APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
3Y-MW2	3Y-MW-2-122908	JA8868
ACMW-3	ACMW-3-121708	JA8257
BH-2	SB-BH2A-24.25	JA1319
MW-101A	MW-101A-121808	JA8388
MW-103A	MW-103A-120208	JA6861
MW-105A	MW-105A-021109-L	CH090217
MW-105A	MW-105A-121008	C081213
MW-105A	MW-105A-121008	JA7679
MW-106A	MW-106A-120408	JA7147
MW-107A	MW-107A-121908	C081229
MW-107A	MW-107A-121908	JA8526
MW-109	MW-109-011309	JA9852
MW-109	MW-109-120408	JA7147
MW-111B	MW-111B-122308	C081229
MW-111B	MW-111B-122308	JA8680
MW-112A	MW-112A-121708	JA8388
MW-112B	MW-112B-120908	C081213
MW-112B	MW-112B-120908	JA7456
MW-113A	MW-113A-120108	JA6754
MW-113B	MW-113B-120908	C081213
MW-113B	MW-113B-120908	JA7456
MW-113C	MW-113C-120108	JA6754
MW-114A	MW-114A-010409	C090106
MW-114A	MW-114A-010409	JA9135
MW-114B	MW-114B-010409	C090106
MW-114B	MW-114B-010409	JA9135
MW-115A	MW-115A-121908	C081229
MW-115A	MW-115A-121908	JA8526
MW-115B	MW-115B-120808	JA7456
MW-117B	DUP-120208	JA6861
MW-117B	MW-117B-010809	JA9455
MW-117B	MW-117B-120208	JA6861
MW-121A	MW-121A-010409	JA9135
MW-121B	MW-121B-010409	JA9135
MW-123	MW-123	CH090121
MW-123	MW-123-122908	JA8868
MW-123	SB-123-0.75	JA372
MW-123	SB-123-4.25	JA372

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
MW-124	DUP-091208	JA567
MW-124	MW-124-010909	JA9579
MW-124	MW-124-122408	JA8781
MW-124	SB-124-1.5	JA567
MW-124	SB-124-9.0	JA567
MW-125	DUP-010909	JA9579
MW-125	MW-125-010909	JA9579
MW-125	MW-125-122308	JA8680
MW-125	SB-125-4.75	JA633
MW-125	SB-125-9.75	JA633
MW-126	Dup-123108	JA9041
MW-126	MW-126-123108	C090106
MW-126	MW-126-123108	JA9041
MW-126	SB-126-11.25	JA3176
MW-126	SB-126-15.5	C081015
MW-126	SB-126-22.5	JA3176
MW-126	SB-126-22.6	C081015
MW-126	SB-126-4.5	JA3176
MW-127	MW-127-122408	JA8781
MW-127	SB-127-1.75	JA372
MW-127	SB-127-8.25	JA372
MW-127	SB-127-9.5	JA372
MW-128	MW-128-031809	C090319
MW-128	MW-128-031809	JA14608
MW-128	SB-128-1.8-022409	JA12802
MW-128	SB-128-13.5	C090226
MW-128	SB-128-13.5-022509	JA12979
MW-128	SB-128-3.8-022409	JA12802
MW-128	SB-128-8.5	C090226
MW-128	SB-128-8.5-022509	JA12802
MW-129	DUP-022409	JA12802
MW-129	MW-129-031809	JA14608
MW-129	SB-129-1.8-022409	JA12802
MW-129	SB-129-7.5-022409	JA12802
MW-130A	MW-130A-121908	C081229
MW-130A	MW-130A-121908	JA8526
MW-130B	MW-130B-122208	C081229
MW-130B	MW-130B-122208	JA8589

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
MW-130B	SB-130-15.5	C081015
MW-130B	SB-130-16.5	JA2953
MW-130B	SB-130-20.5	JA2953
MW-130B	SB-130-20.6	C081015
MW-131	MW-131-120808	JA7456
MW-131	SB-131-19.5	C081015
MW-131	SB-131-19.5	JA2435
MW-131	SB-131-6.0	C081015
MW-131	SB-131-7.5	JA2435
MW-132	DUP-100708	JA2662
MW-132	MW-132-121808	C081229
MW-132	MW-132-121808	JA8526
MW-132	SB-132-10.75	C081015
MW-132	SB-132-19.5	C081015
MW-132	SB-132-19.5	JA2662
MW-132	SB-132-8.5	JA2662
MW-133	MW-133-121008	C081213
MW-133	MW-133-121008	JA7599
MW-133	SB-133-13.25	C081015
MW-133	SB-133-13.25	JA2170
MW-134	MW-134-121008	C081213
MW-134	MW-134-121008	JA7599
MW-134	SB-134-14.75	C081015
MW-134	SB-134-14.75	JA2022
MW-134	SB-134-17.5	C081015
MW-134	SB-134-17.5	JA2022
MW-135	MW-135	CH090121
MW-135	MW-135-120308	JA6980
MW-136	MW-136-122308	JA8680
MW-136	SB-136-1.0	JA372
MW-136	SB-136-21.5	JA372
MW-136	SB-136-8.5	JA372
MW-20	MW-20-121008	C081213
MW-20	MW-20-121008	JA7599
MW-30	MW-30-120408	JA7147
MW-51A	Dup-123008	C090106
MW-51A	Dup-123008	JA8935
MW-51A	MW-51A-123008	C090106

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
MW-51A	MW-51A-123008	JA8935
MW-A-1	MW-A-1-120308	JA6980
MW-A-2	MW-A-2-123008	C090106
MW-A-2	MW-A-2-123008	JA8935
MW-B	MW-B-120308	JA6980
MW-C	MW-C-121708	JA8257
MW-F	MW-F-121808	C081229
MW-F	MW-F-121808	JA8388
MW-J	MW-J-011309	JA9852
MW-L	MW-L-122908	JA8868
MW-M	MW-M-011309	JA9852
MW-N-1	MW-N-1-122908	JA8868
MW-N-2	MW-N-2-123008	C090106
MW-N-2	MW-N-2-123008	JA8935
MW-O	MW-O-121808	C081229
MW-O	MW-O-121808	JA8388
PZ-1D	PZ1D-010809	JA9586
PZ-1D	PZ1D-022509	JA13466
PZ-1I	PZ1I-010909	JA9586
PZ-1I	PZ1I-022509	JA13466
PZ-2D	PZ2D-010609	JA9204
PZ-2I	PZ2I-010709	JA9586
PZ-2I	PZ2I-022709	JA13466
PZ-2S	PZ2S-010809	JA9586
PZ-2S	PZ2S-022709	JA13466
PZ-3D	PZ3D-010709	JA9357
PZ-3D	PZ3D-011309	JA10214
PZ-3D	PZ3D-011309	JA9853
PZ-3D	PZ3D-022509	JA13466
PZ-3I	PZ3I-010709	JA9357
PZ-3I	PZ3I-010709	JA9586
PZ-3I	PZ3I-011109	JA9853
PZ-3I	PZ3I-011309	JA10214
PZ-3S	PZ3S-010709	JA9357
PZ-3S	PZ3S-011309	JA10214
PZ-3S	PZ3S-011309	JA9853
PZ-3S	PZ3S-022509	JA13466
PZ-4I	PZ4I-010709	JA9357

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
PZ-4S	PZ4S-010709	JA9357
PZ-5D	PZ5D-010809	JA9586
PZ-5D	PZ5D-022509	JA13466
PZ-5I	PZ5I-010809	JA9853
PZ-5I	PZ5I-022509	JA13466
PZ-5S	PZ5S-010809	JA9586
PZ-5S	PZ5S-022709	JA13466
PZ-7D	SB-PZ7-16.25	JA1098
SB-39	SB-39-1.0-022409	JA12802
SB-39	SB-39-5.3-022409	JA12802
SB-40	SB-40-1.0	J98967
SB-40	SB-40-4.0	J99111
SB-42	SB-42-1.0	J98967
SB-42	SB-42-9.0	J98967
SB-43	SB-43-0.5	J99111
SB-43	SB-43-3.5	J99111
SB-44	SB-44-1.0	J99672
SB-44	SB-44-8.0	J99672
SB-47	SB-47-1.5	J99323
SB-47	SB-47-3.2	J99111
SB-48	SB-48-6.0	J99111
SB-49	SB-49-4.5	J99536
SB-49	SB-49-9.5	J99536
SB-50	SB-50-11.25	JA3348
SB-50	SB-50-3.0	J99536
SB-51	SB-51-18	J99536
SB-51	SB-51-3.5	J99536
SB-53	SB-53-16.5	J99822
SB-53	SB-53-16.6	C081015
SB-53	SB-53-3.0	J99822
SB-53	SB-53-SZone	C081015
SB-54	SB-54-10.5	C081015
SB-54	SB-54-10.5	JA2435
SB-54	SB-54-22.75	C081015
SB-54	SB-54-22.75	JA2435
SB-55	SB-55-13.75	C081015
SB-55	SB-55-19.5	C081015
SB-55	SB-55-19.5	JA2662

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
SB-55	SB-55-5.25	JA2662
SB-58	SB-58-9.5-022509	JA12979
SS-58	SS-58-0.1	JA3348
TL08.5-10.5	TL 8.5-10.5-0.5	J99204
TL08.5-10.5	TL 8.5-10.5-13*	J99204
TL09.5-10.5	TL 9.5-10.5-1.5	J99204
TL09.5-10.5	TL 9.5-10.5-16.5	J99204
TL09.5-10.5	TL 9.5-10.5-3.5	J99204
TL09.5-11.25	TL 9.5-11.25-0.5	J99204
TL09.5-11.25	TL 9.5-11.25-7.5	J99204
TL09-09	TL09-09-1.0	J99323
TL09-09	TL09-09-19.5	J99323
TL09-09	TL09-09-4.5	J99323
TL10.5-09.5	DUP-082908	J99323
TL10.5-09.5	TL10.5-9.5-1.0	J99323
TL10.5-09.5	TL10.5-9.5-23.5	J99323
TL10.5-09.5	TL10.5-9.5-9.5	J99323
TL10.5-10.5	DUP-082708	J99111
TL10.5-10.5	TL 10.5-10.5-0.5	J99111
TL10.5-10.5	TL 10.5-10.5-14.5	J99111
TL10.5-10.5	TL 10.5-10.5-4.0	J99111
TL10.5-11.25	TL 10.5-11.25-0.5	J99204
TL10.5-11.25	TL 10.5-11.25-12	J99204
TL10.5-11.25	TL 10.5-11.25-8.5	J99204
TL10-09.5	DUP-090408	J99672
TL10-09.5	TL 10-9.5-7.5	J99672
TL11.25-00	TL 11.25-00-17.5	J99672
TL11.75-00	TL 11.75-00-13.5	J99536
TL11-11.75	TL 11-11.75-11	J99111
TL12.5-00	TL 12.5-00-17.5	J99536
TL12.5-10.5	TL 12.5-10.5-1.5	J98898
TL12.5-10.5	TL 12.5-10.5-8.5	J98898
TL12-00.5	TL 12-0.5-18.5	J99536
TL12-00.5	TL 12-0.5-7.5	J99536
TL12-01.5	TL12-1.5-8.5	J99323
TL13.5-10.5	TL 13.5-10.5-1.5	J98898
TL13.5-10.5	TL 13.5-10.5-8.5	J98898
TL13.5-12.75	TL 13.5-12.75-0.5	J99111

APPENDIX S
Sample to SDG Cross Reference
Quanta Resources Superfund Site, OU1
Edgewater, New Jersey

Location	Field Sample ID	SDG
TL13.5-12.75	TL 13.5-12.75-8.5	J99111
TL14-13.25	TL 14-13.25-1.0	J98898
TL14-13.25	TL 14-13.25-8.5	J98898

APPLIED SPECIATION
AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
Tel: (206) 219-3779 Fax: (206) 388-3485
www.appliedspeciation.com

March 16, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Sampling Program: Quanta Task 3
Project Number: 363725.37.Q1.93.FW

Ms. Klopper,

Attached is the report associated with seventeen (17) solid samples submitted for arsenic sequential extraction from September 5 through October 14, 2008. The samples were received from September 6 through October 15, 2008 in sealed containers below -45°C. Sequential extraction procedures for arsenic conformed to the modified method presented by Wenzel et al. Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Sampling Program: Quanta 3006 OU1 SI
Project Number: 332898.QT.20.24

March 16, 2009

1. Sample Reception

Seventeen (17) samples were submitted for arsenic sequential extraction from September 5 through October 14, 2008. All samples were received in acceptable condition from September 6 through October 15, 2008 in sealed container below -45°C.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception all samples were designated secrete sample identifiers and were stored in a cryofreezer maintained at a temperature of -8°C until sequential extractions could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Prior to implementing any sequential extraction all samples were extruded in a glove box containing argon gas. After extrusion the samples were thoroughly homogenized and allowed to air dry in the glove box until the percent moisture equilibrated. After the percent moisture for all samples equilibrated the samples were thoroughly homogenized again. An oxygen meter was monitored throughout the extrusion and drying process to confirm that the environment was free from oxygen.

Arsenic Sequential Extraction by Wenzel et al A five stage sequential extraction method, presented by Wenzel et al and modified to meet the data objective of the

project, was employed for correlation between arsenic and different substrate properties.

In the glove box, approximately 2g of dried, homogenized soil was transferred to a 50mL polyethylene vial and 50mL of ultra pure reagent water (purged with argon gas) was added to each vial. Each vial was capped, transferred from the glove box and shaken on an inverted shaker for 4 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “Fraction 1” a total of 20mL of ultra pure deionized water was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The samples were returned to the glove box and the supernatant was decanted and discarded.

In the glove box exactly 25mL of 0.05 M $(NH_4)H_2PO_4$ was added to each vial. Each vial was capped, transferred from the glove box, and shaken on an inverted shaker for 16 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “Fraction 2” a total of 20mL of ultra pure deionized water was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The samples were returned to the glove box and the supernatant was decanted and discarded.

In the glove box all sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped, transferred from the glove box, and shaken on an inverted shaker for 4 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “Fraction 3” a total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

In the glove box exactly 25mL of 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid was added to each vial. The vials were then transferred from the glove box and placed in a Hotblock digestion apparatus for 30 min at 96°C.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals

analysis and labeled “Fraction 4” a total of 12.5mL of 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then heated at 110°C for 16 hours after the addition of 7mL concentrated HNO, 2mL of concentrated HF, and 2mL of concentrated HCl.

After completion of the HNO3/HF/HCl digestion it as identified that organic residue remained in a number of the samples. Sample containing elevated concentrations of organics is known to interfere with the applied digestion. The samples were brought to a final volume of 20mL with concentrated HNO3 and the supernatant was decanted and labeled “Fraction 5”.

The residue was then digested with 20mL of aqua regia. The samples were heated at 110°C for 16 hours. The resulting digests were labeled “Fraction 6”.

All extraction fractions were then analyzed for As, Fe, Mg, Ca, Al, Si, and Mn by inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).

3. Sample Analysis

All sample analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Trace Metals Quantification by ICP-DRC-MS All samples for trace metals quantification were analyzed by inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). Aliquots of each sample are introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer, on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

4. Analytical Issues

The overall analyses went very well and no analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits with the following exceptions:

The analytical setup used for trace metals analysis is known to cause interferences for Si quantitation. Many of the integrated parts in the ICP-DRC-MS are glass which is known to increase the background of Si to a level which negates the possibility of quantitation with the exception of samples containing percent level of Si (>50,000mg/kg).Teflon fittings associated with the analytical setup were not used due to their impact on the detection limits for the other target elements. None of the applied extraction procedures are designed to solubilize Si with the exception of the final digestion which includes concentrated HF.

The integrity of the sample vessels for Fraction 6 (aqua regia digestion) associated with the samples identified as Sb-53-Sample Zone and Sb-134-17.5 was compromised; therefore, results for Fraction 6 for the referenced samples are not available. An acceptable mass balance was attained for all other samples; therefore, it may be acceptable to extrapolate the missing data points from the remainder of the sequential extraction and total elemental analyses.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-54-22.75

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.162	21.2	124	35.1	2.56	178
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.091	23.3	26.1	143	10.7	34.6
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	1.08	108	2020	31.0	16.2	1140
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.106	281	2120	53.2	11.1	1010
HF/HNO3/HCl	Residual	0.994	47.7	11100	1020	126	3360
Aqua Regia	Residual	0.312	4550	2660	2690	39.8	34000
HF/HNO3/HCl	Total (Original sample)	2.00	4.09	19000	141	216	3080
Aqua Regia	Total (Original sample)	0.464	7030	6990	4100	78.1	46900
SEP % Recovery		111%	72%	69%	94%	70%	79%

Sb-54-10.5 A

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	167	44.8	235	483	1.59	67.7
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	204	75.5	50.6	722	14.7	28.6
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	4930	174	151000	79.3	29.0	413
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	72.0	472	31000	78.5	17.8	528
HF/HNO3/HCl	Residual	104	4.44	111000	339	217	1180
Aqua Regia	Residual	24.0	1710	42000	8070	40.6	25900
HF/HNO3/HCl	Total (Original sample)	3940	1.84	25100	141	108	928
Aqua Regia	Total (Original sample)	805	2810	381000	9700	117.7	30524
SEP % Recovery		116%	88%	83%	99%	142%	89%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-130-15.5

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	1.56	18.0	94.9	106	ND (<0.37)	98.5
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	3.57	30.7	183	267	5.06	29.4
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	5.30	59.3	3470	22.3	13.6	485
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.132	741	3870	64.6	20.9	1930
HF/HNO3/HCl	Residual	1.79	16.6	9810	582	137	2020
Aqua Regia	Residual	0.585	4230	2840	2712	100	33500
HF/HNO3/HCl	Total (Original sample)	10.8	2.48	17700	259	153	2900
Aqua Regia	Total (Original sample)	2.71	5730	5970	3440	63.1	38500
SEP % Recovery		96%	89%	86%	102%	128%	92%

Sb-55-13.75 ASE

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	13.7	10.9	101	53.9	ND (<0.37)	4.19
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	10.3	11.0	57.5	32.2	ND (<0.17)	78.0
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	13.4	11.7	556	25.1	1.75	751
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	6.88	478	2540	49.6	13.8	1450
HF/HNO3/HCl	Residual	17.5	27.1	11400	1010	184	2310
Aqua Regia	Residual	2.86	3910	1510	2370	31.7	26300
HF/HNO3/HCl	Total (Original sample)	41.2	3.75	14000	284	167	3390
Aqua Regia	Total (Original sample)	11.4	6910	6170	4240	75.8	44200
SEP % Recovery		123%	64%	80%	78%	95%	65%

All results are reported in units of mg/kg and reflect air drying under ambient temperature
ND = Not detected

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-55-19.5

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	13.4	42.6	28.9	191	4.47	7.15
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	15.9	23.5	28.1	92.5	2.55	34.3
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	37.0	20.5	1190	18.1	4.76	877
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	6.98	597	3410	57.3	18.0	1810
HF/HNO3/HCl	Residual	17.8	4.32	11000	406	139	1330
Aqua Regia	Residual	3.24	4280	1740	2870	34.0	35100
HF/HNO3/HCl	Total (Original sample)	79.9	1.67	16000	178	193	2920
Aqua Regia	Total (Original sample)	15.7	6390	4850	3070	69.0	42400
SEP % Recovery		99%	78%	83%	112%	78%	86%

Sb-133-13.25

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	1.95	69.9	ND (<2.1)	2000	1.32	ND (<1.1)
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	6.91	139	6.91	1460	18.2	6.4
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	22.7	351	5830	31.2	80.9	1180
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	2.43	586	3920	50.2	29.7	1260
HF/HNO3/HCl	Residual	6.66	10.6	16000	940	697	949
Aqua Regia	Residual	1.89	6210	4010	13600	220	42500
HF/HNO3/HCl	Total (Original sample)	26.6	1.84	23600	304	354	2120
Aqua Regia	Total (Original sample)	5.68	8540	9690	16700	136	53000
SEP % Recovery		132%	86%	89%	106%	214%	83%

All results are reported in units of mg/kg and reflect air drying under ambient temperature
ND = Not detected

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-131-19.5

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.432	276	319	55.3	3.71	867
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.171	1030	109	433	4.55	317
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	0.329	722	345	39.2	15.8	777
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.243	1450	6060	52.2	70.9	4240
HF/HNO3/HCl	Residual	9.00	4.79	24800	85.9	228	2250
Aqua Regia	Residual	2.37	3710	6430	2400	76.1	36000
HF/HNO3/HCl	Total (Original sample)	9.97	2.46	33400	43	225	4250
Aqua Regia	Total (Original sample)	2.2	10180	11700	3470	204	59900
SEP % Recovery		103%	71%	84%	87%	93%	69%

Sb-53-16.6

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	73.9	31.5	117	3150	1.37	14.3
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	38.5	5.40	18.8	139	0.19	50.6
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	170	2.49	2130	13.5	1.73	238
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	63.6	8.21	4540	60.1	3.92	2710
HF/HNO3/HCl	Residual	53.9	3.97	5290	218	134	1770
Aqua Regia	Residual	12.5	1740	289	2190	35.4	29300
HF/HNO3/HCl	Total (Original sample)	316	1.88	13600	280	124	2850
Aqua Regia	Total (Original sample)	96.5	2780	5480	7400	53.0	41200
SEP % Recovery		100%	64%	65%	75%	100%	77%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-53-sample zone

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	1.37	13.7	39.2	182	ND (<0.37)	2.06
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	12.9	73.8	14.2	840	1.60	5.24
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	56.4	210	2680	18.9	3.88	346
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	55.9	310	8460	76.1	16.3	304
HF/HNO3/HCl	Residual	39.8	145	17100	1900	296	162
Aqua Regia	Residual	NA	NA	NA	NA	NA	NA
HF/HNO3/HCl	Total (Original sample)	147	1.43	20500	77	175	2750
Aqua Regia	Total (Original sample)	24.1	3560	7460	8440	37.8	13400
SEP % Recovery		97%	21%	101%	35%	149%	5%

Sb-130-20.6

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	26.2	40.6	184	135	1.68	ND (<1.1)
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	21.4	7.5	20.1	15.2	0.364	32.3
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	44.6	24.7	653	26.6	46.4	874
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	5.53	721	4100	83.8	20.6	2010
HF/HNO3/HCl	Residual	18.4	10.0	12200	537	179	1480
Aqua Regia	Residual	3.06	4660	1400	3440	35.3	39000
HF/HNO3/HCl	Total (Original sample)	90.2	2.58	15500	281	161	2960
Aqua Regia	Total (Original sample)	21.5	6160	5600	4190	65.8	47000
SEP % Recovery		107%	89%	88%	95%	125%	87%

All results are reported in units of mg/kg and reflect air drying under ambient temperature
NA = Results are not available
ND = Not detected

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-126-22.6

Fraction	Analyte (mg/kg)		As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble		0.123	10.0	128	12.2	4.95	102
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes		0.165	32.4	24.4	310	23.8	23.1
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide		0.978	2.49	2510	38.6	46.4	347
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide		0.961	668	5430	57.1	35.2	1880
HF/HNO3/HCl	Residual		0.660	37.8	15500	1520	288	2250
Aqua Regia	Residual		0.136	5640	2420	3650	54.4	33700
HF/HNO3/HCl	Total	(Original sample)	2.14	3.12	20800	456	353	2970
Aqua Regia	Total	(Original sample)	0.5	7200	7370	5090	117	40000
SEP % Recovery			115%	89%	92%	101%	96%	89%

Sb-126-15.5

Fraction	Analyte (mg/kg)		As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble		0.442	48.9	476	50.7	1.33	685
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes		0.419	27.5	72.0	149	4.18	51.3
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide		2.52	54.1	6930	24.5	27.2	1240
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide		0.261	626	4400	59.7	24.0	2000
HF/HNO3/HCl	Residual		0.874	25.5	18600	1160	401	1810
Aqua Regia	Residual		0.221	6320	3770	3830	93.6	34900
HF/HNO3/HCl	Total	(Original sample)	3.54	2.43	32200	311	499	3100
Aqua Regia	Total	(Original sample)	0.989	8120	11200	4830	182	45100
SEP % Recovery			105%	87%	79%	103%	81%	84%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-132-10.75

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.486	146	332	59.1	11.5	664
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.177	630	20.6	1130	48.9	43.9
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	0.413	637	3010	33.4	172	1220
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.135	1430	6390	76.9	93.8	3340
HF/HNO3/HCl	Residual	9.88	7.70	26600	1050	422	1810
Aqua Regia	Residual	3.22	4080	7670	6340	143	37100
HF/HNO3/HCl	Total (Original sample)	9.29	2.04	36000	486	637	2820
Aqua Regia	Total (Original sample)	2.38	9230	10200	6870	264	61800
SEP % Recovery		123%	75%	95%	118%	99%	68%

Sb-132-19.5

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.479	167	281	16.2	8.49	680
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.285	734	15.4	923	33.3	42.4
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	0.815	569	1410	31.1	85.1	738
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.879	1460	6030	61.5	114	3280
HF/HNO3/HCl	Residual	10.9	4.64	26700	635	647	1850
Aqua Regia	Residual	3.10	7040	6980	6080	211	52300
HF/HNO3/HCl	Total (Original sample)	12.1	2.02	33400	221	701	2650
Aqua Regia	Total (Original sample)	2.87	9720	12100	5480	398	61200
SEP % Recovery		110%	103%	91%	136%	100%	92%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-131-6

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.581	92.2	0.194	265	3.52	ND (<1.1)
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	4.63	87.4	5.47	380	15.0	7.14
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	2.02	129	8300	40.4	75.4	5160
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.670	235	3470	78.3	30.5	907
HF/HNO3/HCl	Residual	14.8	ND (<0.46)	15500	74.8	136	1820
Aqua Regia	Residual	4.39	740	5600	3340	112	58200
HF/HNO3/HCl	Total (Original sample)	20.5	ND (<0.74)	31600	ND (<18)	134	4270
Aqua Regia	Total (Original sample)	3.48	2810	11800	3550	172	91800
SEP % Recovery		113%	46%	76%	118%	122%	69%

Sb-134-14.75

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	16.8	80.9	31.4	414	ND (<0.37)	32.3
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	76.4	224	55.1	993	7.04	3.26
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	32.9	434	8750	20.9	49.8	1380
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.893	723	5040	50.1	25.5	1320
HF/HNO3/HCl	Residual	239	16.1	17800	1600	226	7870
Aqua Regia	Residual	60.3	2790	4340	6820	59.1	26200
HF/HNO3/HCl	Total (Original sample)	309	1.81	28700	124	207	2830
Aqua Regia	Total (Original sample)	78.3	5520	11600	12000	107	38300
SEP % Recovery		110%	77%	89%	82%	117%	89%

All results are reported in units of mg/kg and reflect air drying under ambient temperature
ND = Not detected

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Number: 363725.37.Q1.93.FW

Date: March 16, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sb-134-17.5

Fraction	Analyte (mg/kg)		As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble		8.43	50.9	86.2	268	ND (<0.37)	75.0
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes		72.1	168	106	447	4.06	1.66
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide		33.3	284	29900	27.6	129	1580
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide		1.14	790	8780	379	72.9	1260
HF/HNO3/HCl	Residual		302	2.06	29300	473	288	1170
Aqua Regia	Residual		NA	NA	NA	NA	NA	NA
HF/HNO3/HCl	Total	(Original sample)	281	16.0	37200	229	309	2860
Aqua Regia	Total	(Original sample)	80.5	6390	15900	15300	164	57000
SEP % Recovery			115%	20%	128%	10%	104%	7%

Nist 2711

Fraction	Analyte (mg/kg)		As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble		17.5	51.4	47.1	357	0.985	85.7
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes		17.8	295	9.85	2010	38.3	18.7
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide		42.5	946	2060	34.3	209	1240
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide		11.2	1260	9240	54.0	56.6	2570
HF/HNO3/HCl	Residual		6.93	32.3	14000	2270	263	3060
Aqua Regia	Residual		1.16	3780	1830	17800	50.0	36900
HF/HNO3/HCl	Total	(Original sample)	91.1	1.61	25100	282	480	1460
Aqua Regia	Total	(Original sample)	15.4	8370	6740	22000	144	50700
SEP % Recovery			91%	76%	85%	101%	99%	84%

All results are reported in units of mg/kg and reflect air drying under ambient temperature
NA = Results are not available
ND = Not detected

APPLIED SPECIATION
AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
Tel: (206) 219-3779 Fax: (206) 388-3485
www.appliedspeciation.com

January 22, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Re: Quanta OU1 Task 5a GW Event

Dear Ms. Klopper,

Attached is the report associated with seven (7) water samples submitted for arsenic speciation analysis on December 12, 2008. Samples were received on December 13, 2008 in a sealed container at 0.5^{o}C. Arsenic speciation analysis was performed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Lydia Watts

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608

Project: Quanta OU1 Task 5a GW Event

January 22, 2009

1. Sample Reception

Seven (7) water samples were submitted for arsenic speciation analysis on December 12, 2008. Samples were received in acceptable condition on December 13, 2008 in a sealed container at 0.5^{o}C.

All samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception an aliquot of each aqueous sample was filtered, using 0.45µm syringe filters and placed in a secure cryogenically cooled freezer (-80°C) until analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All samples analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor.

All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-DRC-MS All samples for arsenic speciation analysis were analyzed on December 17, 2008 by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Aliquots of each sample are injected onto an anion exchange column and are mobilized by a basic (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and separated on the basis of their mass-to-charge ratio (m/z) by a mass spectrometer. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went very well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits.

The sample identified as EB-120908 is believed to be an equipment blank. It was analyzed directly after a high level sample, so it is possible that the results are biased high. However, compared to the other samples the result is negligible and should not affect the other samples.

It should be noted that the estimated method detection limits (eMDLs) for all arsenic species are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

If you have any questions or concerns regarding this report, please feel free to contact me at (206) 219-3779.

Sincerely,

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 22, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	As(III)	As(V)
MW-133-121008	1940	526
MW-134-121008	311	7.2
MW-20-121008	29.6	33.2
MW-105A-121008	0.23	1.06
MW-113B-120908	5540	2230
MW-112B-120908	10500	16400
EB-120908	0.16	0.63

All results are reported as received and in µg/L

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 22, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 10x	eMDL 25x	eMDL 100x	eMDL 1000x	eMDL 10000x
As(III)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0048	0.05	0.12	0.48	4.8	48
As(V)	0.040	0.044	0.038	0.030	0.038	0.006	0.015	0.15	0.37	1.5	15	150

*Please see narrative regarding eMDL

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
As(III)	LCS	2.00	1.62	81.1
As(V)	LCS	2.00	2.05	102.7

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	MW-20-121008	29.64	29.05	29.34	2.0
As(V)	MW-20-121008	33.17	28.03	30.60	16.8

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
As(III)	MW-20-121008	50.00	82.18	105.7	50.00	81.43	104.2	0.9
As(V)	MW-20-121008	50.00	86.15	111.1	50.00	77.64	94.1	10.4

APPLIED SPECIATION
AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
Tel: (206) 219-3779 Fax: (206) 388-3485
www.appliedspeciation.com

January 27, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Re: Quanta OU1 Task 5a GW Event

Dear Ms. Klopper,

Attached is the report associated with eight (8) water samples submitted for arsenic speciation analysis on December 23, 2008. Samples were received on December 29, 2008 in a sealed container at 4.0^{o}C. Arsenic speciation analysis was performed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Lydia Watts

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608

Project: Quanta OU1 Task 5a GW Event

January 27, 2009

1. Sample Reception

Eight (8) water samples were submitted for arsenic speciation analysis on December 23, 2008. Samples were received in acceptable condition on December 29, 2008 in a sealed container at 4.0^{o}C.

All samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception an aliquot of each aqueous sample was filtered, using 0.45µm syringe filters and placed in a secure cryogenically cooled freezer (-80°C) until analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All samples analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor.

All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-DRC-MS All samples for arsenic speciation analysis were analyzed on December 31, 2008 by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Aliquots of each sample are injected onto an anion exchange column and are mobilized by a basic (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and separated on the basis of their mass-to-charge ratio (m/z) by a mass spectrometer. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went very well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits.

The sample identified as MW-111B exceeded the calibration for arsenite when analyzed on December 31, 2008. The sample was re-analyzed on January 9, 2009 at an appropriate dilution which confirmed the original result for both arsenite and arsenate. Although, there was not a linearity standard for arsenite in the December 31, 2008 analysis, the subsequent analysis and comparable results shows that the calibration was linear at the higher concentration. In addition, a duplicate, matrix spike and matrix spike duplicate were performed on the sample in the December 31, 2008 analysis and were all within acceptance limits. Therefore, it was deemed appropriate to report the results from the December 31, 2008 analysis.

It should be noted that the estimated method detection limits (eMDLs) for all arsenic species are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

If you have any questions or concerns regarding this report, please feel free to contact me at (206) 219-3779.

Sincerely,

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 27, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	As(III)	As(V)
MW-F-121808	25.3	ND (<11)
MW-O-121808	144	ND (<11)
MW-107A-121908	10200	6600
MW-115A-121908	42.2	22
MW-132-121808	ND (<5.7)	ND (<11)
MW-130A-121808	242	ND (<11)
MW-130B-122208	5010	3770
MW-111B-122308	26200	1130

All results are reported as received and in µg/L

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 27, 2009
Report Generated by: Lydia Watts
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Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 1000x
As(III)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0057	5.7
As(V)	0.000	0.000	0.000	0.000	0.000	0.000	0.011	11

*Please see narrative regarding eMDL

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
As(III)	LCS	2.00	1.68	84.0
As(V)	LCS	2.00	1.54	76.8

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	MW-111B-122308	26200	26000	26100	0.8
As(V)	MW-111B-122308	1133	1145	1139	1.0

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
As(III)	MW-111B-122308	2000	27970	93.5	2000	27750	82.5	0.8
As(V)	MW-111B-122308	2000	2910	88.6	2000	2863	86.2	1.6

APPLIED SPECIATION
AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
Tel: (206) 219-3779 Fax: (206) 388-3485
www.appliedspeciation.com

January 27, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Re: Quanta OU1 Task 5a GW Event

Dear Ms. Klopper,

Attached is the report associated with seven (7) water samples submitted for arsenic speciation analysis on January 5, 2009. Samples were received on January 6, 2009 in a sealed container at -0.1^{o}C. Arsenic speciation analysis was performed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Lydia Watts

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608

Project: Quanta OU1 Task 5a GW Event

January 27, 2009

1. Sample Reception

Seven (7) water samples were submitted for arsenic speciation analysis on January 5, 2009. Samples were received in acceptable condition on January 6, 2009 in a sealed container at -0.1^{o}C.

All samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception an aliquot of each aqueous sample was filtered, using 0.45µm syringe filters and placed in a secure cryogenically cooled freezer (-80°C) until analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All samples analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor.

All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-DRC-MS All samples for arsenic speciation analysis were analyzed on January 9, 2009 by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Aliquots of each sample are injected onto an anion exchange column and are mobilized by a basic (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and separated on the basis of their mass-to-charge ratio (m/z) by a mass spectrometer. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went very well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits.

The sample identified as MW-A-2 exceeded the calibration for both arsenite and arsenate when analyzed on January 9, 2009. A linearity standard was run at the end of the analysis, which confirmed the calibration was linear at the higher concentration for arsenate, but was not sufficient to confirm the arsenite value. The sample was re-analyzed on January 22, 2009 at an appropriate dilution which confirmed the original result for both arsenite and arsenate. Although, there was not a sufficient linearity standard for arsenite in the January 9, 2009 analysis, the subsequent analysis and comparable results shows that the calibration was linear at the higher concentration. Therefore, it was deemed appropriate to report the results from the January 9, 2009 analysis.

It should be noted that the estimated method detection limits (eMDLs) for all arsenic species are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

If you have any questions or concerns regarding this report, please feel free to contact me at (206) 219-3779.

Sincerely,

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 27, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	As(III)	As(V)
MW-51A-123008	518	94
MW-A-2-123008	104000	27100
MW-N-2-123008	8580	4620
DUP-123008	532	85.8
MW-126-123108	ND (<8.9)	ND (<12)
MW-114A-010409	ND (<8.9)	ND (<12)
MW-114B-010409	9050	958

All results are reported as received and in µg/L

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: January 27, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 100x	eMDL 1000x
As(III)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0089	0.89	8.9
As(V)	0.000	0.000	0.000	0.018**	0.000	0.000	0.012	1.2	12

*Please see narrative regarding eMDL
**This preparation blank is identified as an outlier using the Grubbs test and has been excluded from all calculations

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
As(III)	LCS	2.00	1.74	87.0
As(V)	LCS	2.00	1.69	84.6

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	MW-114B-010409	9052	9126	9089	0.8
As(V)	MW-114B-010409	958	1044	1001	8.6

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
As(III)	MW-114B-010409	2000	10650	78.0	2000	10630	77.0	0.2
As(III)	MW-51A-123008	2000	2391	93.7	2000	2402	94.2	0.5
As(V)	MW-114B-010409	2000	2842	92.1	2000	2982	99.1	4.8
As(V)	MW-51A-123008	2000	1977	94.1	2000	1983	94.4	0.3

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AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
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www.appliedspeciation.com

March 31, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Sampling Program: Task 7 GW and SW Evaluation

Ms. Klopper,

Attached is the report associated with two (2) solid samples submitted for arsenic sequential extraction on February 25, 2009. The samples were received on February 26, 2009 in sealed containers below -50°C. Sequential extraction procedures for arsenic conformed to the modified method presented by Wenzel et al. Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Lydia Watts

Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Sampling Program: Task 7 GW and SW Evaluation

March 31, 2009

1. Sample Reception

Two (2) samples were submitted for arsenic sequential extraction on February 25, 2009. All samples were received in acceptable condition from February 26, 2009 in sealed container below -50°C.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception all samples were designated secrete sample identifiers and were stored in a cryofreezer maintained at a temperature of -8°C until sequential extractions could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Prior to implementing any sequential extraction all samples were extruded in a glove box containing argon gas. After extrusion the samples were thoroughly homogenized and allowed to air dry in the glove box until the percent moisture equilibrated. After the percent moisture for all samples equilibrated the samples were thoroughly homogenized again. An oxygen meter was monitored throughout the extrusion and drying process to confirm that the environment was free from oxygen.

Arsenic Sequential Extraction by Wenzel et al A five stage sequential extraction method, presented by Wenzel et al and modified to meet the data objective of the project, was employed for correlation between arsenic and different substrate properties.

In the glove box, approximately 1.2g of dried, homogenized soil was transferred to a 50mL polyethylene vial and 25mL of ultra pure reagent water (purged with argon gas) was added to each vial. Each vial was capped, transferred from the glove box and shaken on an inverted shaker for 4 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "Fraction 1" a total of 20mL of ultra pure deionized water was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The samples were returned to the glove box and the supernatant was decanted and discarded.

In the glove box exactly 25mL of 0.05 M $(NH_4)H_2PO_4$ was added to each vial. Each vial was capped, transferred from the glove box, and shaken on an inverted shaker for 16 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "Fraction 2" a total of 20mL of ultra pure deionized water was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The samples were returned to the glove box and the supernatant was decanted and discarded.

In the glove box all sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped, transferred from the glove box, and shaken on an inverted shaker for 4 hours at room temp at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. The samples were then transferred to the glove box. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "Fraction 3" a total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously, transferred out of the glove box, and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

In the glove box exactly 25mL of 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid was added to each vial. The vials were then transferred from the glove box and placed in a Hotblock digestion apparatus for 30 min at 96°C.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "Fraction 4" a total of 12.5mL of 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid was added to each vial. The vials were shaken

vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then heated at 110°C for 6 hours after the addition of 6.4mL concentrated HNO_3, 1.8mL of concentrated HF, and 1.8mL of concentrated HCl.

After completion of the HNO_3/HF/HCl digestion it as identified that organic residue remained in a number of the samples. Sample containing elevated concentrations of organics is known to interfere with the applied digestion. The samples were brought to a volume of 15mL with concentrated HNO_3 and 10mL supernatant was decanted, brought to a final volume of 50mL with water and labeled "Fraction 5".

The residue and 5mL of solution was then digested by aqua regia by adding 15mL of HCl. The samples were heated at 110°C for 16 hours. The resulting digests were brought to a final volume of 50mL with water and were labeled "Fraction 6".

All extraction fractions were then analyzed for As, Mg, Fe, Ca, Mn, and Al by inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).

3. Sample Analysis

All sample analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

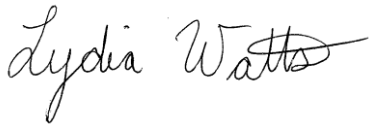
Trace Metals Quantification by ICP-DRC-MS All samples for trace metals quantification were analyzed by inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). Aliquots of each sample are introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer, on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

4. Analytical Issues

The overall analyses went very well and no analytical issues were encountered. The magnesium sample results for fractions one through four have been corrected in accordance with the continuing calibration verification recoveries to account for perceived instrument bias. The arsenic sample results for the residuals and the original samples have been corrected in accordance with the continuing calibration verification recoveries to account for perceived instrument bias. All quality control parameters associated with these samples were within acceptance limits.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,



Lydia Watts
Project Coordinator
Applied Speciation and Consulting, LLC

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Name: Task 7 GW and SW evaluation

Date: March 31, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

SB-128-8.5-022509

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.0362	17.6	65.7	18.3	1.16	75.8
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.165	188	11.7	859	11.8	16.9
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	0.953	72.0	1880	14.4	55.4	486
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.322	483	2770	12.8	21.7	702
HF/HNO3/HCl	Residual	0.710	302	11300	2470	222	4360
Aqua Regia	Residual	0.532	9270	10000	8960	171	44500
HF/HNO3/HCl	Total (Original sample)	3.12	7.43	15500	331	290	2810
Aqua Regia	Total (Original sample)	1.54	8150	11700	11000	232	45300
SEP % Recovery		58%	127%	96%	109%	93%	104%

SB-128-13.5-022509

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.0695	37.5	130	21.4	2.10	106
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.328	391	10.6	1640	5.59	10.1
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	1.66	323	3770	13.0	119	825
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.706	1360	6760	10.9	26.7	1230
HF/HNO3/HCl	Residual	0.621	707	17800	3140	345	1720
Aqua Regia	Residual	0.351	12100	11600	14900	202	30600
HF/HNO3/HCl	Total (Original sample)	2.57	17.6	18900	849	386	1120
Aqua Regia	Total (Original sample)	1.21	8420	16000	18100	216	33400
SEP % Recovery		99%	177%	115%	104%	116%	100%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Name: Task 7 GW and SW evaluation

Date: March 31, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

SB-128-13.5-022509 MD

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.0804	61.3	185	31.0	3.03	155
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	0.301	420	21.3	1740	6.30	19.8
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	1.42	283	3050	12.8	116	884
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.877	1380	7640	9.2	25.4	1320
HF/HNO3/HCl	Residual	0.560	290	16600	2760	297	1270
Aqua Regia	Residual	0.352	9940	11100	14000	186	26600
HF/HNO3/HCl	Total (Original sample)	2.59	21.3	19800	846	401	1180
Aqua Regia	Total (Original sample)	1.21	9200	18000	19000	263	36400
SEP % Recovery		95%	134%	102%	93%	96%	80%

Loamy Clay

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	0.103	468	0.222	3570	3.10	0.573
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	5.01	301	10.5	1650	24.6	0.75
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	7.25	546	5670	6.93	55.2	446
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	0.540	333	1540	6.2	14.3	515
HF/HNO3/HCl	Residual	0.804	15.7	4870	931	220	2960
Aqua Regia	Residual	0.376	2450	2570	27100	48.0	48600
HF/HNO3/HCl	Total (Original sample)	10.4	26.1	8790	337	172	9450
Aqua Regia	Total (Original sample)	5.48	5280	7120	44300	104	56200
SEP % Recovery		89%	78%	92%	75%	132%	80%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

Arsenic Sequential Extraction Results for CH2M HILL
Contact: Amy Klopper
Project Name: Task 7 GW and SW evaluation

Date: March 31, 2009
Report Generated by: Lydia Watts
Applied Speciation and Consulting, LLC

Sample Results

Loamy Sand

Fraction	Analyte (mg/kg)	As	Mg	Fe	Ca	Mn	Al
DI Water	Soluble	3.46	2290	0.193	2500	0.0109	1.35
0.05 M (NH4)H2PO4	Easily Exchangeable outer sphere complexes	62.4	1450	3.14	302	0.385	20.5
0.2M (NH4)2C2O4	Amorphous Fe oxyhydroxide	44.6	4580	191	17.4	42.1	730
0.2M (NH4)2C2O4 + 0.1M Ascorbic acid	Crystilline Fe oxyhydroxide	4.99	33.0	8170	15.0	925	260
HF/HNO3/HCl	Residual	2.35	1.20	2040	50.8	100	4880
Aqua Regia	Residual	1.22	548	1040	595	28.5	65300
HF/HNO3/HCl	Total (Original sample)	93.4	23.1	8270	390	538	28100
Aqua Regia	Total (Original sample)	43.9	9460	4180	4440	348	55100
SEP % Recovery		87%	94%	92%	72%	124%	86%

All results are reported in units of mg/kg and reflect air drying under ambient temperature

APPLIED SPECIATION
AND CONSULTING, LLC

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March 25, 2009

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608
(352) 335-5877

Re: Quanta OU1 Task 5a GW Event

Dear Ms. Klopper,

Attached is the report associated with two (2) water samples submitted for arsenic speciation analysis on March 18, 2009. Samples were received on March 19, 2009 in a sealed container at 2.0^{o}C. Arsenic speciation analysis was performed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Amy Klopper
CH2M HILL
3011 Southwest Williston Road
Gainesville, FL 32608

Project: Quanta OU1 Task 5a GW Event

March 25, 2009

1. Sample Reception

Two (2) water samples were submitted for arsenic speciation analysis on March 18, 2009. Samples were received in acceptable condition on March 19, 2009 in a sealed container at 2.0^{o}C.

All samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception an aliquot of each aqueous sample was filtered, using 0.45µm syringe filters and placed in a secure cryogenically cooled freezer (-80°C) until analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All samples analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor.

All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-DRC-MS All samples for arsenic speciation analysis were analyzed on March 23, 2009 by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Aliquots of each sample are injected onto an anion exchange column and are mobilized by a basic (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and separated on the basis of their mass-to-charge ratio (m/z) by a mass spectrometer. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went very well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits.

It should be noted that the estimated method detection limits (eMDLs) for all arsenic species are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

If you have any questions or concerns regarding this report, please feel free to contact me at (206) 219-3779.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: March 25, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	As(III)	As(V)
MW-128-031809	0.415	0.184
DUP-031809	0.401	0.232

All results are reported as received and in µg/L

Arsenic Speciation Results for CH2M Hill
Project Name: Quanta OU1 Task 5a GW Event
Contact: Amy Klopper

Date: March 25, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 25x
As(III)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.037
As(V)	0.402	0.191	0.086	0.017	0.174	0.168	0.0024	0.060

*Please see narrative regarding eMDL

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
As(III)	LCS	10.00	9.40	94.0
As(V)	LCS	10.00	8.67	86.7

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	MW-128-031809	0.415	0.392	0.403	5.9
As(V)	MW-128-031809	0.184	0.154	0.169	17.4

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
As(III)	MW-128-031809	50.00	54.09	107.4	50.00	53.00	105.2	2.0
As(V)	MW-128-031809	50.00	50.57	100.8	50.00	51.24	102.1	1.3

Applied Speciation and Consulting, LLC
953 Industry Drive
Tukwilla, WA 98188
206-219-3779

Honeywell

Chain Of Custody / Analysis Request

AESI Ref:	39890.63463
COC#	ASCWA-37380-031809-Task5a
Lab Proj # (SDG):	
Lab ID	ASC-WA
Site ID	QUANTA
Lab Job #	
Authorized User:	Honeywell

Privileged & Confidential	Y	Site Name:	Quanta Resources (Edgewater)	Phase:	RI
EDD To:	Load into LocusFocus. Send copy to Paul.Taylor@ch2m.com.	Location of Site:	EDGEWATER, NJ	Sampling Program	Quanta OU1 Task 5a GW Event

Sampling Co.: CH2MHILL

Client Contact: (name, co., address)
Helen Fahy
101 Columbia Rd
Morristown, NJ 07962

Preliminary Data To	Amy.Klopper@ch2m.com
Sample Receipt Acknowledgement To	Amy.Klopper@ch2m.com, Paul.Taylor@ch2m.com, Dana.Bentley@ch2m.com
Hard Copy To	Amy.Klopper@ch2m.com
Invoice To:	Honeywell

Sampler:	Harclerode, Austin
PO #	
Analysis Turnaround Time (TAT):	21
Consultant	CH2M
Full Report TAT:	28

Text & Excel File Drive | Excel & Text File Order

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	Sample Identification				Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Composite/Grab	Field Filtered Sample ?	As III and V Speciation	Sampling Method (code)	Lab Sample Numbers
	Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID							Units				
1	MW-128			MW-128-031809	3/18/2009	12:00	GW	WATER	REG	1	grab	N	x		ASC-B-2463
2	Field QC			DUP-031809	3/18/2009	—	GW	WATER	REG	1	grab	N	x		"-"-1852
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
[signature]	CH2M HILL	Fed Ex			
	Date/Time 3/19/09 17:40		Date/Time	Cooler Temp.	
Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
	Date/Time	[signature]	Date/Time 3-19-09 1159	Cooler Temp. 2.0°C	

Preservatives: (Other; Specify):

0 (none); 1 (4 Deg C); 2 (HCl pH<2); 3 (HNO3 pH<2); 4 (H2SO4 pH<2); 5 (NaOH pH>12); 6 (NaOH, Zn Acetate); 7 (H2SO4 (pH<2), 4 Deg C)); 8 (HCl pH<2); 9 (HCl 4 Deg C); 10 (HNO3 (pH<2), 4Deg C); 11 (4C NaOH (pH>12) & Ascorbic Acid); 12 (4C H2SO4 (pH<2) & Na2S2O3); 13 (Zn Acetate); sp (special instructions)

Environmental Forensic Report

Quanta Resources (Edgewater)

SDG: CH090121

Report To:

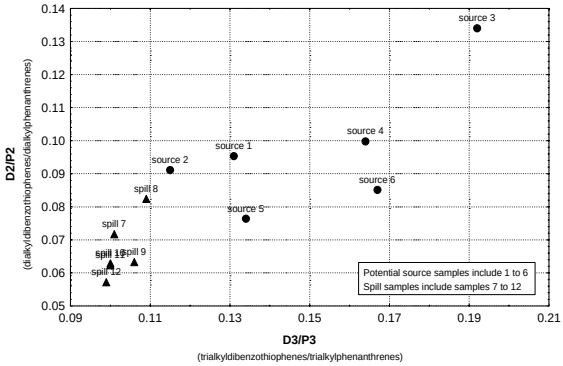
CH2M Hill
3011 S.W. Williston Rd.
Gainesville, FL 32608-3928

Report By:

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472

February 11, 2009

Figure 1. Double Ratio Plot



Identifying and allocating sources of pollutants in complex environments.

META Environmental, Inc.
ENGINEERING & CHEMISTRY

Final Laboratory Report

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472

Phone: 617-923-4662
Fax: 617-923-4610
E-Mail meta@metaenv.com

Certification

This certifies that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed herein. The results included in this data report relate only to the samples as received and analyzed by the laboratory. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and Quality Assurance Officer, as verified by the following signatures.

James A. Roush — February 11, 2009
Environmental Scientist, Laboratory Manager — Date

David M. Mauro — February 11, 2009
Senior Scientist, Quality Assurance Officer — Date

Sample Delivery Group Narrative

Project:	Quanta Resources (Edgewater)
Client:	CH2M Hill 3011 S.W. Williston Rd. Gainesville, FL 32608-3928
Report Contact:	Amy Klopper
Dates of Receipt:	January 21st of 2009
Sample Summary:	The samples received for this project are summarized in the attached sample login forms.
META Project Number:	C01007
SDG No.:	CH090121
Total Pages in Report:	95

Chain of Custody

One container of sample MW-123 was broken upon receipt; however the 2nd container was in good condition. The only container provided for sample MW-135 was damaged but the non-aqueous phase liquid (NAPL) was contained in a ziplock bag. The NAPL was recovered and processed. The internal temperature of the shipment container was not determined due to sample conditions:

Samples received: 01/21/2009 Temperature: Not determined

Internal chain of custody procedures were followed after sample receipt. Samples were stored in a locked refrigerator. A sample custody logbook contains the record of sample removal from the secure sample storage area to the sample preparation laboratory. The custody record for the sample extracts is present on the sample extraction logbook page.

The disposal of samples and extracts will be authorized one month after the release of this data report. Sample disposal will be documented.

Methods

The NAPL samples were prepared by waste dilution (EPA 3580) using dichloromethane (DCM). The extracts were spiked with internal standard and analyzed by GC/MS/SIM (EPA 8270M) for mono- and polycyclic aromatic hydrocarbons (MAHs and PAHs), alkyl PAH homologues and other selected compounds. Extracts were also fractionated using silica gel fractionation, and the aliphatic fraction analyzed for petroleum biomarkers, also by GC/MS/SIM (EPA 8270M).

A portion of each sample was subcontracted to Triton Analytics Corporation in Houston, TX for physical properties testing.

Results

Sample results are presented in several appendices which follow this narrative.
Appendix B: GC/FID Fingerprints (provided again for reference only)
Appendix C: MAH/PAH Concentrations
Appendix D: Extended MAH/PAH Profiles - Histograms
Appendix E: Extracted Ion Current Profiles (EICPs)
Appendix F: Petroleum Biomarker Concentrations
Appendix G: Physical Properties Results

Quality Control

Holding Times
The NAPL samples were extracted within holding times. The samples and extracts were stored at 4°C ± 2°C prior to extraction and analysis. The sample extracts were analyzed within 40 days of sample preparation.

Blanks
Various MAHs and PAHs were detected below the reporting limit (RL) in method blank QC090128-MB. As these compounds were detected in the field samples at much higher relative concentrations (greater than 10x the blank levels) positive bias does not appear to be significant.

Internal Standards
Internal standards were recovered within acceptable QC limits (50%-200%) relative to the continuing calibration standards.

Interpretation

Introduction

Two NAPL samples were received by META from the Quanta Resources (Edgewater) site on January 21, 2009. The samples were analyzed for hydrocarbon fingerprints, an expanded list of MAHs and PAHs and petroleum biomarkers.

This report summarizes the findings and compares the samples.

Sample-Specific Results

Both NAPL samples contained pyrogenic substances. Samples MW-123 and MW-135 were characterized principally by parent PAHs containing 2-, 3-, 4-, 5-, and 6-rings with naphthalene with methylnaphthalenes present at substantial levels. This composition is consistent with coal tar (see Figure 1) and some coal tar products, such as creosote. The fluoranthene/pyrene ratios ranged from 1.299 to 1.314 (Table 1) with a mean of 1.307 and a tight percent relative standard deviation of 0.55%. These values suggest that the pyrogenic material in both samples originated from the same source.

Petroleum biomarkers were not detected in either sample.

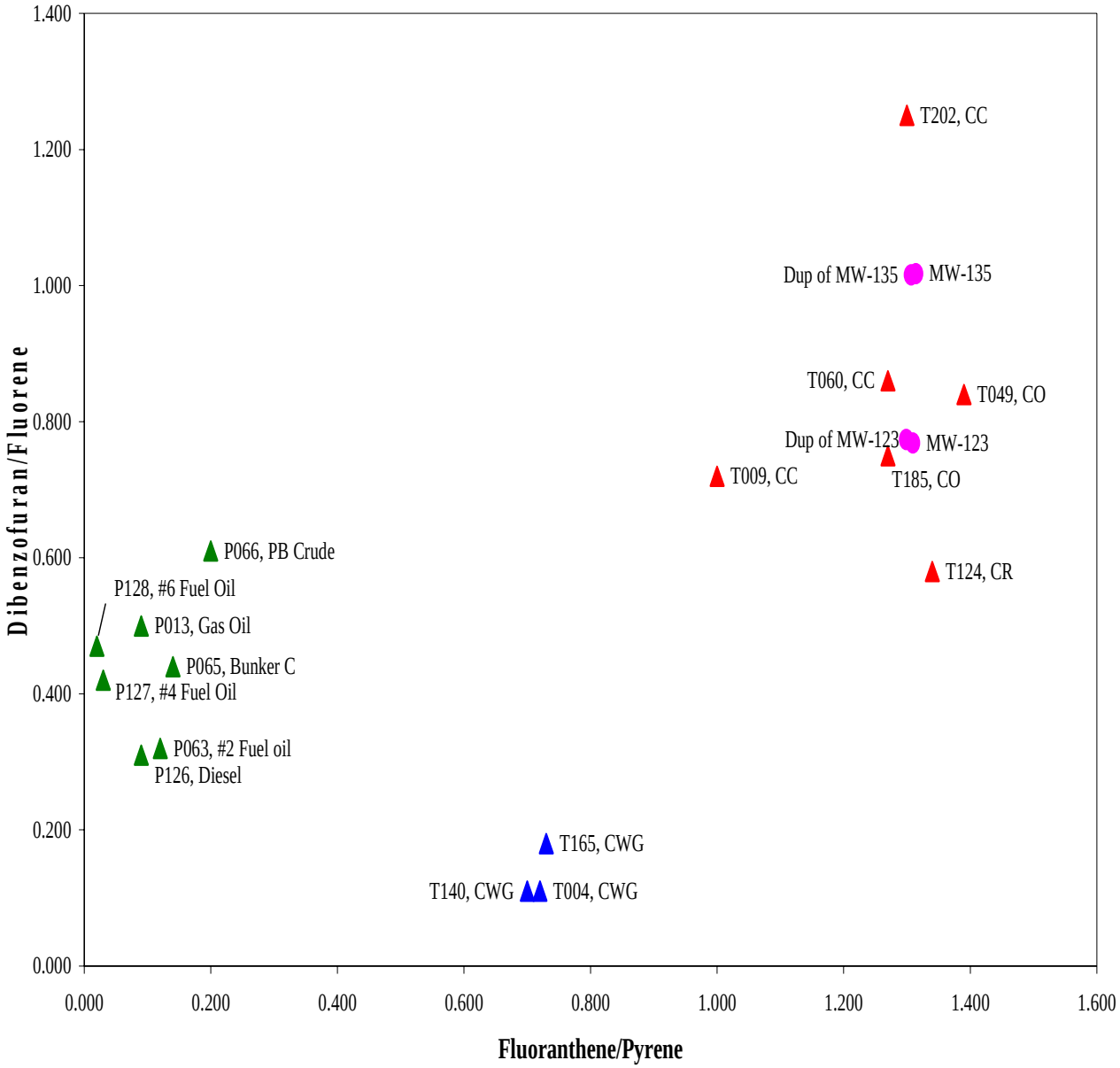
Table 1. Selected Source and Weathering Ratios

	Fl/Py	D/F	C17/Pris	C18/Phy	Pris/Phy	C3D/C3PA	C2D/C2PA	BF/MP
MW-123	1.310	0.768	1.247	2.349	2.091	0.348	0.204	0.995
Dup of MW-123	1.299	0.774	1.210	2.385	2.344	0.332	0.207	1.017
MW-135	1.314	1.017	1.255	5.415	4.946	0.251	0.145	1.015
Dup of MW-135	1.307	1.016	1.301	5.154	4.506	0.235	0.143	1.022

Ratios:

Fl/Py	fluoranthene/pyrene
D/F	dibenzofuran/fluorene
C17/Pris	heptadecane/pristane
C18/Phy	octadecane/phytane
Pris/Phy	pristane/phytane
C3D/C3PA	trialkyldibenzothiophenes/trialkylphenanthrenes/anthracenes
C2D/C2PA	dialkyldibenzothiophenes/dialkylphenanthrenes/anthracenes
BF/MP	benzofluorenes/methylpyrenes
NC	Not calculable

Figure 1. Selected Diagnostic Ratios – Fl/Py v. D/F



TXXX	Tar Sample from META's in house source library
CC	Coal Carbonization Tar
CO	Coke Oven Tar
CR	Creosote
CWG	Carbureted Water Gas Tar
●	Field Samples

Definitions

Pyrogenic substances are complex mixtures of primarily hydrocarbons produced from organic matter subjected to high temperatures but with insufficient oxygen for complete combustion. Pyrogenic materials are produced by fires, internal combustion engines, and furnaces. They also are formed when coke or gas are produced from coal or oil. Coal-tar based products, such as roofing, pavement sealers, waterproofing, pesticides, and some shampoos contain pyrogenic materials.

Petrogenic substances include crude oil and crude oil derivatives such as gasoline, heating oil, and asphalt.

Pitch is the semi-solid or solid material consisting of high molecular weight hydrocarbons that remain following coal tar distillation.

References

McNicoll, D., Tousignant, L.P., Augustine, P. "Facts and Fallacies: Petroleum Degradation in a Subsurface Environment." Contaminated Soil Sediment and Water, 17-21, June,July 2001

"Chemical Fingerprinting of Hydrocarbons," in: Introduction to Environmental Forensics. B.L. Murphy and R.D. Morrison editors, Academic Press, San Diego, CA 2002.

Mauro, D.M., "Chemical Source Attribution at former MGP Sites," EPRI Report 1000728, December 2000.

Appendix A

Chain of Custody

META Environmental, Inc
49 Clarendon Street
Watertown, MA 2472

Honeywell — Chain Of Custody / Analysis Request

AESI Ref:	39833.75011		
COC#	012009-1	META-37380-	
Lab Proj # (SDG):			
Lab ID	META		
Site ID	QUANTA		
Lab Job #			
Authorized User:	Honeywell		

Privileged & Confidential	Y	Site Name:	Quanta Resources (Edgewater)
Phase:	RI		
EDD To:	Load into LocusFocus. Send copy to Dana.Bentley@ch2m.com,	Location of Site:	EDGEWATER, NJ
Sampling Program	Quanta OU1 Allocation Support		

Sampling Co.:	CH2MHILL
Client Contact: (name, co., address)	
Helen Fahy	
101 Columbia Rd	
Morristown, NJ 07962	
Preliminary Data To	Amy.Klopper@ch2m.com
Sample Receipt Acknowledgement To	Amy.Klopper@ch2m.com, Dana.Bentley@ch2m.com, Paul.Taylor@ch2m.com
Hard Copy To	Amy.Klopper@ch2m.com
Invoice To:	Honeywell

Sampler:	Harclerode, Austin
PO #	
Analysis Turnaround Time (TAT):	21
Consultant	CH2M
Full Report TAT:	21

Text & Excel File Drive: Excel & Text File Order

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	Sample Identification: Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID	Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Composite/Grab	Field Filtered Sample ?	EPA 8100M-Fingerprinting	EPA 8270M-PAHs/Petroleum Biomarkers	EPA 8270M-Full Petroleum Biomarkers	SW6010 -Metals	SW8082-PCBs	SW8260-VOCs	SW8270-SVOCs						Sampling Method (code)	Lab Sample Numbers
											Units															
1	MW-123	—		MW-123-122008-D	12/20/08	15:00	NAPL	NAPL	Reg	2	G	N	X	X	X	X	X	X	X	1	01090121-01				1/2 Broken	covered in packing
2	MW-135	—		MW-123-122008-D	↓	13:00	NAPL	NAPL	Reg	1	G	N	X	X	X	X	X	X	X	2	01090121-02				Broken	
3																										
4																										
5																										
6				(1) ONE FULL LITER WAS INTACT. IT WAS CLEANED & SHOULD NOT BE CONSIDERED COMPROMISED																						
7				(2) THE ONLY CONTAINER WAS BROKEN. 4 OZ OF NAPL WAS RECOVERED FROM THE ZIPLOCK BAG																						
8				SAMPLE COULD BE CONSIDERED FOR PROCESSING, BUT WAS RECOVERED OUTSIDE ORIGINAL JAR.																						
9																										
10																										
11																										
12																										

Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
Kia La Fat	CH2M Hill	[illegible] 1/21/09	Date/Time	Cooler Temp.	
18:00 01/20/09	Date/Time				
Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
	Date/Time		Date/Time	Cooler Temp.	

Preservatives: (Other; Specify):

0 (none); 1 (4 Deg C); 2 (HCl pH<2); 3 (HNO3 pH<2); 4 (H2SO4 pH<2); 5 (NaOH pH>12); 6 (NaOH, Zn Acetate); 7 (H2SO4 (pH<2), 4 Deg C)); 8 (HCl pH<2); 9 (HCl 4 Deg C); 10 (HNO3 (pH<2), 4Deg C); 11 (4C NaOH (pH>12) & Ascorbic Acid); 12 (4C H2SO4 (pH<2) & Na2S2O3); 13 (Zn Acetate); sp (special instructions)

META Environmental, Inc.

Sample Receipt Log

Lab ID	Field ID	Matrix	Prep Method	Cleanup Method	Analysis Method	Date Sampled	Date Received	Project #	Container	Comments	Client Name	Project Name
CH090121-01	MW-123	NAPL	2512		4007/4008/4011	12/20/2008	1/21/2009	C01007-60	1 x 1L jar	Sub for Physical Properties	CH2M Hill	Quanta Site-Edgewater, NJ
CH090121-02	MW-135	NAPL	2512		4007/4008/4011	12/20/2008	1/21/2009	C01007-60	1 x 4oz jar	Sub for Physical Properties	CH2M Hill	Quanta Site-Edgewater, NJ

Logged By: RS

Date: 1/21/09

Reviewed By: JM

Date: 1/27/09

META Environmental, Inc.
Sample Receipt Checklist

Receipt date: 1/21/09

Login date: 1/23/09

Login personnel: RS

Client Information:.

Company Name: CH2M Hill

Project Manager: Amy Klopper

Project Name: Quanta Resources (Sagewater)

Shipping Information:

How were samples received? UPS (FedEx) DHL Other:

Number of coolers: 1

Internal temperature of coolers: Not Determined

Was ice present? (Yes) / No

Note: if cooler is outside the 2-6° range, META's project manager should be notified.

Documentation:

Was a Chain of Custody present? (Yes) / No

Was it signed? (Yes) / No

Was all project information present on the COC? (Yes) / No

Was a bill of lading or shipping label retained? Yes / (No)

Sample Information:

Number of sample containers: 3

Does this match the COC? (Yes) / No

Were all sample containers Intact? Yes / (No)

If no, list samples and problems: 2/3 1L jars were broken

Note: if samples are damaged, META's project manager should be notified. - product all over cooler

For aqueous 40ml Voas; was headspace present? Yes / No / NA - cleaned and saved one jar

Comments:

- saved 4oz jar of other sample

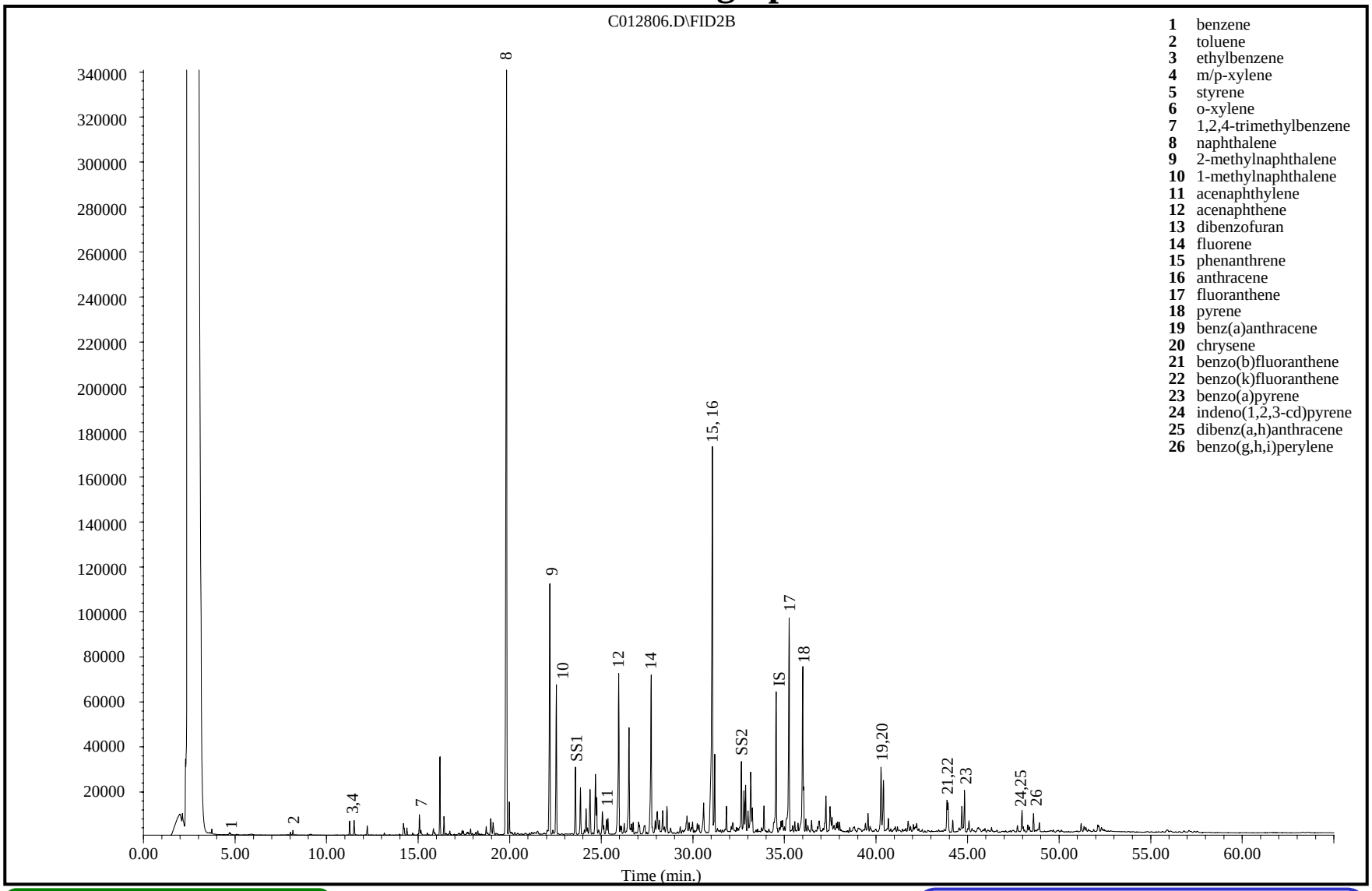
Custodian: [signature]

Project Manager: [signature]

Appendix B

GC/FID Fingerprints

GC/FID Fingerprint

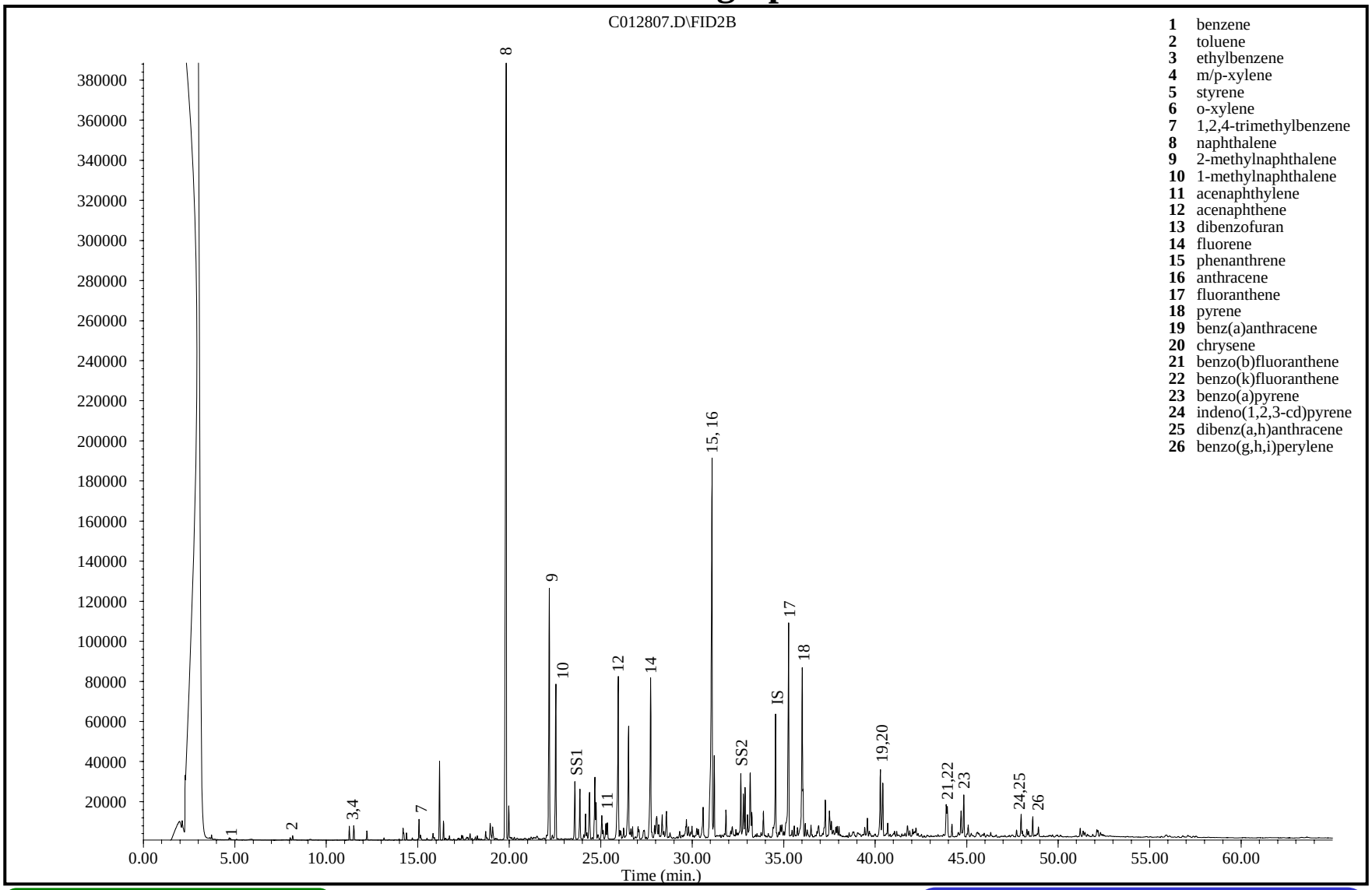


Extraction Date: 01/28/2009
Analysis Date: 01/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-123**
Laboratory ID: CH090121-01
Method: EPA 8100M

GC/FID Fingerprint

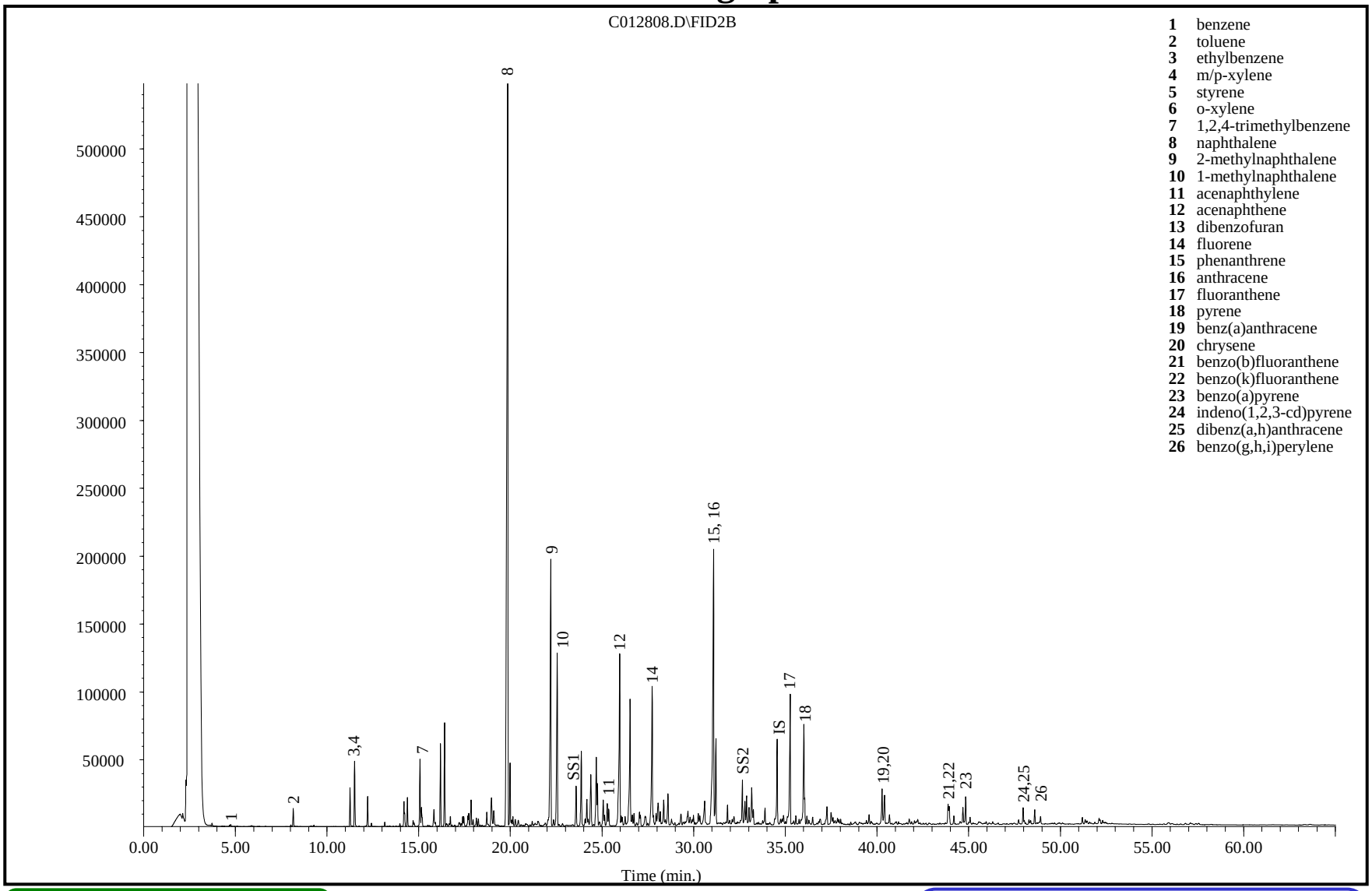


Extraction Date: 01/28/2009
Analysis Date: 01/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-123**
Laboratory ID: CH090121-01DUP-D
Method: EPA 8100M

GC/FID Fingerprint

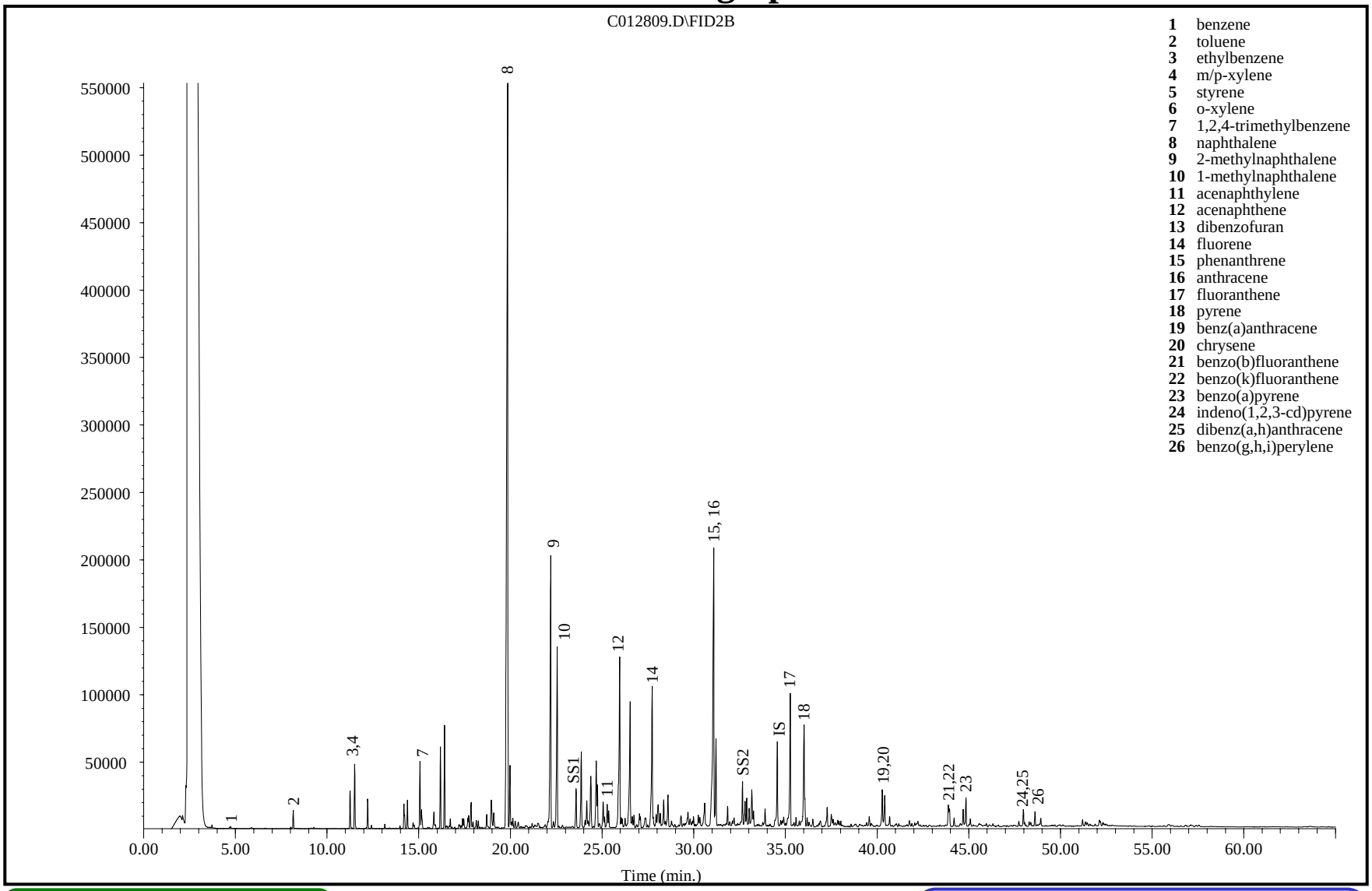


Extraction Date: 01/28/2009
Analysis Date: 01/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-135**
Laboratory ID: CH090121-02-D
Method: EPA 8100M

GC/FID Fingerprint

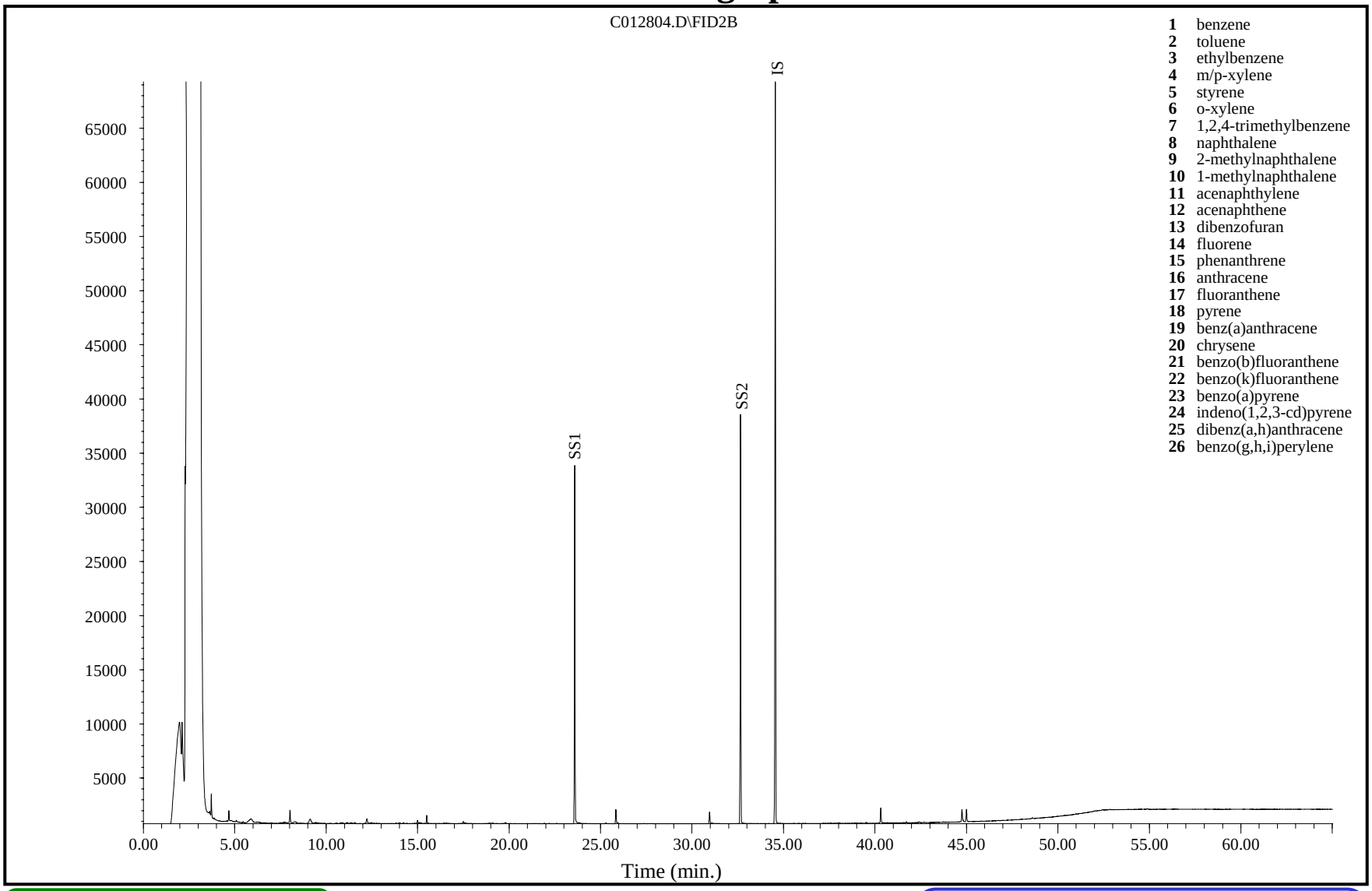


Extraction Date: 01/28/2009
Analysis Date: 01/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-135**
Laboratory ID: CH090121-02DUP-D
Method: EPA 8100M

GC/FID Fingerprint



Extraction Date: 01/28/2009
Analysis Date: 01/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **Method Blank**
Laboratory ID: QC090128-MB
Method: EPA 8100M

Appendix C

MAH/PAH Concentrations

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					
Benzene	105	B	9.88	4.94	
Toluene	267		9.88	4.94	
Ethylbenzene	714		9.88	4.94	
m/p-Xylenes	820		9.88	4.94	
Styrene	54.2		9.88	4.94	
o-Xylene	414		9.88	4.94	
Isopropylbenzene	124		9.88	4.94	
n-Propylbenzene	48.3		9.88	4.94	
1,3,5-Trimethylbenzene	367		9.88	4.94	
1,2,4-Trimethylbenzene	942		9.88	4.94	
t-Butylbenzene		U	9.88	4.94	
sec-Butylbenzene	9.27	J	9.88	4.94	
p-Isopropyltoluene	102		9.88	4.94	
n-Butylbenzene	63.1		9.88	4.94	
C1 - Benzene	164		9.88	4.94	
C2 - Benzene	883		9.88	4.94	
C3 - Benzene	1,150		9.88	4.94	
C4 - Benzene	609		9.88	4.94	
C5 - Benzene	187		9.88	4.94	
trans-Decalin		U	9.88	4.94	
cis-Decalin		U	9.88	4.94	
Naphthalene	16,000	D	9.88	4.94	
2-Methylnaphthalene	16,500	B	9.88	4.94	
1-Methylnaphthalene	9,310		9.88	4.94	
C1 - Naphthalene	15,900	B	9.88	4.94	
C2 - Naphthalene	7,190		9.88	4.94	
C3- Naphthalene	2,460		9.88	4.94	
C4- Naphthalene	698		9.88	4.94	
Acenaphthylene	1,230	B	9.88	4.94	
Acenaphthene	10,300		9.88	4.94	
Dibenzofuran	8,530		9.88	4.94	
Fluorene	11,100		9.88	4.94	
C1 - Fluorene	2,040		9.88	4.94	
C2 - Fluorene	870		9.88	4.94	
C3 - Fluorene	378		9.88	4.94	
Phenanthrene	29,000		9.88	4.94	
Anthracene	6,060		9.88	4.94	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	7,850	9.88	4.94	
C2 - Phenanthrene/Anthracene	2,630	9.88	4.94	
C3 - Phenanthrene/Anthracene	712	9.88	4.94	
C4 - Phenanthrene/Anthracene	176	9.88	4.94	
Dibenzothiophene	2,450	9.88	4.94	
C1 - Dibenzothiophene	994	9.88	4.94	
C2 - Dibenzothiophene	537	9.88	4.94	
C3 - Dibenzothiophene	248	9.88	4.94	
C4 - Dibenzothiophene	74.9	9.88	4.94	
Benzo(b)naphtho(2,1-d)thiophene	565	9.88	4.94	
Fluoranthene	16,500	9.88	4.94	
Pyrene	12,600	9.88	4.94	
C1 - Fluoranthene/Pyrene	5,900	9.88	4.94	
C2 - Fluoranthene/Pyrene	1,390	9.88	4.94	
C3 - Fluoranthene/Pyrene	389	9.88	4.94	
Benz[a]anthracene	4,530	9.88	4.94	
Chrysene*	3,500	9.88	4.94	
C1 - Benz(a)anthracene/Chrysene	1,460	9.88	4.94	
C2 - Benz(a)anthracene/Chrysene	410	9.88	4.94	
C3 - Benz(a)anthracene/Chrysene	142	9.88	4.94	
C4 - Benz(a)anthracene/Chrysene	71.8	9.88	4.94	
Benzo[b]fluoranthene	1,920	9.88	4.94	
Benzo[j/k]fluoranthene	2,310	9.88	4.94	
Benzo(e)pyrene	1,500	9.88	4.94	
Benzo[a]pyrene	2,530	9.88	4.94	
Perylene	582	9.88	4.94	
Indeno[1,2,3-cd]pyrene	1,180	9.88	4.94	
Dibenz[a,h]anthracene	346	9.88	4.94	
Benzo[g,h,i]perylene	1,120	9.88	4.94	
Coronene	272	9.88	4.94	
Retene	26.7	9.88	4.94	
Benzo(b/c)fluorenes	1,510	9.88	4.94	
2-Methylpyrene	651	9.88	4.94	
4-Methylpyrene	435	9.88	4.94	
1-Methylpyrene	431	9.88	4.94	
Heptadecane	121	9.88	4.94	
Pristane	97.0	9.88	4.94	
Octadecane	109	9.88	4.94	
Phytane	46.4	9.88	4.94	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	34.5	9.88	4.94	
2,6,10-trimethyltridecane	62.7	9.88	4.94	
Norpristane	46.0	9.88	4.94	
Tetraethyl lead	U	9.88	4.94	
Total PAH (16)	120,000	9.88	4.94	
Total PAH (42)	186,000	9.88	4.94	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	80	50 - 120
Phenanthrene-d10	93	50 - 120
Benzo[a]pyrene-d12	72	50 - 120
Perylene-d12	85	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					
Benzene	135	B	9.47	4.73	
Toluene	1,220		9.47	4.73	
Ethylbenzene	2,290		9.47	4.73	
m/p-Xylenes	4,340		9.47	4.73	
Styrene	91.6		9.47	4.73	
o-Xylene	1,760		9.47	4.73	
Isopropylbenzene	281		9.47	4.73	
n-Propylbenzene	158		9.47	4.73	
1,3,5-Trimethylbenzene	1,750		9.47	4.73	
1,2,4-Trimethylbenzene	3,890		9.47	4.73	
t-Butylbenzene		U	9.47	4.73	
sec-Butylbenzene	16.1		9.47	4.73	
p-Isopropyltoluene	253		9.47	4.73	
n-Butylbenzene	188		9.47	4.73	
C1 - Benzene	742		9.47	4.73	
C2 - Benzene	3,960		9.47	4.73	
C3 - Benzene	4,150		9.47	4.73	
C4 - Benzene	1,570		9.47	4.73	
C5 - Benzene	380		9.47	4.73	
trans-Decalin	17.4		9.47	4.73	
cis-Decalin		U	9.47	4.73	
Naphthalene	34,500	D	9.47	4.73	
2-Methylnaphthalene	22,400	B	9.47	4.73	
1-Methylnaphthalene	13,500		9.47	4.73	
C1 - Naphthalene	22,100	B	9.47	4.73	
C2 - Naphthalene	9,960		9.47	4.73	
C3- Naphthalene	3,390		9.47	4.73	
C4- Naphthalene	884		9.47	4.73	
Acenaphthylene	2,120	B	9.47	4.73	
Acenaphthene	13,700		9.47	4.73	
Dibenzofuran	11,900		9.47	4.73	
Fluorene	11,700		9.47	4.73	
C1 - Fluorene	1,920		9.47	4.73	
C2 - Fluorene	774		9.47	4.73	
C3 - Fluorene	312		9.47	4.73	
Phenanthrene	25,300		9.47	4.73	
Anthracene	7,670		9.47	4.73	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	5,650	9.47	4.73	
C2 - Phenanthrene/Anthracene	1,720	9.47	4.73	
C3 - Phenanthrene/Anthracene	463	9.47	4.73	
C4 - Phenanthrene/Anthracene	117	9.47	4.73	
Dibenzothiophene	2,200	9.47	4.73	
C1 - Dibenzothiophene	610	9.47	4.73	
C2 - Dibenzothiophene	249	9.47	4.73	
C3 - Dibenzothiophene	116	9.47	4.73	
C4 - Dibenzothiophene	38.0	9.47	4.73	
Benzo(b)naphtho(2,1-d)thiophene	289	9.47	4.73	
Fluoranthene	12,000	9.47	4.73	
Pyrene	9,130	9.47	4.73	
C1 - Fluoranthene/Pyrene	3,570	9.47	4.73	
C2 - Fluoranthene/Pyrene	865	9.47	4.73	
C3 - Fluoranthene/Pyrene	263	9.47	4.73	
Benz[a]anthracene	3,010	9.47	4.73	
Chrysene*	2,440	9.47	4.73	
C1 - Benz(a)anthracene/Chrysene	868	9.47	4.73	
C2 - Benz(a)anthracene/Chrysene	260	9.47	4.73	
C3 - Benz(a)anthracene/Chrysene	98.8	9.47	4.73	
C4 - Benz(a)anthracene/Chrysene	61.8	9.47	4.73	
Benzo[b]fluoranthene	1,500	9.47	4.73	
Benzo[j/k]fluoranthene	1,640	9.47	4.73	
Benzo(e)pyrene	1,180	9.47	4.73	
Benzo[a]pyrene	2,080	9.47	4.73	
Perylene	464	9.47	4.73	
Indeno[1,2,3-cd]pyrene	1,080	9.47	4.73	
Dibenz[a,h]anthracene	240	9.47	4.73	
Benzo[g,h,i]perylene	1,030	9.47	4.73	
Coronene	285	9.47	4.73	
Retene	32.0	9.47	4.73	
Benzo(b/c)fluorenes	892	9.47	4.73	
2-Methylpyrene	364	9.47	4.73	
4-Methylpyrene	250	9.47	4.73	
1-Methylpyrene	265	9.47	4.73	
Heptadecane	172	9.47	4.73	
Pristane	137	9.47	4.73	
Octadecane	150	9.47	4.73	
Phytane	27.7	9.47	4.73	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	66.0	9.47	4.73	
2,6,10-trimethyltridecane	106	9.47	4.73	
Norpristane	40.1	9.47	4.73	
Tetraethyl lead	U	9.47	4.73	
Total PAH (16)	129,000	9.47	4.73	
Total PAH (42)	199,000	9.47	4.73	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	58	50 - 120
Phenanthrene-d10	71	50 - 120
Benzo[a]pyrene-d12	56	50 - 120
Perylene-d12	66	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.724 J	1.0	0.500	
Toluene	U	1.0	0.500	
Ethylbenzene	U	1.0	0.500	
m/p-Xylenes	U	1.0	0.500	
Styrene	U	1.0	0.500	
o-Xylene	U	1.0	0.500	
Isopropylbenzene	U	1.0	0.500	
n-Propylbenzene	U	1.0	0.500	
1,3,5-Trimethylbenzene	U	1.0	0.500	
1,2,4-Trimethylbenzene	U	1.0	0.500	
t-Butylbenzene	U	1.0	0.500	
sec-Butylbenzene	U	1.0	0.500	
p-Isopropyltoluene	U	1.0	0.500	
n-Butylbenzene	U	1.0	0.500	
C1 - Benzene	U	1.0	0.500	
C2 - Benzene	U	1.0	0.500	
C3 - Benzene	U	1.0	0.500	
C4 - Benzene	U	1.0	0.500	
C5 - Benzene	U	1.0	0.500	
trans-Decalin	U	1.0	0.500	
cis-Decalin	U	1.0	0.500	
Naphthalene	U	1.0	0.500	
2-Methylnaphthalene	0.679 J	1.0	0.500	
1-Methylnaphthalene	U	1.0	0.500	
C1 - Naphthalene	0.569 J	1.0	0.500	
C2 - Naphthalene	U	1.0	0.500	
C3- Naphthalene	U	1.0	0.500	
C4- Naphthalene	U	1.0	0.500	
Acenaphthylene	0.837 J	1.0	0.500	
Acenaphthene	U	1.0	0.500	
Dibenzofuran	U	1.0	0.500	
Fluorene	U	1.0	0.500	
C1 - Fluorene	U	1.0	0.500	
C2 - Fluorene	U	1.0	0.500	
C3 - Fluorene	U	1.0	0.500	
Phenanthrene	U	1.0	0.500	
Anthracene	U	1.0	0.500	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	U	1.0	0.500	
C2 - Phenanthrene/Anthracene	U	1.0	0.500	
C3 - Phenanthrene/Anthracene	U	1.0	0.500	
C4 - Phenanthrene/Anthracene	U	1.0	0.500	
Dibenzothiophene	U	1.0	0.500	
C1 - Dibenzothiophene	U	1.0	0.500	
C2 - Dibenzothiophene	U	1.0	0.500	
C3 - Dibenzothiophene	U	1.0	0.500	
C4 - Dibenzothiophene	U	1.0	0.500	
Benzo(b)naphtho(2,1-d)thiophene	U	1.0	0.500	
Fluoranthene	U	1.0	0.500	
Pyrene	U	1.0	0.500	
C1 - Fluoranthene/Pyrene	U	1.0	0.500	
C2 - Fluoranthene/Pyrene	U	1.0	0.500	
C3 - Fluoranthene/Pyrene	U	1.0	0.500	
Benz[a]anthracene	U	1.0	0.500	
Chrysene*	U	1.0	0.500	
C1 - Benz(a)anthracene/Chrysene	U	1.0	0.500	
C2 - Benz(a)anthracene/Chrysene	U	1.0	0.500	
C3 - Benz(a)anthracene/Chrysene	U	1.0	0.500	
C4 - Benz(a)anthracene/Chrysene	U	1.0	0.500	
Benzo[b]fluoranthene	U	1.0	0.500	
Benzo[j/k]fluoranthene	U	1.0	0.500	
Benzo(e)pyrene	U	1.0	0.500	
Benzo[a]pyrene	U	1.0	0.500	
Perylene	U	1.0	0.500	
Indeno[1,2,3-cd]pyrene	U	1.0	0.500	
Dibenz[a,h]anthracene	U	1.0	0.500	
Benzo[g,h,i]perylene	U	1.0	0.500	
Coronene	U	1.0	0.500	
Retene	U	1.0	0.500	
Benzo(b/c)fluorenes	U	1.0	0.500	
2-Methylpyrene	U	1.0	0.500	
4-Methylpyrene	U	1.0	0.500	
1-Methylpyrene	U	1.0	0.500	
Heptadecane	U	1.0	0.500	
Pristane	U	1.0	0.500	
Octadecane	U	1.0	0.500	
Phytane	U	1.0	0.500	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	1.0	0.500	
2,6,10-trimethyltridecane	U	1.0	0.500	
Norpristane	U	1.0	0.500	
Tetraethyl lead	U	1.0	0.500	
Total PAH (16)	0.837	1.0	0.500	
Total PAH (42)	1.41	1.0	0.500	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	80	50 - 120
Phenanthrene-d10	92	50 - 120
Benzo[a]pyrene-d12	72	50 - 120
Perylene-d12	87	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MBS		
File ID:	E012907.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)			RL	EDL	Comments
MAH & PAH COMPOUNDS:	Spike Amount					% Recovery
Benzene	1000	721	B	1.0	0.500	72
Toluene	1000	769		1.0	0.500	77
Ethylbenzene	1000	724		1.0	0.500	72
m/p-Xylenes	1000	730		1.0	0.500	73
Styrene	1000	816		1.0	0.500	82
o-Xylene	1000	749		1.0	0.500	75
Isopropylbenzene	1000	768		1.0	0.500	77
n-Propylbenzene	1000	764		1.0	0.500	76
1,3,5-Trimethylbenzene	1000	774		1.0	0.500	77
1,2,4-Trimethylbenzene	1000	773		1.0	0.500	77
t-Butylbenzene			U	1.0	0.500	
sec-Butylbenzene	1000	769		1.0	0.500	77
p-Isopropyltoluene	1000	793		1.0	0.500	79
n-Butylbenzene	1000	782		1.0	0.500	78
C1 - Benzene			U	1.0	0.500	
C2 - Benzene			U	1.0	0.500	
C3 - Benzene			U	1.0	0.500	
C4 - Benzene			U	1.0	0.500	
C5 - Benzene			U	1.0	0.500	
trans-Decalin			U	1.0	0.500	
cis-Decalin			U	1.0	0.500	
Naphthalene	1000	790		1.0	0.500	79
2-Methylnaphthalene	1000	839	B	1.0	0.500	84
1-Methylnaphthalene	1000	833		1.0	0.500	83
C1 - Naphthalene			BU	1.0	0.500	
C2 - Naphthalene			U	1.0	0.500	
C3- Naphthalene			U	1.0	0.500	
C4- Naphthalene			U	1.0	0.500	
Acenaphthylene	1000	970	B	1.0	0.500	97
Acenaphthene	1000	847		1.0	0.500	85
Dibenzofuran	1000	833		1.0	0.500	83
Fluorene	1000	884		1.0	0.500	88
C1 - Fluorene			U	1.0	0.500	
C2 - Fluorene			U	1.0	0.500	
C3 - Fluorene			U	1.0	0.500	
Phenanthrene	1000	841		1.0	0.500	84
Anthracene	1000	880		1.0	0.500	88

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MBS		
File ID:	E012907.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)			RL	EDL	Comments
C1 - Phenanthrene/Anthracene			U	1.0	0.500	
C2 - Phenanthrene/Anthracene			U	1.0	0.500	
C3 - Phenanthrene/Anthracene			U	1.0	0.500	
C4 - Phenanthrene/Anthracene			U	1.0	0.500	
Dibenzothiophene	1000	844		1.0	0.500	84
C1 - Dibenzothiophene			U	1.0	0.500	
C2 - Dibenzothiophene			U	1.0	0.500	
C3 - Dibenzothiophene			U	1.0	0.500	
C4 - Dibenzothiophene			U	1.0	0.500	
Benzo(b)naphtho(2,1-d)thiophene			U	1.0	0.500	
Fluoranthene	1000	920		1.0	0.500	92
Pyrene	1000	921		1.0	0.500	92
C1 - Fluoranthene/Pyrene			U	1.0	0.500	
C2 - Fluoranthene/Pyrene			U	1.0	0.500	
C3 - Fluoranthene/Pyrene			U	1.0	0.500	
Benz[a]anthracene	1000	918		1.0	0.500	92
Chrysene*	1000	845		1.0	0.500	85
C1 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C2 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C3 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C4 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
Benzo[b]fluoranthene	1000	835		1.0	0.500	84
Benzo[j/k]fluoranthene	1000	892		1.0	0.500	89
Benzo(e)pyrene	1000	831		1.0	0.500	83
Benzo[a]pyrene	1000	847		1.0	0.500	85
Perylene			U	1.0	0.500	
Indeno[1,2,3-cd]pyrene	1000	752		1.0	0.500	75
Dibenz[a,h]anthracene	1000	804		1.0	0.500	80
Benzo[g,h,i]perylene	1000	818		1.0	0.500	82
Coronene			U	1.0	0.500	
Retene			U	1.0	0.500	
Benzo(b/c)fluorenes			U	1.0	0.500	
2-Methylpyrene			U	1.0	0.500	
4-Methylpyrene			U	1.0	0.500	
1-Methylpyrene			U	1.0	0.500	
Heptadecane			U	1.0	0.500	
Pristane			U	1.0	0.500	
Octadecane			U	1.0	0.500	
Phytane			U	1.0	0.500	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MBS		
File ID:	E012907.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.025
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	1.0	0.500	
2,6,10-trimethyltridecane	U	1.0	0.500	
Norpristane	U	1.0	0.500	
Tetraethyl lead	U	1.0	0.500	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	71	50 - 120
Phenanthrene-d10	87	50 - 120
Benzo[a]pyrene-d12	71	50 - 120
Perylene-d12	80	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					RPD
Benzene	92.0	B	9.26	4.63	13.2
Toluene	227		9.26	4.63	16.2
Ethylbenzene	621		9.26	4.63	13.9
m/p-Xylenes	714		9.26	4.63	13.8
Styrene	47.1		9.26	4.63	14
o-Xylene	360		9.26	4.63	14
Isopropylbenzene	108		9.26	4.63	13.8
n-Propylbenzene	42.1		9.26	4.63	13.7
1,3,5-Trimethylbenzene	341		9.26	4.63	7.3
1,2,4-Trimethylbenzene	854		9.26	4.63	9.8
t-Butylbenzene		U	9.26	4.63	NA
sec-Butylbenzene	8.58	J	9.26	4.63	7.7
p-Isopropyltoluene	91.6		9.26	4.63	10.7
n-Butylbenzene	58.4		9.26	4.63	7.7
C1 - Benzene	138		9.26	4.63	17.2
C2 - Benzene	762		9.26	4.63	14.7
C3 - Benzene	1,030		9.26	4.63	11
C4 - Benzene	565		9.26	4.63	7.5
C5 - Benzene	176		9.26	4.63	6.1
trans-Decalin	5.46	J	9.26	4.63	NA
cis-Decalin		U	9.26	4.63	NA
Naphthalene	21,400	D	9.26	4.63	28.9
2-Methylnaphthalene	15,300	B	9.26	4.63	7.5
1-Methylnaphthalene	8,690		9.26	4.63	6.9
C1 - Naphthalene	14,800	B	9.26	4.63	7.2
C2 - Naphthalene	6,820		9.26	4.63	5.3
C3- Naphthalene	2,340		9.26	4.63	5
C4- Naphthalene	661		9.26	4.63	5.4
Acenaphthylene	1,180	B	9.26	4.63	4.1
Acenaphthene	9,640		9.26	4.63	6.6
Dibenzofuran	7,970		9.26	4.63	6.8
Fluorene	10,300		9.26	4.63	7.5
C1 - Fluorene	1,900		9.26	4.63	7.1
C2 - Fluorene	824		9.26	4.63	5.4
C3 - Fluorene	373		9.26	4.63	1.3
Phenanthrene	26,500		9.26	4.63	9
Anthracene	5,700		9.26	4.63	6.1

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	7,430	9.26	4.63	5.5
C2 - Phenanthrene/Anthracene	2,490	9.26	4.63	5.5
C3 - Phenanthrene/Anthracene	680	9.26	4.63	4.6
C4 - Phenanthrene/Anthracene	157	9.26	4.63	11.4
Dibenzothiophene	2,300	9.26	4.63	6.3
C1 - Dibenzothiophene	949	9.26	4.63	4.6
C2 - Dibenzothiophene	515	9.26	4.63	4.2
C3 - Dibenzothiophene	226	9.26	4.63	9.3
C4 - Dibenzothiophene	73.8	9.26	4.63	1.5
Benzo(b)naphtho(2,1-d)thiophene	546	9.26	4.63	3.4
Fluoranthene	15,200	9.26	4.63	8.2
Pyrene	11,700	9.26	4.63	7.4
C1 - Fluoranthene/Pyrene	5,660	9.26	4.63	4.2
C2 - Fluoranthene/Pyrene	1,380	9.26	4.63	0.7
C3 - Fluoranthene/Pyrene	365	9.26	4.63	6.4
Benz[a]anthracene	4,350	9.26	4.63	4.1
Chrysene*	3,340	9.26	4.63	4.7
C1 - Benz(a)anthracene/Chrysene	1,380	9.26	4.63	5.6
C2 - Benz(a)anthracene/Chrysene	405	9.26	4.63	1.2
C3 - Benz(a)anthracene/Chrysene	134	9.26	4.63	5.8
C4 - Benz(a)anthracene/Chrysene	71.9	9.26	4.63	0.1
Benzo[b]fluoranthene	1,850	9.26	4.63	3.7
Benzo[j/k]fluoranthene	2,180	9.26	4.63	5.8
Benzo(e)pyrene	1,430	9.26	4.63	4.8
Benzo[a]pyrene	2,420	9.26	4.63	4.4
Perylene	570	9.26	4.63	2.1
Indeno[1,2,3-cd]pyrene	1,120	9.26	4.63	5.2
Dibenz[a,h]anthracene	268	9.26	4.63	25.4
Benzo[g,h,i]perylene	1,070	9.26	4.63	4.6
Coronene	263	9.26	4.63	3.4
Retene	19.9	9.26	4.63	29.2
Benzo(b/c)fluorenes	1,460	9.26	4.63	3.4
2-Methylpyrene	609	9.26	4.63	6.7
4-Methylpyrene	412	9.26	4.63	5.4
1-Methylpyrene	414	9.26	4.63	4
Heptadecane	112	9.26	4.63	7.7
Pristane	92.6	9.26	4.63	4.6
Octadecane	94.2	9.26	4.63	14.6
Phytane	39.5	9.26	4.63	16.1

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	32.1	9.26	4.63	7.2
2,6,10-trimethyltridecane	60.8	9.26	4.63	3.1
Norpristane	33.2	9.26	4.63	32.3
Tetraethyl lead	U	9.26	4.63	NA
Total PAH (16)	118,000	9.26	4.63	1.7
Total PAH (42)	180,000	9.26	4.63	3.3

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	66	50 - 120
Phenanthrene-d10	81	50 - 120
Benzo[a]pyrene-d12	63	50 - 120
Perylene-d12	75	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					RSD
Benzene	151	B	9.62	4.81	11.2
Toluene	1,300		9.62	4.81	6.3
Ethylbenzene	2,440		9.62	4.81	6.3
m/p-Xylenes	4,610		9.62	4.81	6
Styrene	93.7		9.62	4.81	2.3
o-Xylene	1,880		9.62	4.81	6.6
Isopropylbenzene	296		9.62	4.81	5.2
n-Propylbenzene	168		9.62	4.81	6.1
1,3,5-Trimethylbenzene	1,860		9.62	4.81	6.1
1,2,4-Trimethylbenzene	4,130		9.62	4.81	6
t-Butylbenzene		U	9.62	4.81	NA
sec-Butylbenzene	16.9		9.62	4.81	4.8
p-Isopropyltoluene	266		9.62	4.81	5
n-Butylbenzene	199		9.62	4.81	5.7
C1 - Benzene	798		9.62	4.81	7.3
C2 - Benzene	4,220		9.62	4.81	6.4
C3 - Benzene	4,420		9.62	4.81	6.3
C4 - Benzene	1,670		9.62	4.81	6.2
C5 - Benzene	410		9.62	4.81	7.6
trans-Decalin	18.7		9.62	4.81	7.2
cis-Decalin		U	9.62	4.81	NA
Naphthalene	37,300	D	9.62	4.81	7.8
2-Methylnaphthalene	24,500	B	9.62	4.81	9
1-Methylnaphthalene	14,700		9.62	4.81	8.5
C1 - Naphthalene	24,100	B	9.62	4.81	8.7
C2 - Naphthalene	10,900		9.62	4.81	9
C3- Naphthalene	3,730		9.62	4.81	9.6
C4- Naphthalene	979		9.62	4.81	10.2
Acenaphthylene	2,310	B	9.62	4.81	8.6
Acenaphthene	15,100		9.62	4.81	9.7
Dibenzofuran	13,000		9.62	4.81	8.8
Fluorene	12,800		9.62	4.81	9
C1 - Fluorene	2,150		9.62	4.81	11.3
C2 - Fluorene	870		9.62	4.81	11.7
C3 - Fluorene	348		9.62	4.81	10.9
Phenanthrene	27,800		9.62	4.81	9.4
Anthracene	8,390		9.62	4.81	9

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	6,270	9.62	4.81	10.4
C2 - Phenanthrene/Anthracene	1,910	9.62	4.81	10.5
C3 - Phenanthrene/Anthracene	507	9.62	4.81	9.1
C4 - Phenanthrene/Anthracene	118	9.62	4.81	0.9
Dibenzothiophene	2,430	9.62	4.81	9.9
C1 - Dibenzothiophene	672	9.62	4.81	9.7
C2 - Dibenzothiophene	273	9.62	4.81	9.2
C3 - Dibenzothiophene	119	9.62	4.81	2.6
C4 - Dibenzothiophene	39.4	9.62	4.81	3.6
Benzo(b)naphtho(2,1-d)thiophene	320	9.62	4.81	10.2
Fluoranthene	13,200	9.62	4.81	9.5
Pyrene	10,100	9.62	4.81	10.1
C1 - Fluoranthene/Pyrene	3,990	9.62	4.81	11.1
C2 - Fluoranthene/Pyrene	947	9.62	4.81	9.1
C3 - Fluoranthene/Pyrene	279	9.62	4.81	5.9
Benz[a]anthracene	3,350	9.62	4.81	10.7
Chrysene*	2,680	9.62	4.81	9.4
C1 - Benz(a)anthracene/Chrysene	970	9.62	4.81	11.1
C2 - Benz(a)anthracene/Chrysene	299	9.62	4.81	14
C3 - Benz(a)anthracene/Chrysene	105	9.62	4.81	6.1
C4 - Benz(a)anthracene/Chrysene	55.6	9.62	4.81	10.6
Benzo[b]fluoranthene	1,750	9.62	4.81	15.4
Benzo[j/k]fluoranthene	1,840	9.62	4.81	11.5
Benzo(e)pyrene	1,300	9.62	4.81	9.7
Benzo[a]pyrene	2,320	9.62	4.81	10.9
Perylene	516	9.62	4.81	10.6
Indeno[1,2,3-cd]pyrene	1,210	9.62	4.81	11.4
Dibenz[a,h]anthracene	270	9.62	4.81	11.8
Benzo[g,h,i]perylene	1,140	9.62	4.81	10.1
Coronene	312	9.62	4.81	9
Retene	23.8	9.62	4.81	29.4
Benzo(b/c)fluorenes	993	9.62	4.81	10.7
2-Methylpyrene	395	9.62	4.81	8.2
4-Methylpyrene	279	9.62	4.81	11
1-Methylpyrene	298	9.62	4.81	11.7
Heptadecane	190	9.62	4.81	9.9
Pristane	146	9.62	4.81	6.4
Octadecane	167	9.62	4.81	10.7
Phytane	32.4	9.62	4.81	15.6

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Dup of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta Site	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	10
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	71.0	9.62	4.81	7.3
2,6,10-trimethyltridecane	119	9.62	4.81	11.6
Norpristane	48.8	9.62	4.81	19.6
Tetraethyl lead	U	9.62	4.81	NA
Total PAH (16)	142,000	9.62	4.81	9.6
Total PAH (42)	218,000	9.62	4.81	9.1

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	63	50 - 120
Phenanthrene-d10	75	50 - 120
Benzo[a]pyrene-d12	58	50 - 120
Perylene-d12	70	50 - 120

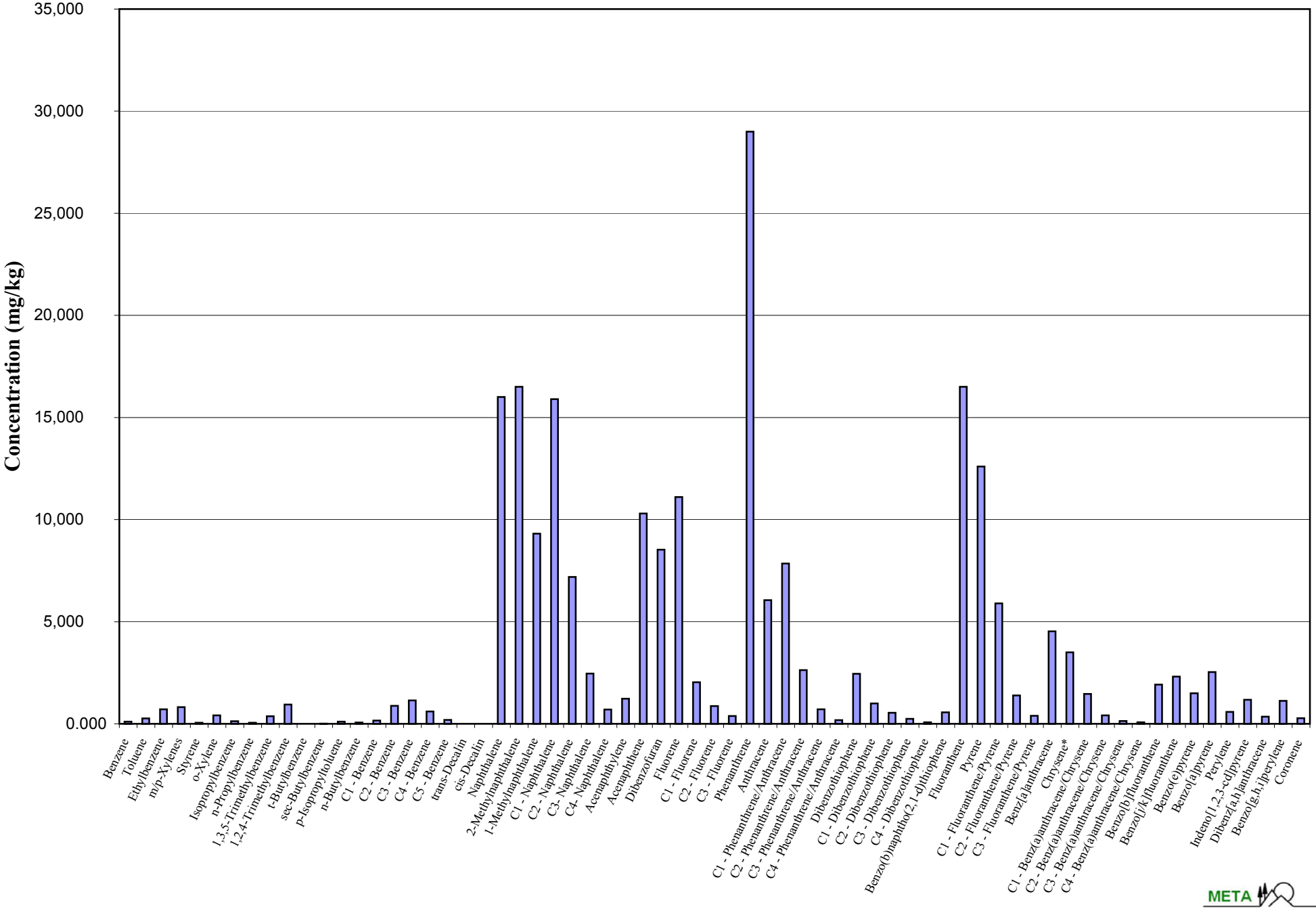
NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Appendix D

Extended MAH/PAH Profiles – Histograms

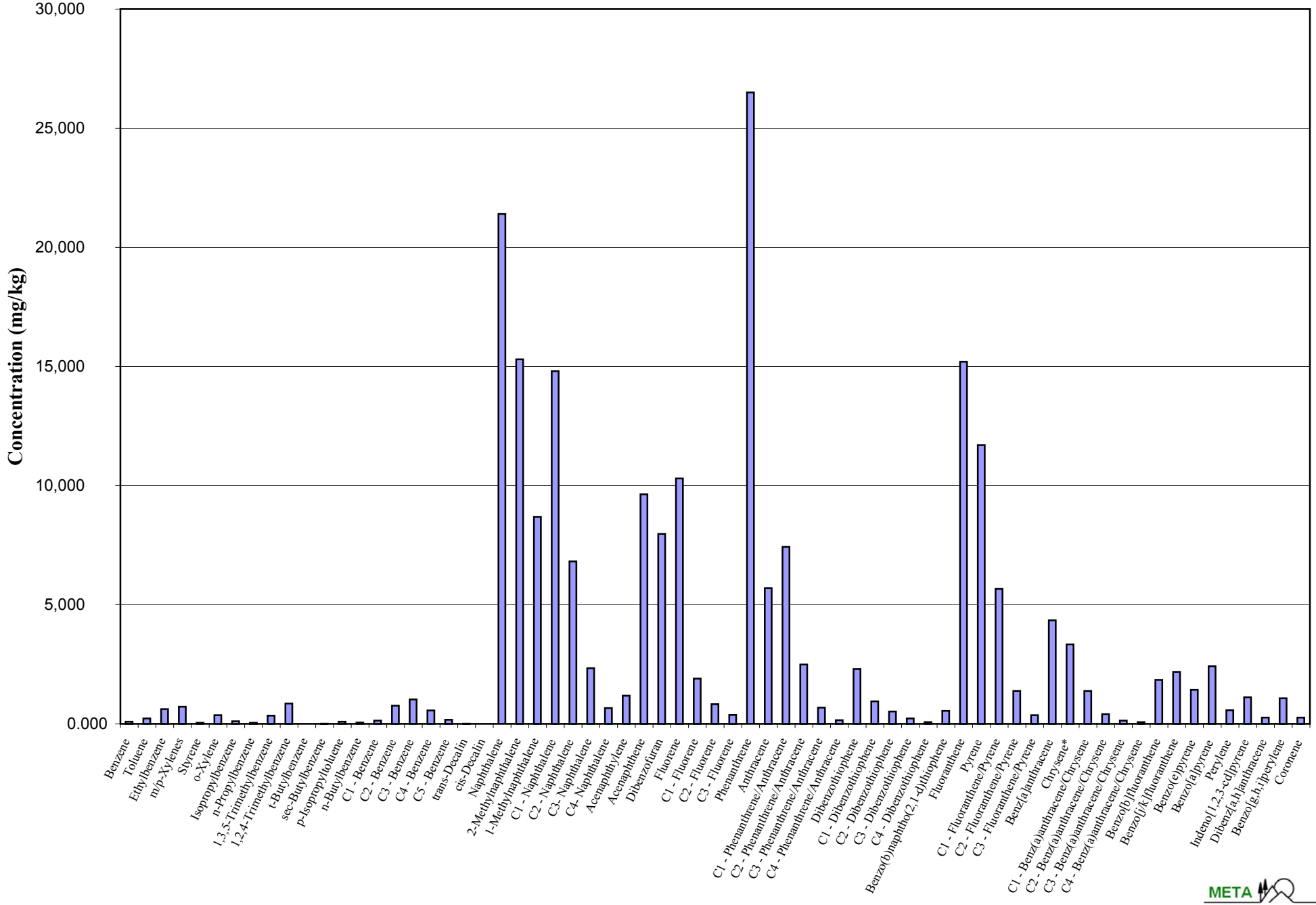
MW-123

CH090121-01-D



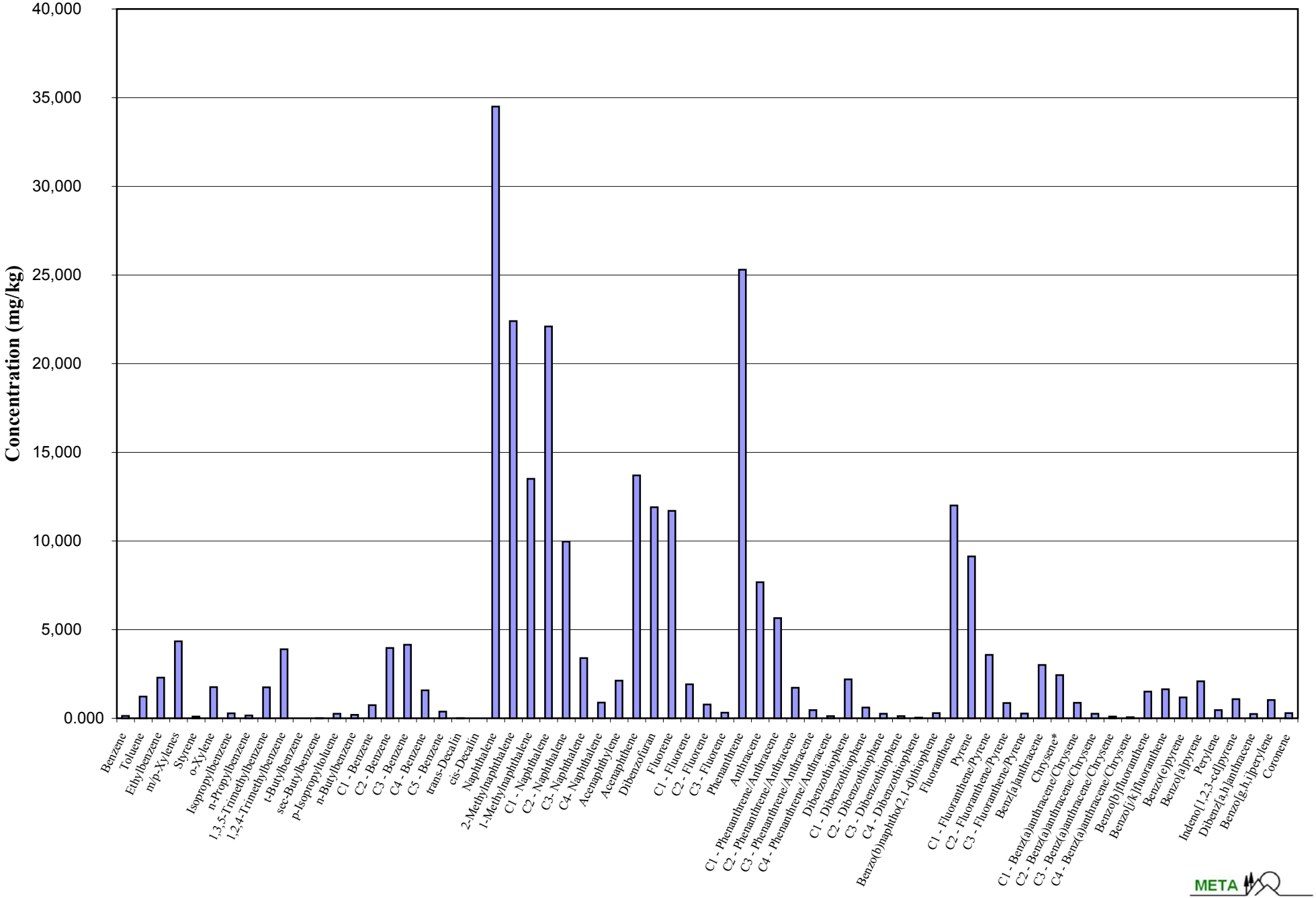
Dup of MW-123

CH090121-01DUP-D



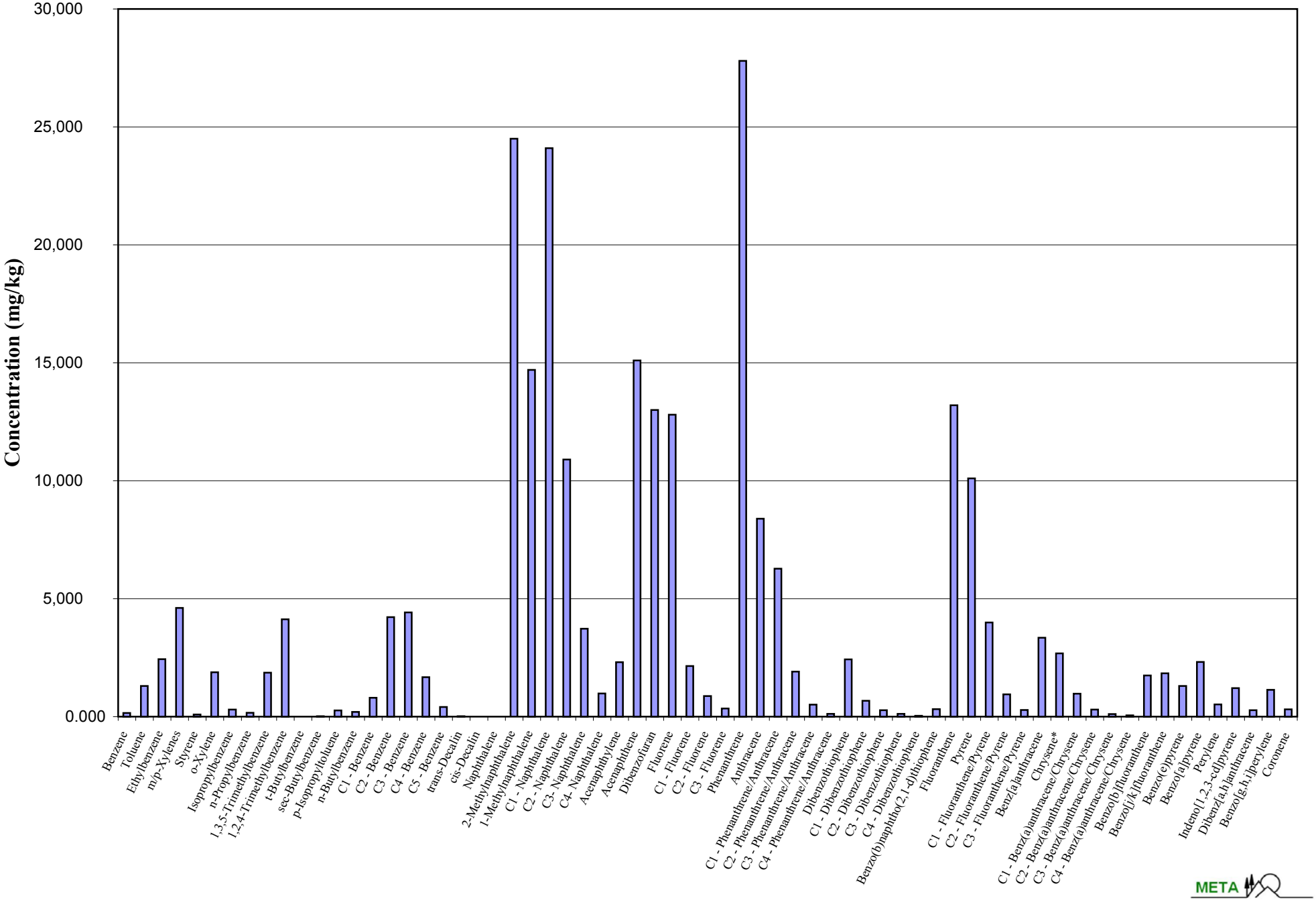
MW-135

CH090121-02-D



Dup of MW-135

CH090121-02DUP-D



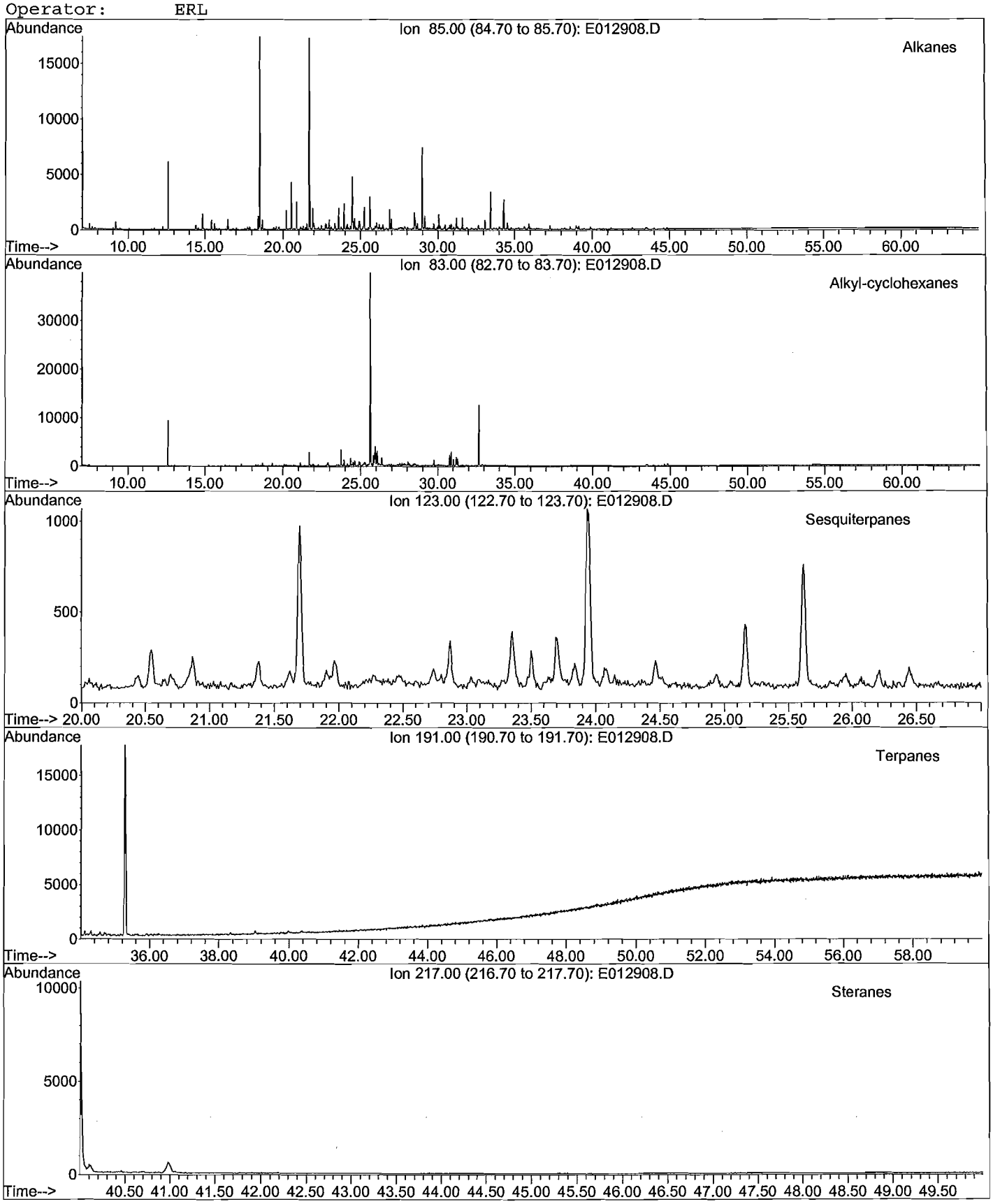
Appendix E

Extracted Ion Current Profiles (EICPs)

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

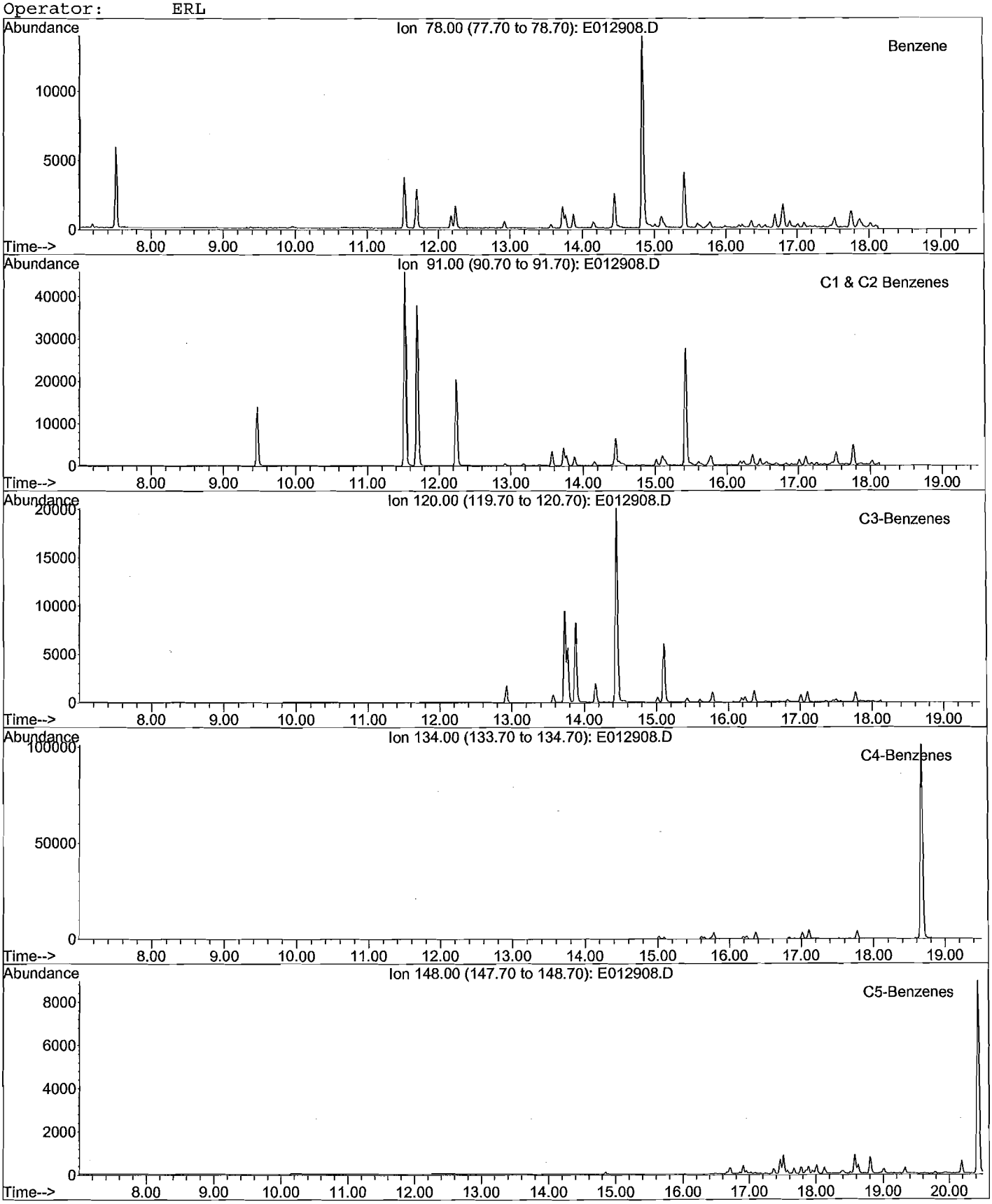
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

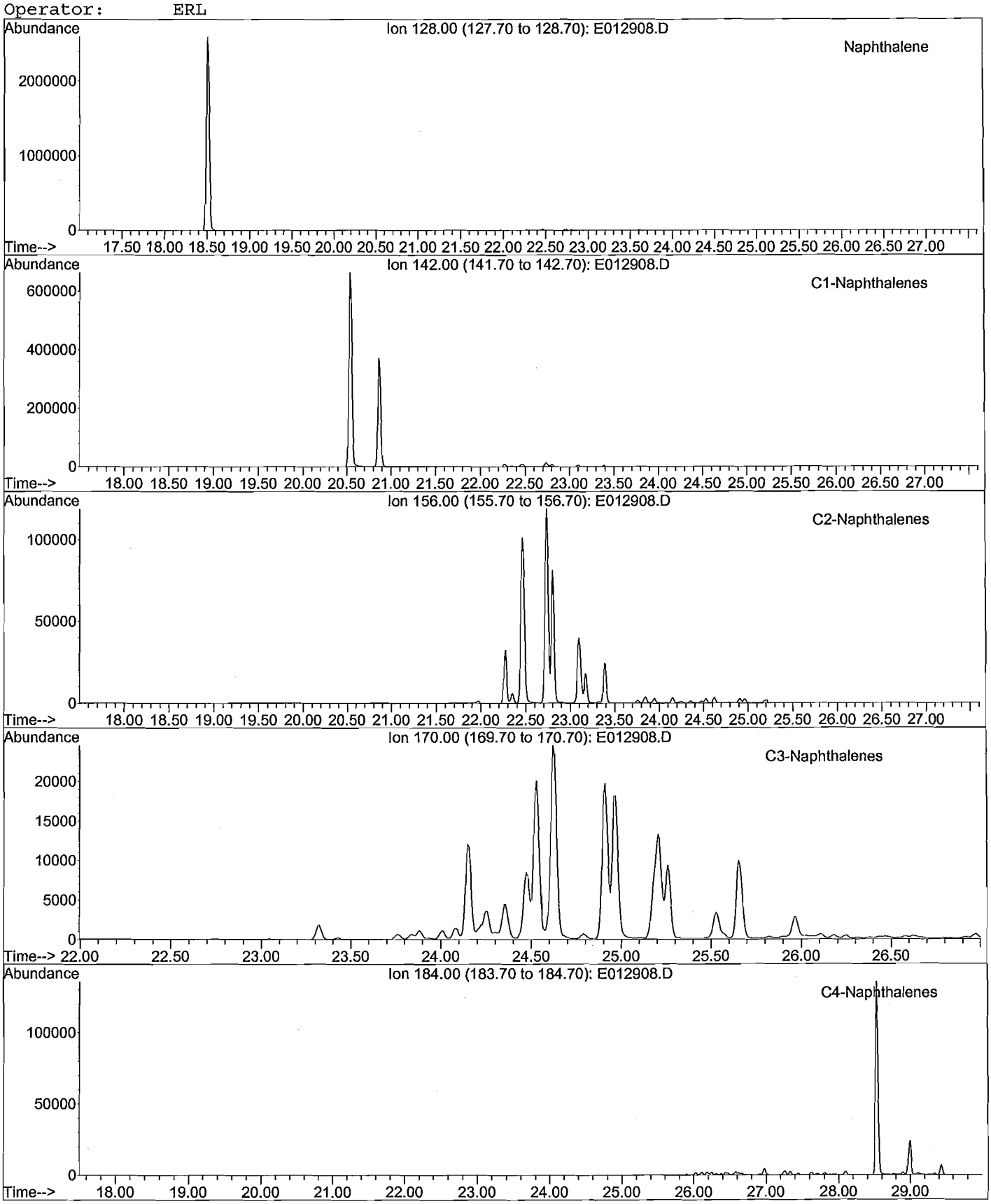
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

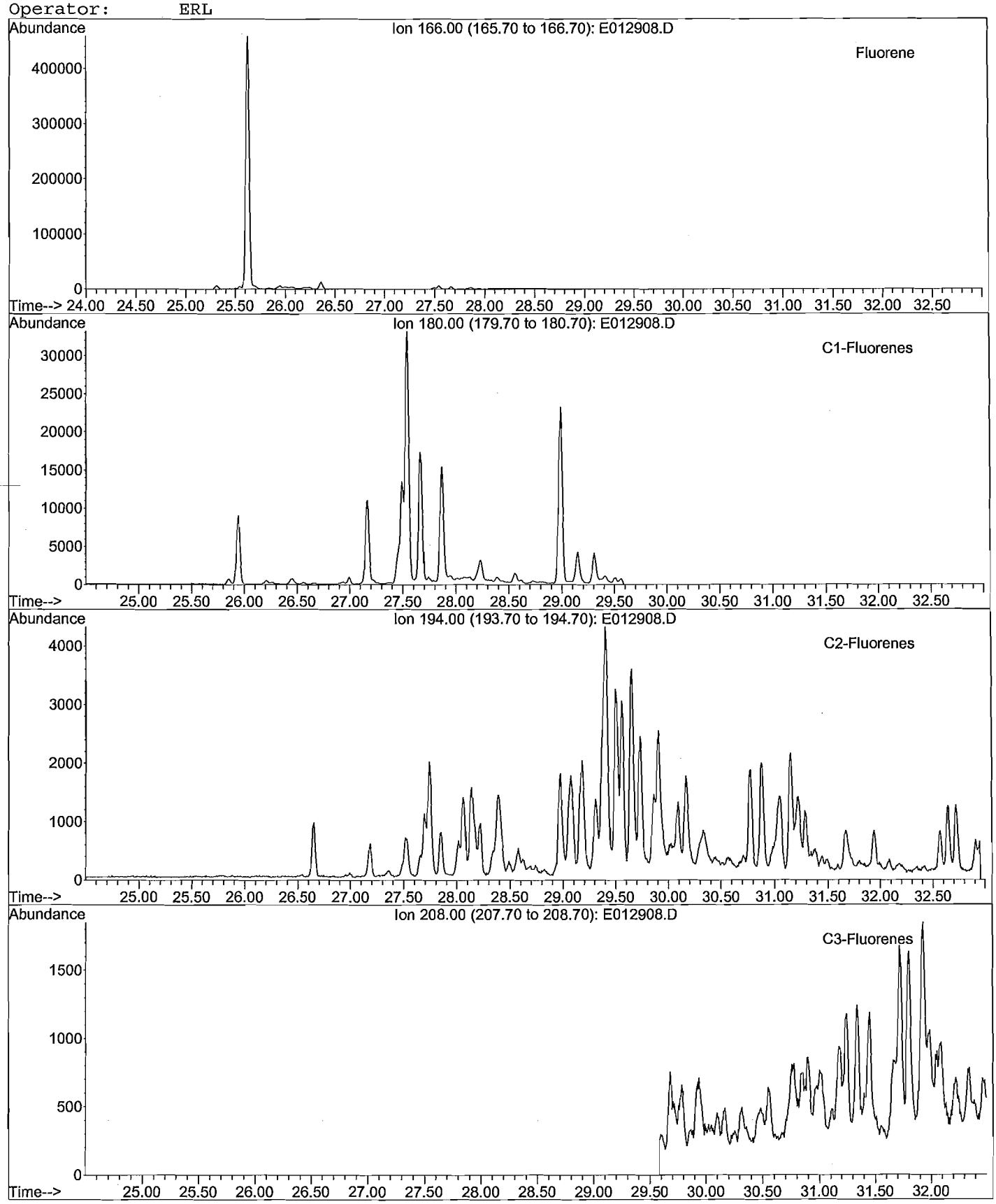
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

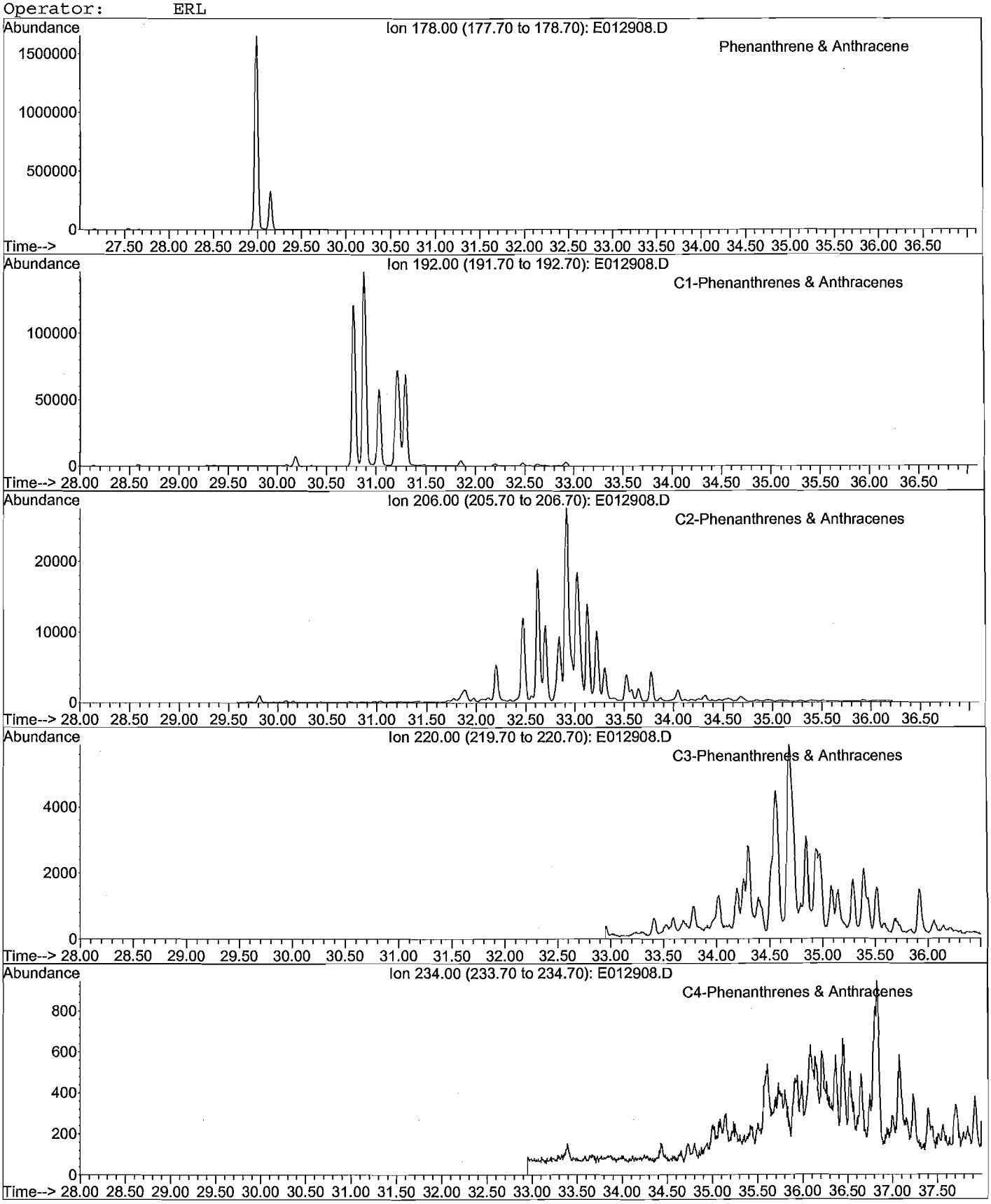
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

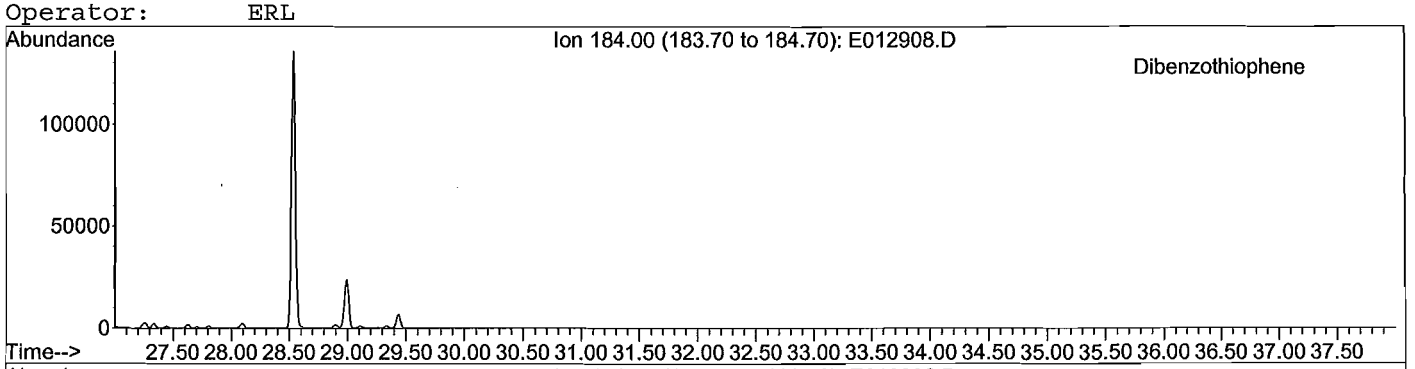
GC/MS EXTRACTED ION CHROMATOGRAM

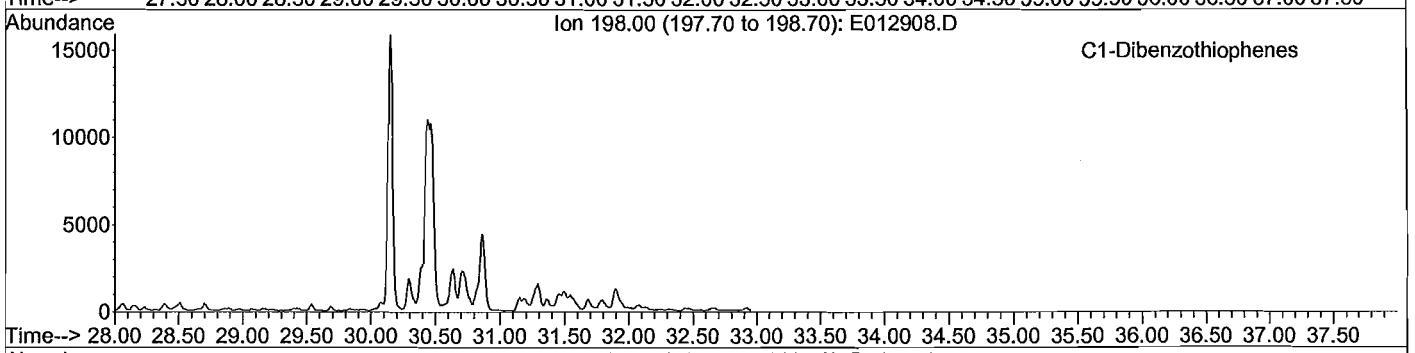
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL

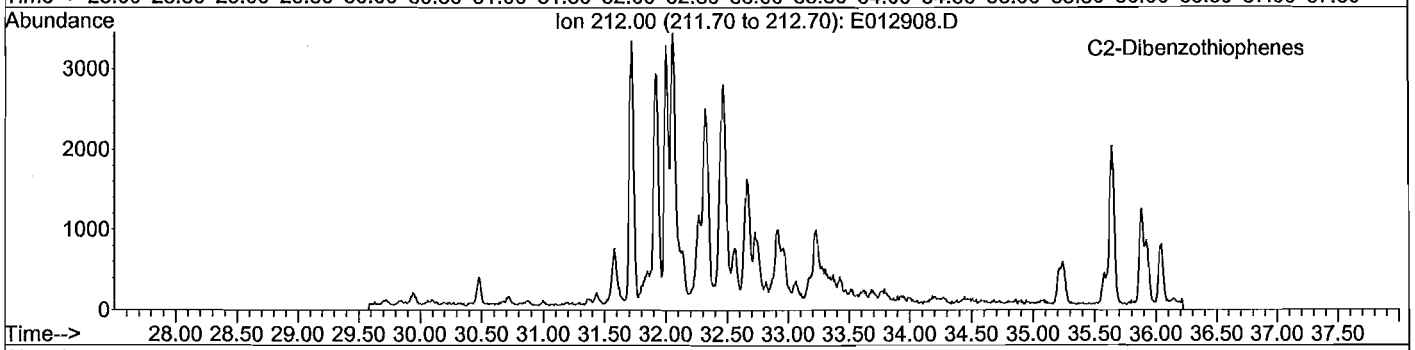


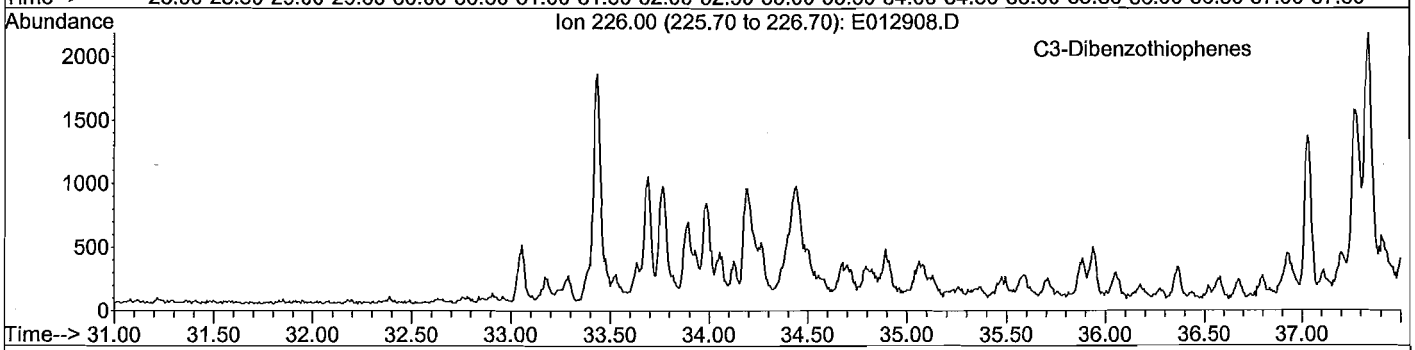
GC/MS EXTRACTED ION CHROMATOGRAM

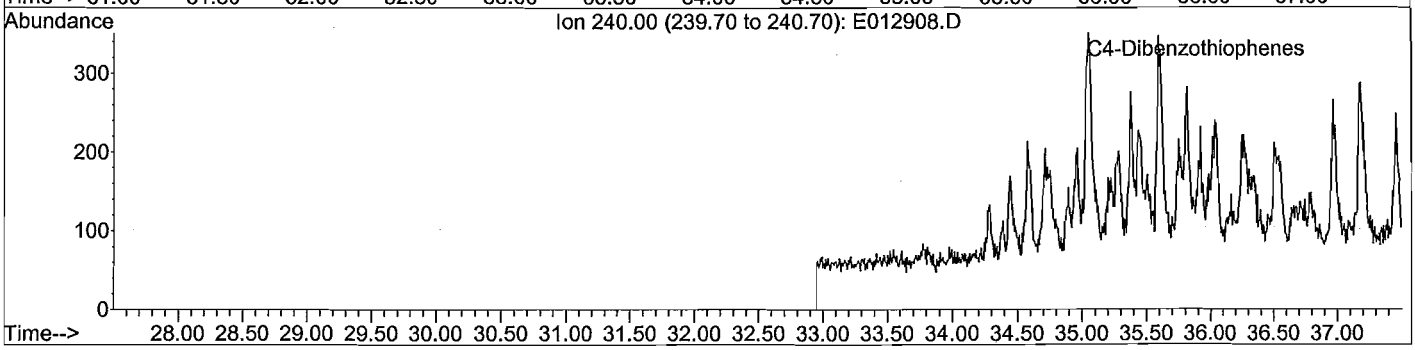
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL







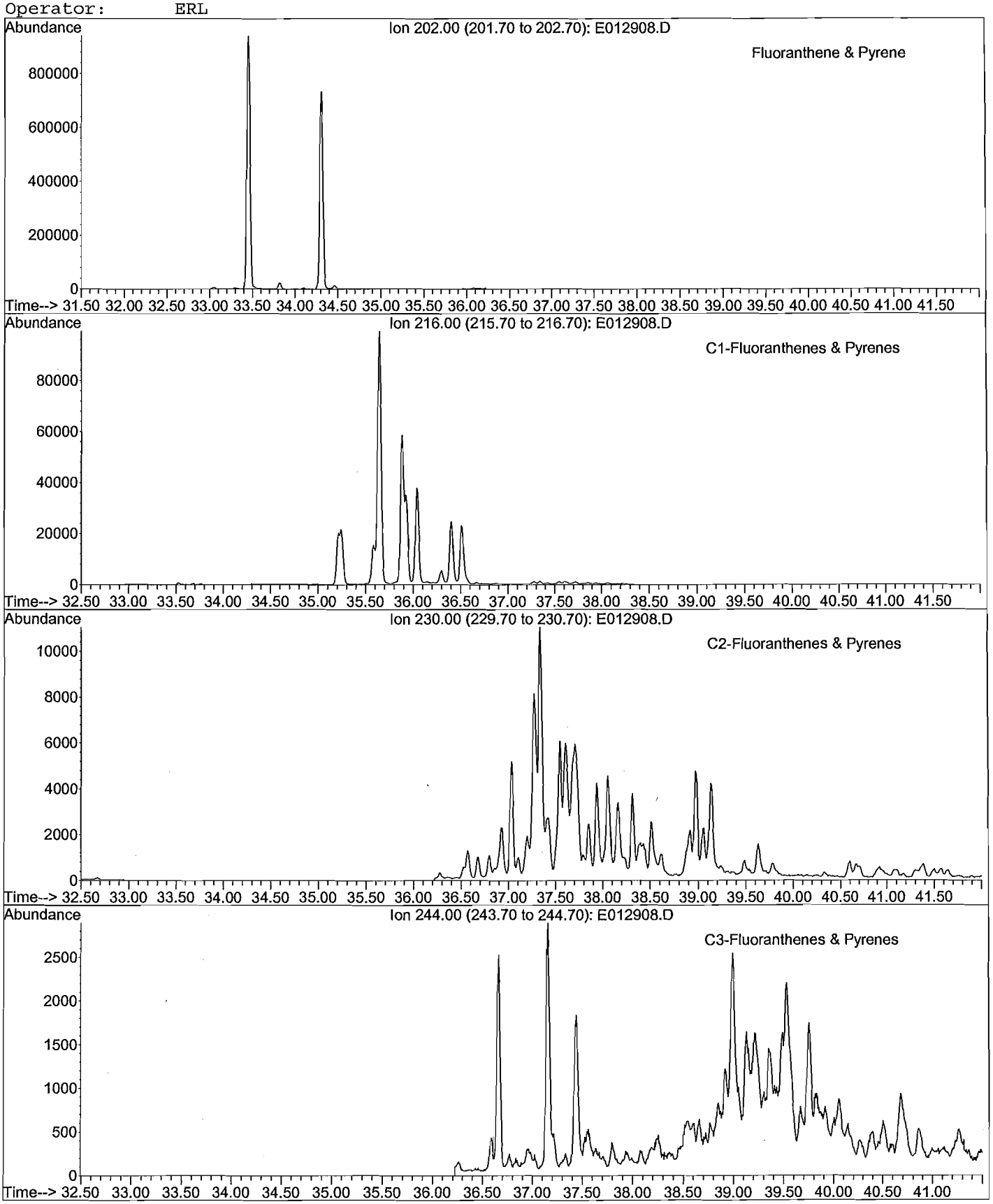




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012908.D
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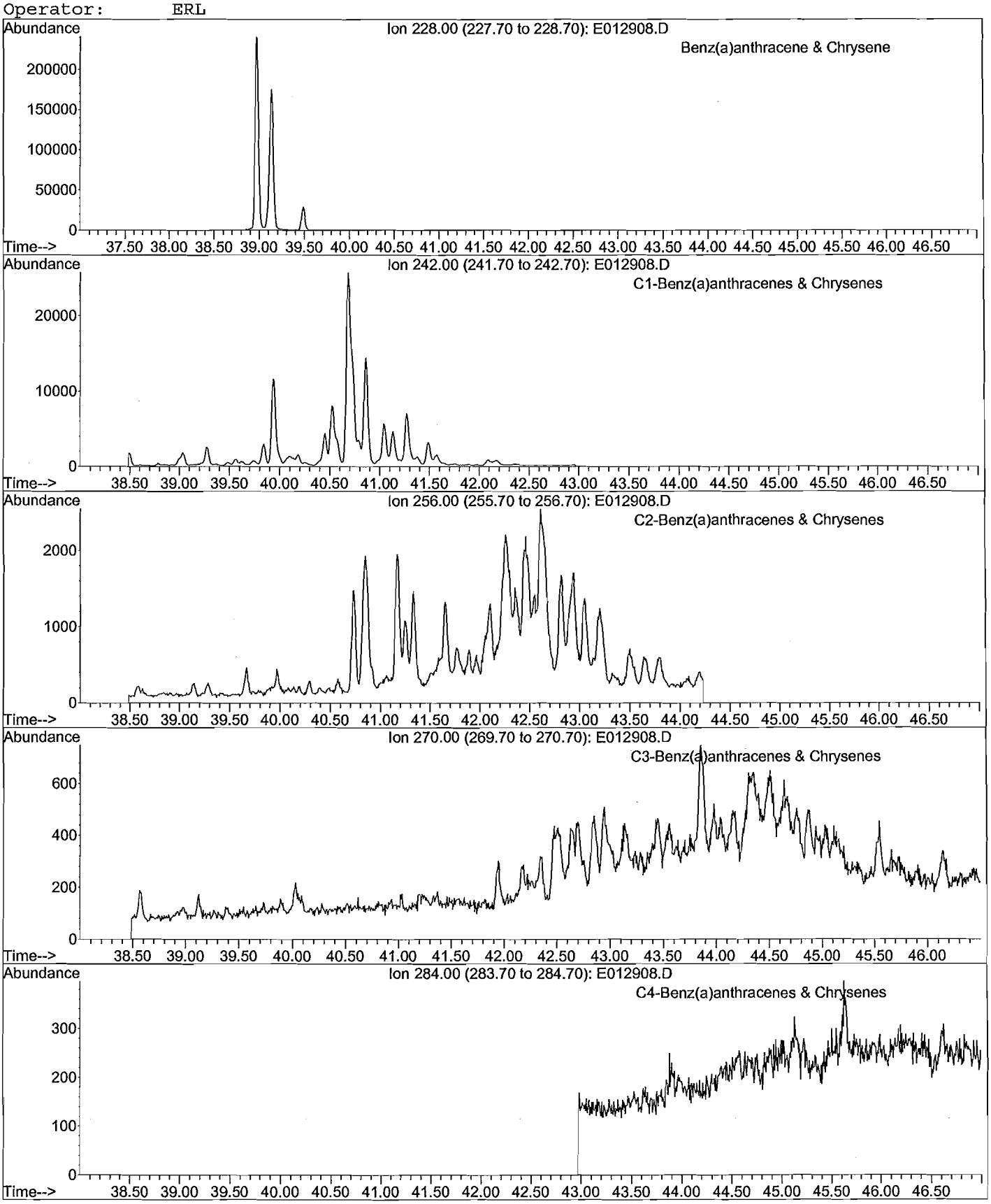
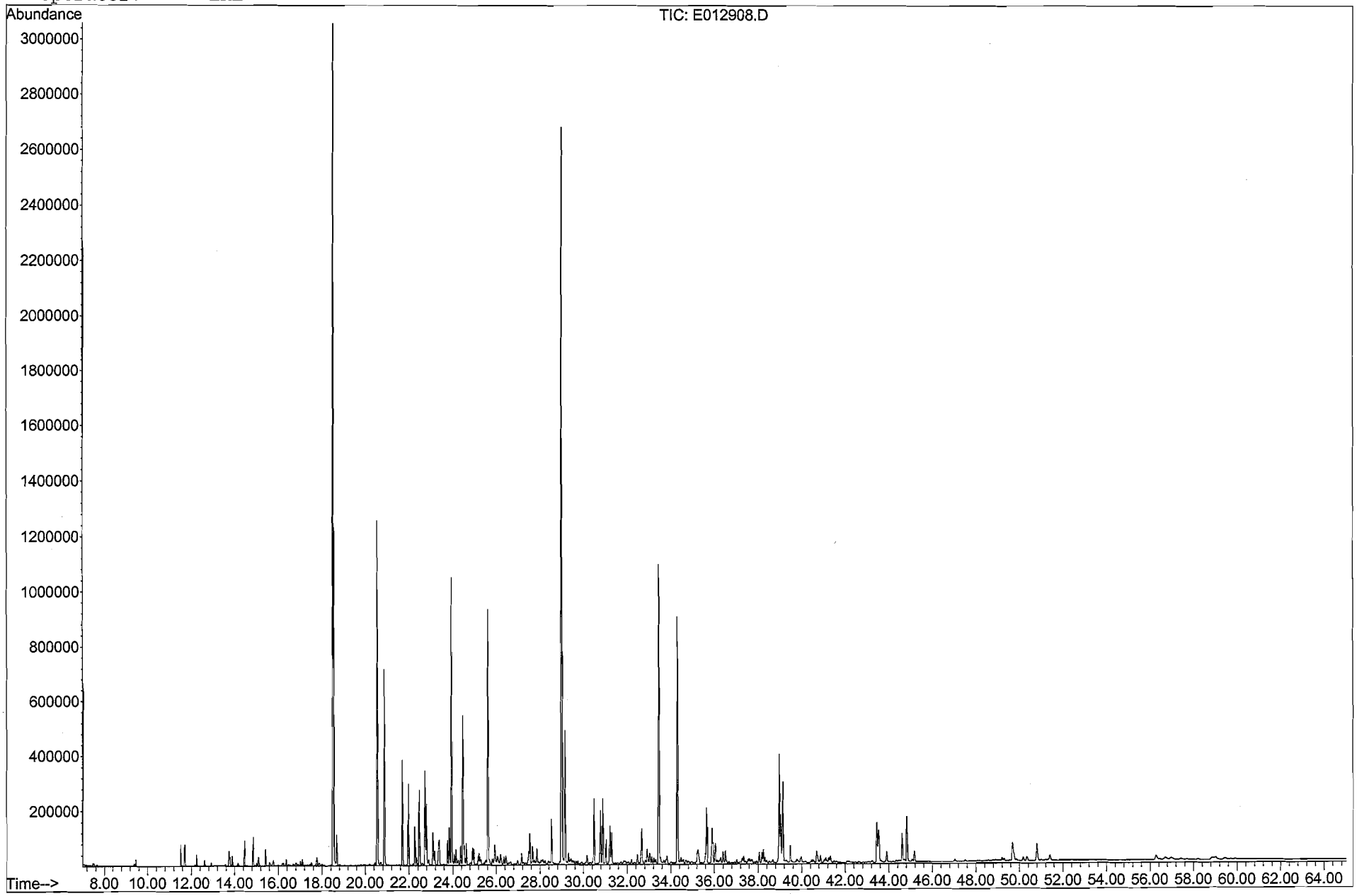
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

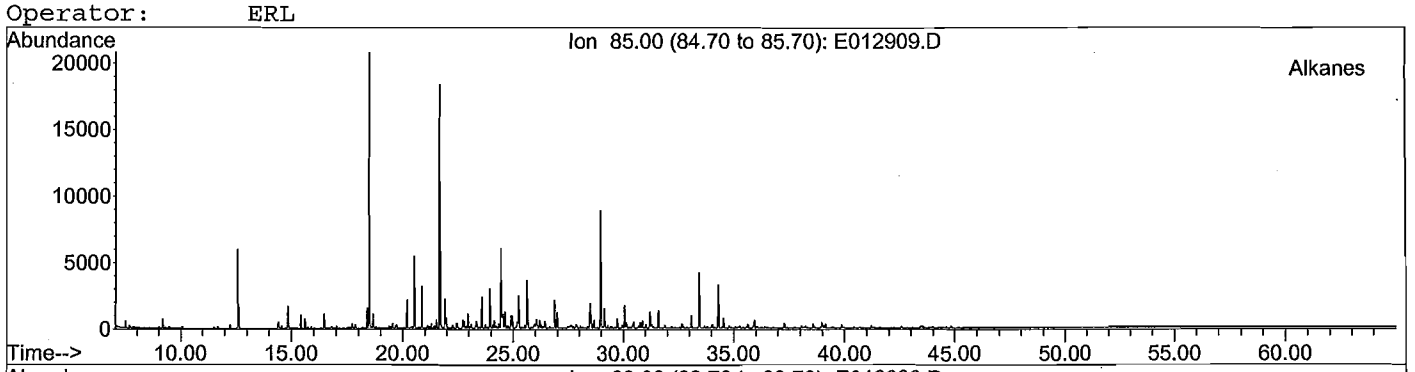
File: J:\1\DATA\E090129\E012908.D
Date Acquired: 29 Jan 2009 11:07 pm
Method File: 4008SIMD.M
Sample Name: CH090121-01-D
Misc Info: MW123 10X
Operator: ERL

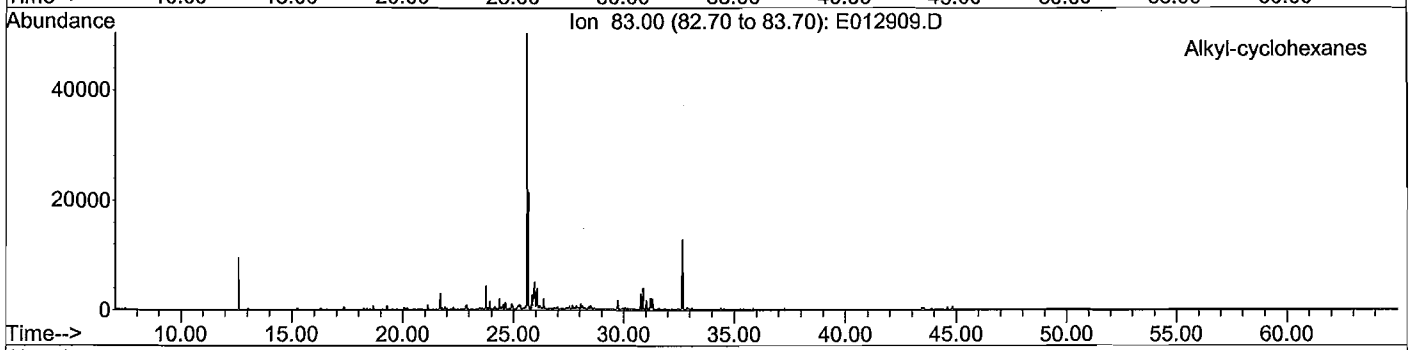


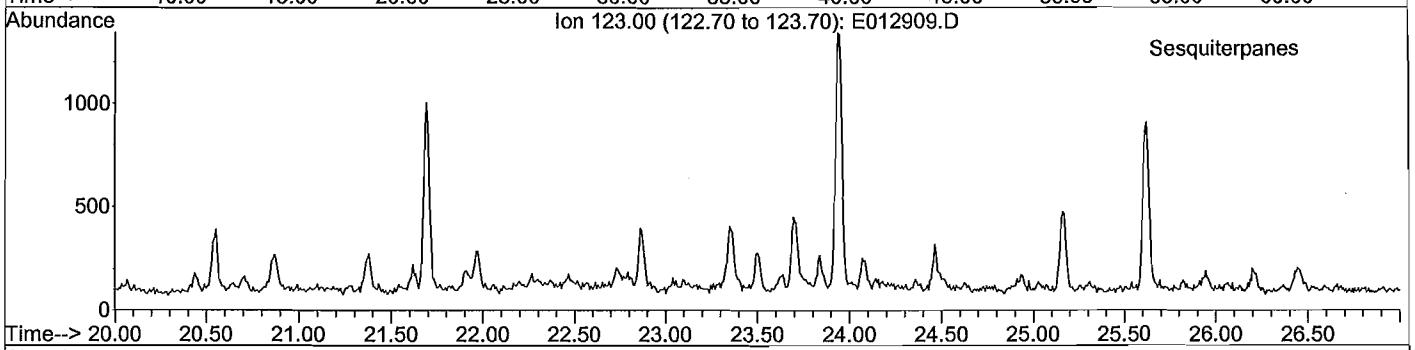
META Environmental, Inc.

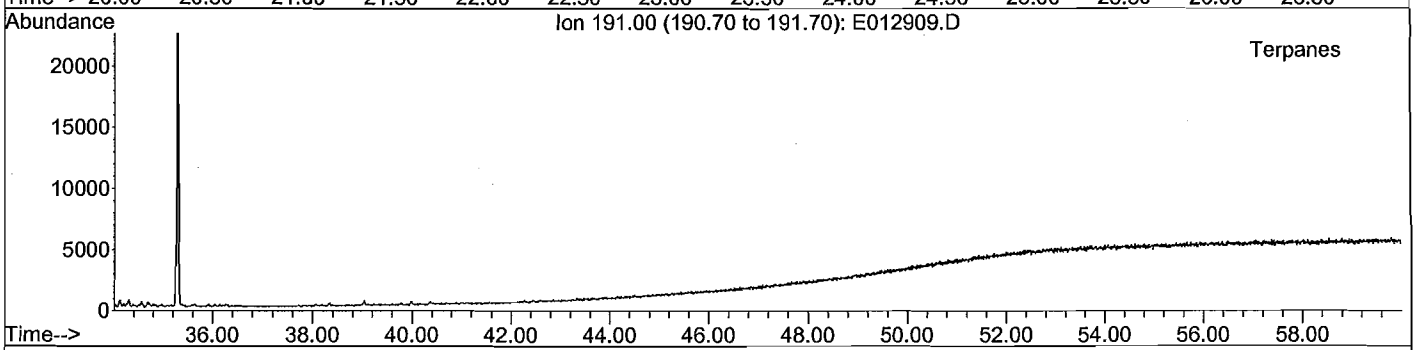
GC/MS EXTRACTED ION CHROMATOGRAM

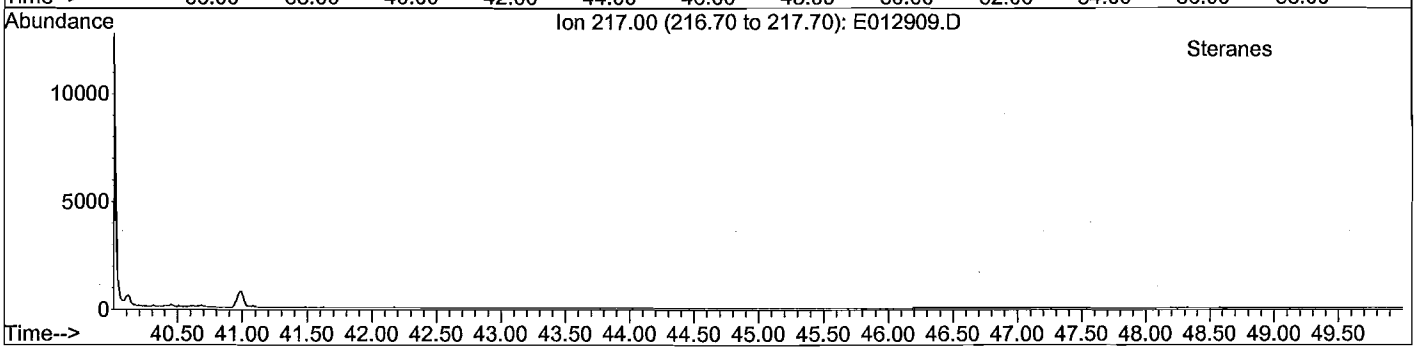
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL







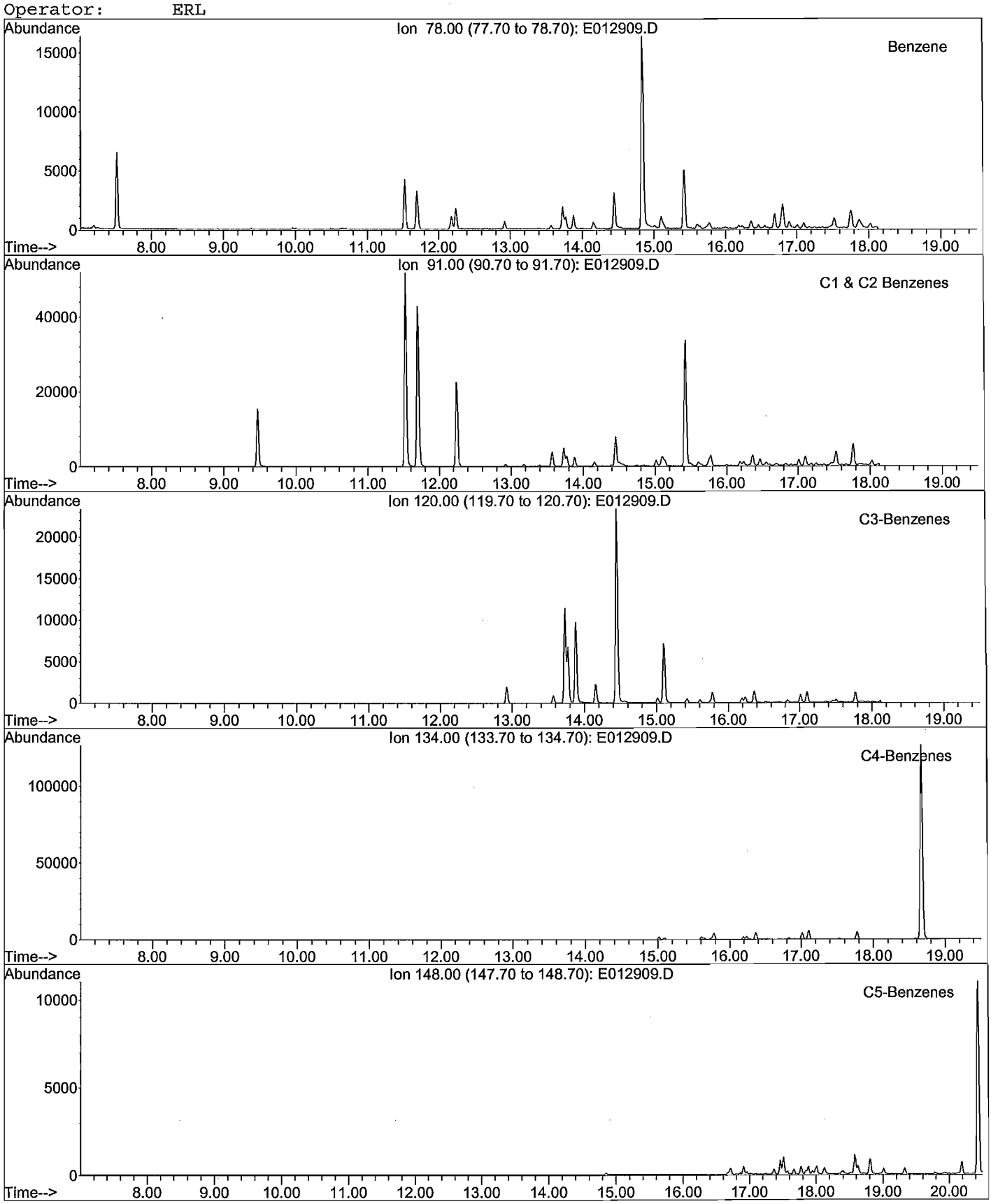




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

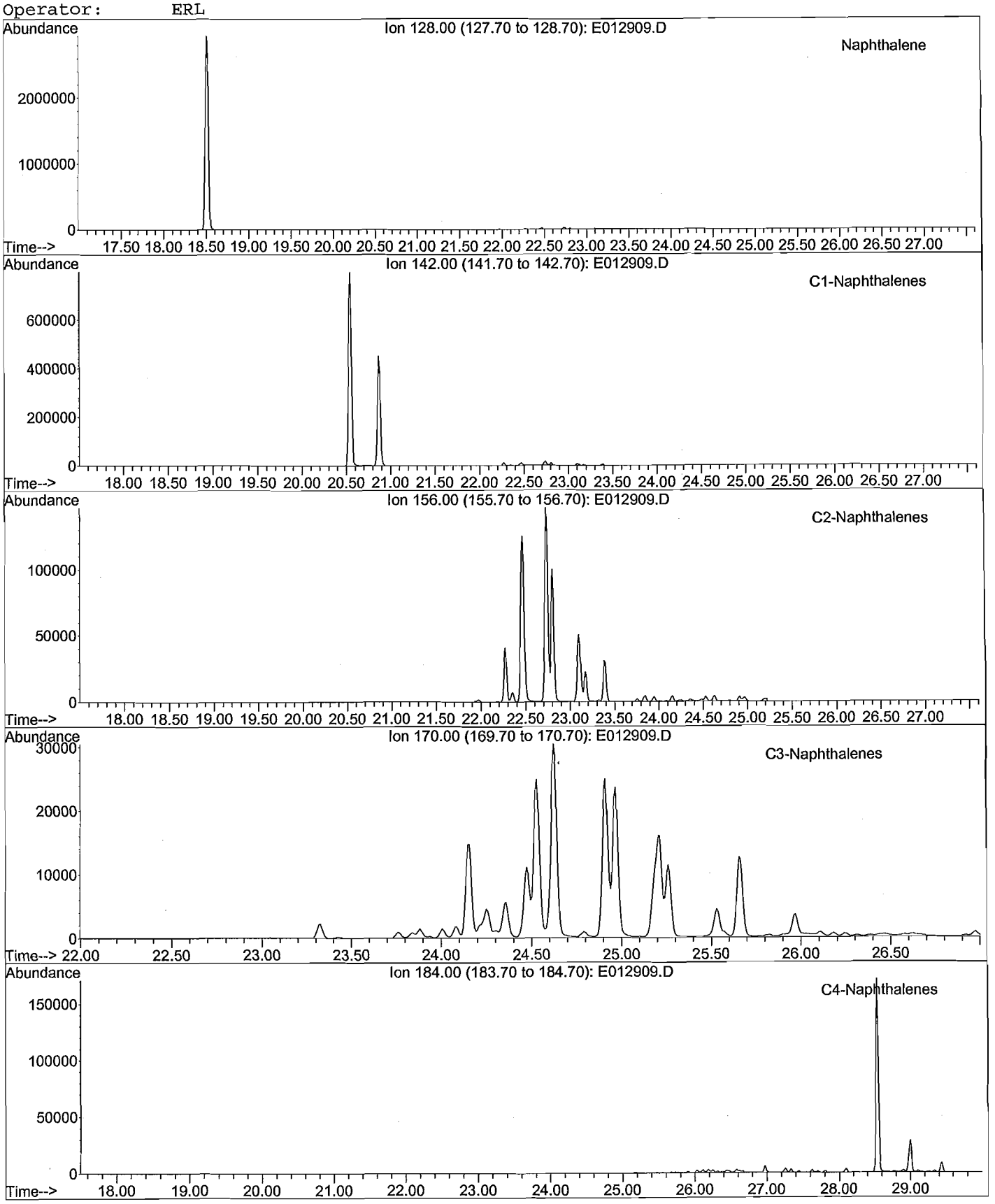
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

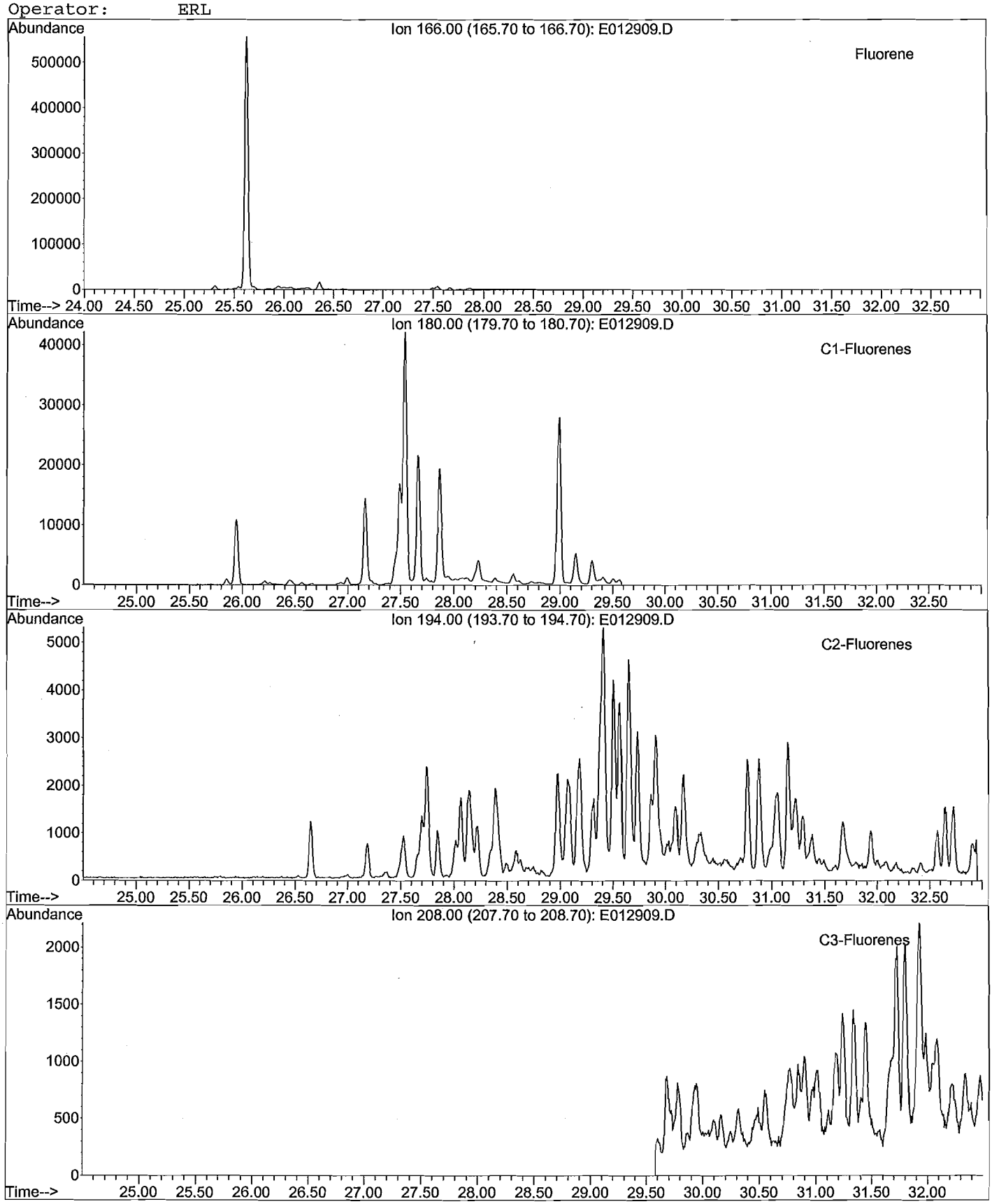
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

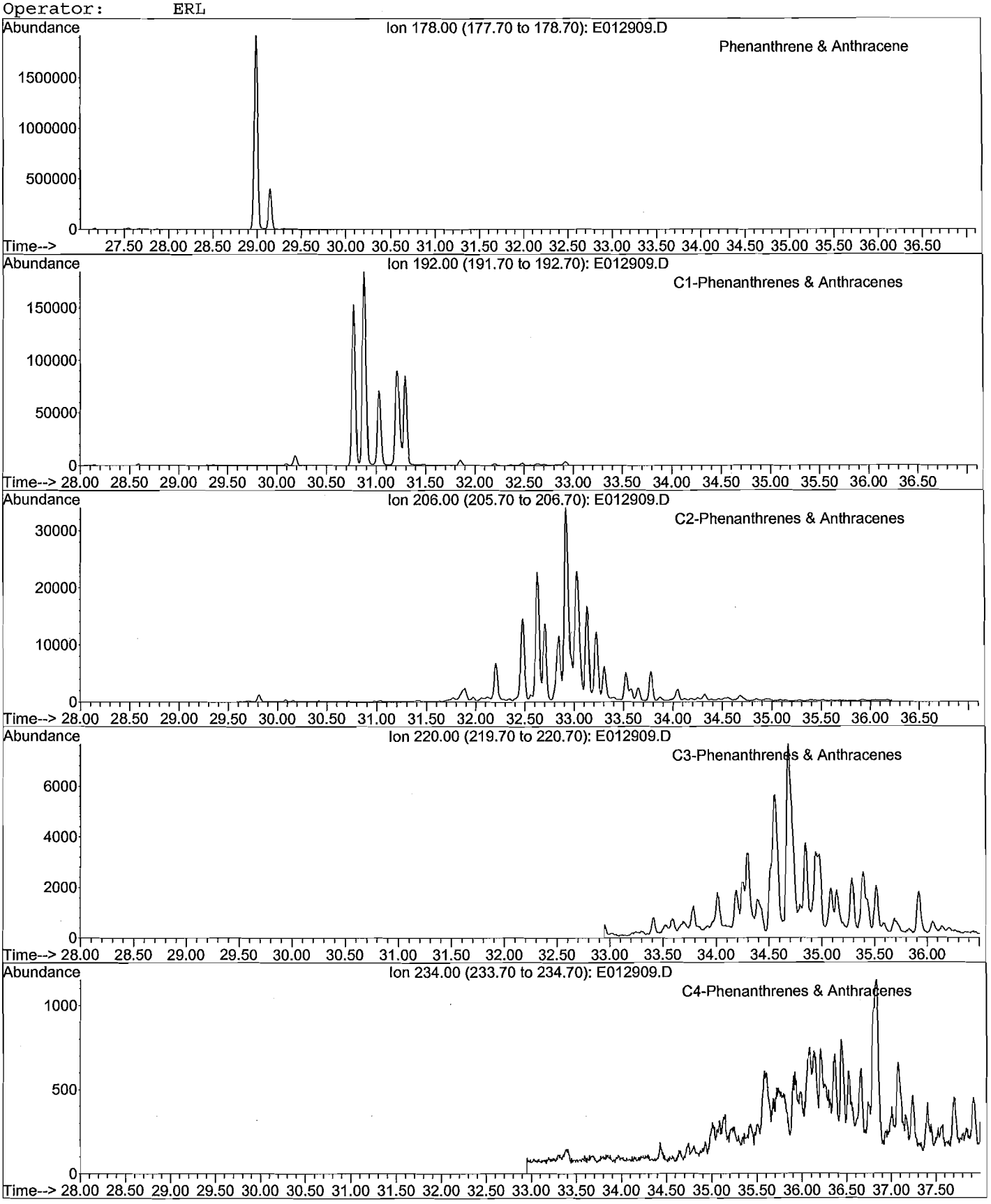
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

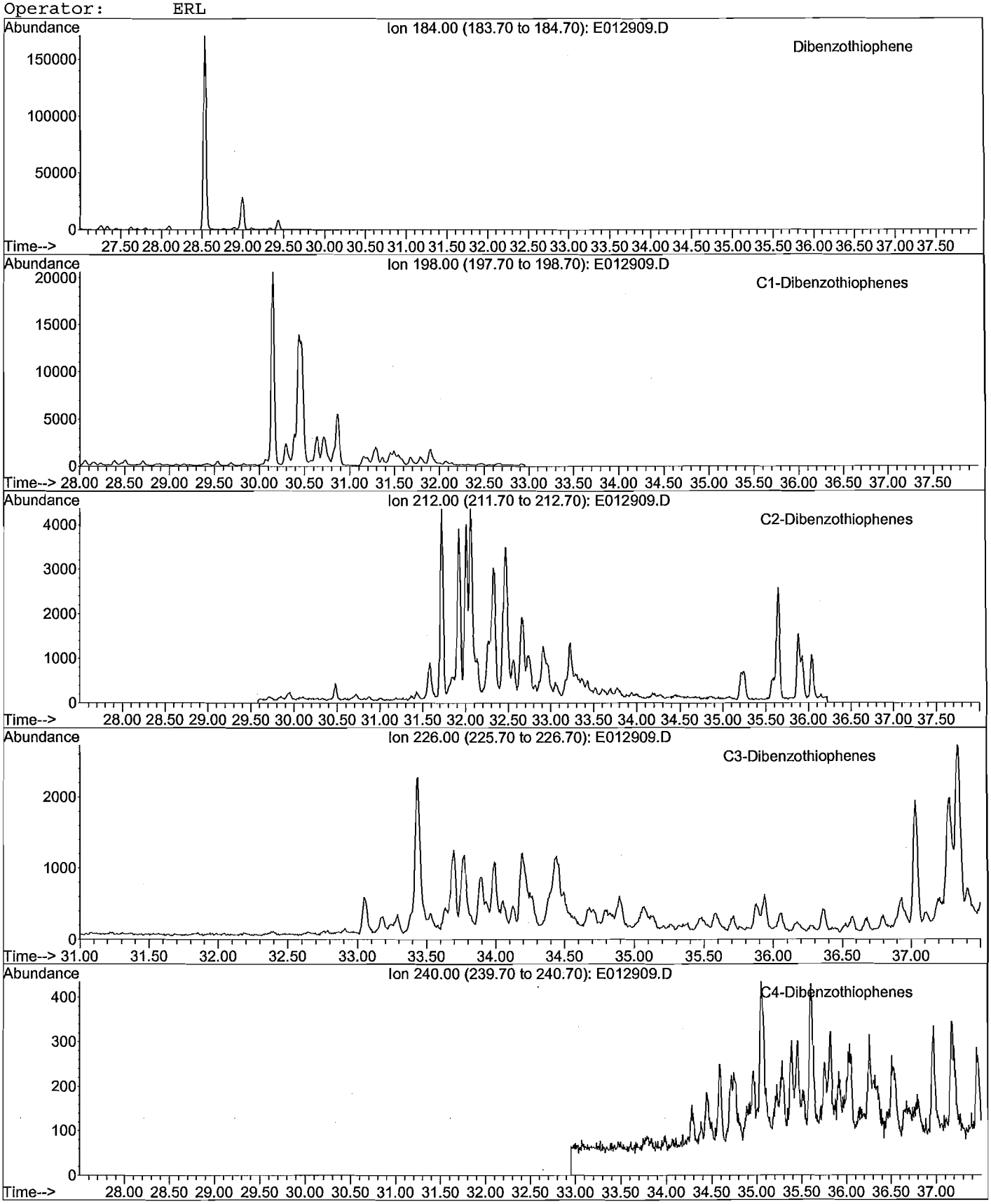
GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



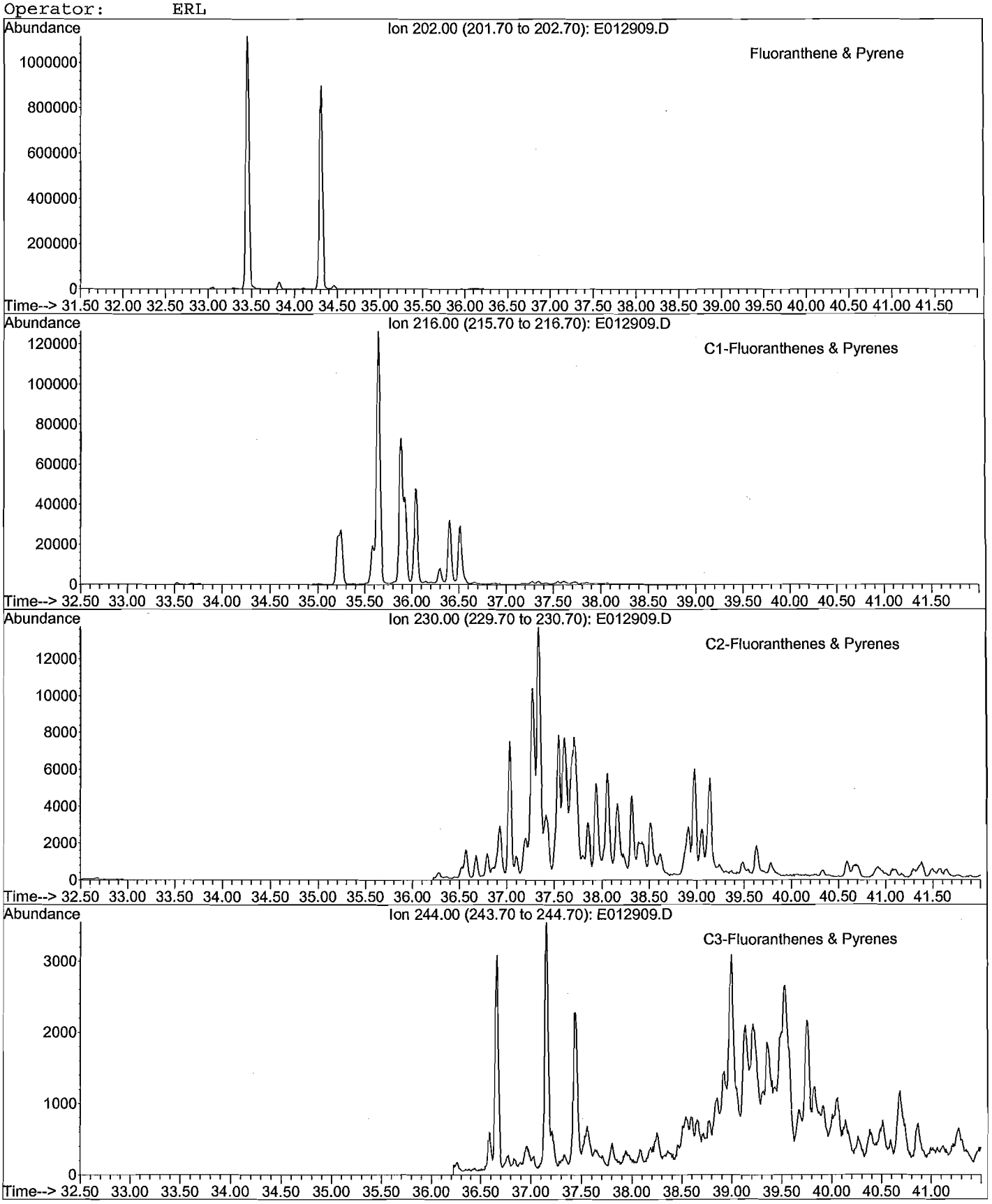
GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



GC/MS EXTRACTED ION CHROMATOGRAM

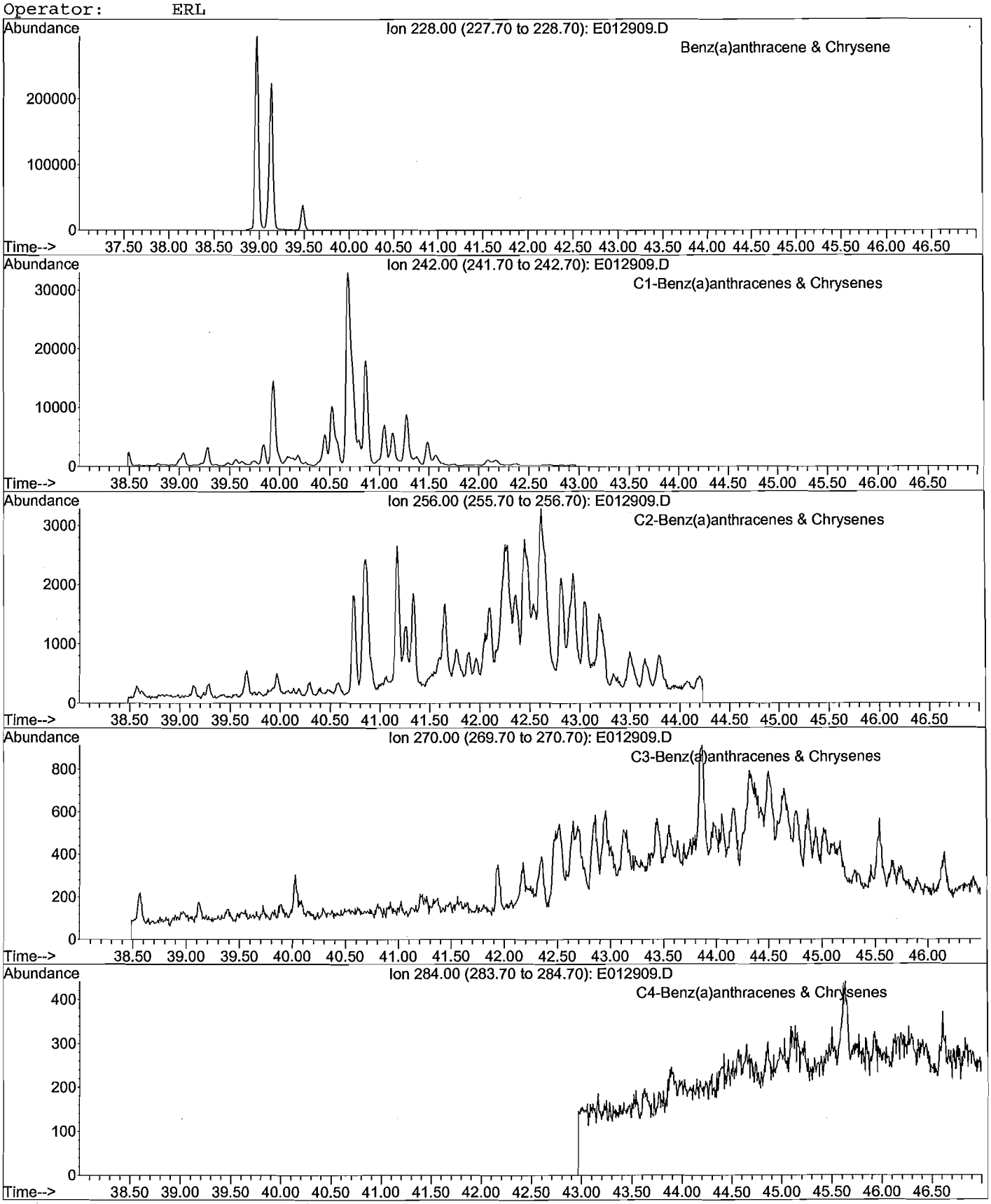
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

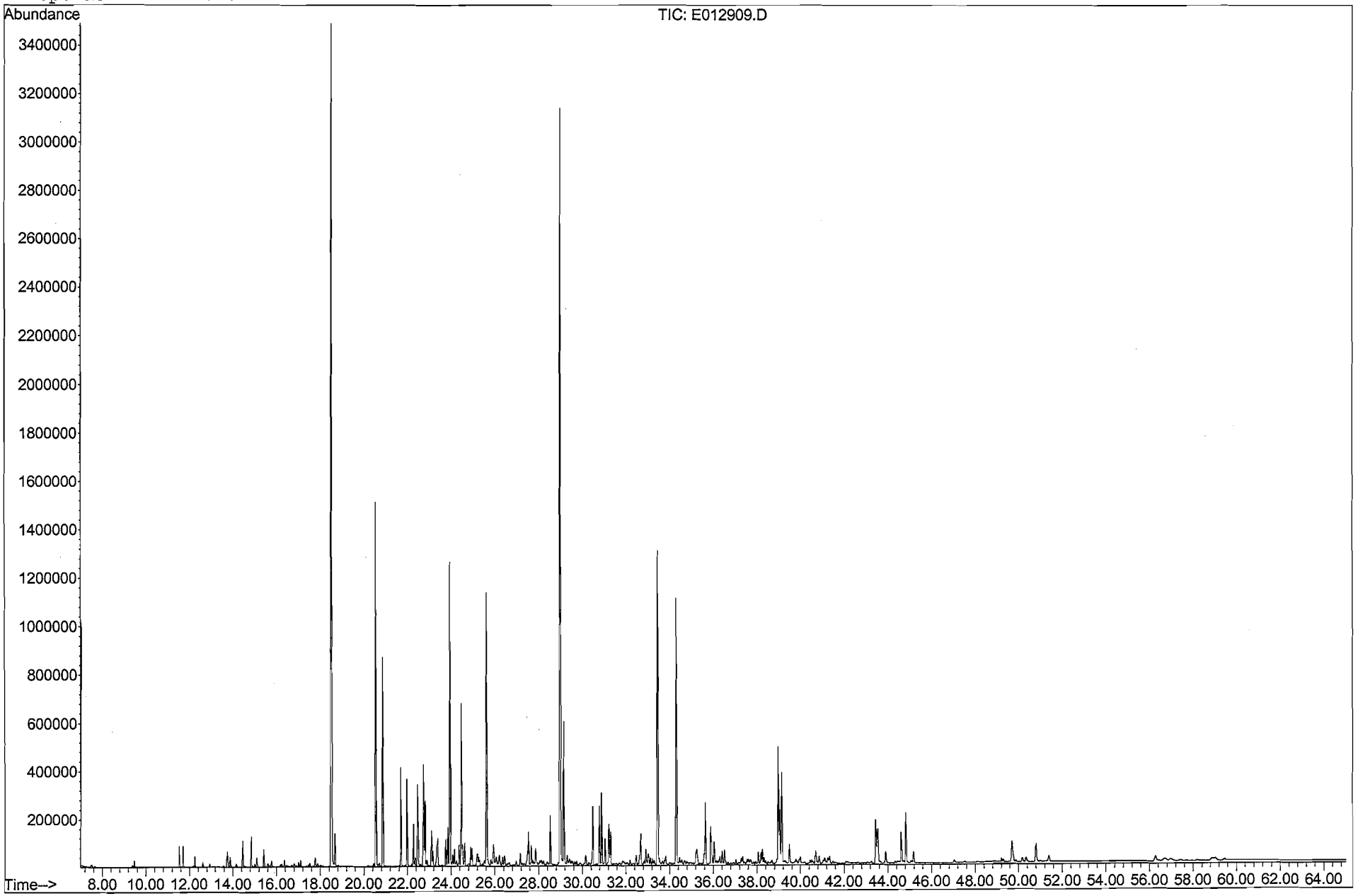
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

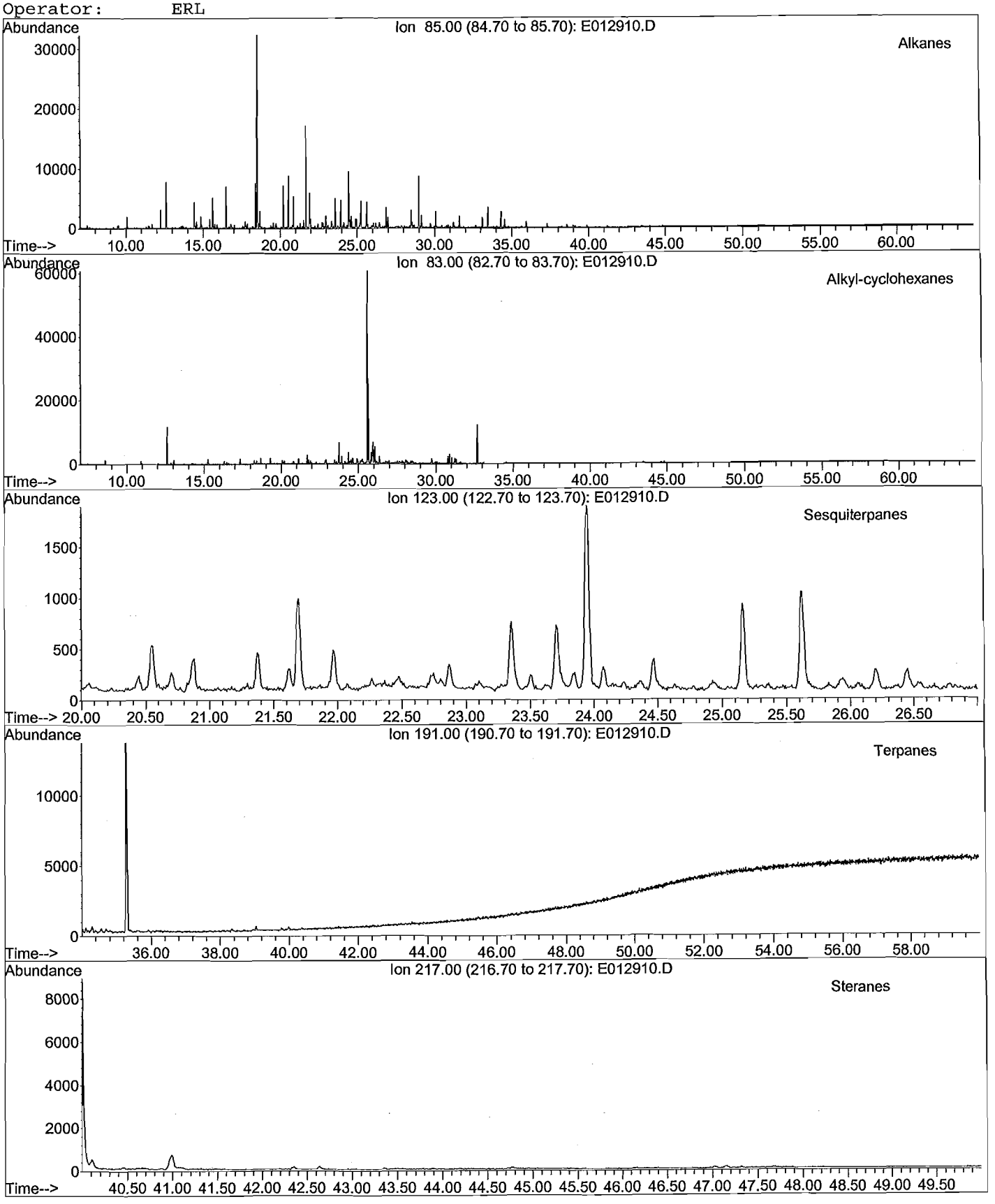
File: J:\1\DATA\E090129\E012909.D
Date Acquired: 30 Jan 2009 12:21 am
Method File: 4008SIMD.M
Sample Name: CH090121-01DUP-D
Misc Info: MW123 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

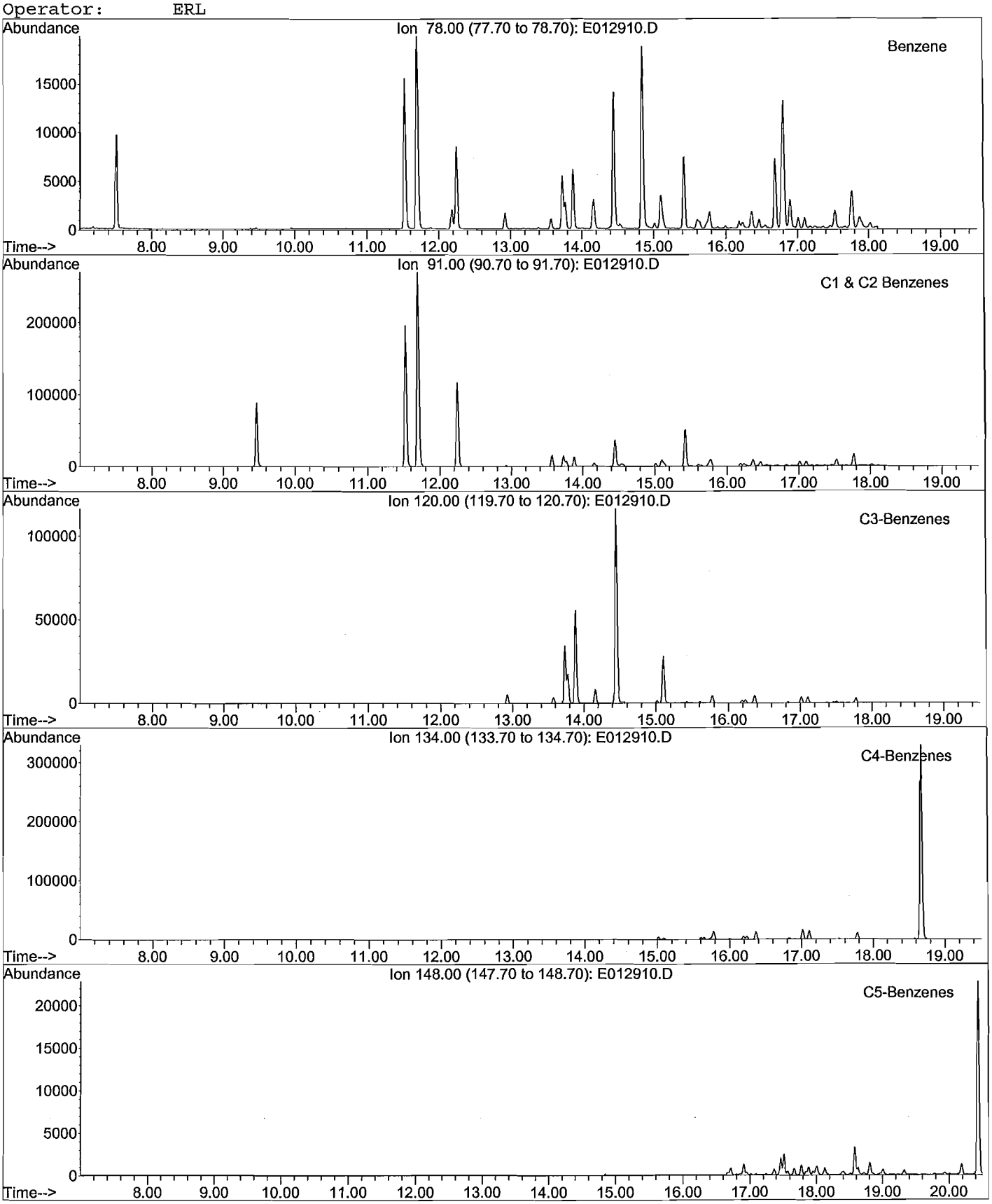
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

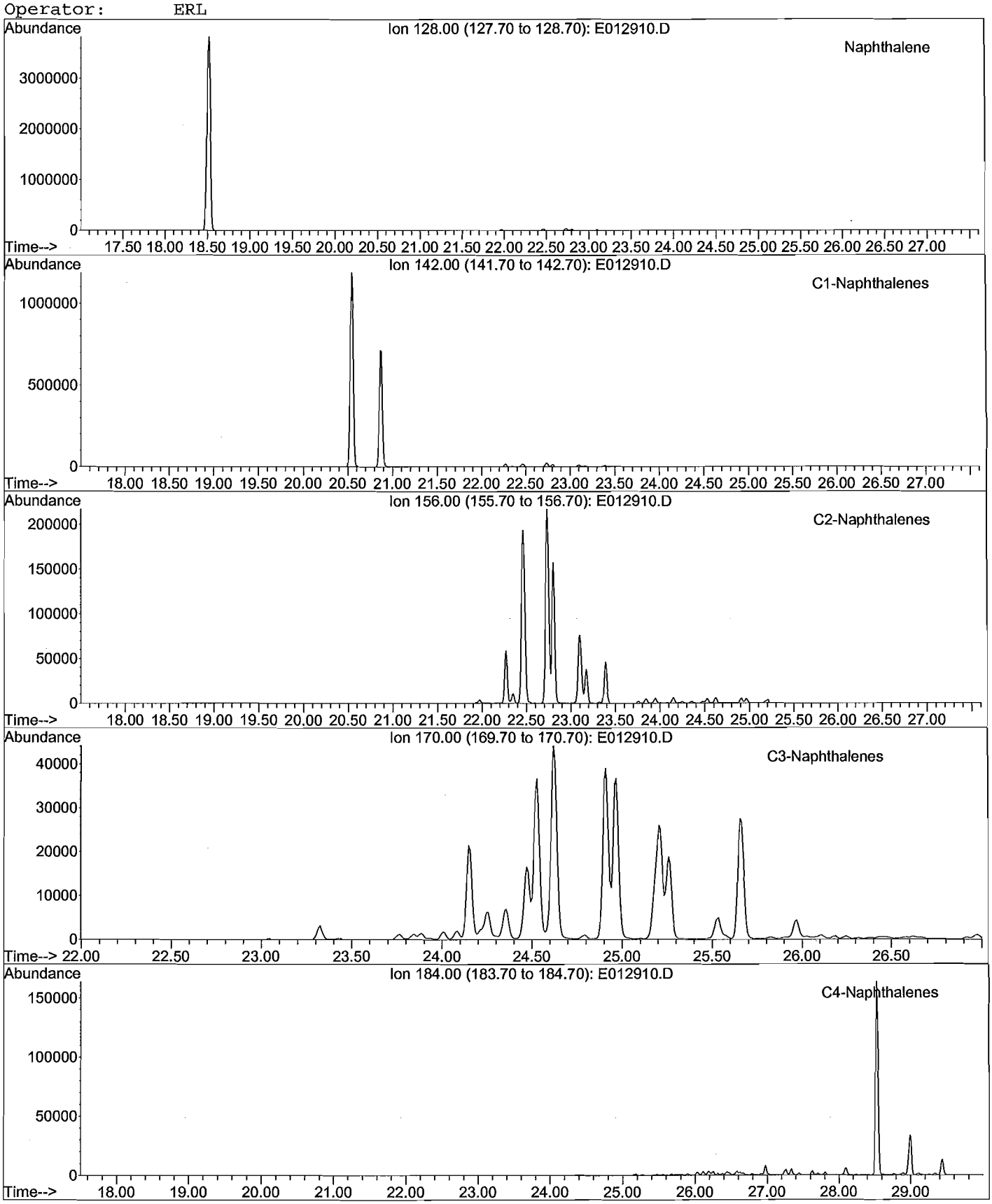
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

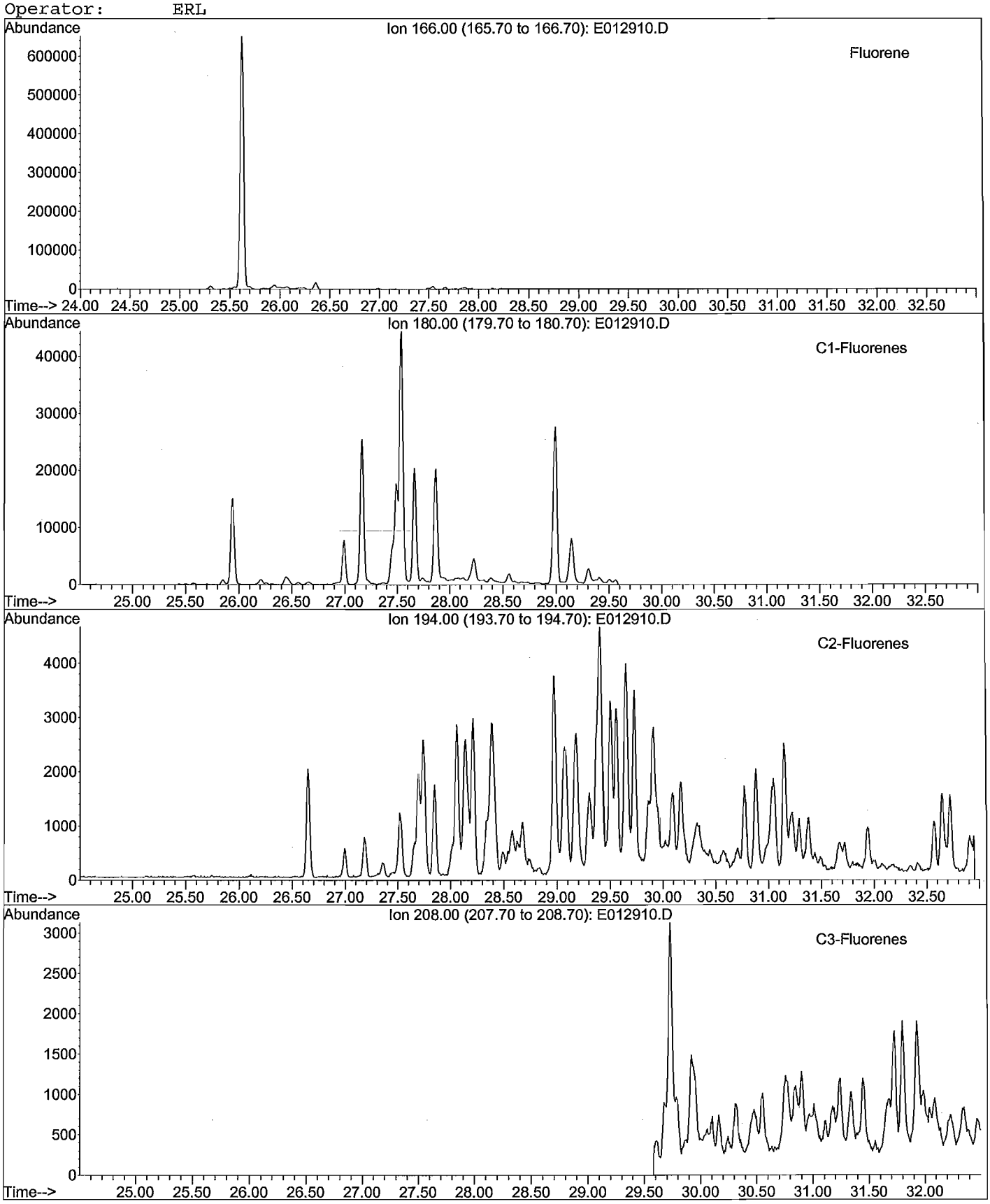
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

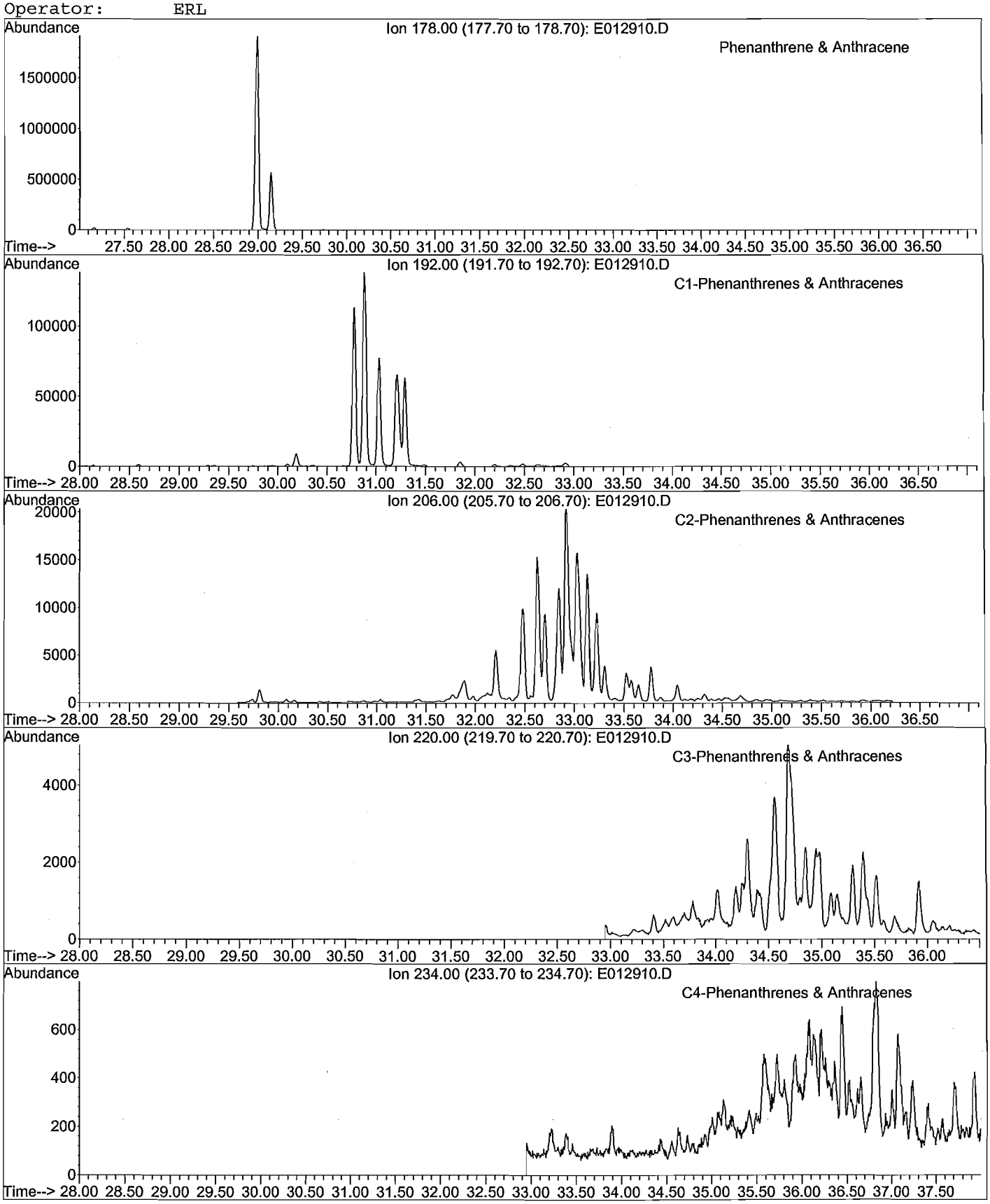
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

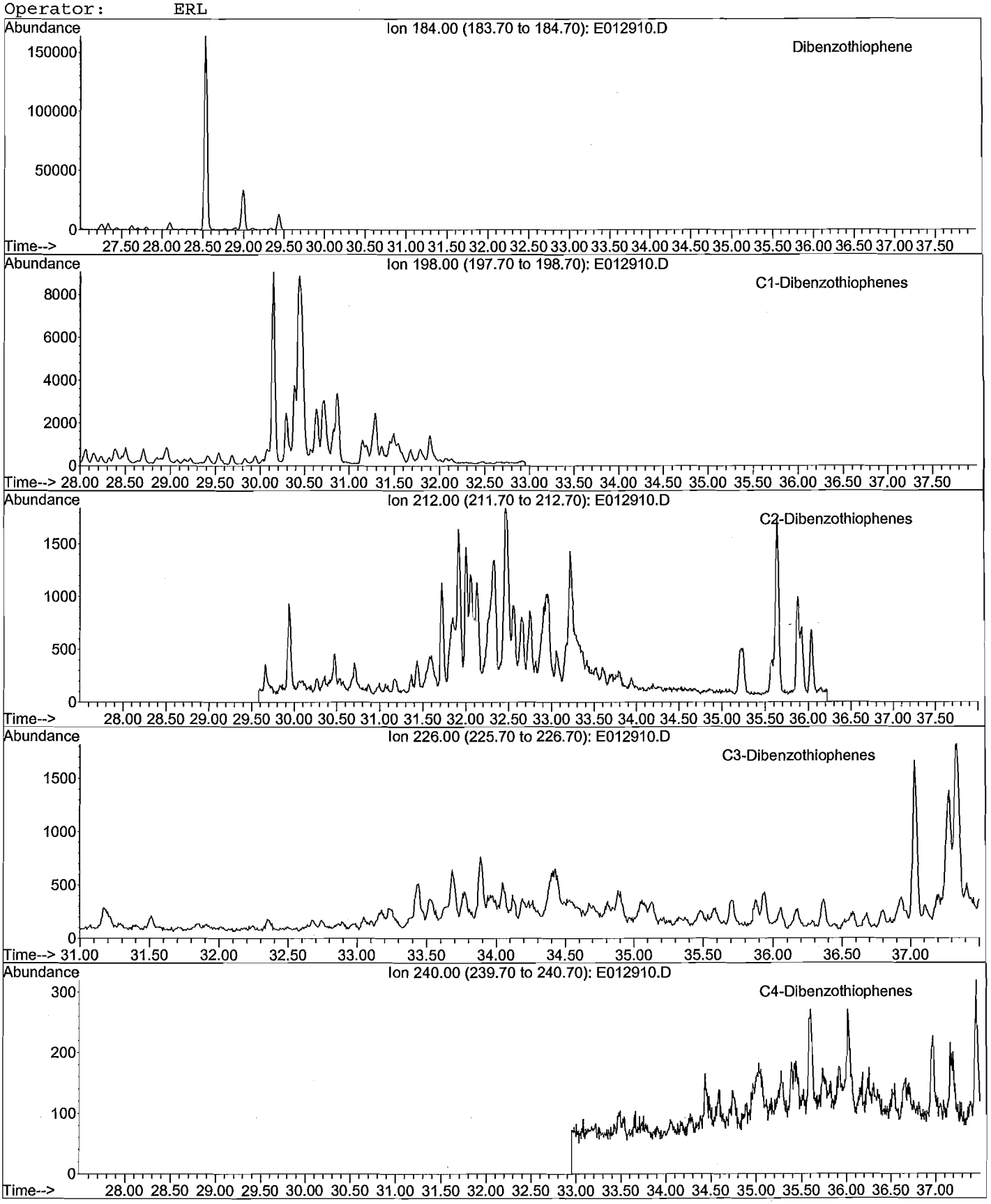
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

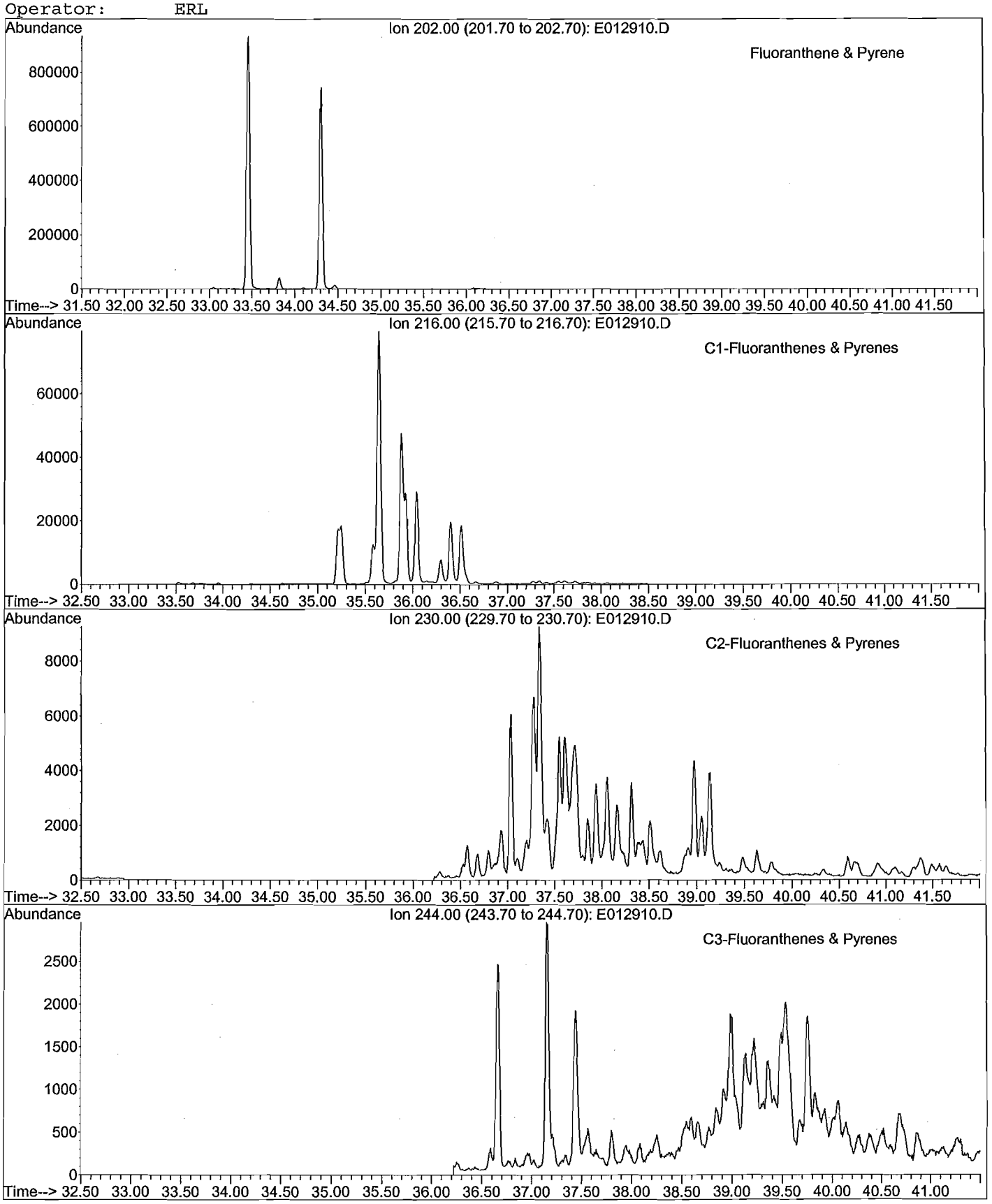
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

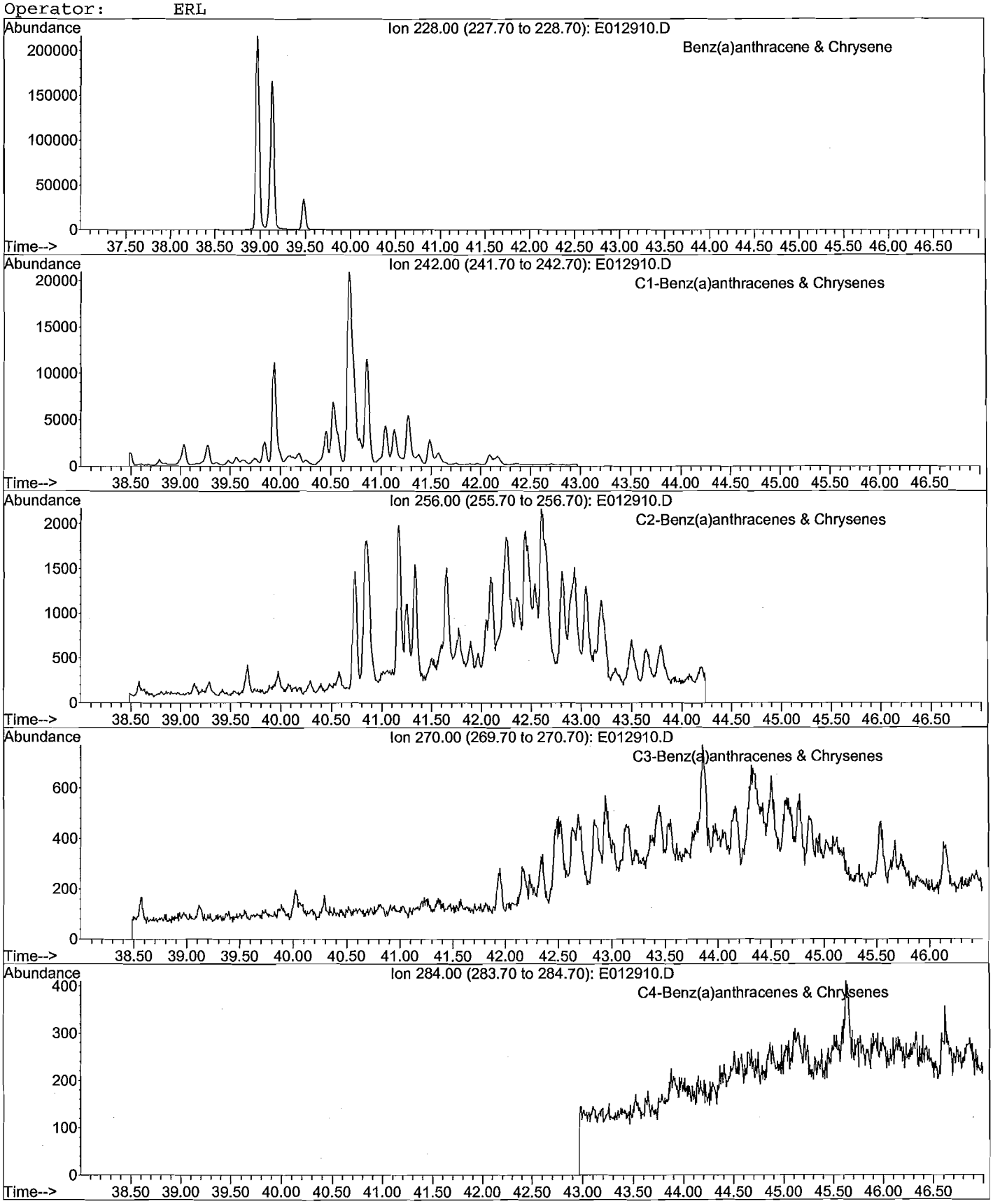
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

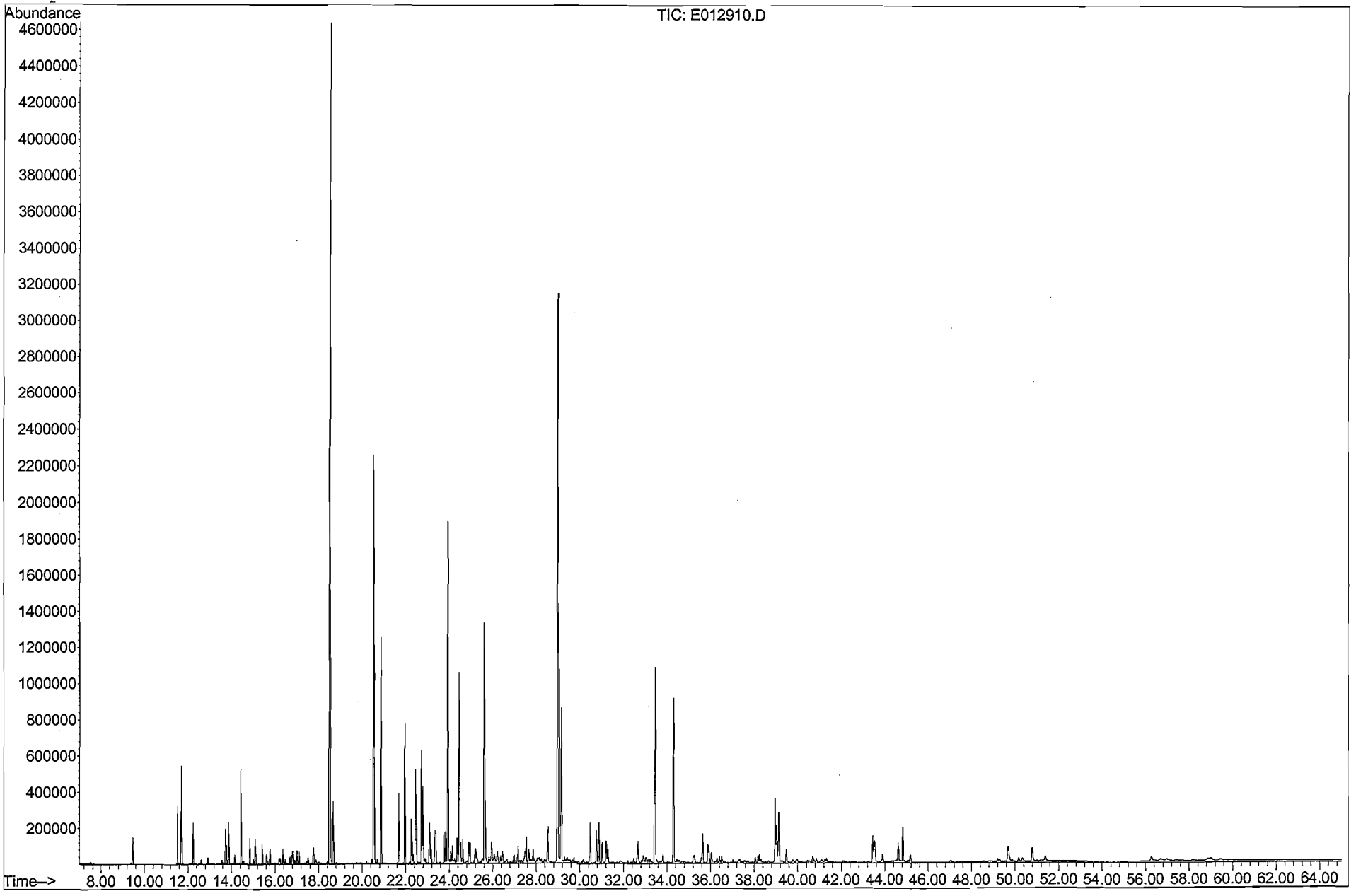
File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012910.D
Date Acquired: 30 Jan 2009 1:35 am
Method File: 4008SIMD.M
Sample Name: CH090121-02-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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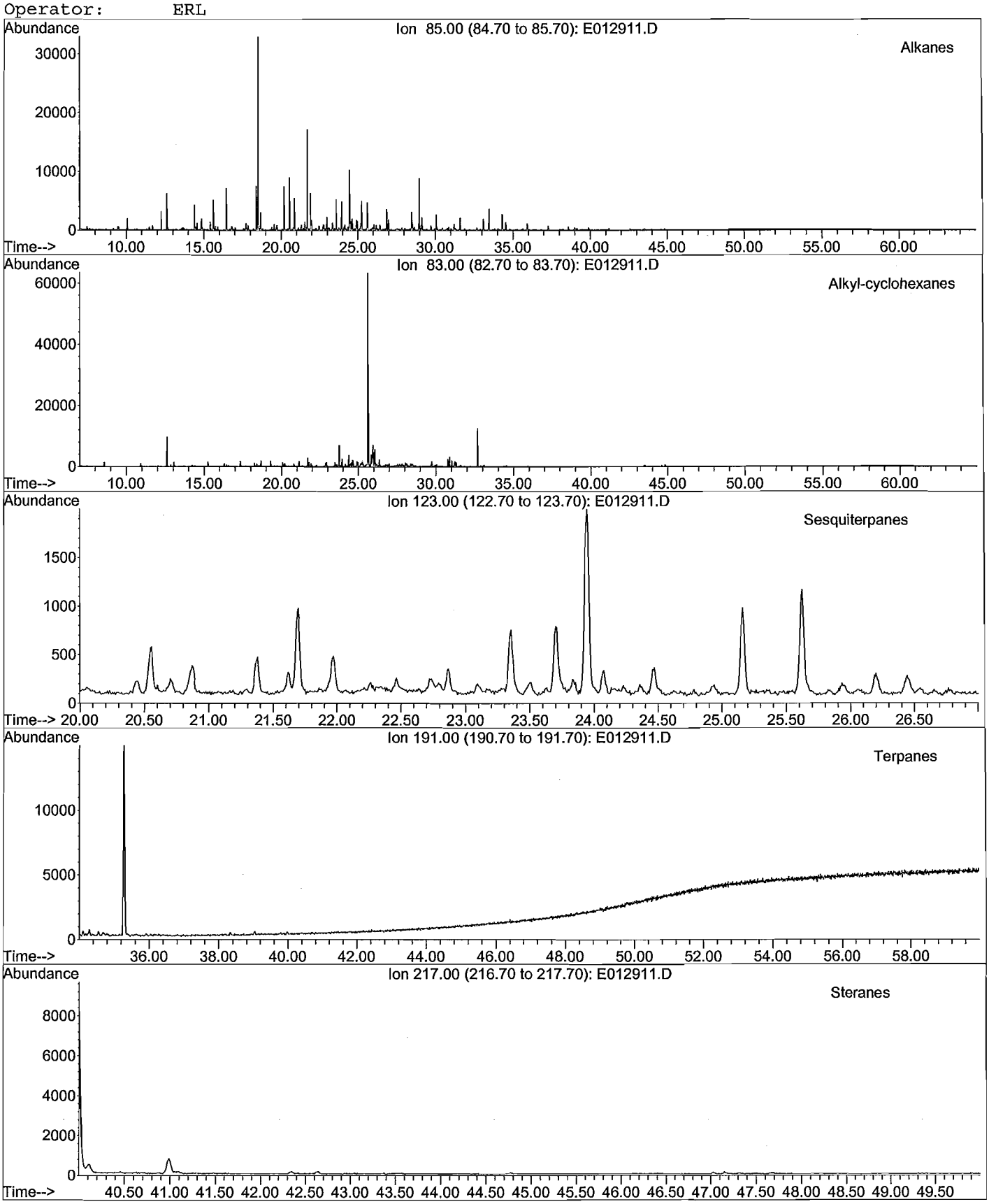
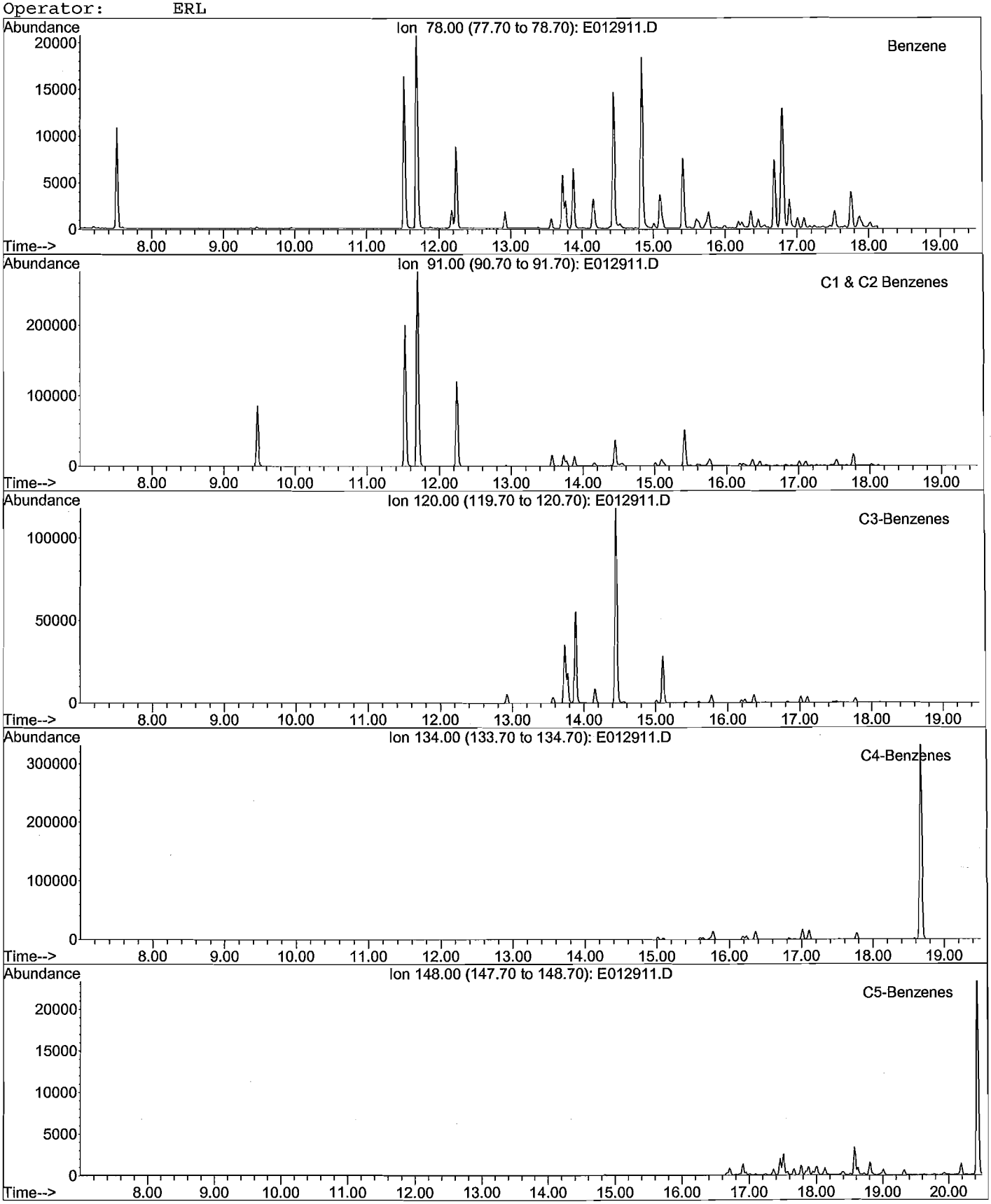
Date Acquired: 30 Jan 2009 2:50 am
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

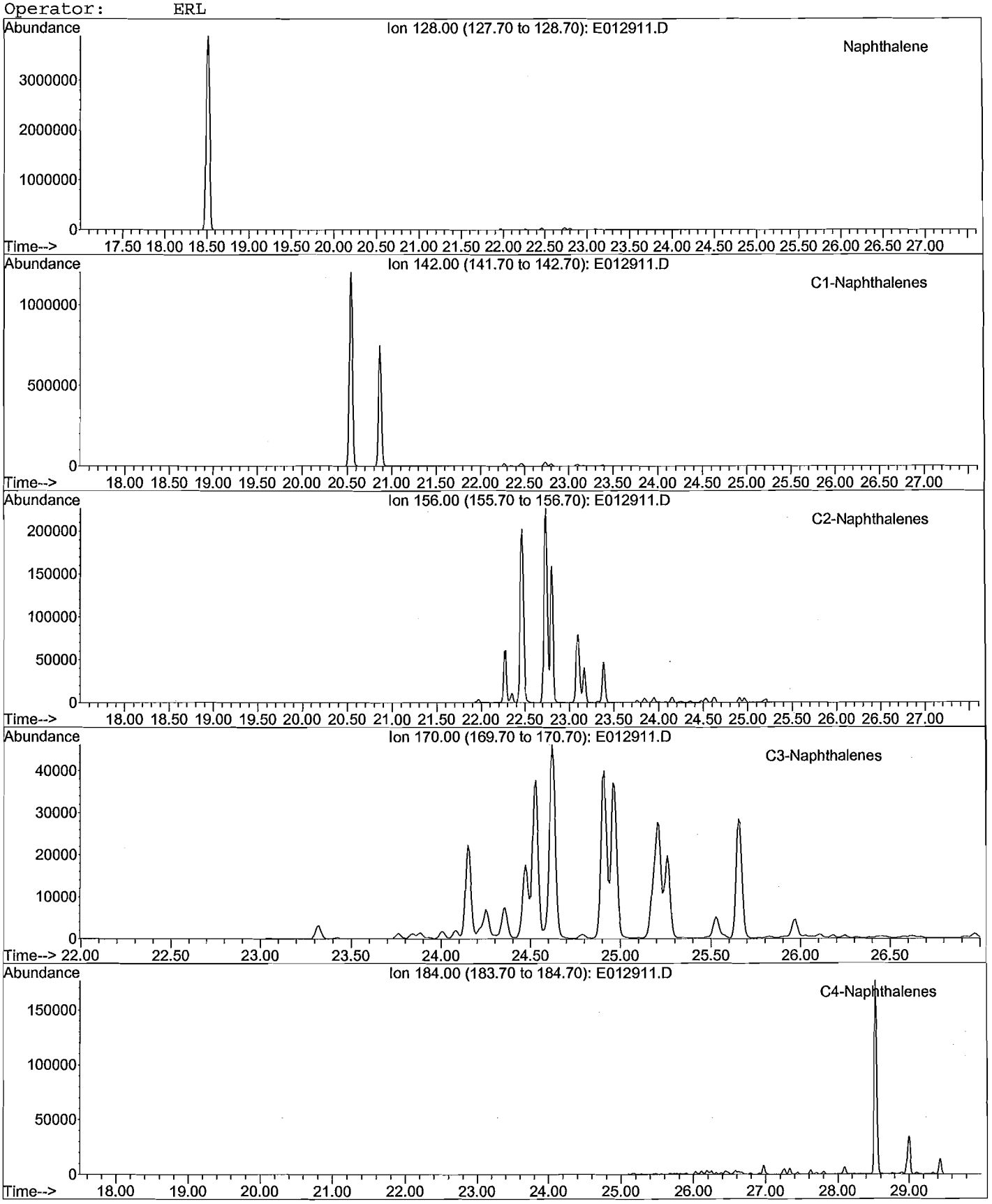
File: J:\1\DATA\E090129\E012911.D
Date Acquired: 30 Jan 2009 2:50 am
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012911.D
Date Acquired: 30 Jan 2009 2:50 am
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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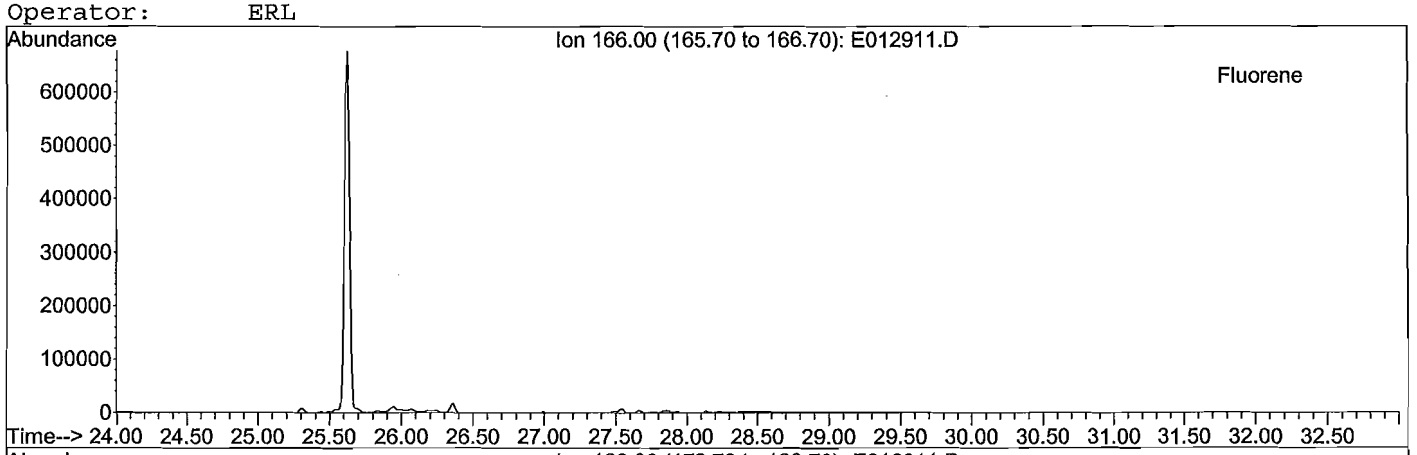
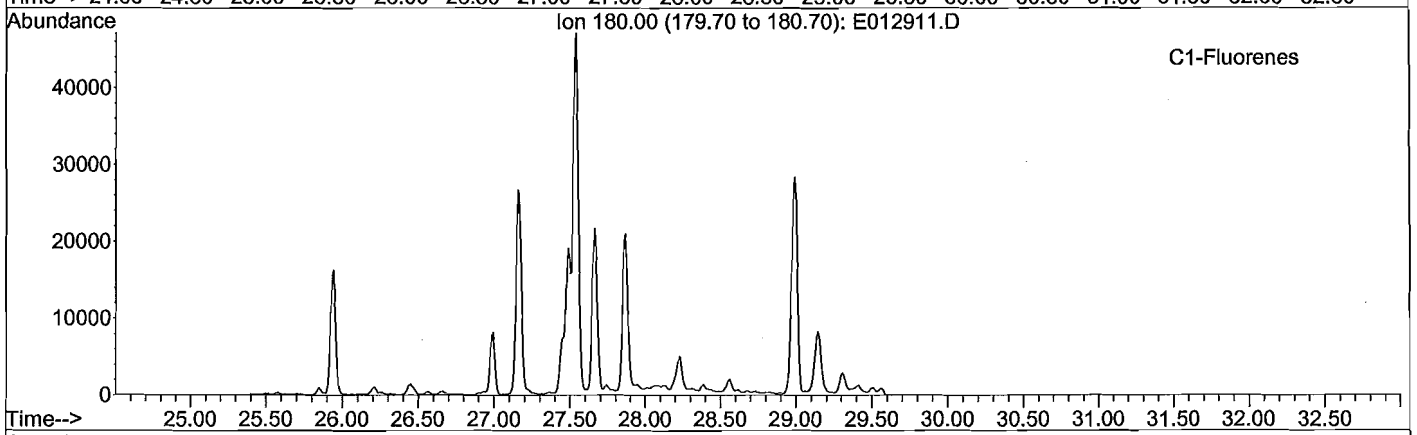
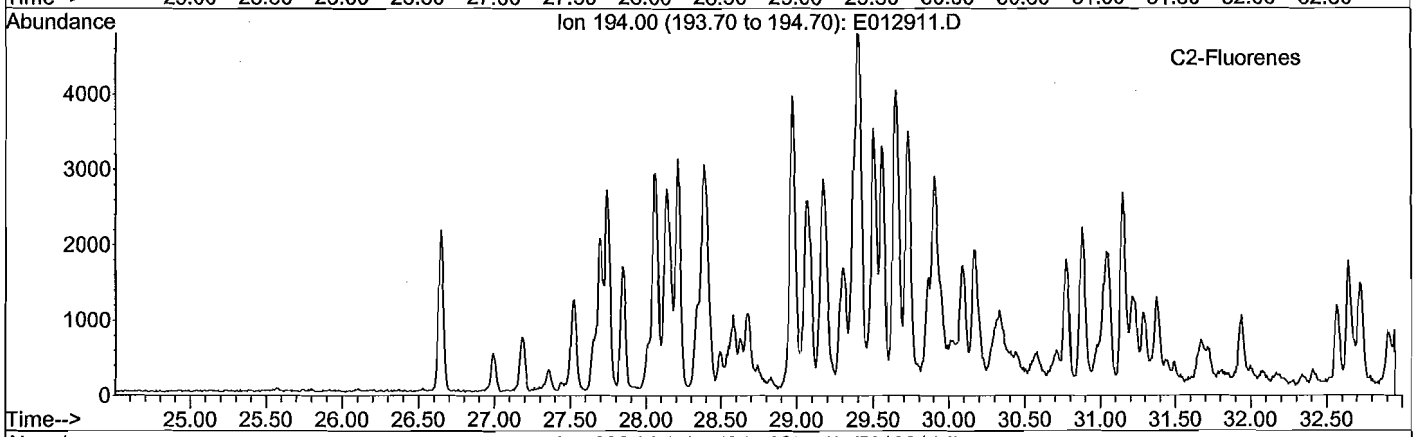
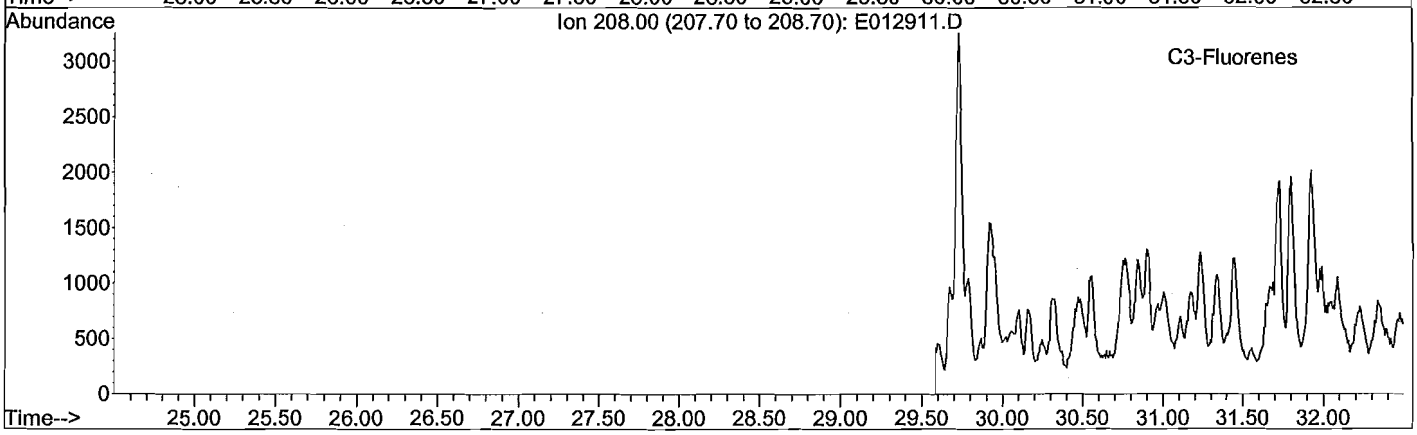
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL









META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012911.D
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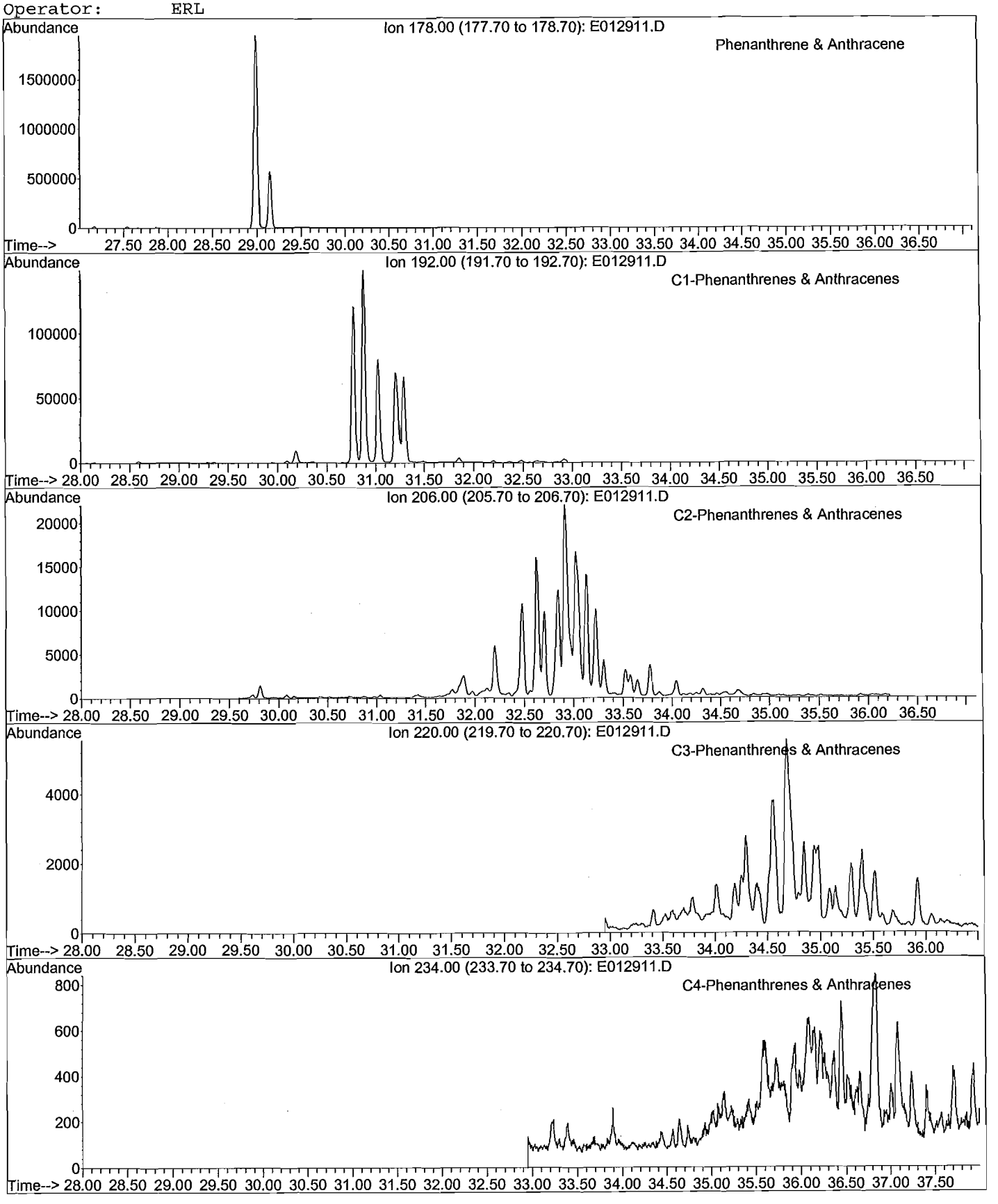
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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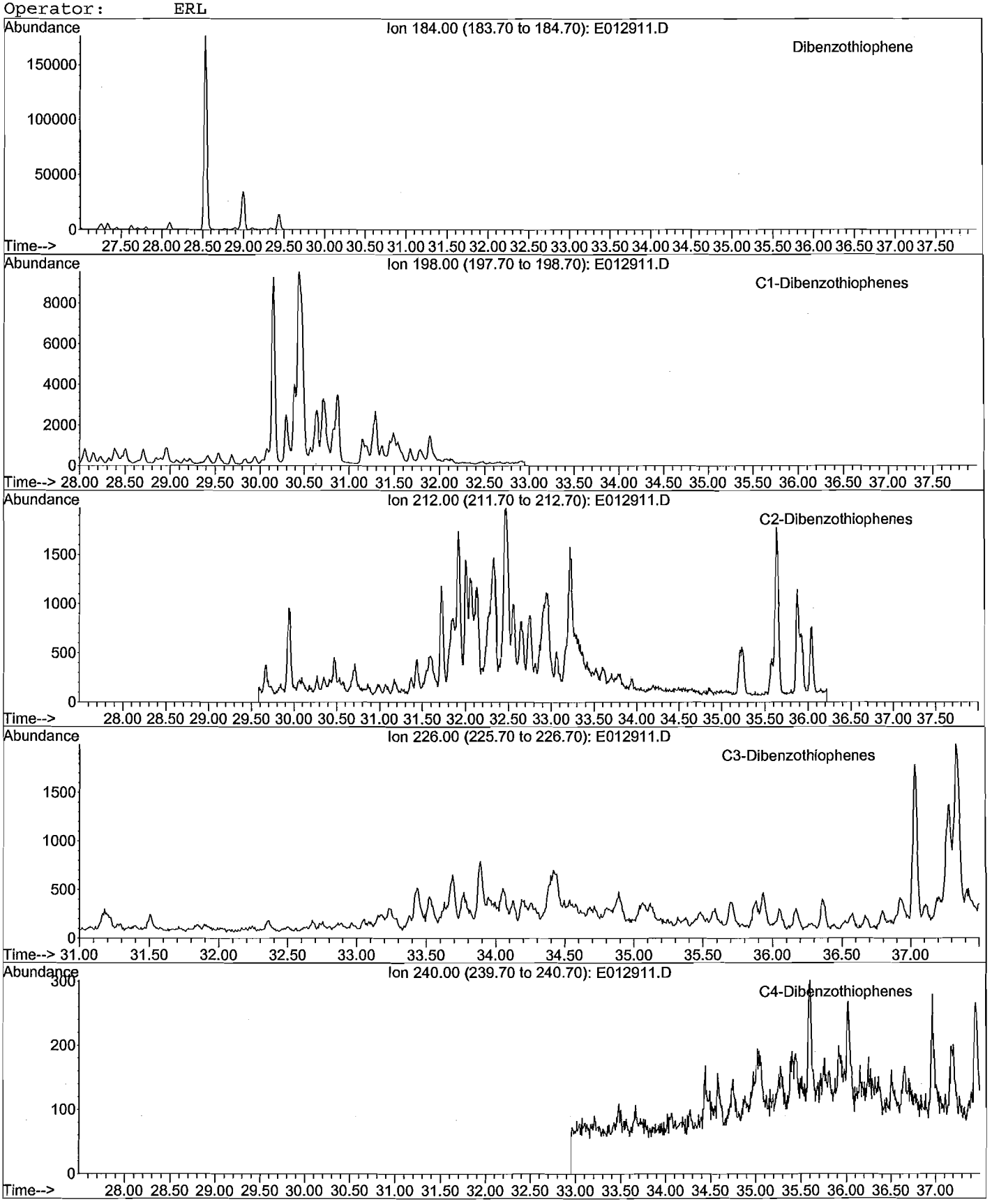
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012911.D
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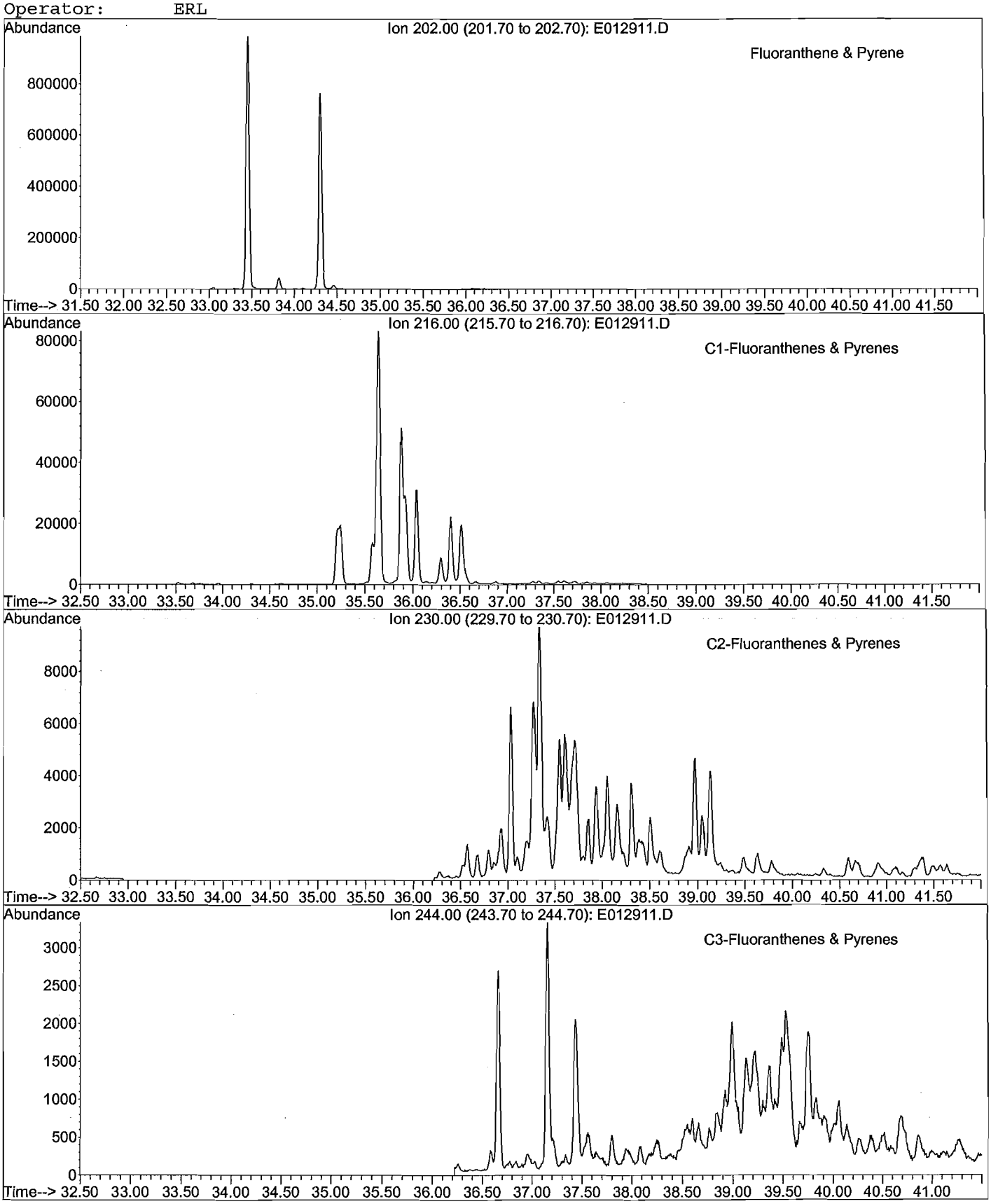
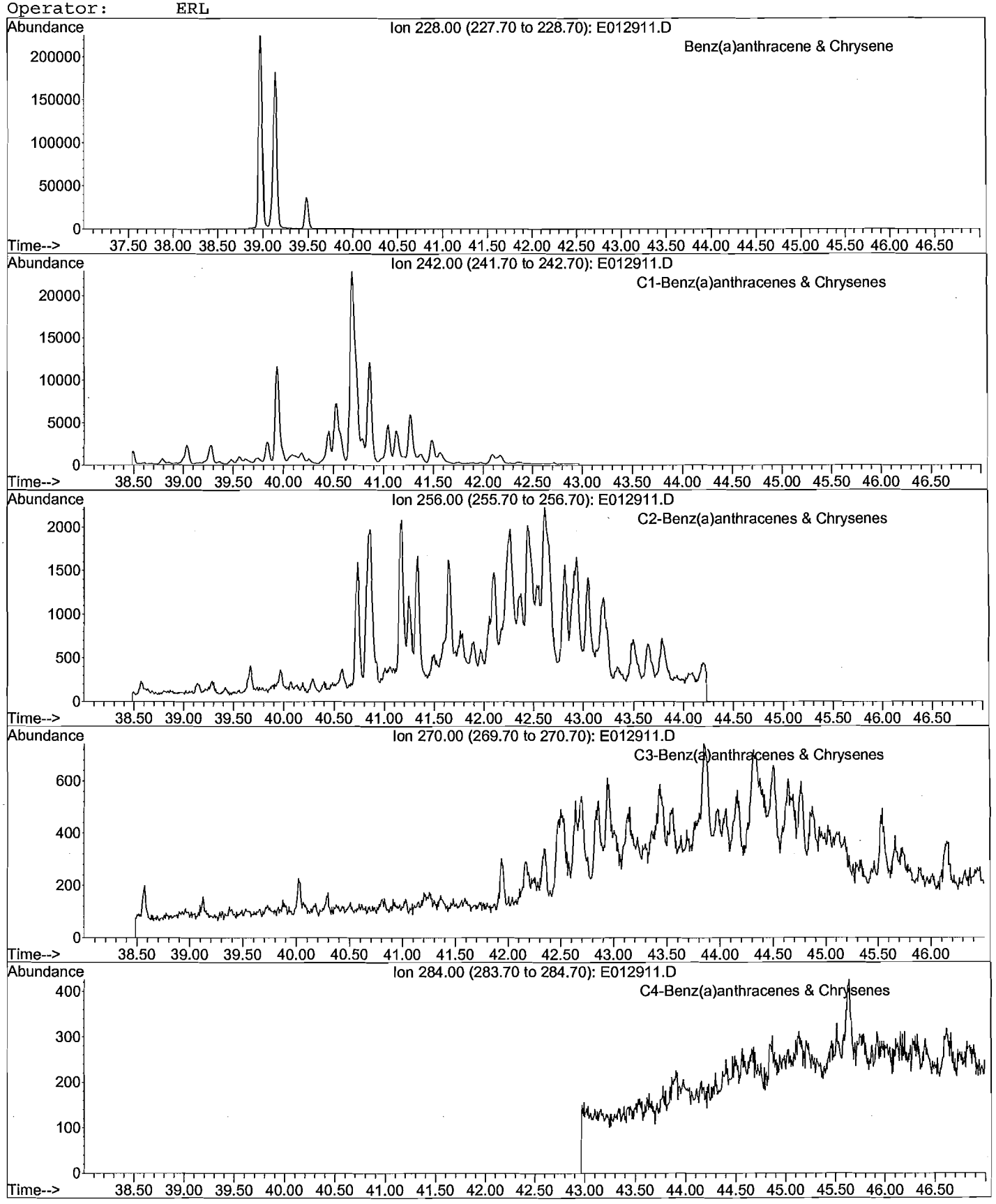
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

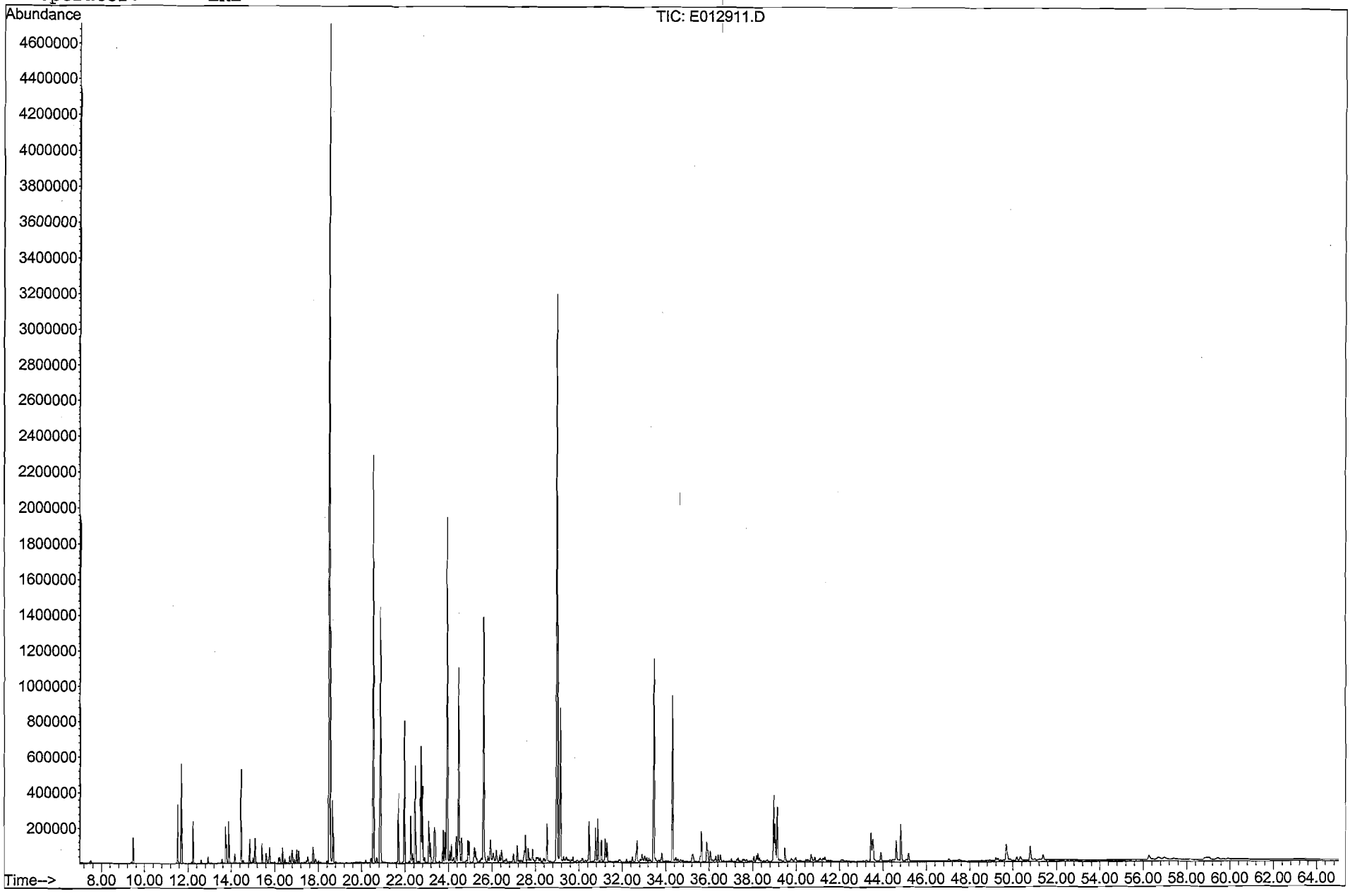
File: J:\1\DATA\E090129\E012911.D
Date Acquired: 30 Jan 2009 2:50 am
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E090129\E012911.D
Date Acquired: 30 Jan 2009 2:50 am
Method File: 4008SIMD.M
Sample Name: CH090121-02DUP-D
Misc Info: MW135 10X
Operator: ERL



Appendix F

Petroleum Biomarker Concentrations

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	U	1.98	0.990	
C20 Tricyclic terpane	U	1.98	0.990	
C21 Tricyclic terpane	U	1.98	0.990	
C22 Tricyclic terpane	U	1.98	0.990	
C23 Tricyclic terpane	U	1.98	0.990	
C24 Tricyclic terpane	U	1.98	0.990	
C25 Tricyclic terpane-22S	U	1.98	0.990	
C25 Tricyclic terpane-22R	U	1.98	0.990	
C26 Tricyclic terpane-22S	U	1.98	0.990	
C26 Tricyclic terpane-22R	U	1.98	0.990	
C24 Tetracyclic terpane	U	1.98	0.990	
C28 Tricyclic terpane-22S	U	1.98	0.990	
C28 Tricyclic terpane-22R	U	1.98	0.990	
C29 Tricyclic terpane-22S	U	1.98	0.990	
C29 Tricyclic terpane-22R	U	1.98	0.990	
18a(H)-22,29,30-Trisnorneohopane - Ts	U	1.98	0.990	
C30 Tricyclic terpane-22S	U	1.98	0.990	
C30 Tricyclic terpane-22R	U	1.98	0.990	
17a(H)-22,29,30-Trisnorhopane - Tm	U	1.98	0.990	
17b(H)-22,29,30-Trisnorhopane	U	1.98	0.990	
17a(H)-29,30-Bisnorhopane	U	1.98	0.990	
17b(H),21b(H)-28,30-Bisnorhopane	U	1.98	0.990	
17b(H),21a(H)-28,30-Bisnorhopane	U	1.98	0.990	
17a(H),21b(H)-28,30-Bisnorhopane	U	1.98	0.990	
17a(H),21b(H)-25-Norhopane	U	1.98	0.990	
30-Norhopane	U	1.98	0.990	
18a(H)-30-Norneohopane - C29Ts	U	1.98	0.990	
15a-methyl-17a(H)-27-Norhopane	U	1.98	0.990	
Oleananes	U	1.98	0.990	
Hopane	U	1.98	0.990	
Moretane	U	1.98	0.990	
17a(H),21b(H)-30-Homohopane-22S	U	1.98	0.990	
17a(H),21b(H)-30-Homohopane-22R	U	1.98	0.990	
Gammacerane	U	1.98	0.990	
17b(H),21b(H)-Hopane	U	1.98	0.990	
30-Homomoretane-22R	U	1.98	0.990	
Hop-22(29)-ene	U	1.98	0.990	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	1.98	0.990	
30,31-Bishomohopane-22R	U	1.98	0.990	
30,31-Bishomomoretane-22R	U	1.98	0.990	
17b(H),21b(H)-Homohopane-22R	U	1.98	0.990	
30,31,32-Trishomohopane-22S	U	1.98	0.990	
30,31,32-Trishomohopane-22R	U	1.98	0.990	
30,31,32,33-Tetrakishomohopane-22S	U	1.98	0.990	
30,31,32,33-Tetrakishomohopane-22R	U	1.98	0.990	
30,31,32,33,34-Pentakishomohopane-22S	U	1.98	0.990	
30,31,32,33,34-Pentakishomohopane-22R	U	1.98	0.990	
Steranes				
C20 14a(H),17a(H)-Sterane	U	1.98	0.990	
C21 14b(H),17b(H)-Sterane	U	1.98	0.990	
C22 14b(H),17b(H)-Sterane	U	1.98	0.990	
C27 13b(H),17a(H)-20S-Diasterane	U	1.98	0.990	
C27 13b(H),17a(H)-20R-Diasterane	U	1.98	0.990	
C27 13a(H),17b(H)-20S-Diasterane	U	1.98	0.990	
C27 13a(H),17b(H)-20R-Diasterane	U	1.98	0.990	
C28 13b(H),17a(H)-20S-Diasterane	U	1.98	0.990	
C28 13a(H),17b(H)-20S-Diasterane	U	1.98	0.990	
C28 13a(H),17b(H)-20R-Diasterane	U	1.98	0.990	
C27 14a(H),17a(H)-20S-Cholestane	U	1.98	0.990	
C27 14b(H),17b(H)-20R-Cholestane	U	1.98	0.990	
C27 14b(H),17b(H)-20S-Cholestane	U	1.98	0.990	
C27 14a(H),17a(H)-20R-Cholestane	U	1.98	0.990	
C29 13b(H),17a(H)-20S-Diasterane	U	1.98	0.990	
C29 13b(H),17a(H)-20R-Diasterane	U	1.98	0.990	
C28 14a(H),17a(H)-20S-Methylcholestane	U	1.98	0.990	
C28 14b(H),17b(H)-20R-Methylcholestane	U	1.98	0.990	
C28 14b(H),17b(H)-20S-Methylcholestane	U	1.98	0.990	
C28 14a(H),17a(H)-20R-Methylcholestane	U	1.98	0.990	
C29 14a(H),17a(H)-20S-Ethylcholestane	U	1.98	0.990	
C29 14b(H),17b(H)-20R-Ethylcholestane	U	1.98	0.990	
C29 14b(H),17b(H)-20S-Ethylcholestane	U	1.98	0.990	
C29 14a(H),17a(H)-20R-Ethylcholestane	U	1.98	0.990	
Total Triterpanes	U	1.98	0.990	
Total Steranes	U	1.98	0.990	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01-D		
File ID:	E012908.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0253
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
5b(H)-Cholane	96	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	U	1.89	0.945	
C20 Tricyclic terpane	U	1.89	0.945	
C21 Tricyclic terpane	U	1.89	0.945	
C22 Tricyclic terpane	U	1.89	0.945	
C23 Tricyclic terpane	U	1.89	0.945	
C24 Tricyclic terpane	U	1.89	0.945	
C25 Tricyclic terpane-22S	U	1.89	0.945	
C25 Tricyclic terpane-22R	U	1.89	0.945	
C26 Tricyclic terpane-22S	U	1.89	0.945	
C26 Tricyclic terpane-22R	U	1.89	0.945	
C24 Tetracyclic terpane	U	1.89	0.945	
C28 Tricyclic terpane-22S	U	1.89	0.945	
C28 Tricyclic terpane-22R	U	1.89	0.945	
C29 Tricyclic terpane-22S	U	1.89	0.945	
C29 Tricyclic terpane-22R	U	1.89	0.945	
18a(H)-22,29,30-Trisnorneohopane - Ts	U	1.89	0.945	
C30 Tricyclic terpane-22S	U	1.89	0.945	
C30 Tricyclic terpane-22R	U	1.89	0.945	
17a(H)-22,29,30-Trisnorhopane - Tm	U	1.89	0.945	
17b(H)-22,29,30-Trisnorhopane	U	1.89	0.945	
17a(H)-29,30-Bisnorhopane	U	1.89	0.945	
17b(H),21b(H)-28,30-Bisnorhopane	U	1.89	0.945	
17b(H),21a(H)-28,30-Bisnorhopane	U	1.89	0.945	
17a(H),21b(H)-28,30-Bisnorhopane	U	1.89	0.945	
17a(H),21b(H)-25-Norhopane	U	1.89	0.945	
30-Norhopane	U	1.89	0.945	
18a(H)-30-Norneohopane - C29Ts	U	1.89	0.945	
15a-methyl-17a(H)-27-Norhopane	U	1.89	0.945	
Oleananes	U	1.89	0.945	
Hopane	U	1.89	0.945	
Moretane	U	1.89	0.945	
17a(H),21b(H)-30-Homohopane-22S	U	1.89	0.945	
17a(H),21b(H)-30-Homohopane-22R	U	1.89	0.945	
Gammacerane	U	1.89	0.945	
17b(H),21b(H)-Hopane	U	1.89	0.945	
30-Homomoretane-22R	U	1.89	0.945	
Hop-22(29)-ene	U	1.89	0.945	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	1.89	0.945	
30,31-Bishomohopane-22R	U	1.89	0.945	
30,31-Bishomomoretane-22R	U	1.89	0.945	
17b(H),21b(H)-Homohopane-22R	U	1.89	0.945	
30,31,32-Trishomohopane-22S	U	1.89	0.945	
30,31,32-Trishomohopane-22R	U	1.89	0.945	
30,31,32,33-Tetrakishomohopane-22S	U	1.89	0.945	
30,31,32,33-Tetrakishomohopane-22R	U	1.89	0.945	
30,31,32,33,34-Pentakishomohopane-22S	U	1.89	0.945	
30,31,32,33,34-Pentakishomohopane-22R	U	1.89	0.945	
Steranes				
C20 14a(H),17a(H)-Sterane	U	1.89	0.945	
C21 14b(H),17b(H)-Sterane	U	1.89	0.945	
C22 14b(H),17b(H)-Sterane	U	1.89	0.945	
C27 13b(H),17a(H)-20S-Diasterane	U	1.89	0.945	
C27 13b(H),17a(H)-20R-Diasterane	U	1.89	0.945	
C27 13a(H),17b(H)-20S-Diasterane	U	1.89	0.945	
C27 13a(H),17b(H)-20R-Diasterane	U	1.89	0.945	
C28 13b(H),17a(H)-20S-Diasterane	U	1.89	0.945	
C28 13a(H),17b(H)-20S-Diasterane	U	1.89	0.945	
C28 13a(H),17b(H)-20R-Diasterane	U	1.89	0.945	
C27 14a(H),17a(H)-20S-Cholestane	U	1.89	0.945	
C27 14b(H),17b(H)-20R-Cholestane	U	1.89	0.945	
C27 14b(H),17b(H)-20S-Cholestane	U	1.89	0.945	
C27 14a(H),17a(H)-20R-Cholestane	U	1.89	0.945	
C29 13b(H),17a(H)-20S-Diasterane	U	1.89	0.945	
C29 13b(H),17a(H)-20R-Diasterane	U	1.89	0.945	
C28 14a(H),17a(H)-20S-Methylcholestane	U	1.89	0.945	
C28 14b(H),17b(H)-20R-Methylcholestane	U	1.89	0.945	
C28 14b(H),17b(H)-20S-Methylcholestane	U	1.89	0.945	
C28 14a(H),17a(H)-20R-Methylcholestane	U	1.89	0.945	
C29 14a(H),17a(H)-20S-Ethylcholestane	U	1.89	0.945	
C29 14b(H),17b(H)-20R-Ethylcholestane	U	1.89	0.945	
C29 14b(H),17b(H)-20S-Ethylcholestane	U	1.89	0.945	
C29 14a(H),17a(H)-20R-Ethylcholestane	U	1.89	0.945	
Total Triterpanes	U	1.89	0.945	
Total Steranes	U	1.89	0.945	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02-D		
File ID:	E012910.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0264
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
5b(H)-Cholane	85	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	U	1.92	0.960	
C20 Tricyclic terpane	U	1.92	0.960	
C21 Tricyclic terpane	U	1.92	0.960	
C22 Tricyclic terpane	U	1.92	0.960	
C23 Tricyclic terpane	U	1.92	0.960	
C24 Tricyclic terpane	U	1.92	0.960	
C25 Tricyclic terpane-22S	U	1.92	0.960	
C25 Tricyclic terpane-22R	U	1.92	0.960	
C26 Tricyclic terpane-22S	U	1.92	0.960	
C26 Tricyclic terpane-22R	U	1.92	0.960	
C24 Tetracyclic terpane	U	1.92	0.960	
C28 Tricyclic terpane-22S	U	1.92	0.960	
C28 Tricyclic terpane-22R	U	1.92	0.960	
C29 Tricyclic terpane-22S	U	1.92	0.960	
C29 Tricyclic terpane-22R	U	1.92	0.960	
18a(H)-22,29,30-Trisnorneohopane - Ts	U	1.92	0.960	
C30 Tricyclic terpane-22S	U	1.92	0.960	
C30 Tricyclic terpane-22R	U	1.92	0.960	
17a(H)-22,29,30-Trisnorhopane - Tm	U	1.92	0.960	
17b(H)-22,29,30-Trisnorhopane	U	1.92	0.960	
17a(H)-29,30-Bisnorhopane	U	1.92	0.960	
17b(H),21b(H)-28,30-Bisnorhopane	U	1.92	0.960	
17b(H),21a(H)-28,30-Bisnorhopane	U	1.92	0.960	
17a(H),21b(H)-28,30-Bisnorhopane	U	1.92	0.960	
17a(H),21b(H)-25-Norhopane	U	1.92	0.960	
30-Norhopane	U	1.92	0.960	
18a(H)-30-Norneohopane - C29Ts	U	1.92	0.960	
15a-methyl-17a(H)-27-Norhopane	U	1.92	0.960	
Oleananes	U	1.92	0.960	
Hopane	U	1.92	0.960	
Moretane	U	1.92	0.960	
17a(H),21b(H)-30-Homohopane-22S	U	1.92	0.960	
17a(H),21b(H)-30-Homohopane-22R	U	1.92	0.960	
Gammacerane	U	1.92	0.960	
17b(H),21b(H)-Hopane	U	1.92	0.960	
30-Homomoretane-22R	U	1.92	0.960	
Hop-22(29)-ene	U	1.92	0.960	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	1.92	0.960	
30,31-Bishomohopane-22R	U	1.92	0.960	
30,31-Bishomomoretane-22R	U	1.92	0.960	
17b(H),21b(H)-Homohopane-22R	U	1.92	0.960	
30,31,32-Trishomohopane-22S	U	1.92	0.960	
30,31,32-Trishomohopane-22R	U	1.92	0.960	
30,31,32,33-Tetrakishomohopane-22S	U	1.92	0.960	
30,31,32,33-Tetrakishomohopane-22R	U	1.92	0.960	
30,31,32,33,34-Pentakishomohopane-22S	U	1.92	0.960	
30,31,32,33,34-Pentakishomohopane-22R	U	1.92	0.960	
Steranes				
C20 14a(H),17a(H)-Sterane	U	1.92	0.960	
C21 14b(H),17b(H)-Sterane	U	1.92	0.960	
C22 14b(H),17b(H)-Sterane	U	1.92	0.960	
C27 13b(H),17a(H)-20S-Diasterane	U	1.92	0.960	
C27 13b(H),17a(H)-20R-Diasterane	U	1.92	0.960	
C27 13a(H),17b(H)-20S-Diasterane	U	1.92	0.960	
C27 13a(H),17b(H)-20R-Diasterane	U	1.92	0.960	
C28 13b(H),17a(H)-20S-Diasterane	U	1.92	0.960	
C28 13a(H),17b(H)-20S-Diasterane	U	1.92	0.960	
C28 13a(H),17b(H)-20R-Diasterane	U	1.92	0.960	
C27 14a(H),17a(H)-20S-Cholestane	U	1.92	0.960	
C27 14b(H),17b(H)-20R-Cholestane	U	1.92	0.960	
C27 14b(H),17b(H)-20S-Cholestane	U	1.92	0.960	
C27 14a(H),17a(H)-20R-Cholestane	U	1.92	0.960	
C29 13b(H),17a(H)-20S-Diasterane	U	1.92	0.960	
C29 13b(H),17a(H)-20R-Diasterane	U	1.92	0.960	
C28 14a(H),17a(H)-20S-Methylcholestane	U	1.92	0.960	
C28 14b(H),17b(H)-20R-Methylcholestane	U	1.92	0.960	
C28 14b(H),17b(H)-20S-Methylcholestane	U	1.92	0.960	
C28 14a(H),17a(H)-20R-Methylcholestane	U	1.92	0.960	
C29 14a(H),17a(H)-20S-Ethylcholestane	U	1.92	0.960	
C29 14b(H),17b(H)-20R-Ethylcholestane	U	1.92	0.960	
C29 14b(H),17b(H)-20S-Ethylcholestane	U	1.92	0.960	
C29 14a(H),17a(H)-20R-Ethylcholestane	U	1.92	0.960	
Total Triterpanes	U	1.92	0.960	
Total Steranes	U	1.92	0.960	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-135

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-02DUP-D		
File ID:	E012911.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0260
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
5b(H)-Cholane	72	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	1000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	U	100	50.0	
C20 Tricyclic terpane	U	100	50.0	
C21 Tricyclic terpane	U	100	50.0	
C22 Tricyclic terpane	U	100	50.0	
C23 Tricyclic terpane	U	100	50.0	
C24 Tricyclic terpane	U	100	50.0	
C25 Tricyclic terpane-22S	U	100	50.0	
C25 Tricyclic terpane-22R	U	100	50.0	
C26 Tricyclic terpane-22S	U	100	50.0	
C26 Tricyclic terpane-22R	U	100	50.0	
C24 Tetracyclic terpane	U	100	50.0	
C28 Tricyclic terpane-22S	U	100	50.0	
C28 Tricyclic terpane-22R	U	100	50.0	
C29 Tricyclic terpane-22S	U	100	50.0	
C29 Tricyclic terpane-22R	U	100	50.0	
18a(H)-22,29,30-Trisnorneohopane - Ts	U	100	50.0	
C30 Tricyclic terpane-22S	U	100	50.0	
C30 Tricyclic terpane-22R	U	100	50.0	
17a(H)-22,29,30-Trisnorhopane - Tm	U	100	50.0	
17b(H)-22,29,30-Trisnorhopane	U	100	50.0	
17a(H)-29,30-Bisnorhopane	U	100	50.0	
17b(H),21b(H)-28,30-Bisnorhopane	U	100	50.0	
17b(H),21a(H)-28,30-Bisnorhopane	U	100	50.0	
17a(H),21b(H)-28,30-Bisnorhopane	U	100	50.0	
17a(H),21b(H)-25-Norhopane	U	100	50.0	
30-Norhopane	U	100	50.0	
18a(H)-30-Norneohopane - C29Ts	U	100	50.0	
15a-methyl-17a(H)-27-Norhopane	U	100	50.0	
Oleananes	U	100	50.0	
Hopane	U	100	50.0	
Moretane	U	100	50.0	
17a(H),21b(H)-30-Homohopane-22S	U	100	50.0	
17a(H),21b(H)-30-Homohopane-22R	U	100	50.0	
Gammacerane	U	100	50.0	
17b(H),21b(H)-Hopane	U	100	50.0	
30-Homomoretane-22R	U	100	50.0	
Hop-22(29)-ene	U	100	50.0	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	1000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	100	50.0	
30,31-Bishomohopane-22R	U	100	50.0	
30,31-Bishomomoretane-22R	U	100	50.0	
17b(H),21b(H)-Homohopane-22R	U	100	50.0	
30,31,32-Trishomohopane-22S	U	100	50.0	
30,31,32-Trishomohopane-22R	U	100	50.0	
30,31,32,33-Tetrakishomohopane-22S	U	100	50.0	
30,31,32,33-Tetrakishomohopane-22R	U	100	50.0	
30,31,32,33,34-Pentakishomohopane-22S	U	100	50.0	
30,31,32,33,34-Pentakishomohopane-22R	U	100	50.0	
Steranes				
C20 14a(H),17a(H)-Sterane	U	100	50.0	
C21 14b(H),17b(H)-Sterane	U	100	50.0	
C22 14b(H),17b(H)-Sterane	U	100	50.0	
C27 13b(H),17a(H)-20S-Diasterane	U	100	50.0	
C27 13b(H),17a(H)-20R-Diasterane	U	100	50.0	
C27 13a(H),17b(H)-20S-Diasterane	U	100	50.0	
C27 13a(H),17b(H)-20R-Diasterane	U	100	50.0	
C28 13b(H),17a(H)-20S-Diasterane	U	100	50.0	
C28 13a(H),17b(H)-20S-Diasterane	U	100	50.0	
C28 13a(H),17b(H)-20R-Diasterane	U	100	50.0	
C27 14a(H),17a(H)-20S-Cholestane	U	100	50.0	
C27 14b(H),17b(H)-20R-Cholestane	U	100	50.0	
C27 14b(H),17b(H)-20S-Cholestane	U	100	50.0	
C27 14a(H),17a(H)-20R-Cholestane	U	100	50.0	
C29 13b(H),17a(H)-20S-Diasterane	U	100	50.0	
C29 13b(H),17a(H)-20R-Diasterane	U	100	50.0	
C28 14a(H),17a(H)-20S-Methylcholestane	U	100	50.0	
C28 14b(H),17b(H)-20R-Methylcholestane	U	100	50.0	
C28 14b(H),17b(H)-20S-Methylcholestane	U	100	50.0	
C28 14a(H),17a(H)-20R-Methylcholestane	U	100	50.0	
C29 14a(H),17a(H)-20S-Ethylcholestane	U	100	50.0	
C29 14b(H),17b(H)-20R-Ethylcholestane	U	100	50.0	
C29 14b(H),17b(H)-20S-Ethylcholestane	U	100	50.0	
C29 14a(H),17a(H)-20R-Ethylcholestane	U	100	50.0	
Total Triterpanes	U	100	50.0	
Total Steranes	U	100	50.0	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090128-MB		
File ID:	E012904.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	1/28/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/29/2009	Extract Volume (µl):	1000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
5b(H)-Cholane	110	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				RPD
C19 Tricyclic terpane	U	1.85	0.925	NA
C20 Tricyclic terpane	U	1.85	0.925	NA
C21 Tricyclic terpane	U	1.85	0.925	NA
C22 Tricyclic terpane	U	1.85	0.925	NA
C23 Tricyclic terpane	U	1.85	0.925	NA
C24 Tricyclic terpane	U	1.85	0.925	NA
C25 Tricyclic terpane-22S	U	1.85	0.925	NA
C25 Tricyclic terpane-22R	U	1.85	0.925	NA
C26 Tricyclic terpane-22S	U	1.85	0.925	NA
C26 Tricyclic terpane-22R	U	1.85	0.925	NA
C24 Tetracyclic terpane	U	1.85	0.925	NA
C28 Tricyclic terpane-22S	U	1.85	0.925	NA
C28 Tricyclic terpane-22R	U	1.85	0.925	NA
C29 Tricyclic terpane-22S	U	1.85	0.925	NA
C29 Tricyclic terpane-22R	U	1.85	0.925	NA
18a(H)-22,29,30-Trisnorneohopane - Ts	U	1.85	0.925	NA
C30 Tricyclic terpane-22S	U	1.85	0.925	NA
C30 Tricyclic terpane-22R	U	1.85	0.925	NA
17a(H)-22,29,30-Trisnorhopane - Tm	U	1.85	0.925	NA
17b(H)-22,29,30-Trisnorhopane	U	1.85	0.925	NA
17a(H)-29,30-Bisnorhopane	U	1.85	0.925	NA
17b(H),21b(H)-28,30-Bisnorhopane	U	1.85	0.925	NA
17b(H),21a(H)-28,30-Bisnorhopane	U	1.85	0.925	NA
17a(H),21b(H)-28,30-Bisnorhopane	U	1.85	0.925	NA
17a(H),21b(H)-25-Norhopane	U	1.85	0.925	NA
30-Norhopane	U	1.85	0.925	NA
18a(H)-30-Norneohopane - C29Ts	U	1.85	0.925	NA
15a-methyl-17a(H)-27-Norhopane	U	1.85	0.925	NA
Oleananes	U	1.85	0.925	NA
Hopane	U	1.85	0.925	NA
Moretane	U	1.85	0.925	NA
17a(H),21b(H)-30-Homohopane-22S	U	1.85	0.925	NA
17a(H),21b(H)-30-Homohopane-22R	U	1.85	0.925	NA
Gammacerane	U	1.85	0.925	NA
17b(H),21b(H)-Hopane	U	1.85	0.925	NA
30-Homomoretane-22R	U	1.85	0.925	NA
Hop-22(29)-ene	U	1.85	0.925	NA

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	1.85	0.925	NA
30,31-Bishomohopane-22R	U	1.85	0.925	NA
30,31-Bishomomoretane-22R	U	1.85	0.925	NA
17b(H),21b(H)-Homohopane-22R	U	1.85	0.925	NA
30,31,32-Trishomohopane-22S	U	1.85	0.925	NA
30,31,32-Trishomohopane-22R	U	1.85	0.925	NA
30,31,32,33-Tetrakishomohopane-22S	U	1.85	0.925	NA
30,31,32,33-Tetrakishomohopane-22R	U	1.85	0.925	NA
30,31,32,33,34-Pentakishomohopane-22S	U	1.85	0.925	NA
30,31,32,33,34-Pentakishomohopane-22R	U	1.85	0.925	NA
Steranes				
C20 14a(H),17a(H)-Sterane	U	1.85	0.925	NA
C21 14b(H),17b(H)-Sterane	U	1.85	0.925	NA
C22 14b(H),17b(H)-Sterane	U	1.85	0.925	NA
C27 13b(H),17a(H)-20S-Diasterane	U	1.85	0.925	NA
C27 13b(H),17a(H)-20R-Diasterane	U	1.85	0.925	NA
C27 13a(H),17b(H)-20S-Diasterane	U	1.85	0.925	NA
C27 13a(H),17b(H)-20R-Diasterane	U	1.85	0.925	NA
C28 13b(H),17a(H)-20S-Diasterane	U	1.85	0.925	NA
C28 13a(H),17b(H)-20S-Diasterane	U	1.85	0.925	NA
C28 13a(H),17b(H)-20R-Diasterane	U	1.85	0.925	NA
C27 14a(H),17a(H)-20S-Cholestane	U	1.85	0.925	NA
C27 14b(H),17b(H)-20R-Cholestane	U	1.85	0.925	NA
C27 14b(H),17b(H)-20S-Cholestane	U	1.85	0.925	NA
C27 14a(H),17a(H)-20R-Cholestane	U	1.85	0.925	NA
C29 13b(H),17a(H)-20S-Diasterane	U	1.85	0.925	NA
C29 13b(H),17a(H)-20R-Diasterane	U	1.85	0.925	NA
C28 14a(H),17a(H)-20S-Methylcholestane	U	1.85	0.925	NA
C28 14b(H),17b(H)-20R-Methylcholestane	U	1.85	0.925	NA
C28 14b(H),17b(H)-20S-Methylcholestane	U	1.85	0.925	NA
C28 14a(H),17a(H)-20R-Methylcholestane	U	1.85	0.925	NA
C29 14a(H),17a(H)-20S-Ethylcholestane	U	1.85	0.925	NA
C29 14b(H),17b(H)-20R-Ethylcholestane	U	1.85	0.925	NA
C29 14b(H),17b(H)-20S-Ethylcholestane	U	1.85	0.925	NA
C29 14a(H),17a(H)-20R-Ethylcholestane	U	1.85	0.925	NA
Total Triterpanes	U	1.85	0.925	NA
Total Steranes	U	1.85	0.925	NA

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-123

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090121-01DUP-D		
File ID:	E012909.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	12/20/2008	Decanted:	None
Date Received:	1/21/2009		
Date Prepared:	1/28/2009	Sample Size (g):	0.0270
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	1/30/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090128-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
5b(H)-Cholane	87	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Appendix G

Physical Properties Results

16840 Barker Springs #302
Houston, Texas 77084

(281) 578-2289
Fax: (281) 578-2295
villalanti@earthlink.net

Triton Analytics Corp.
Reference Laboratories

- Hydrocarbon
- Chemical
- Environmental

Dan Villalanti, *Pres.* • Joe Raia, *Lab Director* • Calvin Blakley, *Mass Spec* • Jeanne Malloy, *GC*

Requested By: James Roush/ Meta Environmental
Project Name: CH2M Hill- Quanta Site
TAC Reference#: 5877
Date:2/09/09

Sample Name	CH090121-01			CH090121-02		
Trial No.	1	2	3	1	2	3
Interfacial Tension (mN/m)@25C	16.12	16.58	17.25	5.55	6.09	5.69
Average (mN/m)		16.65			5.78	
Standard Deviation (mN/m)		0.57			0.28	
Kinematic Viscosity @10C, mm2/s		633			38.2	
Kinematic Viscosity @20C, mm2/s		230			22.7	
Kinematic Viscosity @25C, mm2/s		150			17.7	
Density @10C, g/cm3		1.1324			1.0937	
Density @20C, g/cm3		1.1256			1.0869	
Density @ 25C, g/cm3		1.1222			1.0835	

Note:
1. The samples were measured at room temperature, 20C.
2. The drop was taken 30 seconds after the drop was formed for stabilization.
3. Milli-Q water was used. The temperature of the water was the room temperature.

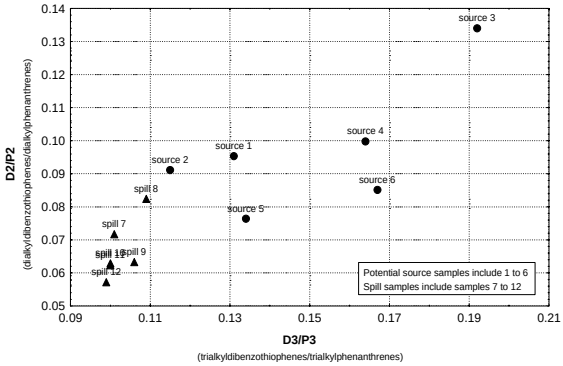
Methods:
1. Interfacial Tension by ASTM D971
2. Density by ASTM D4052
3. Kinematic Viscosity by ASTM D7042

Environmental Forensic Report

Quanta Site – Edgewater, NJ

SDG: CH090217

Figure 1. Double Ratio Plot



Report To:

CH2M Hill
3011 S.W. Williston Road
Gainesville, FL 32608-3928

Report By:

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472

April 13, 2009

Identifying and allocating sources of pollutants in complex environments.

META Environmental, Inc.
ENGINEERING & CHEMISTRY

Final Laboratory Report

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472
Phone: 617-923-4662
Fax: 617-923-4610
E-Mail meta@metaenv.com

Certification

This certifies that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed herein. The results included in this data report relate only to the samples as received and analyzed by the laboratory.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and Quality Assurance Officer, as verified by the following signatures.

James A. Roush — April 13, 2009

James A. Roush
Environmental Scientist

Date

David M. Mauro — April 13, 2009

David M. Mauro
Senior Scientist, Quality Assurance Officer

Date

Sample Delivery Group Narrative

Project:	Quanta Site – Edgewater, NJ
Client	CH2M Hill
Report Contact:	Amy Klopper
Dates of Receipt:	February 17, 2009
Sample Summary:	The sample received for this project is summarized in the attached sample login forms. (Appendix A)
META Project Number:	C01007-60
SDG No.:	CH090217
Total Pages in Report:	69

Chain of Custody

The sample was received in good condition. The internal temperature of the shipping container was above the recommended 2-6°C range and was as follows:

Samples received: 02/17/2009 7.0°C Ice Present

Internal chain of custody procedures were followed after sample receipt. Samples were stored in a locked refrigerator. A sample custody logbook contains the record of sample removal from the secure sample storage area to the sample preparation laboratory. The custody record for the sample extracts is present on the sample extraction logbook page.

The disposal of samples and extracts will be authorized one month after the release of this data report. Sample disposal will be documented.

Methods

The non-aqueous phase liquid (NAPL) sample was prepared by waste dilution (EPA 3580) using dichloromethane (DCM). The extracts were spiked with internal standard and analyzed by GC/FID (EPA 8100M) for fingerprinting and by GC/MS/SIM (EPA 8270M) for mono- and polycyclic aromatic hydrocarbons (MAHs and PAHs), alkyl PAH homologues, petroleum biomarkers, and other selected compounds.

Results

Sample results are presented in several appendices which follow this narrative.

Appendix B: GC/FID Fingerprints
Appendix C: MAH/PAH Concentrations
Appendix D: Extended MAH/PAH Profiles - Histograms
Appendix E: Extracted Ion Current Profiles (EICPs)
Appendix F: Petroleum Biomarkers Concentrations
Appendix G: Petroleum Biomarker Histograms
Appendix H: Petroleum Biomarker EICPs
Appendix I: Physical Properties Results

Quality Control

Analyte Flags

The detection limits were determined as the sample equivalent of the lowest linear initial calibration standard. Analytes measured between 50% and 100% of the lowest standard were reported as "estimated" and flagged with the letter "J." Undetected analytes were reported as null and flagged with the letter, "U." Analytes marked with a "B" were detected in the associated blank and should be reviewed for a possible positive bias. No deviations were thought significant enough to compromise the integrity of the reported values.

Holding Times

The NAPL sample was extracted within the recommended holding time. The sample and extracts were stored at 4°C ± 2°C prior to extraction and analysis. The extracts were analyzed within 40 days of sample preparation.

Surrogate Spikes

Extraction surrogates were added to all samples prior to extraction. All surrogate compounds were recovered within the 50%-120% acceptable criterion.

Blanks

No compounds were detected above the reporting limit (RL) in method blank QC090226-MB.

Blank Spikes

A blank spike sample was extracted with the NAPL batch. All spiked compounds were recovered within criteria (70%-120%), with the exception of acenaphthylene (122%) in QC090226-MBS.

Matrix Spike

Matrix spikes were not performed on the NAPL sample.

Duplicates

Sample *MW-105A-021109-L* was extracted and analyzed in duplicate. Relative percent differences are reported with the sample results in Appendix C.

Internal Standards

Internal standards were recovered within acceptable QC limits (50%-200%) relative to the continuing calibration standards.

Interpretation

Introduction

One sample of NAPL was received by META from the Quanta site on February 17, 2009. The sample was analyzed for a hydrocarbon fingerprint, an expanded list of MAHs and PAHs, and petroleum biomarkers.

This report summarizes the findings and compares the samples.

Chemical Fingerpringing Techniques

A detailed description of chemical fingerprinting techniques can be found under this section in report ***CH090206-16 Report.doc*** dated April 14, 2009.

Discussion

Sample *MW-105A-021109-L* contained a pyrogenic, and one or more petrogenic materials. The pyrogenic material was characterized by a distribution of unsubstituted polycyclic aromatic hydrocarbons (PAHs) containing 2-, 3-, 4-, 5-, and 6-rings with the 2-ring and 3-ring PAHs most abundant. The fluoranthene/pyrene (Fl/Py) ratio of 1.29 (Table 2) is consistent with tars produced from manufactured gas plants (MGPs) utilizing coal carbonization processes (Figures 1 & 2) as well as some coke oven tars and other coal tar products, such as creosote. The reduced level of naphthalene relative to phenanthrene indicates a substantial amount of environmentally induced degradation, also known as weathering, has occurred.

The primary petrogenic material found in sample *MW-105A-021109-L* was represented by a late eluting unresolved complex mixture (UCM) starting at around 25 minutes, peaking at about 40 minutes and ending after 55 minutes. The material also contained the sesquiterpane, triterpane and sterane classes of petroleum biomarkers, confirming the petrogenic nature of the material. This pattern is consistent with high molecular weight lubricating oils, such as motor oil, gear oil, and some hydraulic oils present in META's reference library. Sample MW-105A-021109-L also contained a light petroleum substance that resembles weathered kerosene or severely weathered gasoline; however a definitive identification could not be determined.

Table 1: Sample Specific Observations

Field ID	Lab ID	Matrix	Comments	Fl/Py	Class	Tentative Identification
MW-105A-021109-L	CH090217-01	NAPL	Wide range distribution of PAHs with the 2-, 3- and 4-ring PAHs most abundant. Reduced naphthalene indicating substantial environmentally induced degradation; late eluting UCM with few resolved peaks present. Also, an early eluting UCM with regular series of alkylcyclohexanes. Total PP-PAH: 47,500 mg/kg.	1.29	Pyrogenic/ Petrogenic	Mixed sources: coal tar or creosote, plus unidentified heavy oil and possible weathered kerosene

---

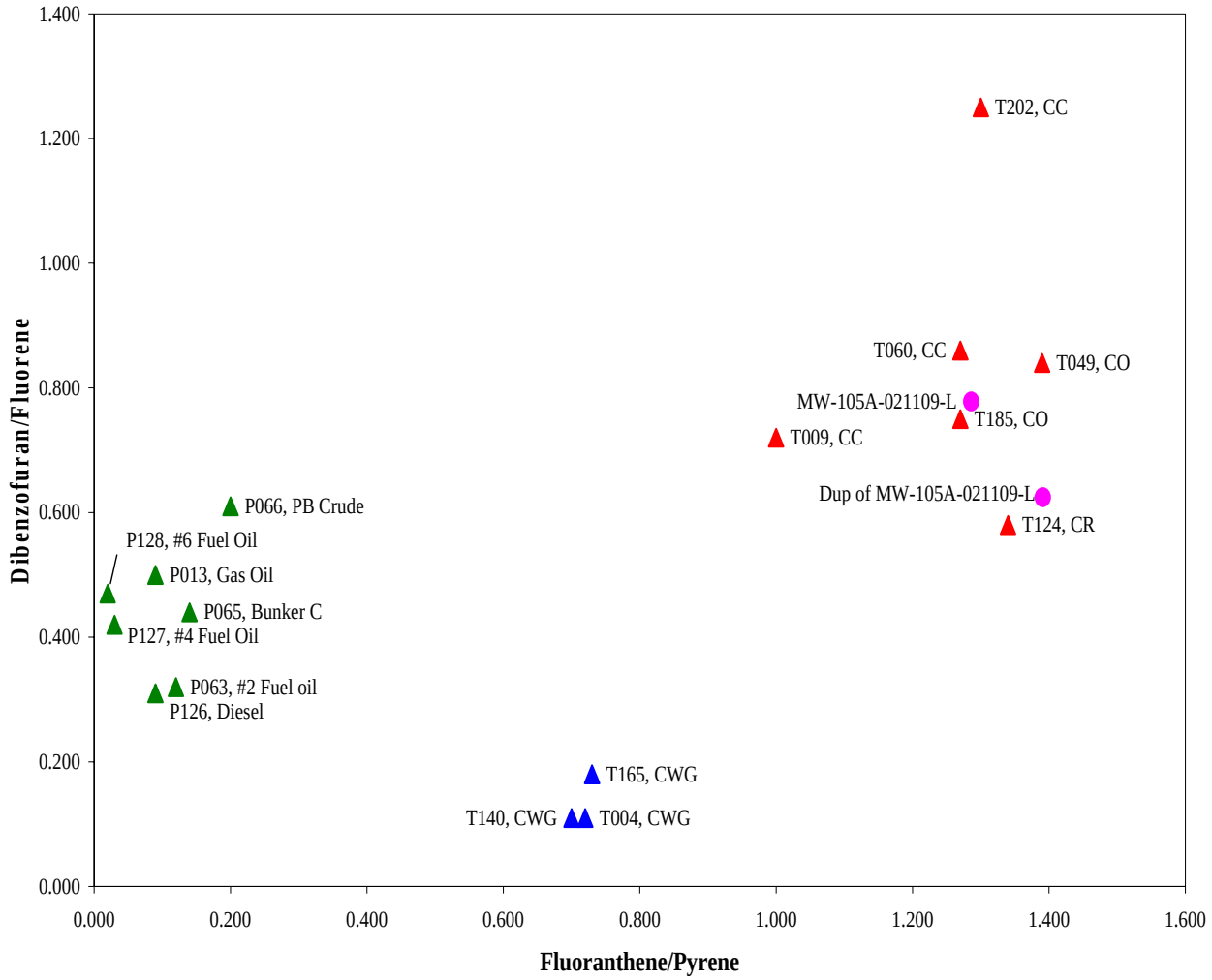
Table 2: Selected Source and Weathering Ratios

Field ID	Fl/Py	D/F	C17/Pris	C18/Phy	Pris/Phy	C3D/C3PA	C2D/C2PA	BF/MP
MW-105A-021109-L	1.286	0.778	0.122	0.083	0.712	0.470	0.302	1.006
Dup of MW-105A-021109-L	1.391	0.624	0.124	0.089	0.720	0.453	0.323	1.009

Ratios:

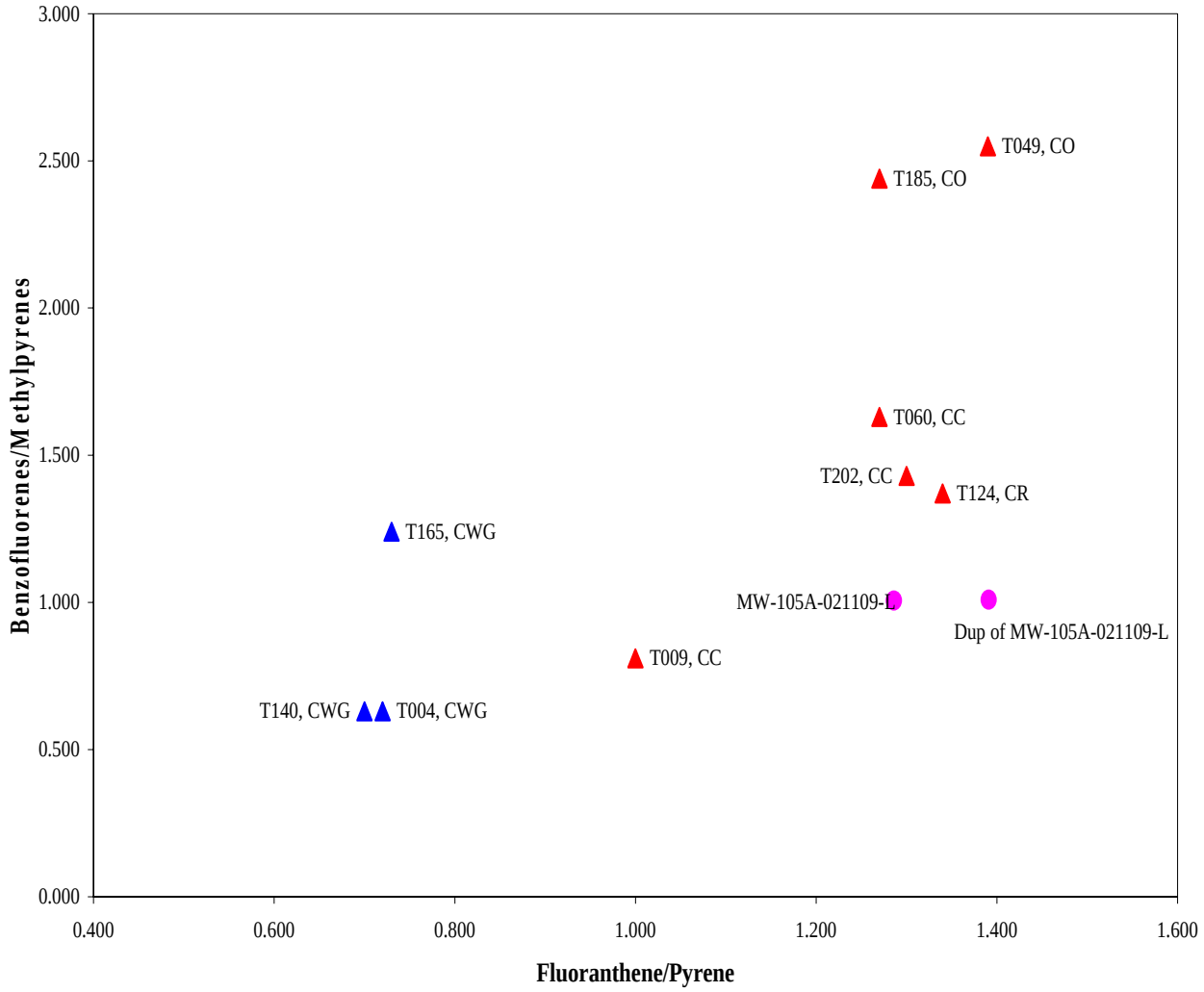
Fl/Py	fluoranthene/pyrene
D/F	dibenzofuran/fluorene
C17/Pris	heptadecane/pristane
C18/Phy	octadecane/phytane
Pris/Phy	pristane/phytane
C3D/C3PA	trialkyldibenzothiophenes/trialkylphenanthrenes/anthracenes
C2D/C2PA	dialkyldibenzothiophenes/dialkylphenanthrenes/anthracenes
BF/MP	benzofluorenes/methylpyrenes
NC	not calculable

Figure 1. Selected Diagnostic Ratios – Fl/Py v. D/F



TXXX	Tar Sample from META's in house source library
CC	Coal Carbonization Tar
CO	Coke Oven Tar
CR	Creosote
CWG	Carbureted Water Gas Tar
●	Field Samples

Figure 2. Selected Diagnostic Ratios – Fl/Py v. BF/MP



TXXX	Tar Sample from META's in house source library
CC	Coal Carbonization Tar
CO	Coke Oven Tar
CR	Creosote
CWG	Carbureted Water Gas Tar
●	Field Samples

Definitions

Pyrogenic substances are complex mixtures of primarily hydrocarbons produced from organic matter subjected to high temperatures but with insufficient oxygen for complete combustion. Pyrogenic materials are produced by fires, internal combustion engines, and furnaces. They also are formed when coke or gas are produced from coal or oil. Coal-tar based products, such as roofing, pavement sealers, waterproofing, pesticides, and some shampoos contain pyrogenic materials.

Petrogenic substances include crude oil and crude oil derivatives such as gasoline, heating oil, and asphalt.

Pitch is the semi-solid or solid material consisting of high molecular weight hydrocarbons that remain following coal tar distillation.

References

McNicoll, D., Tousignant, L.P., Augustine, P. "Facts and Fallacies: Petroleum Degradation in a Subsurface Environment." Contaminated Soil Sediment and Water, 17-21, June,July 2001

"Chemical Fingerprinting of Hydrocarbons," in: Introduction to Environmental Forensics. B.L. Murphy and R.D. Morrison editors, Academic Press, San Diego, CA 2002.

Mauro, D.M., "Chemical Source Attribution at former MGP Sites," EPRI Report 1000728, December 2000.

Appendix A

Chain of Custody

META Environmental, Inc
49 Clarendon Street
Watertown, MA 2472

Honeywell — Chain Of Custody / Analysis Request

AESI Ref:	39860.70477
COC#	D21609-1
	META-37380-120908-1

Privileged & Confidential	Y	Site Name:	Quanta Resources (Edgewater)
Location of Site:	EDGEWATER, NJ	Phase:	RI
Sampling Program	Quanta OU1 Allocation Support	Lab Proj # (SDG):	
Lab ID	META	Site ID	QUANTA
Lab Job #		Authorized User:	Honeywell

Sampling Co.:	CH2MHILL
Client Contact: (name, co., address)	Helen Fahy, 101 Columbia Rd, Morristown, NJ 07962
Preliminary Data To	Amy.Klopper@ch2m.com
Sample Receipt Acknowledgement To	Amy.Klopper@ch2m.com, Dana.Bentley@ch2m.com, Paul.Taylor@ch2m.com
Hard Copy To	Amy.Klopper@ch2m.com
Invoice To:	Honeywell
EDD To:	Load into LocusFocus. Send copy to Dana.Bentley@ch2m.com,
Sampler:	La Fortune, Lisa
PO #	
Analysis Turnaround Time (TAT):	21
Consultant	CH2M
Full Report TAT:	21

Text & Excel File Drive | Excel & Text File Order

Copyright AESI: Version 8.0 Unauthorized use strictly prohibited.

	Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID	Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Composite/Grab	Field Filtered Sample ?	EPA 8100M-Fingerprinting	EPA 8270M-PAHs/Petroleum Biomarkers	EPA 8270M-Full Petroleum Biomarkers	SW6010 -Metals	SW8082-PCBs	SW8260-VOCs	SW8270-SVOCs	ASTM D931 - oil under Interfacial Tension	ASTM D287 - Specific Gravity	ASTM D7042 - kinematic Viscosity @ temp	ASTM D4052 - Density			Sampling Method (code)	Lab Sample Numbers
											Units																
1	MW-105A	—	—	MW-105A-021109-L	02/11/09	10:30	LNAPL	LNAPL	Reg	1	C	N	X	X	X	X	X	X	X	X	X	X	X			CH09027	07
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
12																											

Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
Lisa La Fort	CH2M Hill	Rachel Guilt	Date/Time 2/17/09 10:22	Cooler Temp. 7.0°C	
Date/Time 02/16/09 16:30					
Relinquished by	Company	Received by	Company	Condition	Custody Seals Intact
	Date/Time		Date/Time	Cooler Temp.	

Preservatives: (Other; Specify):

0 (none); 1 (4 Deg C); 2 (HCl pH<2); 3 (HNO3 pH<2); 4 (H2SO4 pH<2); 5 (NaOH pH>12); 6 (NaOH, Zn Acetate); 7 (H2SO4 (pH<2), 4 Deg C)); 8 (HCl pH<2); 9 (HCl 4 Deg C); 10 (HNO3 (pH<2), 4Deg C); 11 (4C NaOH (pH>12) & Ascorbic Acid); 12 (4C H2SO4 (pH<2) & Na2S2O3); 13 (Zn Acetate); sp (special instructions)

META Environmental, Inc.

Sample Receipt Log

Lab ID	Field ID	Matrix	Prep Method	Cleanup Method	Analysis Method	Date Sampled	Date Received	Project #	Container	Comments	Client Name	Project Name
CH090217-01	MW-105A-021109-L	LNAPL	2512		4007/4008/4011/~~4014~~ ~~4016~~ JAL 2/20/09	2/11/2009	2/17/2009	C01007-60	1 x 1L jar	Sub for Physical Properties	CH2M Hill	Quanta Site-Edgewater, NJ

Logged By: RJ

Date: 2/17/09

Reviewed By: JAL

Date: 2/20/09

META Environmental, Inc.
Sample Receipt Checklist

Receipt date: 2/17/09

Login date: 2/17/09

Login personnel: RS

Client Information:.

Company Name: CH2M Hill

Project Manager: Amy Klopper

Project Name: Quanta

Shipping Information:

How were samples received? UPS FedEx DHL Other:

Number of coolers: 1

Internal temperature of coolers: 7.0°C

Was ice present? Yes / No

Note: if cooler is outside the 2-6° range, META's project manager should be notified.

Documentation:

Was a Chain of Custody present? Yes / No

Was it signed? Yes / No

Was all project information present on the COC? Yes / No

Was a bill of lading or shipping label retained? Yes / No

Sample Information:

Number of sample containers: 1

Does this match the COC? Yes / No

Were all sample containers Intact? Yes / No

If no, list samples and problems:

Note: if samples are damaged, META's project manager should be notified.

For aqueous 40ml Voas; was headspace present? Yes / No / NA

Comments:

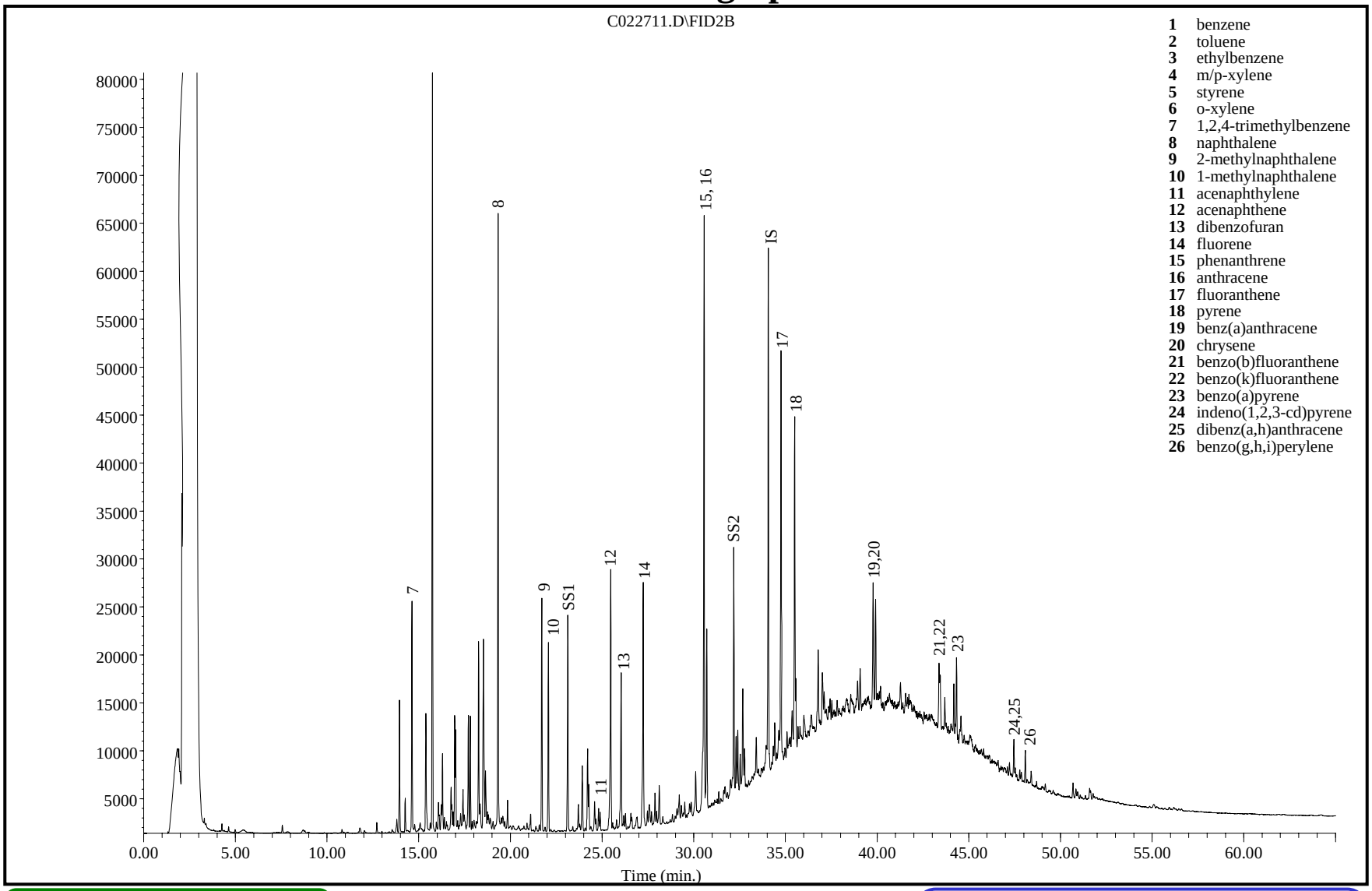
Custodian: Rachel Ford

Project Manager: [signature]

Appendix B

GC/FID Fingerprints

GC/FID Fingerprint

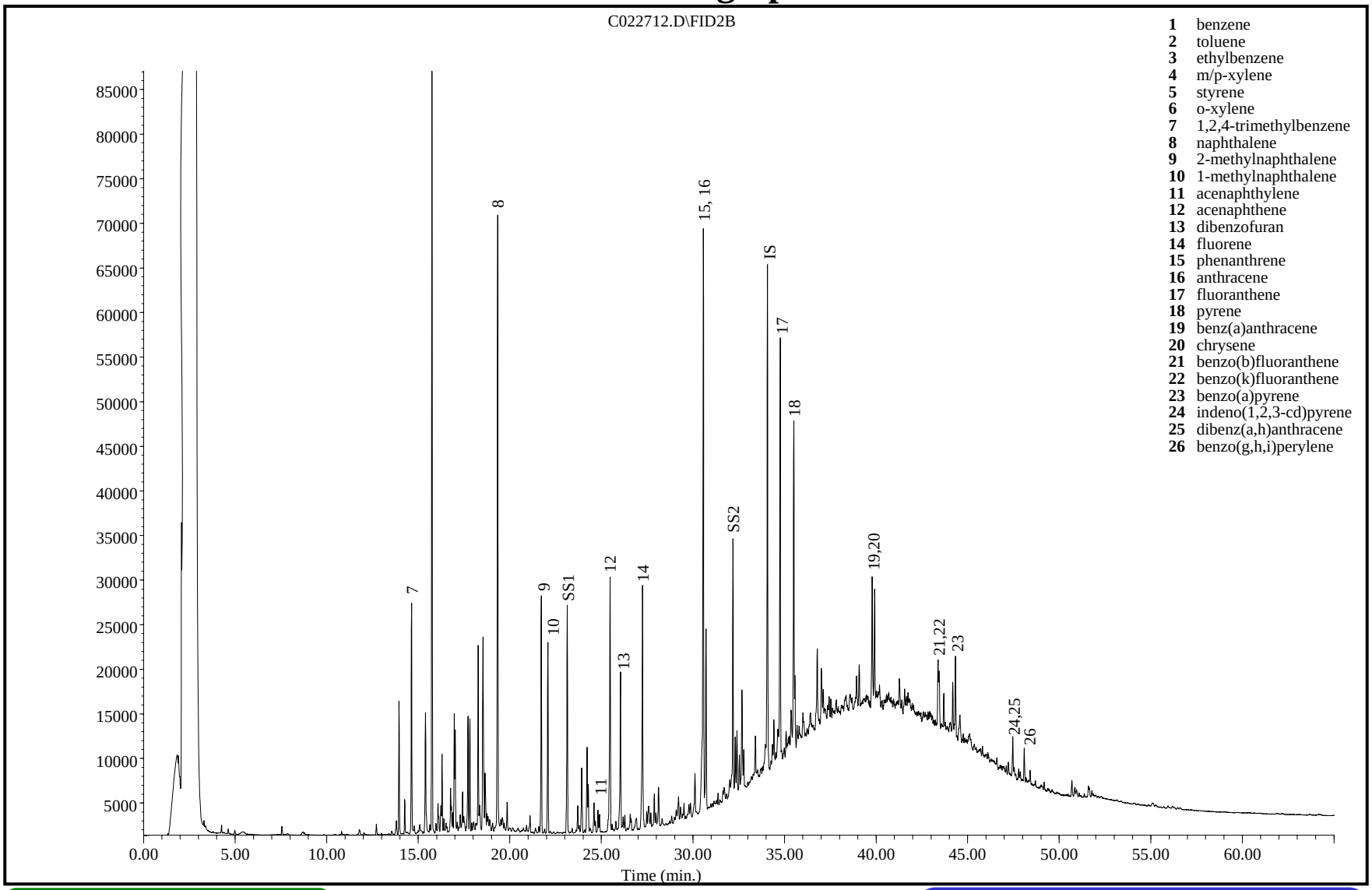


Extraction Date: 02/26/2009
Analysis Date: 02/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-105A-021109-L**
Laboratory ID: CH090217-01
Method: EPA 8100M

GC/FID Fingerprint

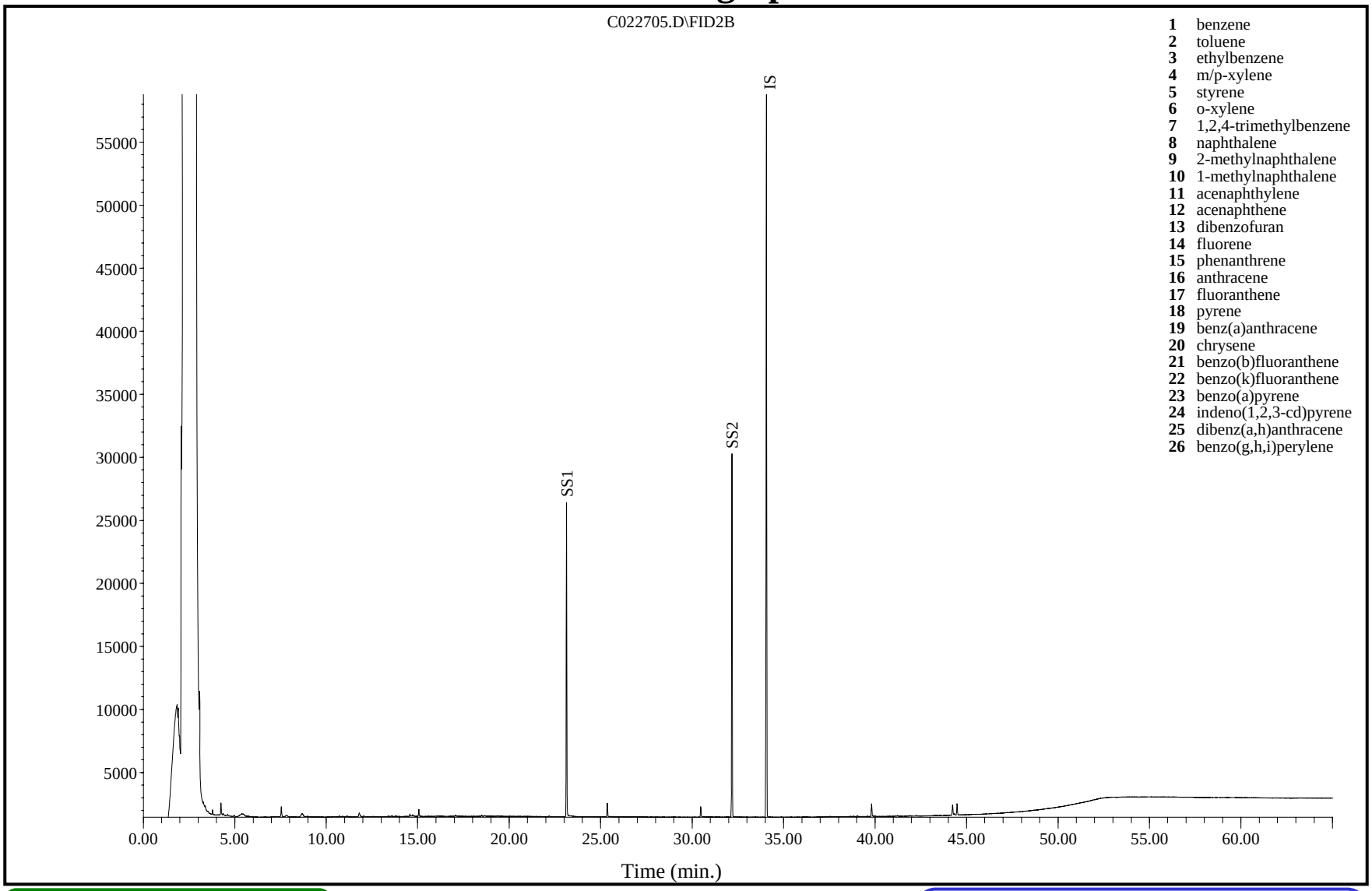


Extraction Date: 02/26/2009
Analysis Date: 02/28/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **MW-105A-021109-L**
Laboratory ID: CH090217-01DUP
Method: EPA 8100M

GC/FID Fingerprint



Extraction Date: 02/26/2009
Analysis Date: 02/27/2009

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **Method Blank**
Laboratory ID: QC090226-MB
Method: EPA 8100M

Appendix C

MAH/PAH Concentrations

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01		
File ID:	E030531.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					
Benzene	4.38	B	0.903	0.451	
Toluene	2.85		1.8	0.903	
Ethylbenzene	64.6		0.903	0.451	
m/p-Xylenes	11.7		0.903	0.451	
Styrene	36.8		1.8	0.903	
o-Xylene	51.7		0.903	0.451	
Isopropylbenzene	210		0.903	0.451	
n-Propylbenzene	53.4		0.903	0.451	
1,3,5-Trimethylbenzene	1,850		0.903	0.451	
1,2,4-Trimethylbenzene	2,930		0.903	0.451	
t-Butylbenzene		U	0.903	0.451	
sec-Butylbenzene	103		0.903	0.451	
p-Isopropyltoluene	387		0.903	0.451	
n-Butylbenzene	382		0.903	0.451	
C1 - Benzene	1.58	J	1.8	0.903	
C2 - Benzene	56.0		0.903	0.451	
C3 - Benzene	4,250		0.903	0.451	
C4 - Benzene	5,130		0.903	0.451	
C5 - Benzene	801		0.903	0.451	
trans-Decalin	88.8		0.903	0.451	
cis-Decalin	6.46		0.903	0.451	
Naphthalene	7,740	D	0.903	0.451	
2-Methylnaphthalene	3,560		0.903	0.451	
1-Methylnaphthalene	2,940		0.903	0.451	
C1 - Naphthalene	4,010		0.903	0.451	
C2 - Naphthalene	2,750		0.903	0.451	
C3- Naphthalene	960		0.903	0.451	
C4- Naphthalene	302		0.903	0.451	
Acenaphthylene	521		0.903	0.451	
Acenaphthene	3,810	D	0.903	0.451	
Dibenzofuran	3,050		0.903	0.451	
Fluorene	3,920	D	0.903	0.451	
C1 - Fluorene	828		0.903	0.451	
C2 - Fluorene	442		0.903	0.451	
C3 - Fluorene	328		0.903	0.451	
Phenanthrene	9,070	D	0.903	0.451	
Anthracene	3,090	D	0.903	0.451	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01		
File ID:	E030531.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
C1 - Phenanthrene/Anthracene	2,490		0.903	0.451	
C2 - Phenanthrene/Anthracene	1,240		0.903	0.451	
C3 - Phenanthrene/Anthracene	709		0.903	0.451	
C4 - Phenanthrene/Anthracene	365		0.903	0.451	
Dibenzothiophene	871		0.903	0.451	
C1 - Dibenzothiophene	461		0.903	0.451	
C2 - Dibenzothiophene	374		0.903	0.451	
C3 - Dibenzothiophene	333		0.903	0.451	
C4 - Dibenzothiophene	185		0.903	0.451	
Benzo(b)naphtho(2,1-d)thiophene	324		0.903	0.451	
Fluoranthene	6,160	D	0.903	0.451	
Pyrene	4,790	D	0.903	0.451	
C1 - Fluoranthene/Pyrene	2,950		0.903	0.451	
C2 - Fluoranthene/Pyrene	942		0.903	0.451	
C3 - Fluoranthene/Pyrene	435		0.903	0.451	
Benz[a]anthracene	1,930		0.903	0.451	
Chrysene*	1,640		0.903	0.451	
C1 - Benz(a)anthracene/Chrysene	943		0.903	0.451	
C2 - Benz(a)anthracene/Chrysene	477		0.903	0.451	
C3 - Benz(a)anthracene/Chrysene	233		0.903	0.451	
C4 - Benz(a)anthracene/Chrysene	195		0.903	0.451	
Benzo[b]fluoranthene	1,040		0.903	0.451	
Benzo[j/k]fluoranthene	1,140		0.903	0.451	
Benzo(e)pyrene	753		0.903	0.451	
Benzo[a]pyrene	1,280		0.903	0.451	
Perylene	317		0.903	0.451	
Indeno[1,2,3-cd]pyrene	635		0.903	0.451	
Dibenz[a,h]anthracene	216		0.903	0.451	
Benzo[g,h,i]perylene	548		0.903	0.451	
Coronene	146		0.903	0.451	
Retene	60.2		0.903	0.451	
Benzo(b/c)fluorenes	788		0.903	0.451	
2-Methylpyrene	312		0.903	0.451	
4-Methylpyrene	227		0.903	0.451	
1-Methylpyrene	244		0.903	0.451	
Heptadecane	22.5		1.8	0.903	
Pristane	185		0.903	0.451	
Octadecane	21.6		1.8	0.903	
Phytane	260		0.903	0.451	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01		
File ID:	E030531.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	18.7	0.903	0.451	
2,6,10-trimethyltridecane	34.2	0.903	0.451	
Norpristane	45.5	0.903	0.451	
Tetraethyl lead	U	1.8	0.903	
Total PAH (16)	47,500	0.903	0.451	
Total PAH (42)	74,500	0.903	0.451	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	80	50 - 120
Phenanthrene-d10	97	50 - 120
Benzo[a]pyrene-d12	80	50 - 120
Perylene-d12	93	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MB		
File ID:	E030529.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	2.23 J	2.5	1.25	
Toluene	U	5.0	2.5	
Ethylbenzene	U	2.5	1.25	
m/p-Xylenes	U	2.5	1.25	
Styrene	U	5.0	2.5	
o-Xylene	U	2.5	1.25	
Isopropylbenzene	U	2.5	1.25	
n-Propylbenzene	U	2.5	1.25	
1,3,5-Trimethylbenzene	U	2.5	1.25	
1,2,4-Trimethylbenzene	U	2.5	1.25	
t-Butylbenzene	U	2.5	1.25	
sec-Butylbenzene	U	2.5	1.25	
p-Isopropyltoluene	U	2.5	1.25	
n-Butylbenzene	U	2.5	1.25	
C1 - Benzene	U	5.0	2.5	
C2 - Benzene	U	2.5	1.25	
C3 - Benzene	U	2.5	1.25	
C4 - Benzene	U	2.5	1.25	
C5 - Benzene	U	2.5	1.25	
trans-Decalin	U	2.5	1.25	
cis-Decalin	U	2.5	1.25	
Naphthalene	U	2.5	1.25	
2-Methylnaphthalene	U	2.5	1.25	
1-Methylnaphthalene	U	2.5	1.25	
C1 - Naphthalene	U	2.5	1.25	
C2 - Naphthalene	U	2.5	1.25	
C3- Naphthalene	U	2.5	1.25	
C4- Naphthalene	U	2.5	1.25	
Acenaphthylene	U	2.5	1.25	
Acenaphthene	U	2.5	1.25	
Dibenzofuran	U	2.5	1.25	
Fluorene	U	2.5	1.25	
C1 - Fluorene	U	2.5	1.25	
C2 - Fluorene	U	2.5	1.25	
C3 - Fluorene	U	2.5	1.25	
Phenanthrene	U	2.5	1.25	
Anthracene	U	2.5	1.25	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MB		
File ID:	E030529.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	U	2.5	1.25	
C2 - Phenanthrene/Anthracene	U	2.5	1.25	
C3 - Phenanthrene/Anthracene	U	2.5	1.25	
C4 - Phenanthrene/Anthracene	U	2.5	1.25	
Dibenzothiophene	U	2.5	1.25	
C1 - Dibenzothiophene	U	2.5	1.25	
C2 - Dibenzothiophene	U	2.5	1.25	
C3 - Dibenzothiophene	U	2.5	1.25	
C4 - Dibenzothiophene	U	2.5	1.25	
Benzo(b)naphtho(2,1-d)thiophene	U	2.5	1.25	
Fluoranthene	U	2.5	1.25	
Pyrene	U	2.5	1.25	
C1 - Fluoranthene/Pyrene	U	2.5	1.25	
C2 - Fluoranthene/Pyrene	U	2.5	1.25	
C3 - Fluoranthene/Pyrene	U	2.5	1.25	
Benz[a]anthracene	U	2.5	1.25	
Chrysene*	U	2.5	1.25	
C1 - Benz(a)anthracene/Chrysene	U	2.5	1.25	
C2 - Benz(a)anthracene/Chrysene	U	2.5	1.25	
C3 - Benz(a)anthracene/Chrysene	U	2.5	1.25	
C4 - Benz(a)anthracene/Chrysene	U	2.5	1.25	
Benzo[b]fluoranthene	U	2.5	1.25	
Benzo[j/k]fluoranthene	U	2.5	1.25	
Benzo(e)pyrene	U	2.5	1.25	
Benzo[a]pyrene	U	2.5	1.25	
Perylene	U	2.5	1.25	
Indeno[1,2,3-cd]pyrene	U	2.5	1.25	
Dibenz[a,h]anthracene	U	2.5	1.25	
Benzo[g,h,i]perylene	U	2.5	1.25	
Coronene	U	2.5	1.25	
Retene	U	2.5	1.25	
Benzo(b/c)fluorenes	U	2.5	1.25	
2-Methylpyrene	U	2.5	1.25	
4-Methylpyrene	U	2.5	1.25	
1-Methylpyrene	U	2.5	1.25	
Heptadecane	U	5.0	2.5	
Pristane	U	2.5	1.25	
Octadecane	U	5.0	2.5	
Phytane	U	2.5	1.25	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MB		
File ID:	E030529.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	2.5	1.25	
2,6,10-trimethyltridecane	U	2.5	1.25	
Norpristane	U	2.5	1.25	
Tetraethyl lead	U	5.0	2.5	
Total PAH (16)	U	2.5	1.25	
Total PAH (42)	U	2.5	1.25	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	80	50 - 120
Phenanthrene-d10	88	50 - 120
Benzo[a]pyrene-d12	72	50 - 120
Perylene-d12	85	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MBS		
File ID:	E030530.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)			RL	EDL	Comments
MAH & PAH COMPOUNDS:	Spike Amount					% Recovery
Benzene	1000.00	814	B	1.0	0.500	81
Toluene	1000.00	970		2.0	1.0	97
Ethylbenzene	1000.00	906		1.0	0.500	91
m/p-Xylenes	1000.00	964		1.0	0.500	96
Styrene	1000.00	1,060		2.0	1.0	106
o-Xylene	1000.00	936		1.0	0.500	94
Isopropylbenzene	1000.00	960		1.0	0.500	96
n-Propylbenzene	1000.00	942		1.0	0.500	94
1,3,5-Trimethylbenzene	1000.00	972		1.0	0.500	97
1,2,4-Trimethylbenzene	1000.00	969		1.0	0.500	97
t-Butylbenzene			U	1.0	0.500	
sec-Butylbenzene	1000.00	960		1.0	0.500	96
p-Isopropyltoluene	1000.00	1,000		1.0	0.500	100
n-Butylbenzene	1000.00	972		1.0	0.500	97
C1 - Benzene			U	2.0	1.0	
C2 - Benzene			U	1.0	0.500	
C3 - Benzene			U	1.0	0.500	
C4 - Benzene			U	1.0	0.500	
C5 - Benzene			U	1.0	0.500	
trans-Decalin			U	1.0	0.500	
cis-Decalin			U	1.0	0.500	
Naphthalene	1000.00	994		1.0	0.500	99
2-Methylnaphthalene	1000.00	1,040		1.0	0.500	104
1-Methylnaphthalene	1000.00	1,040		1.0	0.500	104
C1 - Naphthalene			U	1.0	0.500	
C2 - Naphthalene			U	1.0	0.500	
C3- Naphthalene			U	1.0	0.500	
C4- Naphthalene			U	1.0	0.500	
Acenaphthylene	1000.00	1,220		1.0	0.500	122
Acenaphthene	1000.00	1,060		1.0	0.500	106
Dibenzofuran	1000.00	1,030		1.0	0.500	103
Fluorene	1000.00	1,110		1.0	0.500	111
C1 - Fluorene			U	1.0	0.500	
C2 - Fluorene			U	1.0	0.500	
C3 - Fluorene			U	1.0	0.500	
Phenanthrene	1000.00	998		1.0	0.500	100
Anthracene	1000.00	1,030		1.0	0.500	103

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MBS		
File ID:	E030530.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)			RL	EDL	Comments
C1 - Phenanthrene/Anthracene			U	1.0	0.500	
C2 - Phenanthrene/Anthracene			U	1.0	0.500	
C3 - Phenanthrene/Anthracene			U	1.0	0.500	
C4 - Phenanthrene/Anthracene			U	1.0	0.500	
Dibenzothiophene	1000.00	1,000		1.0	0.500	100
C1 - Dibenzothiophene			U	1.0	0.500	
C2 - Dibenzothiophene			U	1.0	0.500	
C3 - Dibenzothiophene			U	1.0	0.500	
C4 - Dibenzothiophene			U	1.0	0.500	
Benzo(b)naphtho(2,1-d)thiophene			U	1.0	0.500	
Fluoranthene	1000.00	1,100		1.0	0.500	110
Pyrene	1000.00	1,100		1.0	0.500	110
C1 - Fluoranthene/Pyrene			U	1.0	0.500	
C2 - Fluoranthene/Pyrene			U	1.0	0.500	
C3 - Fluoranthene/Pyrene			U	1.0	0.500	
Benz[a]anthracene	1000.00	1,060		1.0	0.500	106
Chrysene*	1000.00	1,010		1.0	0.500	101
C1 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C2 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C3 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
C4 - Benz(a)anthracene/Chrysene			U	1.0	0.500	
Benzo[b]fluoranthene	1000.00	1,030		1.0	0.500	103
Benzo[j/k]fluoranthene	1000.00	1,080		1.0	0.500	108
Benzo(e)pyrene	1000.00	1,000		1.0	0.500	100
Benzo[a]pyrene	1000.00	1,040		1.0	0.500	104
Perylene			U	1.0	0.500	
Indeno[1,2,3-cd]pyrene	1000.00	1,130		1.0	0.500	113
Dibenz[a,h]anthracene	1000.00	1,020		1.0	0.500	102
Benzo[g,h,i]perylene	1000.00	993		1.0	0.500	99
Coronene			U	1.0	0.500	
Retene			U	1.0	0.500	
Benzo(b/c)fluorenes			U	1.0	0.500	
2-Methylpyrene			U	1.0	0.500	
4-Methylpyrene			U	1.0	0.500	
1-Methylpyrene			U	1.0	0.500	
Heptadecane			U	2.0	1.0	
Pristane			U	1.0	0.500	
Octadecane			U	2.0	1.0	
Phytane			U	1.0	0.500	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Method Blank Spike

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC090226-MBS		
File ID:	E030530.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.01
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	1.0	0.500	
2,6,10-trimethyltridecane	U	1.0	0.500	
Norpristane	U	1.0	0.500	
Tetraethyl lead	U	2.0	1.0	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	88	50 - 120
Phenanthrene-d10	103	50 - 120
Benzo[a]pyrene-d12	87	50 - 120
Perylene-d12	99	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01DUP		
File ID:	E030532.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					RPD
Benzene	4.39	B	0.919	0.460	0.2
Toluene	2.6		1.84	0.919	9.2
Ethylbenzene	63.8		0.919	0.460	1.2
m/p-Xylenes	11.2		0.919	0.460	4.4
Styrene	36.4		1.84	0.919	1.1
o-Xylene	50.7		0.919	0.460	2
Isopropylbenzene	207		0.919	0.460	1.4
n-Propylbenzene	52.6		0.919	0.460	1.5
1,3,5-Trimethylbenzene	1,840		0.919	0.460	0.5
1,2,4-Trimethylbenzene	2,930		0.919	0.460	0
t-Butylbenzene		U	0.919	0.460	NA
sec-Butylbenzene	101		0.919	0.460	2
p-Isopropyltoluene	383		0.919	0.460	1
n-Butylbenzene	381		0.919	0.460	0.3
C1 - Benzene	1.56	J	1.84	0.919	1.3
C2 - Benzene	54.8		0.919	0.460	2.2
C3 - Benzene	4,190		0.919	0.460	1.4
C4 - Benzene	5,090		0.919	0.460	0.8
C5 - Benzene	804		0.919	0.460	0.4
trans-Decalin	87.8		0.919	0.460	1.1
cis-Decalin	5.73		0.919	0.460	12
Naphthalene	9,670	D	0.919	0.460	22.2
2-Methylnaphthalene	3,600		0.919	0.460	1.1
1-Methylnaphthalene	2,970		0.919	0.460	1
C1 - Naphthalene	4,050		0.919	0.460	1
C2 - Naphthalene	2,780		0.919	0.460	1.1
C3- Naphthalene	976		0.919	0.460	1.7
C4- Naphthalene	313		0.919	0.460	3.6
Acenaphthylene	522		0.919	0.460	0.2
Acenaphthene	4,730	D	0.919	0.460	21.5
Dibenzofuran	3,060		0.919	0.460	0.3
Fluorene	4,900	D	0.919	0.460	22.2
C1 - Fluorene	851		0.919	0.460	2.7
C2 - Fluorene	429		0.919	0.460	3
C3 - Fluorene	345		0.919	0.460	5.1
Phenanthrene	11,300	D	0.919	0.460	21.9
Anthracene	3,870	D	0.919	0.460	22.4

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01DUP		
File ID:	E030532.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)		RL	EDL	Comments
C1 - Phenanthrene/Anthracene	2,840		0.919	0.460	13.1
C2 - Phenanthrene/Anthracene	1,240		0.919	0.460	0
C3 - Phenanthrene/Anthracene	740		0.919	0.460	4.3
C4 - Phenanthrene/Anthracene	401		0.919	0.460	9.4
Dibenzothiophene	876		0.919	0.460	0.6
C1 - Dibenzothiophene	515		0.919	0.460	11.1
C2 - Dibenzothiophene	400		0.919	0.460	6.7
C3 - Dibenzothiophene	335		0.919	0.460	0.6
C4 - Dibenzothiophene	194		0.919	0.460	4.7
Benzo(b)naphtho(2,1-d)thiophene	329		0.919	0.460	1.5
Fluoranthene	8,290	D	0.919	0.460	29.5
Pyrene	5,960	D	0.919	0.460	21.8
C1 - Fluoranthene/Pyrene	2,950		0.919	0.460	0
C2 - Fluoranthene/Pyrene	955		0.919	0.460	1.4
C3 - Fluoranthene/Pyrene	473		0.919	0.460	8.4
Benz[a]anthracene	1,940		0.919	0.460	0.5
Chrysene*	1,660		0.919	0.460	1.2
C1 - Benz(a)anthracene/Chrysene	967		0.919	0.460	2.5
C2 - Benz(a)anthracene/Chrysene	461		0.919	0.460	3.4
C3 - Benz(a)anthracene/Chrysene	228		0.919	0.460	2.2
C4 - Benz(a)anthracene/Chrysene	191		0.919	0.460	2.1
Benzo[b]fluoranthene	1,080		0.919	0.460	3.8
Benzo[j/k]fluoranthene	1,140		0.919	0.460	0
Benzo(e)pyrene	768		0.919	0.460	2
Benzo[a]pyrene	1,300		0.919	0.460	1.6
Perylene	322		0.919	0.460	1.6
Indeno[1,2,3-cd]pyrene	654		0.919	0.460	2.9
Dibenz[a,h]anthracene	220		0.919	0.460	1.8
Benzo[g,h,i]perylene	566		0.919	0.460	3.2
Coronene	153		0.919	0.460	4.7
Retene	42.6		0.919	0.460	34.2
Benzo(b/c)fluorenes	793		0.919	0.460	0.6
2-Methylpyrene	316		0.919	0.460	1.3
4-Methylpyrene	225		0.919	0.460	0.9
1-Methylpyrene	245		0.919	0.460	0.4
Heptadecane	23.5		1.84	0.919	4.3
Pristane	190		0.919	0.460	2.7
Octadecane	23.5		1.84	0.919	8.4
Phytane	264		0.919	0.460	1.5

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3580
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	CH090217-01DUP		
File ID:	E030532.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	NA	Percent Solid:	NA
Date Analyzed:	3/7/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1
Operator:	ERL	Analysis DF:	1
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
2,6,10-trimethyldodecane	19.9	0.919	0.460	6.2
2,6,10-trimethyltridecane	35.2	0.919	0.460	2.9
Norpristane	44.5	0.919	0.460	2.2
Tetraethyl lead	U	1.84	0.919	NA
Total PAH (16)	57,800	0.919	0.460	19.6
Total PAH (42)	85,500	0.919	0.460	13.8

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	75	50 - 120
Phenanthrene-d10	102	50 - 120
Benzo[a]pyrene-d12	85	50 - 120
Perylene-d12	98	50 - 120

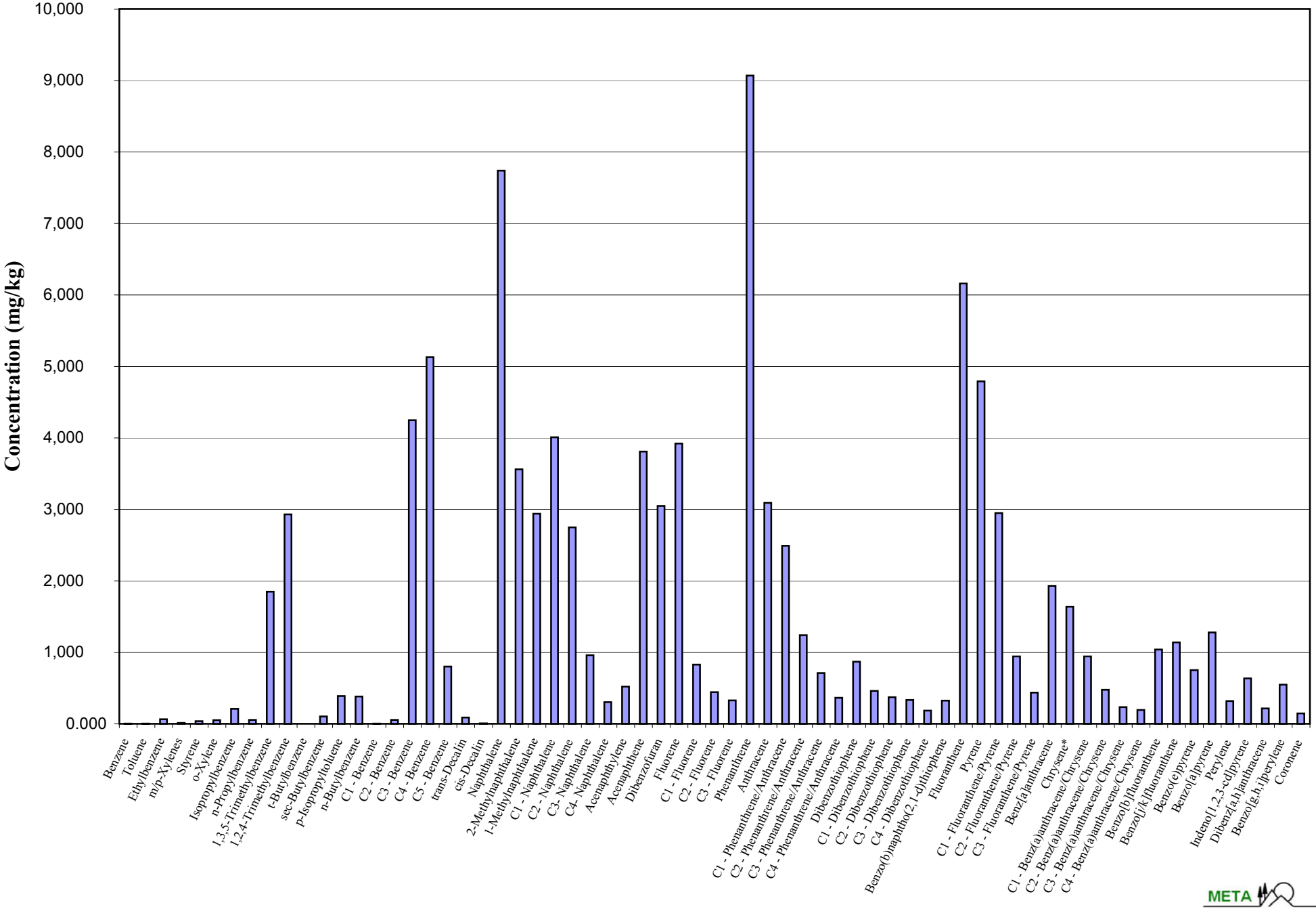
NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Appendix D

Extended MAH/PAH Profiles – Histograms

MW-105A-021109-L

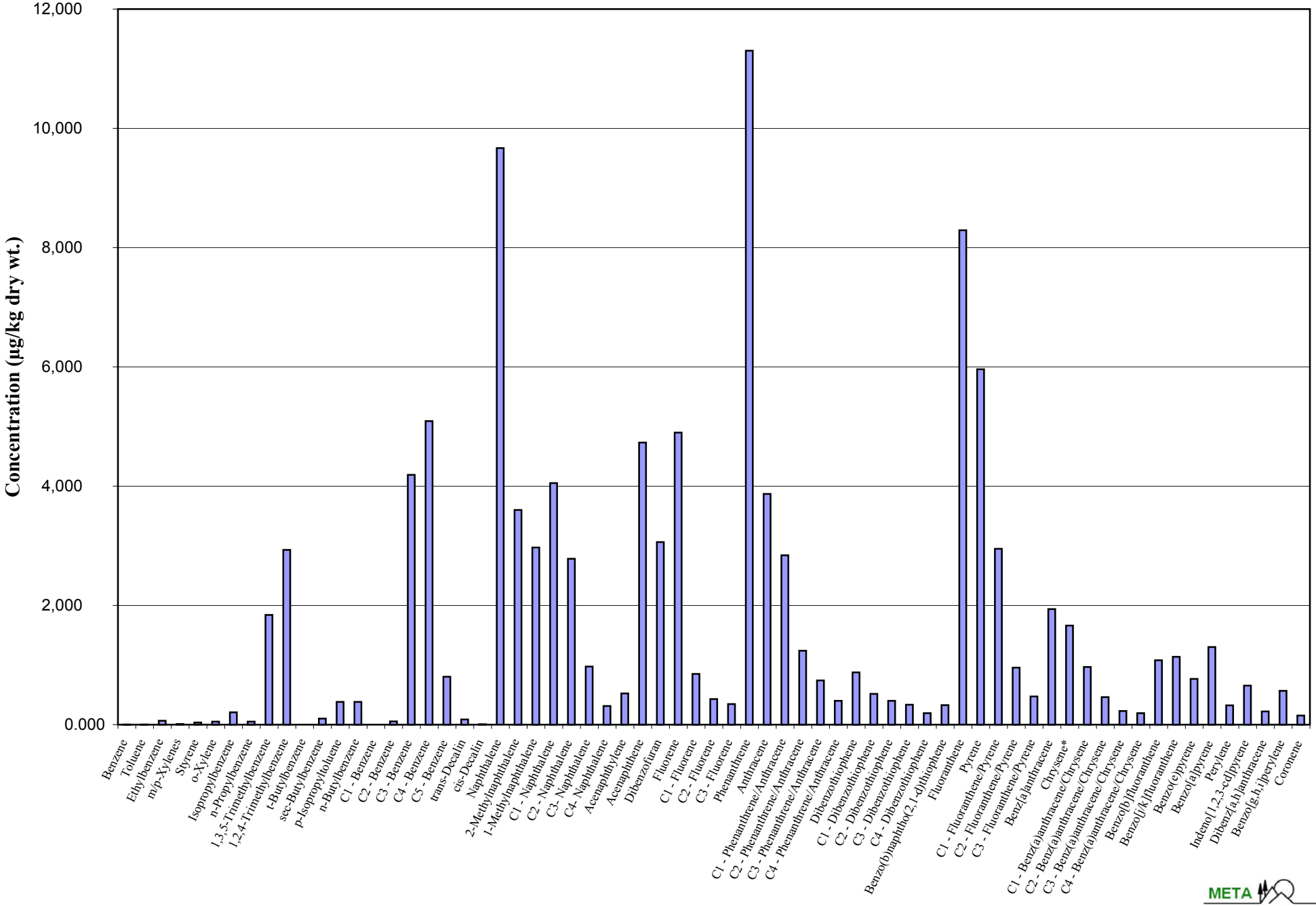
CH090217-01



META

Duplicate of MW-105A-021109-L

CH090217-01DUP



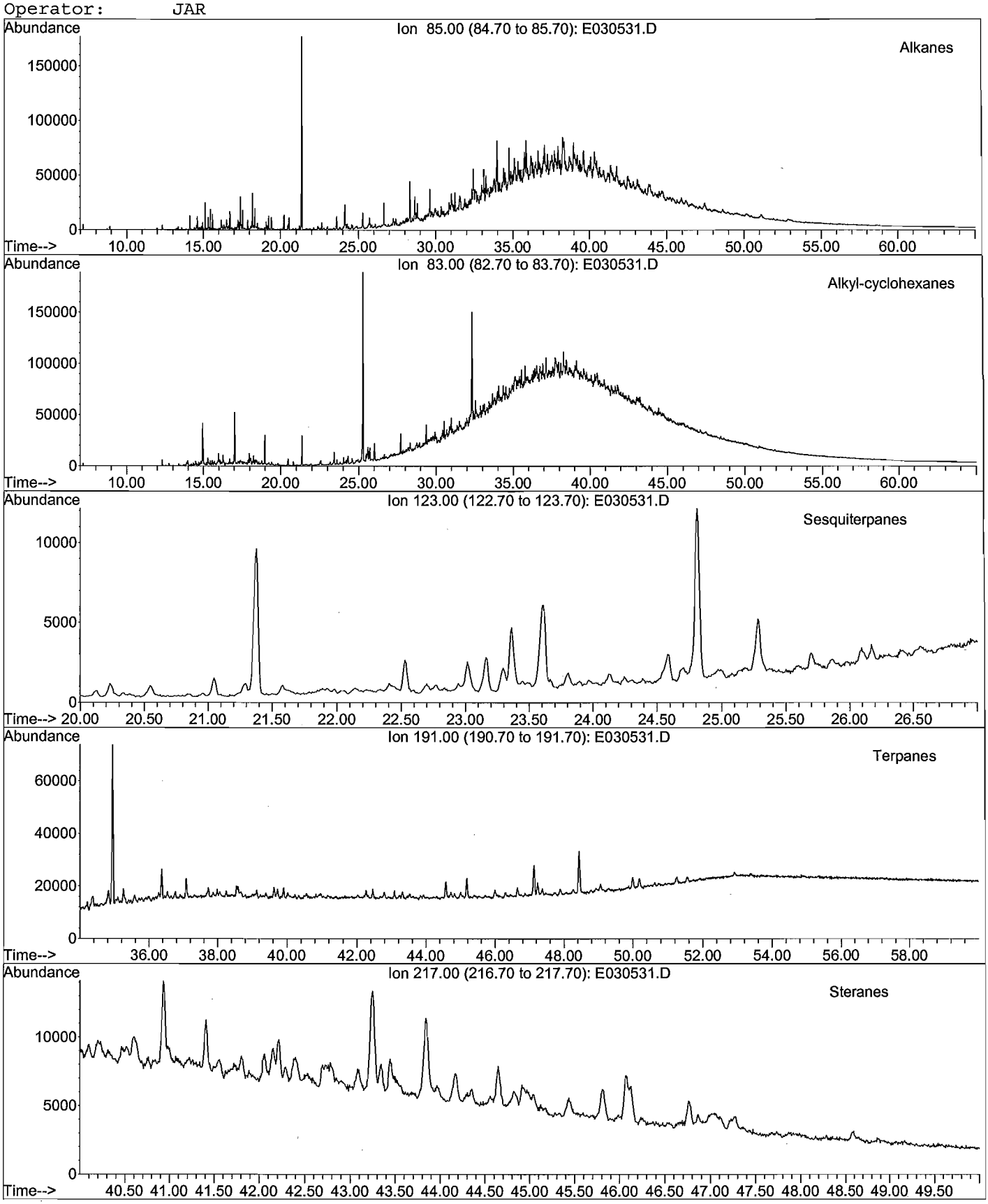
Appendix E

Extracted Ion Current Profiles (EICPs)

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030531.D
Date Acquired: 7 Mar 2009 4:17 pm
Method File: 4008SIMD.M
Sample Name: CH090217-01
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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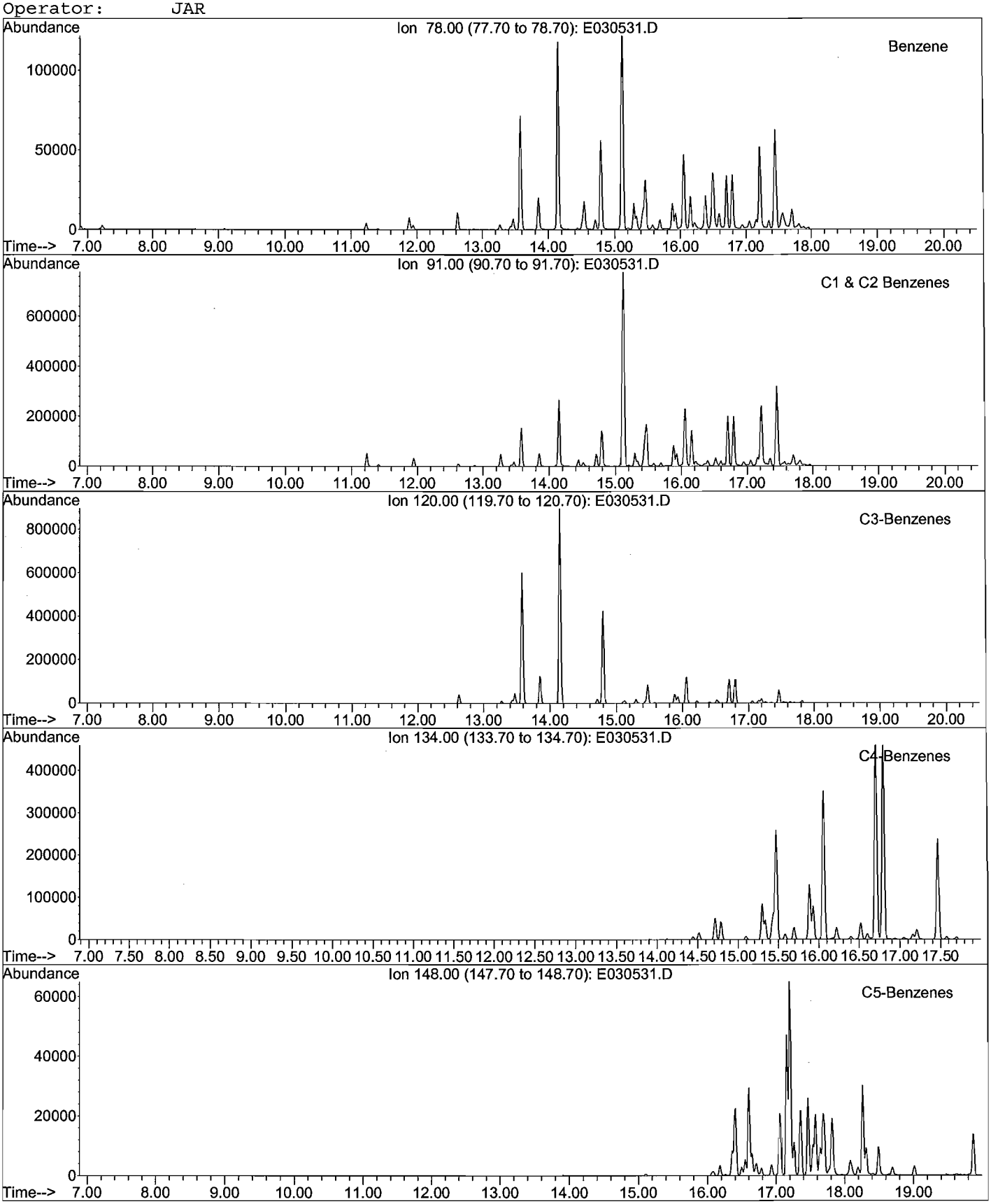
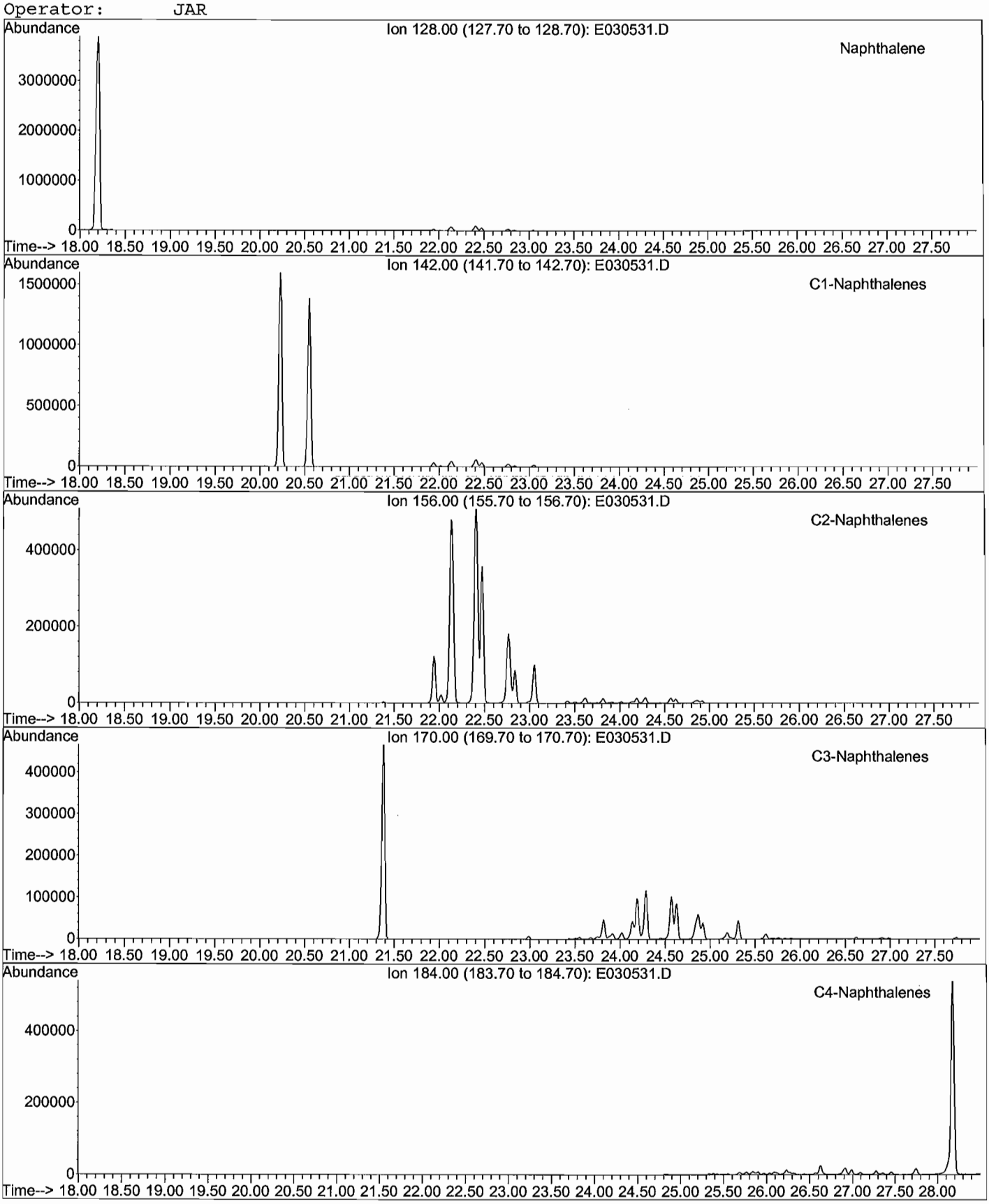
Method File: 4008SIMD.M
Sample Name: CH090217-01
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030531.D
Date Acquired: 7 Mar 2009 4:17 pm
Method File: 4008SIMD.M
Sample Name: CH090217-01
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030531.D
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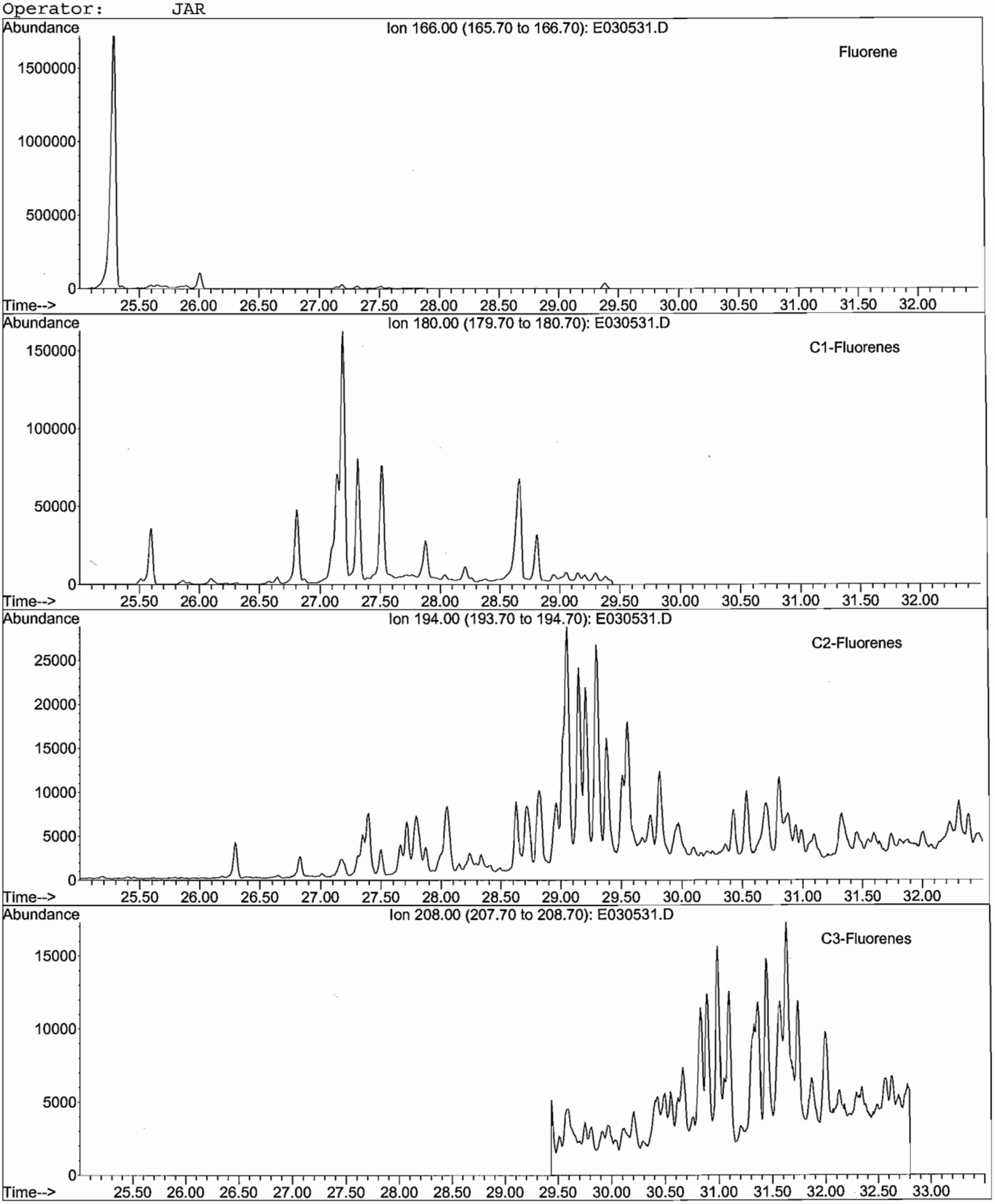
Method File: 4008SIMD.M
Sample Name: CH090217-01
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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Sample Name: CH090217-01
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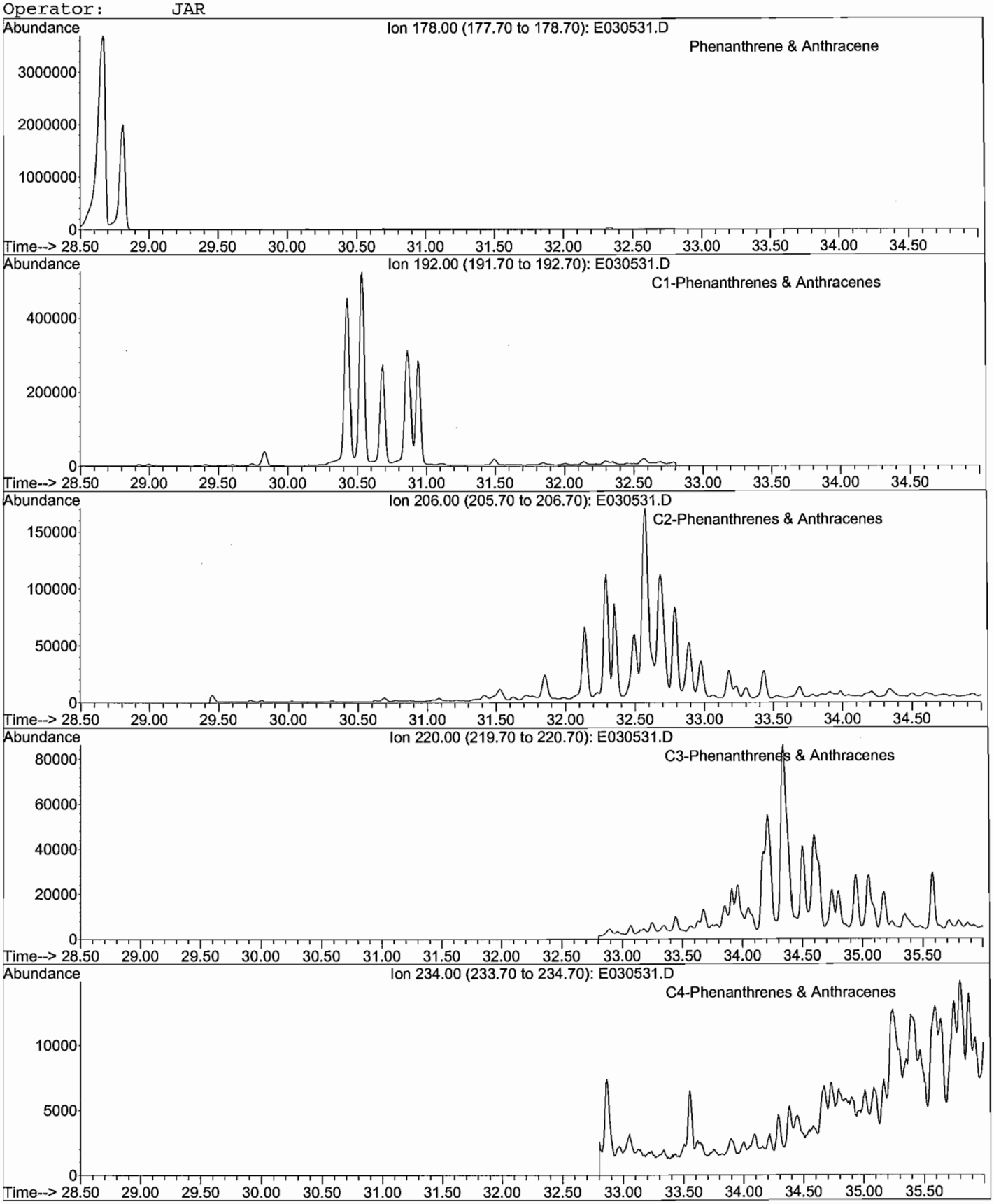
Operator: JAR



META Environmental, Inc.

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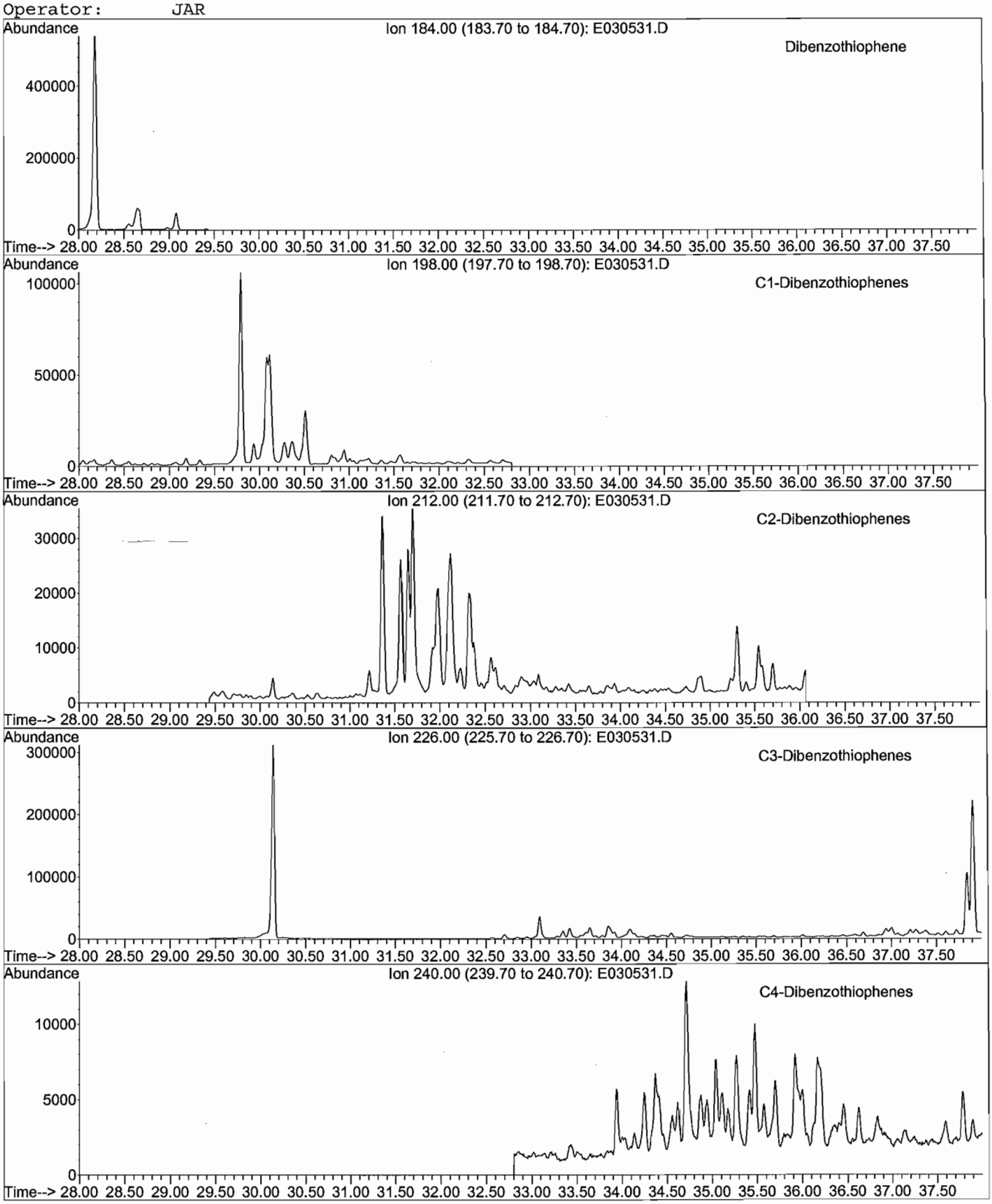
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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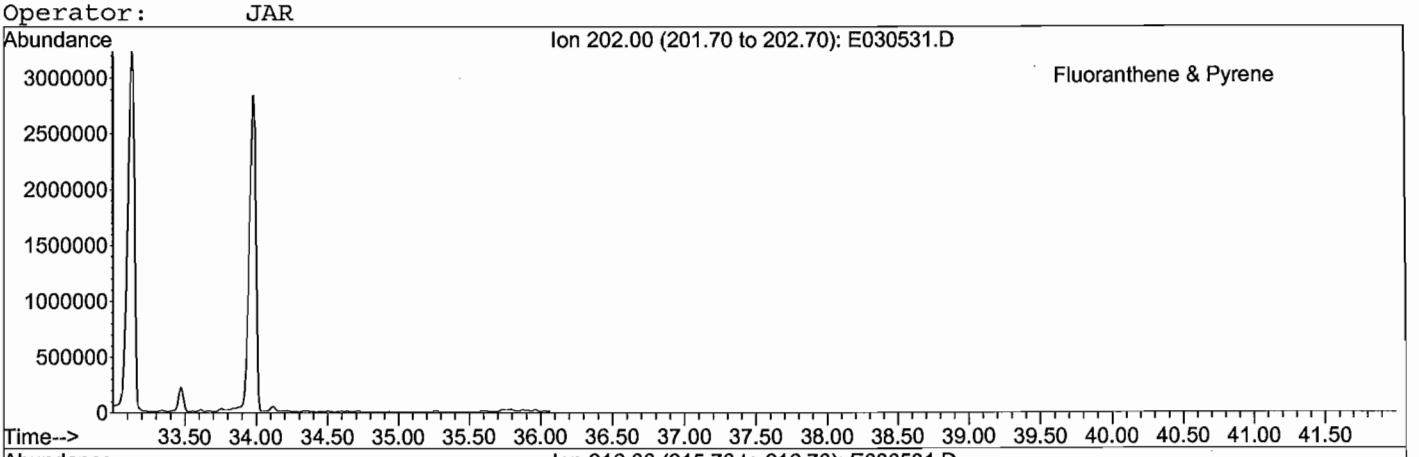
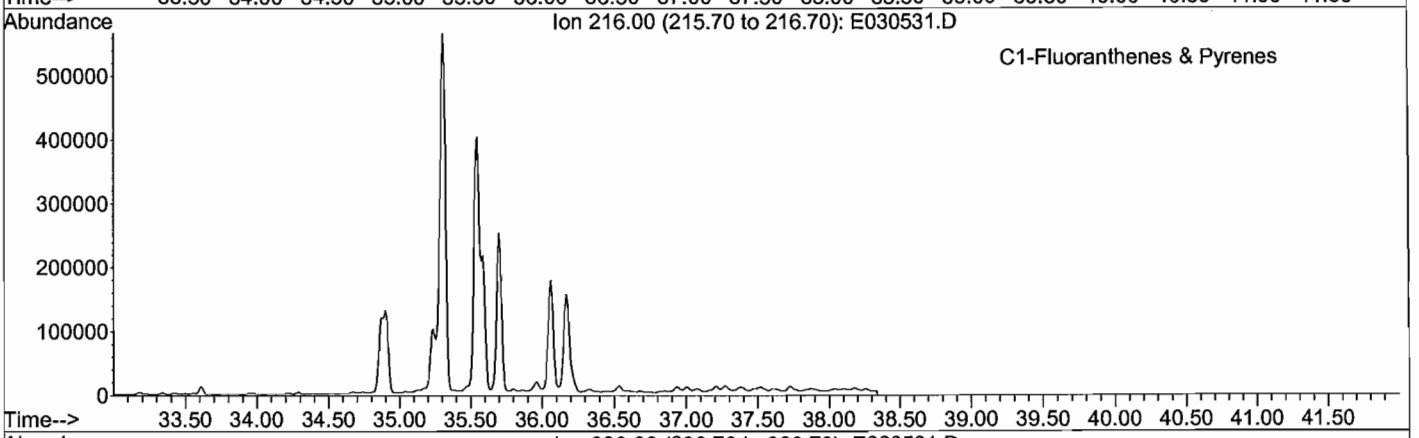
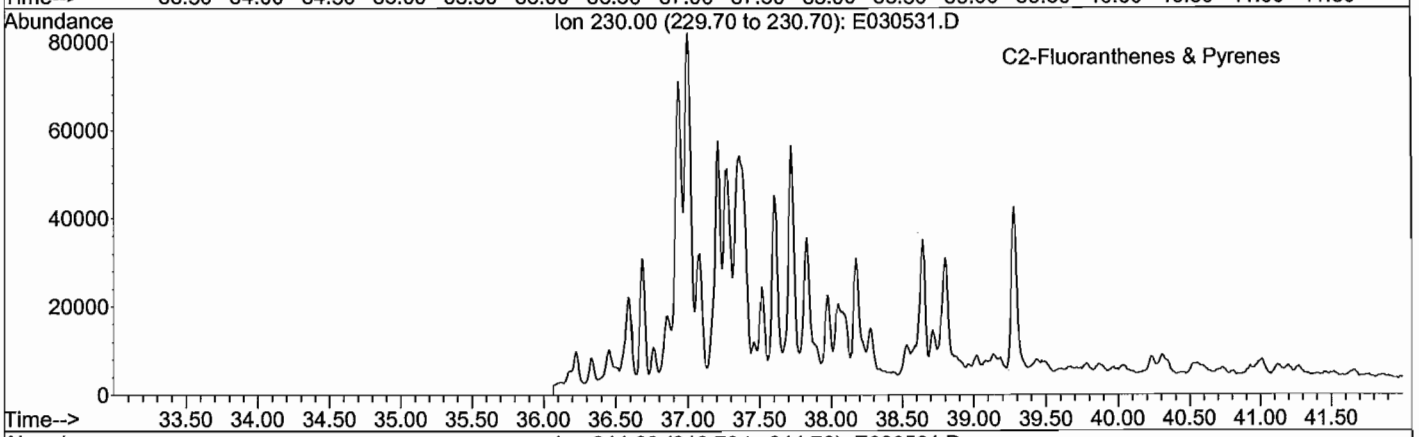
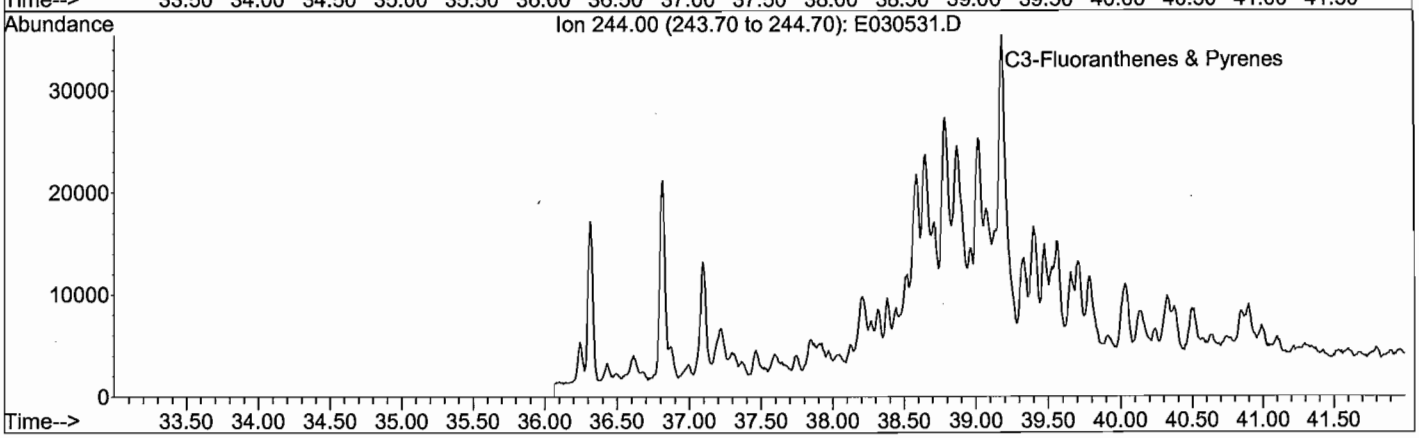
Operator: JAR









META Environmental, Inc.

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Sample Name: CH090217-01
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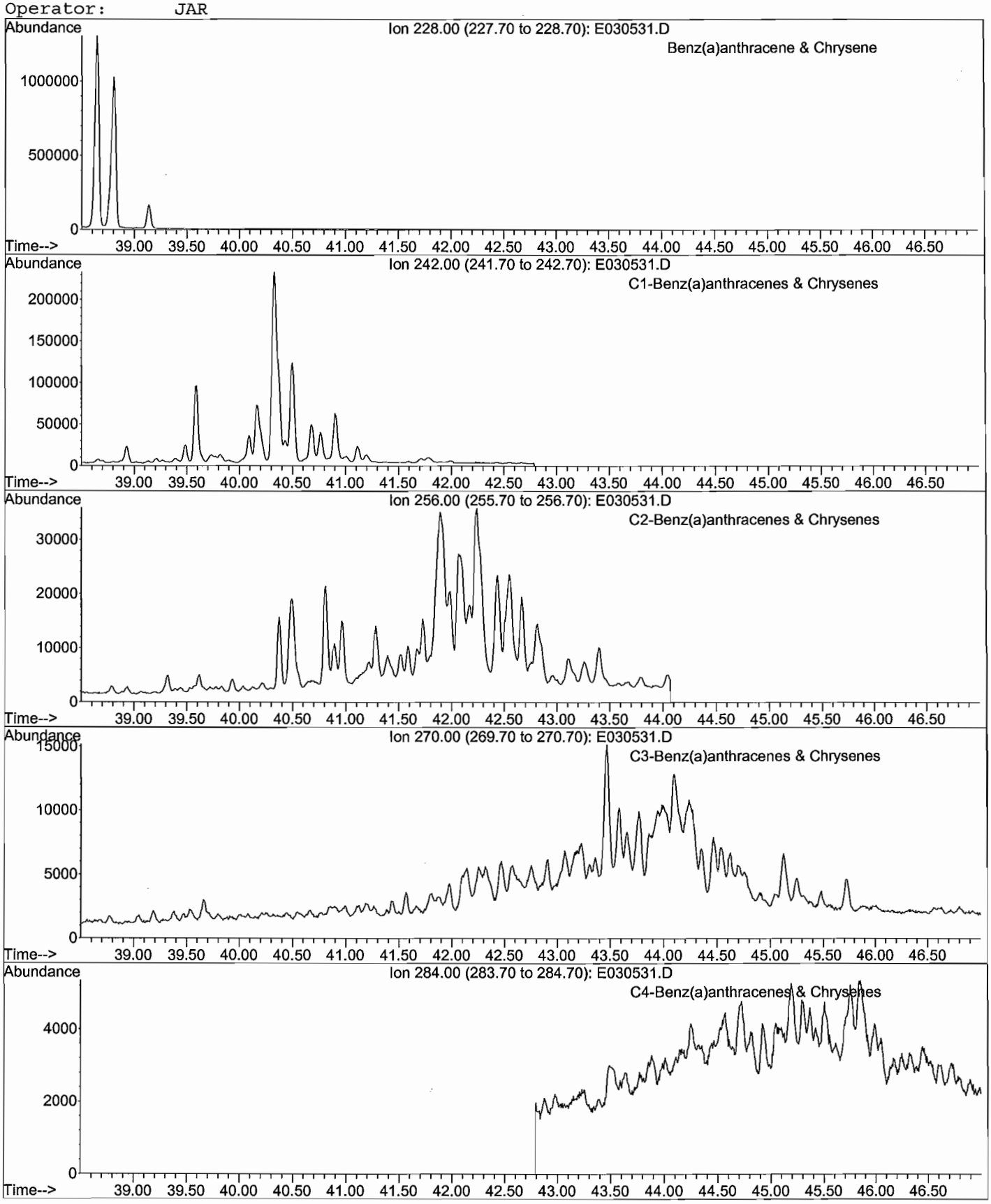
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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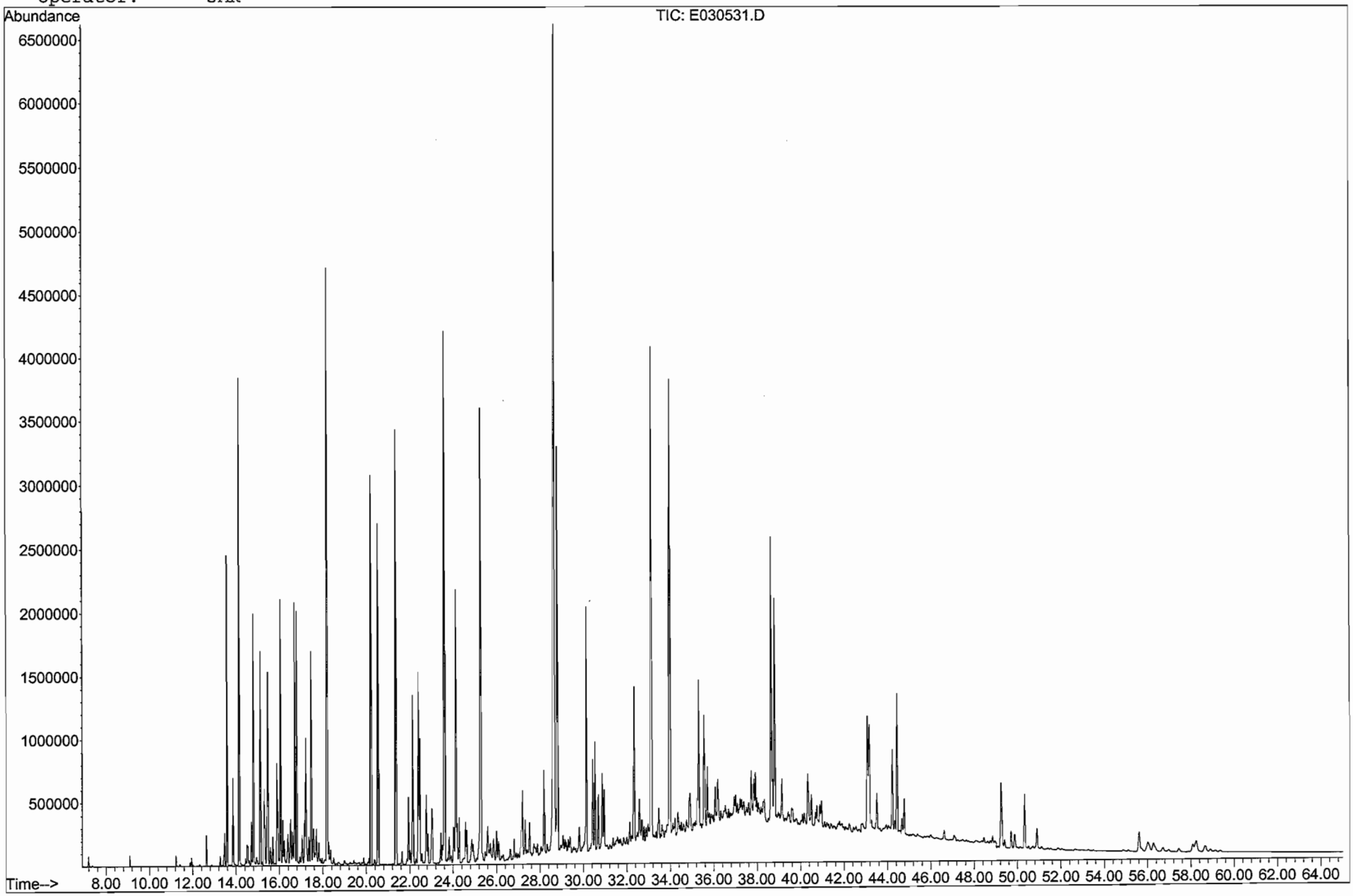
Operator: JAR



META Environmental, Inc.

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Sample Name: CH090217-01DUP
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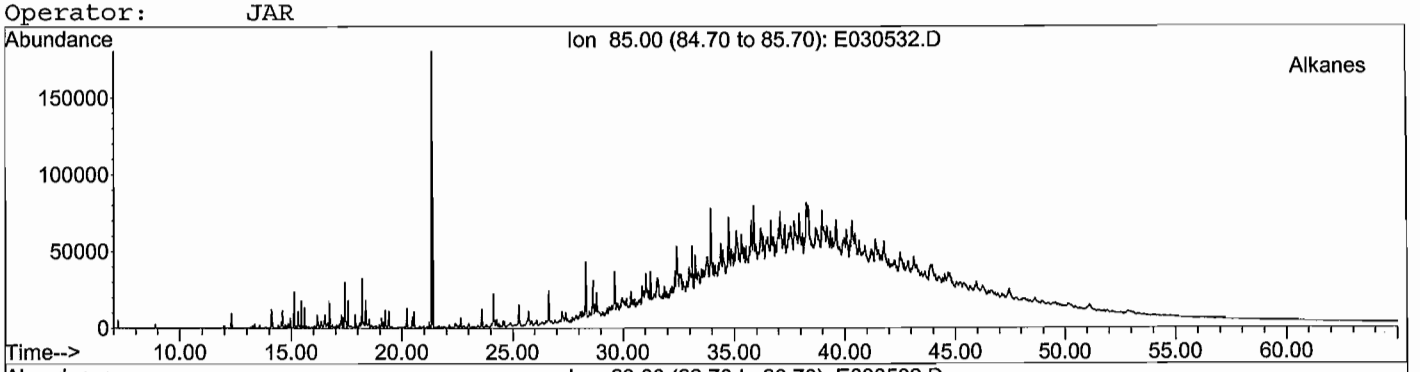
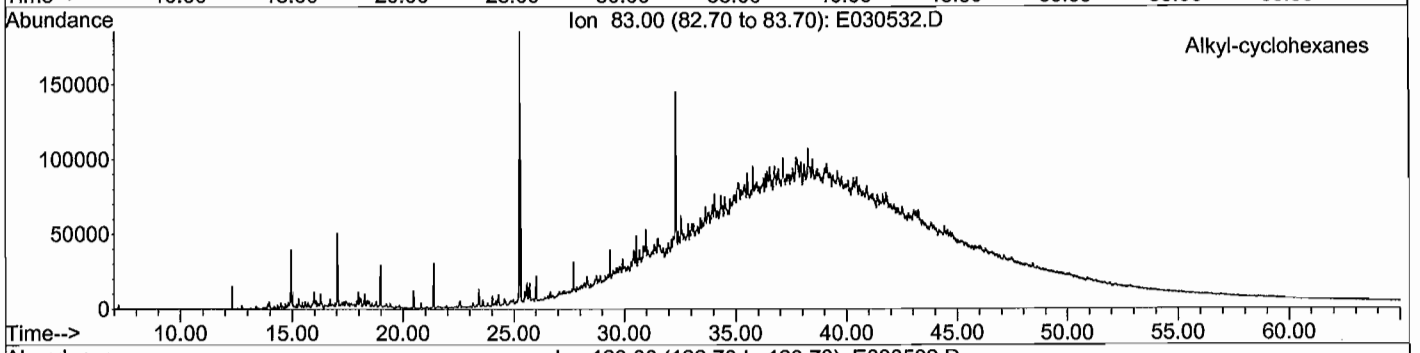
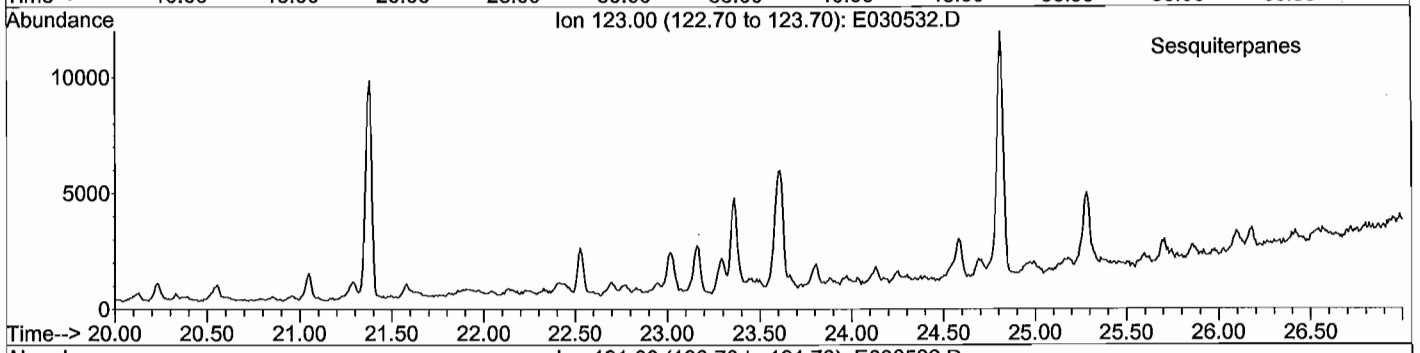
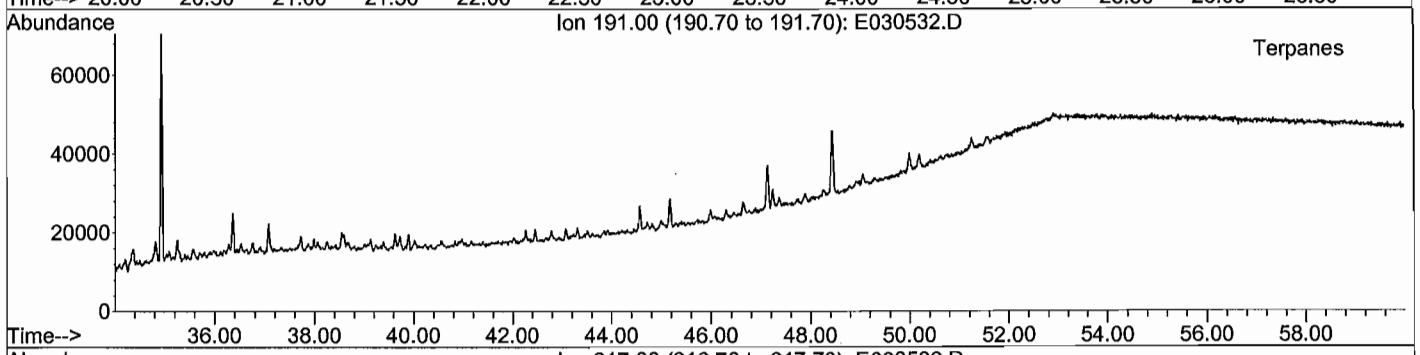
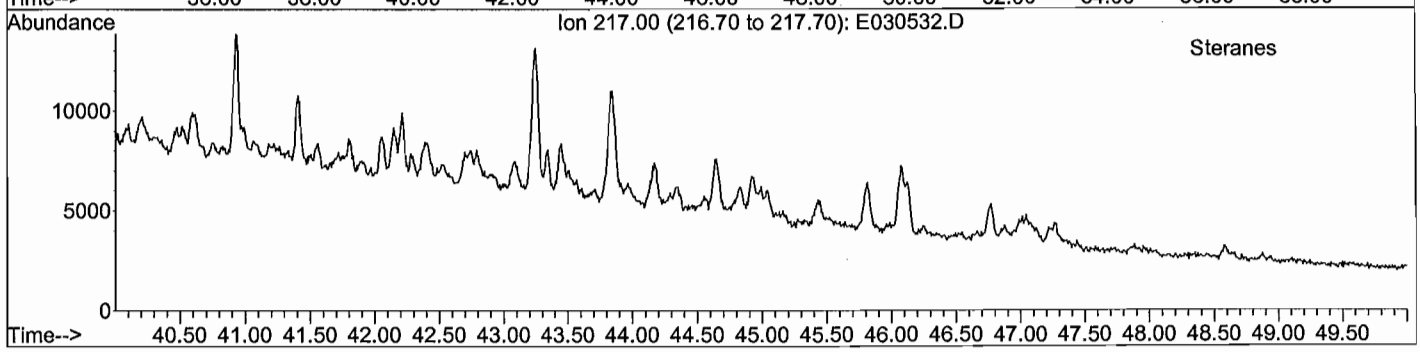
Operator: JAR











META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030532.D
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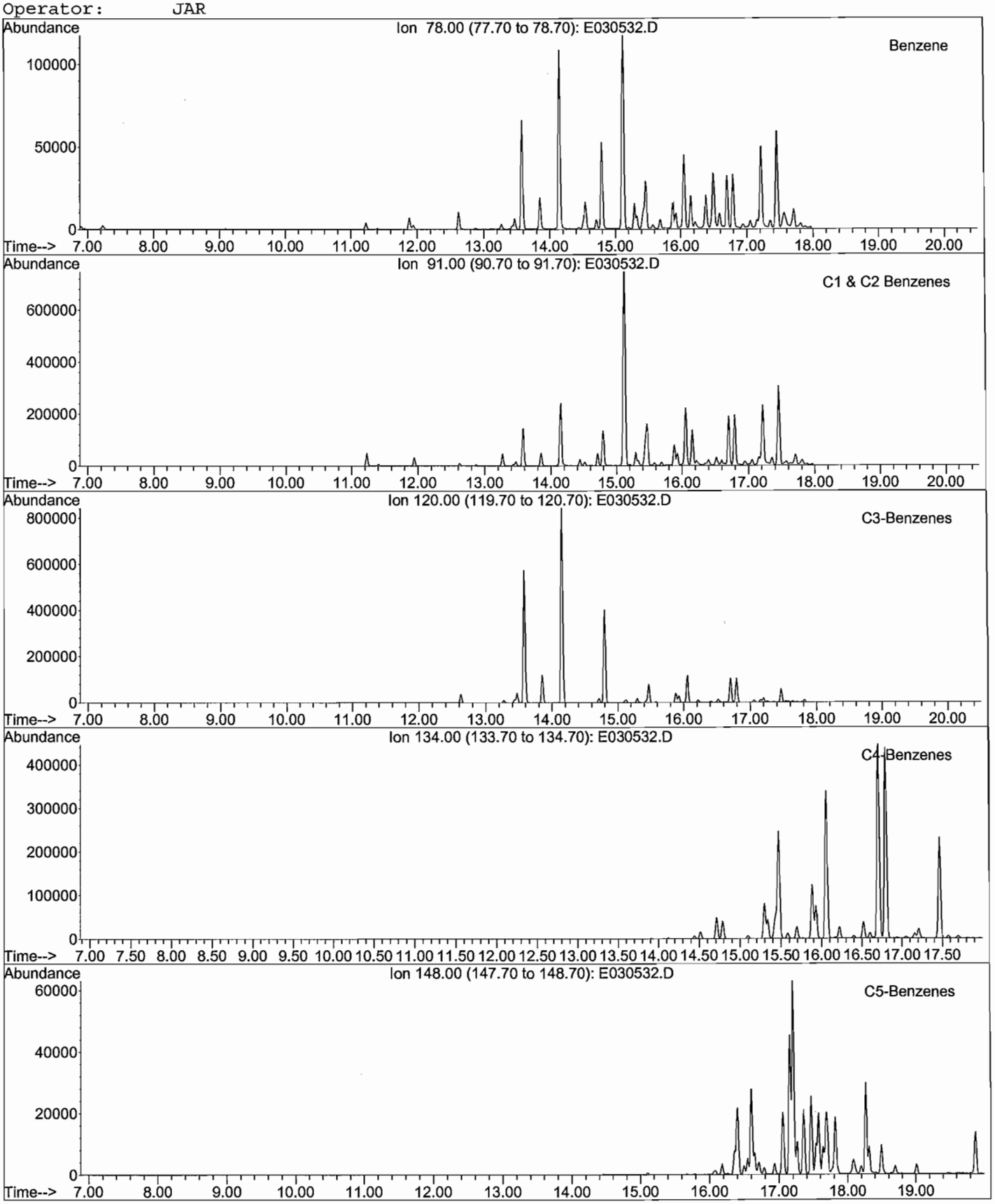
Sample Name: CH090217-01DUP
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

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Sample Name: CH090217-01DUP
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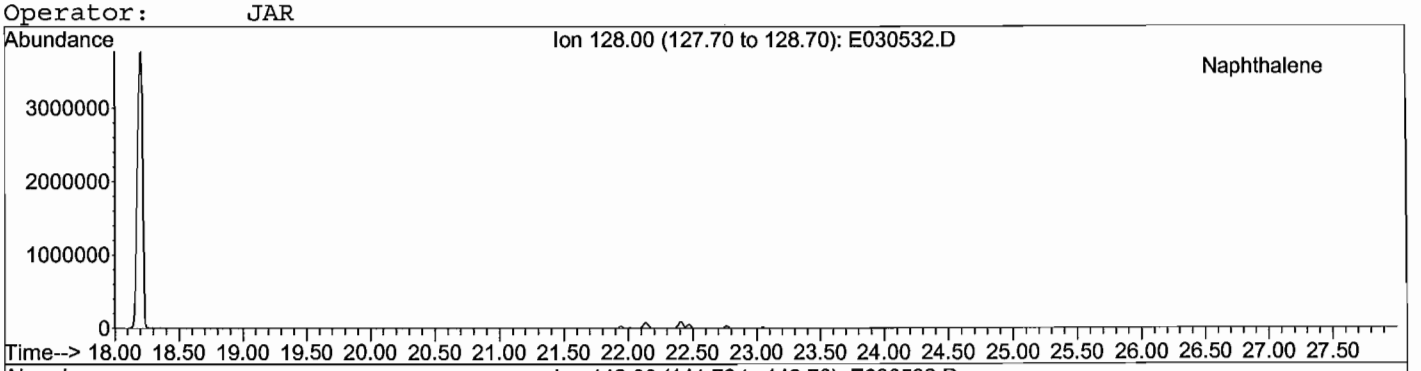

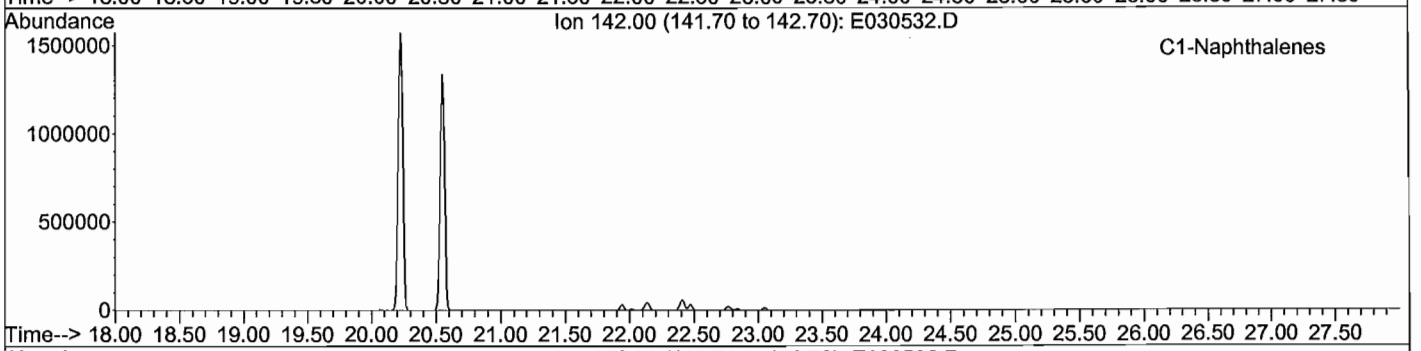

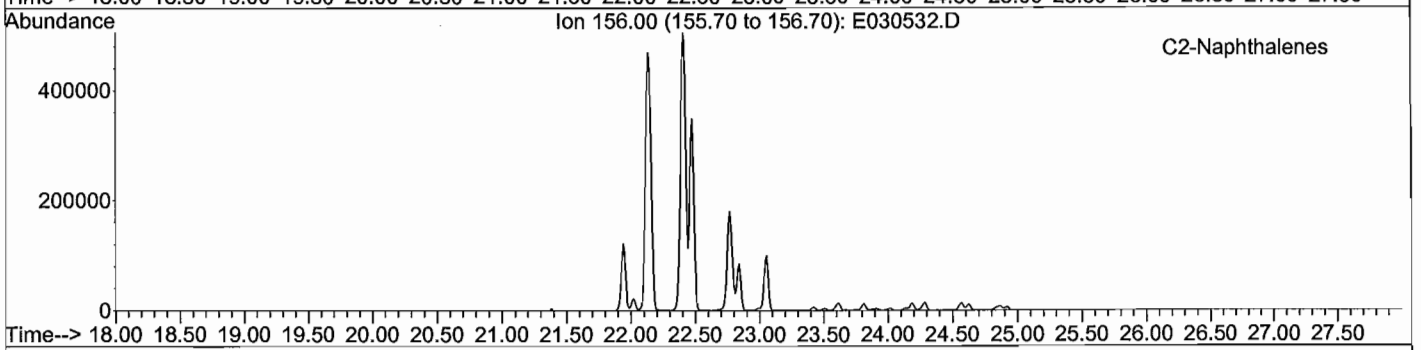

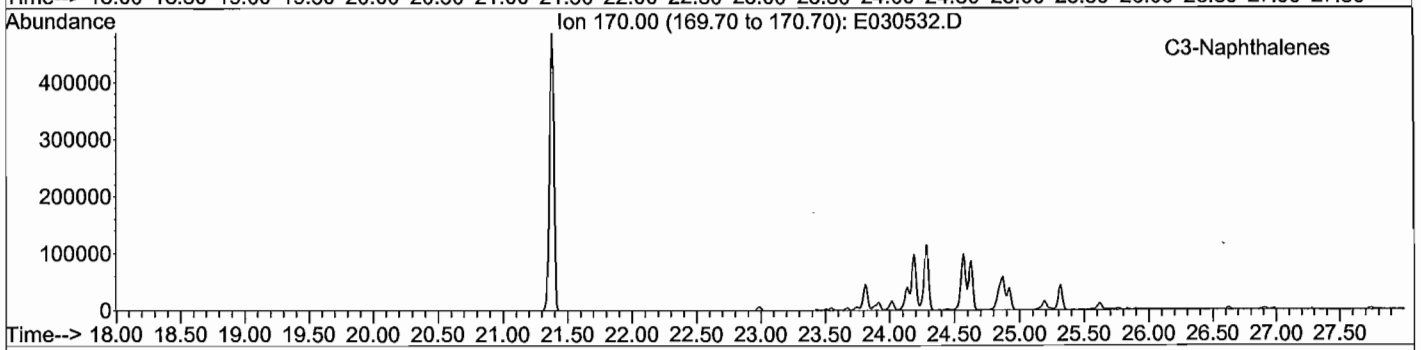

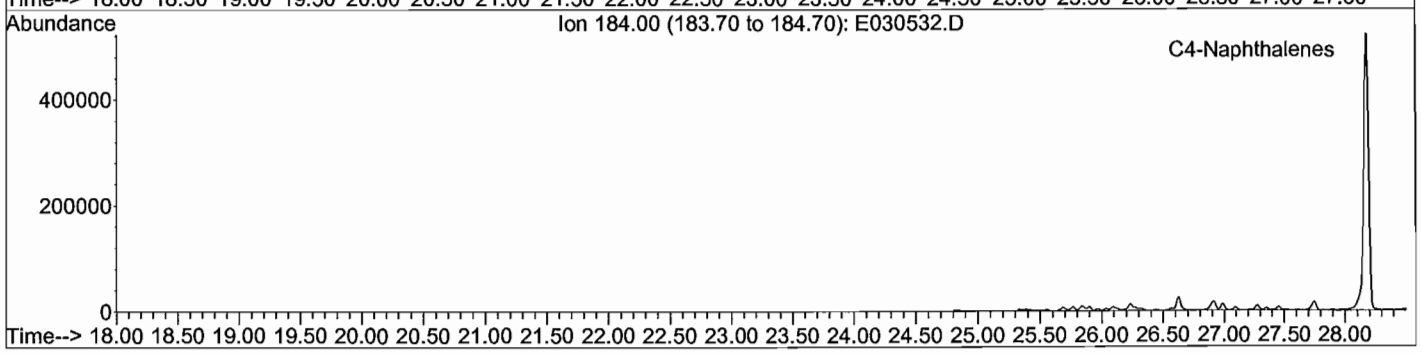

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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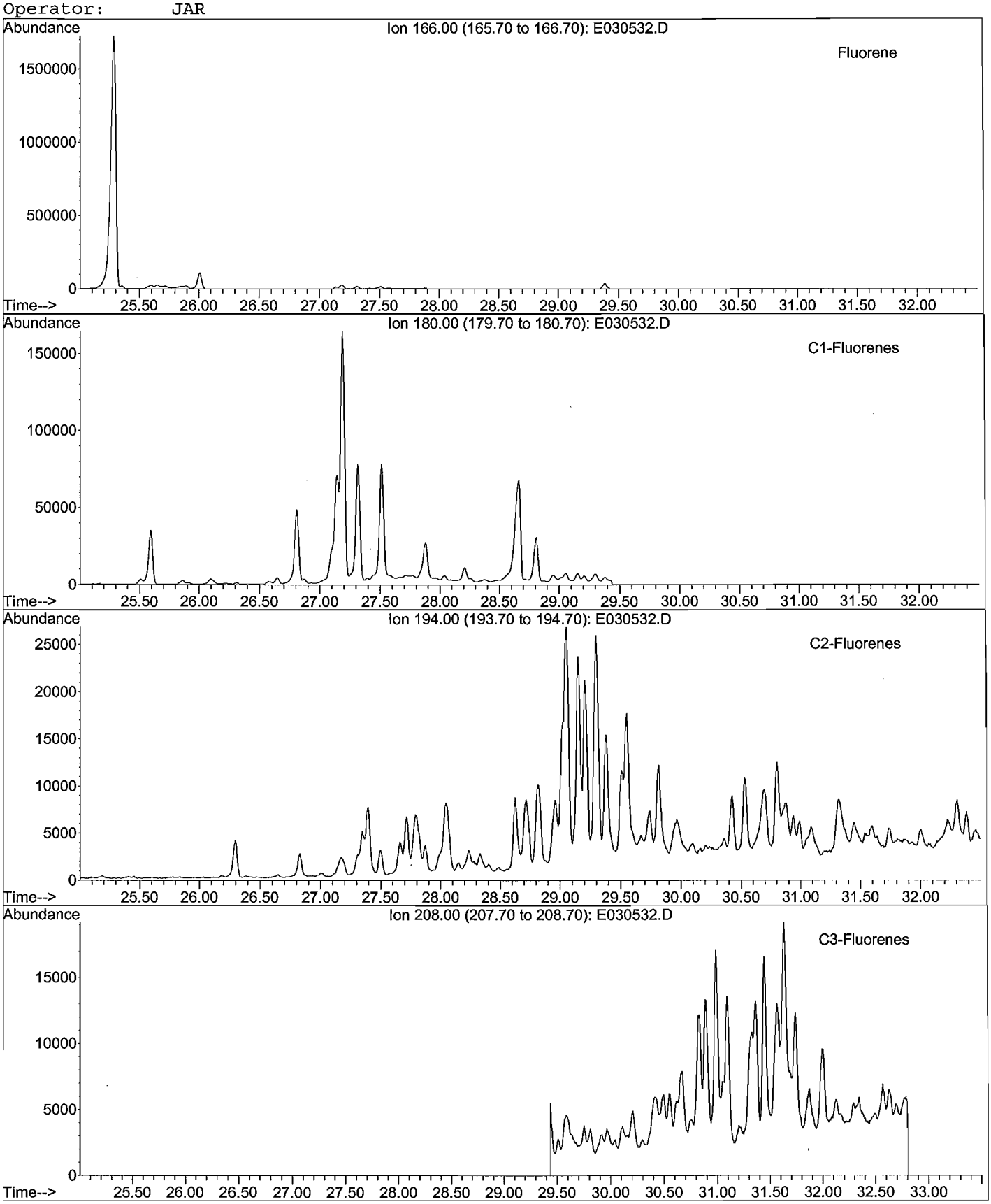
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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Sample Name: CH090217-01DUP
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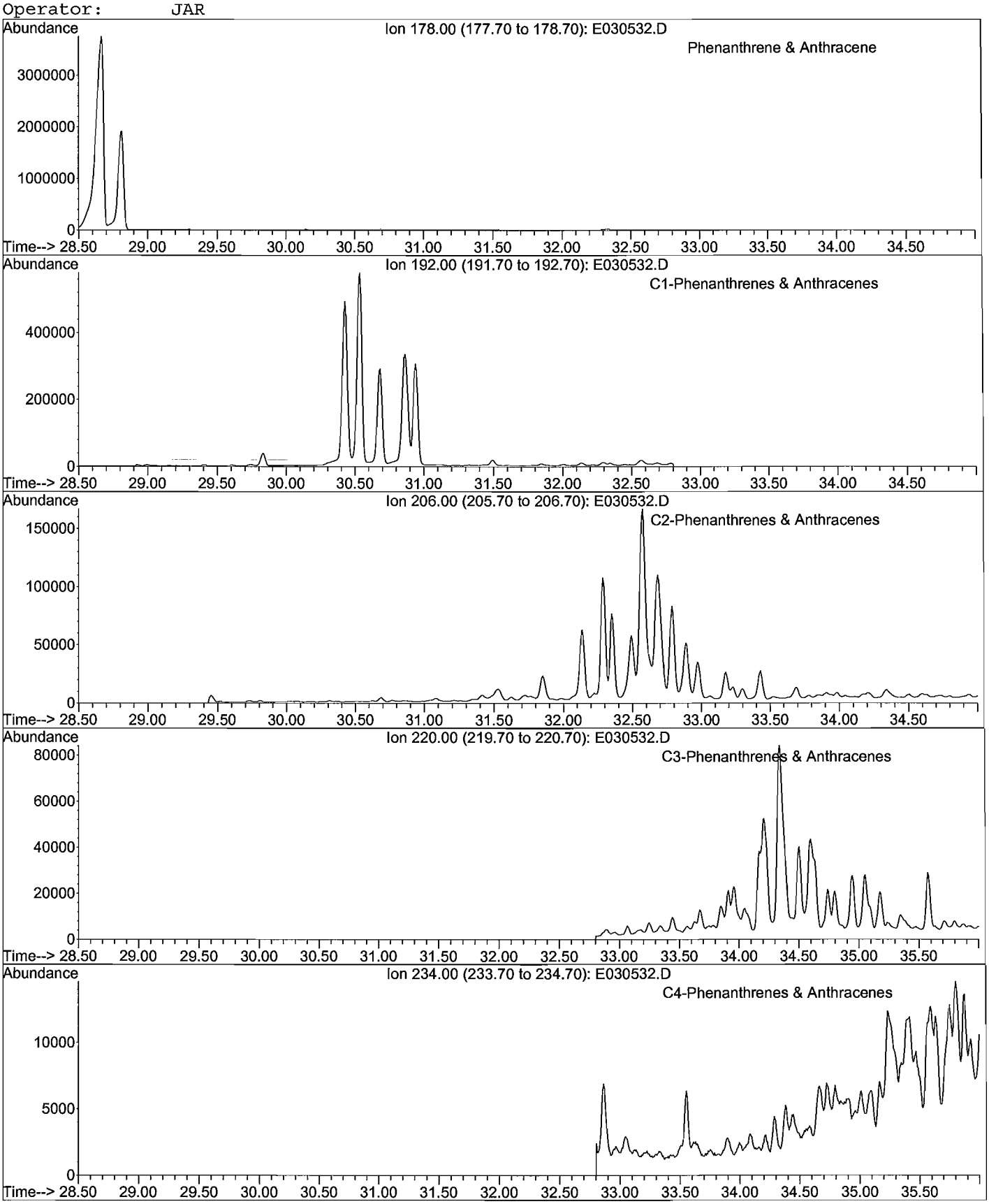

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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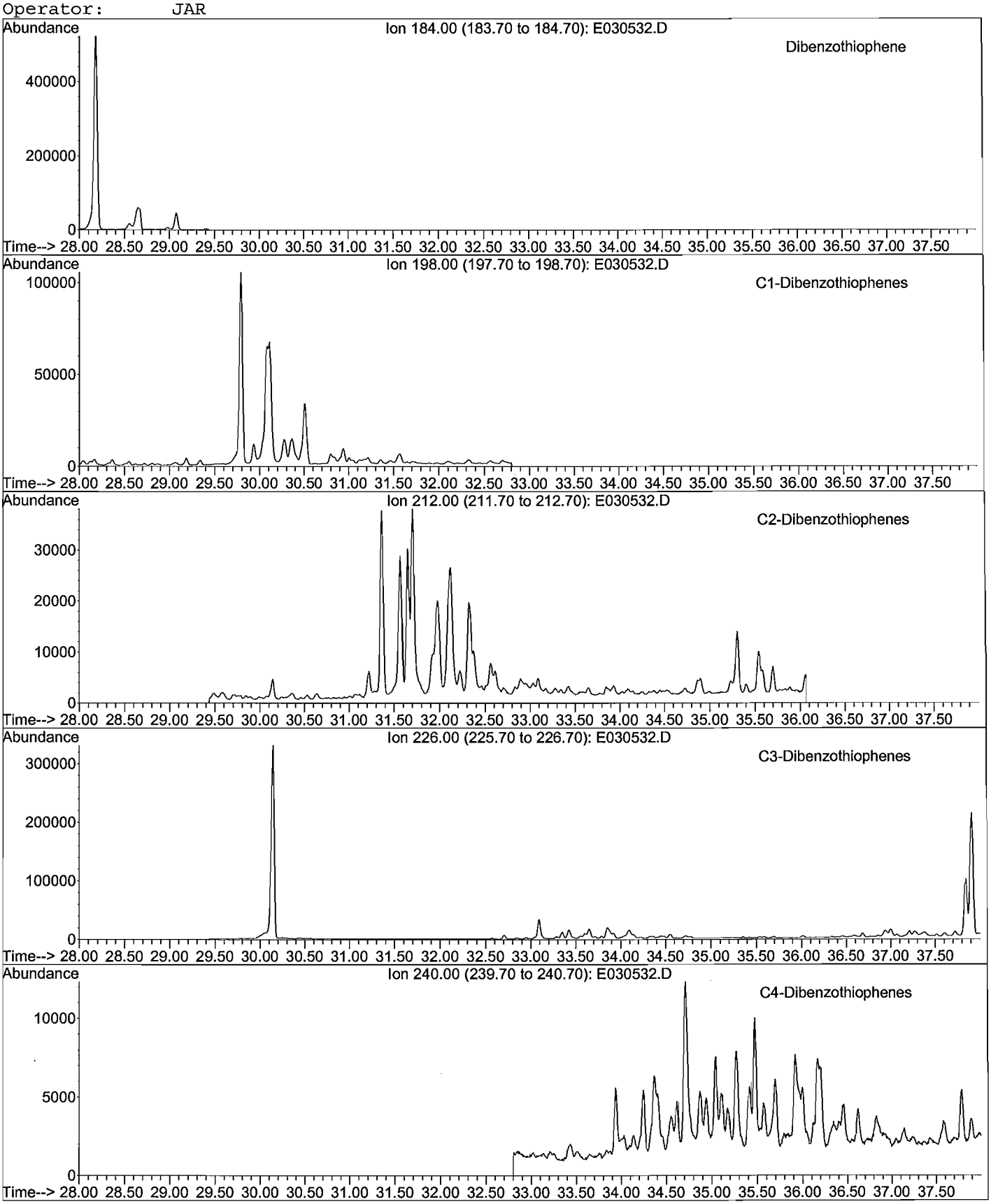
Sample Name: CH090217-01DUP
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030532.D
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Sample Name: CH090217-01DUP
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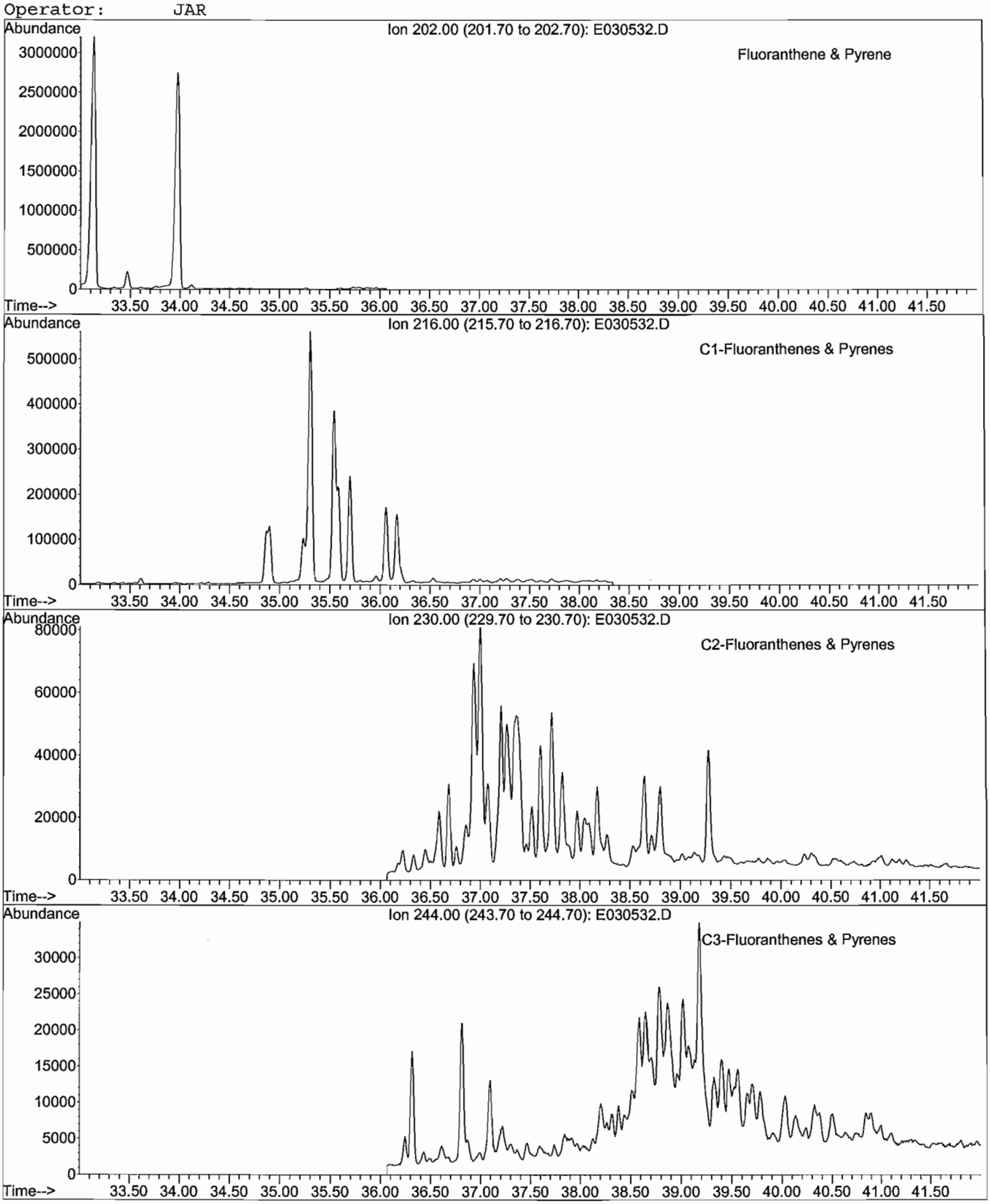
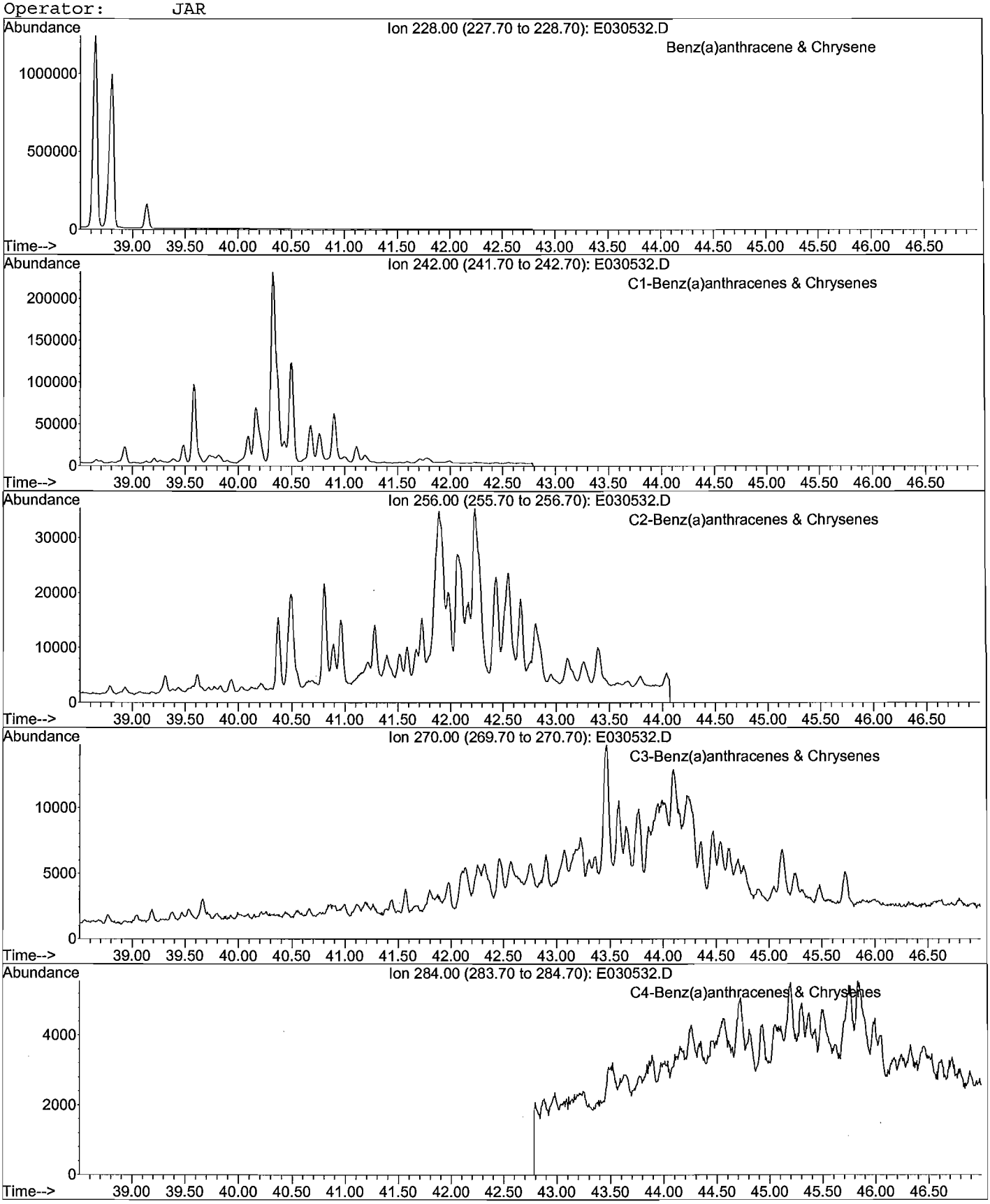
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

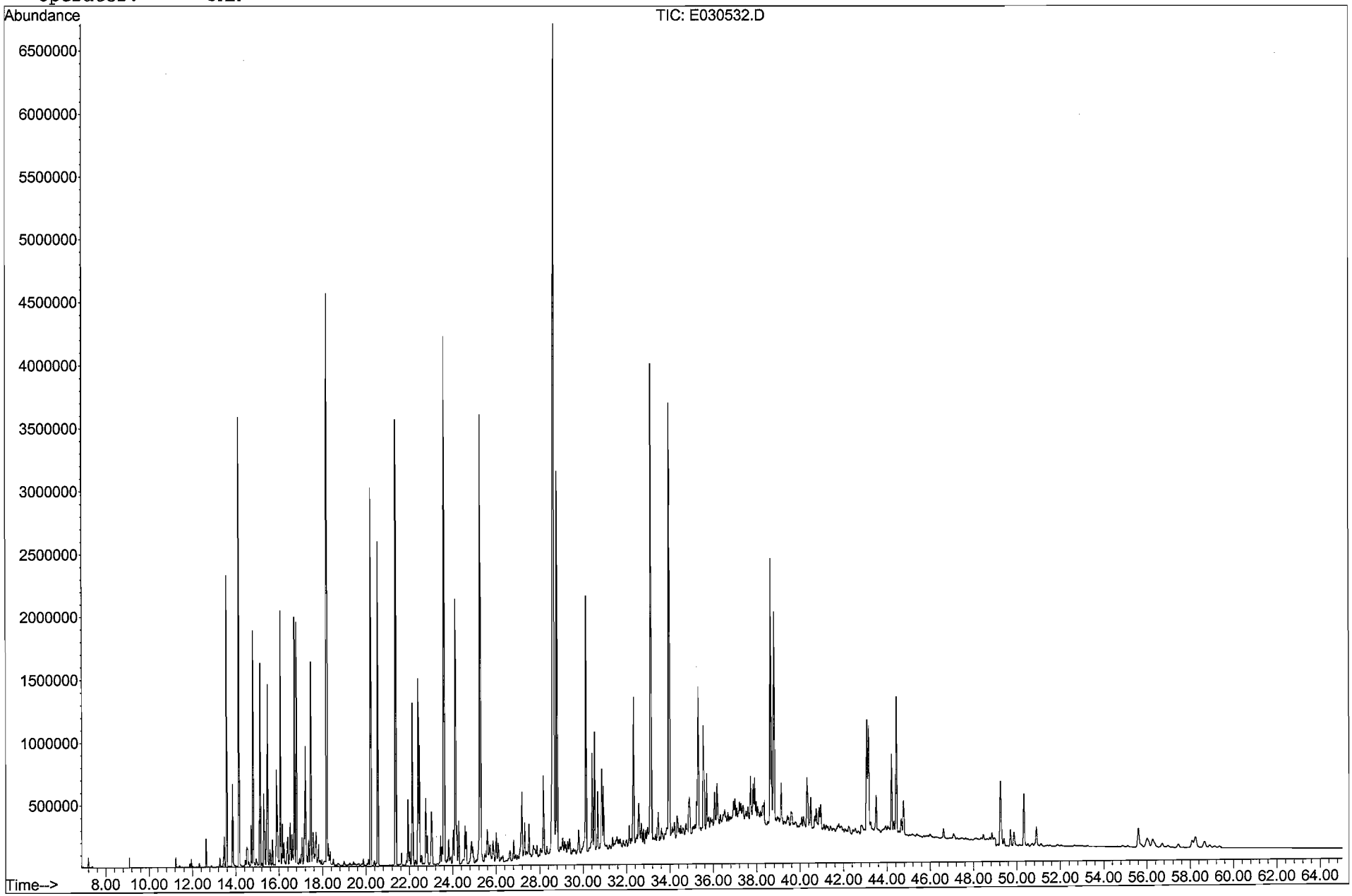
File: J:\1\DATA\E090305\E030532.D
Date Acquired: 7 Mar 2009 5:33 pm
Method File: 4008SIMD.M
Sample Name: CH090217-01DUP
Misc Info: MW-105A-021109-L
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E090305\E030532.D
Date Acquired: 7 Mar 2009 5:33 pm
Method File: 4008SIMD.M
Sample Name: CH090217-01DUP
Misc Info: MW-105A-021109-L
Operator: JAR



Appendix F

Petroleum Biomarker Concentrations

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01-F1		
File ID:	E031042.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	10.6	1.8	0.900	
C20 Tricyclic terpane	18.0	1.8	0.900	
C21 Tricyclic terpane	13.0	1.8	0.900	
C22 Tricyclic terpane	5.24	1.8	0.900	
C23 Tricyclic terpane	31.2	1.8	0.900	
C24 Tricyclic terpane	21.6	1.8	0.900	
C25 Tricyclic terpane-22S	10.6	1.8	0.900	
C25 Tricyclic terpane-22R	9.77	1.8	0.900	
C26 Tricyclic terpane-22S	8.42	1.8	0.900	
C26 Tricyclic terpane-22R	9.57	1.8	0.900	
C24 Tetracyclic terpane	10.9	1.8	0.900	
C28 Tricyclic terpane-22S	9.82	1.8	0.900	
C28 Tricyclic terpane-22R	8.99	1.8	0.900	
C29 Tricyclic terpane-22S	7.08	1.8	0.900	
C29 Tricyclic terpane-22R	7.36	1.8	0.900	
18a(H)-22,29,30-Trisnorneohopane - Ts	20.1	1.8	0.900	
C30 Tricyclic terpane-22S	6.51	1.8	0.900	
C30 Tricyclic terpane-22R	7.12	1.8	0.900	
17a(H)-22,29,30-Trisnorhopane - Tm	25.1	1.8	0.900	
17b(H)-22,29,30-Trisnorhopane	U	1.8	0.900	
17a(H)-29,30-Bisnorhopane	9.36	1.8	0.900	
17b(H),21b(H)-28,30-Bisnorhopane	7.5	1.8	0.900	
17b(H),21a(H)-28,30-Bisnorhopane	U	1.8	0.900	
17a(H),21b(H)-28,30-Bisnorhopane	13.0	1.8	0.900	
17a(H),21b(H)-25-Norhopane	U	1.8	0.900	
30-Norhopane	43.2	1.8	0.900	
18a(H)-30-Norneohopane - C29Ts	18.8	1.8	0.900	
15a-methyl-17a(H)-27-Norhopane	7.81	1.8	0.900	
Oleananes	5.88	1.8	0.900	
Hopane	65.1	1.8	0.900	
Moretane	8.47	1.8	0.900	
17a(H),21b(H)-30-Homohopane-22S	14.4	1.8	0.900	
17a(H),21b(H)-30-Homohopane-22R	16.9	1.8	0.900	
Gammacerane	U	1.8	0.900	
17b(H),21b(H)-Hopane	5.06	1.8	0.900	
30-Homomoretane-22R	U	1.8	0.900	
Hop-22(29)-ene	U	1.8	0.900	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01-F1		
File ID:	E031042.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	10.4	1.8	0.900	
30,31-Bishomohopane-22R	7.55	1.8	0.900	
30,31-Bishomomoretane-22R	U	1.8	0.900	
17b(H),21b(H)-Homohopane-22R	U	1.8	0.900	
30,31,32-Trishomohopane-22S	6.5	1.8	0.900	
30,31,32-Trishomohopane-22R	3.35	1.8	0.900	
30,31,32,33-Tetrakishomohopane-22S	U	1.8	0.900	
30,31,32,33-Tetrakishomohopane-22R	U	1.8	0.900	
30,31,32,33,34-Pentakishomohopane-22S	U	1.8	0.900	
30,31,32,33,34-Pentakishomohopane-22R	U	1.8	0.900	
Steranes				
C20 14a(H),17a(H)-Sterane	23.8	1.8	0.900	
C21 14b(H),17b(H)-Sterane	59.9	1.8	0.900	
C22 14b(H),17b(H)-Sterane	20.6	1.8	0.900	
C27 13b(H),17a(H)-20S-Diasterane	40.6	1.8	0.900	
C27 13b(H),17a(H)-20R-Diasterane	20.7	1.8	0.900	
C27 13a(H),17b(H)-20S-Diasterane	10.3	1.8	0.900	
C27 13a(H),17b(H)-20R-Diasterane	14.8	1.8	0.900	
C28 13b(H),17a(H)-20S-Diasterane	17.8	1.8	0.900	
C28 13a(H),17b(H)-20S-Diasterane	12.0	1.8	0.900	
C28 13a(H),17b(H)-20R-Diasterane	13.8	1.8	0.900	
C27 14a(H),17a(H)-20S-Cholestane	66.6	1.8	0.900	
C27 14b(H),17b(H)-20R-Cholestane	16.0	1.8	0.900	
C27 14b(H),17b(H)-20S-Cholestane	15.5	1.8	0.900	
C27 14a(H),17a(H)-20R-Cholestane	55.8	1.8	0.900	
C29 13b(H),17a(H)-20S-Diasterane	17.8	1.8	0.900	
C29 13b(H),17a(H)-20R-Diasterane	3.55	1.8	0.900	
C28 14a(H),17a(H)-20S-Methylcholestane	18.9	1.8	0.900	
C28 14b(H),17b(H)-20R-Methylcholestane	13.2	1.8	0.900	
C28 14b(H),17b(H)-20S-Methylcholestane	15.4	1.8	0.900	
C28 14a(H),17a(H)-20R-Methylcholestane	11.6	1.8	0.900	
C29 14a(H),17a(H)-20S-Ethylcholestane	15.6	1.8	0.900	
C29 14b(H),17b(H)-20R-Ethylcholestane	32.7	1.8	0.900	
C29 14b(H),17b(H)-20S-Ethylcholestane	21.2	1.8	0.900	
C29 14a(H),17a(H)-20R-Ethylcholestane	14.0	1.8	0.900	
Total Triterpanes	273	1.8	0.900	
Total Steranes	630	1.8	0.900	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01-F1		
File ID:	E031042.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0277
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
1-Chlorooctadecane	111	50 - 120		

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	QC090226-MB-F1		
File ID:	E031014.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.010
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/11/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				
C19 Tricyclic terpane	U	5.0	2.5	
C20 Tricyclic terpane	U	5.0	2.5	
C21 Tricyclic terpane	U	5.0	2.5	
C22 Tricyclic terpane	U	5.0	2.5	
C23 Tricyclic terpane	U	5.0	2.5	
C24 Tricyclic terpane	U	5.0	2.5	
C25 Tricyclic terpane-22S	U	5.0	2.5	
C25 Tricyclic terpane-22R	U	5.0	2.5	
C26 Tricyclic terpane-22S	U	5.0	2.5	
C26 Tricyclic terpane-22R	U	5.0	2.5	
C24 Tetracyclic terpane	U	5.0	2.5	
C28 Tricyclic terpane-22S	U	5.0	2.5	
C28 Tricyclic terpane-22R	U	5.0	2.5	
C29 Tricyclic terpane-22S	U	5.0	2.5	
C29 Tricyclic terpane-22R	U	5.0	2.5	
18a(H)-22,29,30-Trisnorneohopane - Ts	U	5.0	2.5	
C30 Tricyclic terpane-22S	U	5.0	2.5	
C30 Tricyclic terpane-22R	U	5.0	2.5	
17a(H)-22,29,30-Trisnorhopane - Tm	U	5.0	2.5	
17b(H)-22,29,30-Trisnorhopane	U	5.0	2.5	
17a(H)-29,30-Bisnorhopane	U	5.0	2.5	
17b(H),21b(H)-28,30-Bisnorhopane	U	5.0	2.5	
17b(H),21a(H)-28,30-Bisnorhopane	U	5.0	2.5	
17a(H),21b(H)-28,30-Bisnorhopane	U	5.0	2.5	
17a(H),21b(H)-25-Norhopane	U	5.0	2.5	
30-Norhopane	U	5.0	2.5	
18a(H)-30-Norneohopane - C29Ts	U	5.0	2.5	
15a-methyl-17a(H)-27-Norhopane	U	5.0	2.5	
Oleananes	U	5.0	2.5	
Hopane	U	5.0	2.5	
Moretane	U	5.0	2.5	
17a(H),21b(H)-30-Homohopane-22S	U	5.0	2.5	
17a(H),21b(H)-30-Homohopane-22R	U	5.0	2.5	
Gammacerane	U	5.0	2.5	
17b(H),21b(H)-Hopane	U	5.0	2.5	
30-Homomoretane-22R	U	5.0	2.5	
Hop-22(29)-ene	U	5.0	2.5	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	QC090226-MB-F1		
File ID:	E031014.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.010
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/11/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	U	5.0	2.5	
30,31-Bishomohopane-22R	U	5.0	2.5	
30,31-Bishomomoretane-22R	U	5.0	2.5	
17b(H),21b(H)-Homohopane-22R	U	5.0	2.5	
30,31,32-Trishomohopane-22S	U	5.0	2.5	
30,31,32-Trishomohopane-22R	U	5.0	2.5	
30,31,32,33-Tetrakishomohopane-22S	U	5.0	2.5	
30,31,32,33-Tetrakishomohopane-22R	U	5.0	2.5	
30,31,32,33,34-Pentakishomohopane-22S	U	5.0	2.5	
30,31,32,33,34-Pentakishomohopane-22R	U	5.0	2.5	
Steranes				
C20 14a(H),17a(H)-Sterane	U	5.0	2.5	
C21 14b(H),17b(H)-Sterane	U	5.0	2.5	
C22 14b(H),17b(H)-Sterane	U	5.0	2.5	
C27 13b(H),17a(H)-20S-Diasterane	U	5.0	2.5	
C27 13b(H),17a(H)-20R-Diasterane	U	5.0	2.5	
C27 13a(H),17b(H)-20S-Diasterane	U	5.0	2.5	
C27 13a(H),17b(H)-20R-Diasterane	U	5.0	2.5	
C28 13b(H),17a(H)-20S-Diasterane	U	5.0	2.5	
C28 13a(H),17b(H)-20S-Diasterane	U	5.0	2.5	
C28 13a(H),17b(H)-20R-Diasterane	U	5.0	2.5	
C27 14a(H),17a(H)-20S-Cholestane	U	5.0	2.5	
C27 14b(H),17b(H)-20R-Cholestane	U	5.0	2.5	
C27 14b(H),17b(H)-20S-Cholestane	U	5.0	2.5	
C27 14a(H),17a(H)-20R-Cholestane	U	5.0	2.5	
C29 13b(H),17a(H)-20S-Diasterane	U	5.0	2.5	
C29 13b(H),17a(H)-20R-Diasterane	U	5.0	2.5	
C28 14a(H),17a(H)-20S-Methylcholestane	U	5.0	2.5	
C28 14b(H),17b(H)-20R-Methylcholestane	U	5.0	2.5	
C28 14b(H),17b(H)-20S-Methylcholestane	U	5.0	2.5	
C28 14a(H),17a(H)-20R-Methylcholestane	U	5.0	2.5	
C29 14a(H),17a(H)-20S-Ethylcholestane	U	5.0	2.5	
C29 14b(H),17b(H)-20R-Ethylcholestane	U	5.0	2.5	
C29 14b(H),17b(H)-20S-Ethylcholestane	U	5.0	2.5	
C29 14a(H),17a(H)-20R-Ethylcholestane	U	5.0	2.5	
Total Triterpanes	U	5.0	2.5	
Total Steranes	U	5.0	2.5	

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Method Blank

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	QC090226-MB-F1		
File ID:	E031014.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	2/26/2009	Sample Size (g):	0.010
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/11/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments

Extraction Surrogate Recoveries (%)		Limits
1-Chlorooctadecane	93	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01DUP-F1		
File ID:	E031043.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Terpanes				RPD
C19 Tricyclic terpane	10.4	1.84	0.920	1.9
C20 Tricyclic terpane	15.5	1.84	0.920	14.9
C21 Tricyclic terpane	12.3	1.84	0.920	5.5
C22 Tricyclic terpane	3.84	1.84	0.920	30.8
C23 Tricyclic terpane	26.7	1.84	0.920	15.5
C24 Tricyclic terpane	19.7	1.84	0.920	9.2
C25 Tricyclic terpane-22S	9.82	1.84	0.920	7.6
C25 Tricyclic terpane-22R	8.05	1.84	0.920	19.3
C26 Tricyclic terpane-22S	7.39	1.84	0.920	13
C26 Tricyclic terpane-22R	8.92	1.84	0.920	7
C24 Tetracyclic terpane	10.6	1.84	0.920	2.8
C28 Tricyclic terpane-22S	8.14	1.84	0.920	18.7
C28 Tricyclic terpane-22R	9.84	1.84	0.920	9
C29 Tricyclic terpane-22S	9.66	1.84	0.920	30.8
C29 Tricyclic terpane-22R	6.89	1.84	0.920	6.6
18a(H)-22,29,30-Trisnorneohopane - Ts	20.4	1.84	0.920	1.5
C30 Tricyclic terpane-22S	6.83	1.84	0.920	4.8
C30 Tricyclic terpane-22R	7.29	1.84	0.920	2.4
17a(H)-22,29,30-Trisnorhopane - Tm	22.7	1.84	0.920	10
17b(H)-22,29,30-Trisnorhopane	U	1.84	0.920	NA
17a(H)-29,30-Bisnorhopane	8.95	1.84	0.920	4.5
17b(H),21b(H)-28,30-Bisnorhopane	U	1.84	0.920	NA
17b(H),21a(H)-28,30-Bisnorhopane	U	1.84	0.920	NA
17a(H),21b(H)-28,30-Bisnorhopane	10.5	1.84	0.920	21.3
17a(H),21b(H)-25-Norhopane	U	1.84	0.920	NA
30-Norhopane	38.3	1.84	0.920	12
18a(H)-30-Norneohopane - C29Ts	16.0	1.84	0.920	16.1
15a-methyl-17a(H)-27-Norhopane	6.8	1.84	0.920	13.8
Oleananes	6.35	1.84	0.920	7.7
Hopane	60.5	1.84	0.920	7.3
Moretane	9.38	1.84	0.920	10.2
17a(H),21b(H)-30-Homohopane-22S	13.3	1.84	0.920	7.9
17a(H),21b(H)-30-Homohopane-22R	13.2	1.84	0.920	24.6
Gammacerane	U	1.84	0.920	NA
17b(H),21b(H)-Hopane	4.2	1.84	0.920	18.6
30-Homomoretane-22R	2.81	1.84	0.920	NA
Hop-22(29)-ene	U	1.84	0.920	NA

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01DUP-F1		
File ID:	E031043.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
30,31-Bishomohopane-22S	7.76	1.84	0.920	29.1
30,31-Bishomohopane-22R	7.01	1.84	0.920	7.4
30,31-Bishomomoretane-22R	U	1.84	0.920	NA
17b(H),21b(H)-Homohopane-22R	U	1.84	0.920	NA
30,31,32-Trishomohopane-22S	3.78	1.84	0.920	52.9
30,31,32-Trishomohopane-22R	3.9	1.84	0.920	15.2
30,31,32,33-Tetrakishomohopane-22S	U	1.84	0.920	NA
30,31,32,33-Tetrakishomohopane-22R	U	1.84	0.920	NA
30,31,32,33,34-Pentakishomohopane-22S	U	1.84	0.920	NA
30,31,32,33,34-Pentakishomohopane-22R	U	1.84	0.920	NA
Steranes				
C20 14a(H),17a(H)-Sterane	23.9	1.84	0.920	0.4
C21 14b(H),17b(H)-Sterane	57.4	1.84	0.920	4.3
C22 14b(H),17b(H)-Sterane	13.2	1.84	0.920	43.8
C27 13b(H),17a(H)-20S-Diasterane	33.6	1.84	0.920	18.9
C27 13b(H),17a(H)-20R-Diasterane	19.1	1.84	0.920	8
C27 13a(H),17b(H)-20S-Diasterane	9.33	1.84	0.920	9.9
C27 13a(H),17b(H)-20R-Diasterane	13.4	1.84	0.920	9.9
C28 13b(H),17a(H)-20S-Diasterane	14.5	1.84	0.920	20.4
C28 13a(H),17b(H)-20S-Diasterane	8.46	1.84	0.920	34.6
C28 13a(H),17b(H)-20R-Diasterane	15.0	1.84	0.920	8.3
C27 14a(H),17a(H)-20S-Cholestane	60.2	1.84	0.920	10.1
C27 14b(H),17b(H)-20R-Cholestane	16.4	1.84	0.920	2.5
C27 14b(H),17b(H)-20S-Cholestane	14.6	1.84	0.920	6
C27 14a(H),17a(H)-20R-Cholestane	49.0	1.84	0.920	13
C29 13b(H),17a(H)-20S-Diasterane	16.6	1.84	0.920	7
C29 13b(H),17a(H)-20R-Diasterane	3.91	1.84	0.920	9.7
C28 14a(H),17a(H)-20S-Methylcholestane	18.0	1.84	0.920	4.9
C28 14b(H),17b(H)-20R-Methylcholestane	11.8	1.84	0.920	11.2
C28 14b(H),17b(H)-20S-Methylcholestane	14.0	1.84	0.920	9.5
C28 14a(H),17a(H)-20R-Methylcholestane	10.4	1.84	0.920	10.9
C29 14a(H),17a(H)-20S-Ethylcholestane	17.0	1.84	0.920	8.6
C29 14b(H),17b(H)-20R-Ethylcholestane	30.3	1.84	0.920	7.6
C29 14b(H),17b(H)-20S-Ethylcholestane	18.6	1.84	0.920	13.1
C29 14a(H),17a(H)-20R-Ethylcholestane	14.2	1.84	0.920	1.4
Total Triterpanes	239	1.84	0.920	13.3
Total Steranes	562	1.84	0.920	11.4

Analytical Results for Petroleum Biomarkers
META Environmental, Inc.

Field ID: Duplicate of MW-105A-021109-L

Client:	CH2M Hill	Preparation Method:	EPA 3570
Project:	Quanta	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270
Lab ID	CH090217-01DUP-F1		
File ID:	E031043.D	Matrix:	NAPL
		Preservation:	None
Date Sampled:	2/11/2009	Decanted:	None
Date Received:	2/17/2009		
Date Prepared:	2/26/2009	Sample Size (g):	0.0272
Date Cleanup:	2/29/2009	Percent Solid:	NA
Date Analyzed:	3/12/2009	Extract Volume (µl):	5000
Instrument:	El Camino	Prep DF:	1.00
Operator:	ERL/JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC090226-MB-F1		

Analyte	Concentration (mg/kg)	RL	EDL	Comments
Extraction Surrogate Recoveries (%)		Limits		
1-Chlorooctadecane	97	50 - 120		

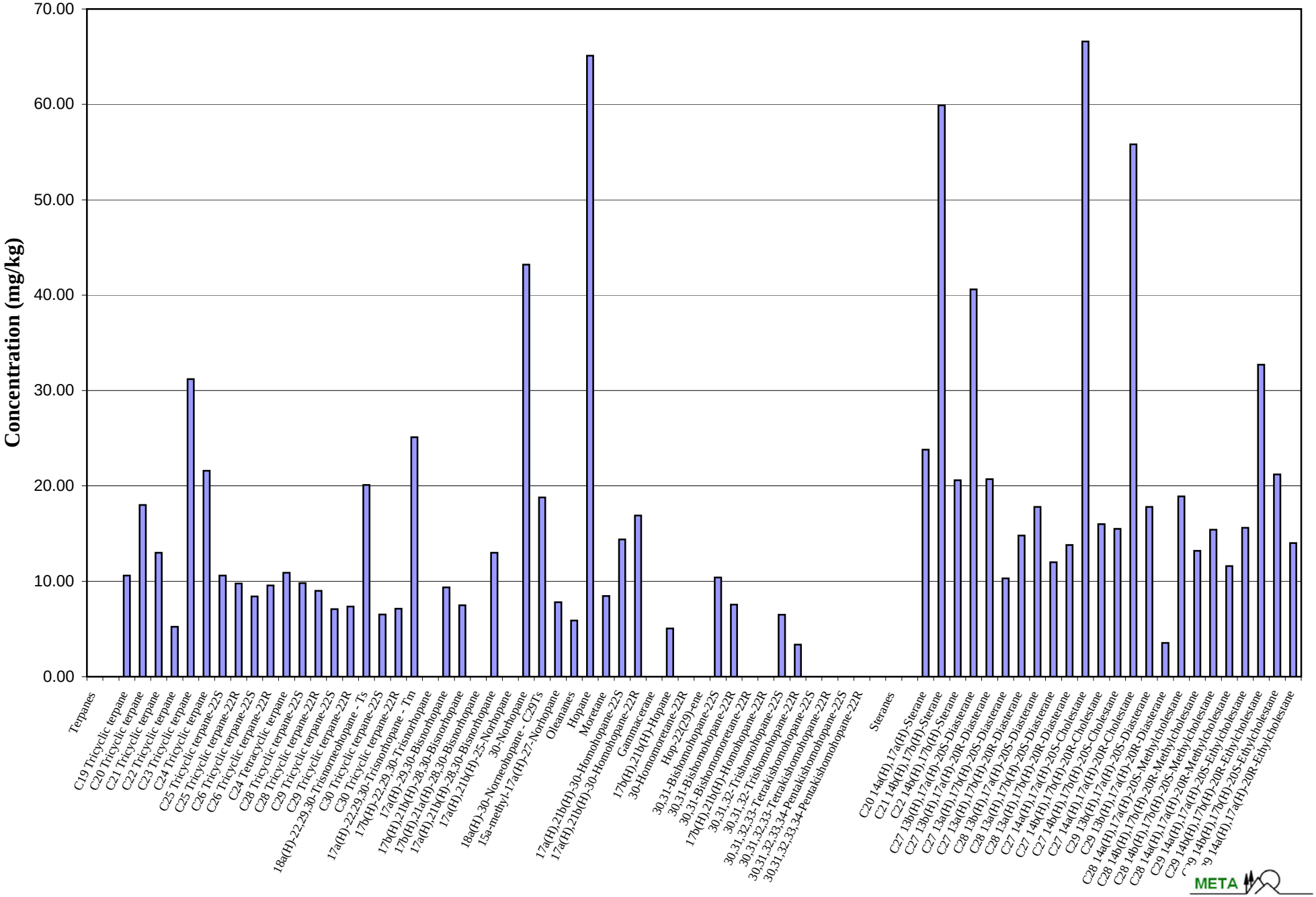
NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.

Appendix G

Petroleum Biomarker Histograms

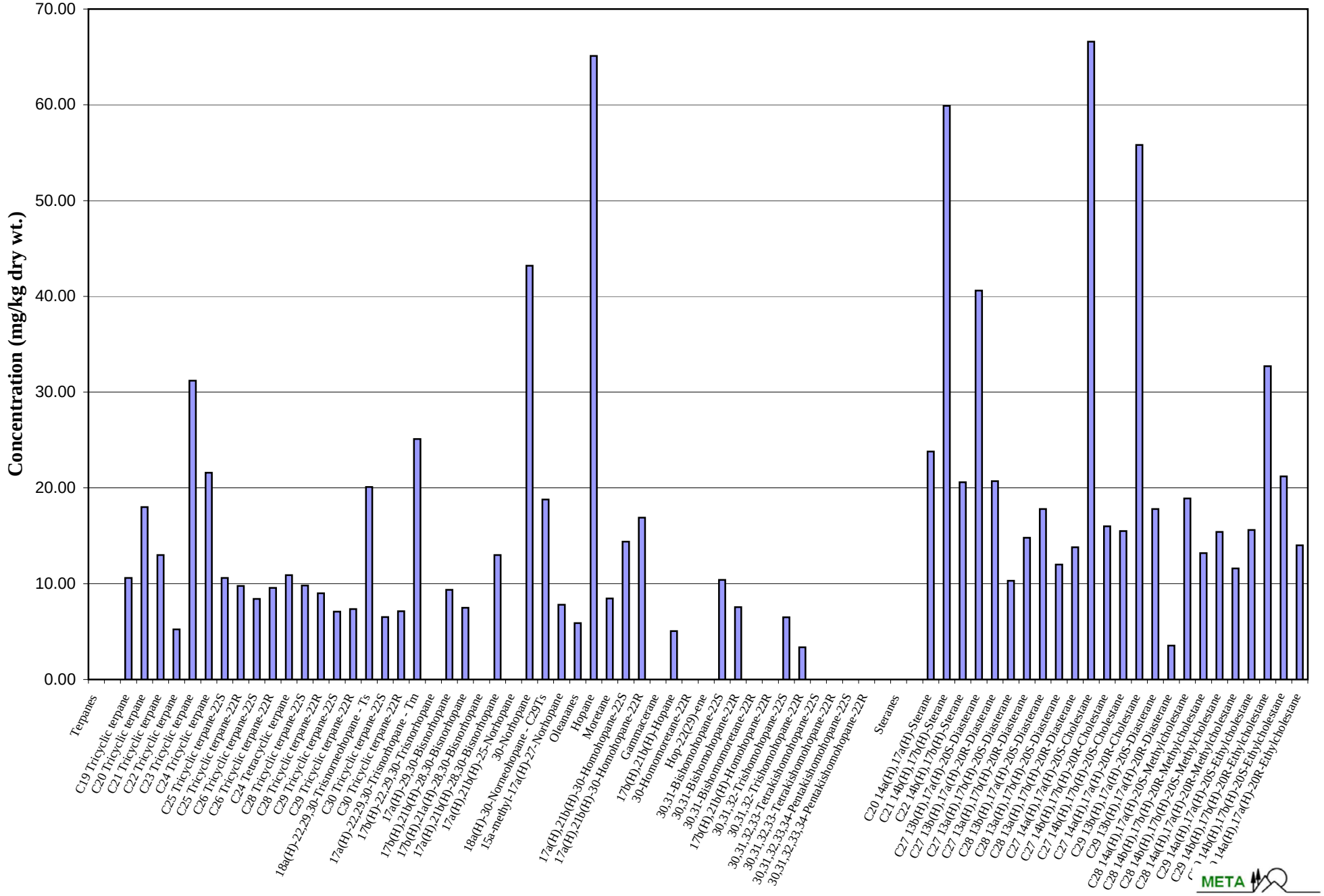
MW-105A-021109-L

CH090217-01-F1



Duplicate of MW-105A-021109-L

CH090217-01DUP-F1



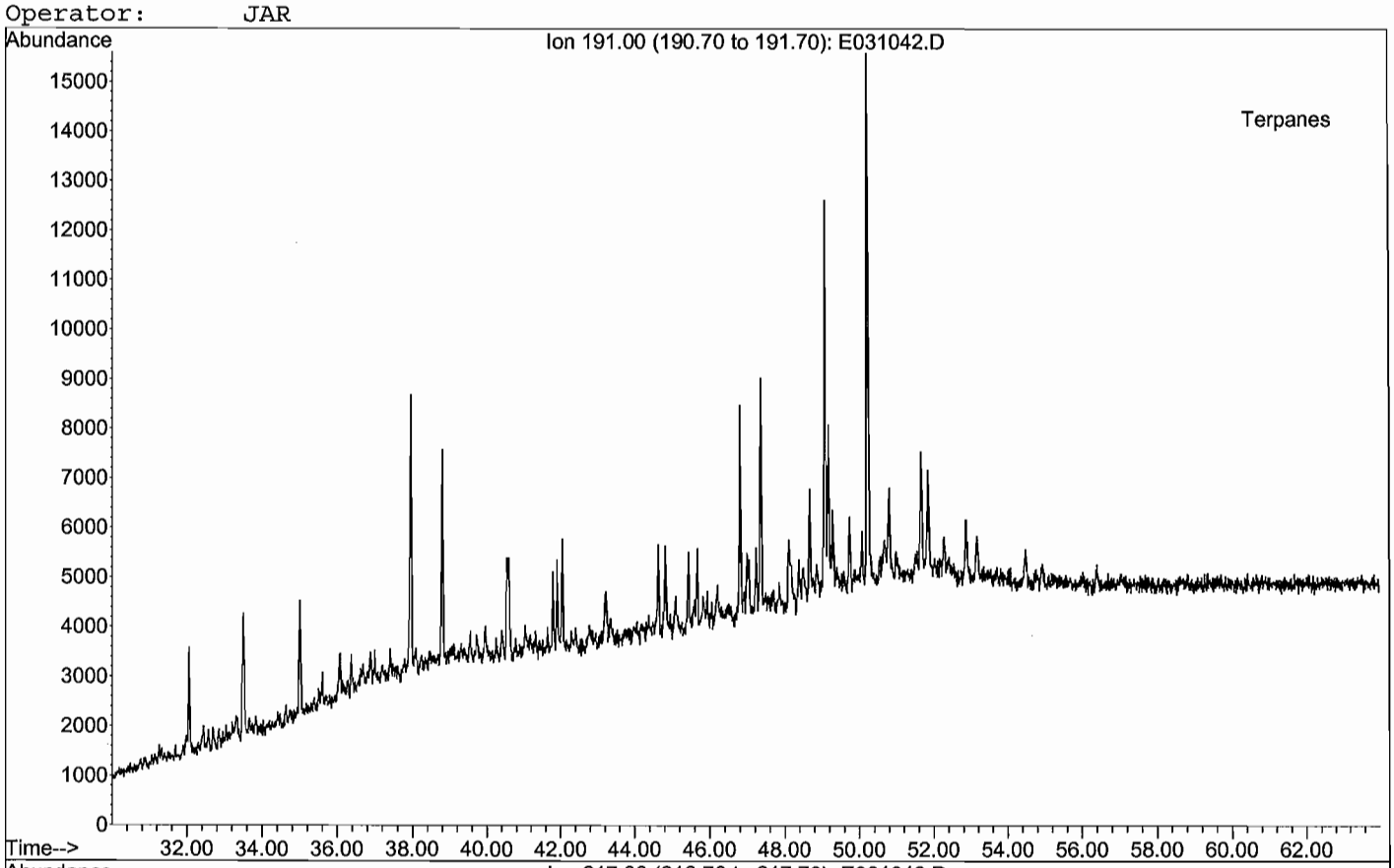
Appendix H

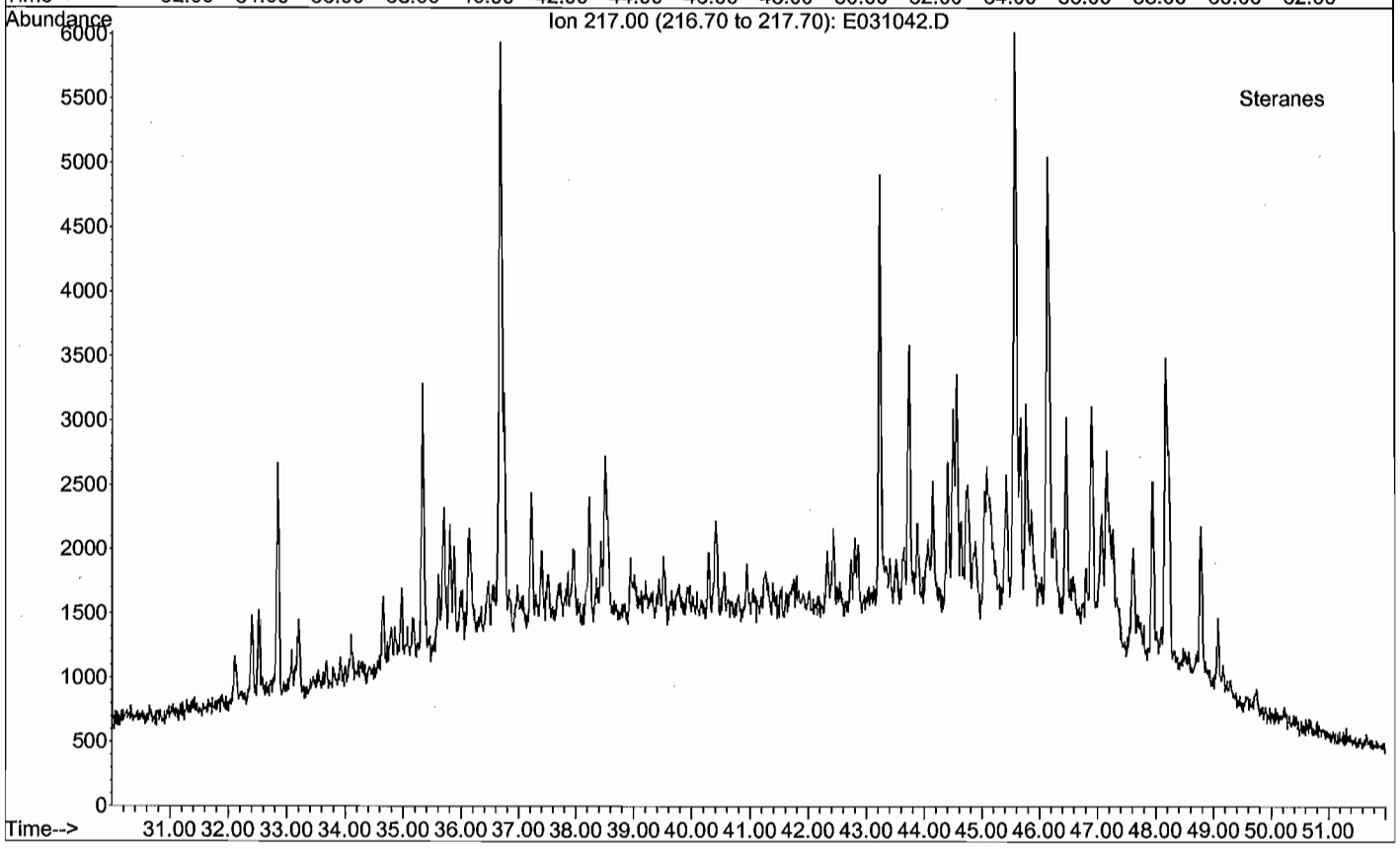
Petroleum Biomarker EICPs

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090310\E031042.D
Date Acquired: 12 Mar 2009 2:27 pm
Method File: 4011SIM3.M
Sample Name: CH090217-01-F1
Misc Info: MW-105A-021109-L
Operator: JAR

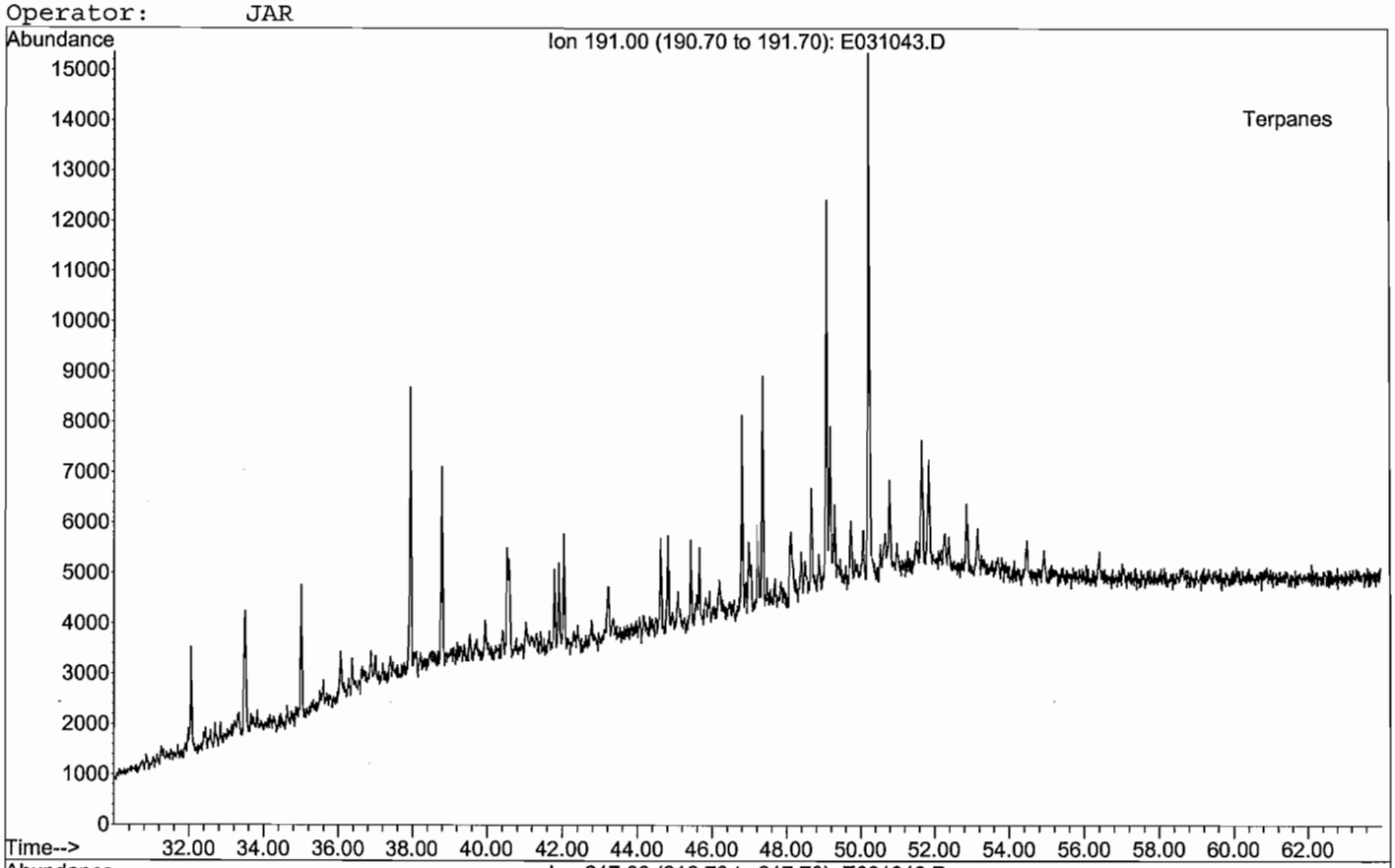


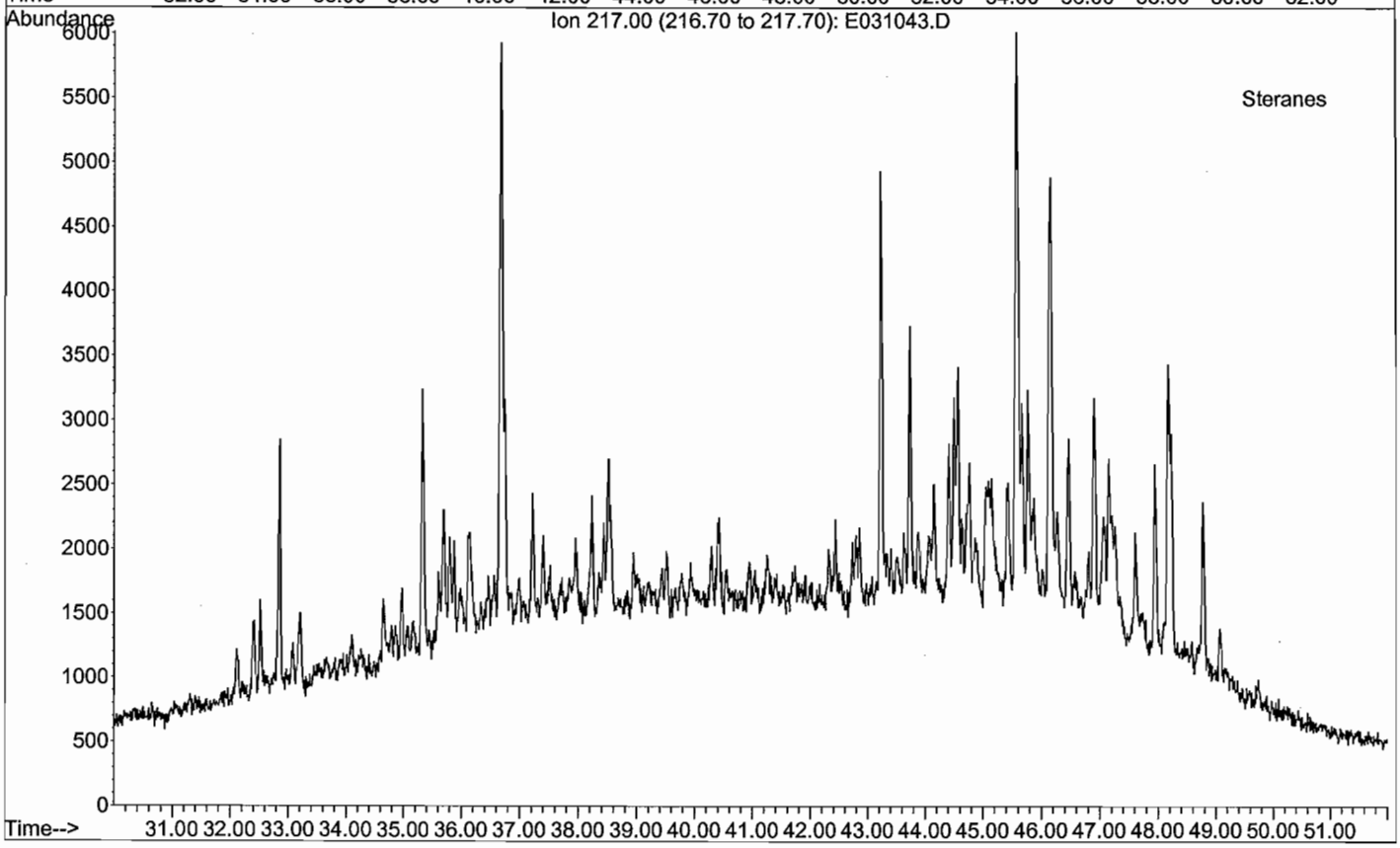


META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E090310\E031043.D
Date Acquired: 12 Mar 2009 3:45 pm
Method File: 4011SIM3.M
Sample Name: CH090217-01DUP-F1
Misc Info: MW-105A-021109-L
Operator: JAR





Appendix I

Physical Properties Results

16840 Barker Springs #302
Houston, Texas 77084

(281) 578-2289
Fax: (281) 578-2295
villalanti@earthlink.net

Triton Analytics Corp.
Reference Laboratories

- Hydrocarbon
- Chemical
- Environmental

Dan Villalanti, *Pres.* • Joe Raia, *Lab Director* • Calvin Blakley, *Mass Spec* • Jeanne Malloy, *GC*

Requested By: James Roush/ Meta Environmental
Project Name: CH2M Hill- Quanta Edgewater
TAC Reference#: 5902
Date:3/20/09

Sample Name	**CH090217-01**		
Trial No.	1	2	3
Interfacial Tension (mN/m)@25C	See Notes Below		
Average (mN/m)			
Standard Deviation (mN/m)			
Kinematic Viscosity @10C, mm2/s	308		
Kinematic Viscosity @20C, mm2/s	146		
Kinematic Viscosity @25C, mm2/s	105		
Density @10C, g/cm3	0.9549		
Density @20C, g/cm3	0.9484		
Density @ 25C, g/cm3	0.9452		
Density @60F g/cm3	0.9517		
API Gravity @60F	17.0		
Specific Gravity @60F	0.9526		

Note:
This sample cannot be analyzed by our current method for interfacial tension.
The following measures were taken to attempt analysis:
1) Sample was attempted with both straight and curved needles
2) Needles of the following diameters were attempted: 0.42mm, 0.70mm and 1.22mm
3) Performing the analysis in different solvents ie acetone, ethanol
4) Centrifugation of the sample prior to analysis as sample appeared very heterogenous.
Dark and very fine particulates are dispersed in the oil phase of the sample.

Despite all these trials, a bubble could not be formed at the tip of the needle which makes it impossible to take a measurement.

Methods:
1. Interfacial Tension by ASTM D971
2. Density by ASTM D4052
3. Kinematic Viscosity by ASTM D7042