

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (QT Reviewed)

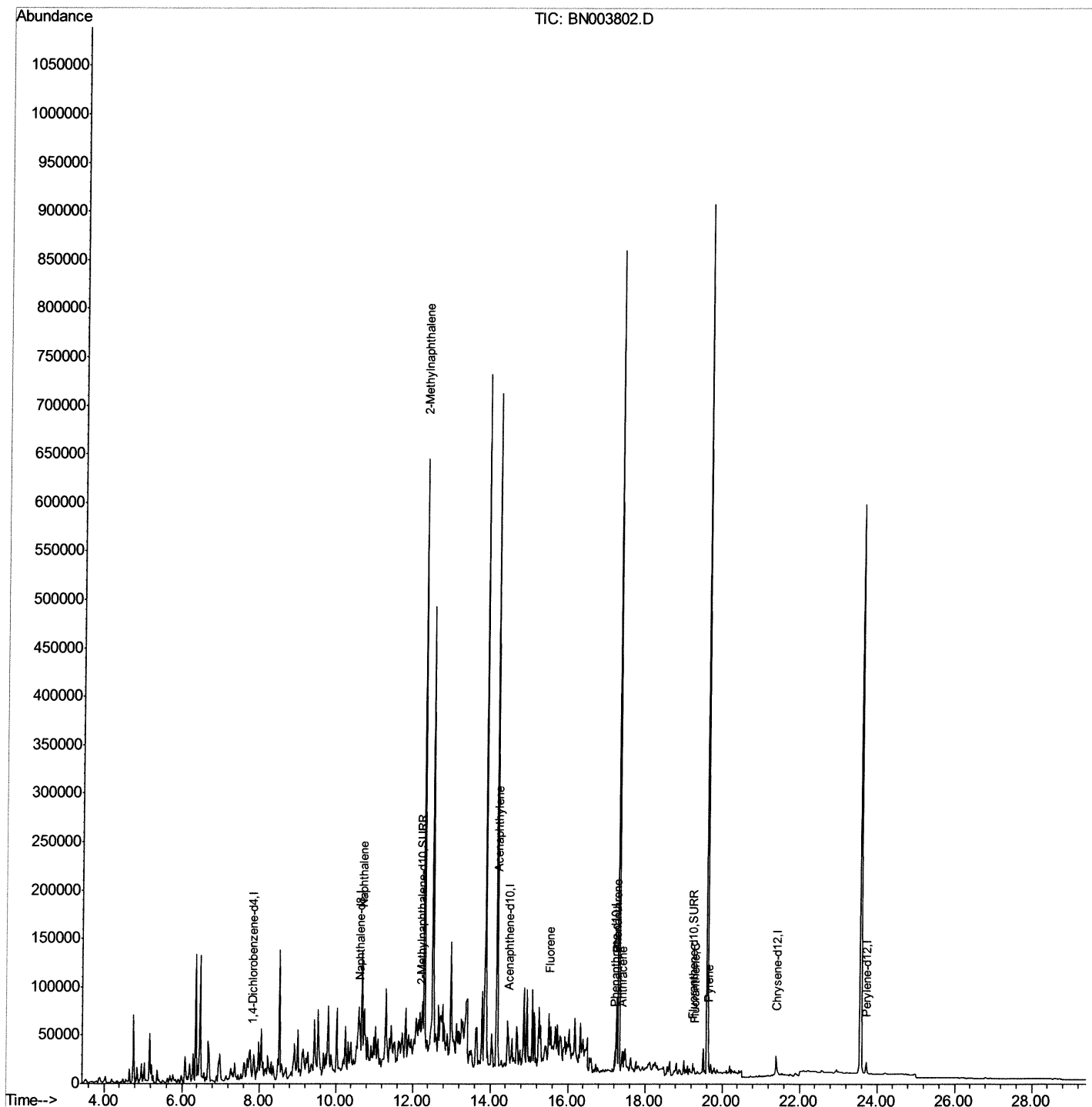
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:24:40 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

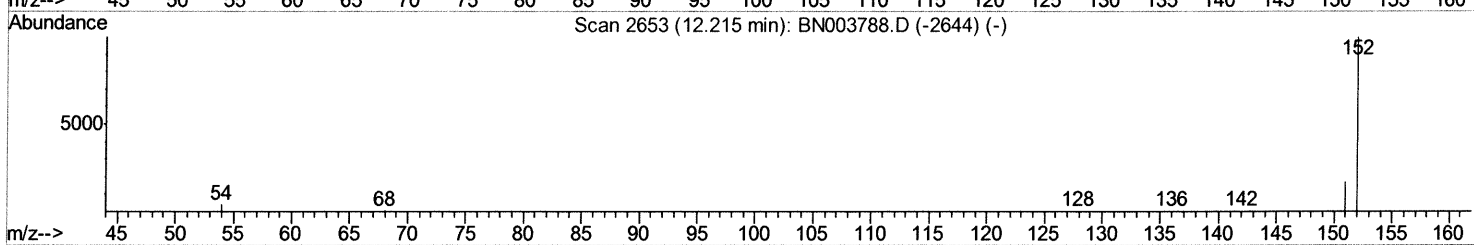
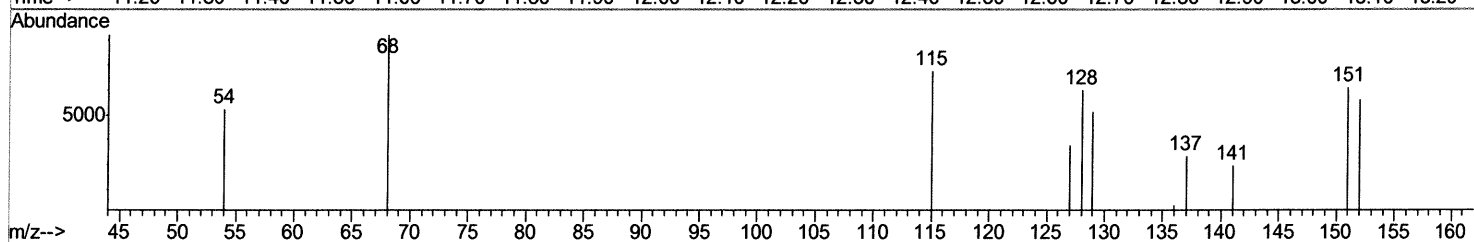
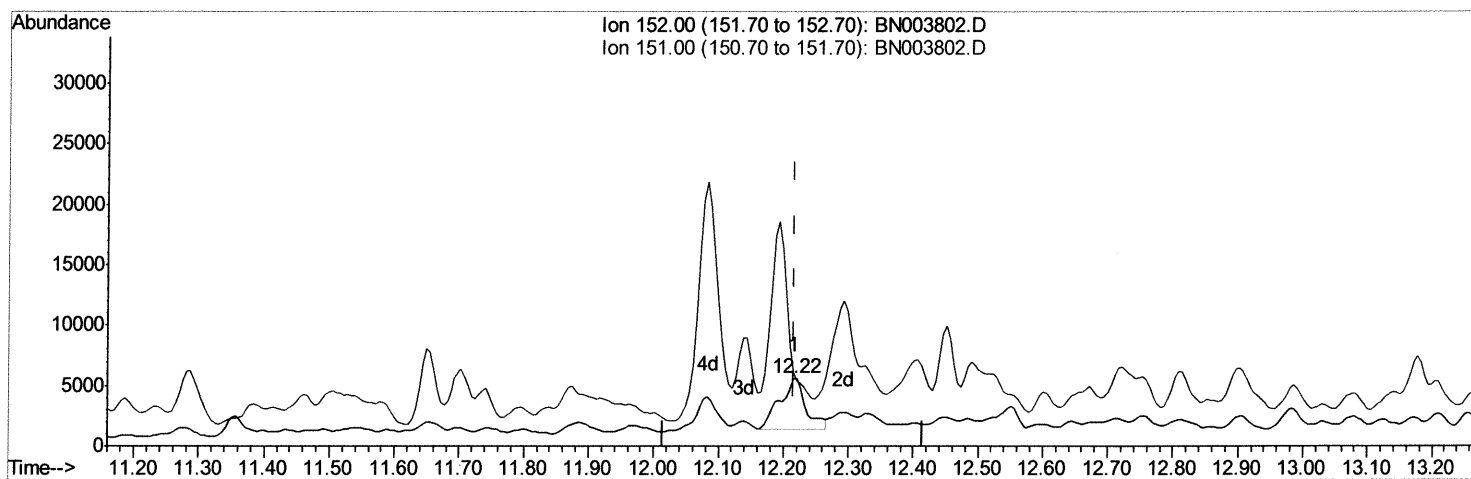
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampled :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:14:26 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



TIC: BN003802.D

(4) 2-Methylnaphthalene-d10 (SURR)

12.215min (-0.000) 0.37ng/ul

response 11714

Ion	Exp%	Act%
152.00	100	100
151.00	19.50	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

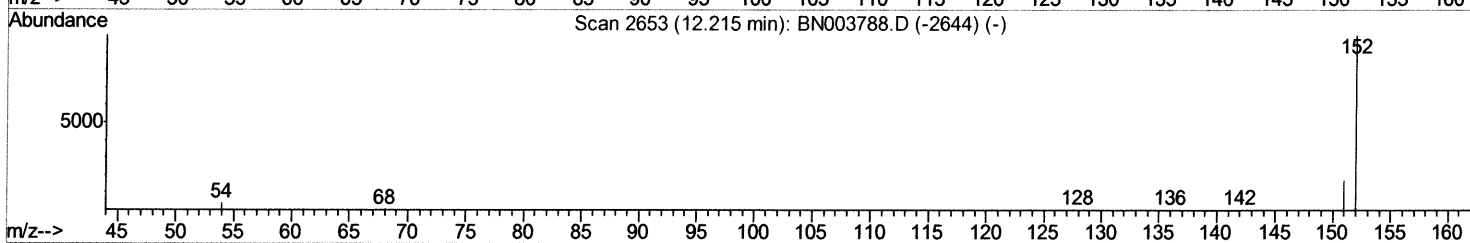
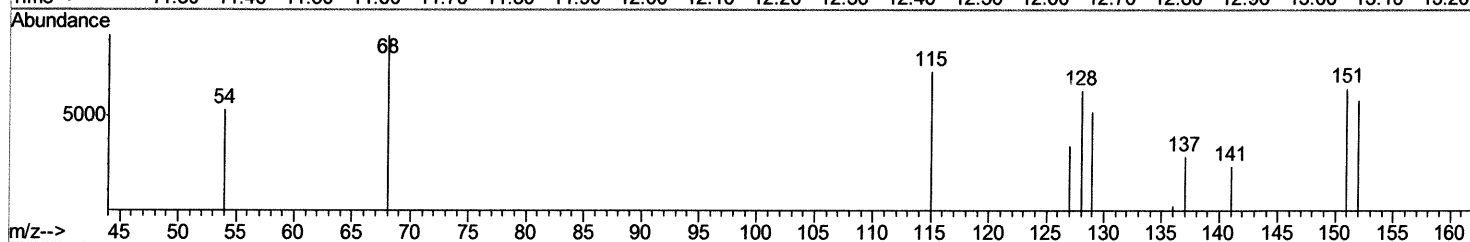
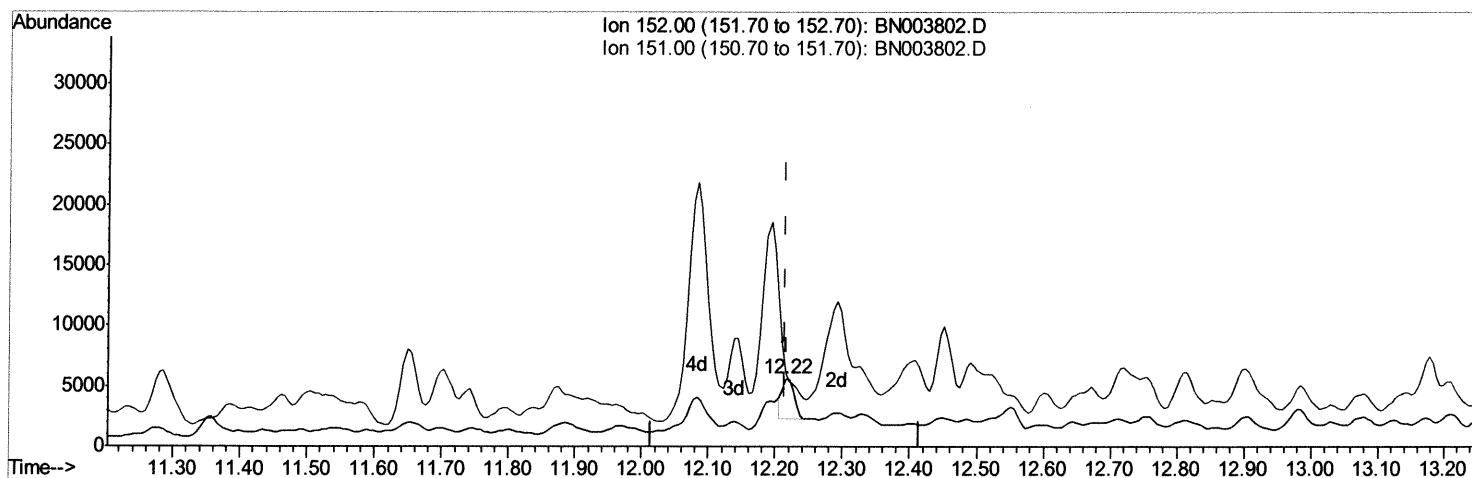
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:14:26 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



TIC: BN003802.D

(4) 2-Methylnaphthalene-d10 (SURR)

12.215min (-0.000) 0.14ng/ul m > 50 12/12/18

response 4426

Ion	Exp%	Act%
152.00	100	100
151.00	19.50	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

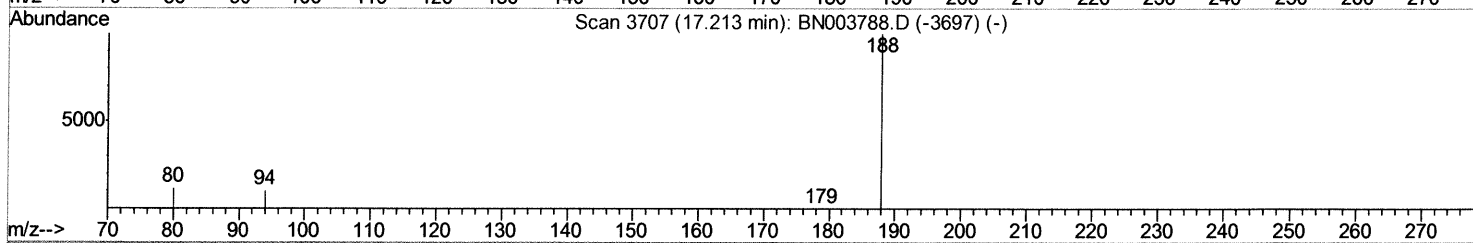
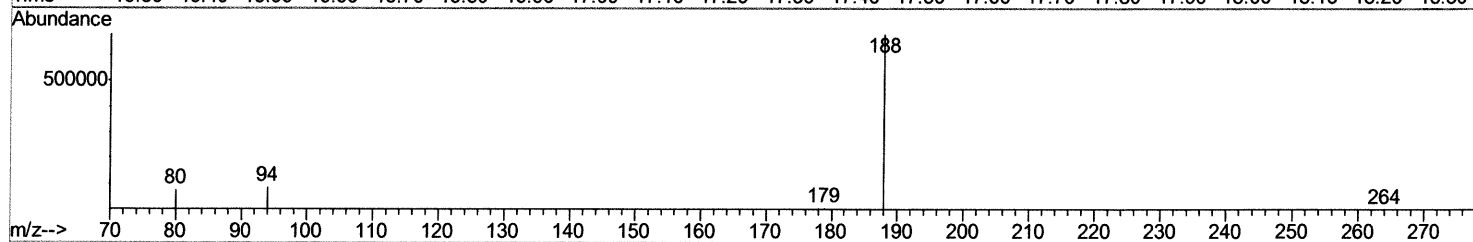
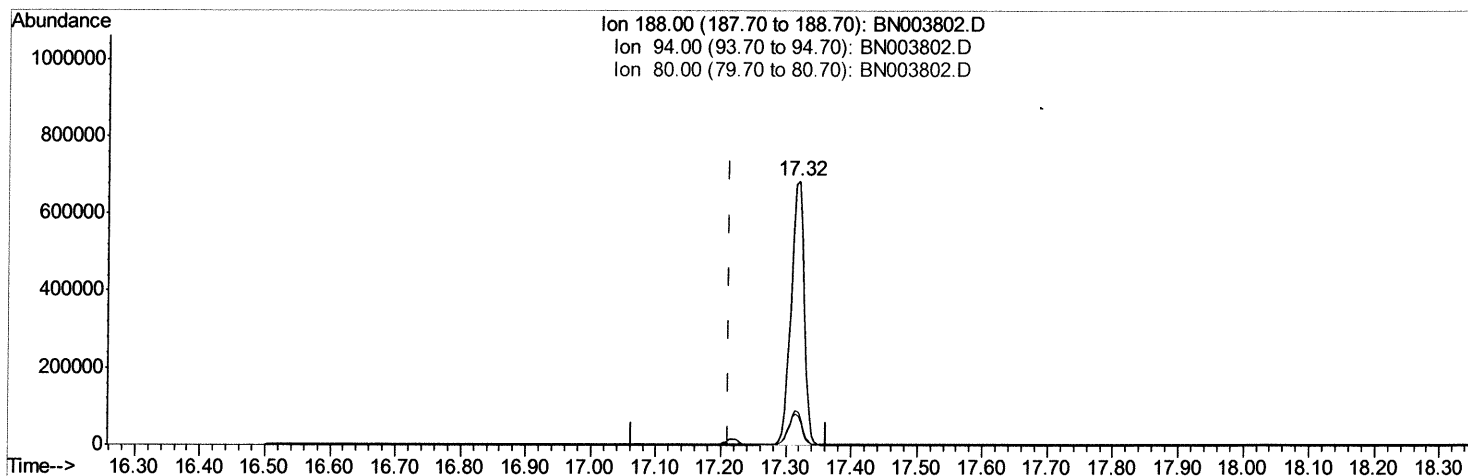
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampled :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:14:26 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



TIC: BN003802.D

(10) Phenanthrene-d10 (I)

17.318min (+0.105) 0.40ng/ul

response 953521

Ion	Exp%	Act%
188.00	100	100
94.00	10.40	12.47
80.00	11.60	11.01
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

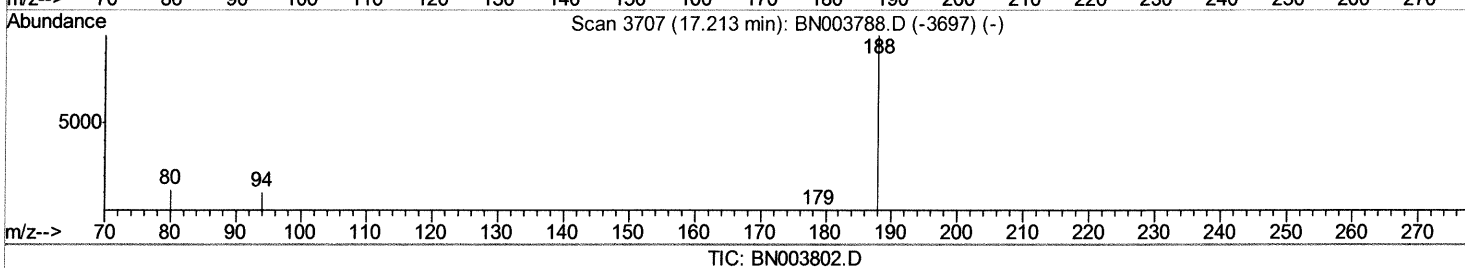
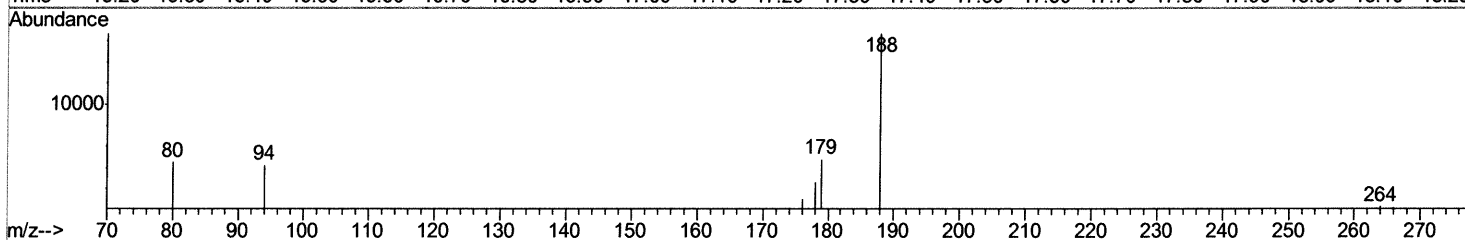
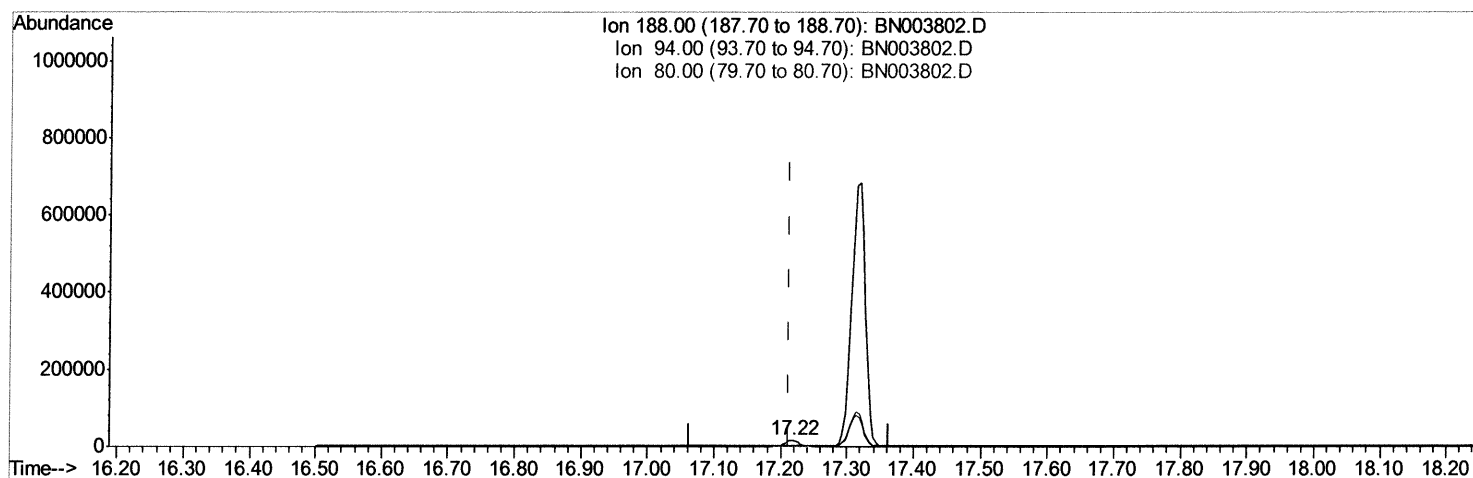
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:14:26 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(10) Phenanthrene-d10 (I)

17.217min (+0.004) 0.40ng/ul m) SJ 12/12/18

response 24006

Ion	Exp%	Act%
188.00	100	100
94.00	10.40	25.27#
80.00	11.60	27.06#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

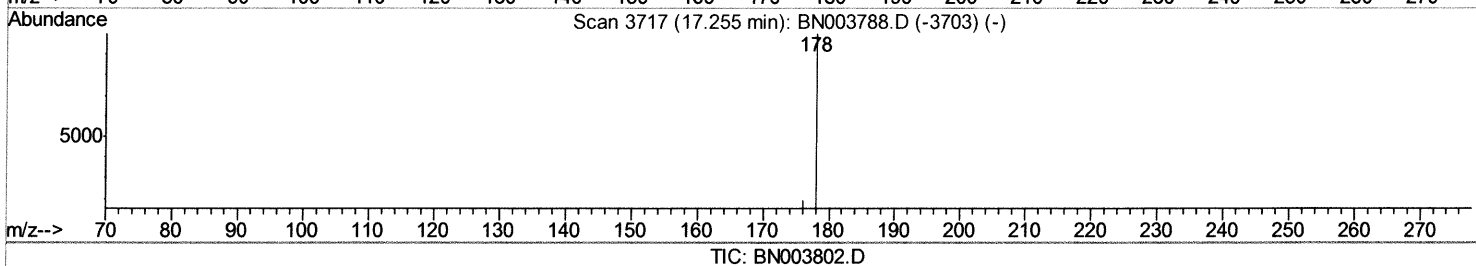
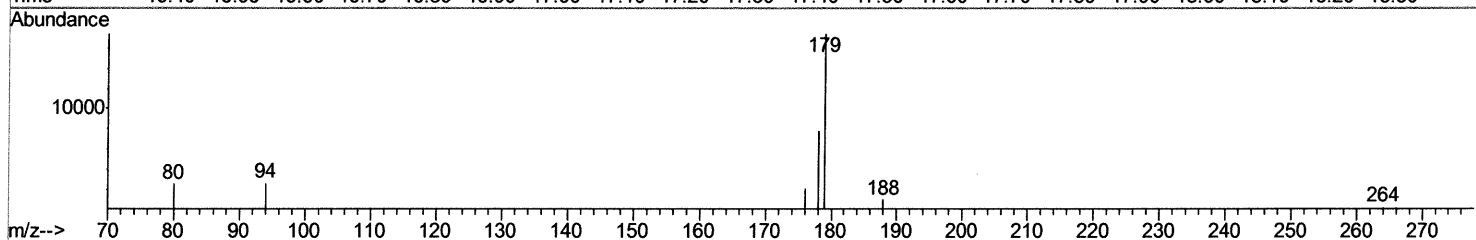
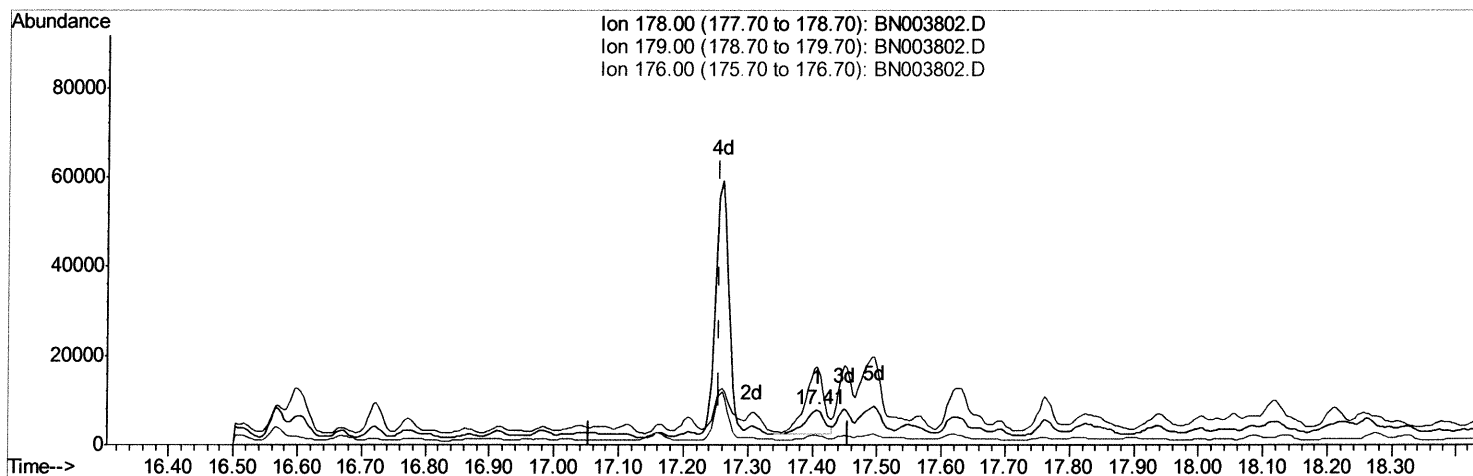
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(12) Phenanthrene

17.407min (+0.152) 0.15ng/ul

response 11634

Ion	Exp%	Act%
178.00	100	100
179.00	15.60	221.71#
176.00	18.70	26.78#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

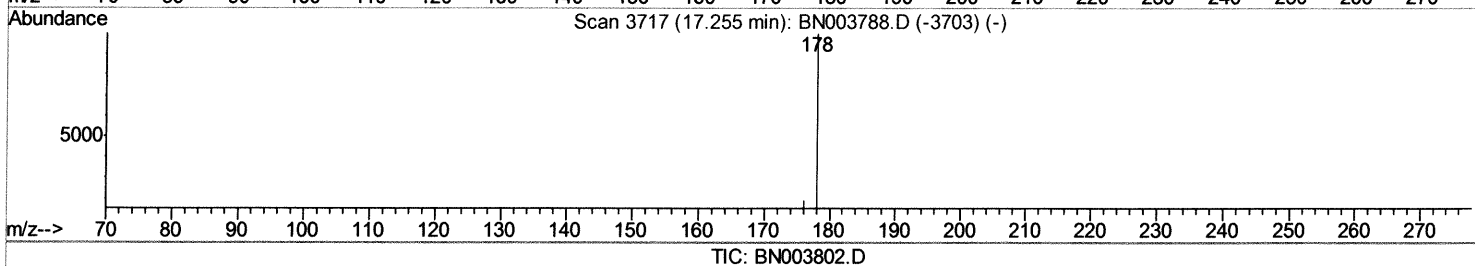
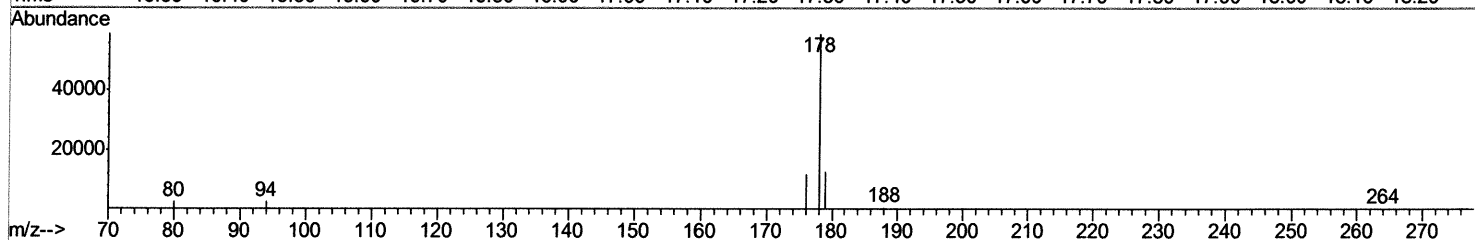
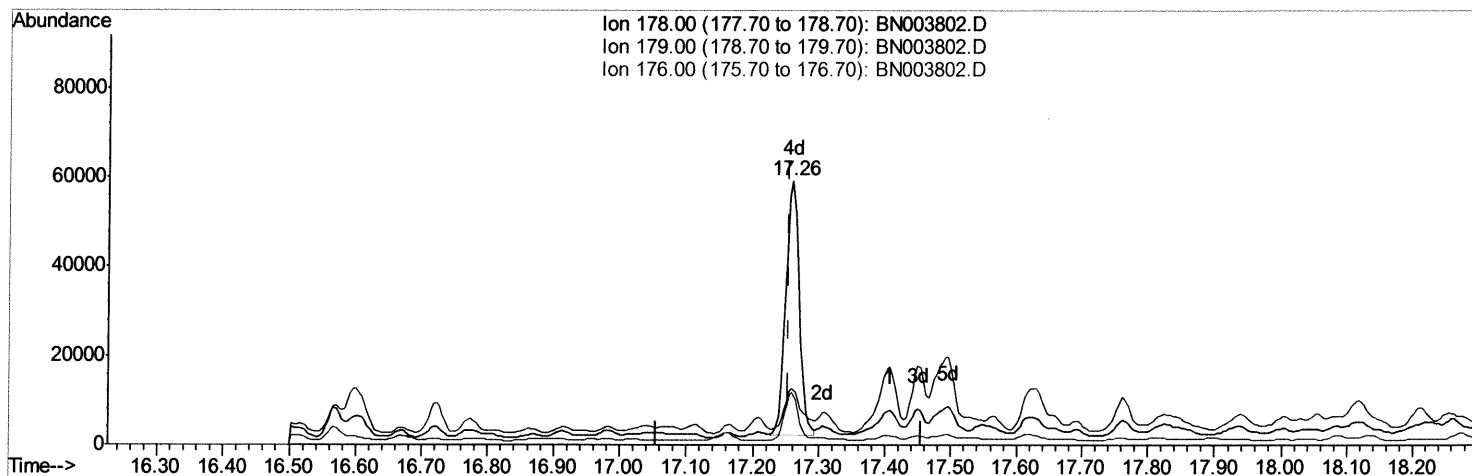
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(12) Phenanthrene

17.259min (+0.004) 1.03ng/ul m) SJ 12/12/18

response 81031

Ion	Exp%	Act%
178.00	100	100
179.00	15.60	21.43#
176.00	18.70	19.87
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

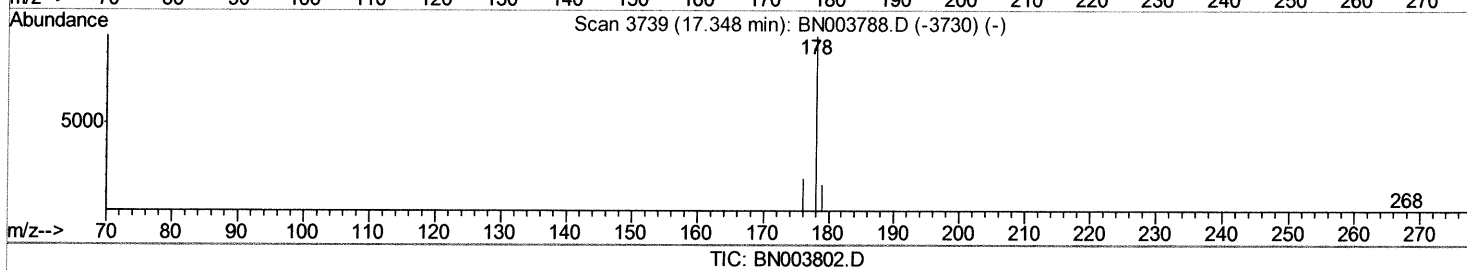
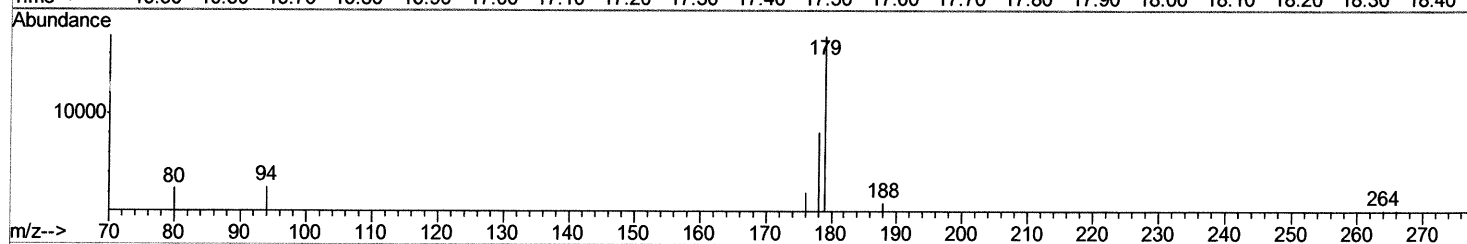
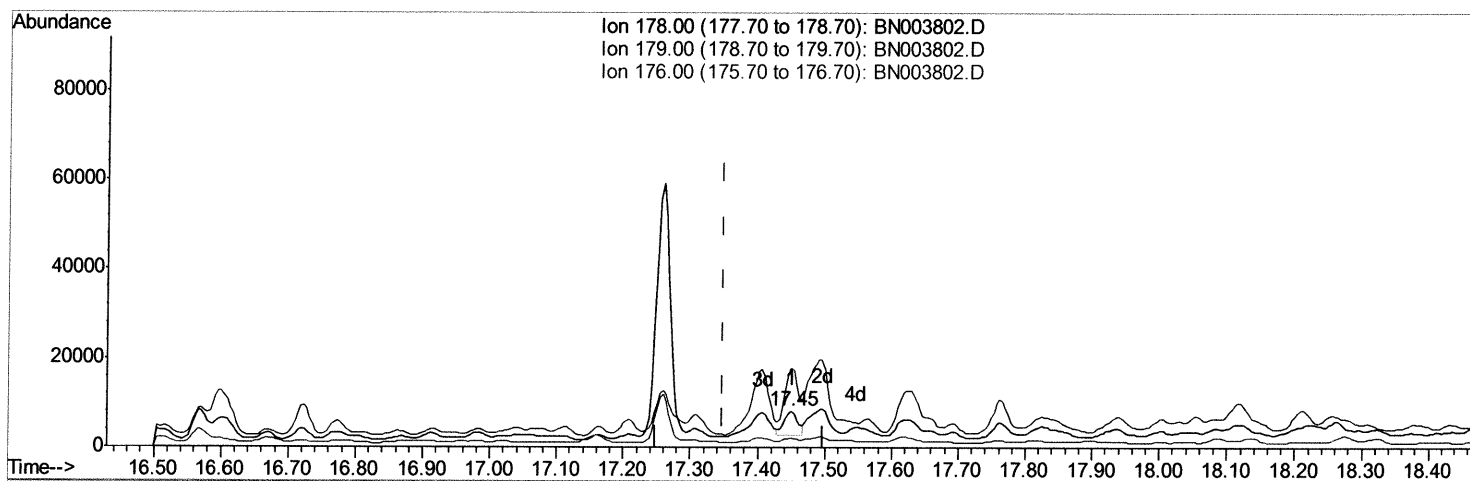
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(13) Anthracene

17.449min (+0.101) 0.12ng/ul

response 8038

Ion	Exp%	Act%
178.00	100	100
179.00	15.40	218.71#
176.00	18.50	25.60#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

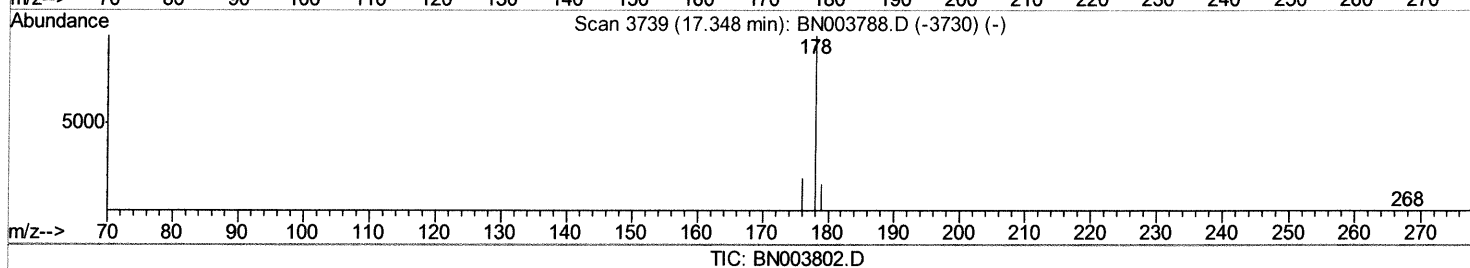
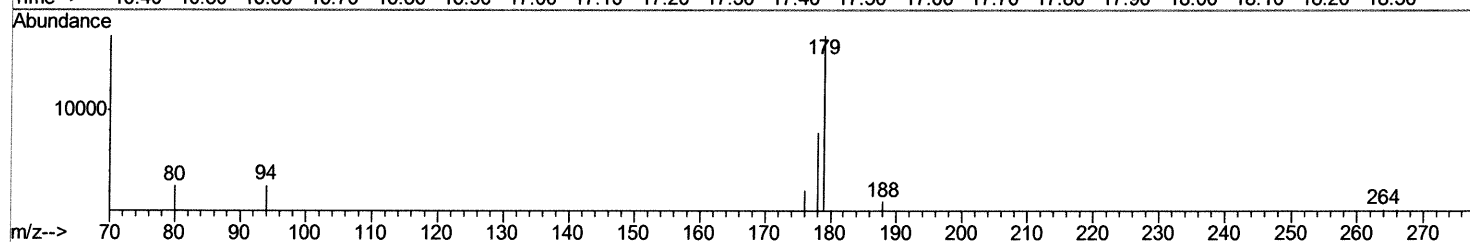
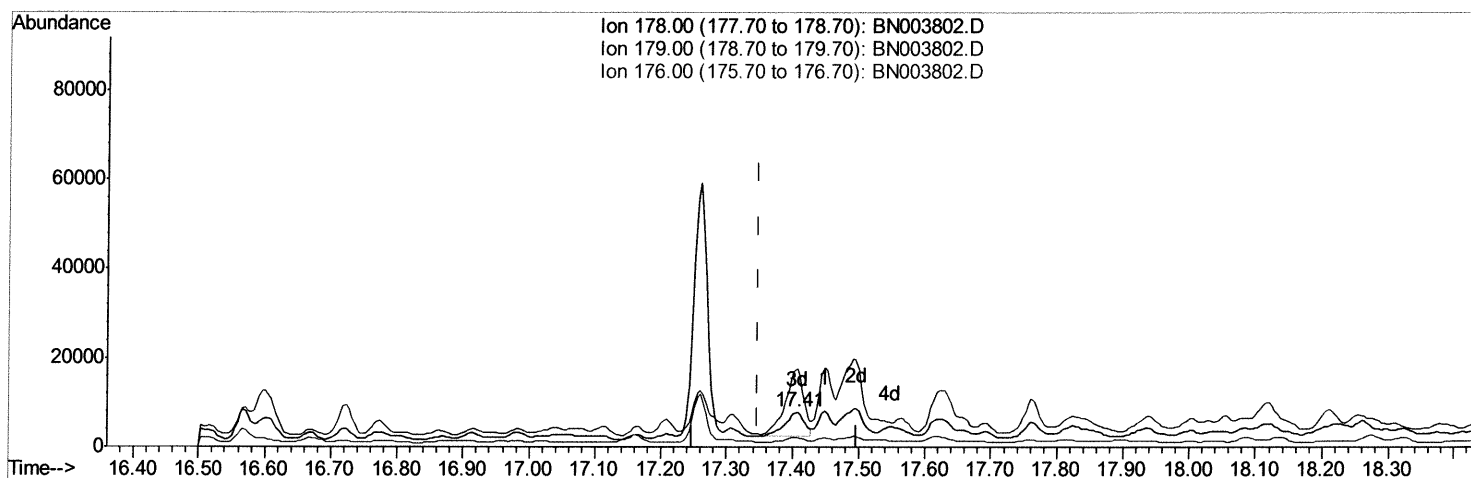
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(13) Anthracene

17.407min (+0.059) 0.17ng/ul m) SJ 12/12/18

response 11326

Ion	Exp%	Act%
178.00	100	100
179.00	15.40	221.71#
176.00	18.50	26.78#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

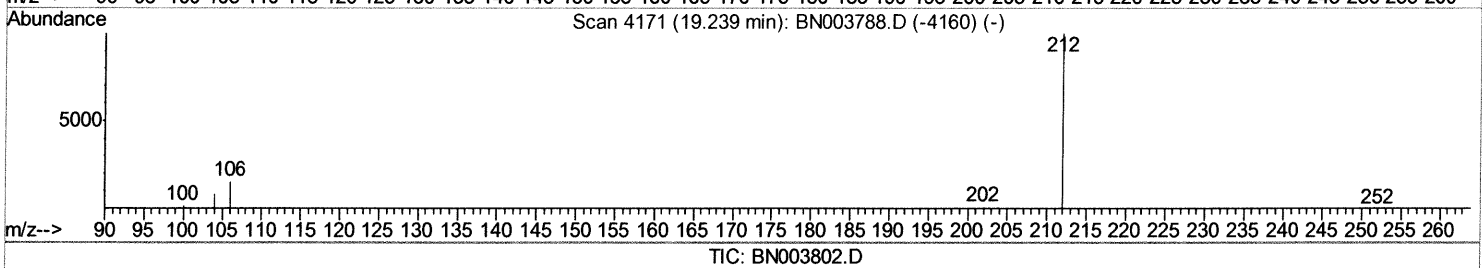
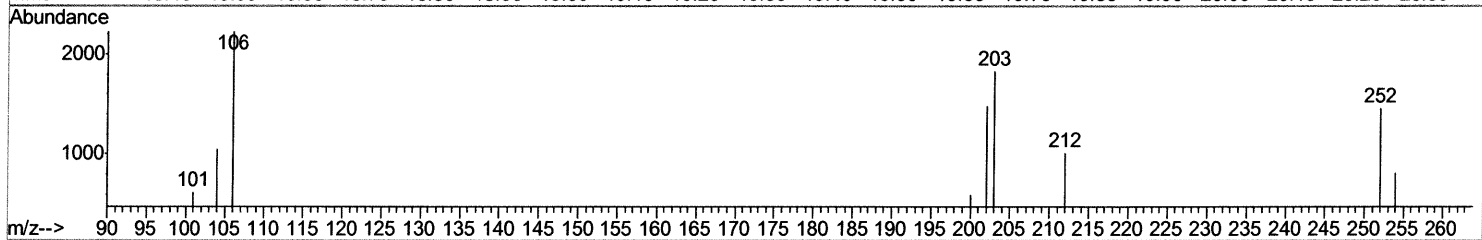
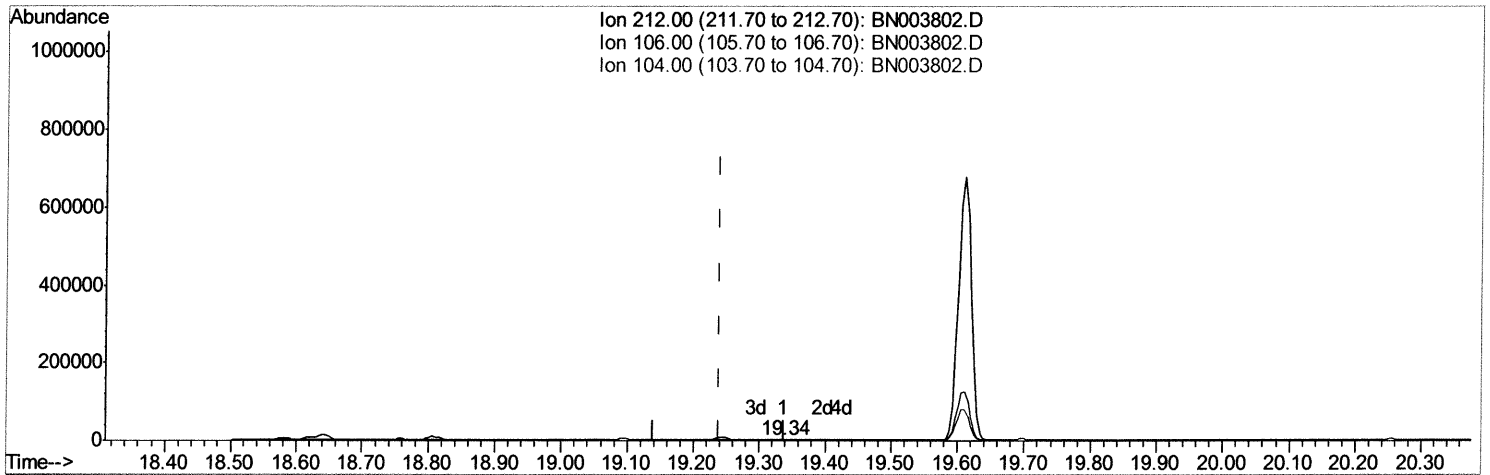
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(14) Fluoranthene-d10 (SURRE)

19.336min (+0.098) 0.01ng/ul

response 984

Ion	Exp%	Act%
212.00	100	100
106.00	14.20	53.66#
104.00	8.00	32.83#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

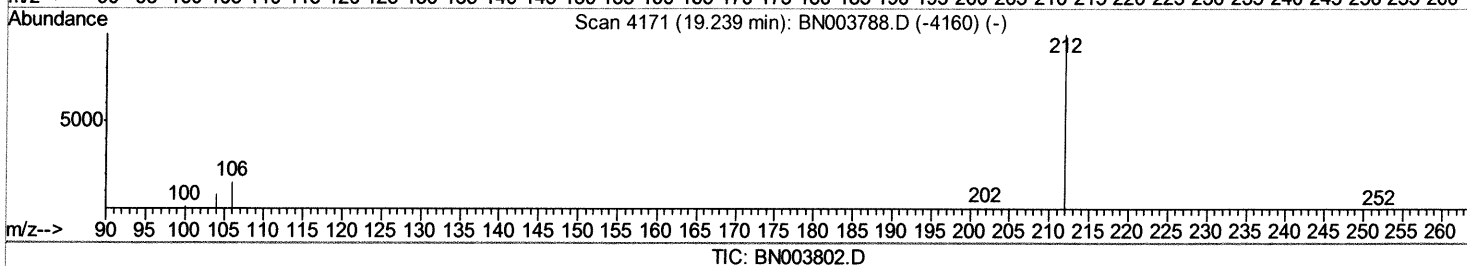
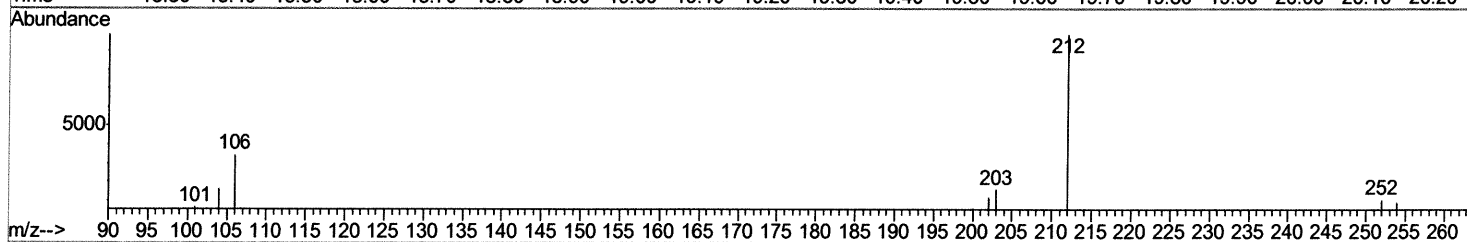
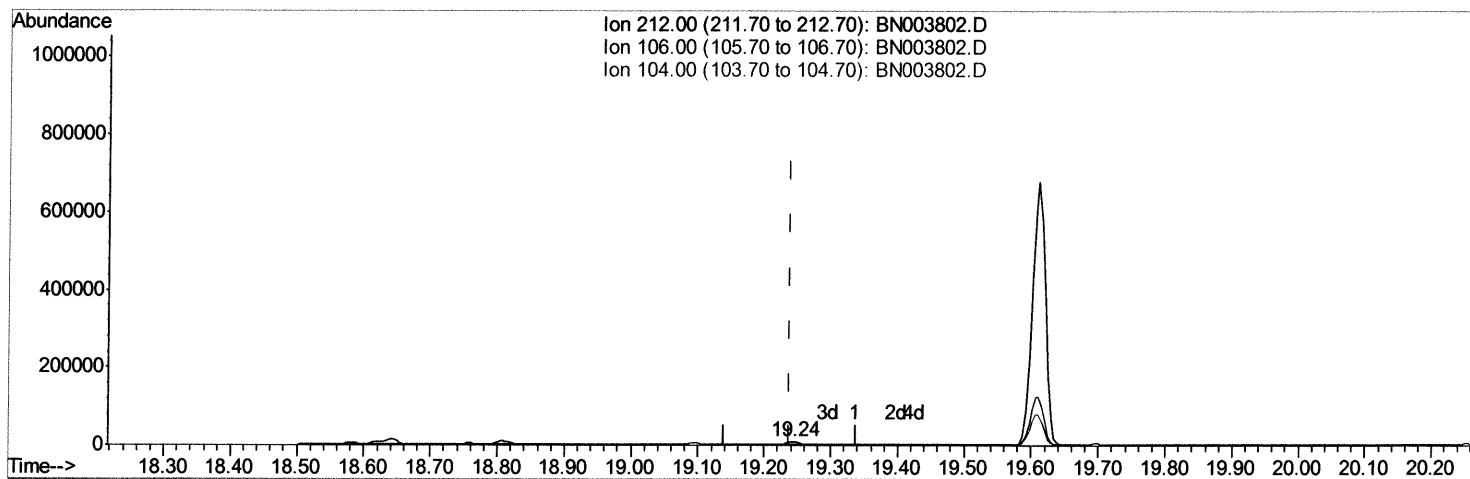
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(14) Fluoranthene-d10 (SURR)

19.244min (+0.005) 0.17ng/ul m> SJ 12/12/18

response 12163

Ion	Exp%	Act%
212.00	100	100
106.00	14.20	4.34#
104.00	8.00	2.66#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

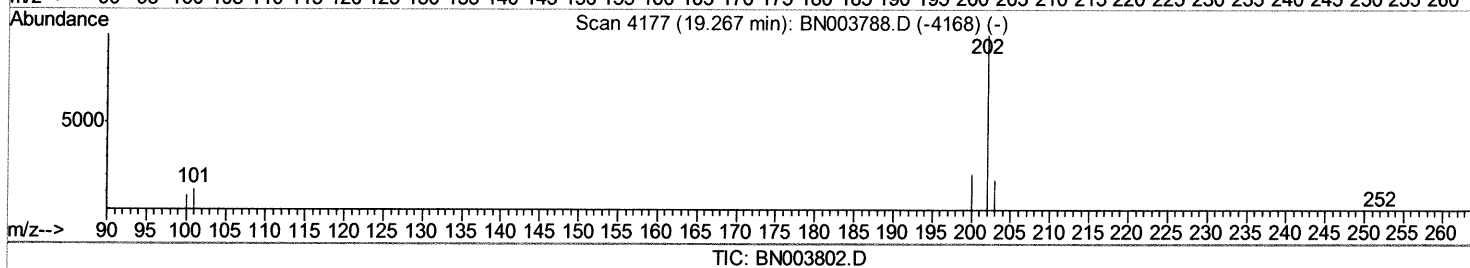
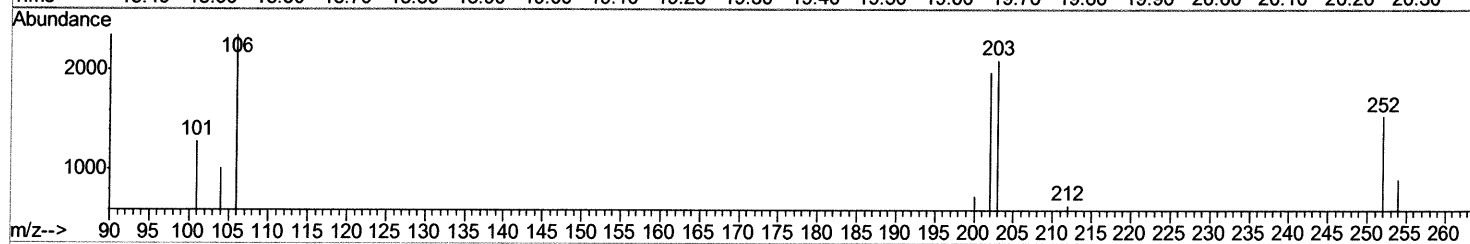
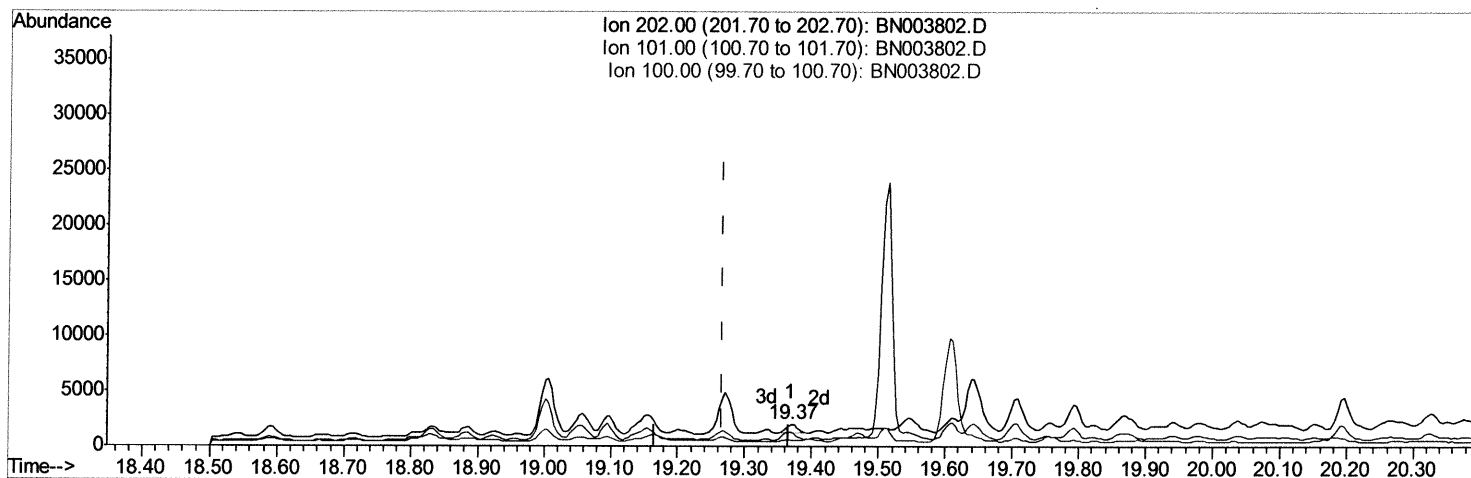
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(15) Fluoranthene (C)

19.369min (+0.102) 0.01ng/ul

response 981

Ion	Exp%	Act%
202.00	100	100
101.00	10.70	65.01#
100.00	8.10	30.23#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

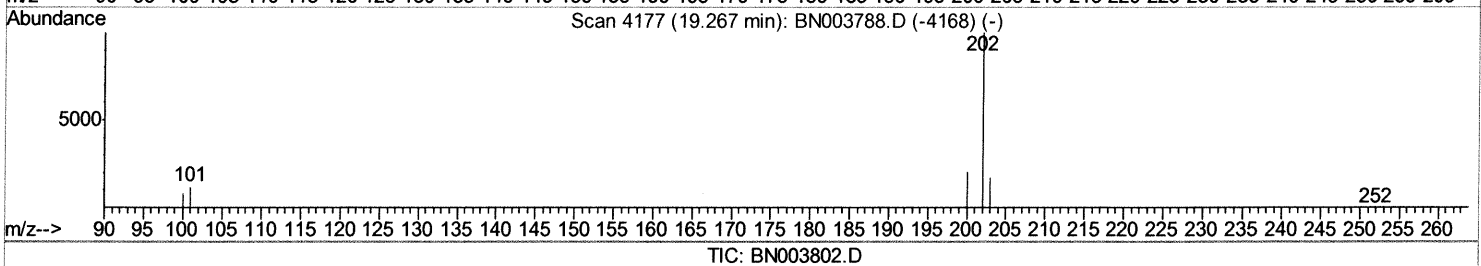
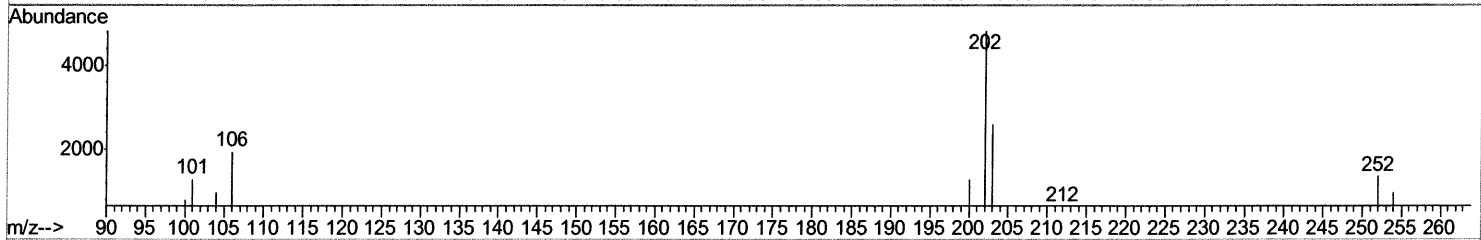
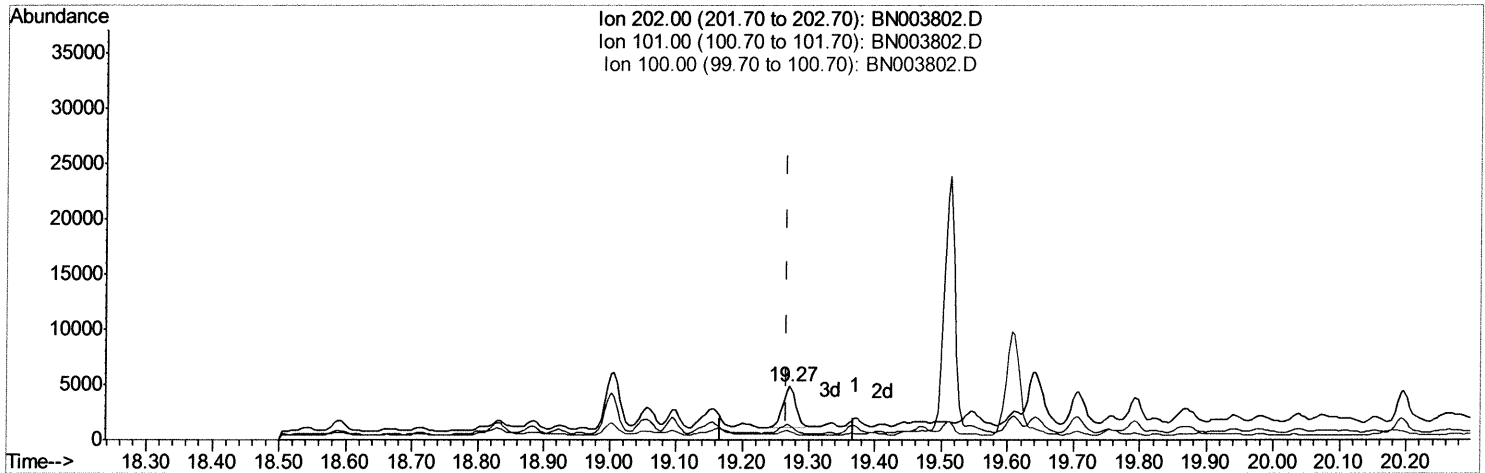
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampled :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(15) Fluoranthene (C)

19.271min (+0.005) 0.06ng/ul m> 53 12/12/18

response 5298

Ion	Exp%	Act%
202.00	100	100
101.00	10.70	26.67
100.00	8.10	16.28
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

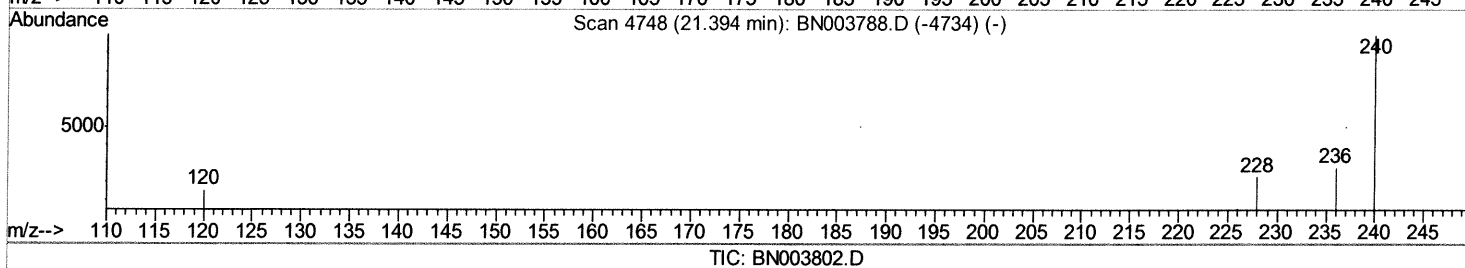
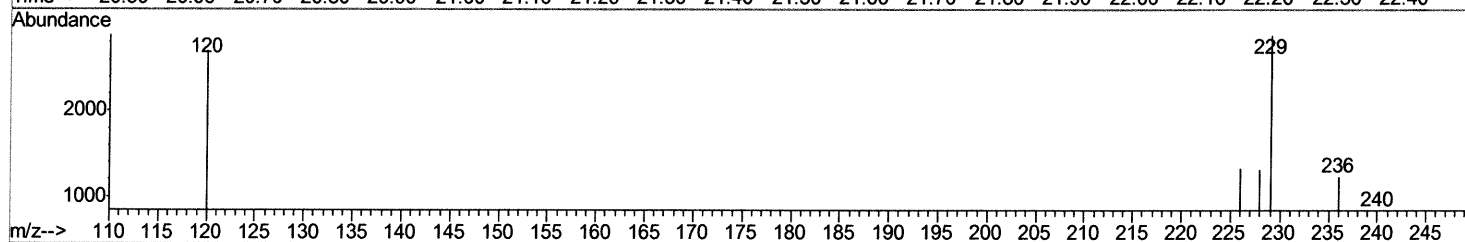
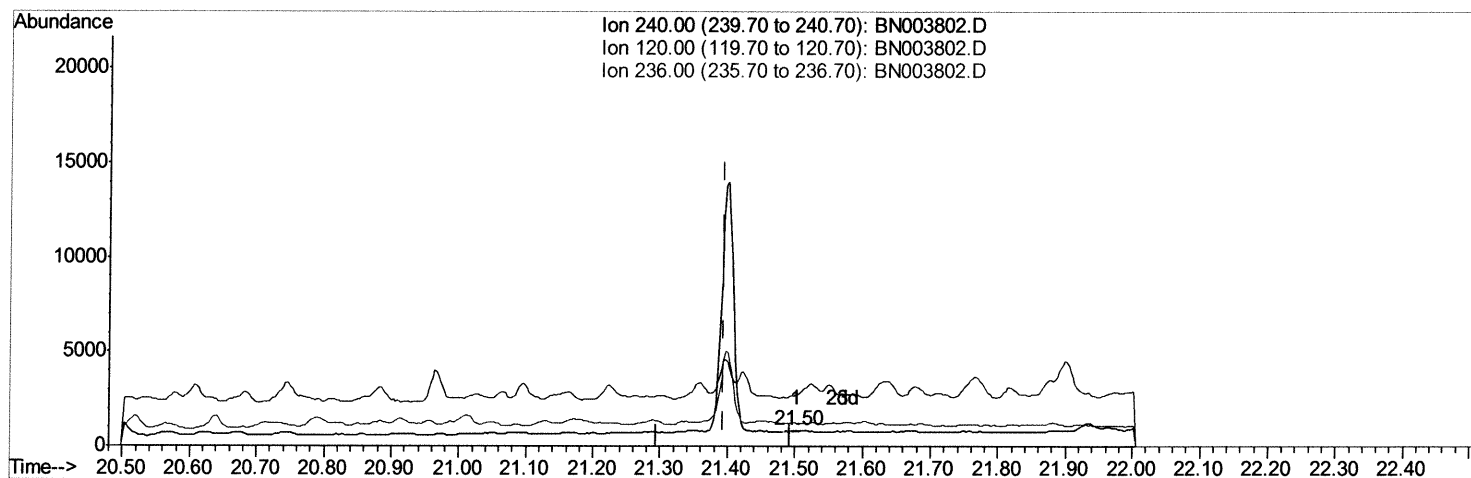
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(16) Chrysene-d12 (I)

21.502min (+0.108) 0.40ng/ul

response 57

Ion	Exp%	Act%
240.00	100	100
120.00	14.00	322.86#
236.00	27.60	146.43#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

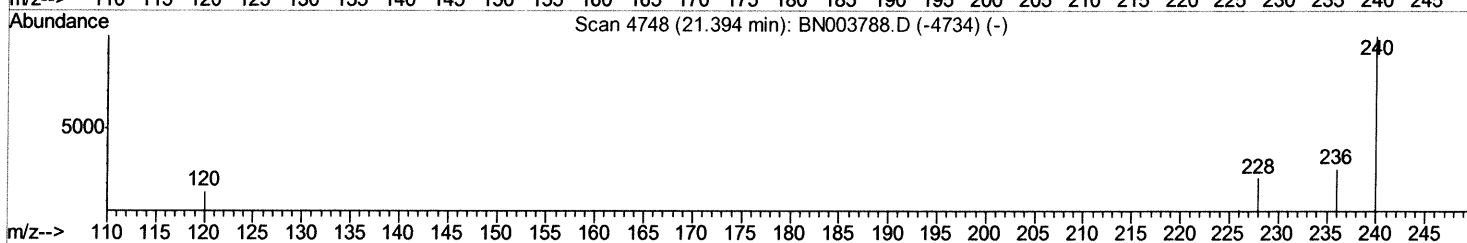
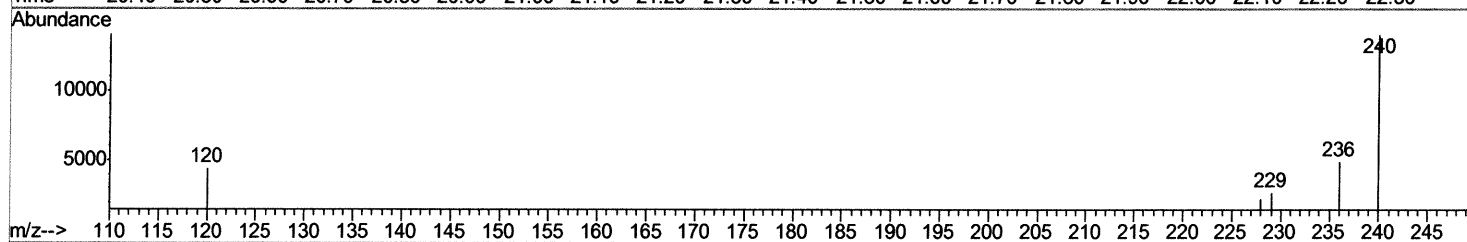
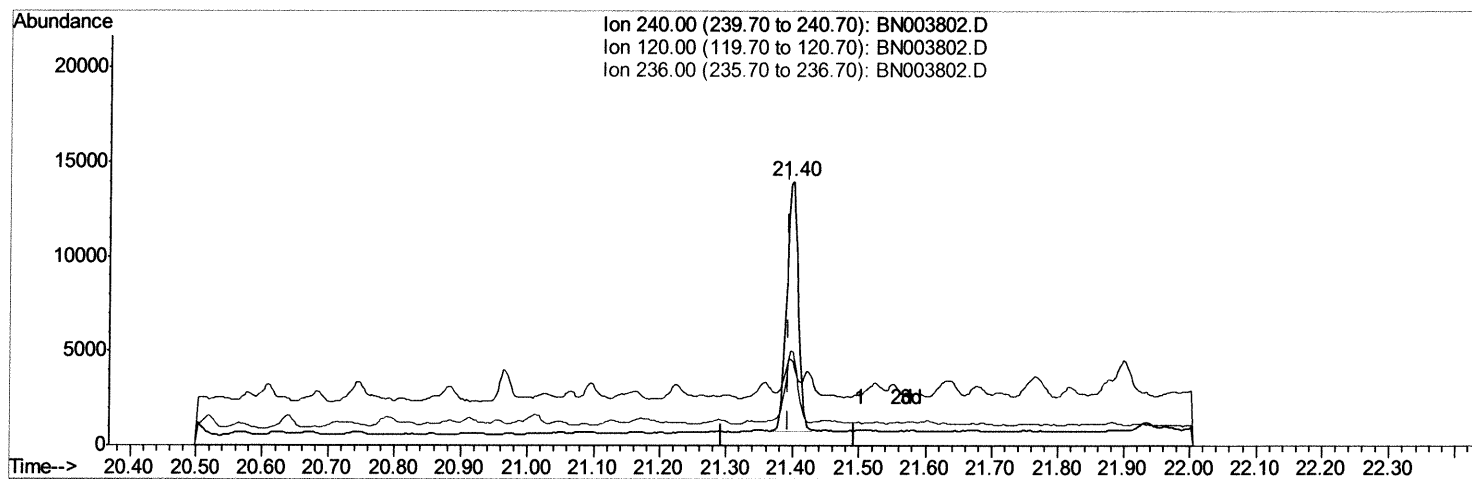
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:22:12 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



TIC: BN003802.D

(16) Chrysene-d12 (I)

21.400min (+0.006) 0.40ng/ul m> SJ 12/12/18

response 15967

Ion	Exp%	Act%
240.00	100	100
120.00	14.00	31.83#
236.00	27.60	35.46#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

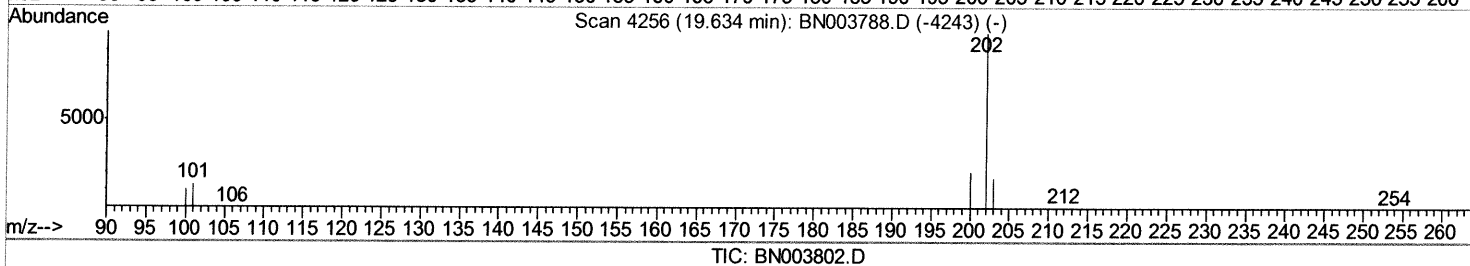
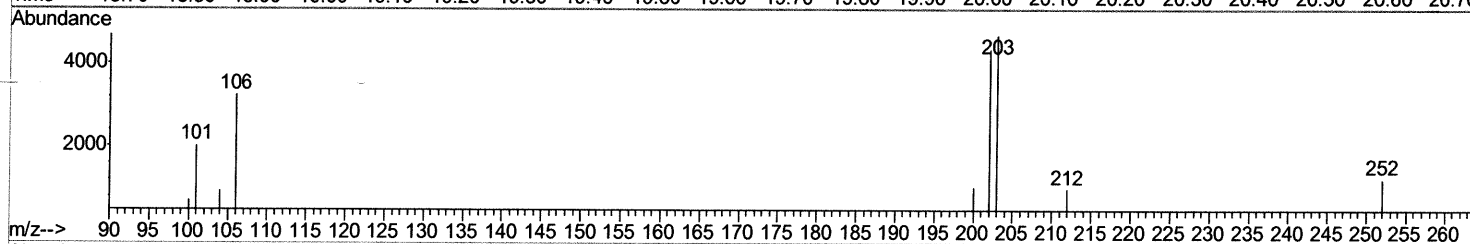
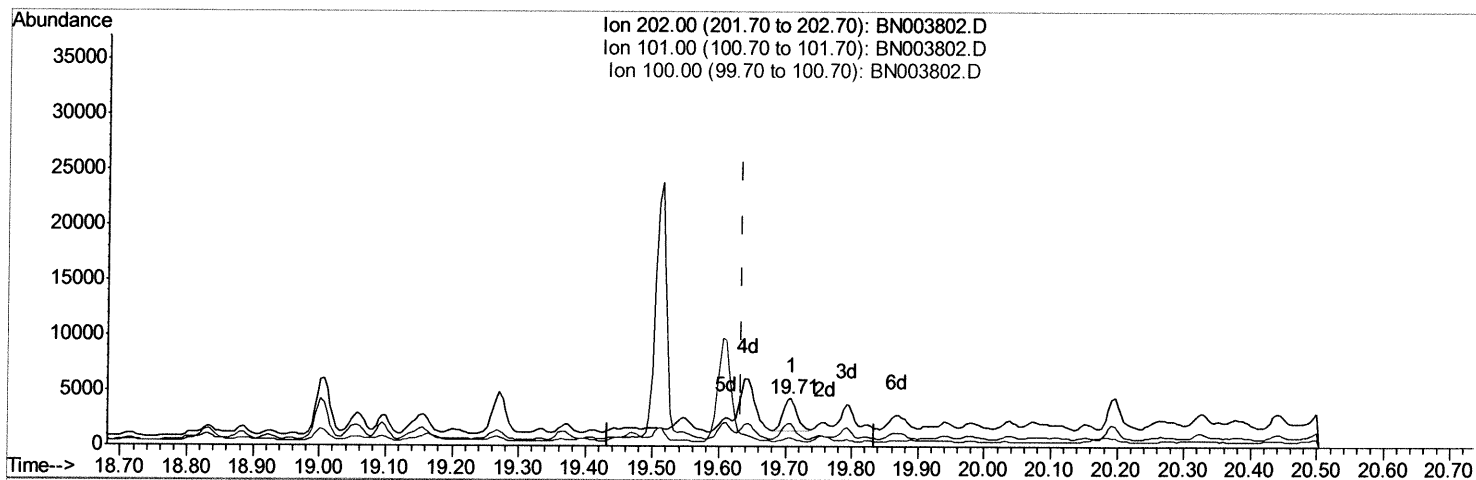
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:23:44 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(17) Pyrene

19.708min (+0.074) 0.07ng/ul

response 4286

Ion	Exp%	Act%
202.00	100	100
101.00	12.90	46.55#
100.00	10.60	16.43#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

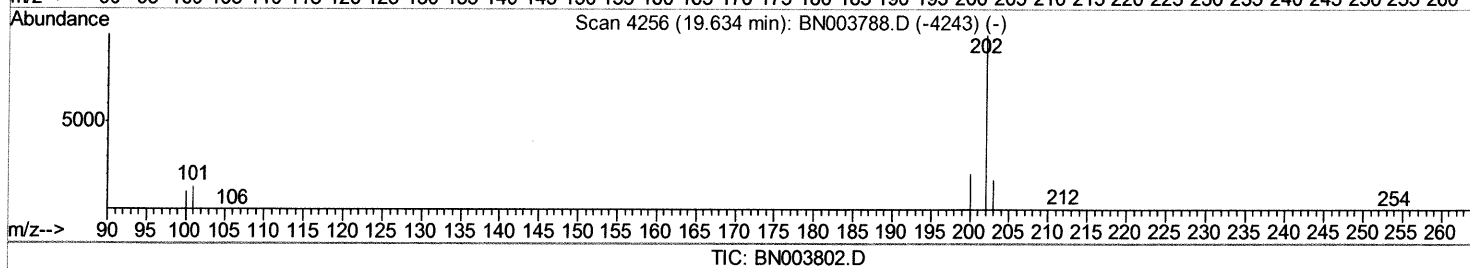
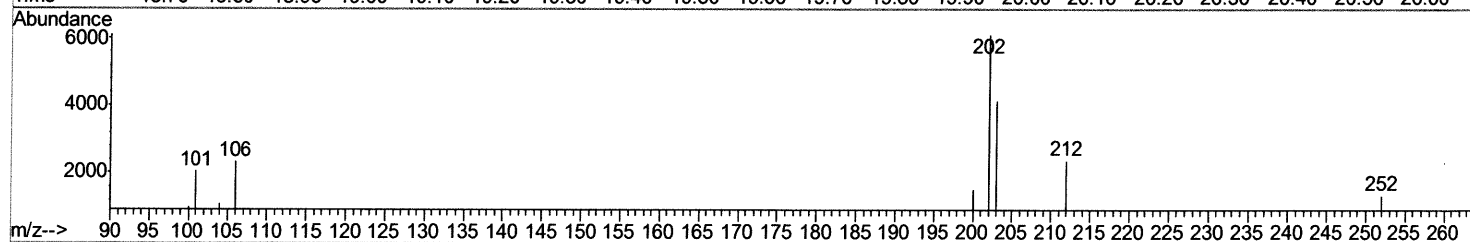
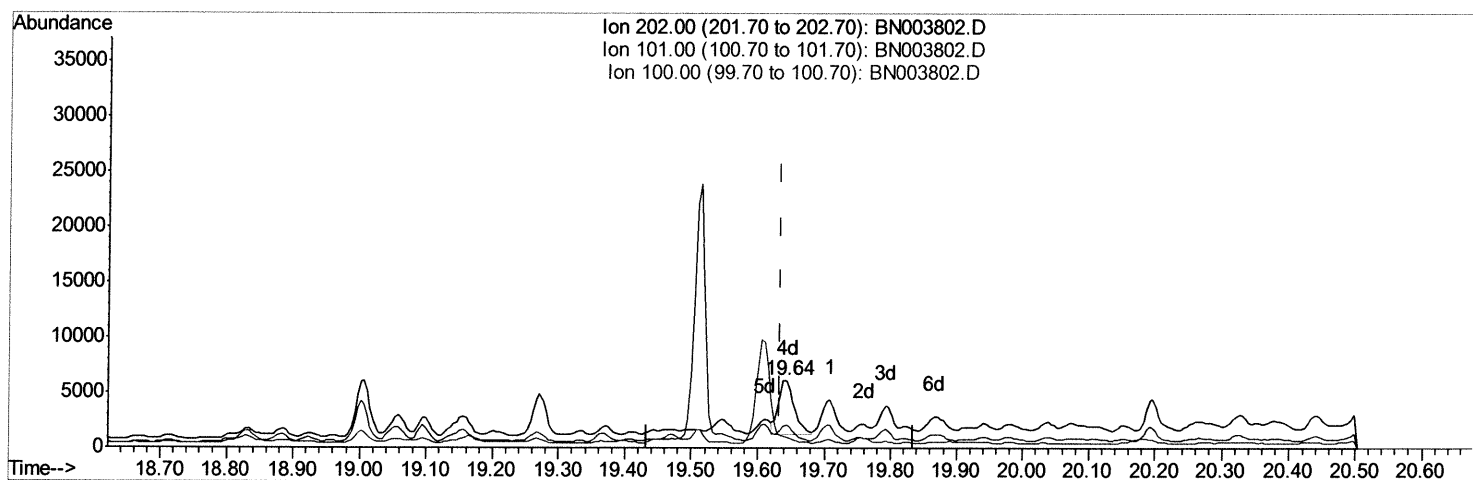
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampled :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:23:44 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(17) Pyrene

19.643min (+0.009) 0.14ng/ul m2 SJ 12/12/18

response 8136

Ion	Exp%	Act%
202.00	100	100
101.00	12.90	33.42#
100.00	10.60	15.97#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

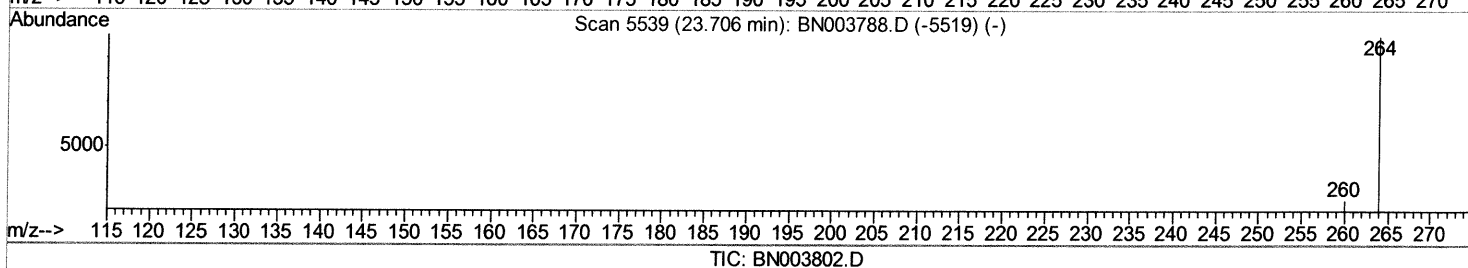
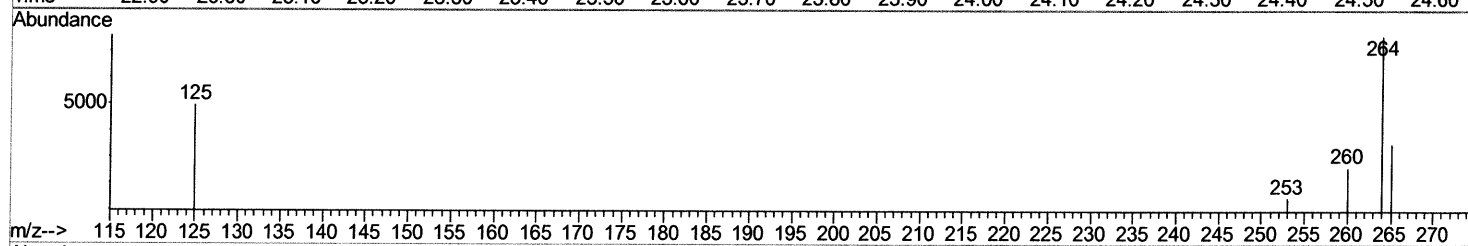
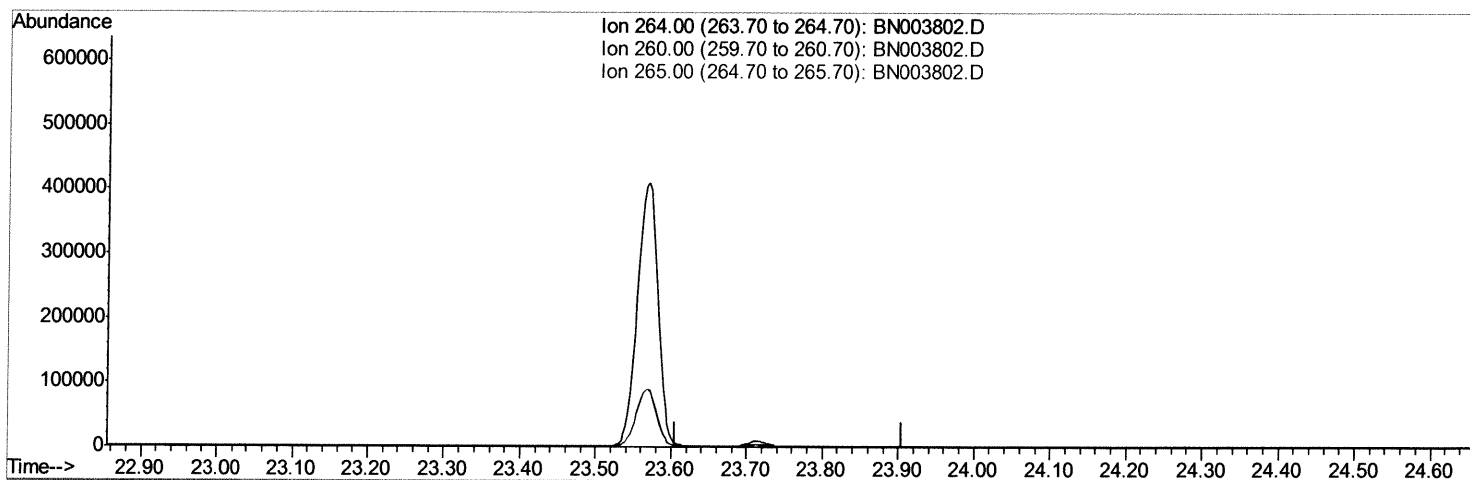
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:23:44 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(20) Perylene-d12 (I)

23.706min (-23.706) 0.00ng/ul

response 0

Ion	Exp%	Act%
264.00	100	0.00
260.00	26.20	0.00#
265.00	33.50	0.00#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (Qedit)

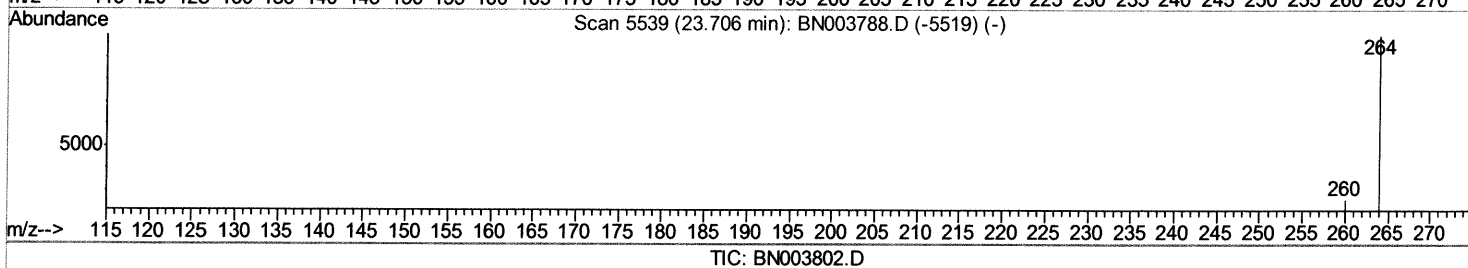
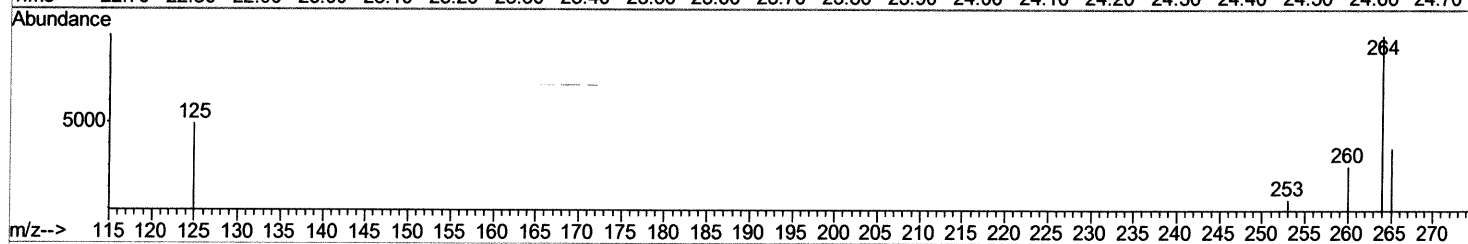
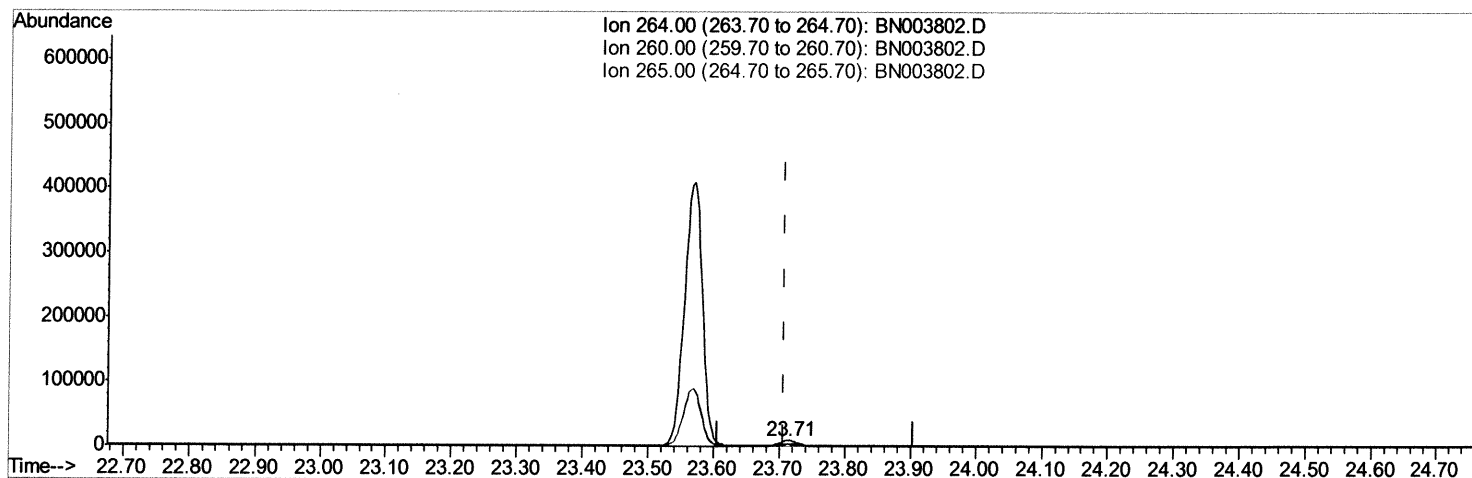
Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampled :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:23:44 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration



(20) Perylene-d12 (I)

23.715min (+0.009) 0.40ng/ul m> SJ 12/12/18

response 15648

Ion	Exp%	Act%
264.00	100	100
260.00	26.20	32.86#
265.00	33.50	42.59#
0.00	0.00	0.00

Data Path : Z:\SVOASRV\HPCHEM1\BNA_N\DATA\BN121018\
Quantitation Report (QT Reviewed)

Data File : BN003802.D
Acq On : 11 Dec 2018 05:24
Operator : JU/SJ
Sample : J6077-19
Misc :
ALS Vial : 28 Sample Multiplier: 1

Instrument :
BNA_N
ClientSampleId :
F9Y04

Manual Integrations
APPROVED

Sohil
12/11/2018 6:12:36 PM

Quant Time: Dec 11 08:24:40 2018
Quant Method : Z:\SVOASRV\HPCHEM1\BNA_N\METHODS\SOM-EPA-SIM-BN111918.M
Quant Title : ASP BNA STANDARDS FOR 5 POINT CALIBRATION
QLast Update : Tue Dec 11 04:22:54 2018
Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) 1,4-Dichlorobenzene-d4	7.84	152	5069	0.40	ng/ul	0.00
2) Naphthalene-d8	10.63	136	20535	0.40	ng/ul	0.00
6) Acenaphthene-d10	14.47	164	13984	0.40	ng/ul	0.00
10) Phenanthrene-d10	17.22	188	24006m	0.40	ng/ul	0.00
16) Chrysene-d12	21.40	240	15967m	0.40	ng/ul	0.00
20) Perylene-d12	23.71	264	15648m	0.40	ng/ul	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc	Units	Dev(Min)
4) 2-Methylnaphthalene-d10	12.22	152	4426m	0.14	ng/ul	0.00
14) Fluoranthene-d10	19.24	212	12163m	0.17	ng/ul	0.00

Target Compounds	R.T.	QIon	Response	Conc	Units	Qvalue
3) Naphthalene	10.68	128	131605	2.282	ng/ul#	89
5) 2-Methylnaphthalene	12.29	142	409783	10.174	ng/ul	99
7) Acenaphthylene	14.19	152	9820	0.156	ng/ul#	1
9) Fluorene	15.52	166	22711	0.353	ng/ul#	81
12) Phenanthrene	17.26	178	81031m	1.028	ng/ul	
13) Anthracene	17.41	178	11326m	0.175	ng/ul	
15) Fluoranthene	19.27	202	5298m	0.057	ng/ul	
17) Pyrene	19.64	202	8136m	0.142	ng/ul	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

SJ 12/12/18

SJ 12/12/18