.77	7.187e3					1.1	NO		bb		
16	FUNCTION1 PFK	23.34	7.682e3					1.1	NO		bb		
17	FUNCTION1 PFK	23.27	9.595e3					1.0	NO		bb		
18	FUNCTION1 PFK	23.05	4.231e4					1.7	NO		db		
19	FUNCTION1 PFK	22.94	2.091e4					1.4	NO		bd		

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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 PFK	27.71	6.927e3					2.3	NO		bb		0.000
2	FUNCTION2 PFK	29.75	3.360e4					4.8	YES		dd		0.000
3	FUNCTION2 PFK	29.60	7.889e4					8.7	YES		dd		0.000
4	FUNCTION2 PFK	29.46	1.594e5					11.8	YES		dd		0.000
5	FUNCTION2 PFK	29.42	1.235e5					12.6	YES		dd		0.000
6	FUNCTION2 PFK	29.25	1.490e5					14.4	YES		dd		0.000
7	FUNCTION2 PFK	29.23	6.080e4					13.9	YES		dd		0.000
8	FUNCTION2 PFK	29.13	2.276e5					15.1	YES		dd		0.000
9	FUNCTION2 PFK	28.97	3.427e4					7.6	YES		bd		0.000
10	FUNCTION2 PFK	28.76	3.689e5					19.6	YES		db		0.000
11	FUNCTION2 PFK	28.68	3.704e5					18.3	YES		dd		0.000
12	FUNCTION2 PFK	28.42	1.341e5					12.7	YES		dd		0.000
13	FUNCTION2 PFK	28.23	3.566e4					4.6	YES		dd		0.000
14	FUNCTION2 PFK	28.10	8.723e4					9.2	YES		dd		0.000
15	FUNCTION2 PFK	28.06	9.781e4					8.5	YES		dd		0.000
16	FUNCTION2 PFK	27.89	3.621e4					4.8	YES		dd		0.000
17	FUNCTION2 PFK	27.83	2.378e4					4.7	YES		bd		0.000
18	FUNCTION2 PFK	31.47	1.383e4					2.6	NO		dd		0.000
19	FUNCTION2 PFK	31.38	1.491e4					2.6	NO		dd		0.000
20	FUNCTION2 PFK	31.28	7.157e3					1.2	NO		bd		0.000
21	FUNCTION2 PFK	31.08	6.937e3					1.3	NO		db		0.000
22	FUNCTION2 PFK	30.95	9.634e3					1.8	NO		dd		0.000
23	FUNCTION2 PFK	30.91	1.064e4					2.2	NO		dd		0.000
24	FUNCTION2 PFK	30.83	6.156e3					1.5	NO		bd		0.000
25	FUNCTION2 PFK	30.70	7.455e3					1.9	NO		db		0.000
26	FUNCTION2 PFK	30.62	1.268e4					2.0	NO		dd		0.000
27	FUNCTION2 PFK	30.57	7.425e3					2.3	NO		bd		0.000
28	FUNCTION2 PFK	30.46	1.137e3					0.6	NO		bb		0.000
29	FUNCTION2 PFK	30.37	4.654e2					0.4	NO		bb		0.000
30	FUNCTION2 PFK	30.21	1.440e4					2.0	NO		bb		0.000
31	FUNCTION2 PFK	30.03	1.952e3					0.7	NO		db		0.000
32	FUNCTION2 PFK	29.97	8.995e3					2.1	NO		dd		0.000
33	FUNCTION2 PFK	29.89	1.826e4					3.0	YES		dd		0.000
34	FUNCTION2 PFK	32.38	8.994e3					1.4	NO		db		0.000
35	FUNCTION2 PFK	32.31	5.586e3					2.0	NO		dd		0.000
36	FUNCTION2 PFK	32.27	1.747e4					3.8	YES		dd		0.000
37	FUNCTION2 PFK	32.22	2.585e4					5.0	YES		dd		0.000

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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
38	FUNCTION2 PFK	32.19	1.352e4					4.4	YES		bd		0.000
39	FUNCTION2 PFK	32.07	4.925e4					7.9	YES		db		0.000
40	FUNCTION2 PFK	31.97	8.853e4					7.1	YES		dd		0.000
41	FUNCTION2 PFK	31.82	5.438e4					5.9	YES		dd		0.000
42	FUNCTION2 PFK	31.77	3.355e4					4.8	YES		dd		0.000
43	FUNCTION2 PFK	31.62	2.508e4					4.2	YES		dd		0.000
44	FUNCTION2 PFK	31.57	2.587e4					4.3	YES		dd		0.000
45	FUNCTION2 PFK	31.51	1.422e4					3.7	YES		dd		0.000

PFK3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 PFK	35.44	2.354e5					12.5	YES		bb		0.000
2	FUNCTION3 PFK	34.92	3.410e5					6.6	YES		bb		0.000
3	FUNCTION3 PFK	34.58	3.294e5					13.7	YES		bb		0.000
4	FUNCTION3 PFK	36.75	5.450e5					10.8	YES		bb		0.000
5	FUNCTION3 PFK	36.12	9.374e5					10.4	YES		db		0.000
6	FUNCTION3 PFK	36.02	2.031e4					4.2	YES		bd		0.000
7	FUNCTION3 PFK	35.70	1.428e5					3.6	YES		bb		0.000

PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

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PFK5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION5 PFK	43.90	3.034e2					0.3	NO		bb		
2	FUNCTION5 PFK	43.80	5.055e2					0.5	NO		bb		
3	FUNCTION5 PFK	43.74	1.557e3					0.9	NO		db		
4	FUNCTION5 PFK	43.68	8.804e3					2.0	NO		bd		
5	FUNCTION5 PFK	43.62	7.117e3					2.1	NO		bb		
6	FUNCTION5 PFK	43.35	7.264e3					1.2	NO		bb		
7	FUNCTION5 PFK	43.31	9.333e2					0.5	NO		bb		
8	FUNCTION5 PFK	43.14	6.455e3					1.9	NO		db		
9	FUNCTION5 PFK	43.11	3.540e3					1.5	NO		dd		
10	FUNCTION5 PFK	43.08	2.853e3					1.3	NO		bd		
11	FUNCTION5 PFK	45.14	1.579e3					0.9	NO		bb		
12	FUNCTION5 PFK	45.06	1.845e3					1.0	NO		bb		
13	FUNCTION5 PFK	45.00	3.435e3					1.2	NO		db		
14	FUNCTION5 PFK	44.97	8.689e3					2.2	NO		bd		
15	FUNCTION5 PFK	44.91	3.298e3					1.5	NO		bb		
16	FUNCTION5 PFK	44.85	2.981e3					1.4	NO		db		
17	FUNCTION5 PFK	44.81	7.292e3					1.7	NO		dd		
18	FUNCTION5 PFK	44.76	6.561e2					0.5	NO		bd		
19	FUNCTION5 PFK	44.71	1.092e4					2.9	NO		bb		
20	FUNCTION5 PFK	44.55	1.015e3					0.6	NO		bb		
21	FUNCTION5 PFK	44.47	1.125e4					1.9	NO		db		
22	FUNCTION5 PFK	44.42	8.482e3					1.8	NO		bd		
23	FUNCTION5 PFK	44.29	2.925e3					0.8	NO		bb		
24	FUNCTION5 PFK	44.12	3.189e2					0.0	NO		bb		
25	FUNCTION5 PFK	44.10	2.018e3					1.0	NO		bb		
26	FUNCTION5 PFK	43.99	8.600e2					0.5	NO		bb		
27	FUNCTION5 PFK	45.79	1.029e4					1.3	NO		bb		
28	FUNCTION5 PFK	45.57	1.246e4					1.6	NO		db		
29	FUNCTION5 PFK	45.47	5.744e3					1.2	NO		bd		
30	FUNCTION5 PFK	45.33	1.100e4					2.2	NO		db		
31	FUNCTION5 PFK	45.28	2.449e3					1.2	NO		dd		
32	FUNCTION5 PFK	45.25	7.627e2					0.7	NO		bd		
33	FUNCTION5 PFK	45.21	6.920e3					1.6	NO		bb		

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ETHERS1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 HXCD...	26.40	7.533e1					3.7	YES		bb		0.000
2	FUNCTION1 HXCD...	25.76	3.351e2					10.0	YES		bb		0.000
3	FUNCTION1 HXCD...	25.45	1.766e2					6.1	YES		db		0.000
4	FUNCTION1 HXCD...	25.39	1.594e2					5.7	YES		bd		0.000
5	FUNCTION1 HXCD...	24.63	9.234e1					3.6	YES		bb		0.000
6	FUNCTION1 HXCD...	23.53	7.140e1					2.7	NO		db		0.000
7	FUNCTION1 HXCD...	23.40	3.241e2					9.6	YES		bd		0.000
8	FUNCTION1 HXCD...	21.93	1.297e2					5.5	YES		bb		0.000
9	FUNCTION1 HXCD...	27.27	1.039e2					3.0	YES		bb		0.000

ETHERS2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 HPCD...	30.76	7.358e1					2.5	NO		bb		0.000
2	FUNCTION2 HPCD...	30.45	7.607e1					2.0	NO		bb		0.000
3	FUNCTION2 HPCD...	28.56	2.427e2					9.2	YES		bb		0.000

ETHERS4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 OCDPE	33.82	2.020e2					11.8	YES		bb		0.000
2	FUNCTION3 OCDPE	32.71	7.959e1					5.6	YES		bb		0.000

ETHERS5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 NCDPE	38.05	3.582e2					14.3	YES		bb		0.000

ETHERS6

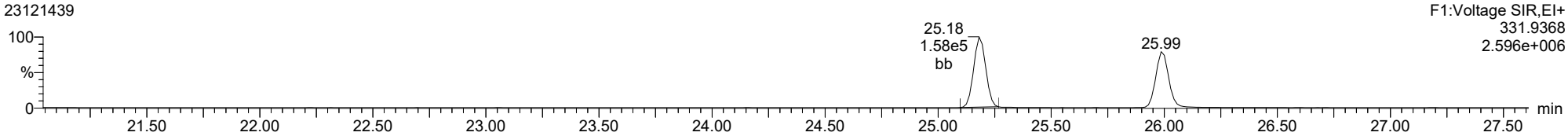
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1													

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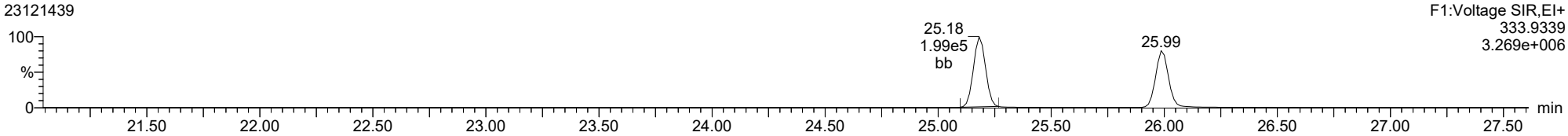
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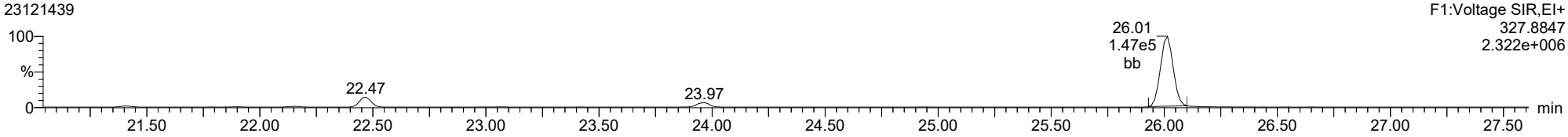
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13C-1234-TCDD



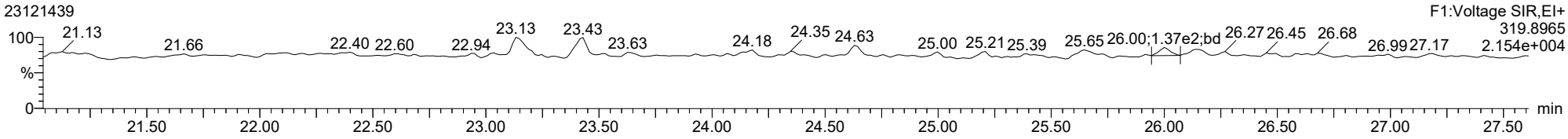
37CL-2378-TCDD



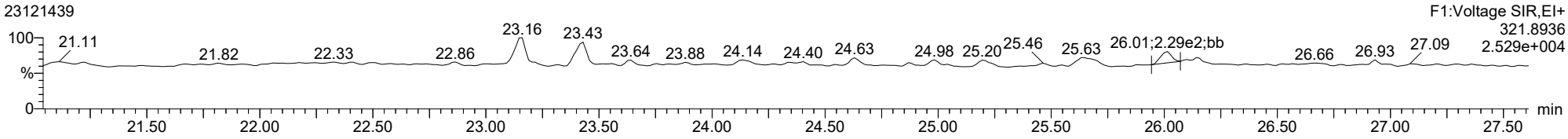
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ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

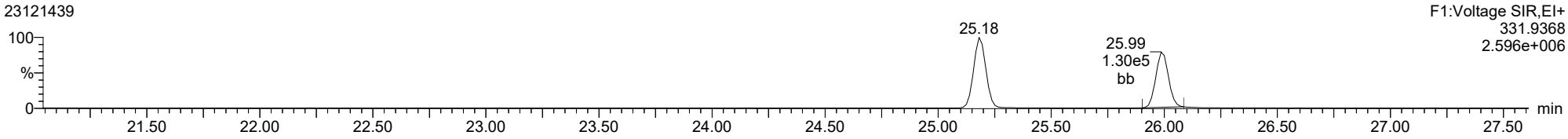
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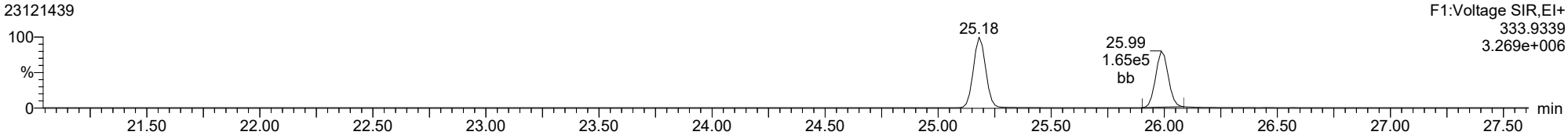
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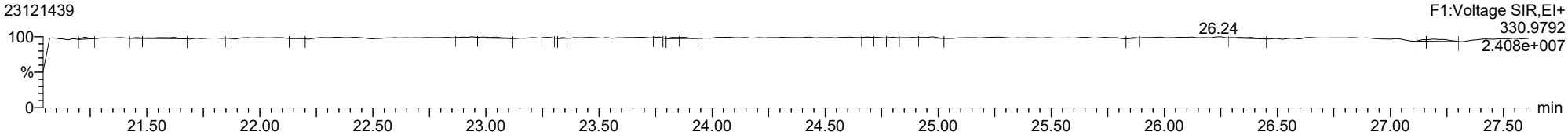
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13C-2378-TCDD

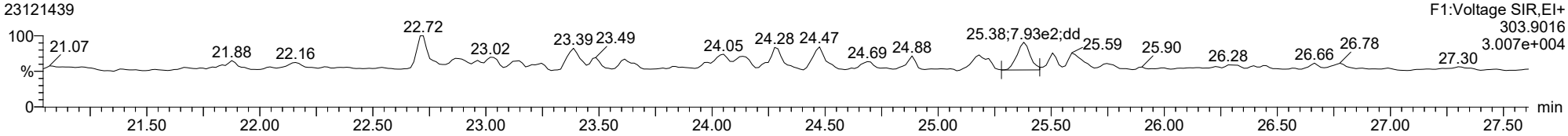


FUNCTION1 PFK

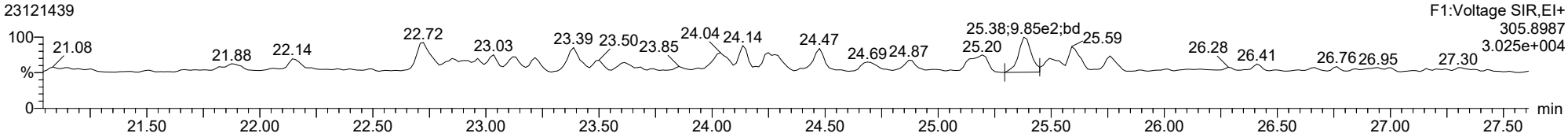


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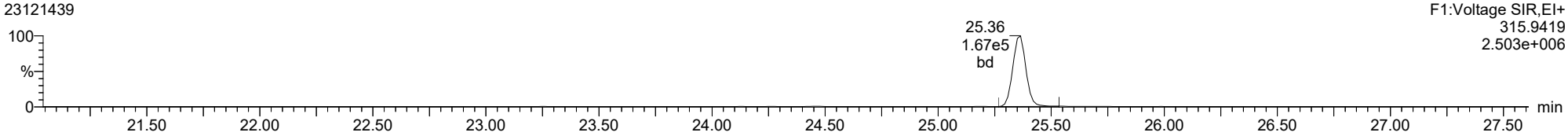
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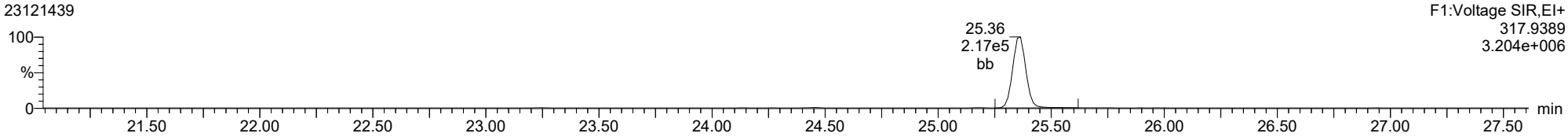
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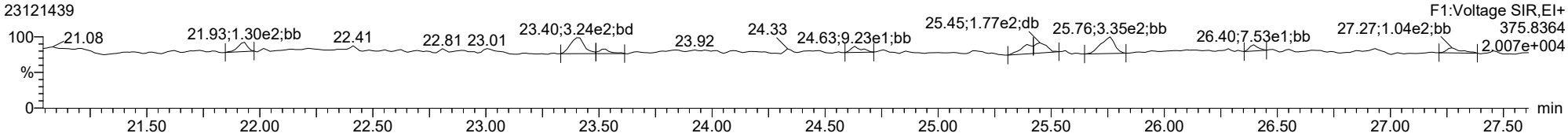
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13C-2378-TCDF

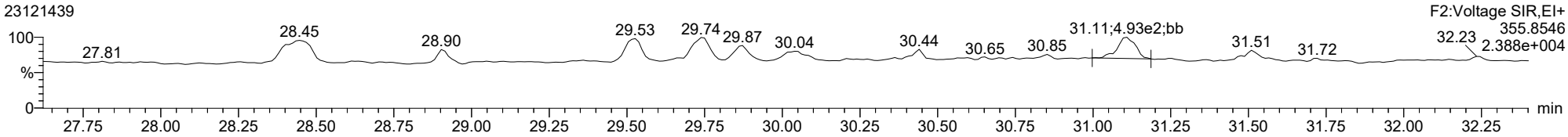


FUNCTION1 HXCDPE

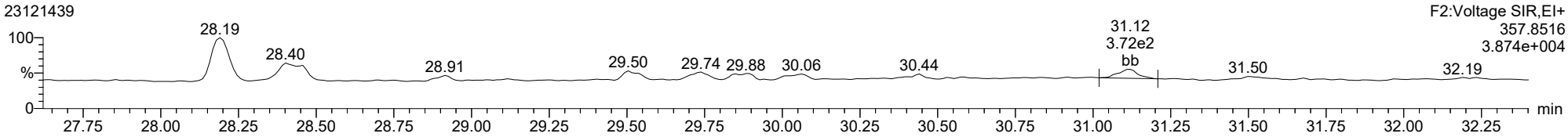


ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

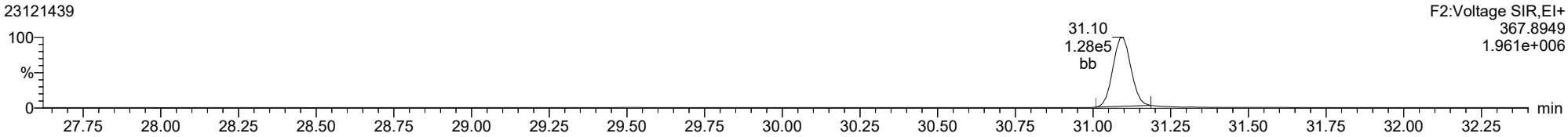
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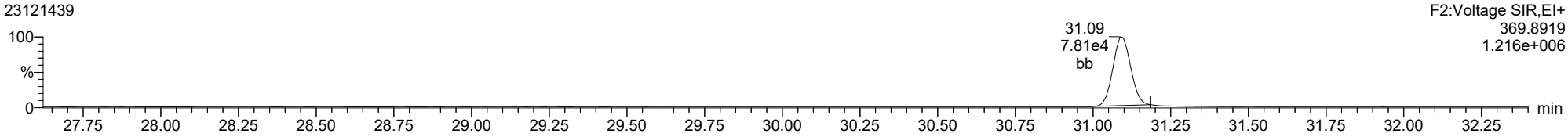
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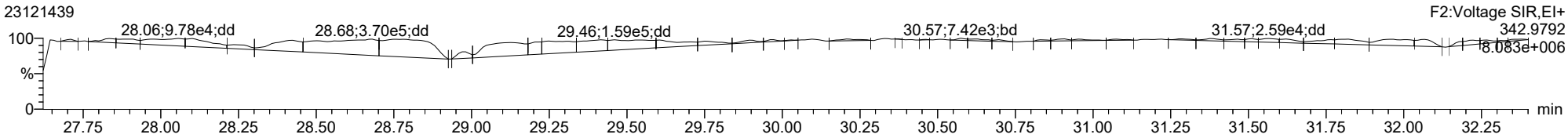
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13C-12378-PeCDD

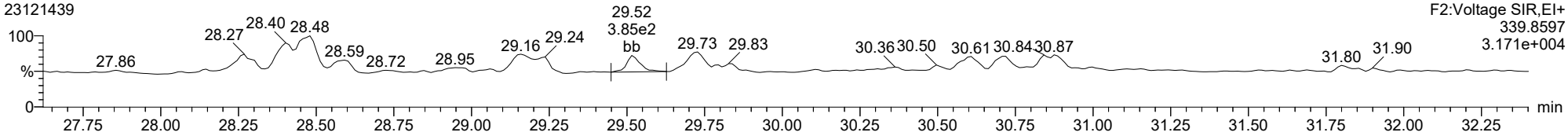


FUNCTION2 PFK

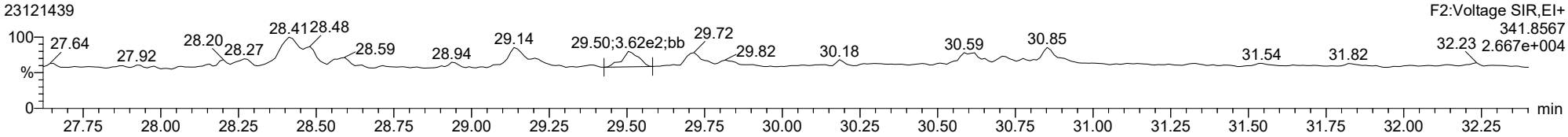


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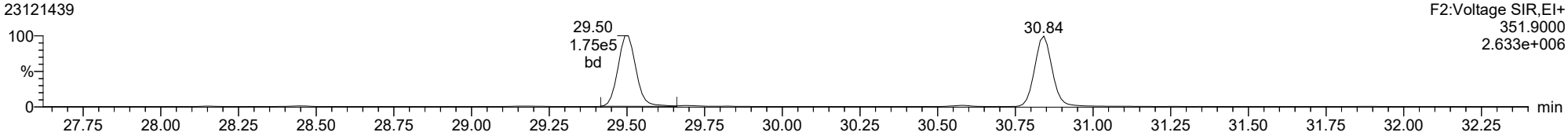
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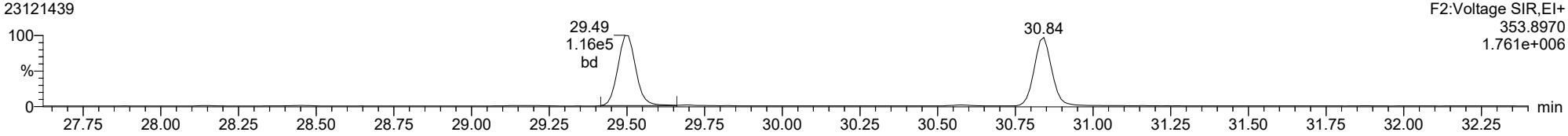
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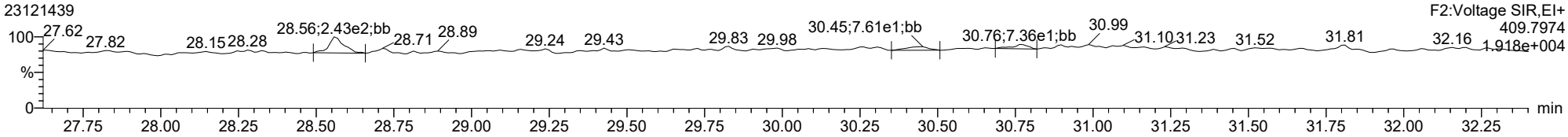
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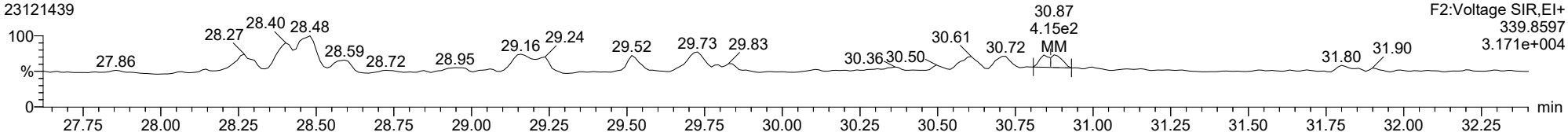


FUNCTION2 HPCDPE

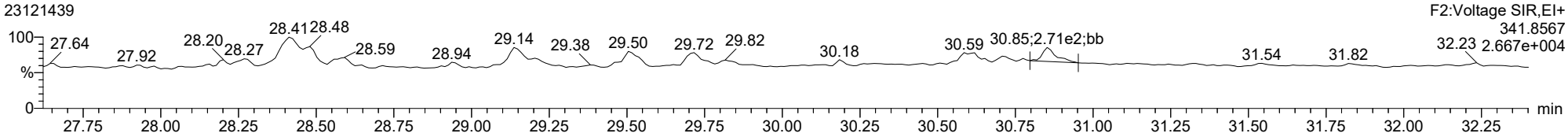


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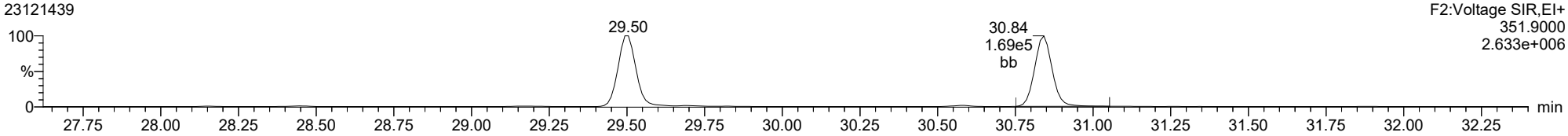
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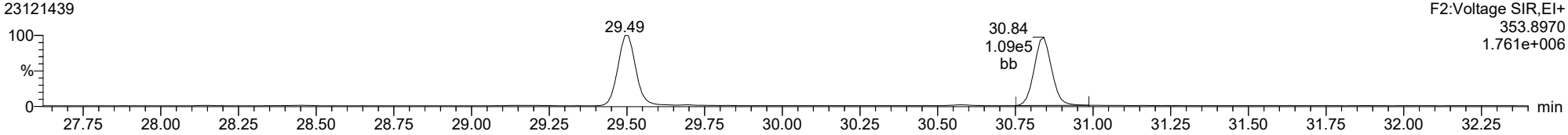
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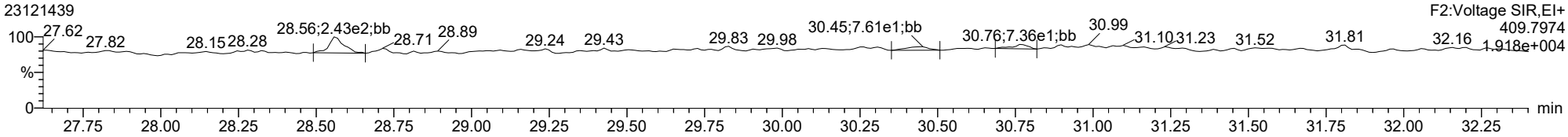
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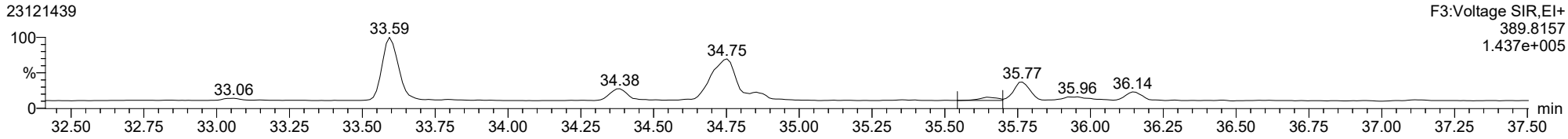


FUNCTION2 HPCDPE

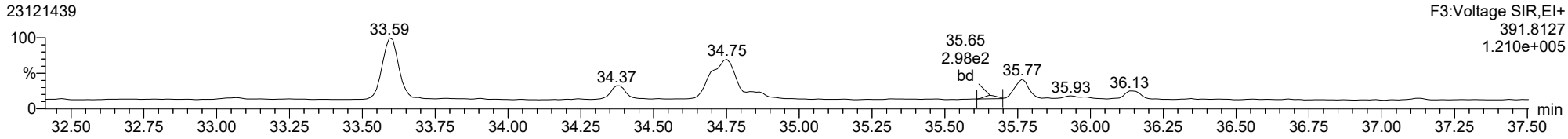


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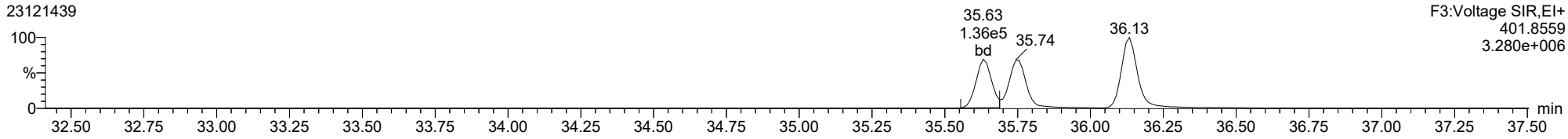
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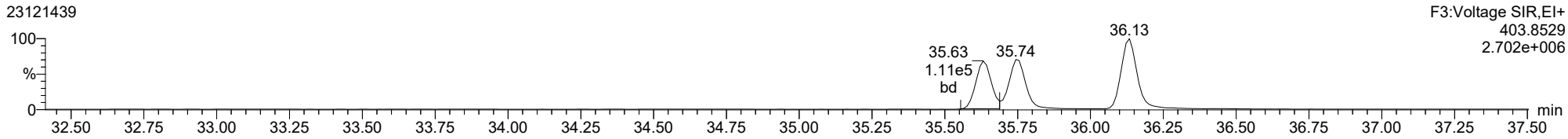
123478-HxCDD



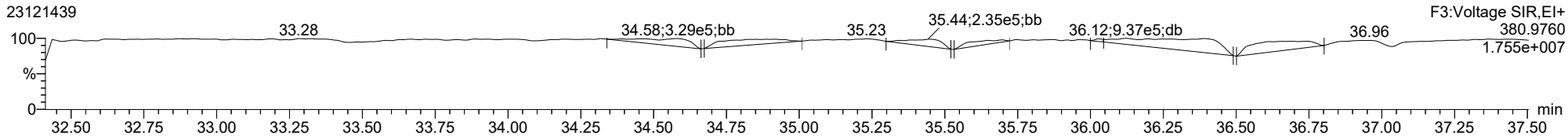
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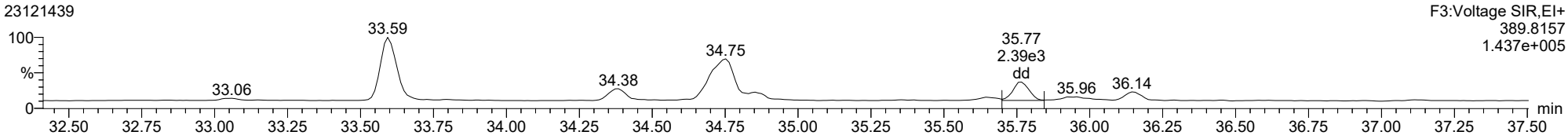
FUNCTION3 PFK



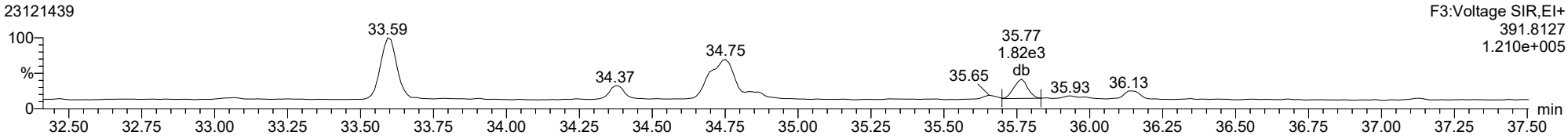
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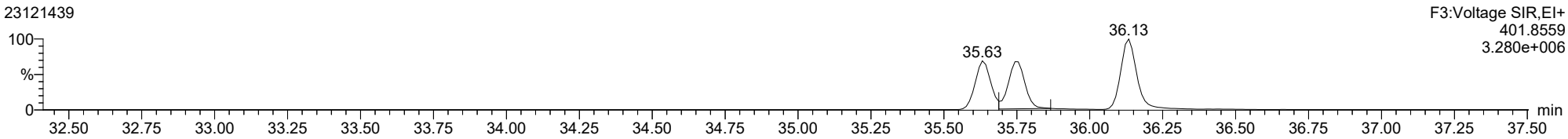
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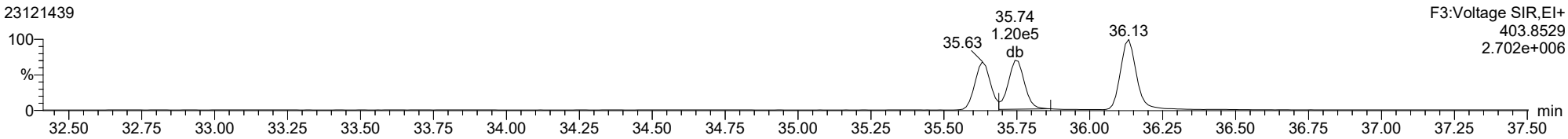
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13C-123678-HxCDD

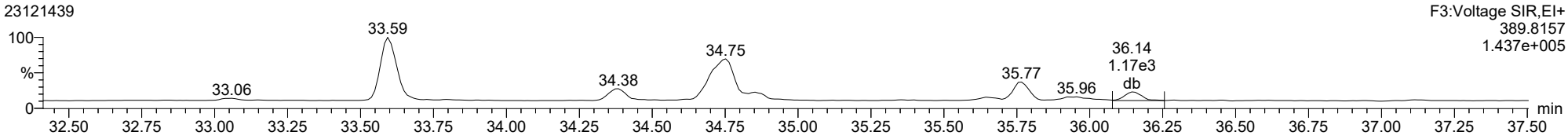


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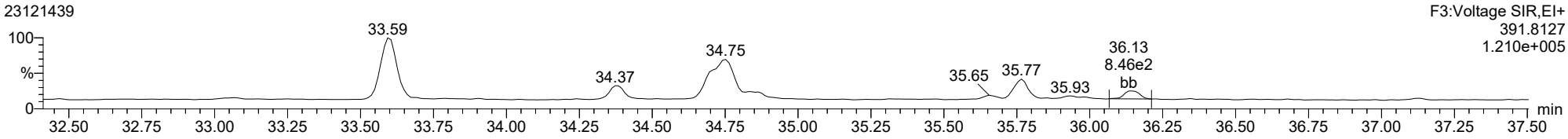


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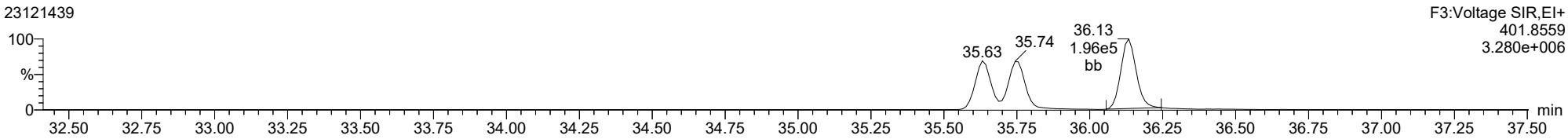
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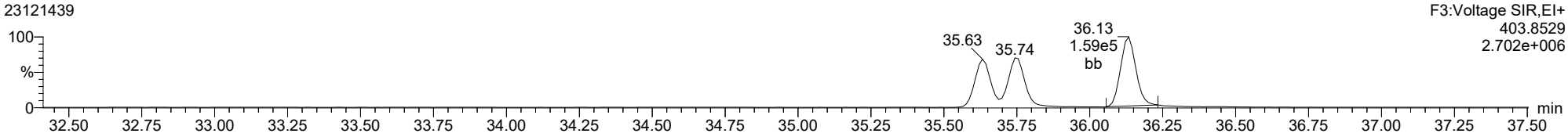
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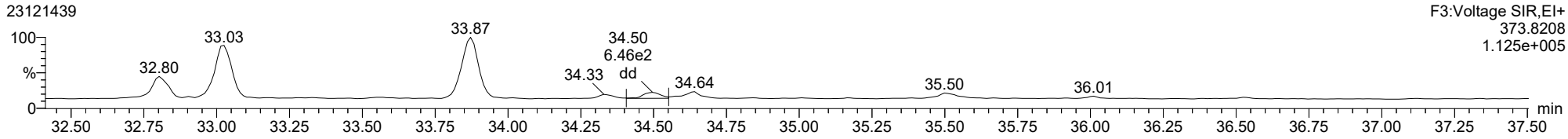


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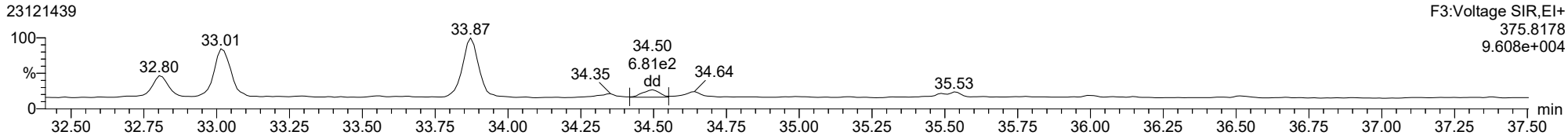


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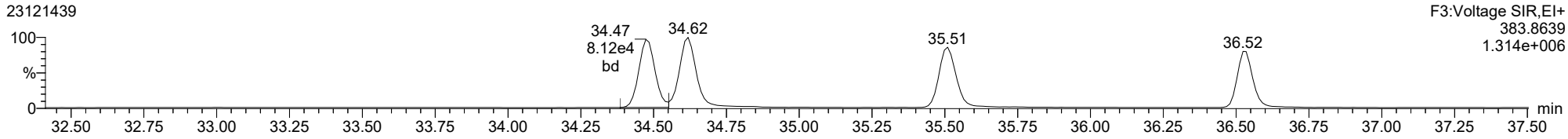
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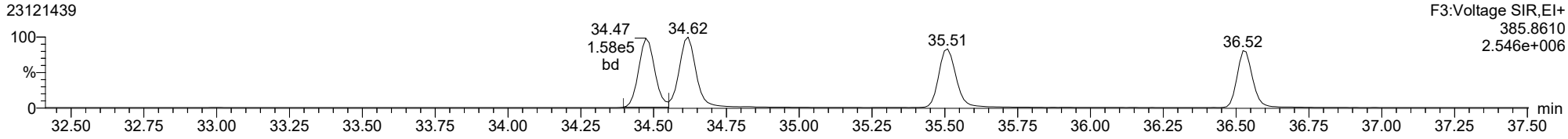
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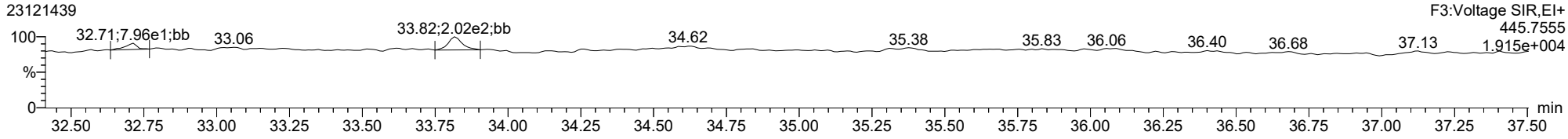
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13C-123478-HxCDF

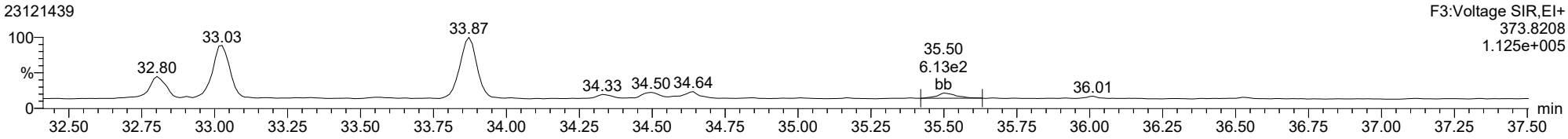


FUNCTION3 OCDPE

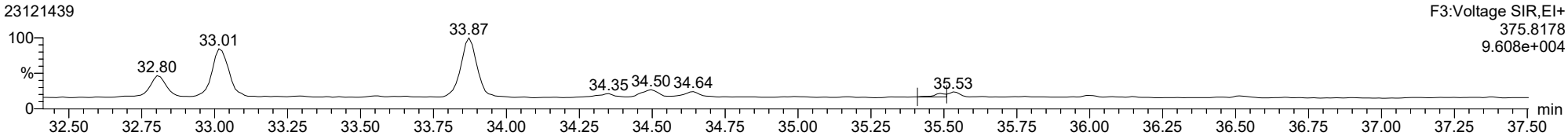


ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

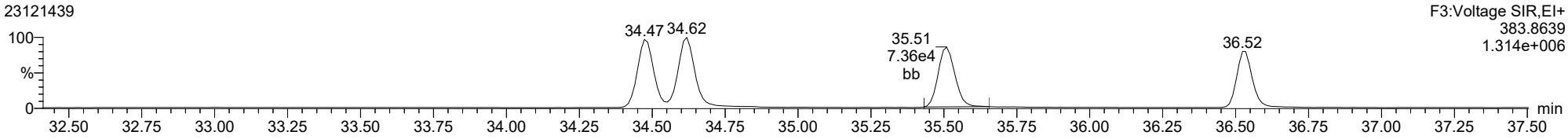
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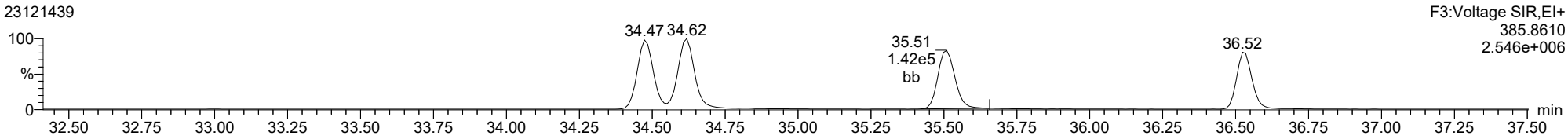
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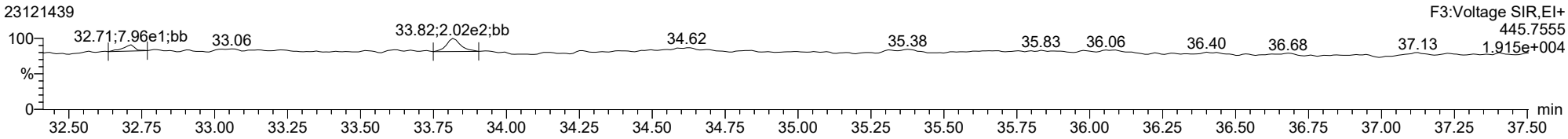
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13C-234678-HxCDF

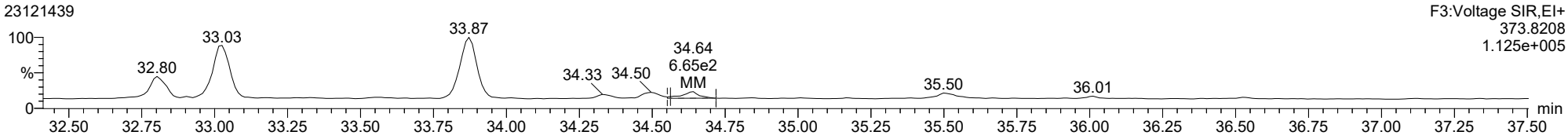


FUNCTION3 OCDPE

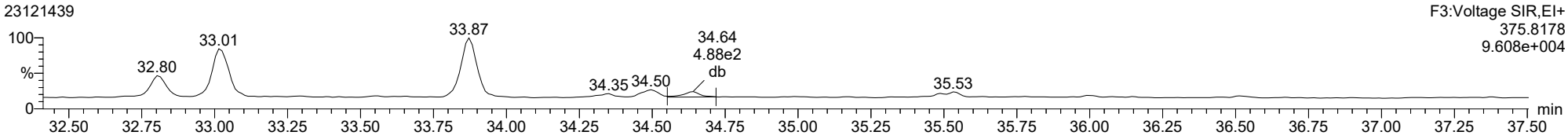


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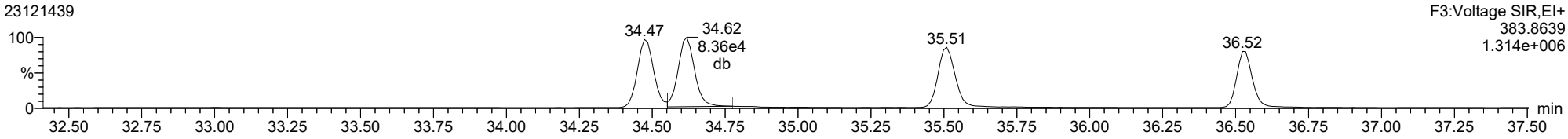
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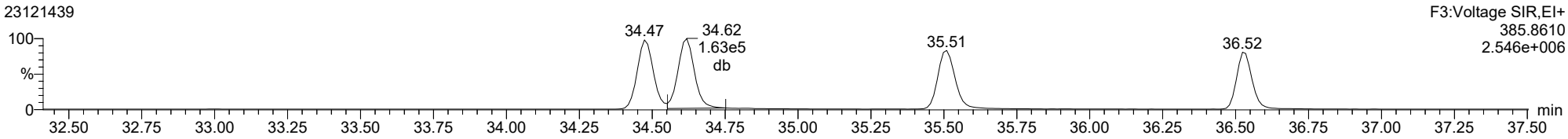
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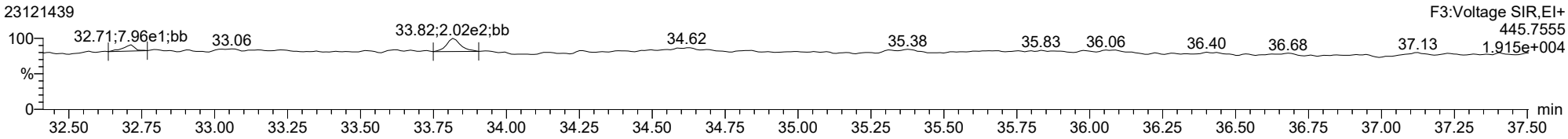
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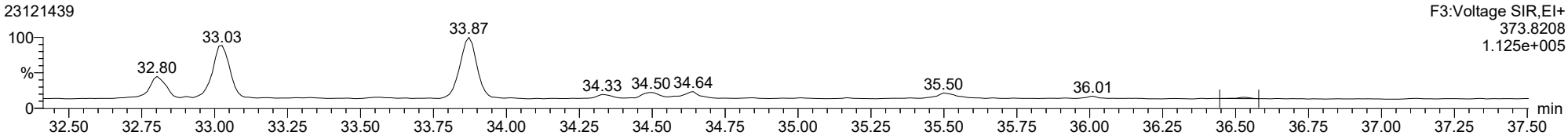


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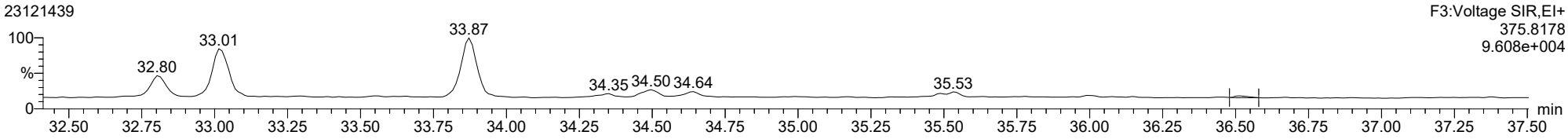


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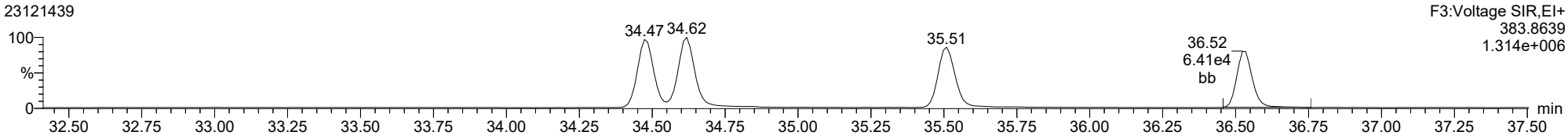
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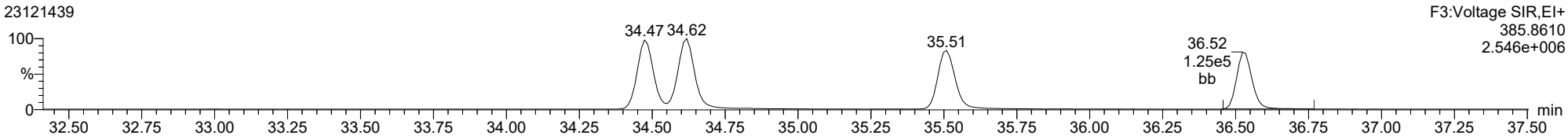
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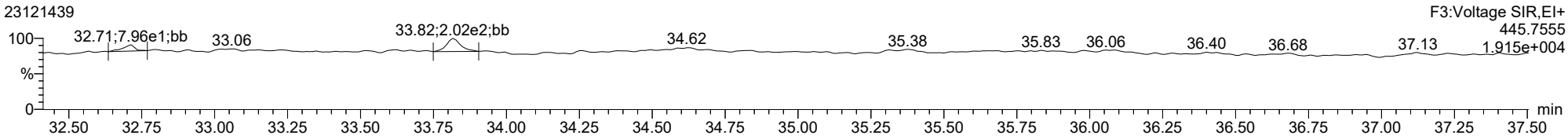
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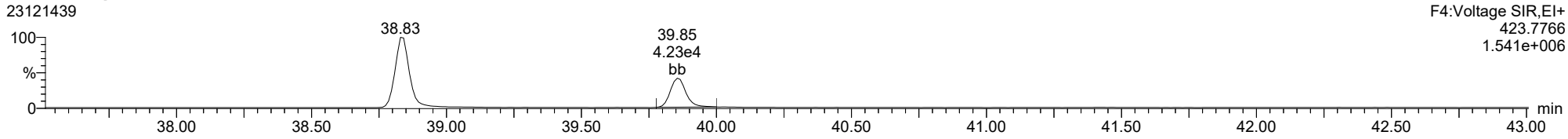


FUNCTION3 OCDPE

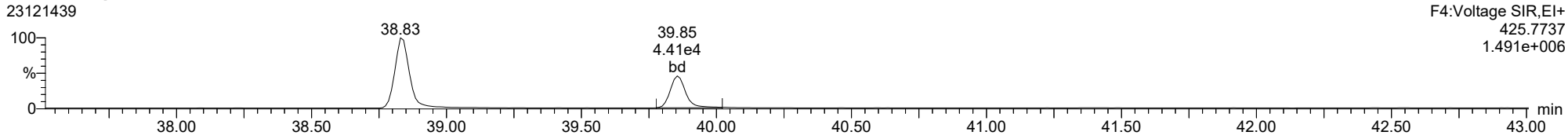


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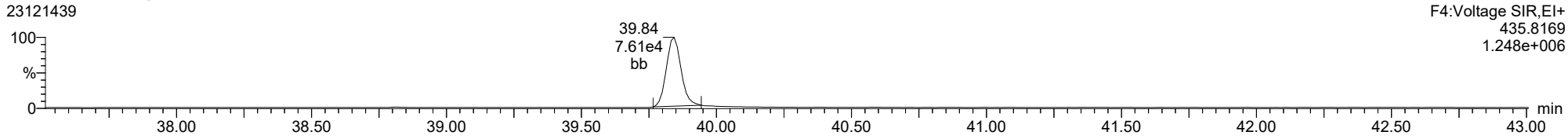
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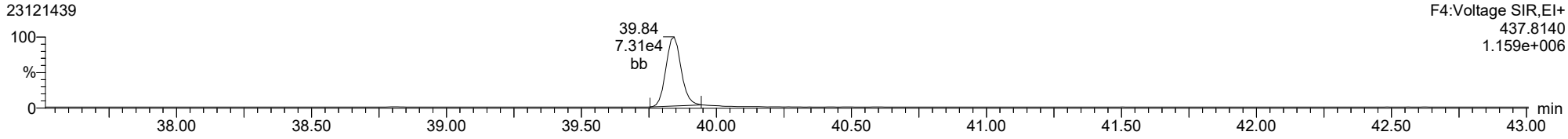
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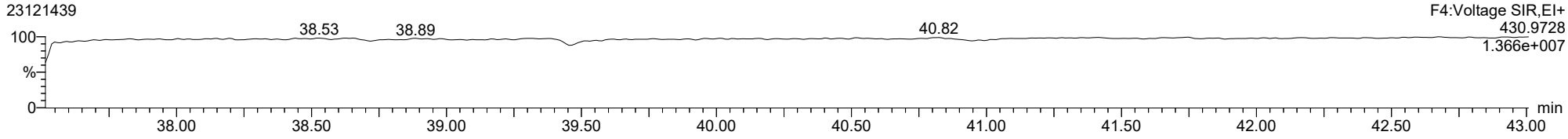
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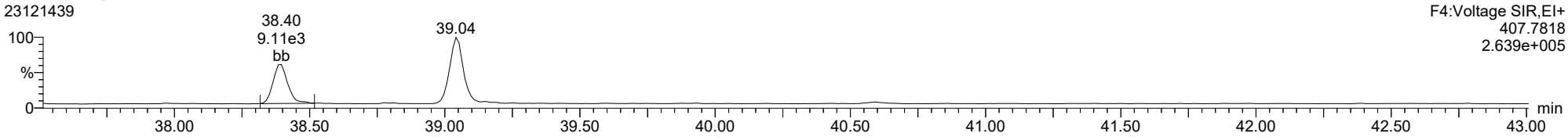


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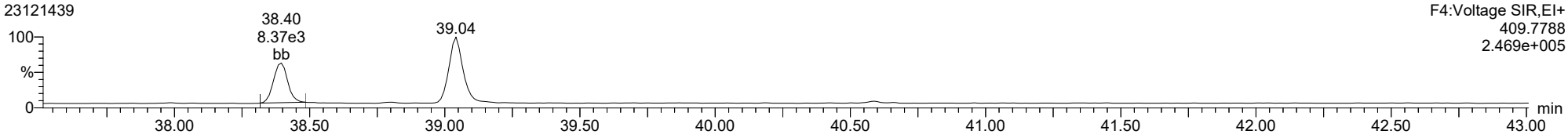


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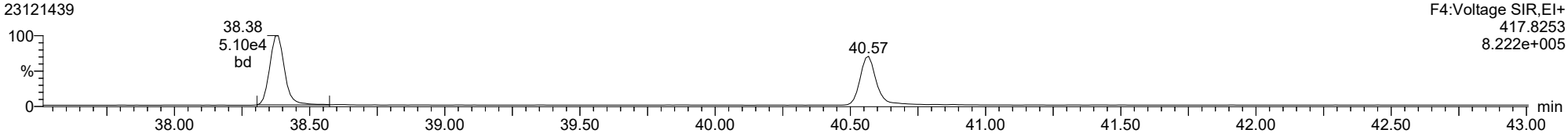
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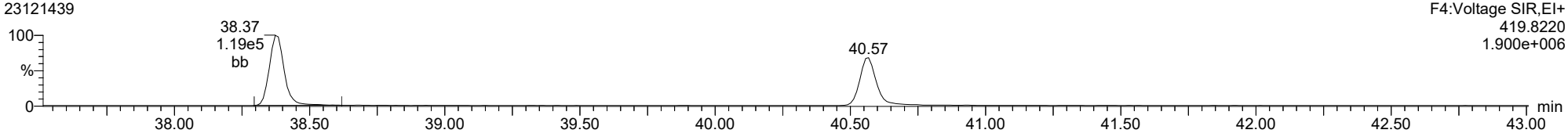
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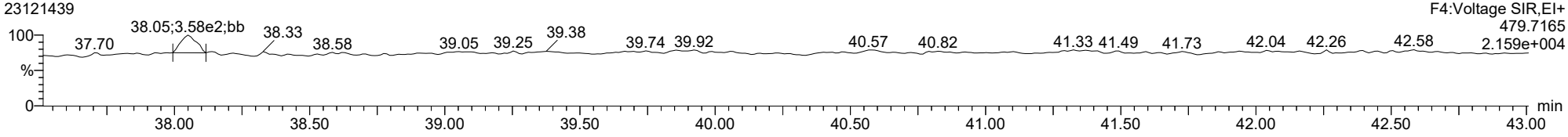
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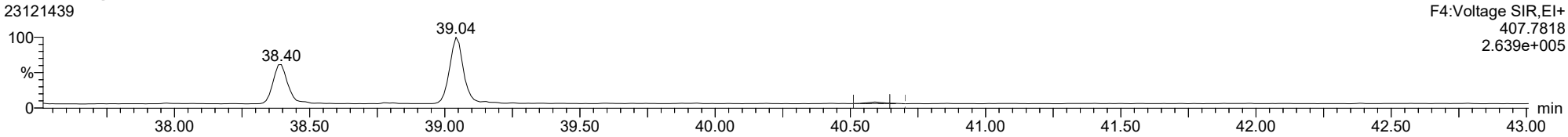


FUNCTION4 NCDPE

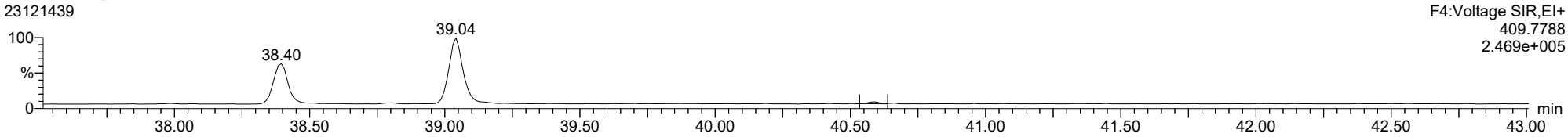


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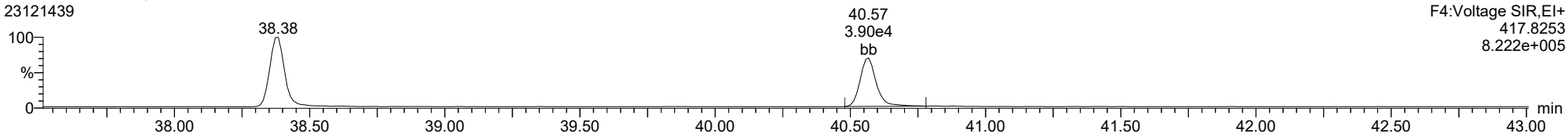
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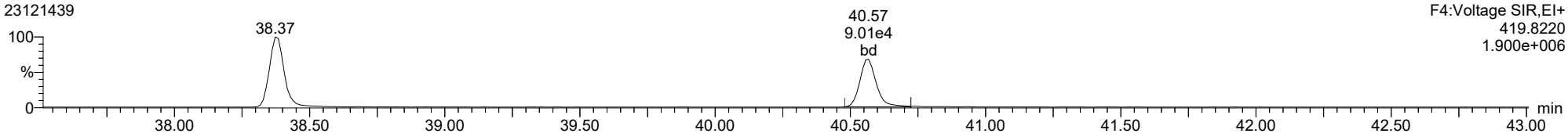
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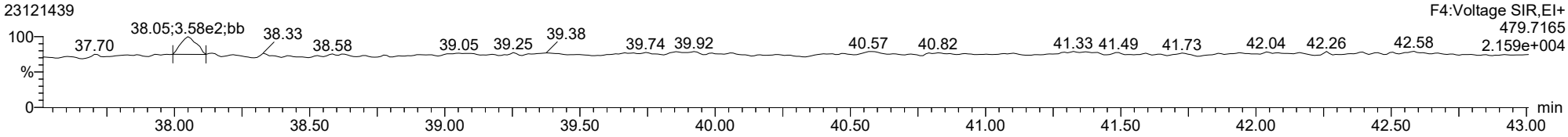
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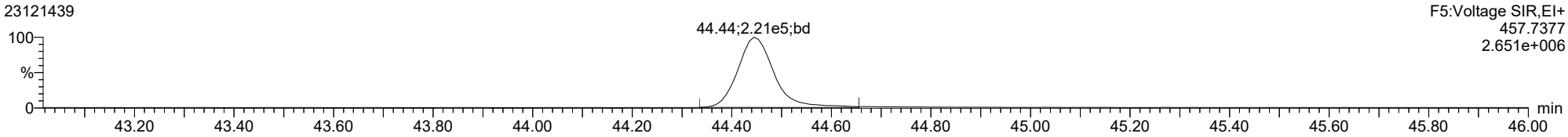


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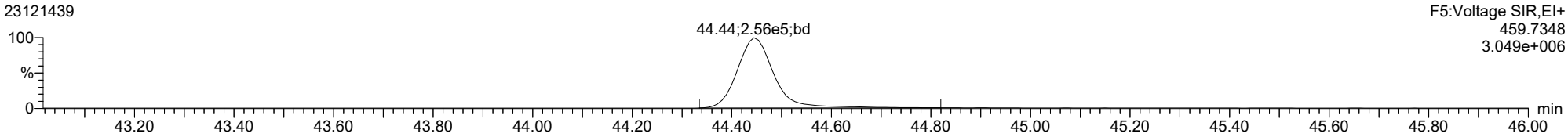


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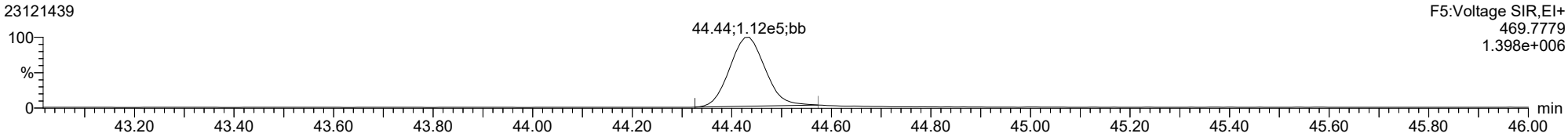
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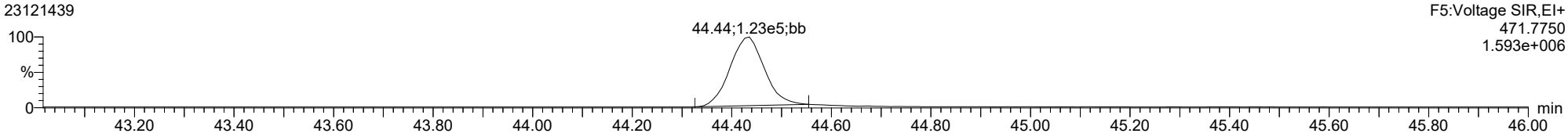
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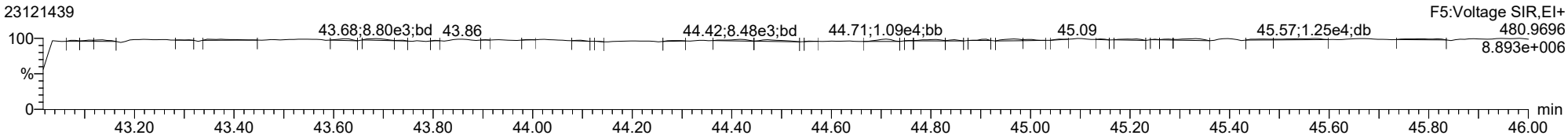
13C-OCDD



13C-OCDD



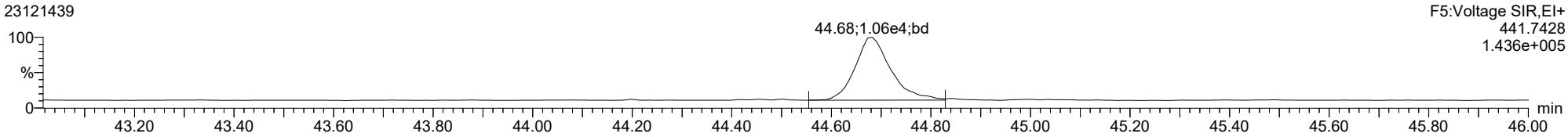
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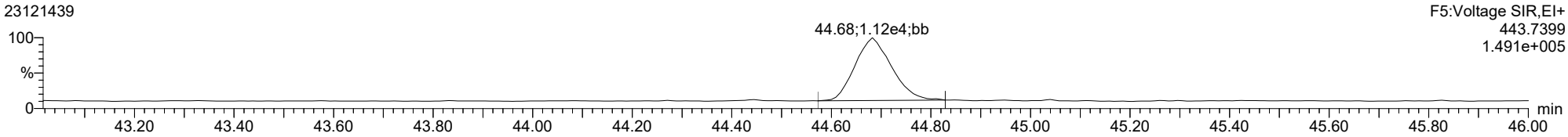
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ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

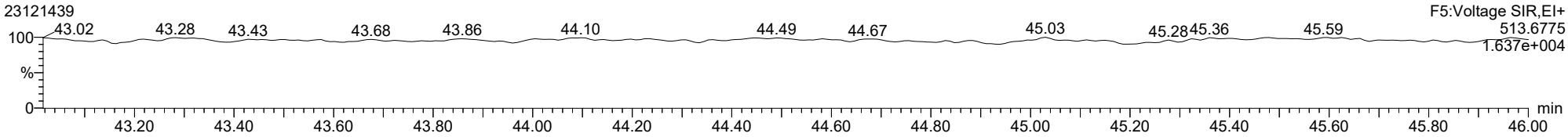
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OCDF

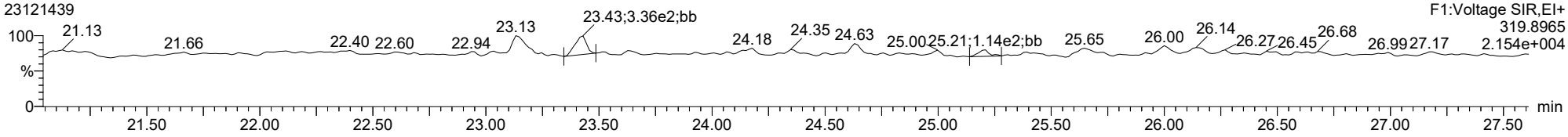


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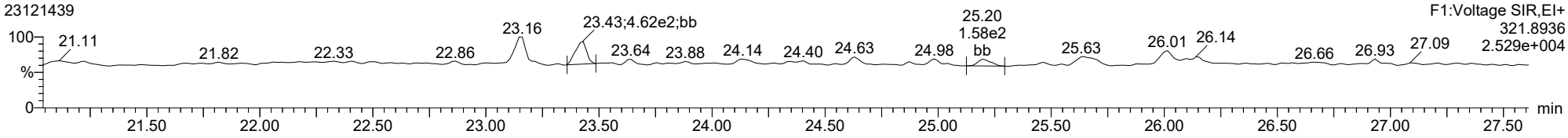


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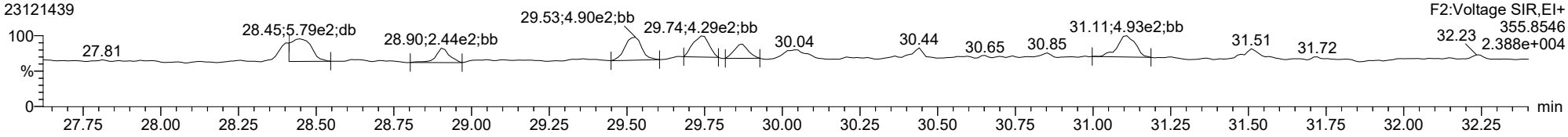
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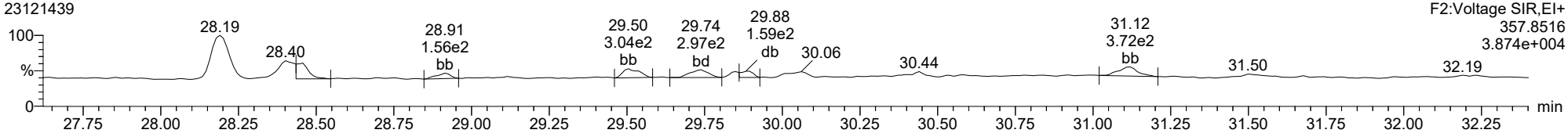
Total-tetradioxins



Total-pentadioxins

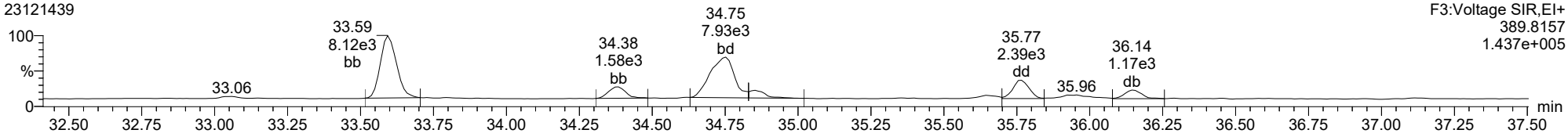


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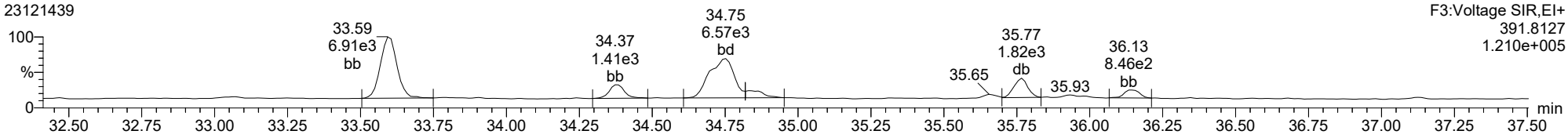


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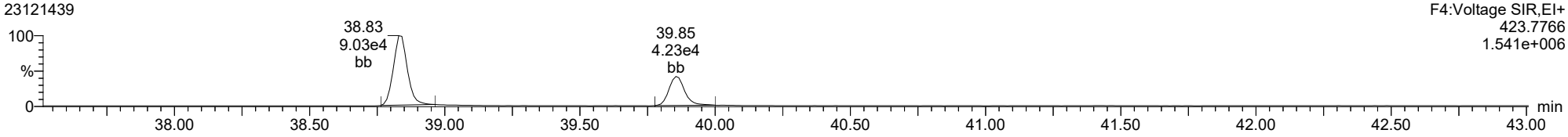
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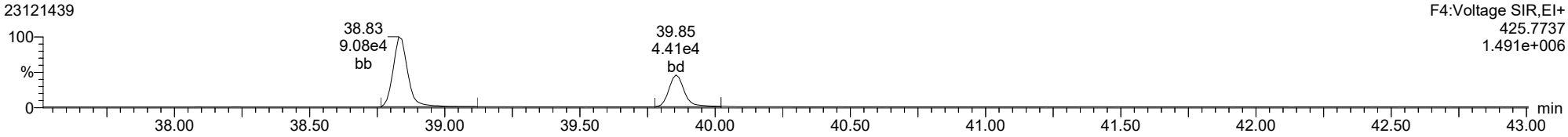
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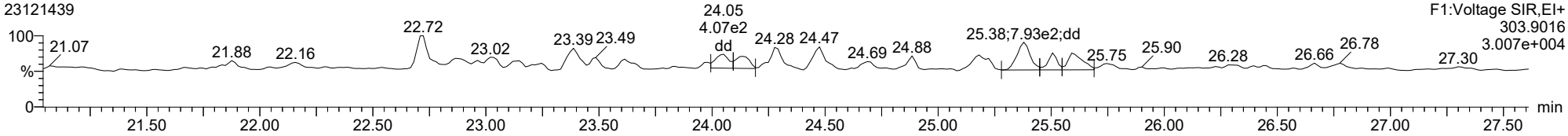


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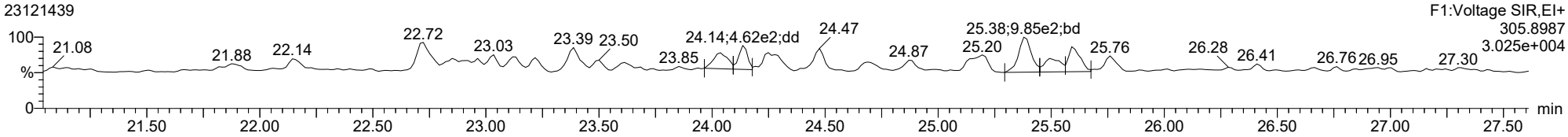


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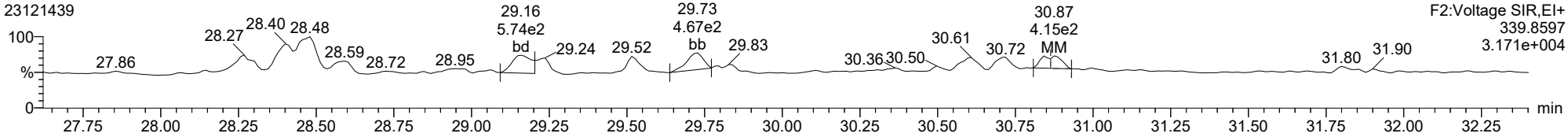
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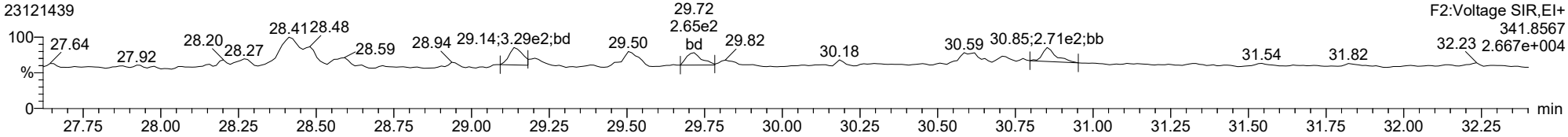
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Total-pentafurans



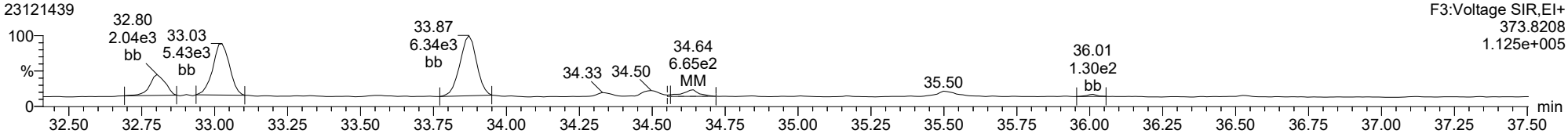
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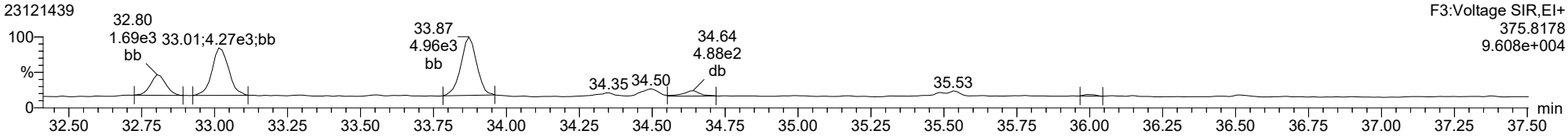
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ID: 23J0690-04, Name: 23121439, Date: 15-Dec-2023, Time: 22:06:47, Conditions: AUTOSPEC01, User: pk

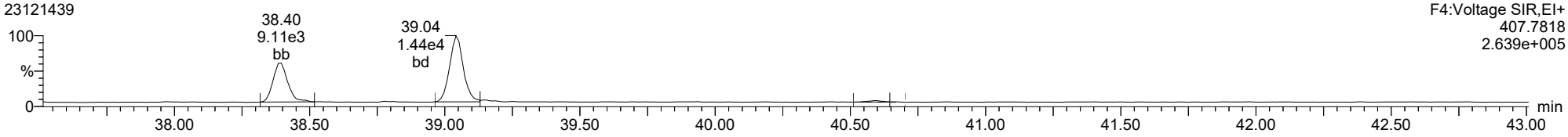
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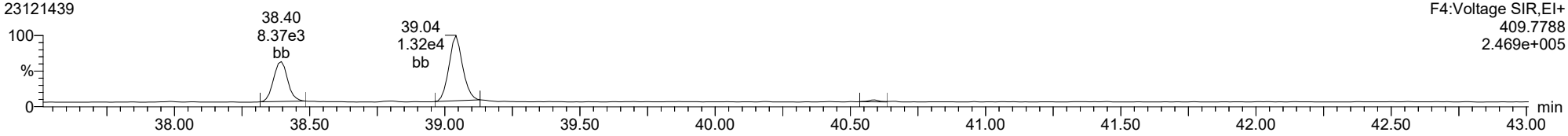
Total-hexafurans



Total-heptafurans



Total-heptafurans



Analytical Resources, LLC
Analytical Chemists and Consultants

SED-27C:0-1

Form 1
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-06 A	File ID:	23121440
Sampled:	03/22/23 13:24	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 22:55
% Solids:	69.45	Preparation:	EPA 1613	Initial/Final:	14.52 g Wet / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.200	0.655-0.886	0.272	0.992	0.703	ng/kg	X, EMPC, J
1746-01-6	2,3,7,8-TCDD	1		0.655-0.886	0.169	0.992	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1	1.493	1.318-1.783	0.377	0.992	0.436	ng/kg	J
57117-31-4	2,3,4,7,8-PeCDF	1	1.617	1.318-1.783	0.355	0.992	0.543	ng/kg	J
40321-76-4	1,2,3,7,8-PeCDD	1	1.170	1.318-1.783	0.273	0.992	0.685	ng/kg	EMPC, J
70648-26-9	1,2,3,4,7,8-HxCDF	1	1.712	1.054-1.426	0.223	0.992	1.34	ng/kg	EMPC
57117-44-9	1,2,3,6,7,8-HxCDF	1	1.406	1.054-1.426	0.232	0.992	1.13	ng/kg	
60851-34-5	2,3,4,6,7,8-HxCDF	1	1.321	1.054-1.426	0.258	0.992	1.43	ng/kg	
72918-21-9	1,2,3,7,8,9-HxCDF	1		1.054-1.426	0.311	0.992	ND	ng/kg	U
39227-28-6	1,2,3,4,7,8-HxCDD	1	1.113	1.054-1.426	0.307	0.992	1.03	ng/kg	
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.199	1.054-1.426	0.339	0.992	4.34	ng/kg	
19408-74-3	1,2,3,7,8,9-HxCDD	1	1.398	1.054-1.426	0.370	0.992	2.92	ng/kg	
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	1.009	0.893-1.208	0.348	0.992	24.9	ng/kg	B
55673-89-7	1,2,3,4,7,8,9-HpCDF	1	1.027	0.893-1.208	0.543	0.992	1.59	ng/kg	
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	1.044	0.893-1.208	0.853	2.48	130	ng/kg	B
39001-02-0	OCDF	1	0.970	0.757-1.024	0.802	2.48	51.0	ng/kg	B
3268-87-9	OCDD	1	0.887	0.757-1.024	1.78	9.92	925	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.992	0.743	ng/kg	
41903-57-5	Total TCDD	1	0.000			0.992	0.778	ng/kg	
30402-15-4	Total PeCDF	1	0.000			0.992	5.44	ng/kg	
36088-22-9	Total PeCDD	1	0.000			0.992	0.581	ng/kg	
55684-94-1	Total HxCDF	1	0.000			0.992	29.0	ng/kg	
34465-46-8	Total HxCDD	1	0.000			0.992	28.0	ng/kg	
38998-75-3	Total HpCDF	1	0.000			0.992	66.8	ng/kg	
37871-00-4	Total HpCDD	1	0.000			0.992	362	ng/kg	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 4.01

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 4.11

SED-27C:0-1

Form 2

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Sediment	Laboratory ID:	23J0690-06	File ID:	23121440
Sampled:	03/22/23 13:24	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 22:55
Solids Wt%:	69.45	Preparation:	EPA 1613	Initial/Final:	14.52 g / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.775	0.655-0.886	0.143	52.7	24 - 169 %	
13C12-2,3,7,8-TCDD		0.777	0.655-0.886	0.205	65.2	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.516	1.318-1.783	0.214	52.4	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.508	1.318-1.783	0.227	51.4	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.593	1.318-1.783	0.249	66.0	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.507	0.434-0.587	0.247	58.1	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.511	0.434-0.587	0.201	49.8	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.509	0.434-0.587	0.246	53.0	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.509	0.434-0.587	0.283	54.3	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.209	1.054-1.426	0.354	69.6	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.225	1.054-1.426	0.293	59.6	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.451	0.374-0.506	0.271	46.4	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.424	0.374-0.506	0.354	45.6	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.036	0.893-1.208	0.386	60.9	23 - 140 %	
13C12-OCDD		0.852	0.757-1.024	0.591	52.7	17 - 157 %	
37Cl4-2,3,7,8-TCDD		328.000		0.089	84.5	35 - 197 %	

* Values outside of QC limits

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:41:09 Pacific Standard Time

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
2378-TCDF	25.379	1.001	1.368e2	6.834e2	0.903	0.200	0.770	800	751	3.18e3	9.44e3	4.0	12.6	YES	bd	bd	0.355
12378-PeCDF	29.515	1.000	2.322e2	1.556e2	0.923	1.493	1.550	841	784	4.20e3	3.06e3	5.0	3.9	NO	bb	bb	0.220
23478-PeCDF	30.841	1.000	2.968e2	1.836e2	0.991	1.617	1.550	841	784	4.85e3	2.96e3	5.8	3.8	NO	MM	MM	0.274
123478-HxCDF	34.496	1.001	7.079e2	4.136e2	1.128	1.712	1.240	426	532	8.77e3	5.81e3	20.6	10.9	YES	dd	MM	0.676
234678-HxCDF	35.509	1.000	5.959e2	4.510e2	1.081	1.321	1.240	426	532	7.96e3	5.70e3	18.7	10.7	NO	bb	bb	0.721
123678-HxCDF	34.629	1.000	5.306e2	3.774e2	1.032	1.406	1.240	426	532	6.09e3	5.94e3	14.3	11.2	NO	db	db	0.569
123789-HxCDF					0.988		1.240	426	532								
1234678-HpCDF	38.395	1.000	7.782e3	7.715e3	1.164	1.009	1.050	577	549	1.26e5	1.28e5	218.6	233.4	NO	bb	bb	12.578
1234789-HpCDF	40.579	1.000	3.589e2	3.495e2	1.104	1.027	1.050	577	549	5.25e3	4.50e3	9.1	8.2	NO	bb	bb	0.803
OCDF	44.682	1.006	1.110e4	1.145e4	1.130	0.970	0.890	682	795	1.39e5	1.40e5	204.6	176.1	NO	bb	bb	25.721
2378-TCDD					1.243		0.770	523	502								
12378-PeCDD	31.087	1.000	2.816e2	2.407e2	1.150	1.170	1.550	547	522	3.82e3	4.30e3	7.0	8.2	YES	MM	bb	0.345
123478-HxCDD	35.632	1.000	4.084e2	3.670e2	0.960	1.113	1.240	530	710	6.62e3	6.43e3	12.5	9.1	NO	MM	bd	0.521
123678-HxCDD	35.743	1.000	1.686e3	1.407e3	0.883	1.199	1.240	530	710	2.65e4	2.29e4	49.9	32.2	NO	dd	dd	2.186
123789-HxCDD	36.133	1.011	1.087e3	7.776e2	0.804	1.398	1.240	530	710	1.67e4	1.33e4	31.4	18.8	NO	MM	bb	1.473
1234678-HpCDD	39.866	1.001	3.579e4	3.428e4	1.200	1.044	1.050	1313	1058	5.28e5	5.16e5	402.2	487.9	NO	bb	bb	65.736
OCDD	44.453	1.000	1.801e5	2.031e5	1.059	0.887	0.890	1329	1734	2.14e6	2.44e6	1608.4	1405.9	NO	bb	bb	466.482
13C-2378-TCDF	25.365	1.007	1.118e5	1.443e5	1.835	0.775	0.770	1027	791	1.64e6	2.13e6	1596.0	2687.9	NO	dd	bb	52.747
13C-12378-PeCDF	29.504	1.172	1.150e5	7.588e4	1.377	1.516	1.550	1308	730	1.67e6	1.14e6	1278.0	1562.8	NO	bd	bd	52.424
13C-23478-PeCDF	30.841	1.225	1.065e5	7.060e4	1.301	1.508	1.550	1308	730	1.65e6	1.08e6	1263.6	1474.2	NO	bb	bb	51.442
13C-123478-HxCDF	34.473	0.954	4.945e4	9.754e4	1.091	0.507	0.510	957	697	7.63e5	1.48e6	797.6	2129.4	NO	bd	bd	58.147
13C-123678-HxCDF	34.618	0.958	5.226e4	1.023e5	1.340	0.511	0.510	957	697	8.04e5	1.57e6	840.5	2255.6	NO	db	db	49.760
13C-234678-HxCDF	35.498	0.983	4.525e4	8.896e4	1.093	0.509	0.510	957	697	6.90e5	1.37e6	720.8	1972.3	NO	bb	bb	52.956
13C-123789-HxCDF	36.534	1.011	4.034e4	7.932e4	0.952	0.509	0.510	957	697	6.26e5	1.21e6	654.5	1733.7	NO	bd	bb	54.253
13C-1234678-HpCDF	38.384	1.063	3.291e4	7.297e4	0.985	0.451	0.440	663	980	5.14e5	1.18e6	775.6	1205.3	NO	bb	bd	46.376
13C-1234789-HpCDF	40.568	1.123	2.379e4	5.611e4	0.756	0.424	0.440	663	980	3.33e5	7.92e5	502.2	807.9	NO	bb	bd	45.611
13C-1234-TCDD	25.181	0.000	1.161e5	1.484e5	1.000	0.783	0.770	1020	548	1.81e6	2.30e6	1770.1	4191.7	NO	bb	bb	100.000
13C-2378-TCDD	26.000	1.033	8.367e4	1.076e5	1.110	0.777	0.770	1020	548	1.27e6	1.62e6	1243.0	2959.4	NO	bb	bb	65.176
13C-12378-PeCDD	31.098	1.235	8.080e4	5.072e4	0.754	1.593	1.550	771	528	1.25e6	7.79e5	1616.6	1475.1	NO	bb	bb	65.970
13C-123478-HxCDD	35.621	0.986	8.476e4	7.012e4	0.960	1.209	1.240	711	1377	1.37e6	1.11e6	1928.3	809.6	NO	bd	bd	69.610
13C-123678-HxCDD	35.732	0.989	8.824e4	7.202e4	1.159	1.225	1.240	711	1377	1.36e6	1.12e6	1907.3	811.9	NO	db	db	59.644
13C-1234678-HpCDD	39.843	1.103	4.522e4	4.364e4	0.629	1.036	1.050	651	843	7.02e5	6.84e5	1077.9	811.8	NO	bb	bb	60.920
13C-OCDD	44.435	1.230	7.139e4	8.379e4	0.635	0.852	0.890	907	1398	8.92e5	9.86e5	983.0	705.0	NO	bb	bd	105.406
13C-123789-HxCDD	36.122	0.000	1.285e5	1.033e5	1.000	1.244	1.240	711	1377	2.03e6	1.67e6	2851.1	1214.5	NO	bb	bb	100.000
37CL-2378-TCDD	26.014	1.033	1.034e5		1.157			711		1.60e6		2249.4			bb		33.789

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:41:09 Pacific Standard Time

ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
1368-TCDF					1.170		0.770	800	751								
1289-TCDF					0.847		0.770	800	751								
13468-PECDF	26.791	0.908	3.274e3	2.057e3	1.241	1.592	1.550	475	537	5.02e4	2.95e4	105.7	55.0	NO	bb	bb	2.250
12389-PECDF					0.880		1.550	841	784								
123468-HXCDF	32.813	0.952	1.949e3	1.445e3	1.206	1.349	1.240	426	532	3.01e4	2.25e4	70.6	42.3	NO	db	db	1.915
1368-TCDD	23.161	0.891	3.610e2	5.246e2	1.181	0.688	0.770	523	502	6.01e3	7.74e3	11.5	15.4	NO	bb	bb	0.392
1289-TCDD					0.963		0.770	523	502								
12479-PECDD	28.424	0.914	5.272e2	1.965e2	2.166	2.683	1.550	547	522	8.11e3	5.47e3	14.8	10.5	YES	db	db	0.254
12389-PECDD					1.326		1.550	547	522								
124679-HXCDD	33.593	0.943	7.074e3	5.891e3	1.127	1.201	1.240	530	710	1.08e5	9.21e4	202.9	129.8	NO	bb	bb	7.430
1234679-HPCDD	38.841	0.975	6.727e4	6.794e4	1.303	0.990	1.050	1313	1058	1.09e6	1.09e6	830.3	1032.1	NO	bb	bd	116.813
Total-tetrafurans			3.986e2		0.973			800		8.97e3							0.375
Total-penta1			3.274e3					475		5.02e4							2.250
Total-pentafurans			5.290e2		0.931			841		9.05e3							0.494
Total-hexafurans			1.261e4		1.087			426		1.85e5							14.618
Total-heptafurans			1.931e4		1.134			577		3.13e5							33.698
Total-Furans			4.723e4		1.053			800		7.06e5							77.156
Total-tetradioxins			3.610e2		1.129			523		6.01e3							0.392
Total-pentadioxins			3.700e2		1.548			547		5.87e3							0.293
Total-hexadioxins			1.232e4		0.943			530		1.94e5							14.133
Total-heptadioxins			1.031e5		1.251			1313		1.62e6							182.549
Total-Dioxins			2.962e5		1.182			523		3.96e6							663.848
Total-TEQ			3.434e5					523		4.67e6							741.004
FUNCTION1 PFK			9.783e4					204892		1.75e6							
FUNCTION2 PFK			0.000e0					104947		0.00e0							
FUNCTION3 PFK			0.000e0					177201		0.00e0							
FUNCTION4 PFK			5.908e5					152382		1.04e7							
FUNCTION5 PFK			7.809e5					121382		4.19e6							
FUNCTION1 HXCD...			5.216e2					345		7.40e3							0.000
FUNCTION1 HPCD...																	
FUNCTION2 HPCD...			6.330e2					450		8.57e3							0.000
FUNCTION3 OCDPE			8.893e2					379		1.38e4							0.000
FUNCTION4 NCDPE			2.805e2					391		5.26e3							0.000
FUNCTION5 DCDPE			0.000e0					351		0.00e0							

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

TF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.04	2.286e2	2.987e2	0.973	0.77	0.77	6.3	YES	NO	dd	bd	0.212
2	Total-tetrafurans	25.51	1.700e2	2.365e2	0.973	0.72	0.77	4.9	YES	NO	dd	dd	0.163

PP

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	13468-PECDF	26.79	3.274e3	2.057e3	1.241	1.59	1.55	105.7	YES	NO	bb	bb	2.250

PF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	23478-PeCDF	30.84	2.968e2	1.836e2	0.991	1.62	1.55	5.8	YES	NO	MM	MM	0.274
2	12378-PeCDF	29.52	2.322e2	1.556e2	0.923	1.49	1.55	5.0	YES	NO	bb	bb	0.220

HF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	234678-HxCDF	35.51	5.959e2	4.510e2	1.081	1.32	1.24	18.7	YES	NO	bb	bb	0.721
2	123678-HxCDF	34.63	5.306e2	3.774e2	1.032	1.41	1.24	14.3	YES	NO	db	db	0.569
3	Total-hexafurans	34.33	2.609e2	2.201e2	1.087	1.19	1.24	9.2	YES	NO	bd	bd	0.319
4	Total-hexafurans	33.87	4.514e3	3.711e3	1.087	1.22	1.24	151.5	YES	NO	bb	bb	5.449
5	Total-hexafurans	33.03	4.760e3	3.761e3	1.087	1.27	1.24	170.5	YES	NO	bb	bb	5.645
6	123468-HXCDF	32.81	1.949e3	1.445e3	1.206	1.35	1.24	70.6	YES	NO	db	db	1.915

HPF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234789-HpCDF	40.58	3.589e2	3.495e2	1.104	1.03	1.05	9.1	YES	NO	bb	bb	0.803
2	Total-heptafurans	39.05	1.117e4	1.022e4	1.134	1.09	1.05	314.0	YES	NO	bb	bb	20.316
3	1234678-HpCDF	38.40	7.782e3	7.715e3	1.164	1.01	1.05	218.6	YES	NO	bb	bb	12.578

ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

Furans,TF,PP,PF,HF,HPF,OF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.04	2.286e2	2.987e2	0.973	0.77	0.77	6.3	YES	NO	dd	bd	0.212
2	Total-tetrafurans	25.51	1.700e2	2.365e2	0.973	0.72	0.77	4.9	YES	NO	dd	dd	0.163
3	23478-PeCDF	30.84	2.968e2	1.836e2	0.991	1.62	1.55	5.8	YES	NO	MM	MM	0.274
4	12378-PeCDF	29.52	2.322e2	1.556e2	0.923	1.49	1.55	5.0	YES	NO	bb	bb	0.220
5	234678-HxCDF	35.51	5.959e2	4.510e2	1.081	1.32	1.24	18.7	YES	NO	bb	bb	0.721
6	123678-HxCDF	34.63	5.306e2	3.774e2	1.032	1.41	1.24	14.3	YES	NO	db	db	0.569
7	Total-hexafurans	34.33	2.609e2	2.201e2	1.087	1.19	1.24	9.2	YES	NO	bd	bd	0.319
8	Total-hexafurans	33.87	4.514e3	3.711e3	1.087	1.22	1.24	151.5	YES	NO	bb	bb	5.449
9	Total-hexafurans	33.03	4.760e3	3.761e3	1.087	1.27	1.24	170.5	YES	NO	bb	bb	5.645
10	123468-HXCDF	32.81	1.949e3	1.445e3	1.206	1.35	1.24	70.6	YES	NO	db	db	1.915
11	1234789-HpCDF	40.58	3.589e2	3.495e2	1.104	1.03	1.05	9.1	YES	NO	bb	bb	0.803
12	Total-heptafurans	39.05	1.117e4	1.022e4	1.134	1.09	1.05	314.0	YES	NO	bb	bb	20.316
13	1234678-HpCDF	38.40	7.782e3	7.715e3	1.164	1.01	1.05	218.6	YES	NO	bb	bb	12.578
14	OCDF	44.68	1.110e4	1.145e4	1.130	0.97	0.89	204.6	YES	NO	bb	bb	25.721
15	13468-PECDF	26.79	3.274e3	2.057e3	1.241	1.59	1.55	105.7	YES	NO	bb	bb	2.250

TD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1368-TCDD	23.16	3.610e2	5.246e2	1.181	0.69	0.77	11.5	YES	NO	bb	bb	0.392

PD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-pentadioxins	29.73	3.700e2	2.267e2	1.548	1.63	1.55	10.7	YES	NO	dd	bb	0.293

HD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-hexadioxins	34.37	1.167e3	9.514e2	0.943	1.23	1.24	37.5	YES	NO	bb	bb	1.425
2	124679-HXCDD	33.59	7.074e3	5.891e3	1.127	1.20	1.24	202.9	YES	NO	bb	bb	7.430
3	123789-HxCDD	36.13	1.087e3	7.776e2	0.804	1.40	1.24	31.4	YES	NO	MM	bb	1.473
4	123678-HxCDD	35.74	1.686e3	1.407e3	0.883	1.20	1.24	49.9	YES	NO	dd	dd	2.186
5	123478-HxCDD	35.63	4.084e2	3.670e2	0.960	1.11	1.24	12.5	YES	NO	MM	bd	0.521
6	Total-hexadioxins	34.85	9.006e2	7.292e2	0.943	1.24	1.24	31.1	YES	NO	db	db	1.097

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HPD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234678-HpCDD	39.87	3.579e4	3.428e4	1.200	1.04	1.05	402.2	YES	NO	bb	bb	65.736
2	1234679-HPCDD	38.84	6.727e4	6.794e4	1.303	0.99	1.05	830.3	YES	NO	bb	bd	116.813

Dioxins,TD,PD,HD,HPD,OD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1368-TCDD	23.16	3.610e2	5.246e2	1.181	0.69	0.77	11.5	YES	NO	bb	bb	0.392
2	Total-pentadioxins	29.73	3.700e2	2.267e2	1.548	1.63	1.55	10.7	YES	NO	dd	bb	0.293
3	Total-hexadioxins	34.37	1.167e3	9.514e2	0.943	1.23	1.24	37.5	YES	NO	bb	bb	1.425
4	124679-HXCDD	33.59	7.074e3	5.891e3	1.127	1.20	1.24	202.9	YES	NO	bb	bb	7.430
5	123789-HxCDD	36.13	1.087e3	7.776e2	0.804	1.40	1.24	31.4	YES	NO	MM	bb	1.473
6	123678-HxCDD	35.74	1.686e3	1.407e3	0.883	1.20	1.24	49.9	YES	NO	dd	dd	2.186
7	123478-HxCDD	35.63	4.084e2	3.670e2	0.960	1.11	1.24	12.5	YES	NO	MM	bd	0.521
8	Total-hexadioxins	34.85	9.006e2	7.292e2	0.943	1.24	1.24	31.1	YES	NO	db	db	1.097
9	1234678-HpCDD	39.87	3.579e4	3.428e4	1.200	1.04	1.05	402.2	YES	NO	bb	bb	65.736
10	1234679-HPCDD	38.84	6.727e4	6.794e4	1.303	0.99	1.05	830.3	YES	NO	bb	bd	116.813
11	OCDD	44.45	1.801e5	2.031e5	1.059	0.89	0.89	1608.4	YES	NO	bb	bb	466.482

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TotalTEQ,Furans,Dioxins

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-tetrafurans	24.04	2.286e2	2.987e2	0.973	0.77	0.77	6.3	YES	NO	dd	bd	0.212
2	Total-tetrafurans	25.51	1.700e2	2.365e2	0.973	0.72	0.77	4.9	YES	NO	dd	dd	0.163
3	23478-PeCDF	30.84	2.968e2	1.836e2	0.991	1.62	1.55	5.8	YES	NO	MM	MM	0.274
4	12378-PeCDF	29.52	2.322e2	1.556e2	0.923	1.49	1.55	5.0	YES	NO	bb	bb	0.220
5	234678-HxCDF	35.51	5.959e2	4.510e2	1.081	1.32	1.24	18.7	YES	NO	bb	bb	0.721
6	123678-HxCDF	34.63	5.306e2	3.774e2	1.032	1.41	1.24	14.3	YES	NO	db	db	0.569
7	Total-hexafurans	34.33	2.609e2	2.201e2	1.087	1.19	1.24	9.2	YES	NO	bd	bd	0.319
8	Total-hexafurans	33.87	4.514e3	3.711e3	1.087	1.22	1.24	151.5	YES	NO	bb	bb	5.449
9	Total-hexafurans	33.03	4.760e3	3.761e3	1.087	1.27	1.24	170.5	YES	NO	bb	bb	5.645
10	123468-HXCDF	32.81	1.949e3	1.445e3	1.206	1.35	1.24	70.6	YES	NO	db	db	1.915
11	1234789-HpCDF	40.58	3.589e2	3.495e2	1.104	1.03	1.05	9.1	YES	NO	bb	bb	0.803
12	Total-heptafurans	39.05	1.117e4	1.022e4	1.134	1.09	1.05	314.0	YES	NO	bb	bb	20.316
13	1234678-HpCDF	38.40	7.782e3	7.715e3	1.164	1.01	1.05	218.6	YES	NO	bb	bb	12.578
14	OCDF	44.68	1.110e4	1.145e4	1.130	0.97	0.89	204.6	YES	NO	bb	bb	25.721
15	13468-PECDF	26.79	3.274e3	2.057e3	1.241	1.59	1.55	105.7	YES	NO	bb	bb	2.250
16	1368-TCDD	23.16	3.610e2	5.246e2	1.181	0.69	0.77	11.5	YES	NO	bb	bb	0.392
17	Total-pentadioxins	29.73	3.700e2	2.267e2	1.548	1.63	1.55	10.7	YES	NO	dd	bb	0.293
18	Total-hexadioxins	34.37	1.167e3	9.514e2	0.943	1.23	1.24	37.5	YES	NO	bb	bb	1.425
19	124679-HXCDD	33.59	7.074e3	5.891e3	1.127	1.20	1.24	202.9	YES	NO	bb	bb	7.430
20	123789-HxCDD	36.13	1.087e3	7.776e2	0.804	1.40	1.24	31.4	YES	NO	MM	bb	1.473
21	123678-HxCDD	35.74	1.686e3	1.407e3	0.883	1.20	1.24	49.9	YES	NO	dd	dd	2.186
22	123478-HxCDD	35.63	4.084e2	3.670e2	0.960	1.11	1.24	12.5	YES	NO	MM	bd	0.521
23	Total-hexadioxins	34.85	9.006e2	7.292e2	0.943	1.24	1.24	31.1	YES	NO	db	db	1.097
24	1234678-HpCDD	39.87	3.579e4	3.428e4	1.200	1.04	1.05	402.2	YES	NO	bb	bb	65.736
25	1234679-HPCDD	38.84	6.727e4	6.794e4	1.303	0.99	1.05	830.3	YES	NO	bb	bd	116.813
26	OCDD	44.45	1.801e5	2.031e5	1.059	0.89	0.89	1608.4	YES	NO	bb	bb	466.482

PFK1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 PFK	26.51	7.352e3					1.1	NO		bb		
2	FUNCTION1 PFK	25.73	6.987e4					2.8	NO		bb		
3	FUNCTION1 PFK	21.25	7.057e3					1.5	NO		bb		
4	FUNCTION1 PFK	21.17	8.846e3					1.8	NO		db		
5	FUNCTION1 PFK	21.13	4.710e3					1.3	NO		bd		

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

PFK3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
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PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 PFK	39.32	1.782e4					1.6	NO		bd		
2	FUNCTION4 PFK	39.10	5.617e3					0.8	NO		bb		
3	FUNCTION4 PFK	39.05	1.421e3					0.5	NO		bb		
4	FUNCTION4 PFK	38.67	8.131e3					1.5	NO		bb		
5	FUNCTION4 PFK	38.51	6.756e3					1.5	NO		bb		
6	FUNCTION4 PFK	38.33	9.089e3					1.5	NO		bb		
7	FUNCTION4 PFK	38.26	6.957e3					1.4	NO		db		
8	FUNCTION4 PFK	38.22	7.989e3					1.8	NO		bd		
9	FUNCTION4 PFK	38.17	1.584e3					0.6	NO		db		
10	FUNCTION4 PFK	38.11	1.573e4					1.9	NO		bd		
11	FUNCTION4 PFK	37.73	9.607e4					7.3	YES		db		
12	FUNCTION4 PFK	37.65	1.193e5					10.0	YES		dd		
13	FUNCTION4 PFK	37.58	1.476e5					13.5	YES		bd		
14	FUNCTION4 PFK	42.07	1.697e4					2.0	NO		db		
15	FUNCTION4 PFK	41.97	1.420e4					2.4	NO		bd		
16	FUNCTION4 PFK	41.89	2.482e3					0.8	NO		bb		
17	FUNCTION4 PFK	41.82	6.317e2					0.4	NO		bb		
18	FUNCTION4 PFK	41.59	9.873e3					1.5	NO		bb		
19	FUNCTION4 PFK	41.53	2.160e3					0.8	NO		bb		
20	FUNCTION4 PFK	41.35	7.071e3					1.3	NO		bb		
21	FUNCTION4 PFK	40.97	2.488e3					0.7	NO		bb		
22	FUNCTION4 PFK	40.90	3.014e3					0.4	NO		db		
23	FUNCTION4 PFK	40.86	7.292e3					1.4	NO		bd		
24	FUNCTION4 PFK	40.42	8.202e3					0.6	NO		bb		
25	FUNCTION4 PFK	40.31	2.177e3					0.8	NO		bb		
26	FUNCTION4 PFK	40.19	3.422e3					0.9	NO		bb		
27	FUNCTION4 PFK	39.65	1.174e4					1.7	NO		bb		
28	FUNCTION4 PFK	39.51	6.429e3					1.2	NO		bb		
29	FUNCTION4 PFK	39.39	1.700e4					1.5	NO		db		
30	FUNCTION4 PFK	42.81	7.420e3					1.6	NO		bb		
31	FUNCTION4 PFK	42.73	2.773e3					0.7	NO		bb		
32	FUNCTION4 PFK	42.51	1.446e3					0.5	NO		bb		
33	FUNCTION4 PFK	42.24	1.327e4					1.5	NO		bb		
34	FUNCTION4 PFK	42.13	6.757e3					1.3	NO		bb		

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PFK5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION5 PFK	45.60	2.830e3					0.8	NO		bb		
2	FUNCTION5 PFK	45.56	1.334e3					0.8	NO		bb		
3	FUNCTION5 PFK	45.51	6.536e3					1.7	NO		bb		
4	FUNCTION5 PFK	44.99	4.939e3					1.3	NO		bb		
5	FUNCTION5 PFK	44.65	1.272e3					0.6	NO		bb		
6	FUNCTION5 PFK	44.54	3.331e3					1.2	NO		db		
7	FUNCTION5 PFK	44.51	2.857e3					1.3	NO		bd		
8	FUNCTION5 PFK	44.46	7.311e3					0.9	NO		bb		
9	FUNCTION5 PFK	43.37	2.890e5					8.0	YES		db		
10	FUNCTION5 PFK	43.19	4.604e5					17.4	YES		bd		
11	FUNCTION5 PFK	45.95	1.054e3					0.6	NO		bb		

ETHERS1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 HXCD...	25.53	8.719e1					3.6	YES		db		0.000
2	FUNCTION1 HXCD...	25.41	2.318e2					8.8	YES		bd		0.000
3	FUNCTION1 HXCD...	23.39	2.027e2					9.1	YES		bb		0.000

ETHERS2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 HPCD...	31.65	1.027e2					1.8	NO		bb		0.000
2	FUNCTION2 HPCD...	29.76	8.243e1					2.6	NO		db		0.000
3	FUNCTION2 HPCD...	29.64	1.265e2					3.5	YES		bd		0.000
4	FUNCTION2 HPCD...	28.57	3.213e2					11.1	YES		bb		0.000

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ETHERS4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 OCDPE	37.41	1.357e2					4.4	YES		bb		0.000
2	FUNCTION3 OCDPE	33.84	2.581e2					11.5	YES		bb		0.000
3	FUNCTION3 OCDPE	32.71	4.954e2					20.5	YES		bb		0.000

ETHERS5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 NCDPE	38.05	2.805e2					13.5	YES		bb		0.000

ETHERS6

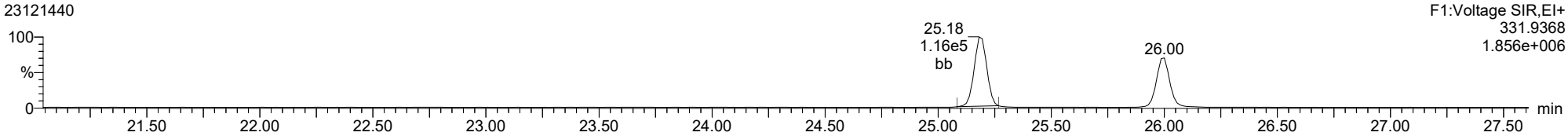
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1													

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Printed: Saturday, December 16, 2023 10:41:09 Pacific Standard Time

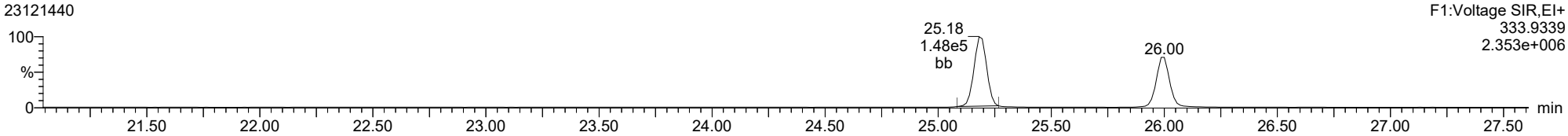
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ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

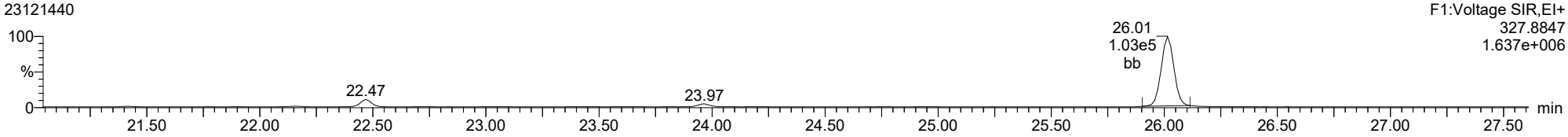
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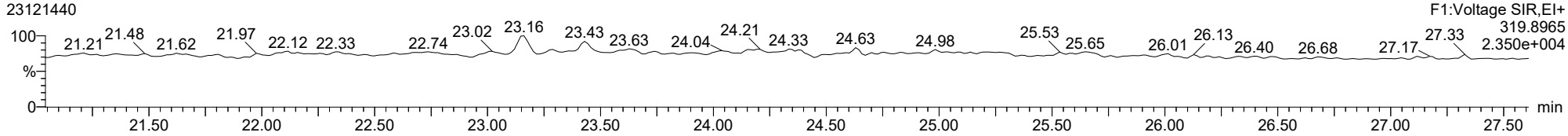


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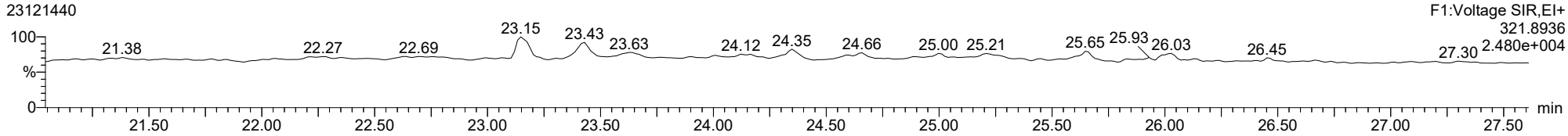


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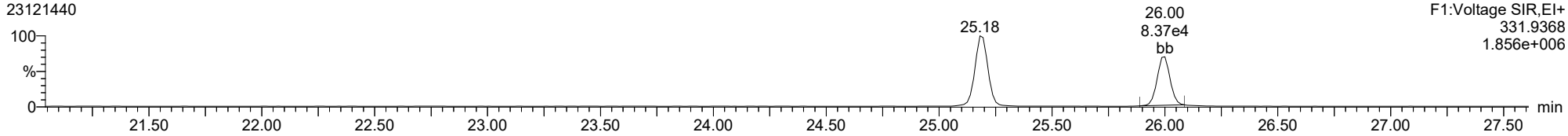
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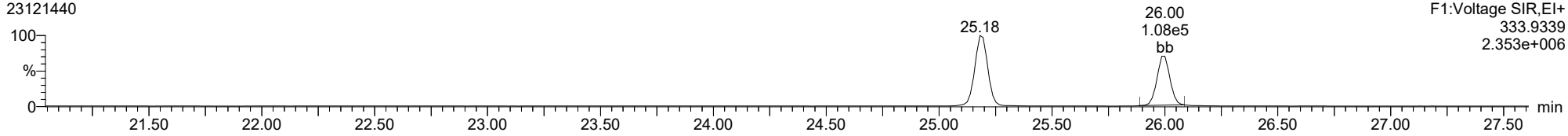
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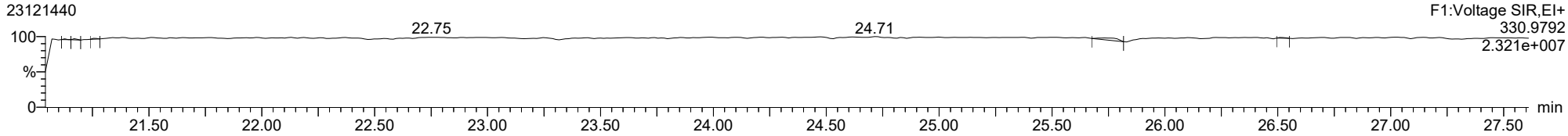
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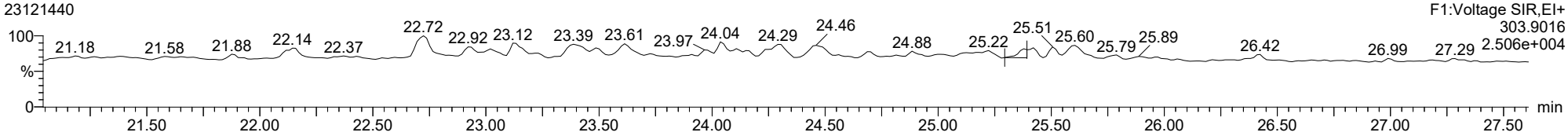


FUNCTION1 PFK

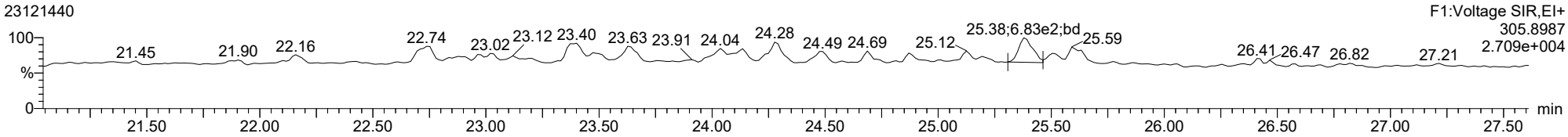


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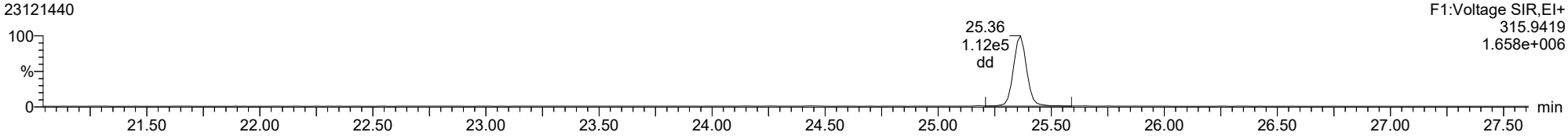
2378-TCDF



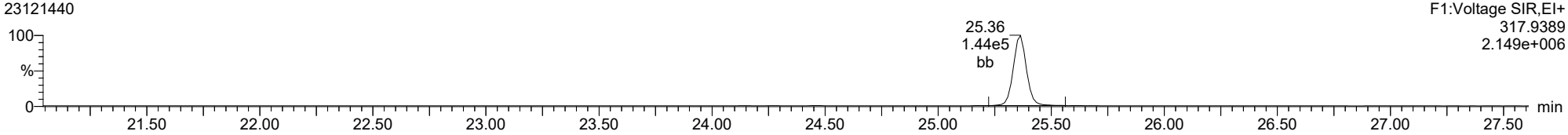
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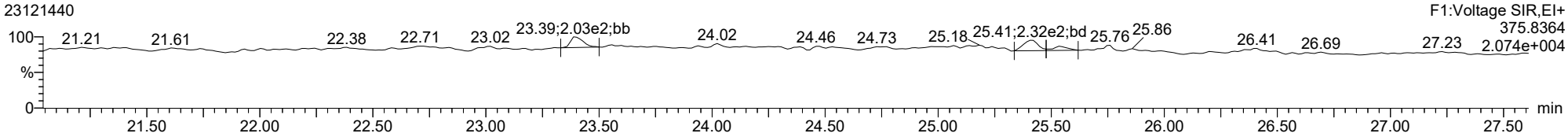
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13C-2378-TCDF

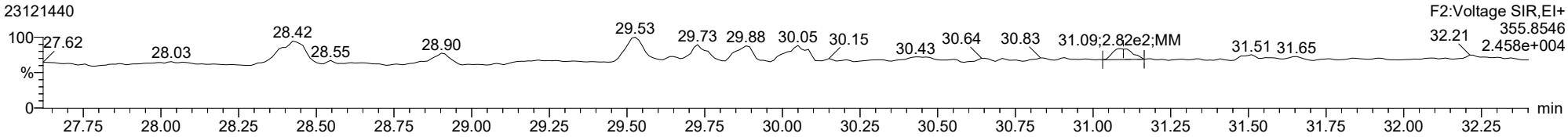


FUNCTION1 HXCDPE

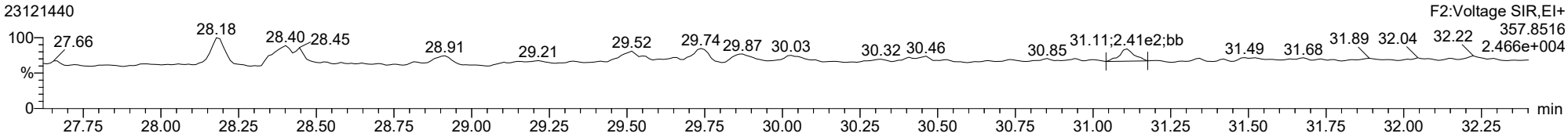


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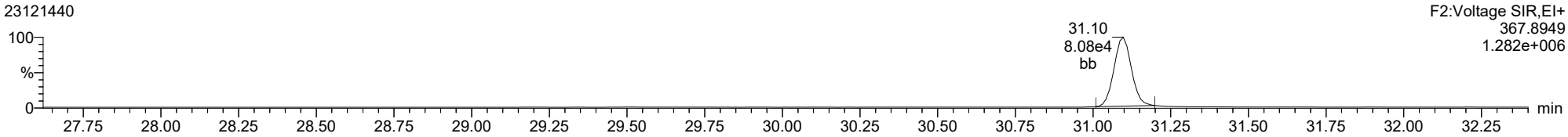
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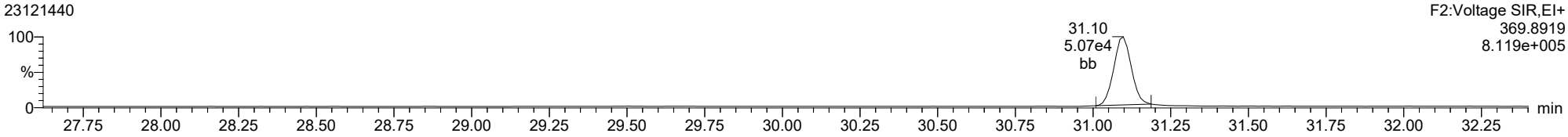
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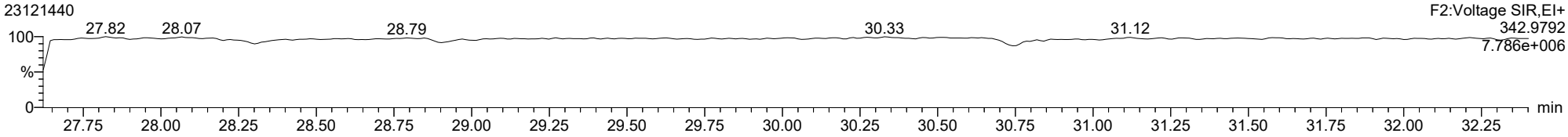
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13C-12378-PeCDD

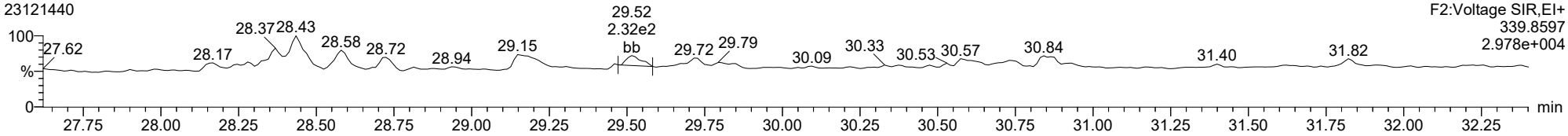


FUNCTION2 PFK

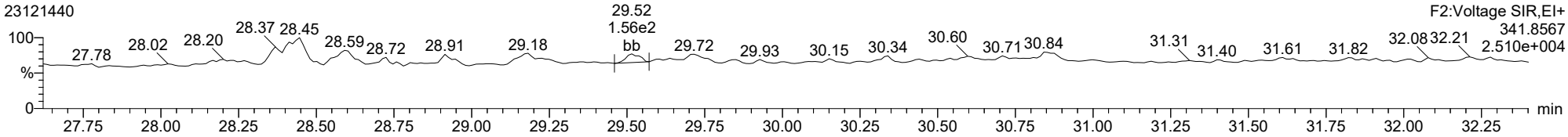


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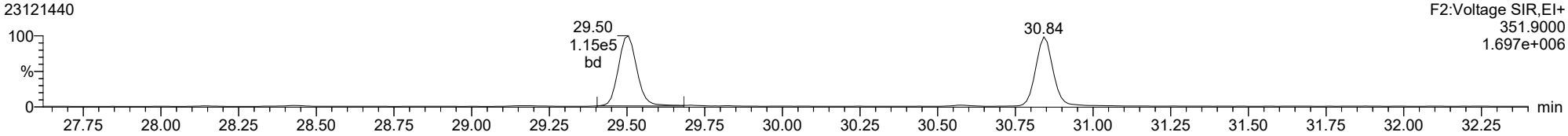
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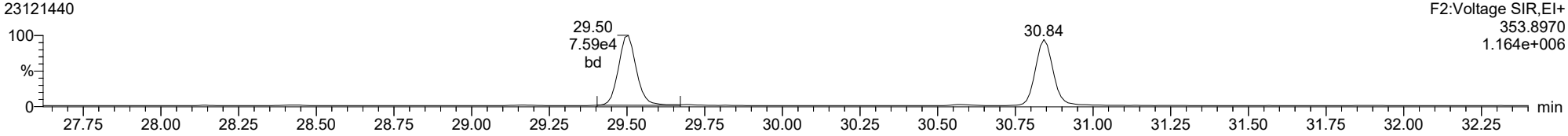
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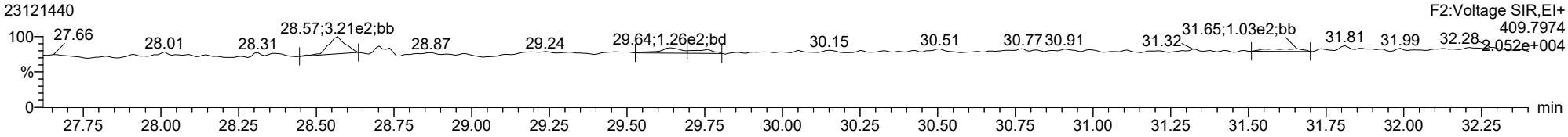
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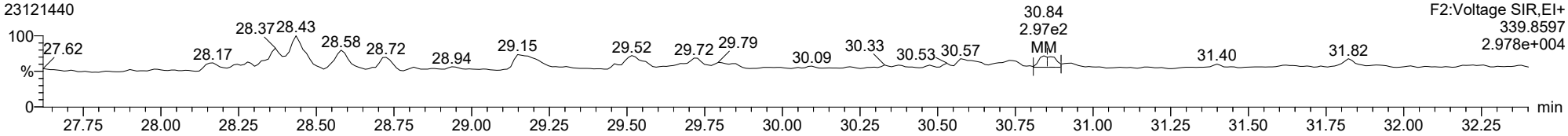


FUNCTION2 HPCDPE

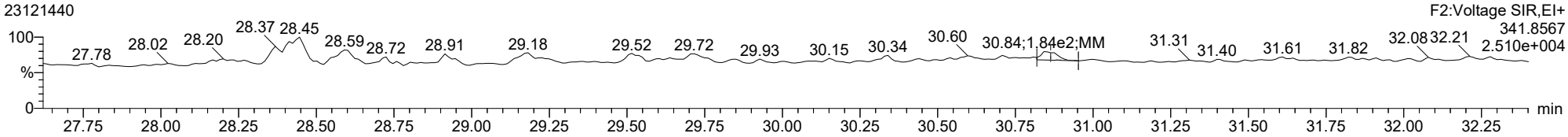


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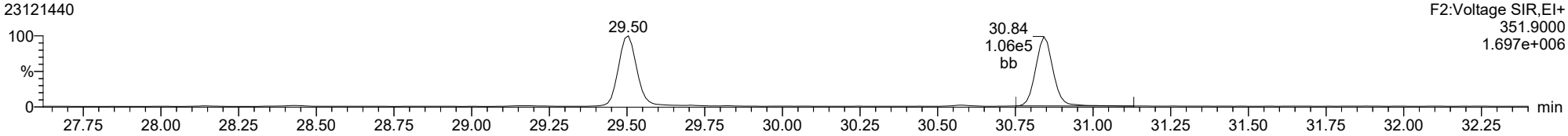
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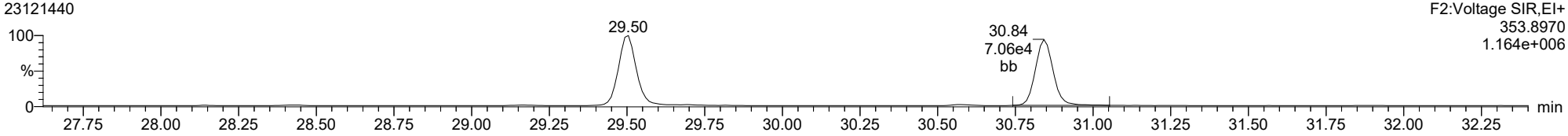
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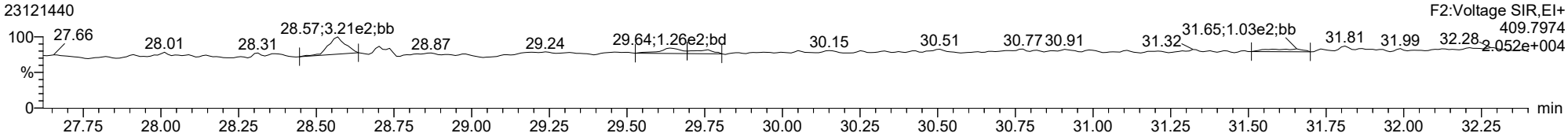
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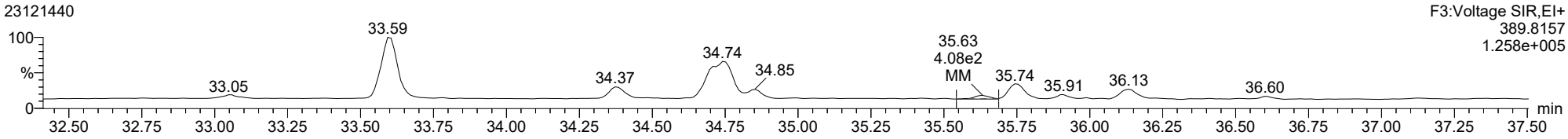


FUNCTION2 HPCDPE

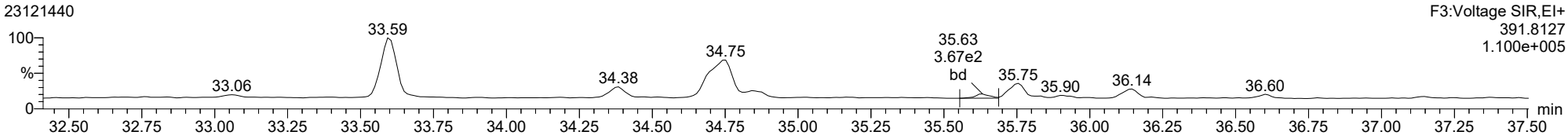


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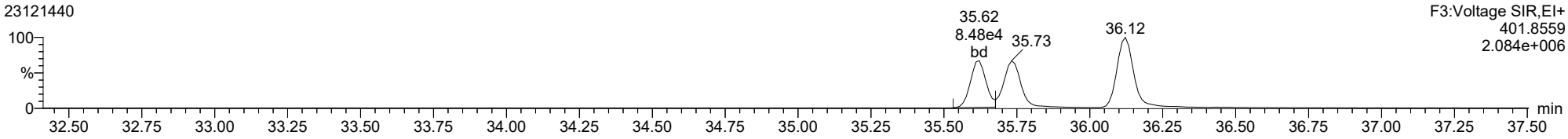
123478-HxCDD



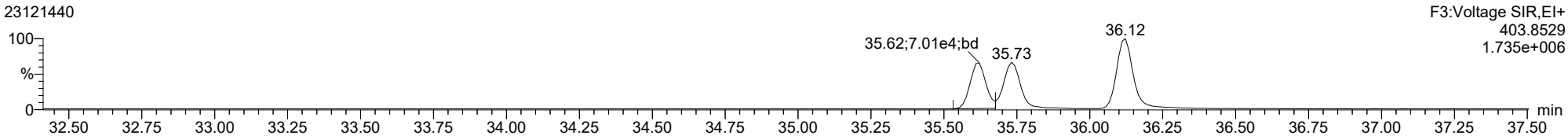
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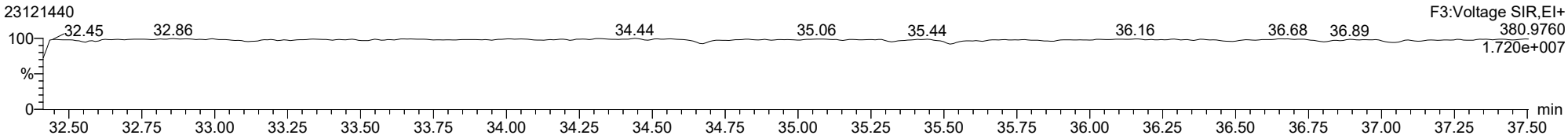
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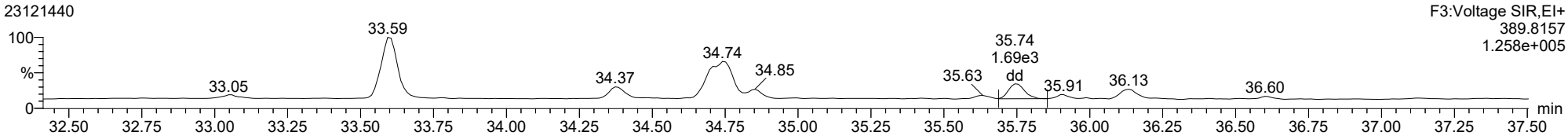


FUNCTION3 PFK

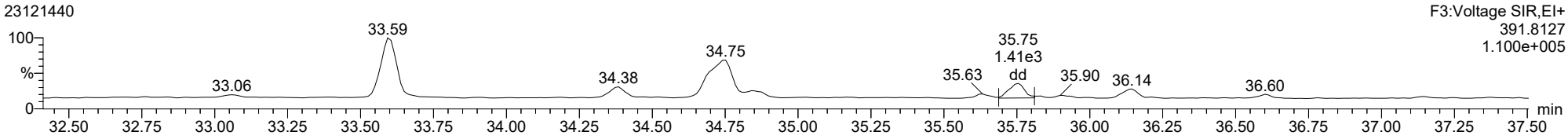


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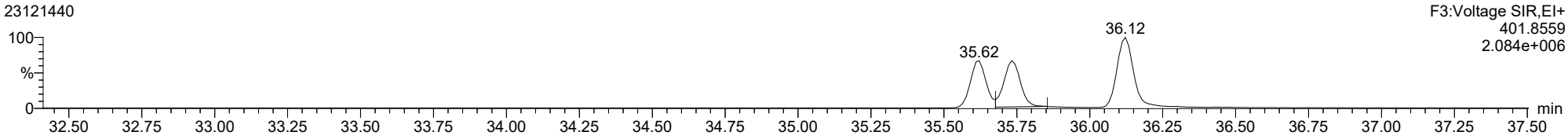
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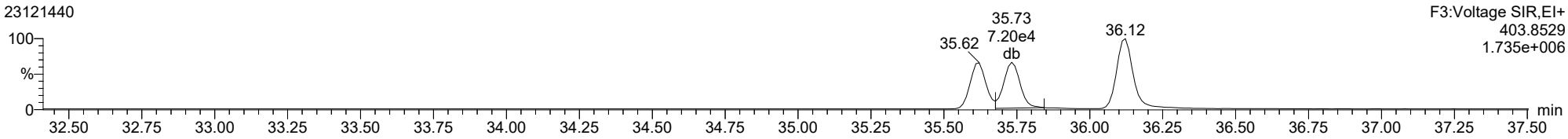
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13C-123678-HxCDD



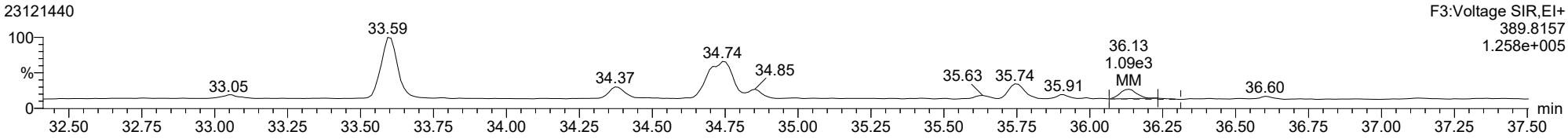
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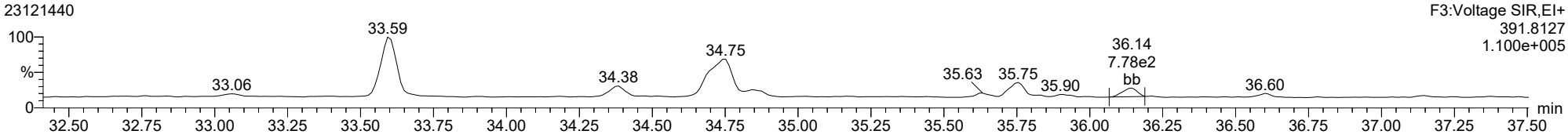
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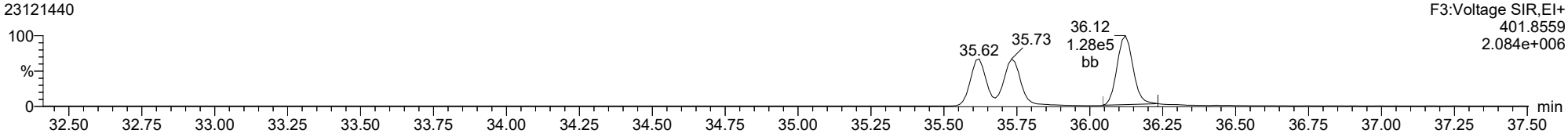
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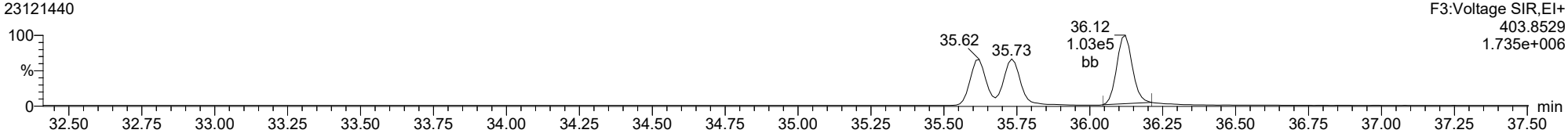
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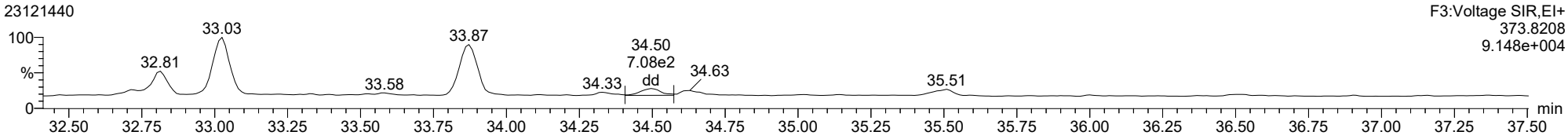


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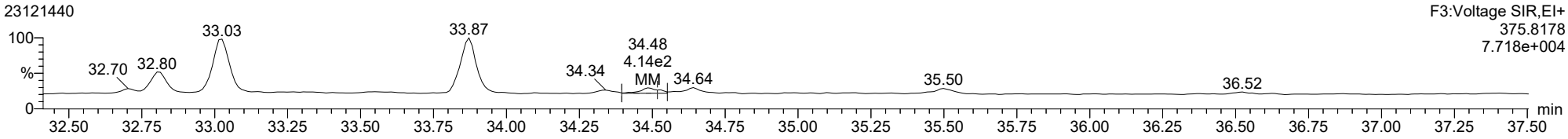


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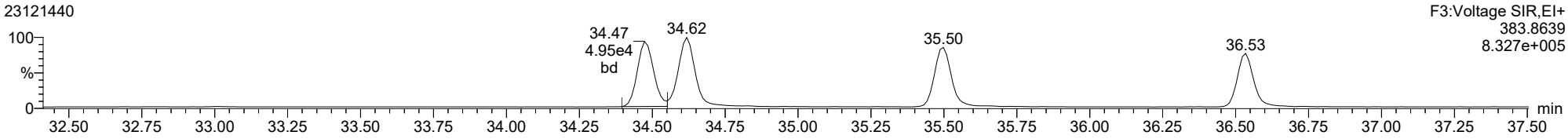
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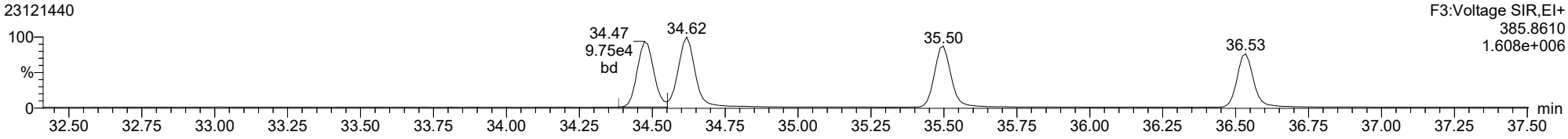
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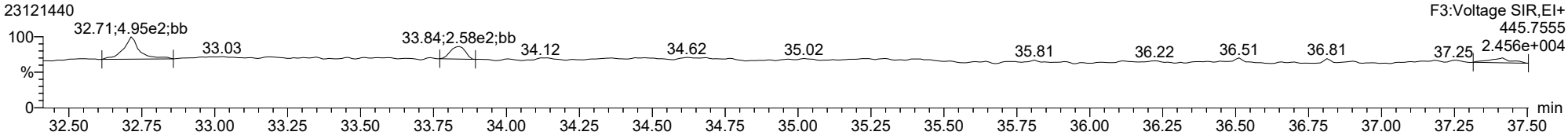
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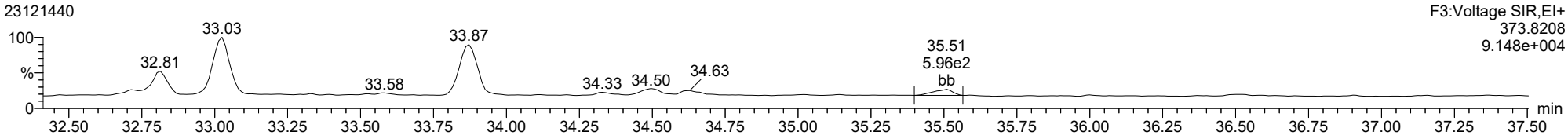


FUNCTION3 OCDPE

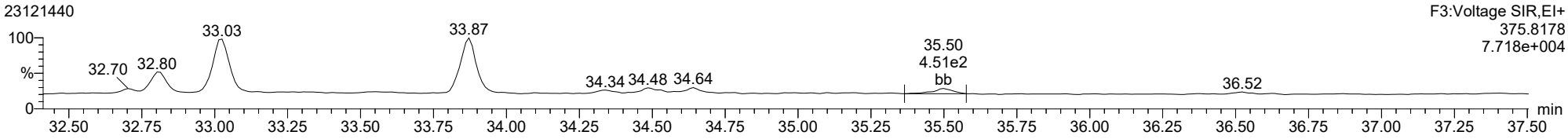


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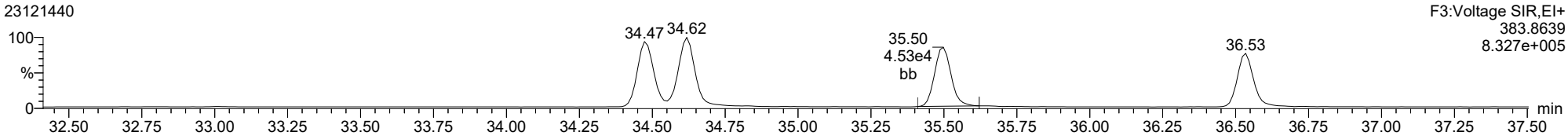
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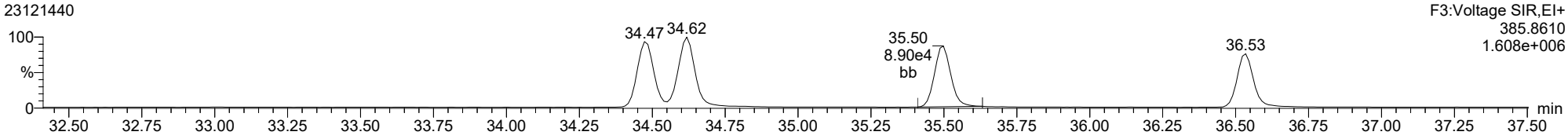
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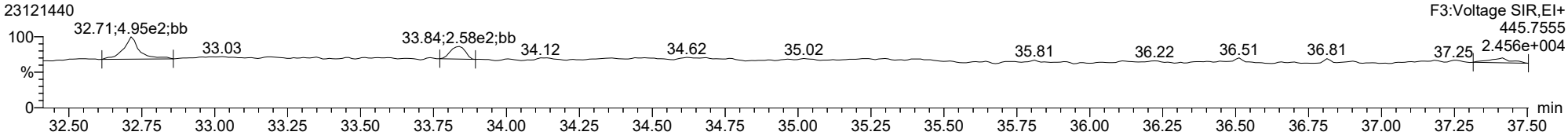
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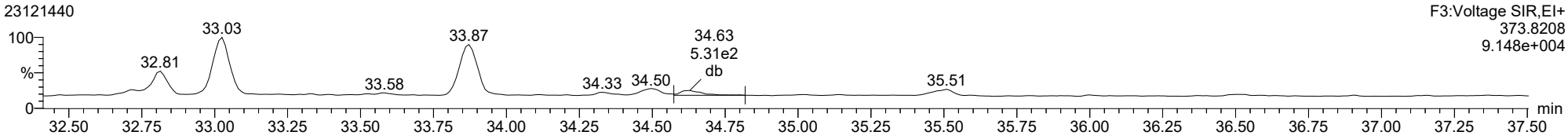


FUNCTION3 OCDPE

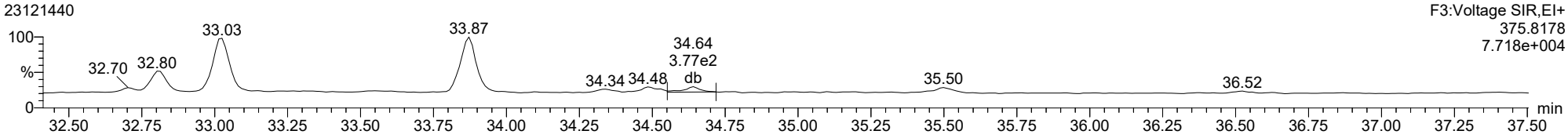


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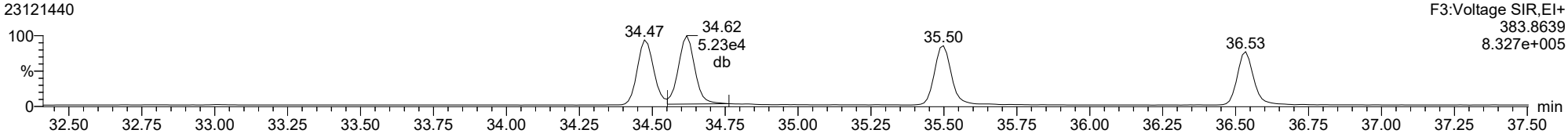
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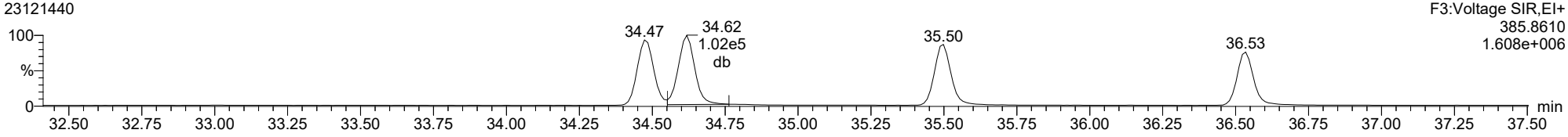
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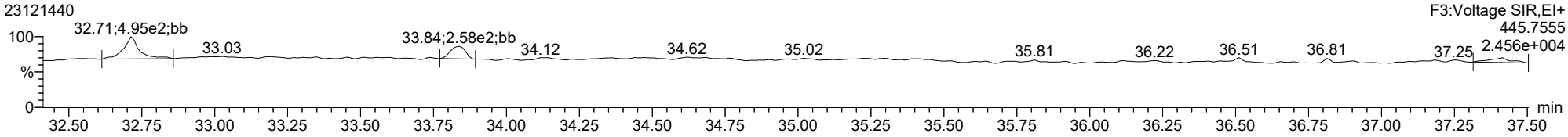
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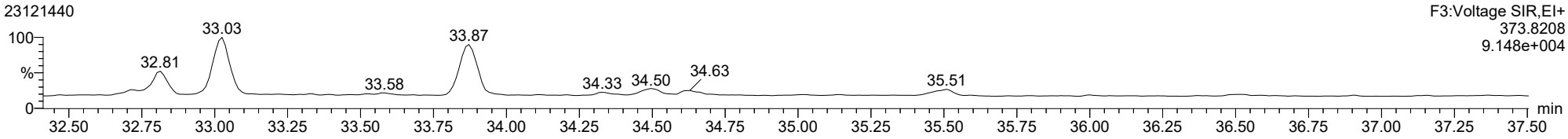


FUNCTION3 OCDPE

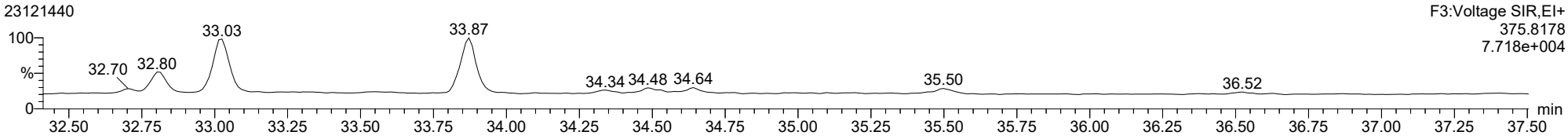


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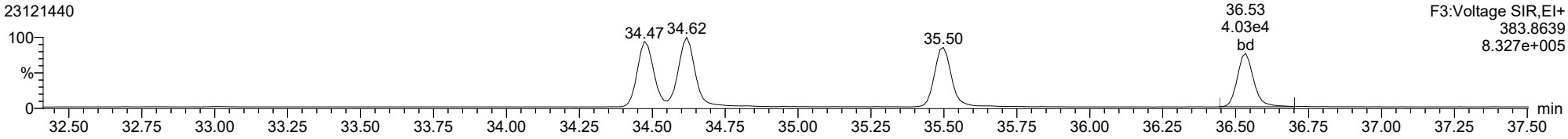
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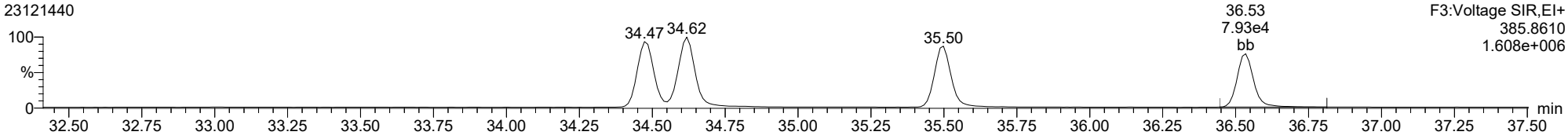
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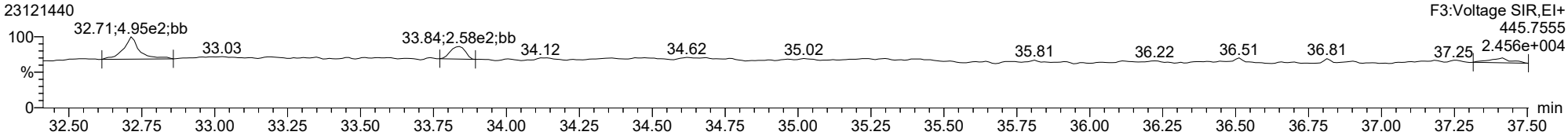
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13C-123789-HxCDF

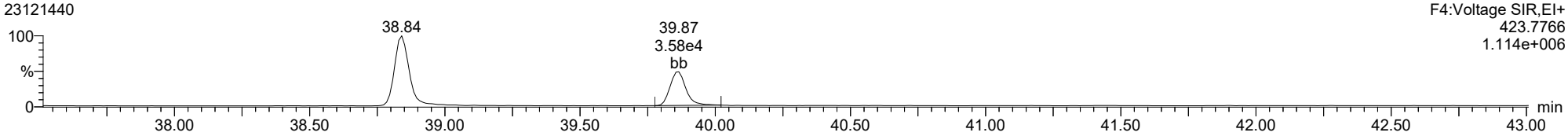


FUNCTION3 OCDPE

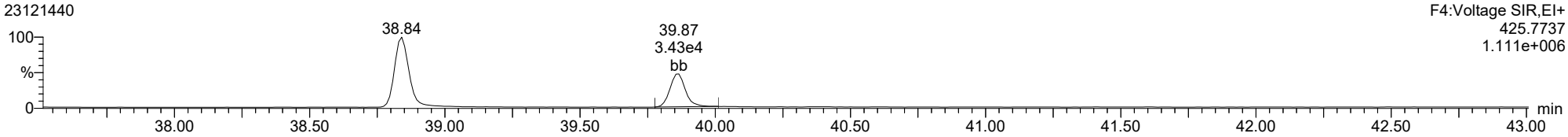


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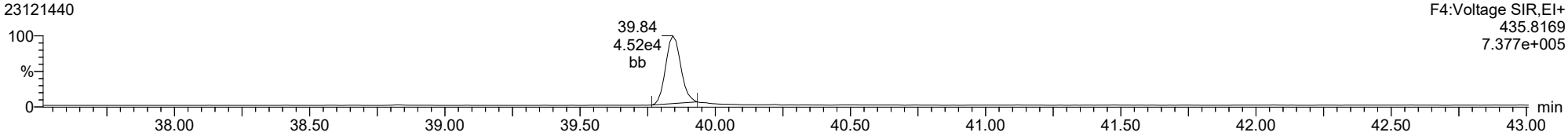
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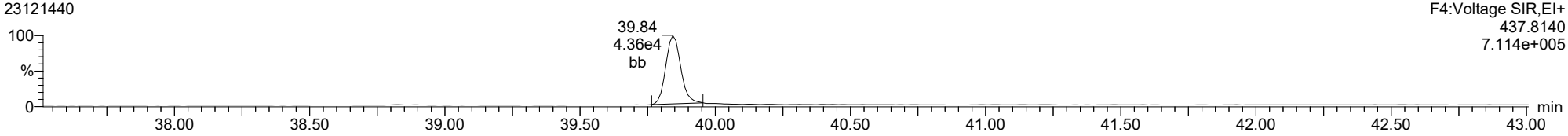
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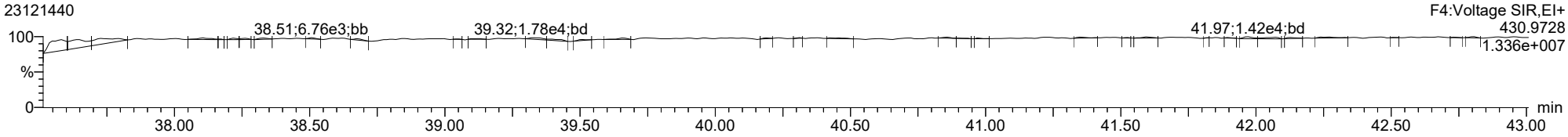
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13C-1234678-HpCDD

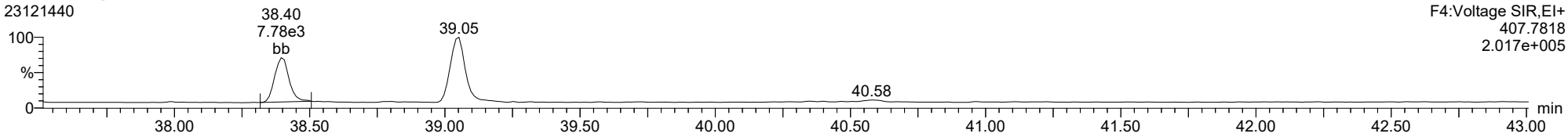


FUNCTION4 PFK

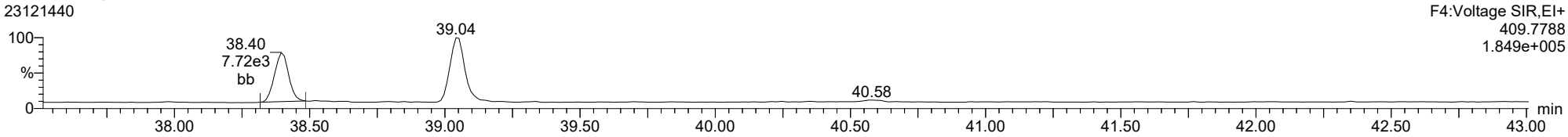


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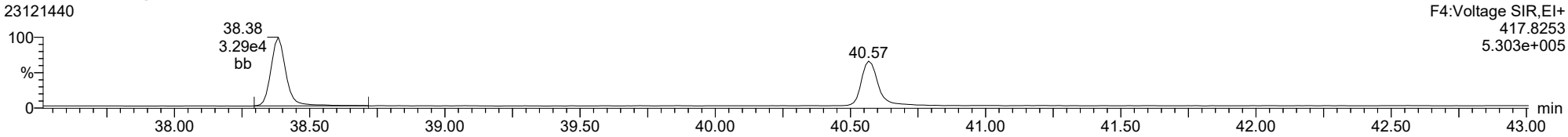
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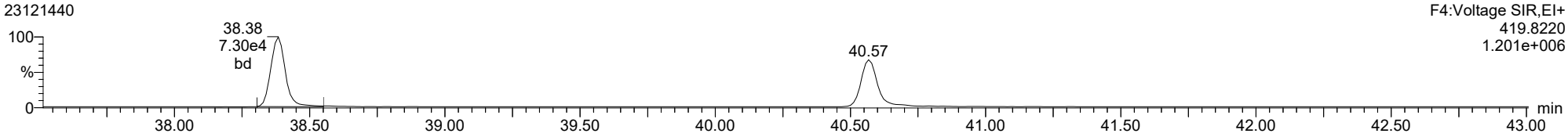
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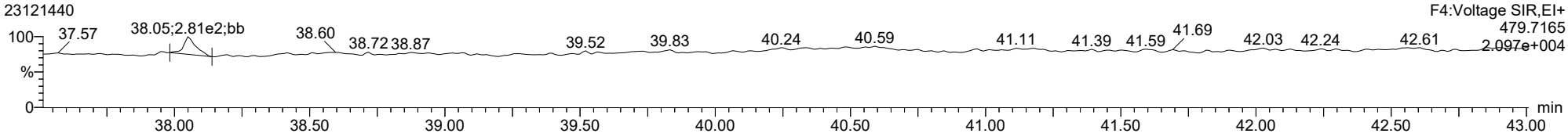
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13C-1234678-HpCDF

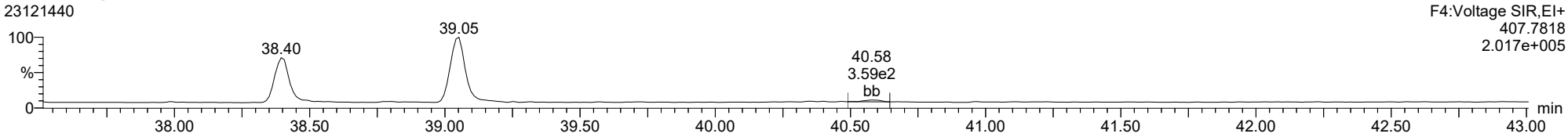


FUNCTION4 NCDPE

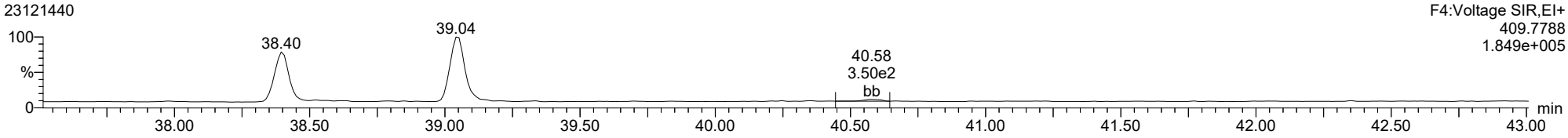


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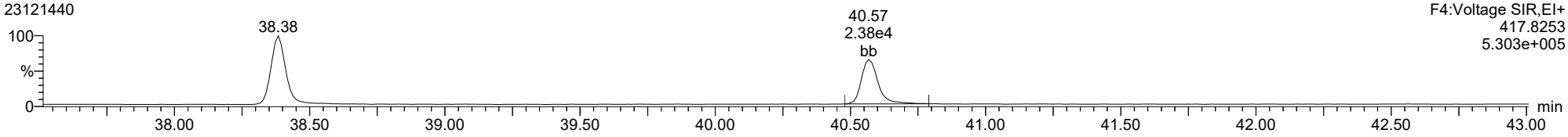
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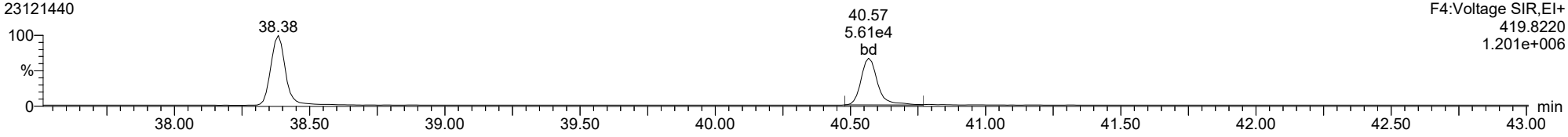
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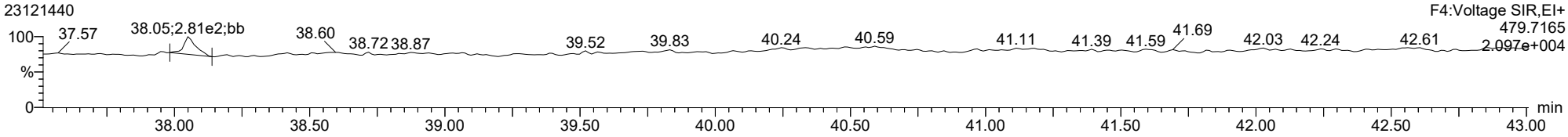
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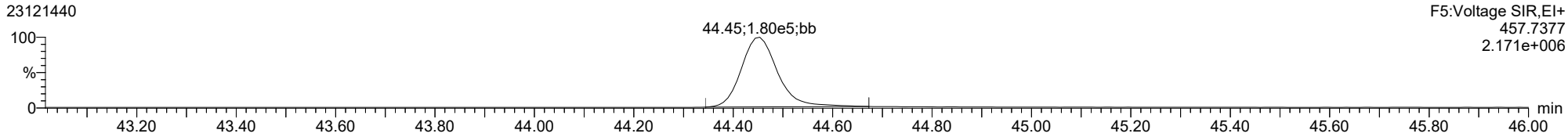
FUNCTION4 NCDPE



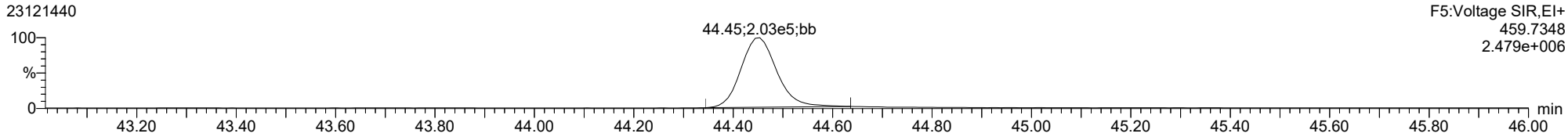
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Printed: Saturday, December 16, 2023 10:41:09 Pacific Standard Time

ID: 23J0690-06, Name: 23121440, Date: 15-Dec-2023, Time: 22:55:39, Conditions: AUTOSPEC01, User: pk

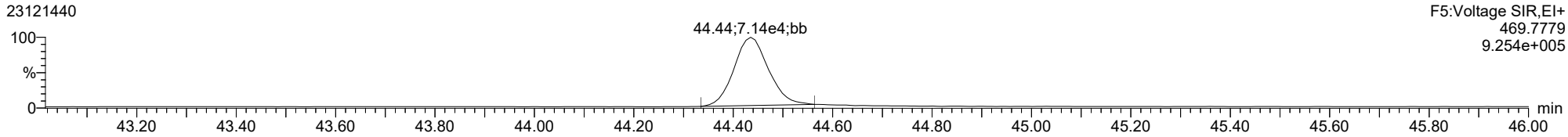
OCDD



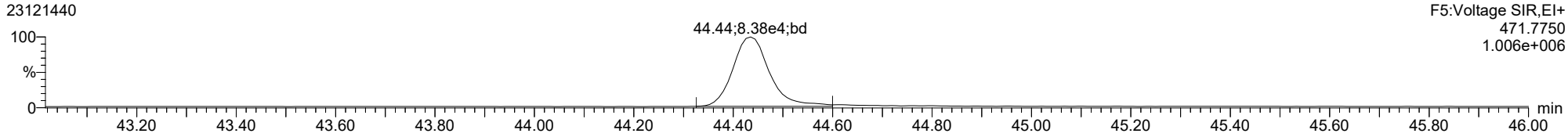
OCDD



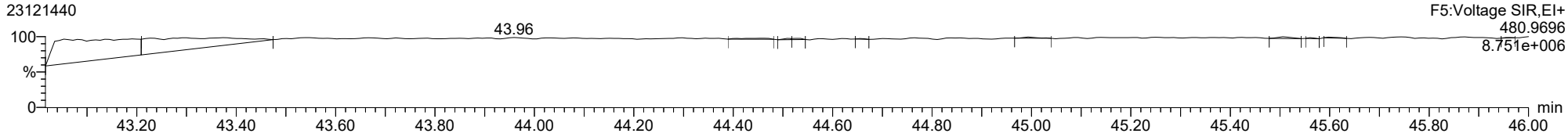
13C-OCDD



13C-OCDD



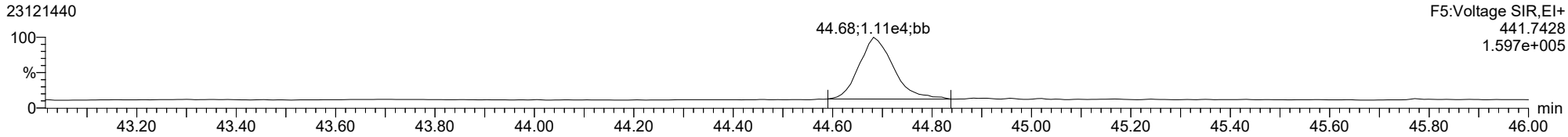
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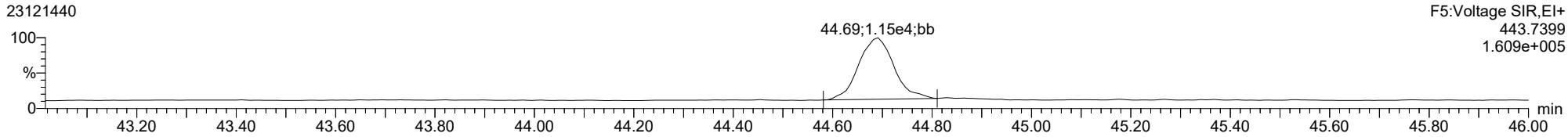
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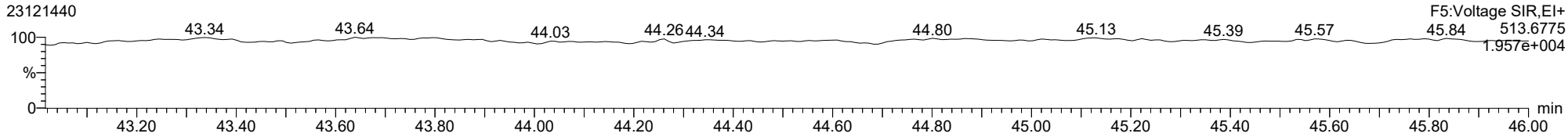
OCDF



OCDF

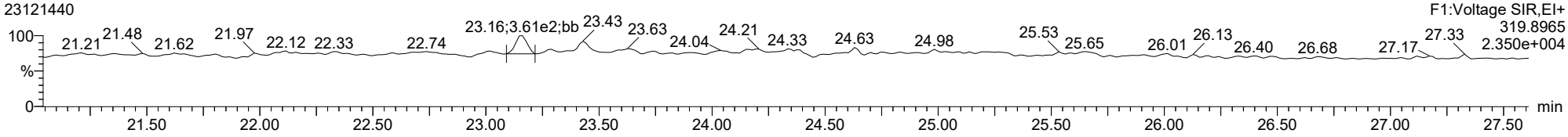


FUNCTION5 DCDPE

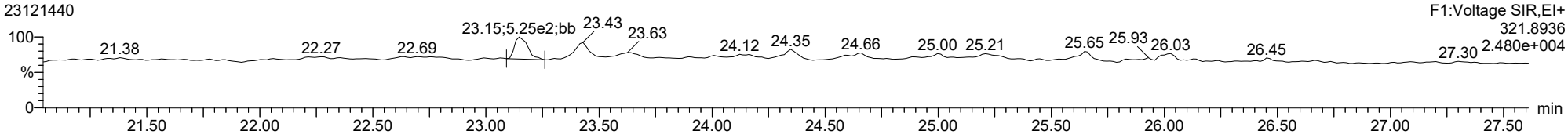


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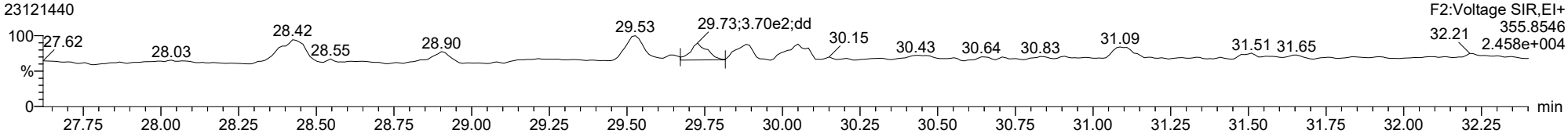
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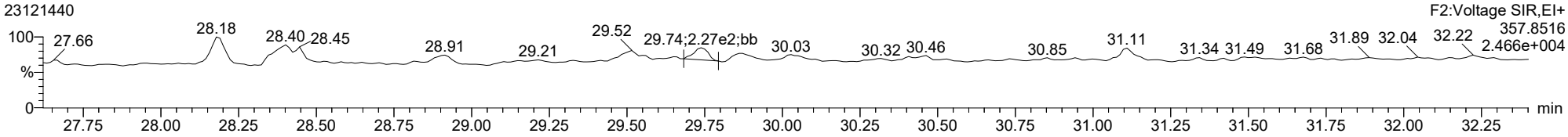
Total-tetradioxins



Total-pentadioxins

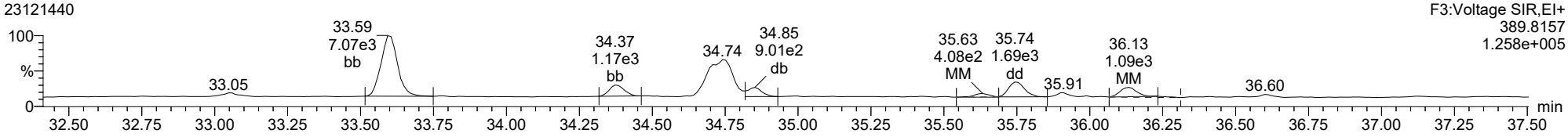


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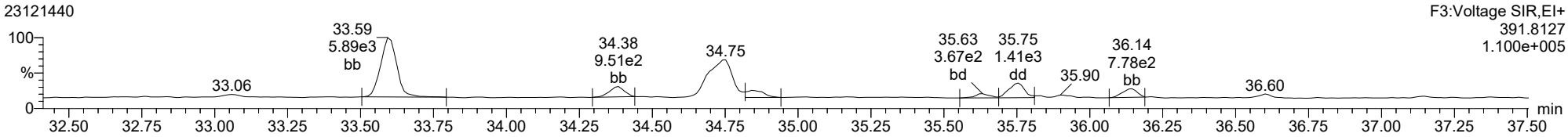


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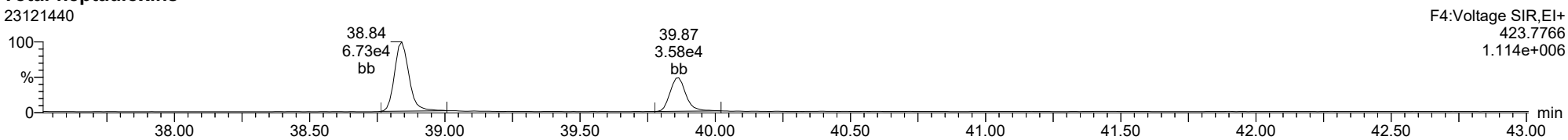
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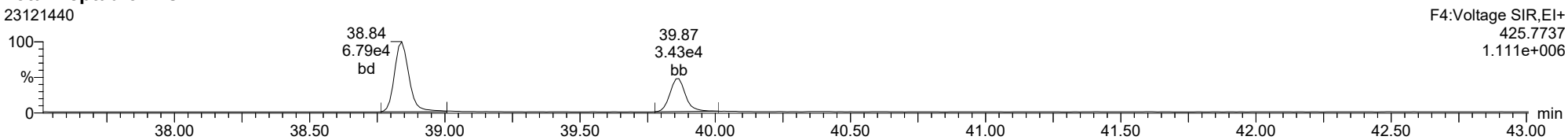
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Total-heptadioxins



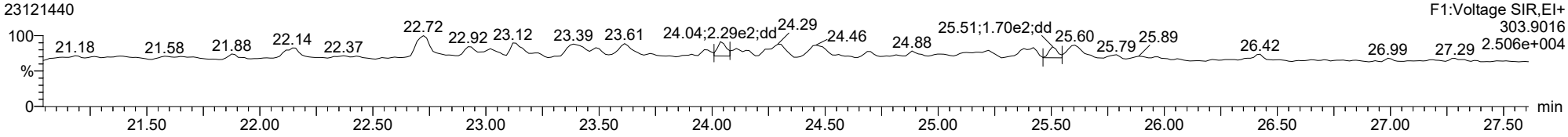
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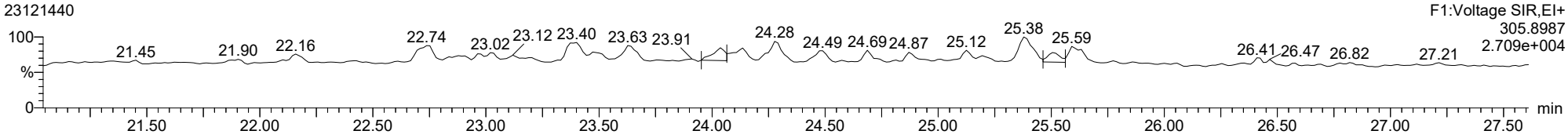
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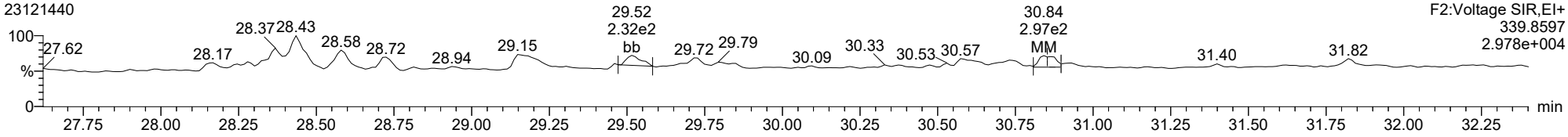
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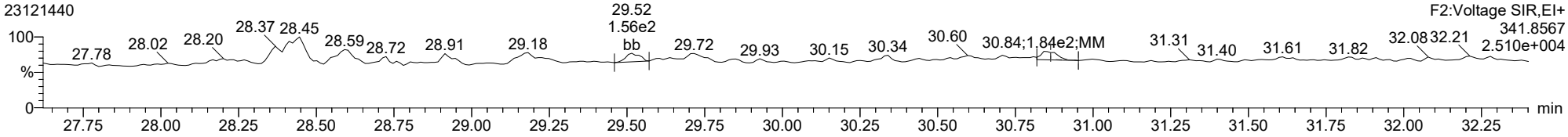
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Total-pentafurans



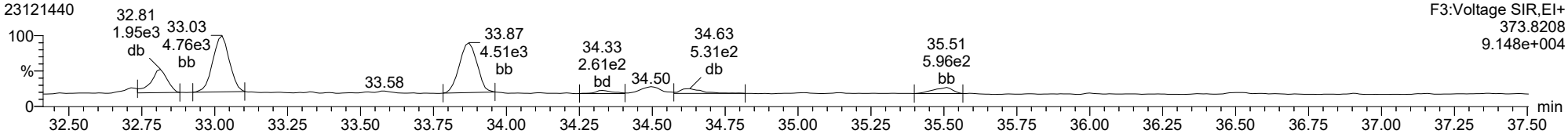
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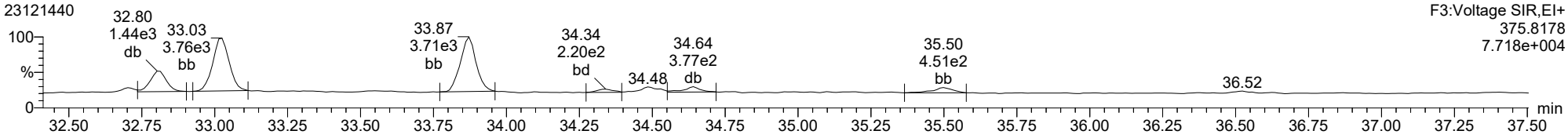
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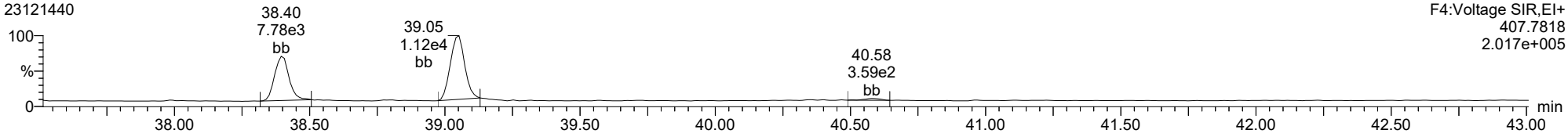
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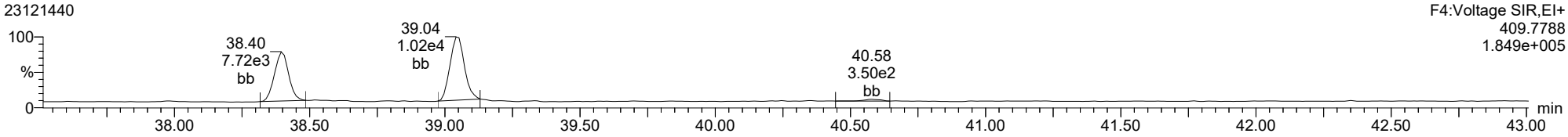
Total-hexafurans



Total-heptafurans



Total-heptafurans



SED-26C:1-3

Form 1
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC				
Project:	Port of Friday Harbor 2023				
Matrix:	Sediment	Laboratory ID:	23J0690-07 A	File ID:	23121441
Sampled:	03/22/23 10:38	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 23:44
% Solids:	74.64	Preparation:	EPA 1613	Initial/Final:	13.42 g Wet / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1		0.655-0.886	0.158	0.998	ND	ng/kg	U
1746-01-6	2,3,7,8-TCDD	1		0.655-0.886	0.118	0.998	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1		1.318-1.783	0.209	0.998	ND	ng/kg	U
57117-31-4	2,3,4,7,8-PeCDF	1		1.318-1.783	0.215	0.998	ND	ng/kg	U
40321-76-4	1,2,3,7,8-PeCDD	1	0.827	1.318-1.783	0.181	0.998	0.165	ng/kg	EMPC, J
70648-26-9	1,2,3,4,7,8-HxCDF	1	1.038	1.054-1.426	0.213	0.998	0.476	ng/kg	EMPC, J
57117-44-9	1,2,3,6,7,8-HxCDF	1	1.074	1.054-1.426	0.213	0.998	0.331	ng/kg	J
60851-34-5	2,3,4,6,7,8-HxCDF	1	1.380	1.054-1.426	0.217	0.998	0.650	ng/kg	J
72918-21-9	1,2,3,7,8,9-HxCDF	1		1.054-1.426	0.297	0.998	ND	ng/kg	U
39227-28-6	1,2,3,4,7,8-HxCDD	1	0.489	1.054-1.426	0.148	0.998	0.195	ng/kg	EMPC, J
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.151	1.054-1.426	0.160	0.998	1.31	ng/kg	
19408-74-3	1,2,3,7,8,9-HxCDD	1	0.873	1.054-1.426	0.176	0.998	0.694	ng/kg	EMPC, J
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	0.980	0.893-1.208	0.291	0.998	12.2	ng/kg	B
55673-89-7	1,2,3,4,7,8,9-HpCDF	1	0.793	0.893-1.208	0.515	0.998	0.669	ng/kg	EMPC, J
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	1.015	0.893-1.208	0.334	2.50	44.0	ng/kg	B
39001-02-0	OCDF	1	0.896	0.757-1.024	0.520	2.50	28.5	ng/kg	B
3268-87-9	OCDD	1	0.874	0.757-1.024	1.06	9.98	368	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.998	ND	ng/kg	
41903-57-5	Total TCDD	1	0.000			0.998	0.287	ng/kg	
30402-15-4	Total PeCDF	1	0.000			0.998	ND	ng/kg	
36088-22-9	Total PeCDD	1	0.000			0.998	ND	ng/kg	
55684-94-1	Total HxCDF	1	0.000			0.998	10.3	ng/kg	
34465-46-8	Total HxCDD	1	0.000			0.998	9.02	ng/kg	
38998-75-3	Total HpCDF	1	0.000			0.998	32.3	ng/kg	
37871-00-4	Total HpCDD	1	0.000			0.998	98.8	ng/kg	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 1.22
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 1.34

SED-26C:1-3

Form 2

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxins/Furans by HRGC/HRMS

Laboratory:	Analytical Resources, LLC			SDG:	23J0690
Client:	Leon Environmental, LLC			Project:	Port of Friday Harbor 2023
Matrix:	Sediment	Laboratory ID:	23J0690-07	File ID:	23121441
Sampled:	03/22/23 10:38	Prepared:	11/14/23 13:25	Analyzed:	12/15/23 23:44
Solids Wt%:	74.64	Preparation:	EPA 1613	Initial/Final:	13.42 g / 20 uL
Result Basis:	Dry	Sequence:	SLL0222	Calibration:	GH00041
Batch:	BLK0112	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.760	0.655-0.886	0.099	57.0	24 - 169 %	
13C12-2,3,7,8-TCDD		0.787	0.655-0.886	0.190	71.3	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.523	1.318-1.783	0.191	62.6	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.488	1.318-1.783	0.202	62.5	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.649	1.318-1.783	0.173	75.6	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.510	0.434-0.587	0.202	60.5	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.518	0.434-0.587	0.164	54.9	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.493	0.434-0.587	0.202	60.0	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.510	0.434-0.587	0.232	58.0	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.236	1.054-1.426	0.185	75.5	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.245	1.054-1.426	0.154	65.5	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.437	0.374-0.506	0.216	49.6	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.425	0.374-0.506	0.281	46.9	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.050	0.893-1.208	0.268	65.7	23 - 140 %	
13C12-OCDD		0.882	0.757-1.024	0.423	50.7	17 - 157 %	
37Cl4-2,3,7,8-TCDD		328.000		0.070	91.9	35 - 197 %	

* Values outside of QC limits

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:41:22 Pacific Standard Time

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
2378-TCDF					0.903		0.770	482	750								
12378-PeCDF					0.923		1.550	848	513								
23478-PeCDF					0.991		1.550	848	513								
123478-HxCDF	34.485	1.000	3.026e2	2.915e2	1.128	1.038	1.240	595	748	4.60e3	4.40e3	7.7	5.9	YES	bd	bd	0.238
234678-HxCDF	35.532	1.001	4.484e2	3.250e2	1.081	1.380	1.240	595	748	4.02e3	4.32e3	6.8	5.8	NO	MM	bb	0.325
123678-HxCDF	34.641	1.001	2.183e2	2.033e2	1.032	1.074	1.240	595	748	4.48e3	2.80e3	7.5	3.7	NO	db	MM	0.166
123789-HxCDF					0.988		1.240	595	748								
1234678-HpCDF	38.396	1.000	5.743e3	5.861e3	1.164	0.980	1.050	901	640	9.34e4	1.06e5	103.6	166.5	NO	bb	bb	6.091
1234789-HpCDF	40.590	1.000	1.942e2	2.451e2	1.104	0.793	1.050	901	640	4.07e3	4.56e3	4.5	7.1	YES	bb	bd	0.335
OCDF	44.692	1.006	8.234e3	9.186e3	1.130	0.896	0.890	579	719	9.94e4	1.08e5	171.5	151.0	NO	bb	bb	14.293
2378-TCDD					1.243		0.770	604	393								
12378-PeCDD	31.120	1.001	8.066e1	9.749e1	1.150	0.827	1.550	468	557	2.77e3	1.73e3	5.9	3.1	YES	db	bd	0.083
123478-HxCDD	35.632	1.000	7.469e1	1.526e2	0.960	0.489	1.240	534	399	2.17e3	2.62e3	4.1	6.6	YES	bd	bd	0.097
123678-HxCDD	35.744	1.000	7.871e2	6.838e2	0.883	1.151	1.240	534	399	1.28e4	1.05e4	23.9	26.4	NO	dd	db	0.655
123789-HxCDD	36.123	1.011	3.239e2	3.710e2	0.804	0.873	1.240	534	399	5.04e3	5.71e3	9.4	14.3	YES	bb	bb	0.348
1234678-HpCDD	39.866	1.001	1.847e4	1.819e4	1.200	1.015	1.050	834	656	2.72e5	2.72e5	325.7	414.8	NO	bb	bd	22.054
OCDD	44.454	1.000	9.823e4	1.124e5	1.059	0.874	0.890	1099	1388	1.15e6	1.31e6	1047.8	942.7	NO	bd	bd	184.527
13C-2378-TCDF	25.365	1.007	1.484e5	1.953e5	1.835	0.760	0.770	787	836	2.24e6	2.91e6	2845.0	3480.0	NO	bb	bb	56.975
13C-12378-PeCDF	29.505	1.171	1.710e5	1.123e5	1.377	1.523	1.550	1353	983	2.55e6	1.67e6	1884.8	1699.2	NO	bd	bd	62.622
13C-23478-PeCDF	30.842	1.224	1.597e5	1.074e5	1.301	1.488	1.550	1353	983	2.29e6	1.53e6	1694.8	1553.6	NO	bb	bb	62.462
13C-123478-HxCDF	34.474	0.954	7.470e4	1.464e5	1.091	0.510	0.510	881	1132	1.13e6	2.24e6	1285.1	1980.8	NO	bd	bd	60.494
13C-123678-HxCDF	34.619	0.958	8.420e4	1.625e5	1.340	0.518	0.510	881	1132	1.25e6	2.42e6	1415.4	2138.7	NO	db	db	54.928
13C-234678-HxCDF	35.499	0.983	7.255e4	1.473e5	1.093	0.493	0.510	881	1132	1.13e6	2.23e6	1282.9	1971.0	NO	bb	bd	59.987
13C-123789-HxCDF	36.535	1.011	6.249e4	1.224e5	0.952	0.510	0.510	881	1132	9.28e5	1.82e6	1052.4	1609.9	NO	bd	bd	57.990
13C-1234678-HpCDF	38.384	1.063	4.979e4	1.139e5	0.985	0.437	0.440	762	1181	8.28e5	1.89e6	1087.3	1603.2	NO	bd	bb	49.594
13C-1234789-HpCDF	40.568	1.123	3.546e4	8.339e4	0.756	0.425	0.440	762	1181	4.85e5	1.16e6	636.6	980.3	NO	bd	bd	46.923
13C-1234-TCDD	25.195	0.000	1.447e5	1.839e5	1.000	0.787	0.770	1003	873	2.35e6	2.96e6	2341.9	3394.2	NO	bb	bb	100.000
13C-2378-TCDD	26.000	1.032	1.146e5	1.456e5	1.110	0.787	0.770	1003	873	1.79e6	2.25e6	1784.8	2577.6	NO	bb	bb	71.346
13C-12378-PeCDD	31.098	1.234	1.166e5	7.073e4	0.754	1.649	1.550	532	629	1.83e6	1.11e6	3447.3	1762.6	NO	bb	bb	75.642
13C-123478-HxCDD	35.621	0.986	1.342e5	1.086e5	0.960	1.236	1.240	916	710	2.18e6	1.76e6	2378.7	2481.5	NO	bd	bd	75.490
13C-123678-HxCDD	35.733	0.989	1.411e5	1.133e5	1.159	1.245	1.240	916	710	2.20e6	1.81e6	2400.9	2544.8	NO	db	db	65.488
13C-1234678-HpCDD	39.844	1.103	7.097e4	6.760e4	0.629	1.050	1.050	791	750	1.14e6	1.08e6	1442.9	1440.4	NO	bb	bb	65.708
13C-OCDD	44.436	1.230	1.011e5	1.146e5	0.635	0.882	0.890	1238	1215	1.24e6	1.41e6	1001.5	1164.2	NO	bb	bb	101.328
13C-123789-HxCDD	36.123	0.000	1.842e5	1.509e5	1.000	1.221	1.240	916	710	3.01e6	2.41e6	3282.4	3397.3	NO	bb	bb	100.000
37CL-2378-TCDD	26.014	1.033	1.398e5		1.157			722		2.14e6		2965.0			bb		36.744

Dataset: T:\Autospec\Processed Data Batch\231214IH2.qld
Last Altered: Saturday, December 16, 2023 10:26:00 Pacific Standard Time
Printed: Saturday, December 16, 2023 10:41:22 Pacific Standard Time

ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

Compound	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N 1	S/N 2	EMPC	Int.1	Int.2	pg
1368-TCDF					1.170		0.770	482	750								
1289-TCDF					0.847		0.770	482	750								
13468-PECDF	26.806	0.909	9.746e2	8.660e2	1.241	1.125	1.550	620	510	1.48e4	1.16e4	23.8	22.7	YES	bb	bd	0.524
12389-PECDF					0.880		1.550	848	513								
123468-HXCDF	32.814	0.952	9.628e2	7.781e2	1.206	1.237	1.240	595	748	1.45e4	8.72e3	24.4	11.7	NO	bb	bb	0.653
1368-TCDD	23.161	0.891	1.909e2	2.509e2	1.181	0.761	0.770	604	393	2.75e3	3.94e3	4.6	10.0	NO	bb	bb	0.144
1289-TCDD					0.963		0.770	604	393								
12479-PECDD					2.166		1.550	468	557								
12389-PECDD					1.326		1.550	468	557								
124679-HXCDD	33.594	0.943	2.706e3	2.042e3	1.127	1.325	1.240	534	399	4.18e4	3.04e4	78.3	76.3	NO	bb	bb	1.736
1234679-HPCDD	38.841	0.975	2.500e4	2.449e4	1.303	1.020	1.050	834	656	4.13e5	3.82e5	495.9	582.4	NO	bb	bd	27.416
Total-tetrafurans			0.000e0		0.973			482		0.00e0							
Total-penta1			0.000e0					620		0.00e0							
Total-pentafurans			0.000e0		0.931			848		0.00e0							
Total-hexafurans			6.870e3		1.087			595		1.04e5							5.169
Total-heptafurans			1.393e4		1.134			901		2.25e5							16.154
Total-Furans			2.904e4		1.053			482		4.28e5							35.616
Total-tetradioxins			1.909e2		1.129			604		2.75e3							0.144
Total-pentadioxins			0.000e0		1.548			468		0.00e0							
Total-hexadioxins			6.263e3		0.943			534		8.48e4							4.517
Total-heptadioxins			4.346e4		1.251			834		6.85e5							49.469
Total-Dioxins			1.481e5		1.182			604		1.92e6							238.657
Total-TEQ			1.772e5					604		2.35e6							274.272
FUNCTION1 PFK			4.477e4					293948		7.75e5							
FUNCTION2 PFK			2.034e5					97131		5.00e6							0.000
FUNCTION3 PFK			0.000e0					170479		0.00e0							
FUNCTION4 PFK			2.123e5					154998		3.80e6							
FUNCTION5 PFK			3.334e5					111231		3.80e6							
FUNCTION1 HXCD...			4.049e2					404		3.88e3							0.000
FUNCTION1 HPCD...																	
FUNCTION2 HPCD...			0.000e0					439		0.00e0							
FUNCTION3 OCDPE			3.111e2					334		5.23e3							0.000
FUNCTION4 NCDPE			0.000e0					548		0.00e0							
FUNCTION5 DCDPE			0.000e0					365		0.00e0							

Method: T:\Autospec\Methods\Dioxin231215.mdb 15 Dec 2023 13:28:43
Calibration: T:\Autospec\Curves\230811ICIH.cdb 12 Aug 2023 09:45:18

ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

TF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

PP

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

PF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

HF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	234678-HxCDF	35.53	4.484e2	3.250e2	1.081	1.38	1.24	6.8	YES	NO	MM	bb	0.325
2	123678-HxCDF	34.64	2.183e2	2.033e2	1.032	1.07	1.24	7.5	YES	NO	db	MM	0.166
3	Total-hexafurans	33.87	2.515e3	2.184e3	1.087	1.15	1.24	63.5	YES	NO	bb	bb	1.981
4	Total-hexafurans	33.03	2.726e3	2.119e3	1.087	1.29	1.24	72.5	YES	NO	bb	bb	2.043
5	123468-HXCDF	32.81	9.628e2	7.781e2	1.206	1.24	1.24	24.4	YES	NO	bb	bb	0.653

HPF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-heptafurans	39.05	8.191e3	7.926e3	1.134	1.03	1.05	145.7	YES	NO	bb	bd	10.063
2	1234678-HpCDF	38.40	5.743e3	5.861e3	1.164	0.98	1.05	103.6	YES	NO	bb	bb	6.091

ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

Furans,TF,PP,PF,HF,HPF,OF

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	234678-HxCDF	35.53	4.484e2	3.250e2	1.081	1.38	1.24	6.8	YES	NO	MM	bb	0.325
2	123678-HxCDF	34.64	2.183e2	2.033e2	1.032	1.07	1.24	7.5	YES	NO	db	MM	0.166
3	Total-hexafurans	33.87	2.515e3	2.184e3	1.087	1.15	1.24	63.5	YES	NO	bb	bb	1.981
4	Total-hexafurans	33.03	2.726e3	2.119e3	1.087	1.29	1.24	72.5	YES	NO	bb	bb	2.043
5	123468-HXCDF	32.81	9.628e2	7.781e2	1.206	1.24	1.24	24.4	YES	NO	bb	bb	0.653
6	Total-heptafurans	39.05	8.191e3	7.926e3	1.134	1.03	1.05	145.7	YES	NO	bb	bd	10.063
7	1234678-HpCDF	38.40	5.743e3	5.861e3	1.164	0.98	1.05	103.6	YES	NO	bb	bb	6.091
8	OCDF	44.69	8.234e3	9.186e3	1.130	0.90	0.89	171.5	YES	NO	bb	bb	14.293

TD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1368-TCDD	23.16	1.909e2	2.509e2	1.181	0.76	0.77	4.6	YES	NO	bb	bb	0.144

PD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

HD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	Total-hexadioxins	34.86	3.213e2	2.560e2	0.943	1.26	1.24	10.4	YES	NO	db	db	0.246
2	Total-hexadioxins	34.74	2.448e3	1.961e3	0.943	1.25	1.24	46.0	YES	NO	bd	bd	1.880
3	124679-HXCDD	33.59	2.706e3	2.042e3	1.127	1.33	1.24	78.3	YES	NO	bb	bb	1.736
4	123678-HxCDD	35.74	7.871e2	6.838e2	0.883	1.15	1.24	23.9	YES	NO	dd	db	0.655

HPD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1234678-HpCDD	39.87	1.847e4	1.819e4	1.200	1.01	1.05	325.7	YES	NO	bb	bd	22.054
2	1234679-HPCDD	38.84	2.500e4	2.449e4	1.303	1.02	1.05	495.9	YES	NO	bb	bd	27.416

ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

Dioxins,TD,PD,HD,HPD,OD

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	1368-TCDD	23.16	1.909e2	2.509e2	1.181	0.76	0.77	4.6	YES	NO	bb	bb	0.144
2	Total-hexadioxins	34.86	3.213e2	2.560e2	0.943	1.26	1.24	10.4	YES	NO	db	db	0.246
3	Total-hexadioxins	34.74	2.448e3	1.961e3	0.943	1.25	1.24	46.0	YES	NO	bd	bd	1.880
4	124679-HXCDD	33.59	2.706e3	2.042e3	1.127	1.33	1.24	78.3	YES	NO	bb	bb	1.736
5	123678-HxCDD	35.74	7.871e2	6.838e2	0.883	1.15	1.24	23.9	YES	NO	dd	db	0.655
6	1234678-HpCDD	39.87	1.847e4	1.819e4	1.200	1.01	1.05	325.7	YES	NO	bb	bd	22.054
7	1234679-HPCDD	38.84	2.500e4	2.449e4	1.303	1.02	1.05	495.9	YES	NO	bb	bd	27.416
8	OCDD	44.45	9.823e4	1.124e5	1.059	0.87	0.89	1047.8	YES	NO	bd	bd	184.527

TotalTEQ,Furans,Dioxins

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	234678-HxCDF	35.53	4.484e2	3.250e2	1.081	1.38	1.24	6.8	YES	NO	MM	bb	0.325
2	123678-HxCDF	34.64	2.183e2	2.033e2	1.032	1.07	1.24	7.5	YES	NO	db	MM	0.166
3	Total-hexafurans	33.87	2.515e3	2.184e3	1.087	1.15	1.24	63.5	YES	NO	bb	bb	1.981
4	Total-hexafurans	33.03	2.726e3	2.119e3	1.087	1.29	1.24	72.5	YES	NO	bb	bb	2.043
5	123468-HXCDF	32.81	9.628e2	7.781e2	1.206	1.24	1.24	24.4	YES	NO	bb	bb	0.653
6	Total-heptafurans	39.05	8.191e3	7.926e3	1.134	1.03	1.05	145.7	YES	NO	bb	bd	10.063
7	1234678-HpCDF	38.40	5.743e3	5.861e3	1.164	0.98	1.05	103.6	YES	NO	bb	bb	6.091
8	OCDF	44.69	8.234e3	9.186e3	1.130	0.90	0.89	171.5	YES	NO	bb	bb	14.293
9	1368-TCDD	23.16	1.909e2	2.509e2	1.181	0.76	0.77	4.6	YES	NO	bb	bb	0.144
10	Total-hexadioxins	34.86	3.213e2	2.560e2	0.943	1.26	1.24	10.4	YES	NO	db	db	0.246
11	Total-hexadioxins	34.74	2.448e3	1.961e3	0.943	1.25	1.24	46.0	YES	NO	bd	bd	1.880
12	124679-HXCDD	33.59	2.706e3	2.042e3	1.127	1.33	1.24	78.3	YES	NO	bb	bb	1.736
13	123678-HxCDD	35.74	7.871e2	6.838e2	0.883	1.15	1.24	23.9	YES	NO	dd	db	0.655
14	1234678-HpCDD	39.87	1.847e4	1.819e4	1.200	1.01	1.05	325.7	YES	NO	bb	bd	22.054
15	1234679-HPCDD	38.84	2.500e4	2.449e4	1.303	1.02	1.05	495.9	YES	NO	bb	bd	27.416
16	OCDD	44.45	9.823e4	1.124e5	1.059	0.87	0.89	1047.8	YES	NO	bd	bd	184.527

PFK1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 PFK	27.51	1.475e4					1.5	NO		bb		
2	FUNCTION1 PFK	22.37	3.001e4					1.2	NO		bb		

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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION2 PFK	27.79	5.966e3					2.1	NO		db		0.000
2	FUNCTION2 PFK	27.74	5.317e3					1.7	NO		bd		0.000
3	FUNCTION2 PFK	29.46	4.814e3					1.5	NO		bd		0.000
4	FUNCTION2 PFK	29.11	1.906e3					0.8	NO		bb		0.000
5	FUNCTION2 PFK	29.07	6.110e2					0.6	NO		bb		0.000
6	FUNCTION2 PFK	29.03	6.195e2					0.5	NO		db		0.000
7	FUNCTION2 PFK	28.96	1.981e3					0.8	NO		bd		0.000
8	FUNCTION2 PFK	28.85	2.072e4					2.3	NO		db		0.000
9	FUNCTION2 PFK	28.74	1.029e4					2.5	NO		dd		0.000
10	FUNCTION2 PFK	28.68	3.972e3					1.3	NO		dd		0.000
11	FUNCTION2 PFK	28.61	1.089e4					2.4	NO		dd		0.000
12	FUNCTION2 PFK	28.52	8.721e3					1.7	NO		dd		0.000
13	FUNCTION2 PFK	28.48	4.028e3					1.3	NO		bd		0.000
14	FUNCTION2 PFK	28.19	1.520e4					1.7	NO		bb		0.000
15	FUNCTION2 PFK	28.12	1.389e3					0.8	NO		db		0.000
16	FUNCTION2 PFK	28.08	6.047e3					1.4	NO		bd		0.000
17	FUNCTION2 PFK	27.91	3.421e3					1.1	NO		db		0.000
18	FUNCTION2 PFK	27.86	5.176e3					1.5	NO		bd		0.000
19	FUNCTION2 PFK	31.42	3.316e3					1.2	NO		bb		0.000
20	FUNCTION2 PFK	31.22	5.259e3					1.3	NO		bb		0.000
21	FUNCTION2 PFK	31.14	2.930e3					1.0	NO		bb		0.000
22	FUNCTION2 PFK	31.06	4.883e3					1.8	NO		bb		0.000
23	FUNCTION2 PFK	30.88	3.553e3					1.0	NO		db		0.000
24	FUNCTION2 PFK	30.83	2.113e3					0.9	NO		bd		0.000
25	FUNCTION2 PFK	30.77	3.773e2					0.3	NO		bb		0.000
26	FUNCTION2 PFK	30.64	1.077e4					1.6	NO		bb		0.000
27	FUNCTION2 PFK	30.16	2.320e3					0.9	NO		db		0.000
28	FUNCTION2 PFK	30.13	2.144e3					1.0	NO		bd		0.000
29	FUNCTION2 PFK	29.92	8.707e3					1.5	NO		bb		0.000
30	FUNCTION2 PFK	29.86	2.092e3					0.8	NO		bb		0.000
31	FUNCTION2 PFK	29.68	4.965e3					1.6	NO		db		0.000
32	FUNCTION2 PFK	29.64	5.564e3					1.9	NO		dd		0.000
33	FUNCTION2 PFK	29.57	7.141e3					1.8	NO		dd		0.000
34	FUNCTION2 PFK	29.53	7.216e3					1.4	NO		dd		0.000
35	FUNCTION2 PFK	32.06	1.901e3					0.8	NO		db		0.000
36	FUNCTION2 PFK	31.99	8.919e3					2.5	NO		bd		0.000
37	FUNCTION2 PFK	31.94	1.640e3					0.9	NO		db		0.000

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PFK2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
38	FUNCTION2 PFK	31.88	6.560e3					1.3	NO		bd		0.000

PFK3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

PFK4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION4 PFK	40.88	3.027e3					0.9	NO		bb		
2	FUNCTION4 PFK	40.80	6.140e3					1.2	NO		bb		
3	FUNCTION4 PFK	40.19	4.961e3					1.3	NO		bb		
4	FUNCTION4 PFK	39.53	1.220e4					2.0	NO		bb		
5	FUNCTION4 PFK	39.39	2.527e3					0.9	NO		bb		
6	FUNCTION4 PFK	38.46	8.389e3					1.6	NO		bb		
7	FUNCTION4 PFK	38.26	4.539e3					0.9	NO		bb		
8	FUNCTION4 PFK	38.16	4.199e3					1.2	NO		bb		
9	FUNCTION4 PFK	38.09	1.566e4					2.2	NO		bb		
10	FUNCTION4 PFK	37.59	1.191e5					6.7	YES		bb		
11	FUNCTION4 PFK	42.97	3.356e3					0.9	NO		bb		
12	FUNCTION4 PFK	42.31	5.094e3					1.0	NO		bb		
13	FUNCTION4 PFK	41.93	2.193e3					0.8	NO		bb		
14	FUNCTION4 PFK	41.51	3.089e3					1.0	NO		bb		
15	FUNCTION4 PFK	41.40	1.777e4					1.7	NO		bb		

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PFK5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION5 PFK	45.04	2.302e3					1.2	NO		bd		
2	FUNCTION5 PFK	44.94	8.848e3					2.1	NO		bb		
3	FUNCTION5 PFK	44.82	9.363e3					2.2	NO		bb		
4	FUNCTION5 PFK	44.41	8.614e2					0.9	NO		bb		
5	FUNCTION5 PFK	44.28	1.481e3					0.8	NO		bb		
6	FUNCTION5 PFK	43.79	3.676e3					1.5	NO		bb		
7	FUNCTION5 PFK	43.67	3.714e3					1.7	NO		bb		
8	FUNCTION5 PFK	43.55	3.100e3					1.3	NO		bb		
9	FUNCTION5 PFK	43.19	7.967e4					9.2	YES		db		
10	FUNCTION5 PFK	43.14	2.166e5					11.9	YES		bd		
11	FUNCTION5 PFK	45.07	3.800e3					1.5	NO		db		

ETHERS1

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION1 HXCD...	26.69	7.017e1					3.2	YES		bb		0.000
2	FUNCTION1 HXCD...	25.45	1.146e2					2.6	NO		bb		0.000
3	FUNCTION1 HXCD...	21.90	2.200e2					3.9	YES		bb		0.000

ETHERS2

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS3

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

ETHERS4

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1	FUNCTION3 OCDPE	33.83	1.337e2					6.9	YES		bb		0.000
2	FUNCTION3 OCDPE	32.71	1.775e2					8.7	YES		bb		0.000

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ETHERS5

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

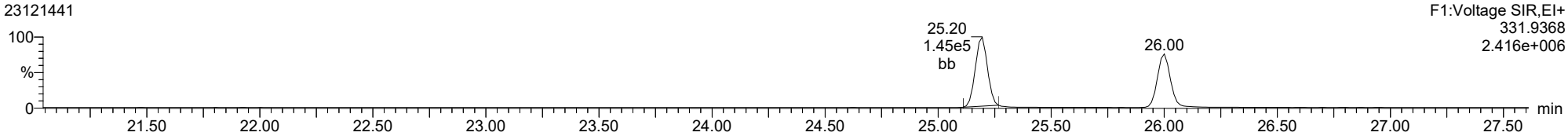
ETHERS6

	Compound	RT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	S/N 1	SNFlag	EMPC	Int.1	Int.2	pg
1													

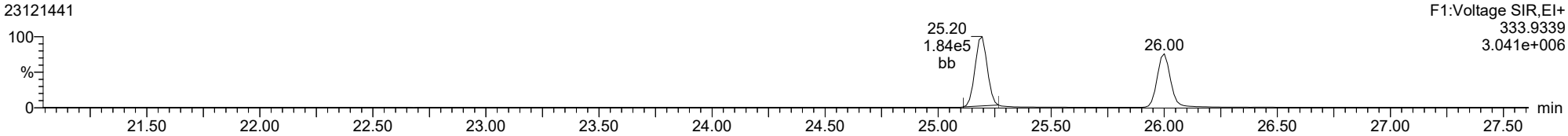
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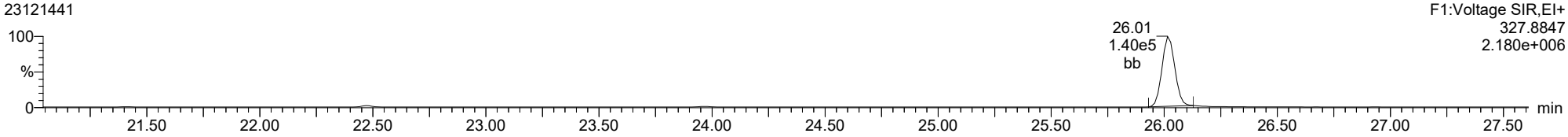
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13C-1234-TCDD



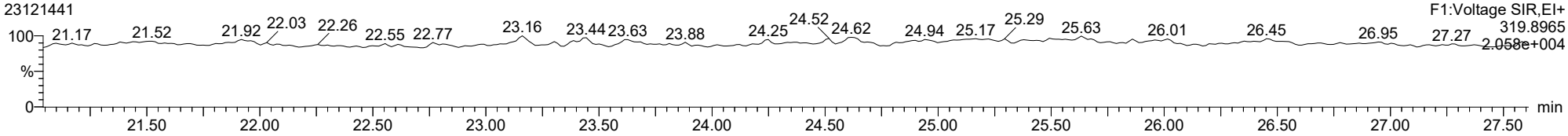
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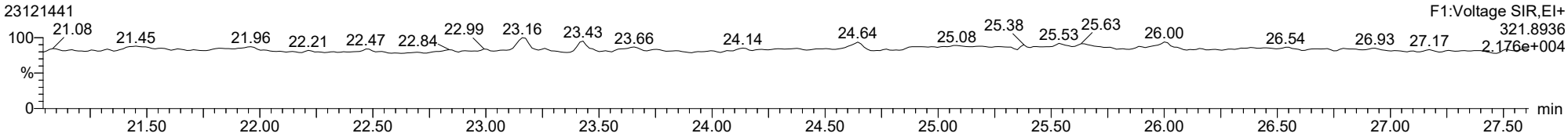
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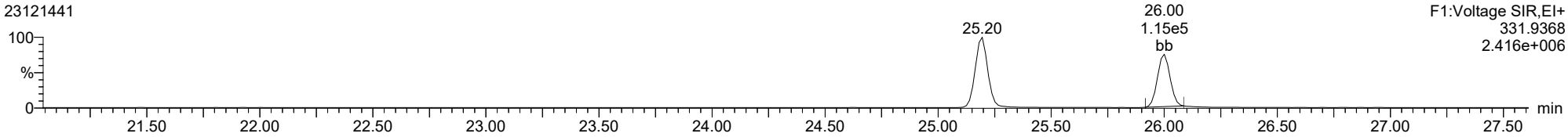
2378-TCDD



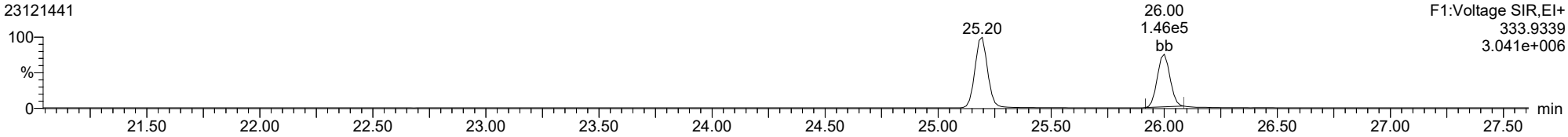
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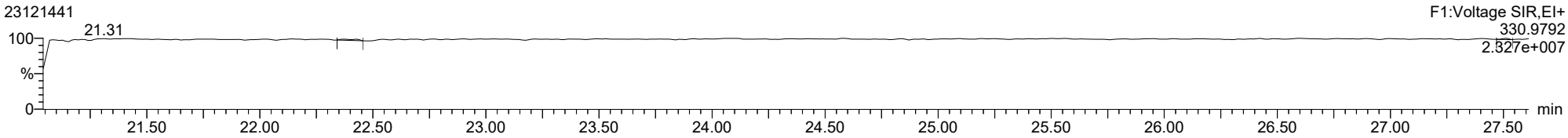
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13C-2378-TCDD

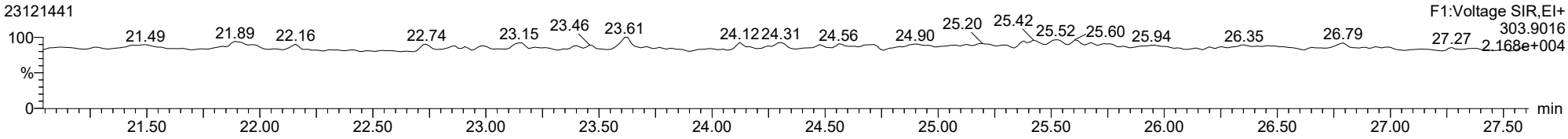


FUNCTION1 PFK

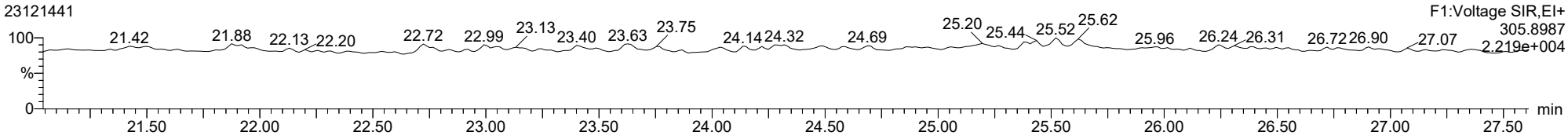


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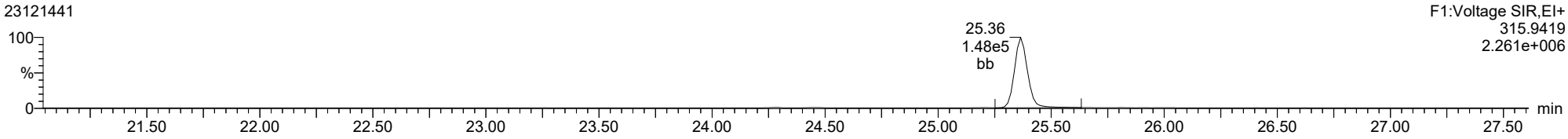
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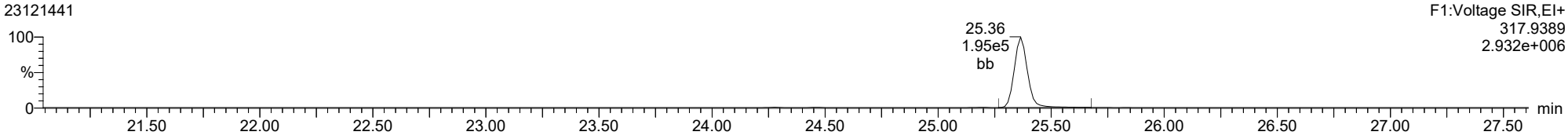
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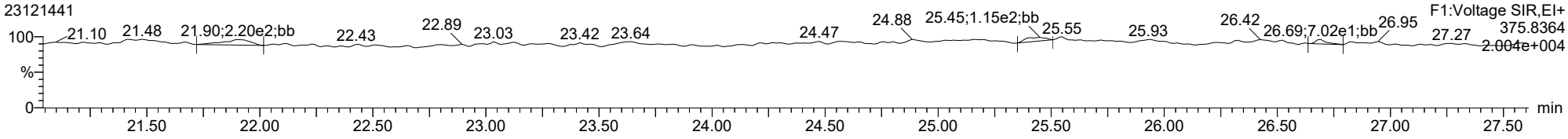
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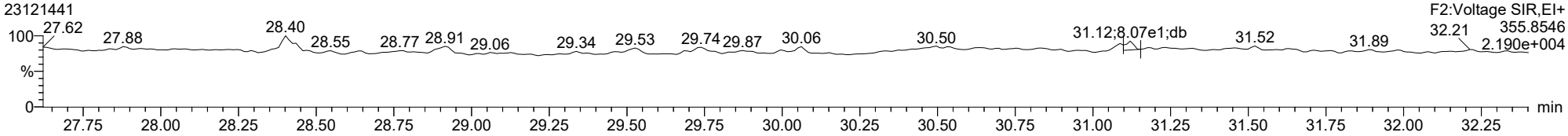


FUNCTION1 HXCDPE

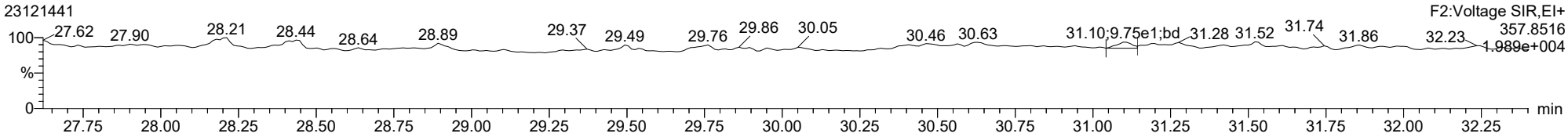


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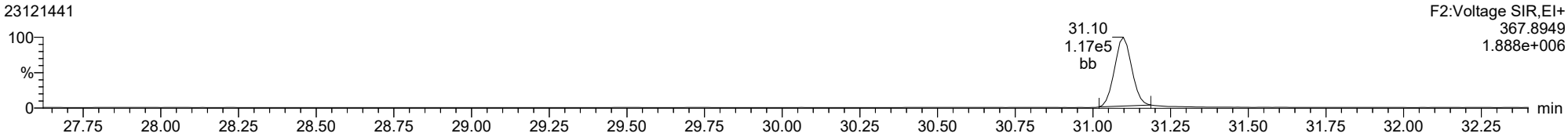
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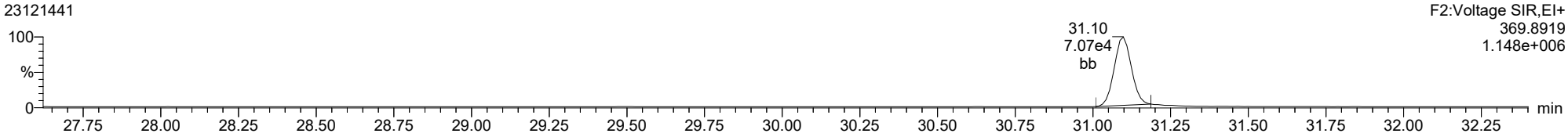
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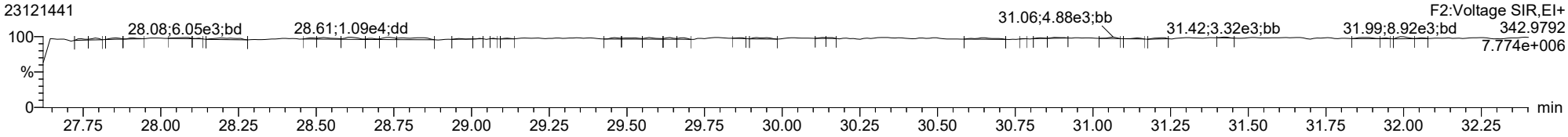
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13C-12378-PeCDD

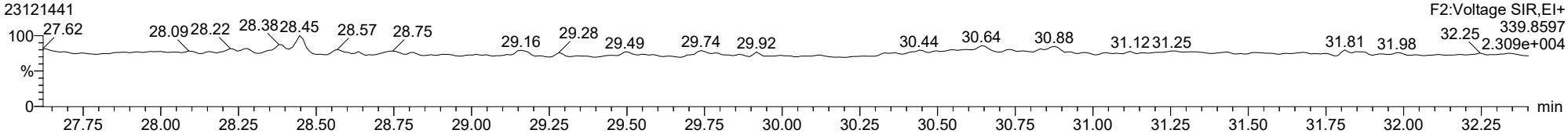


FUNCTION2 PFK

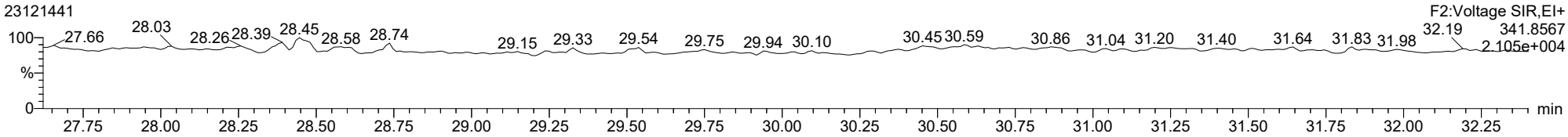


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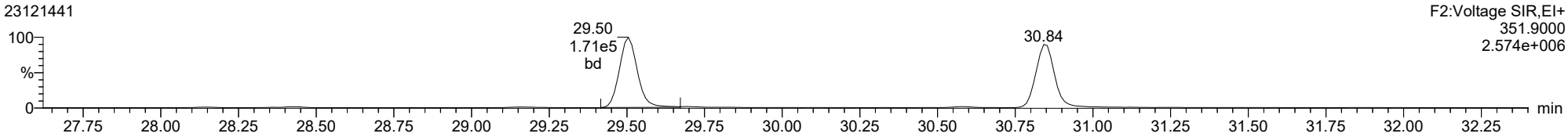
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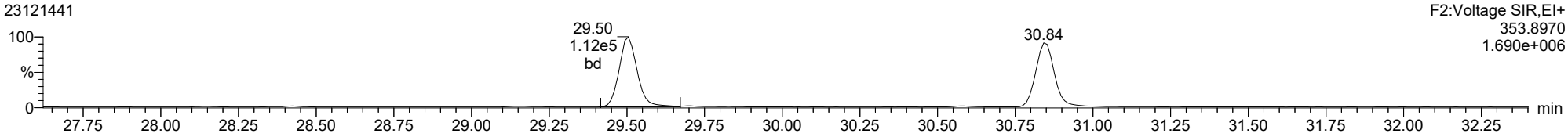
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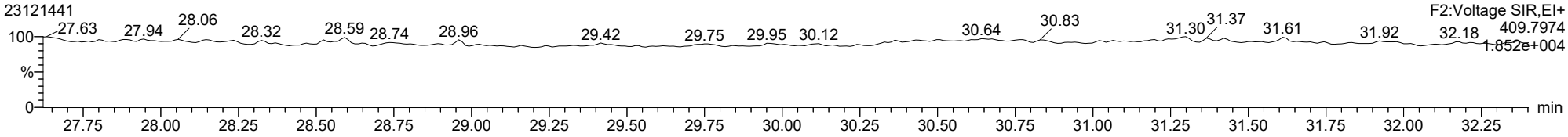
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13C-12378-PeCDF

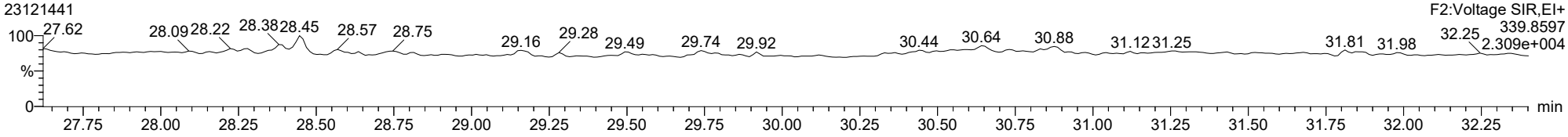


FUNCTION2 HPCDPE

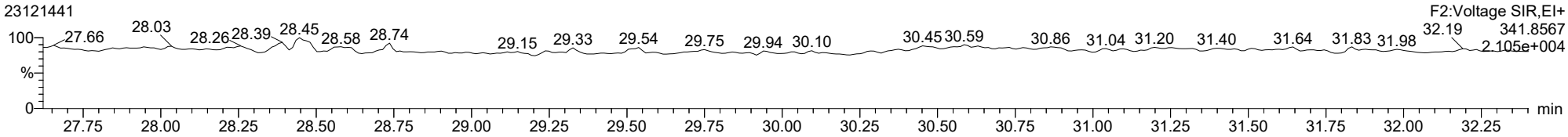


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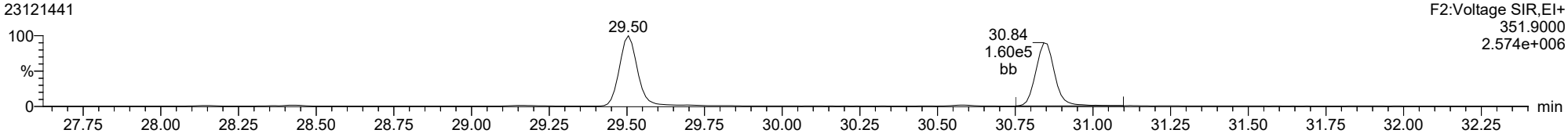
23478-PeCDF



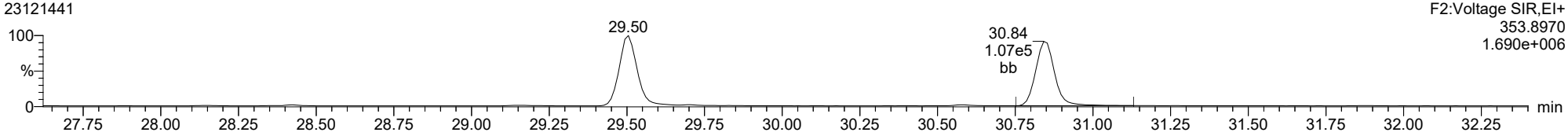
23478-PeCDF



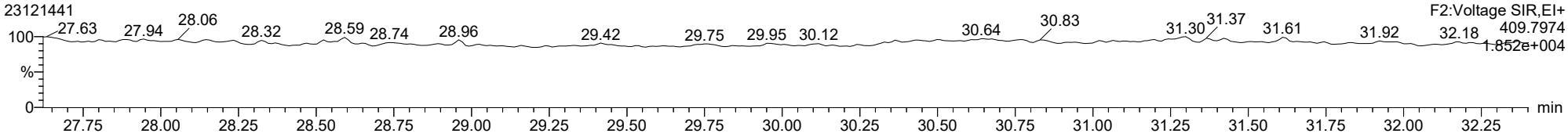
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13C-23478-PeCDF

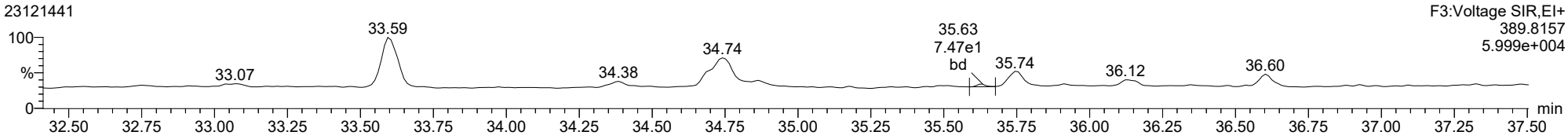


FUNCTION2 HPCDPE

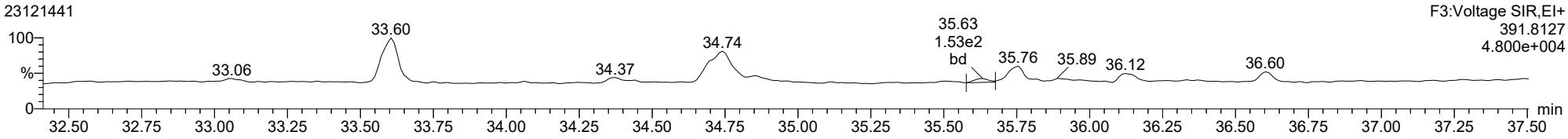


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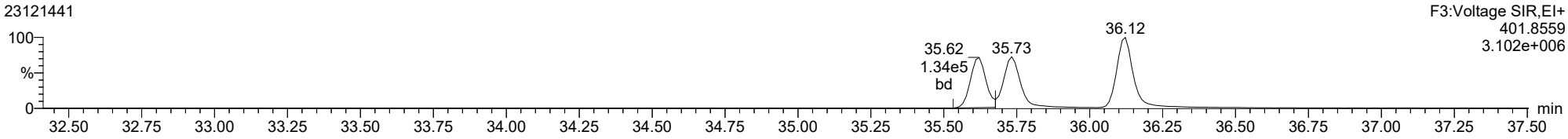
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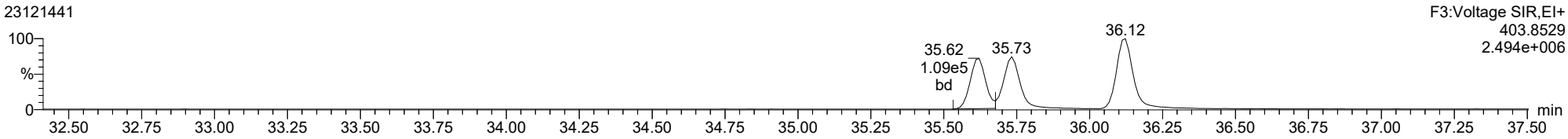
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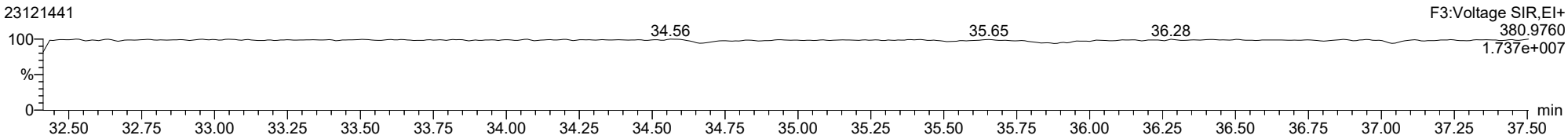
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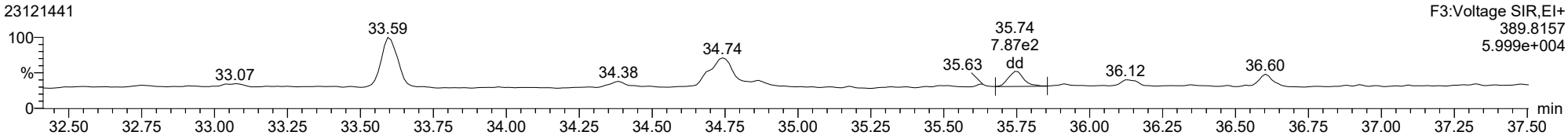


FUNCTION3 PFK

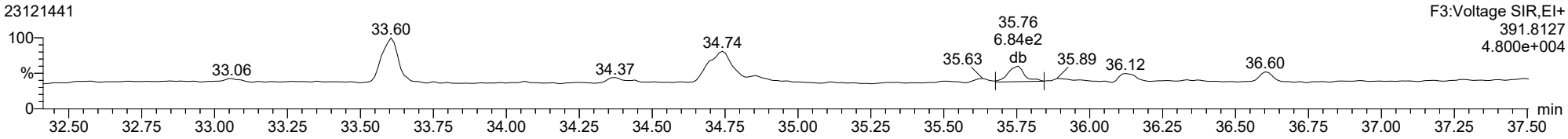


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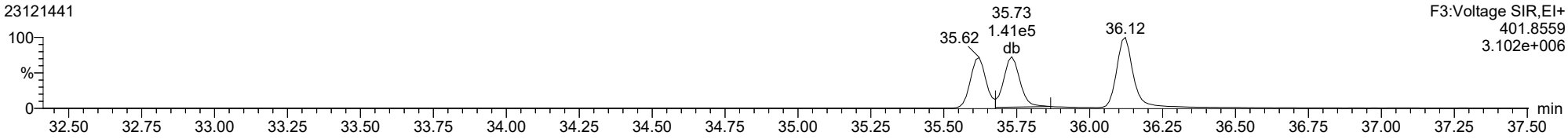
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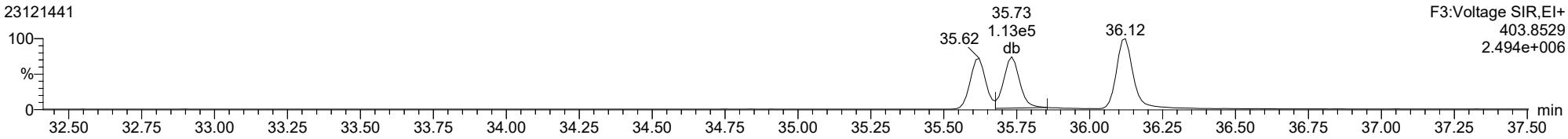
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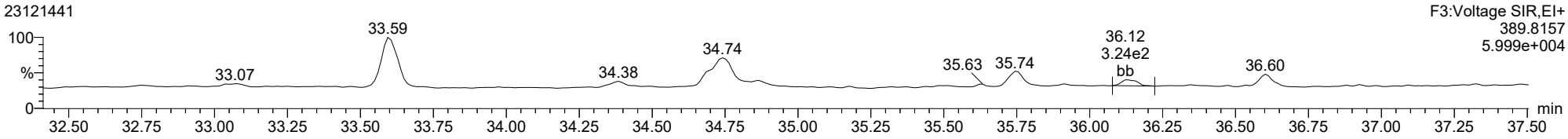


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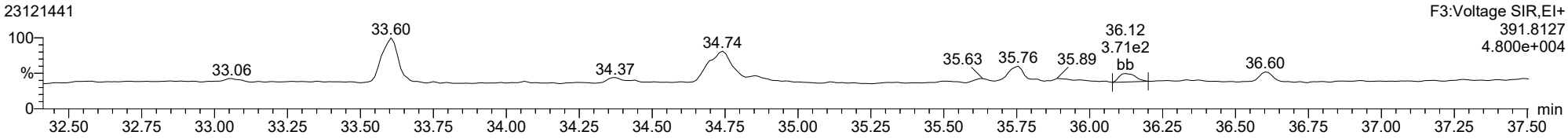


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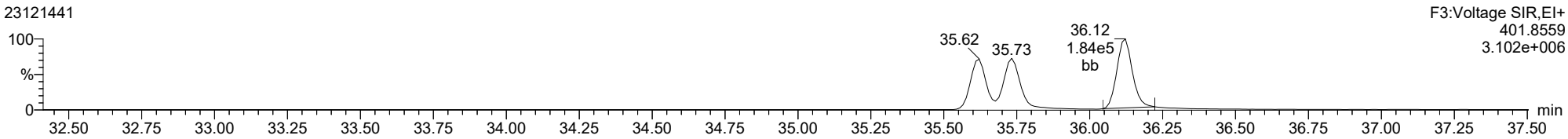
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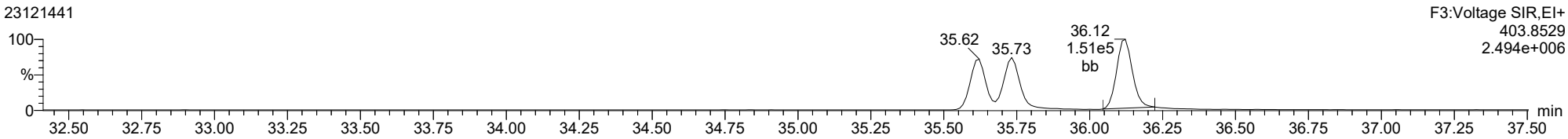
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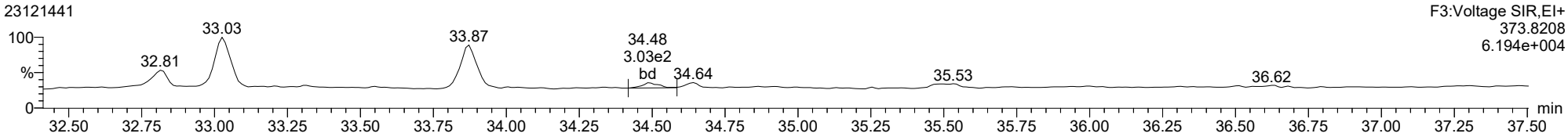


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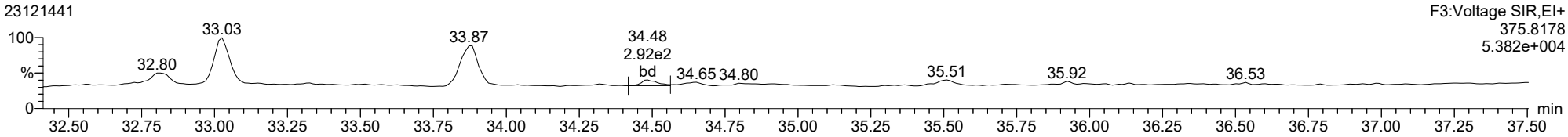


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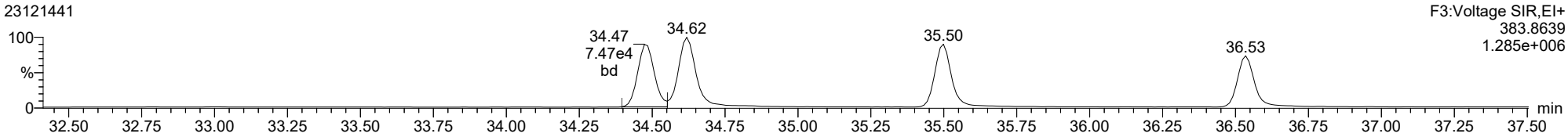
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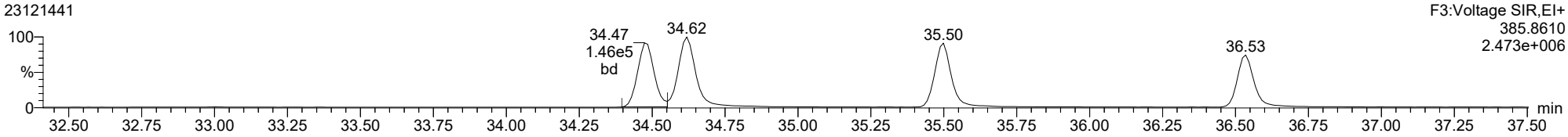
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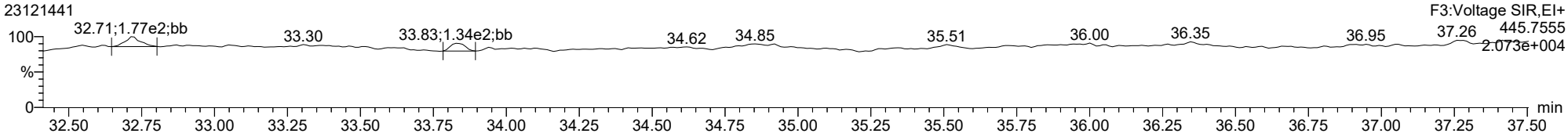
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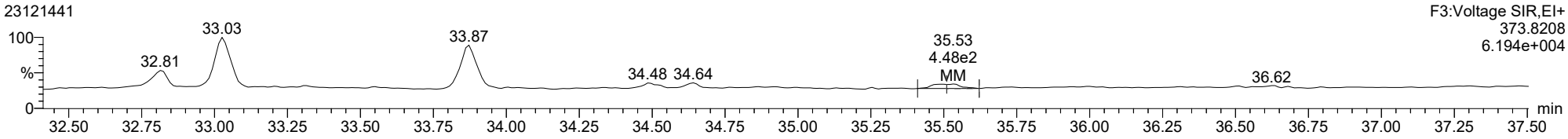


FUNCTION3 OCDPE

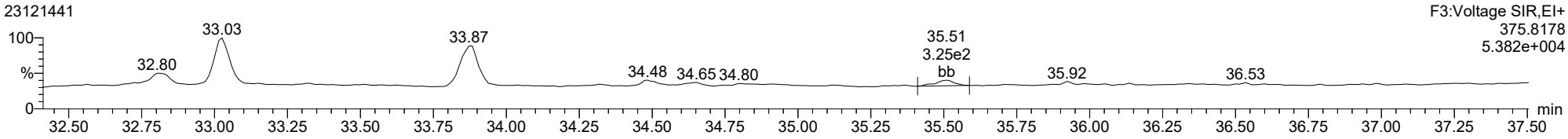


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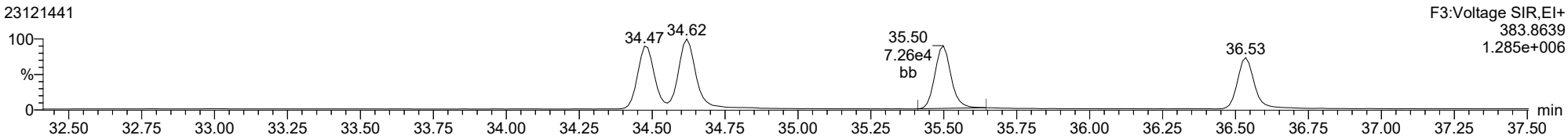
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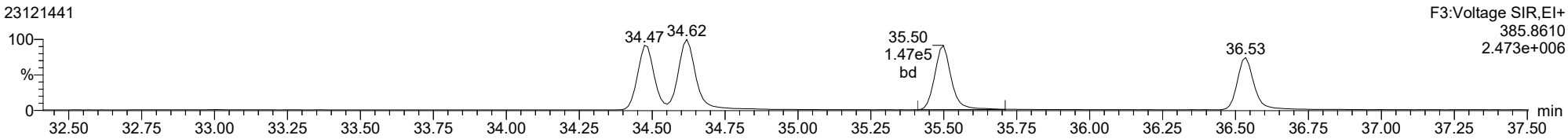
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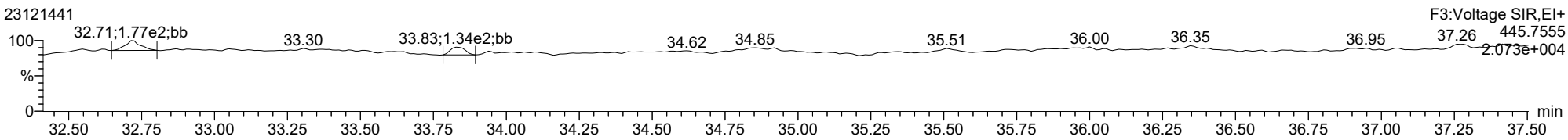
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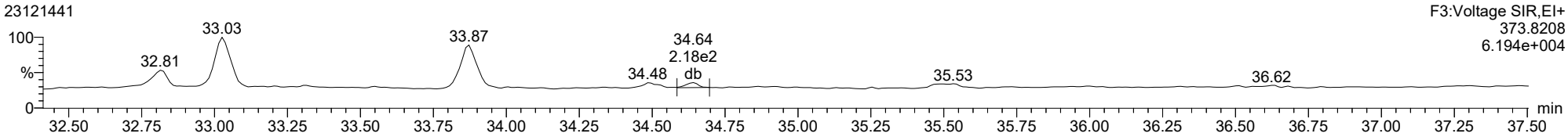


FUNCTION3 OCDPE

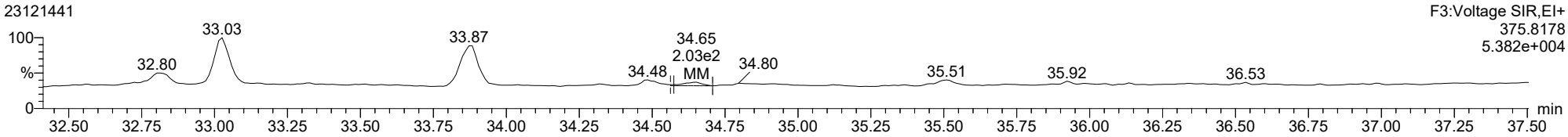


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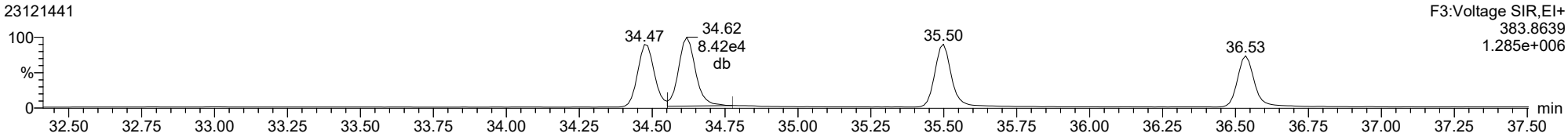
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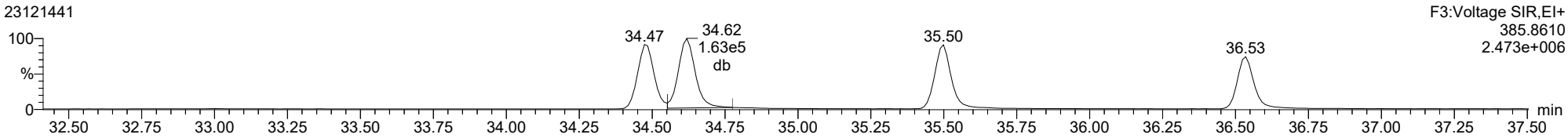
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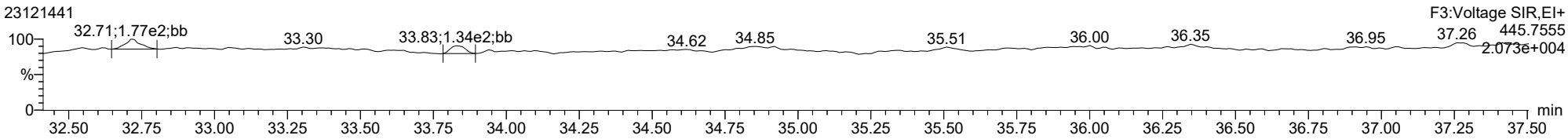
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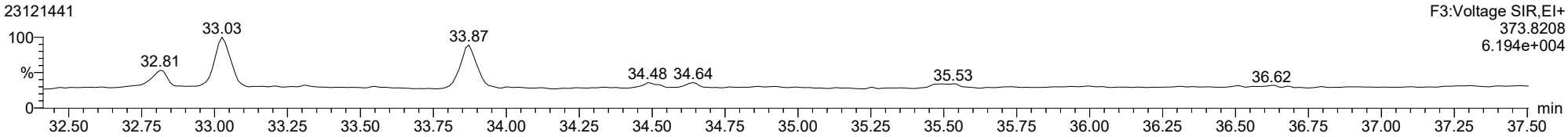


FUNCTION3 OCDPE

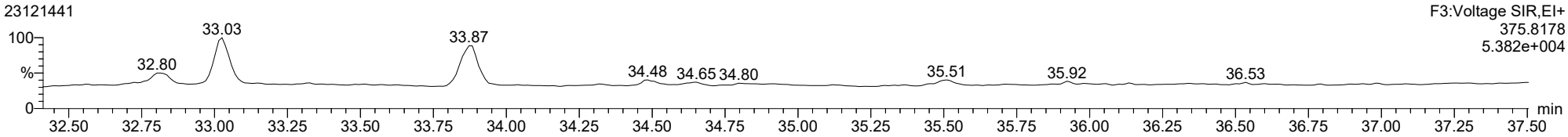


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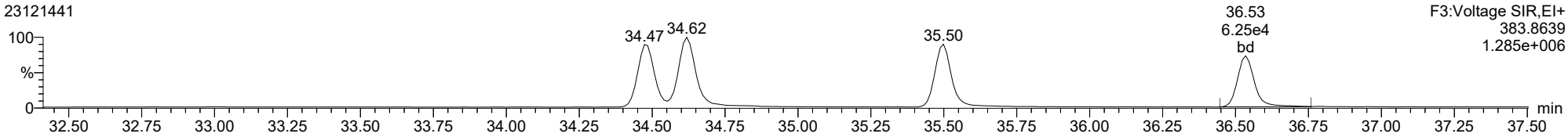
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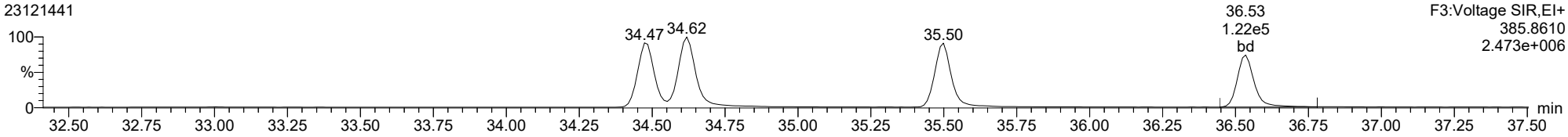
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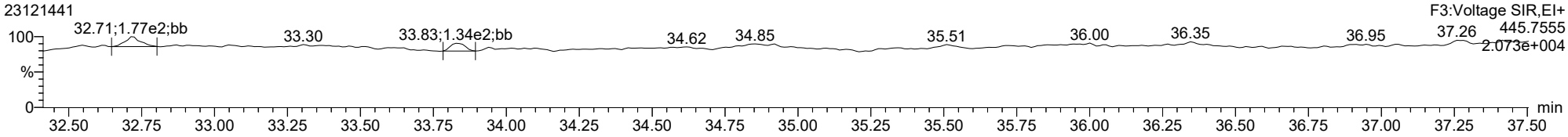
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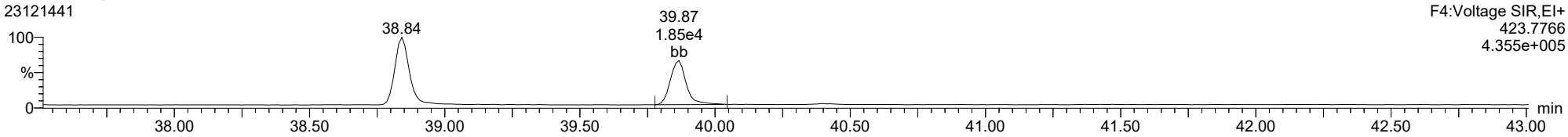
FUNCTION3 OCDPE



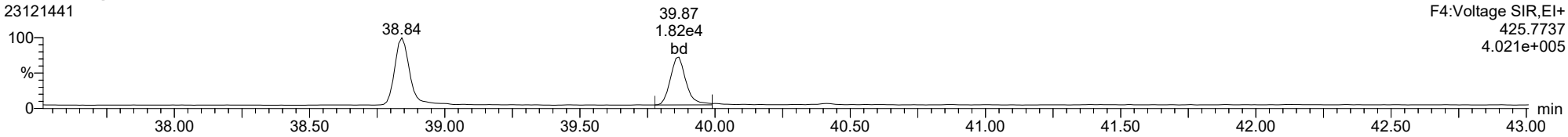
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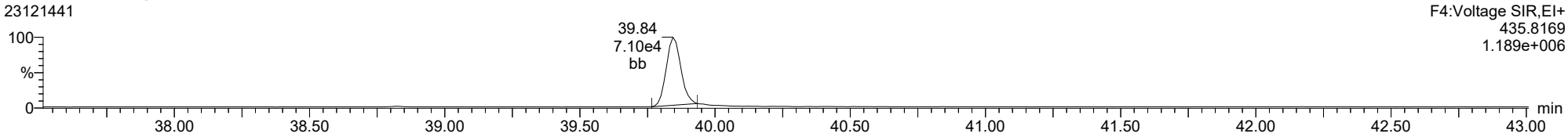
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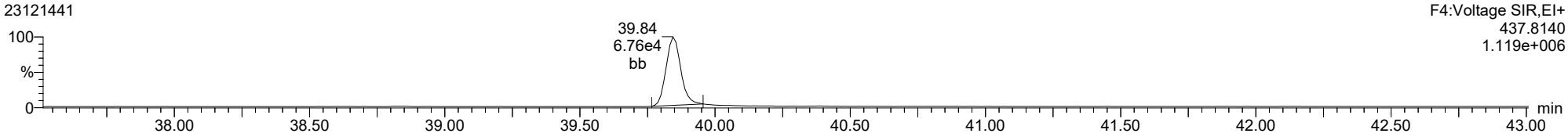
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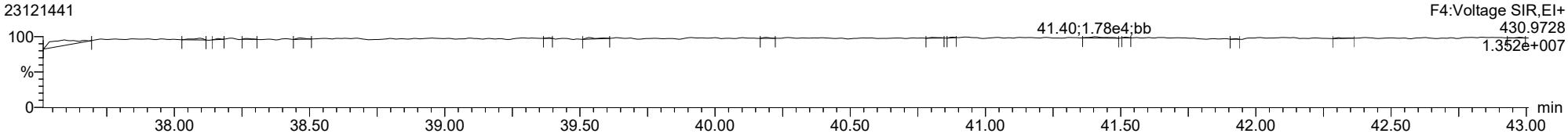
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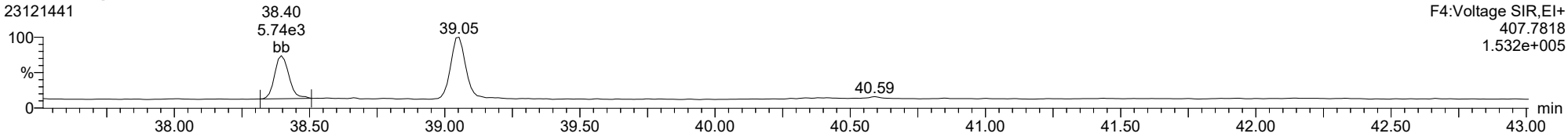


FUNCTION4 PFK

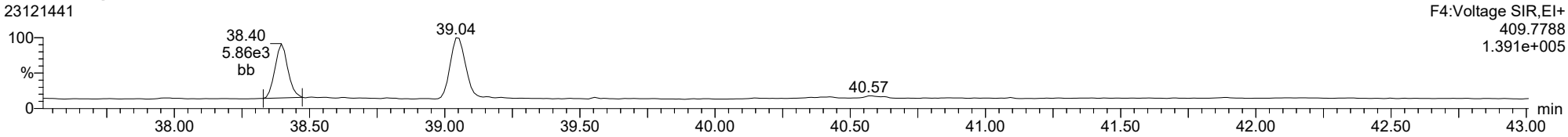


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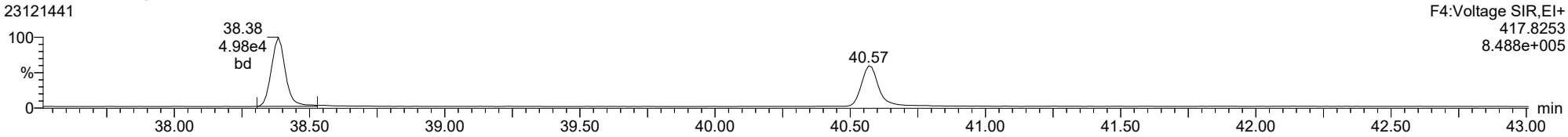
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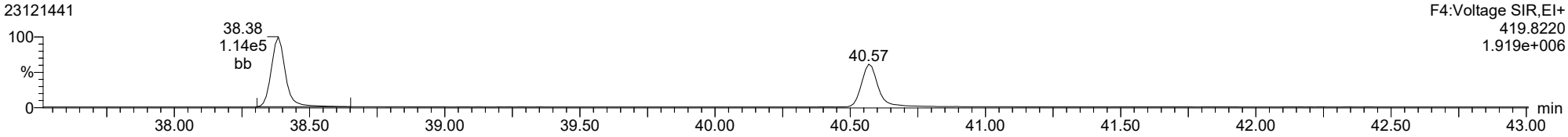
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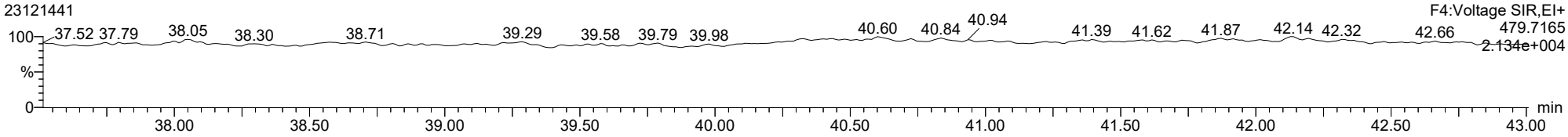
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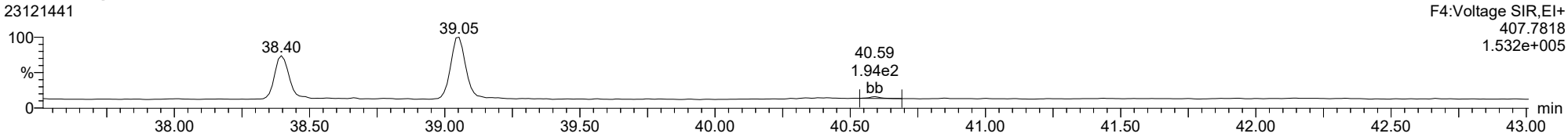


FUNCTION4 NCDPE

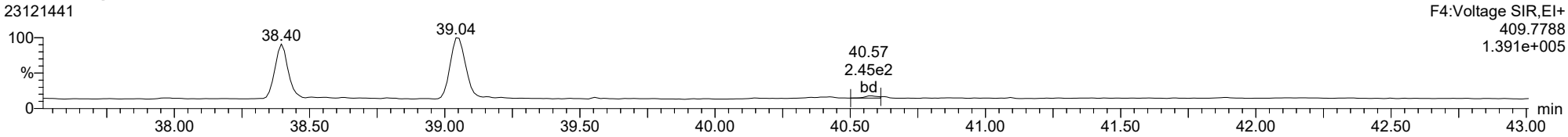


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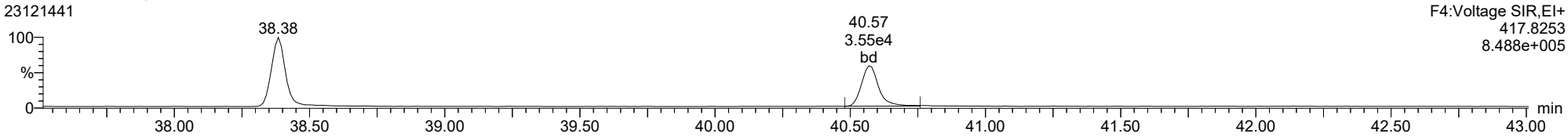
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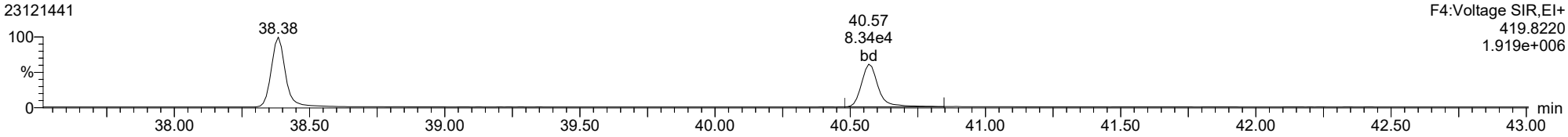
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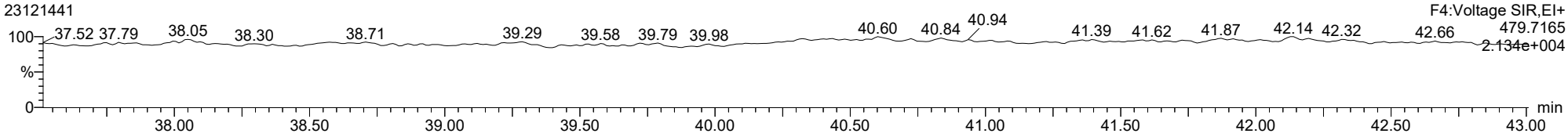
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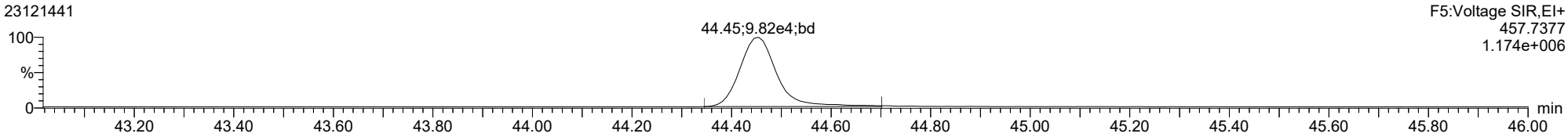
FUNCTION4 NCDPE



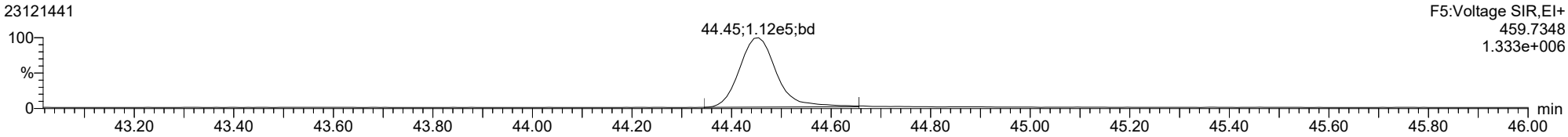
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ID: 23J0690-07, Name: 23121441, Date: 15-Dec-2023, Time: 23:44:36, Conditions: AUTOSPEC01, User: pk

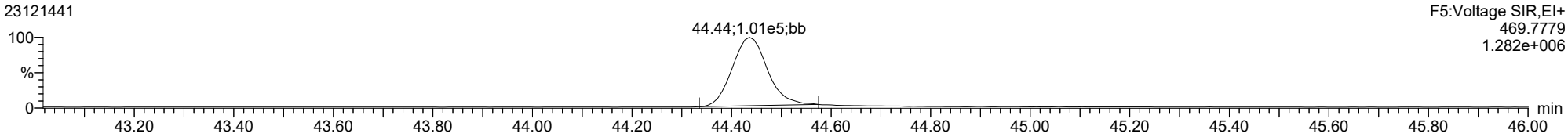
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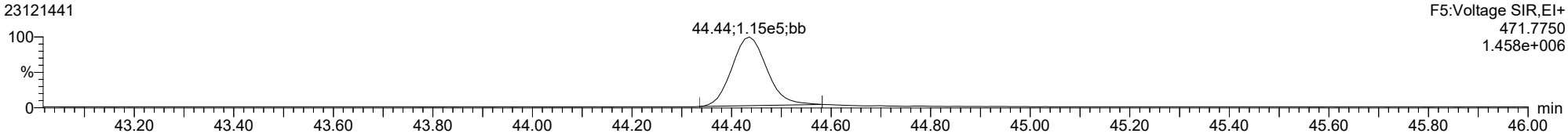
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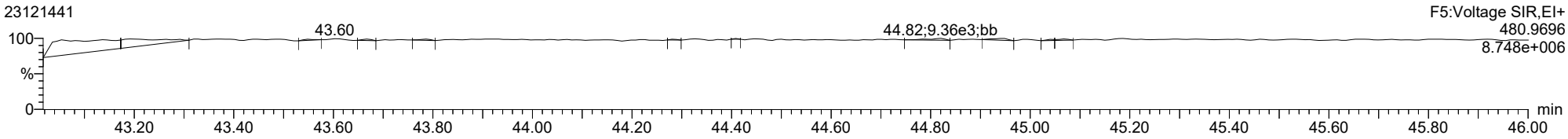
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13C-OCDD

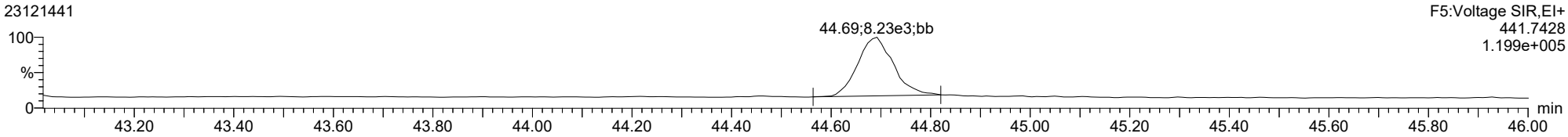


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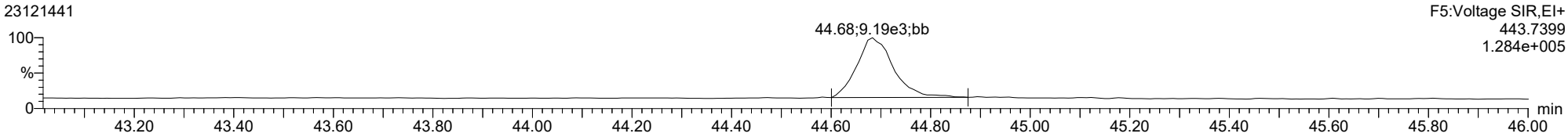


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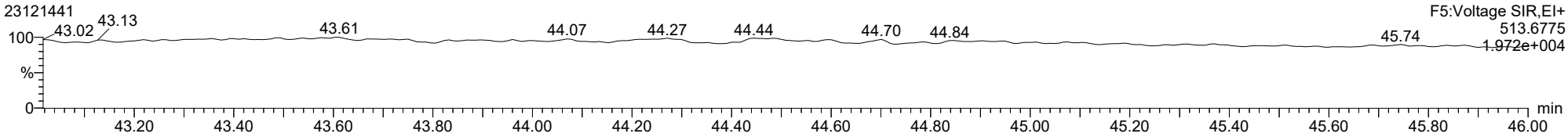
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OCDF

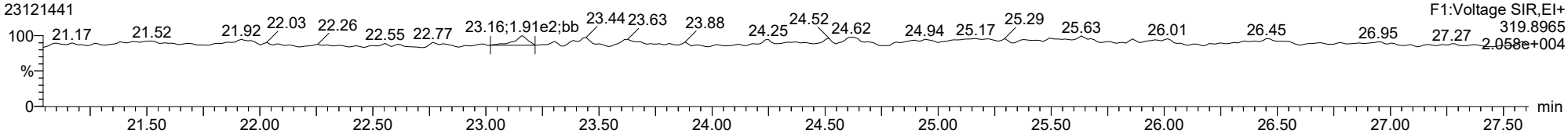


FUNCTION5 DCDPE

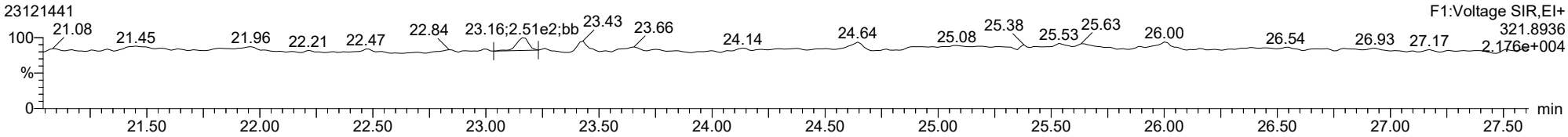


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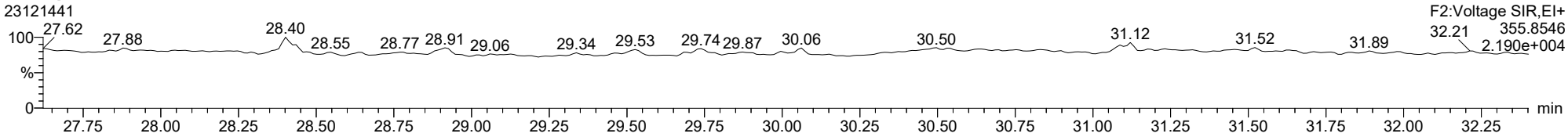
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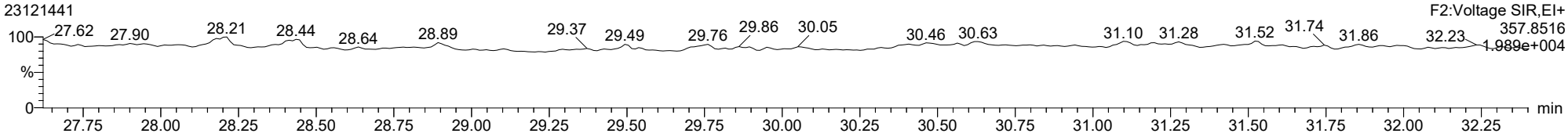
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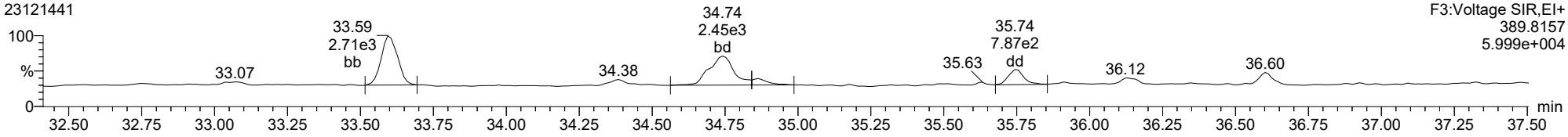


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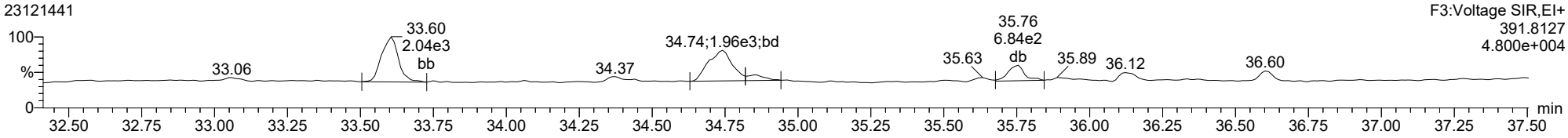


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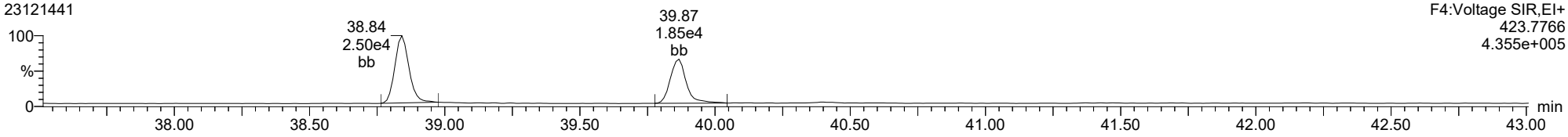
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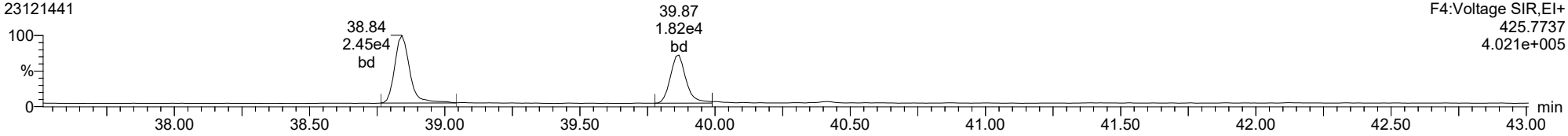
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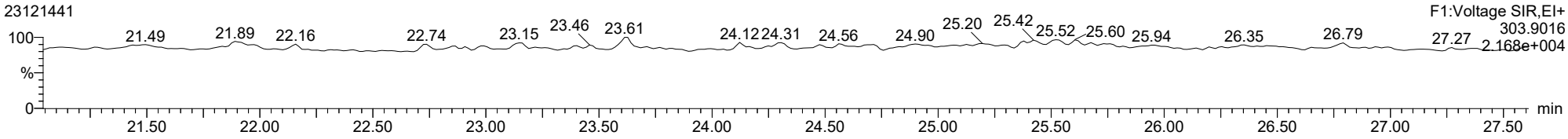
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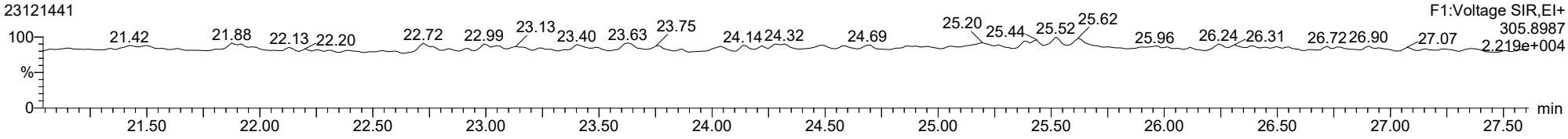
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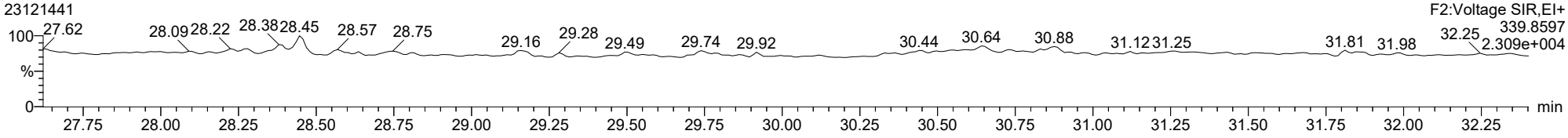
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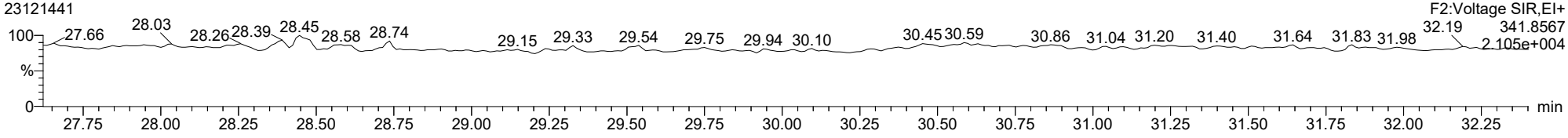
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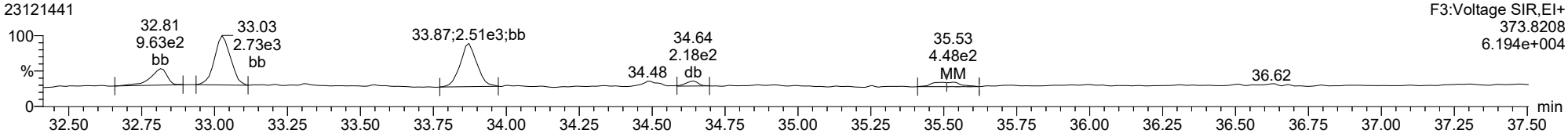
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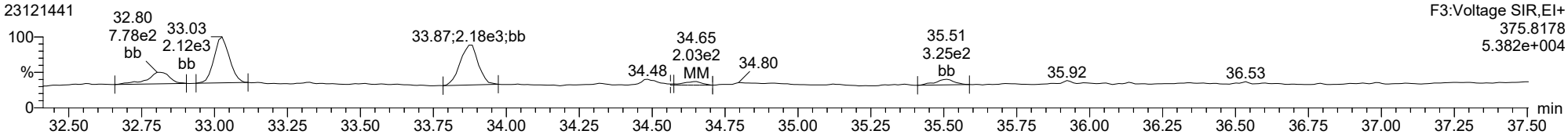
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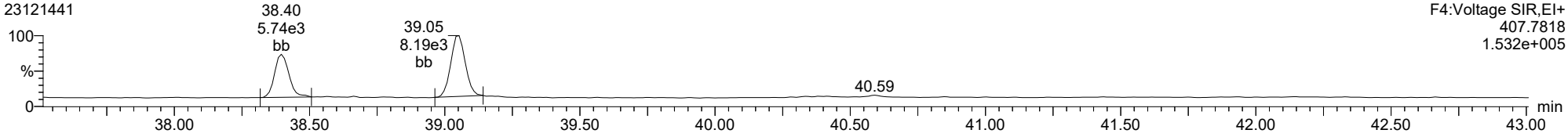
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Total-hexafurans



Total-heptafurans



Total-heptafurans

