Arthur D Little

DRAFT

Environmental
Monitoring and Analysis Unit
Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390 USA

Direct Number (1) 617.498.5387
Main Number (1) 617.498.5000
Fax (1) 617.498.7296

Abu Dhabi
Arlington
Berlin
Bogotá
Bombay
Brussels
Buenos Aires
Cambridge, U.K.
Cambridge, U.S.A.
Caracas
Chicago
Copenhagen
Düsseldorf
Gothenburg
Harrogate
Hong Kong
Houston
Jeddah
Kuala Lumpur
Lisbon
London
Los Angeles
Madrid
Mexico City
Milan
Monterrey
Moscow
Munich
New York
Palo Alto
Paris
Philadelphia
Prague
Riyadh
Rotterdam
San Francisco
Santa Barbara
São Paulo
Seattle
Seoul
Singapore
Stockholm
Sydney
Tokyo
Toronto
Vienna
Washington
Wiesbaden
Zürich

Fax Transmittal

To:	Mr. Rich Rosen	**Company:**	Tesoro Hawaii
Date:	September 14, 1998	**Fax Number:**	808-847-7183
From:	John S. Brown	**Location:**	15W/311
Total number of pages (including cover):	35		

Dear Rich:

Attached are the Draft saturated hydrocarbon data (GC/FID), PAH data (GC/MS), and biomarker data (GC/MS) for the six oil spill samples analyzed by Arthur D. Little, Inc.

Please call me if you require additional information.

Regards,

John S. Brown
Principal
Environmental Science and Technology

Confidentiality Notice
This facsimile transmission and the accompanying documents are intended only for the use of the recipient named above. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, of the taking of any action in reliance on, the contents of this facsimile is strictly prohibited. If you have received this facsimile in error, please notify us immediately by telephone to arrange for the return of the document at our expense.

☐ Please call to confirm:

☑ Call if there is a problem: (1) 617.498.5387

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii
Sample Set: B0143
Data : SHC/TPH - Main - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike	KBCJ02	KBCJ04
Lab ID	BV-S-87PB	BV-S-88BS	98D2796	98D2798
Lab Batch	B0143	B0143	B0143	B0143
File	09119808.D	09119809.D	09119810.D	09119811.D
Sample Type	QC	QC	SAMP	SAMP
Weight Basis	Oil	Oil	Oil	Oil
Matrix	Oil	Oil	Oil	Oil
Sample Size	10 mg	10 mg	13 mg	13.8 mg
Associated Blank	NA	BV-S-87PB	BV-S-87PB	BV-S-87PB
Field Date	NA	NA	09/07/98	09/07/98
Extract Date	09/11/98	09/11/98	09/11/98	09/11/98
Analysis Date	09/11/98	09/11/98	09/11/98	09/12/98
Min Reporting Limit	0.4	0.4	0.31	0.29
Units	ug/mg	ug/mg	ug/mg	ug/mg
nC8	0.2 J	0.39 JB	0.25 JB	0.01 B
nC9	ND	ND	ND	ND
nC10	ND	1.9	0.04 J	ND
nC11	ND	ND	0.14 J	ND
nC12	0.014 J	ND	0.21 J	ND
nC13	0.019 J	ND	0.34	0.019 JB
1380	ND	ND	0.55	0.019 J
nC14	0.034 J	ND	0.39	0.14 JB
1470	ND	ND	0.8	0.09 J
nC15	0.026 J	2.1	0.44	0.45
nC16	0.024 J	ND	0.32	1.4
1650	ND	ND	0.94	0.83
nC17	0.025 J	ND	0.36	2.8
pristane	0.021 J	2.4	1.6	1.8
nC18	0.022 J	ND	0.38	3.5
phytane	ND	ND	1.1	1.3
nC19	0.025 J	ND	0.4	3.7
nC20	ND	2.3	0.52	3.4
nC21	0.024 J	ND	0.39	2.6
nC22	0.022 J	ND	0.31	1.6
nC23	0.027 J	ND	0.39	1.2
nC24	ND	0.086 J	0.42	0.74
nC25	0.017	2.3	0.54	0.53
nC26	0.019 J	ND	0.57	0.37
nC27	ND	ND	0.73	0.32
nC28	ND	ND	0.97	0.23 J
nC29	ND	ND	1.6	0.27 J
nC30	ND	2.1	2.1	0.18 J
nC31	ND	0.082 J	3.2	0.2 J
nC32	ND	ND	3.8	0.21 J
nC33	ND	ND	5	0.17 J
nC34	ND	1.7	5.3	0.16 J
nC35	ND	ND	5.4	0.17 J
nC36	ND	1.6	4.4	0.17 J
nC37	ND	ND	4.1	0.13 J
nC38	ND	ND	3.7	0.14 J
nC39	ND	ND	2.6	0.11 J
nC40	ND	ND	2.5	0.12 J
Total Resolved	1.9	18	100	60
TPHC	1.9	18	360	320
%OTP	87	88	78	91
%SAA	89	90	82	95
%DSOT	94	95	88	96

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii
Sample Set: B0143
Data : SHC/TPH - Main - Surrogate Corrected

Field ID	KBML01	KBML02	SPM HOSE002	SPM HOSE001
Lab ID	98D2801	98D2802	98D2803	98D2804
Lab Batch	B0143	B0143	B0143	B0143
File	09119812.D	09119813.D	09119814.D	09119815.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Weight Basis	Oil	Oil	Oil	Oil
Matrix	Oil	Oil	Oil	Oil
Sample Size	10.2 mg	13.4 mg	10.5 mg	10.1 mg
Associated Blank	BV-S-87PB	BV-S-87PB	BV-S-87PB	BV-S-87PB
Field Date	09/05/98	09/06/98	08/26/98	08/31/98
Extract Date	09/11/98	09/11/98	09/11/98	09/11/98
Analysis Date	09/12/98	09/12/98	09/12/98	09/12/98
Min Reporting Limit	0.39	0.3	0.38	0.4
Units	ug/mg	ug/mg	ug/mg	ug/mg
nC8	0.42 B	ND	ND	0.035 JB
nC9	ND	ND	ND	0.15 J
nC10	ND	ND	ND	0.53
nC11	ND	ND	ND	0.93
nC12	ND	0.034 JB	0.022 JB	1.2
nC13	0.14 J	0.21 J	0.12 J	1.7
1380	0.088 J	0.11 J	0.063 J	0.51
nC14	0.62	0.83	0.45	3
1470	0.28 J	0.36	0.18 J	0.91
nC15	1.2	1.4	0.71	2.8
nC16	2.1	2.5	1.2	3.7
1650	1.3	1.3	0.7	1.8
nC17	3.3	3.6	1.8	4.3
pristane	2.2	2.3	1.2	2.8
nC18	3.3	3.6	1.9	3.7
phytane	1.4	1.4	0.7	1.4
nC19	3.5	3.5	1.9	3.3
nC20	3.1	3.2	1.7	2.8
nC21	2.4	2.3	1.3	2.1
nC22	1.6	1.5	0.84	1.3
nC23	1.1	1	0.58	0.92
nC24	0.7	0.67	0.36 J	0.6
nC25	0.5	0.47	0.26 J	0.41
nC26	0.35 J	0.34	0.19 J	0.31 J
nC27	0.3 J	0.28 J	0.15 J	0.24 J
nC28	0.25 J	0.21 J	0.12 J	0.19 J
nC29	ND	ND	0.13 J	0.18 J
nC30	ND	ND	ND	0.17 J
nC31	0.22 J	0.2 J	0.12 J	0.17 J
nC32	0.22 J	0.2 J	0.11 J	0.17 J
nC33	0.2 J	0.16 J	0.09 J	0.16 J
nC34	0.16 J	0.11 J	0.081 J	0.13 J
nC35	0.18 J	0.13 J	0.088 J	0.14 J
nC36	0.16 J	0.12 J	0.089 J	0.13 J
nC37	0.14 J	0.11 J	0.08 J	0.1 J
nC38	0.15 J	0.11 J	0.092 J	0.12 J
nC39	ND	ND	0.069 J	0.1 J
nC40	ND	ND	0.062 J	0.088 J
Total Resolved	64	67	34	100
TPHC	320	320	180	360
%OTP	89	93	89	88
%5AA	91	97	91	90
%D50T	94	99	94	94

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii
Sample Set: B0143
Data : SHC/TPH - BS - Surrogate Corrected

Field ID	Procedural Blank		Blank Spike				
Lab ID	BV-S-87PB		BV-S-88BS				
Lab Batch	B0143		B0143				
File	09119808.D		09119809.D				
Sample Type	QC		QC				
Weight Basis	Oil		Oil				
Matrix	Oil		Oil				
Sample Size	10 mg		10 mg				
Associated Blank	NA		BV-S-87PB				
Field Date	NA		NA				
Extract Date	09/11/98		09/11/98				
Analysis Date	09/11/98		09/11/98				
Min Reporting Limit	0.4		0.4				
Units	ug/mg		ug/mg		T	%R	Q
nC8	0.2	J	0.39	JB			
nC9	ND		ND				
nC10	ND		1.9		2.5	76	
nC11	ND		ND				
nC12	0.014	J	ND				
nC13	0.019	J	ND				
1380	ND		ND				
nC14	0.034	J	ND				
1470	ND		ND				
nC15	0.026	J	2.1		2.5	83	
nC16	0.024	J	ND				
1660	ND		ND				
nC17	0.025	J	ND				
pristane	0.021	J	2.4		2.5	95	
nC18	0.022	J	ND				
phytane	ND		ND				
nC19	0.025	J	ND				
nC20	ND		2.3		2.5	92	
nC21	0.024	J	ND				
nC22	0.022	J	ND				
nC23	0.027	J	ND				
nC24	ND		0.086	J			
nC25	0.017	J	2.3		2.5	91	
nC26	0.019	J	ND				
nC27	ND		ND				
nC28	ND		ND				
nC29	ND		ND				
nC30	ND		2.1		2.5	84	
nC31	ND		0.082	J			
nC32	ND		ND				
nC33	ND		ND				
nC34	ND		1.7		2.5	68	
nC35	ND		ND				
nC36	ND		1.6		2.5	64	
nC37	ND		ND				
nC38	ND		ND				
nC39	ND		ND				
nC40	ND		ND				
Total Resolved	1.9		18				
TPHC	1.9		18				
%OTP	87		88				
%5AA	89		90				
%DSOT	94		95				

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii
Sample Set: B0143
Data : SHC/TPH - NSC - Surrogate Corrected

Field ID	NSC			
Lab ID	BM26			
Lab Batch	B0143			
File	09119807.D			
Sample Type	QC			
Weight Basis	Oil			
Matrix	Oil			
Sample Size	5.05 mg			
Associated Blank	NA			
Field Date	NA			
Extract Date	NA			
Analysis Date	9/11/98			
Min Reporting Limit	0.2			
Units	ug/mg	T	%D	Q
nC8	4.8	4.7	2.1	
nC9	4.9	4.8	2.1	
nC10	4.2	4.2	0	
nC11	4.1	4.3	-4.6	
nC12	3.7	4	-7.5	
nC13	3.8	4	-5	
1380	1	1	0	
nC14	4.8	4.2	14	
1470	1.3	1.4	-7.1	
nC15	3.6	3.7	-2.7	
nC16	2.9	3.2	-9.4	
1650	1.4	1.5	-6.7	
nC17	2.9	3.2	-9.4	
pristane	2.2	2.2	0	
nC18	2.6	2.9	-10	
phytane	1.5	1.6	-6.2	
nC19	2.4	2.6	-7.7	
nC20	2.6	2.7	-3.7	
nC21	2.4	2.4	0	
nC22	2.1	2.2	-4.5	
nC23	2	2	0	
nC24	1.8	2	-10	
nC25	1.8	1.7	5.9	
nC26	1.4	1.5	-6.7	
nC27	1.2	1.2	0	
nC28	0.92	0.88	4.5	
nC29	0.82	0.81	1.2	
nC30	0.66	0.65	1.5	
nC31	0.62	0.58	6.9	
nC32	0.49	0.44	11	
nC33	0.45	0.4	12	
nC34	0.38	0.35	8.6	
nC35	0.37	0.35	5.7	
nC36	0.28	0.23	22	
nC37	0.26	0.23	13	
nC38	0.26	0.22	18	
nC39	0.2	0.18	11	
nC40	0.19 J	0.19	0	
Total Resolved	200	220	-9.1	
TPHC	600	660	-9.1	
%OTP	89			
%5AA	93			
%D50T	98			

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii Corp
Data Package: 1321
Data Table: PAH - Main - Surrogate Corrected

PAH

Field ID	SRM 1491	North Slope Crude	Procedural Blank	Blank Spike
Lab ID	BM07	BM26	BV-S-87PB	BV-S-88BS
Lab Batch	B0143	B0143	B0143	B0143
File	DX8246.D	DX8247.D	DX8253.D	DX8254.D
Sample Type	QC	QC	QC	QC
Weight Basis	VOLUME	OIL	OIL	OIL
Matrix	NA	OIL	OIL	OIL
Sample Size	0.1 mL	5.05 mg	10 mg	10 mg
Associated Blank	NA	NA	NA	BV-S-87PB
Field Date	NA	NA	NA	NA
Extract Date	NA	NA	09/10/98	09/10/98
Analysis Date	09/11/98	09/12/98	09/12/98	09/12/98
Min Reporting Limit	250	5	10	10
Units	ug/L	mg/Kg	mg/Kg	mg/Kg
Naphthalene	6100	710	ND	87
C1-Naphthalenes	ND	1600	ND	ND
C2-Naphthalenes	ND	2200	ND	ND
C3-Naphthalenes	ND	1800	ND	ND
C4-Naphthalenes	ND	1100	ND	ND
Acenaphthylene	6400	ND	ND	90
Acenaphthene	6400	ND	ND	90
Biphenyl	6500	200	ND	ND
Fluorene	6400	92	ND	88
C1-Fluorenes	ND	210	ND	ND
C2-Fluorenes	ND	350	ND	ND
C3-Fluorenes	ND	400	ND	ND
Anthracene	6900	ND	ND	99
Phenanthrene	6500	250	ND	87
C1-Phenanthrenes/anthracenes	ND	600	ND	ND
C2-Phenanthrenes/anthracenes	ND	740	ND	ND
C3-Phenanthrenes/anthracenes	ND	560	ND	ND
C4-Phenanthrenes/anthracenes	ND	360	ND	ND
Dibenzothiophene	ND	210	ND	ND
C1-Dibenzothiophenes	ND	460	ND	ND
C2-Dibenzothiophenes	ND	650	ND	ND
C3-Dibenzothiophenes	ND	580	ND	ND
Fluoranthene	5600	ND	0.65 J	88
Pyrene	5600	13	0.77 J	86
C1-Fluoranthenes/pyrenes	ND	79	ND	ND
C2-Fluoranthenes/pyrenes	ND	140	ND	ND
C3-Fluoranthenes/pyrenes	ND	160	ND	ND
Benzo[a]anthracene	3400	ND	ND	94
Chrysene	6400	46	0.84 J	90
C1-Chrysenes	ND	90	ND	ND
C2-Chrysenes	ND	100	ND	ND
C3-Chrysenes	ND	87	ND	ND
C4-Chrysenes	ND	76	ND	ND
Benzo[b]fluoranthene	4500	6.7	0.89 J	88
Benzo[k]fluoranthene	5100	ND	0.9 J	84
Benzo[e]pyrene	5200	9.8	1.1 J	ND
Benzo[a]pyrene	7200	ND	1.1 J	100
Perylene	7000	ND	1.5 J	ND
Indeno[1,2,3,-c,d]pyrene	5400	ND	ND	78
Dibenzo[a,h]anthracene	4400	ND	ND	75
Benzo[g,h,i]perylene	4700	ND	ND	76
%d8-Naphthalene	100	103	105	111
%d10-Acenaphthene	97	102	101	106
%d10-Phenanthrene	98	98	101	104
%d12-Benzo[a]pyrene	100	115	109	106

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii Corp
Data Package: 1321
Data Table: PAH - Main - Surrogate Corrected

Field ID	KBCJ02	KBCJ04	KBML01	KBML02
Lab ID	98D2796	98D2798	98D2801	98D2802
Lab Batch	B0143	B0143	B0143	B0143
File	DX8255.D	DX8256.D	DX8257.D	DX8259.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Weight Basis	OIL	OIL	OIL	OIL
Matrix	TAR BALL	FEATHER	SEDIMENT	FEATHER
Sample Size	13 mg	13.8	10.2	13.4 mg
Associated Blank	BV-S-87PB	BV-S-87PB	BV-S-87PB	BV-S-87PB
Field Date	09/07/98	09/07/98	09/05/98	09/06/98
Extract Date	09/10/98	09/10/98	09/10/98	09/10/98
Analysis Date	09/12/98	09/12/98	09/12/98	09/12/98
Min Reporting Limit	7.7	7.2	9.8	7.5
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Naphthalene	1.5 J	ND	1.2 J	2.1 J
C1-Naphthalenes	10	3.2 J	35	60
C2-Naphthalenes	120	83	290	370
C3-Naphthalenes	420	310	680	800
C4-Naphthalenes	470	510	770	850
Acenaphthylene	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	8.5
Biphenyl	ND	1.3 J	6.9 J	9.7
Fluorene	6.8 J	18	39	46
C1-Fluorenes	50	140	190	210
C2-Fluorenes	150	350	350	370
C3-Fluorenes	220	410	400	390
Anthracene	ND	20	28	29
Phenanthrene	30	170	190	220
C1-Phenanthrenes/anthracenes	250	550	560	580
C2-Phenanthrenes/anthracenes	460	680	640	610
C3-Phenanthrenes/anthracenes	370	400	360	360
C4-Phenanthrenes/anthracenes	220	180	150	140
Dibenzothiophene	14	59	73	80
C1-Dibenzothiophenes	180	230	230	260
C2-Dibenzothiophenes	410	370	340	340
C3-Dibenzothiophenes	420	340	290	290
Fluoranthene	ND	ND	ND	ND
Pyrene	8.7	23	22	20
C1-Fluoranthenes/pyrenes	39	65	64	62
C2-Fluoranthenes/pyrenes	76	78	72	73
C3-Fluoranthenes/pyrenes	92	76	67	66
Benzo[a]anthracene	ND	6.3 J	6.4 J	6.7 J
Chrysene	32	17	16	15
C1-Chrysenes	60	40	37	37
C2-Chrysenes	62	58	50	50
C3-Chrysenes	56	57	51	58
C4-Chrysenes	39	48	53	46
Benzo[b]fluoranthene	6.4 JB	3.7 J	4 J	4.3 J
Benzo[k]fluoranthene	ND	ND	ND	ND
Benzo[e]pyrene	8.9 B	6.6 J	5.4 J	6.8 J
Benzo[a]pyrene	ND	ND	1.8 J	2.4 J
Perylene	ND	ND	1.8 J	1.8 J
Indeno[1,2,3,-c,d]pyrene	ND	ND	ND	ND
Dibenzo[a,h]anthracene	ND	ND	ND	ND
Benzo[g,h,i]perylene	ND	4 J	4.3 J	3.9 J
%d8-Naphthalene	105	108	101	111
%d10-Acenaphthene	118	110	105	115
%d10-Phenanthrene	121	109	104	112
%d12-Benzo[a]pyrene	121	121	116	121

Total PPH
mgs / kg

Arthur D. Little
Environmental Monitoring and Analysis Unit

DRAFT

Project Title : Tesoro Hawaii Corp
Data Package: 1321
Data Table: PAH - Main - Surrogate Corrected

Field ID	SPM HOSE002	SPM HOSE001
Lab ID	98D2803	98D2804
Lab Batch	B0143	B0143
File	DX8260.D	DX8261.D
Sample Type	SAMP	SAMP
Weight Basis	OIL	OIL
Matrix	OIL	OIL
Sample Size	10.5 mg	10.1 mg
Associated Blank	BV-S-87PB	BV-S-87PB
Field Date	08/26/98	08/31/98
Extract Date	09/10/98	09/10/98
Analysis Date	09/12/98	09/12/98
Min Reporting Limit	9.5	9.9
Units	mg/Kg	mg/Kg
Naphthalene	3.2 J	280
C1-Naphthalenes	49	790
C2-Naphthalenes	220	1500
C3-Naphthalenes	430	1700
C4-Naphthalenes	440	1200
Acenaphthylene	ND	ND
Acenaphthene	5.2 J	27
Biphenyl	7 J	61
Fluorene	24	110
C1-Fluorenes	110	300
C2-Fluorenes	190	390
C3-Fluorenes	200	370
Anthracene	15	36
Phenanthrene	120	290
C1-Phenanthrenes/anthracenes	290	600
C2-Phenanthrenes/anthracenes	340	590
C3-Phenanthrenes/anthracenes	180	310
C4-Phenanthrenes/anthracenes	81	120
Dibenzothiophene	44	120
C1-Dibenzothiophenes	130	260
C2-Dibenzothiophenes	190	330
C3-Dibenzothiophenes	150	250
Fluoranthene	ND	ND
Pyrene	11	21
C1-Fluoranthenes/pyrenes	32	53
C2-Fluoranthenes/pyrenes	39	62
C3-Fluoranthenes/pyrenes	35	60
Benzo[a]anthracene	3.7 J	7 J
Chrysene	8.4 J	14
C1-Chrysenes	19	30
C2-Chrysenes	28	45
C3-Chrysenes	30	47
C4-Chrysenes	21	40
Benzo[b]fluoranthene	2.2 J	3.1 J
Benzo[k]fluoranthene	ND	ND
Benzo[e]pyrene	3.6 J	5.4 J
Benzo[a]pyrene	1.5 J	2.3 J
Perylene	1.3 J	2.1 J
Indeno[1,2,3,-c,d]pyrene	ND	ND
Dibenzo[a,h]anthracene	ND	ND
Benzo[g,h,i]perylene	2.6 J	3.1 J
%d8-Naphthalene	109	108
%d10-Acenaphthene	110	113
%d10-Phenanthrene	106	109
%d12-Benzo[a]pyrene	112	117

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro Hawaii Corp
Data Package: 1321
Data Table: PAH - BS-BSD - Surrogate Corrected

DRAFT

Field ID	Procedural Blank	Blank Spike			
Lab ID	BV-S-87PB	BV-S-88BS			
Lab Batch	B0143	B0143			
File	UX8253.D	UX8254.D			
Sample Type	QC	QC			
Weight Basis	OIL	OIL			
Matrix	OIL	OIL			
Sample Size	10 mg	10 mg			
Associated Blank	NA	BV-S-87PB			
Field Date	NA	NA			
Extract Date	09/10/98	09/10/98			
Analysis Date	09/12/98	09/12/98			
Min Reporting Limit	10	10			
Units	mg/Kg	mg/Kg	T	%R	Q
Naphthalene	ND	87	100	87	
C1-Naphthalenes	ND	ND			
C2-Naphthalenes	ND	ND			
C3-Naphthalenes	ND	ND			
C4-Naphthalenes	ND	ND			
Acenaphthylene	ND	90	100	90	
Acenaphthene	ND	90	100	90	
Biphenyl	ND	ND			
Fluorene	ND	88	100	88	
C1-Fluorenes	ND	ND			
C2-Fluorenes	ND	ND			
C3-Fluorenes	ND	ND			
Anthracene	ND	99	100	99	
Phenanthrene	ND	87	100	87	
C1-Phenanthrenes/anthracenes	ND	ND			
C2-Phenanthrenes/anthracenes	ND	ND			
C3-Phenanthrenes/anthracenes	ND	ND			
C4-Phenanthrenes/anthracenes	ND	ND			
Dibenzothiophene	ND	ND			
C1-Dibenzothiophenes	ND	ND			
C2-Dibenzothiophenes	ND	ND			
C3-Dibenzothiophenes	ND	ND			
Fluoranthene	0.65 J	88	100	87	
Pyrene	0.77 J	86	100	85	
C1-Fluoranthenes/pyrenes	ND	ND			
C2-Fluoranthenes/pyrenes	ND	ND			
C3-Fluoranthenes/pyrenes	ND	ND			
Benzo[a]anthracene	ND	94	100	94	
Chrysene	0.84 J	90	100	89	
C1-Chrysenes	ND	ND			
C2-Chrysenes	ND	ND			
C3-Chrysenes	ND	ND			
C4-Chrysenes	ND	ND			
Benzo[b]fluoranthene	0.89 J	88	100	87	
Benzo[k]fluoranthene	0.9 J	84	100	83	
Benzo[e]pyrene	1.1 J	ND			
Benzo[a]pyrene	1.1 J	100	100	99	
Perylene	1.5 J	ND			
Indeno[1,2,3,-c,d]pyrene	ND	78	100	78	
Dibenzo[a,h]anthracene	ND	75	100	75	
Benzo[g,h,i]perylene	ND	76	100	76	
%d8-Naphthalene	105	111			
%d10-Acenaphthene	101	106			
%d10-Phenanthrene	101	104			
%d12-Benzo[a]pyrene	109	106			

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro Hawaii Corp
Data Package: 1321
Data Table: PAH - IRM - Surrogate Corrected

DRAFT

Field ID	SRM 1491			
Lab ID	BM07			
Lab Batch	NA			
File	DX8246.D			
Sample Type	QC			
Weight Basis	VOLUME			
Matrix	NA			
Sample Size	0.1 mL			
Associated Blank	NA			
Field Date	NA			
Extract Date	NA			
Analysis Date	09/11/98			
Min Reporting Limit	250			
Units	ug/L	T	%D	Q
Naphthalene	6100	6090	-11	
C1-Naphthalenes	ND			
C2-Naphthalenes	ND			
C3-Naphthalenes	ND			
C4-Naphthalenes	ND			
Acenaphthylene	6400	6960	-8	
Acenaphthene	6400	7280	-12	
Biphenyl	6500	7000	-7.1	
Fluorene	6400	7270	-12	
C1-Fluorenes	ND			
C2-Fluorenes	ND			
C3-Fluorenes	ND			
Anthracene	8900	7820	14	
Phenanthrene	6500	7010	-7.3	
C1-Phenanthrenes/anthracenes	ND			
C2-Phenanthrenes/anthracenes	ND			
C3-Phenanthrenes/anthracenes	ND			
C4-Phenanthrenes/anthracenes	ND			
Dibenzothiophene	ND			
C1-Dibenzothiophenes	ND			
C2-Dibenzothiophenes	ND			
C3-Dibenzothiophenes	ND			
Fluoranthene	5800	5910	-5.2	
Pyrene	5600	5890	-4.9	
C1-Fluoranthenes/pyrenes	ND			
C2-Fluoranthenes/pyrenes	ND			
C3-Fluoranthenes/pyrenes	ND			
Benzo[a]anthracene	3400	3590	-5.3	
Chrysene	6400	7030	-9	
C1-Chrysenes	ND			
C2-Chrysenes	ND			
C3-Chrysenes	ND			
C4-Chrysenes	ND			
Benzo[b]fluoranthene	4500	5250	-14	
Benzo[k]fluoranthene	5100	5570	-8.4	
Benzo[e]pyrene	5200	5620	-7.5	
Benzo[a]pyrene	7200	6790	6	
Perylene	7000	7120	-1.7	
Indeno[1,2,3,-c,d]pyrene	5400	6290	-14	
Dibenzo[a,h]anthracene	4400	5180	-15	
Benzo[g,h,i]perylene	4700	5290	-11	
%d8-Naphthalene	100			
%d10-Acenaphthene	97			
%d10-Phenanthrene	98			
%d12-Benzo[a]pyrene	100			

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tasoro Hawaii Corp
Data Package: 1321
Data Table: PAH - NSC - Surrogate Corrected

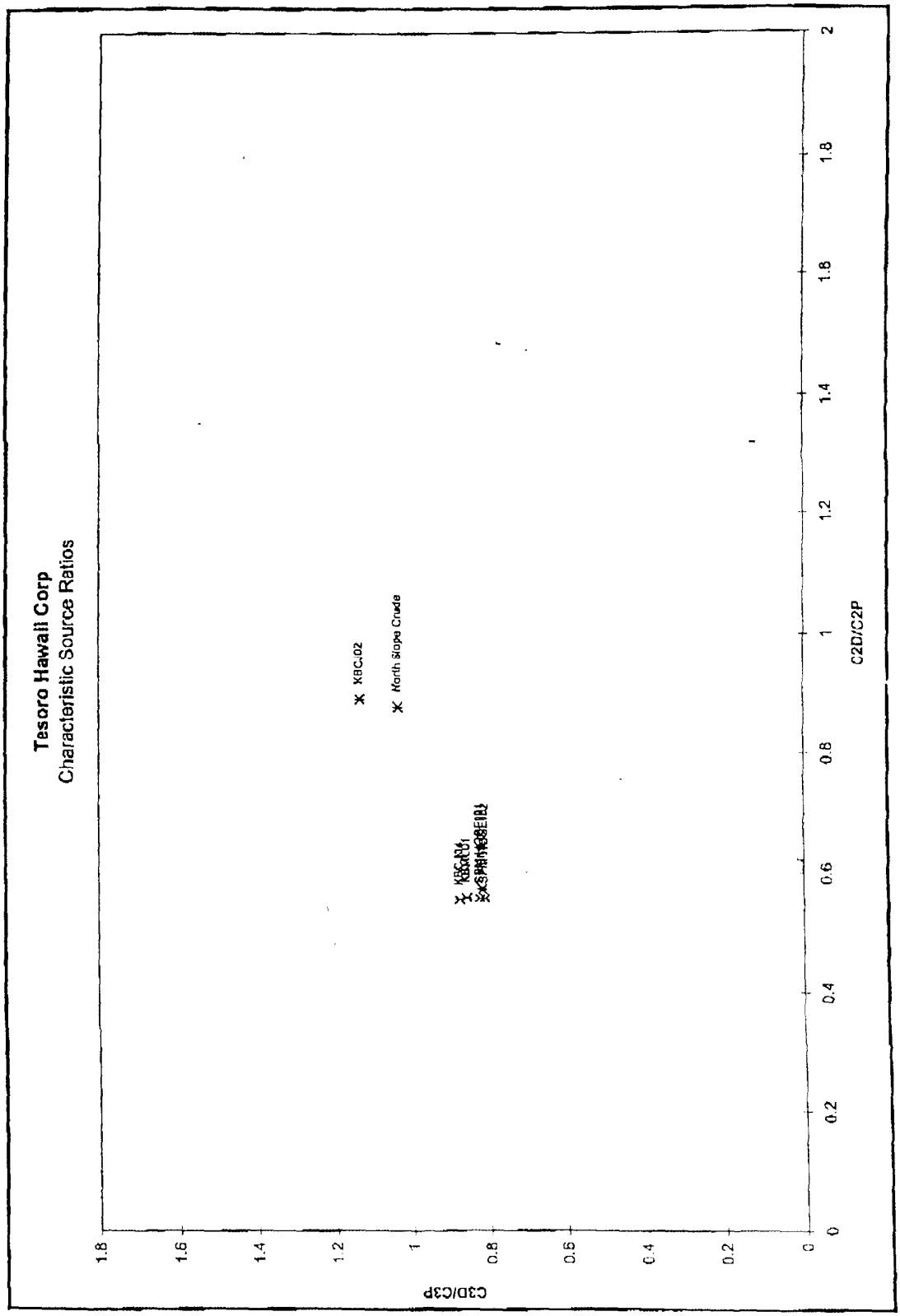
DRAFT

Field ID	North Slope Crude			
Lab ID	BM28			
Lab Batch	NA			
File	DX8247.D			
Sample Type	SAMP			
Weight Basis	DRY			
Matrix	NA			
Sample Size	5.05 mg			
Associated Blank	NA			
Field Date	NA			
Extract Date	NA			
Analysis Date	09/12/98			
Min Reporting Limit	5			
Units	mg/Kg	T	%D	Q
Naphthalene	710	750	5.3	
C1-Naphthalenes	1600	1700	-5.9	
C2-Naphthalenes	2200	2400	-8.3	
C3-Naphthalenes	1800	2000	-10	
C4-Naphthalenes	1100	1200	-8.3	
Acenaphthylene	ND			
Acenaphthene	ND			
Biphenyl	200	220	-9.1	
Fluorene	92	94	-2.1	
C1-Fluorenes	210	240	-12	
C2-Fluorenes	350	350	0	
C3-Fluorenes	400	400	0	
Anthracene	ND			
Phenanthrene	250	260	-3.8	
C1-Phenanthrenes/anthracenes	600	600	0	
C2-Phenanthrenes/anthracenes	740	740	0	
C3-Phenanthrenes/anthracenes	560	540	3.7	
C4-Phenanthrenes/anthracenes	360	330	9.1	
Dibenzothiophene	210	240	-12	
C1-Dibenzothiophenes	460	500	-8	
C2-Dibenzothiophenes	650	740	-12	
C3-Dibenzothiophenes	580	660	-12	
Fluoranthene	ND			
Pyrene	13	14	-7.1	
C1-Fluoranthenes/pyrenes	79	83	-4.8	
C2-Fluoranthenes/pyrenes	140	150	-6.7	
C3-Fluoranthenes/pyrenes	160	170	-5.9	
Benzo[a]anthracene	ND			
Chrysene	46	49	-6.1	
C1-Chrysenes	90	84	7.1	
C2-Chrysenes	100	110	-9.1	
C3-Chrysenes	87	92	-5.4	
C4-Chrysenes	78	75	1.3	
Benzo[b]fluoranthene	6.7	6.8	1.5	
Benzo[k]fluoranthene	ND			
Benzo[e]pyrene	9.8	12	-18	
Benzo[a]pyrene	ND			
Perylene	ND			
Indeno[1,2,3,-c,d]pyrene	ND			
Dibenzo[a,h]anthracene	ND			
Benzo[g,h,i]perylene	ND			
%d8-Naphthalene	103			
%d10-Acenaphthene	102			
%d10-Phenanthrene	98			
%d12-Benzo[a]pyrene	115			

DRAFT

Arthur D. Little

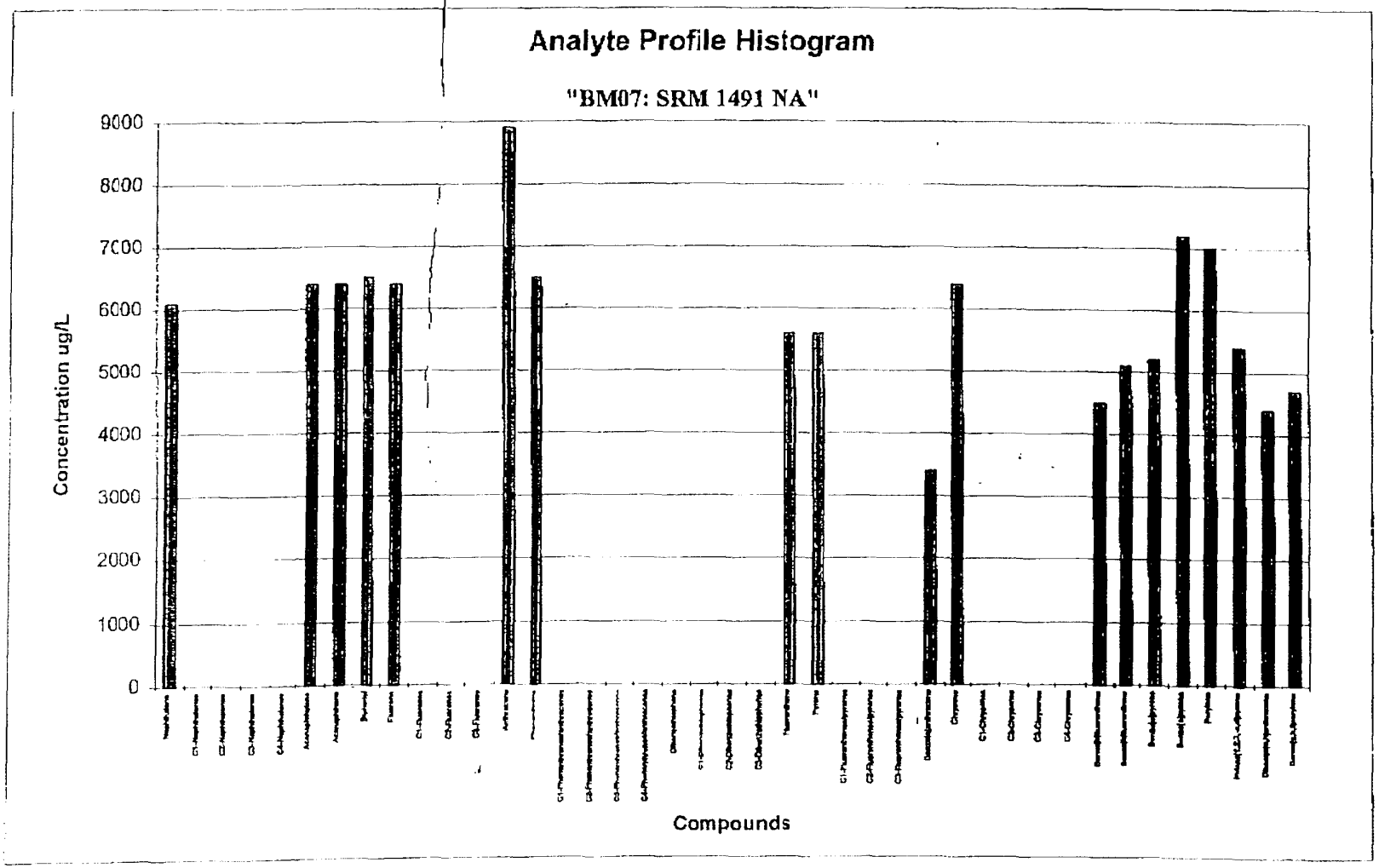
Environmental Monitoring and Analysis



9/14/98

Arthur D. Little

Environmental Monitoring and Analysis

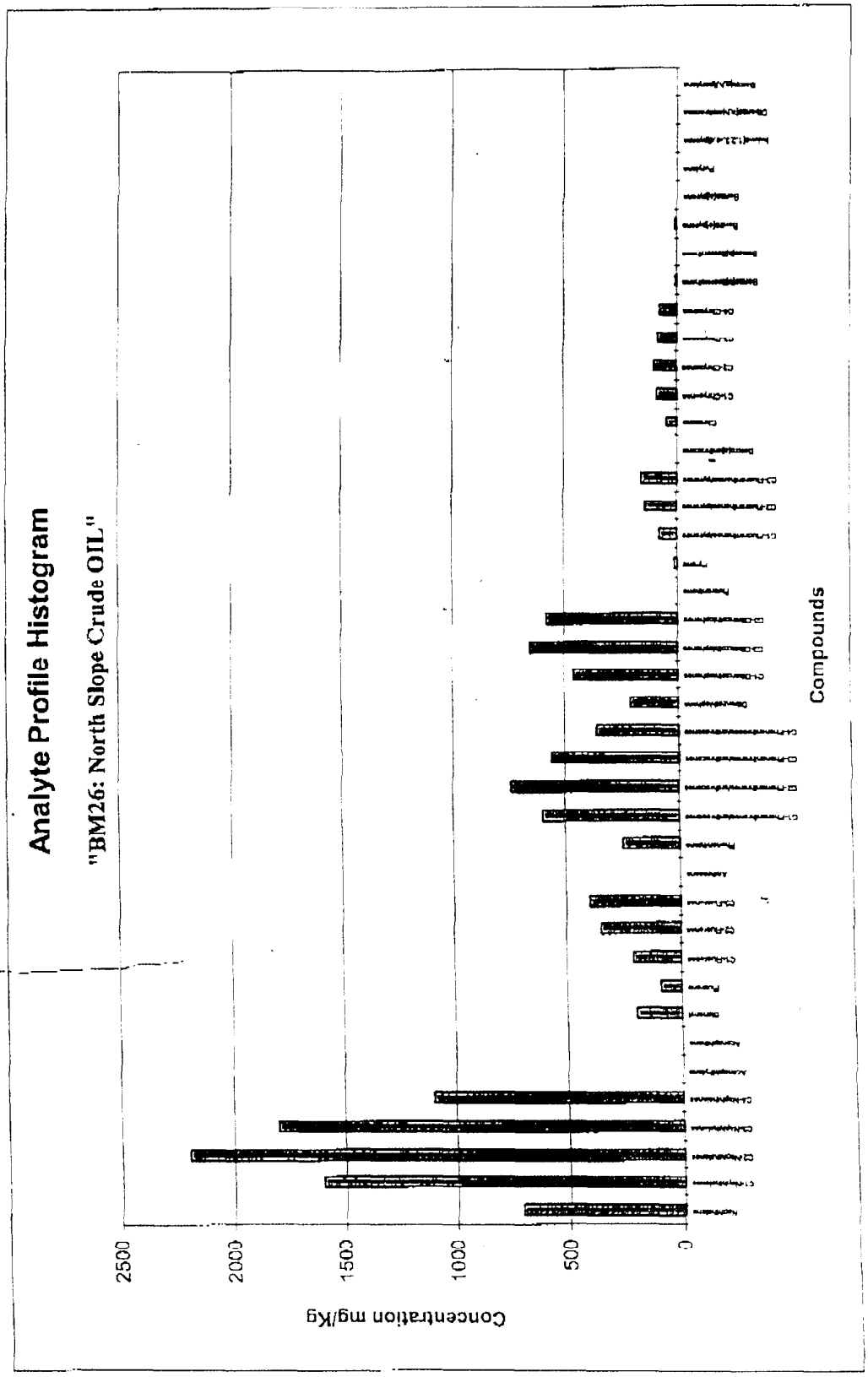


DRAFT

DX8246.D

DRAFT

Environmental Monitoring and Analysis

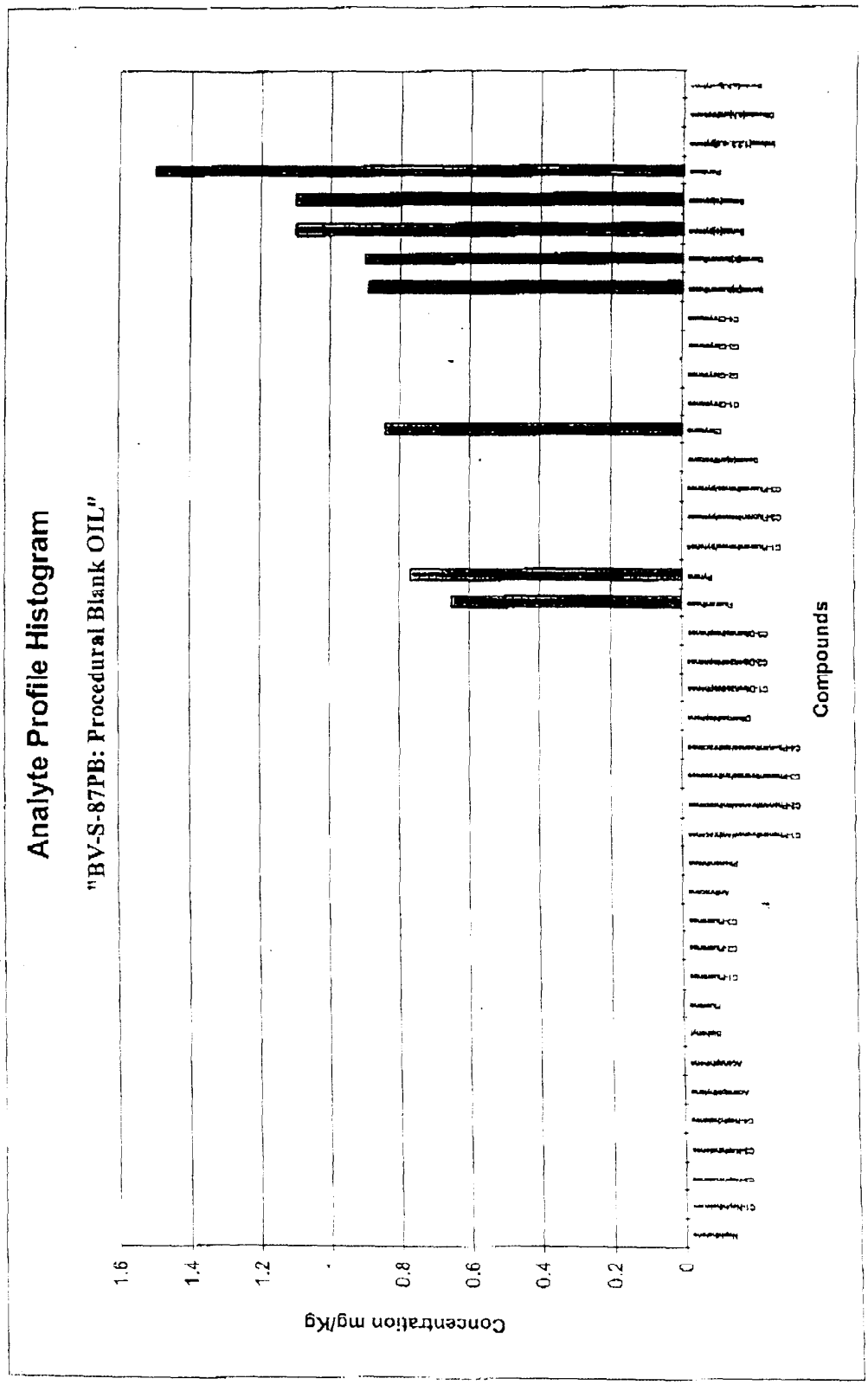


DX8247.D

Arthur D. Little

DRAFT

Environmental Monitoring and Analysis

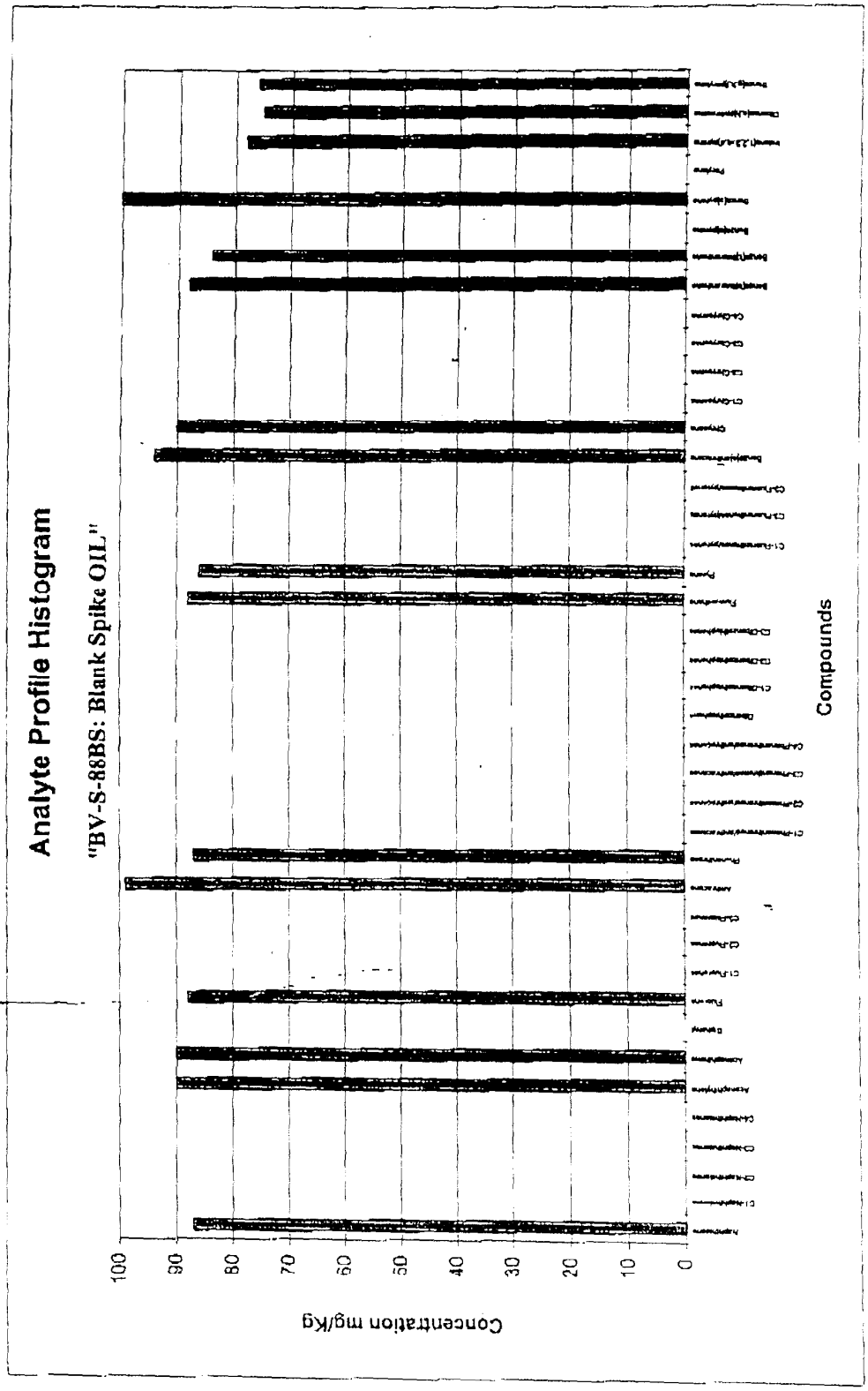


DX8253.0

Arthur D. Little

DRAFT

Environmental Monitoring and Analysis

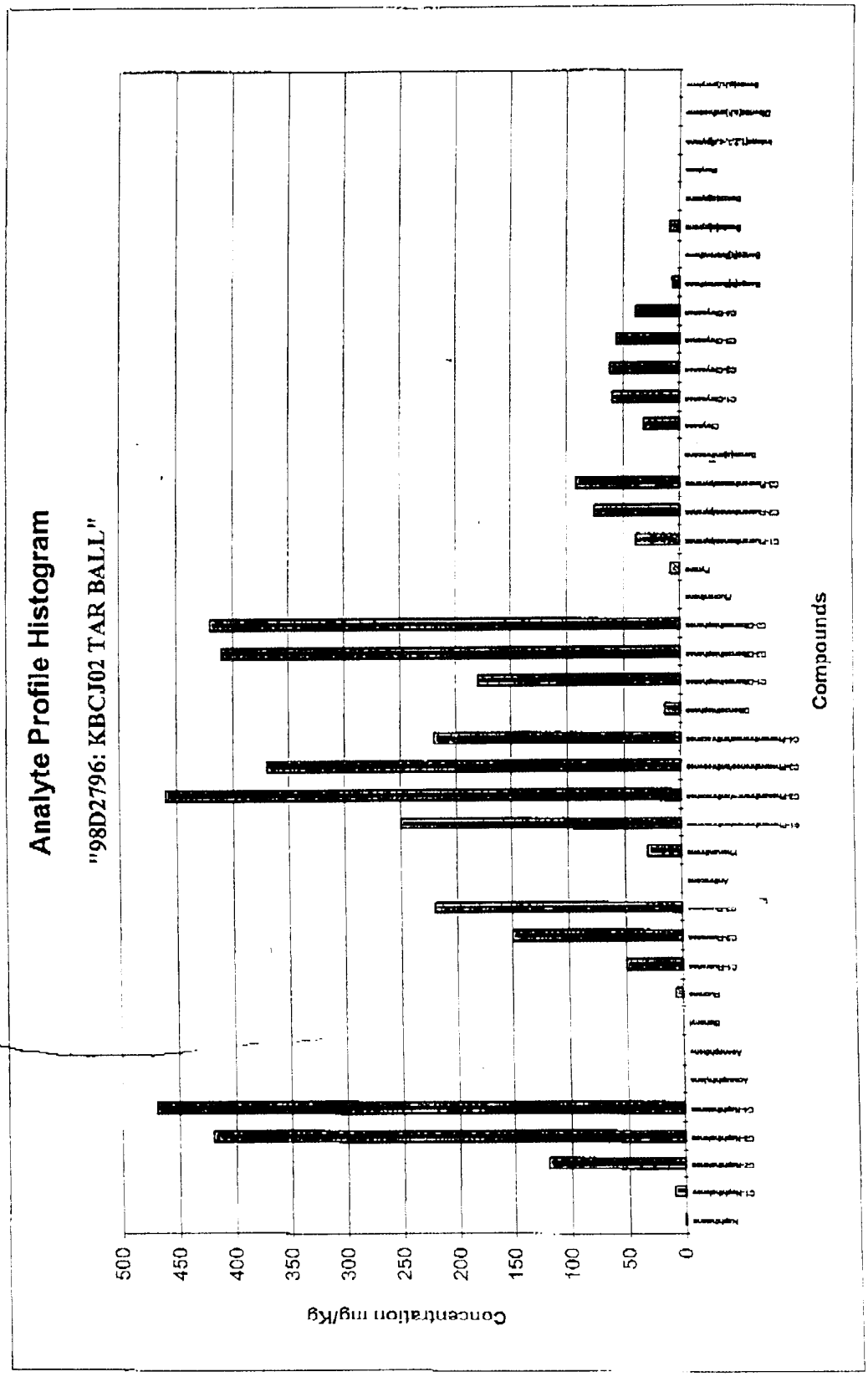


DX8254.D

Arthur D. Little

DRAFT

Environmental Monitoring and Analysis

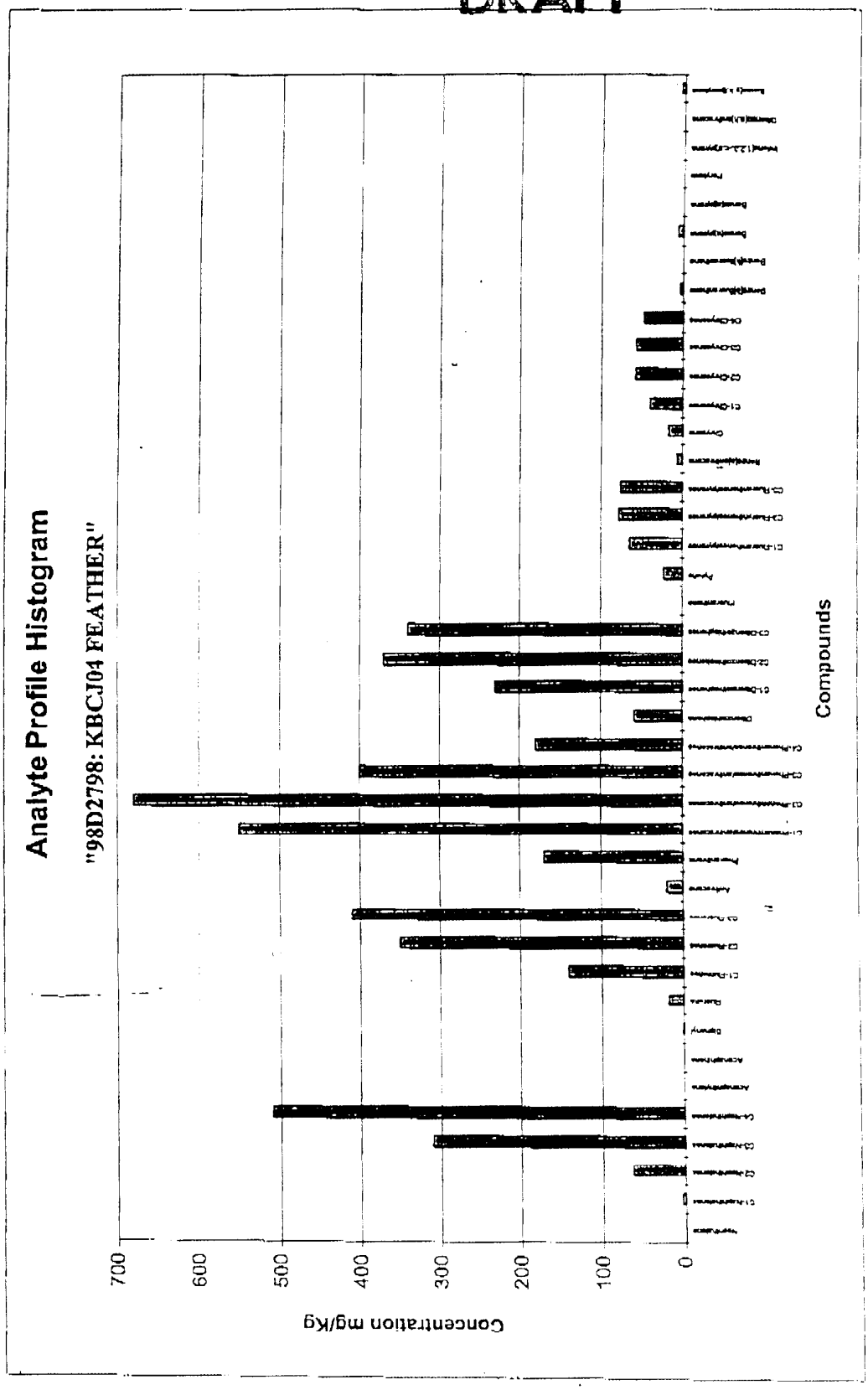


DX8255.D

Arthur D. Little

DRAFT

Environmental Monitoring and Analysis



DX8256.D

Arthur D. Little