



SPM Hose Spill Incident	Description	Ahukini "Reference" Site at Ninini Point, looking west	Photo 7
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 3, 1998



SPM Hose Spill Incident	Description	Ahukini "Reference" Site at Ninini Point, looking southwest	Photo 8
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 3, 1998



SPM Hose Spill Incident	Description	Ahukini "Reference" Site at Ninini Point, looking southwest	Photo 9
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 3, 1998



SPM Hose Spill Incident	Description	Overview of Kipu Kai South Beach, looking southeast	Photo 10
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai South Beach "Oiled" Site, looking northeast	Photo 11
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai South Beach "Oiled" Site, looking east	Photo 12
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai South Beach "Oiled" Site, looking southeast	Photo 13
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai South Beach "Oiled" Site, looking northwest	Photo 14
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai North Beach "Oiled" Site, looking southeast	Photo 15
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai North Beach "Oiled" Site, looking north	Photo 16
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai "Reference" Site (SITE3), looking northeast	Photo 17
	Project	Opili Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai "Reference" Site (SITE3), looking southwest	Photo 18
	Project	Opili Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai "Reference" Site (SITE4), looking northeast	Photo 19
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Kipu Kai "Reference" Site (SITE4), looking southwest	Photo 20
	Project	Opini Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 2, 1998



SPM Hose Spill Incident	Description	Haena "Control" Site at Kee Beach, looking west	Photo 21
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 3, 1998



SPM Hose Spill Incident	Description	Haena "Control" Site at Kee Beach, looking east	Photo 22
	Project	Opihi Tissue Sampling	Photo Date
	Client	Tesoro Hawaii Corporation	Nov. 3, 1998

ARTHUR D. LITTLE
Environmental Monitoring and Analysis Unit
Polynuclear Aromatic Hydrocarbons in Tissue Samples
Project Narrative

Client: Tesoro Hawaii Corporation Batch No. B0301
Project No.: 39650 Package No.: 1529
Entered By: Richard Purdy Date: January 11, 1999

Polynuclear Aromatic Hydrocarbons in Tissue Samples

Sample Receipt

Twenty-two (22) tissue samples were received intact and in good condition by Arthur D. Little, Inc. on September 28 and November 4, 1998 on behalf of Tesoro Hawaii Corporation. All pertinent sample receipt information is noted on the chain of custody records included as part of this deliverable. Data for the following samples are reported in this package:

Blackfoot 1	Yellowfoot 1	Blackfoot 4A ²	Site 2N Kipu Jar 2
Blackfoot 2 ¹	KK Crab 092398 ¹	Blackfoot 4B ²	Site 3 Kipu Jar 2
Blackfoot 3 ¹	KK Urchin 1 ¹	Site 1 Ahu Jar 2	Site 4 Kipu Jar 2
Blackfoot 5 ¹	KK Urchin 2 ¹	Site 2S Kipu Jar 2	Site 5 Nini Jar 2
Blackfoot 6	KK Urchin 3 ¹	Site 2S Kipu Jar 3	Site 1 Ahu
Site 2S Kipu	Site 2N Kipu	Site 3 Kipu	Site 4 Kipu
Site 5 Nini	Site 6 Kee		

¹ - Sample not analyzed

² - Samples combined, prepared and analyzed together

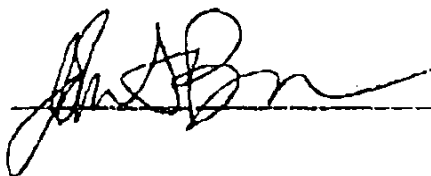
Laboratory Methods

These samples were prepared and analyzed for Parent and Alkyl Homologue Polynuclear Aromatic Hydrocarbons in accordance with the laboratory procedures described in the quality assurance workplan for the project. Quality control samples include a preparation blank, matrix spike/matrix spike duplicate (MS/MSD), and reference material samples.

Preparation

These tissue samples were prepared by homogenizing portions of each sample and serially extracting with methylene chloride. The extracts were cleaned-up using size exclusion chromatography and alumina columns to remove non-target matrix

Approved By: _____



Date: _____

1/11/99

Arthur D Little

ARTHUR D. LITTLE
Environmental Monitoring and Analysis Unit
Polynuclear Aromatic Hydrocarbons in Tissue Samples
Project Narrative

interferences. The solvent extracts were then concentrated to a known volume and submitted for analysis.

Analysis

The sample extracts were analyzed for Parent and Alkyl Homologue Polynuclear Aromatic Hydrocarbons using gas chromatography/mass spectrometry in the selected ion monitoring mode (GC/MS/SIM). The GC/MS is tuned using PFTBA at the start of each analytical sequence, before the calibration. Continuing calibration standards are analyzed after every fifteen to eighteen samples and at the end of the sequence. Target compounds are quantified from the average response factor (RRF) of the calibration curve. Alkyl homologues are quantified using the RRF of the parent compound.

Quality Assurance/Quality Control

Quality assurance and quality control procedures for the analyses are documented in the laboratory quality assurance plan and standard operating procedures (SOPs). The preparation and analysis data are contained in ADL packages 1529. Quality assurance audits were performed on all data generated as part of this deliverable. Please note the following:

- Initial and continuing calibration standards met control limit requirements.
- All surrogate and matrix spike compound recoveries met control limit requirements.
- Target compound recoveries in the standard reference materials (SRM) exceeded quality control requirements for six of the thirteen certified recoveries. Re-analysis of the sample confirmed these results. Triplicate analyses of this SRM, analyzed as part of an interlaboratory comparison study during the same time period yielded results for all compounds within acceptable limits. The data are accepted without further qualification but associated results may be biased high.

Data Report

The final report includes the following components:

- Narrative – includes project discussion, sample listing, report qualifiers
- Chain of Custody – includes all signed chain of custody records and observation forms for the reported field samples.
- Data Tables – includes data summary, surrogate recovery summary and quality control results for all analyses

Approved By: _____



Date: _____

1/11/99

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ARTHUR D. LITTLE
Environmental Monitoring and Analysis Unit
Polynuclear Aromatic Hydrocarbons In Tissue Samples
Project Narrative

The method detection limit (MDL) and minimum reporting limits (MRL) were adjusted for sample size, sample split and pre-injection volume (PIV). The minimum reporting limits (MRL) were calculated based on the low calibration standard, 25 µg/mL.

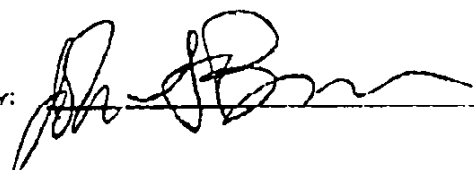
Qualifiers used in reporting of the analytical data are described in the following table.

Table 1: Report Qualifiers

Qualifier	Explanation
J	Concentration between the adjusted minimum reporting limit (MRL) and the adjusted method detection limit (MDL)
U	Concentration below MDL
D	Concentration quantitated from dilution analysis
B	Detected in the associated procedural blank
DO	Diluted out; result could not be measured

Additional qualifiers may be used as defined in the individual data reports or project narrative

Approved By: _____



Date: _____

1/11/99

Arthur D. Little

Clayton ENVIRONMENTAL CONSULTANTS

REQUEST FOR LABORATORY ANALYTICAL SERVICES

Page 1 of 1
For Clayton Use Only
Clayton Lab Project #

Date Results Requested: No Yes Fast Results
 Rush Charge Authorized? Yes No
 Phone or Fax Results: Phone Fax

Name: Rica Rosen (Resord) Client Job No. _____
 Company: Resord Humal Corp Dept. _____
 Mailing Address: PO BOX 3379
 City, State, Zip: Herndon, VA 22052
 Telephone No. (908) 547-3795 FAX No. _____

Special instructions and/or specific regulatory requirements:
HOLD FOR FURTHER INSTRUCTIONS
 * Explanation of Preservative

CLIENT SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	MATRIX MEDIA	AIR VOLUME (specify units)	Samples are: <input type="checkbox"/> Drinking Water <input type="checkbox"/> Groundwater <input type="checkbox"/> Wastewater	Number of Containers	ANALYSIS REQUESTED (Enter an X in the box below to indicate request. Enter a "P" Preservative added.)	
							FOR LAE USE ONLY	FOR LAE USE ONLY
BLACK FOOT 1	9/23/98	10:30	1	1	<input type="checkbox"/>	1	<input checked="" type="checkbox"/>	98D3047
BLACK FOOT 2		10:20	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3048
BLACK FOOT 3		10:45	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3049
BLACK FOOT 4		11:00	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3050
BLACK FOOT 5		11:15	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3051
YELLOW FOOT 1		11:00	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3052
KK CRAB - 092598	9/23/98	9:30	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3053
KK CURCHIN 1	9/23/98	10:45	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3054
KK CURCHIN 2	9/23/98	11:00	1	1	<input type="checkbox"/>	1	<input type="checkbox"/>	98D3055

Collected by: Judy Tiedt
 Date/Time: 9/23/98 11:00
 Analyzed by: Judy Tiedt
 Date/Time: 9/23/98 11:00
 Method of Shipment: Team Air w/ Dry Ice
 Received by: Quincy Sams
 Date/Time: 9/24/98 10:50
 Received at Lab by: Walt, T. U.
 Date/Time: 9/28/98 9:45
 Sample Condition Upon Receipt: Acceptable Other (explain)

Authorized by: _____
 (Client Signature, MUST Accompany Receipt)

Please return completed form and samples to one of the Clayton Environmental Consultants, Inc. labs listed below:

Detroit Regional Lab
 22245 Rochel Drive
 Novi, MI 48375
 (800) 636-5857
 (313) 344-1170
 FAX (313) 344-2855

Atlanta Regional Lab
 400 Cherokee Center Blvd., N.Y., Suite 400
 Marietta, GA 30144
 (404) 252-8919
 (770) 498-7900
 FAX (770) 423-4990

San Francisco Regional Lab
 1232 Querry Lane
 Menlo Park, CA 94025
 (415) 294-1755
 (514) 426-2657
 FAX (510) 426-9136

Seattle Regional Lab
 4636 E. Marginal Way S., Suite 215
 Seattle, WA 98138
 (800) 968-7753
 (206) 763-7384
 FAX (206) 763-4199

DISTRIBUTION:
 White = Clayton Laboratory
 Yellow = Clayton Accounting
 Pink = Client Copy

11/95 20X

Relinquished by: Stephanie Sakurai 9/24/98 1530

Clayton ENVIRONMENTAL CONSULTANTS

REQUEST FOR LABORATORY ANALYTICAL SERVICES

Page 2 of 4
For Clayton Use Only
Clayton Lab Project No.

Use Results Requested: Yes No
 Fresh Changes Authorized? Phone or Fax Results

Name: Rich Rosen (Tesoro) Client Job No. _____
 Company: Tesoro Petroleum Corp Dept. _____
 Mailing Address: _____
 City, State, Zip: _____
 Telephone No. (808) 547-2795 FAX No. _____

Special Instructions and/or specific regulatory requirements:
 (method, limit of detection, etc.)
HOLD FOR FURTHER INSTRUCTIONS

Explanation of Preservative:

CLIENT SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	SAMPLER	MATERIAL/MEDIA	SAMPLES ARE: (check if applicable) <input type="checkbox"/> Drinking Water <input type="checkbox"/> Groundwater <input type="checkbox"/> Wastewater	Number of Containers	ANALYSIS REQUESTED (Enter an "X" in the box below to indicate request. Enter a "P" if Preservative added.)	
							FOR LAB USE ONLY	FOR LAB USE ONLY
KKURETAN 3	9-23-98	11:00	ISSUE	ISSUE		2		98D3056
Blackfoot 4A	9-23-98	11:00	ISSUE	ISSUE		1		98D3057
Blackfoot 4B	9-23-98	11:00	ISSUE	ISSUE		1		98D3058

Collected by: Judy N. Kelly
 Relinquished by: Judy N. Kelly Date/Time: 9/24/98 1705
 Relinquished by: Stephanie Sekurai Date/Time: 9/24/98 10:30
 Method of Transport: Ice in Dry Ice
 Received at Lab of: WALU LLC
 Sample Condition Upon Receipt: Acceptable Other (explain)

Please return completed form and samples to one of the Clayton Environmental Consultants, Inc. labs listed below:

Detroit Regional Lab
 22455 Ecorse Drive
 Detroit, MI 48215
 (313) 894-6887
 (248) 34-1770
 FAX (313) 344-6655

Atlanta Regional Lab
 400 Chickasaw Center Blvd., L.W. S. 2nd Ave
 Kennesaw, GA 30144
 (800) 253-9939
 (770) 499-7330
 FAX (770) 428-6990

San Francisco Regional Lab
 1225 Quarry Lane
 Pleasanton, CA 94566
 (908) 284-1785
 (910) 428-3557
 FAX (910) 626-0165

Seattle Regional Lab
 4020 E. Marginal Way S., Suite 215
 Seattle, WA 98104
 (206) 508-7753
 (206) 743-7354
 FAX (206) 763-4189

DISTRIBUTION:
 White = Clayton Laboratory
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11/85 23K

Relinquished by Stephanie Sekurai 9/24/98 1500

Clayton LABORATORY SERVICES

REQUEST FOR LABORATORY ANALYTICAL SERVICES

IMPORTANT

Date Results Requested: Yes No
 Rush Charges? Authorize? Yes No
 Phone or Fax Results

For Clayton Use Only
 Clayton Lab Project No.

Name: Richard Rosen Client Job No. SAM HOSE
 Company: Resoro Hawaii Corporation Dept. _____
 Address: P.O. Box 9879
 City, State, Zip: Honolulu, HI 96802
 Telephone No. (808) 547-1795 FAX No. (808) 547-1304

Special Instructions and/or specific regulatory requirements:
 (method, unit of abstraction, etc.)
Please call Judy Vedoff (Entrix)
and Rich Rosen to confirm
analyses

Number of Containers

CLIENT SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	MATRIX/MEDIA	ANALYSIS REQUESTED	FOR LAB USE ONLY
SITE1-AHM	11/2/98	8:25	Tissue	Enter an 'X' in the box below to indicate request. Enter a 'P' if Preservative added.	98D4265
SITE2-KIPU	11/2/98	12:00	1		98D4266
SITE3-KIPU	11/2/98	11:30			98D4267
SITE4-KIPU	11/2/98	2:15			98D4268
SITE5-NINI	11/3/98	9:10			98D4269
SITE6-KEE	11/3/98	12:00			98D4270
					98D4271

Collected by: Stephanie G. Satorai (Clayton) (initial)
 Refinquired by: Stephanie G. Satorai
 Date/Time: 11/16/98
 Date/Time: _____
 Method of Shipment: DEL-Team Air Express
 Date/Time: _____
 Collector's Signature: Stephanie G. Satorai
 Received by: _____
 Date/Time: _____
 Received at Lab by: JPN
 Date/Time: 11-19-98
 Sample Condition Upon Receipt: Acceptable Other (explain): _____

Authorized by: _____ Date: _____
 (Client Signature MUST accompany Request)

Please return completed form and samples to one of the Clayton Group Services, Inc. labs listed below:

Atlanta Regional Lab
 22045 Roswell Drive
 Norcross, GA 30071
 (800) 465-5889
 (214) 344-1770
 FAX (408) 344-2855

San Francisco Regional Lab
 153 Quarry Lane
 Pleasanton, CA 94666
 (903) 234-1755
 (916) 430-2637
 FAX (916) 436-1166

Seattle Regional Lab
 400 E. Marginal Way S., Suite 215
 Seattle, WA 98134
 (206) 568-7755
 (206) 763-7364
 FAX (206) 763-1180

DISPOSITION:
 White = Clayton Laboratory
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Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro
Data Package: B0301
Data Table: PAH - Main - Surrogate Corrected

Field ID	SRM 1491	North Slope Crude	SPM HOSE001	Procedural Blank	1974a
Lab ID	BN18	BN14	98D2604RE	CA-S-20PB PCA	CA-S-21SRM PCA
Lab Batch	B0301	B0301	B0301	B0301	B0301
File	DZ5473.D	DZ5474.D	DZ5500.D	DZ5476.D	DZ5477.D
Sample Type	QC	QC	QC	QC	SAMP
Weight Basis	VOLUME	OIL	OIL	DRY	DRY
Matrix	SRM	OIL	OIL	TISSUE	TISSUE
Sample Size	0.1 mL	5 mg	10.1 mg	2 g	1.68 g
Percent Moisture	NA	NA	NA	NA	88.6
Associated Blank	NA	NA	NA	NA	CA-S-20PB PCA
Field Date	NA	NA	NA	NA	NA
Extract Date	NA	NA	NA	NA	12/08/98
Analysis Date	12/17/98	12/17/98	12/18/98	12/17/98	12/17/98
Min Reporting Limit	250	5	5	25	30
Units	ug/L	mg/Kg	mg/Kg	ug/Kg	ug/Kg
Naphthalene	6600	760	300	25	18 JB
C1-Naphthalenes	ND	1700	820	NO	13 J
C2-Naphthalenes	ND	2000	1300	NO	ND
C3-Naphthalenes	ND	1500	1400	NO	ND
C4-Naphthalenes	ND	860	950	NO	ND
Acenaphthylene	6400	ND	ND	ND	14 J
Acenaphthene	6200	ND	20	ND	7 J
Biphenyl	7000	220	66	ND	5.6 J
Fluorene	6200	95	110	NO	6.3 J
C1-Fluorenes	ND	220	300	NO	ND
C2-Fluorenes	ND	330	380	NO	ND
C3-Fluorenes	ND	370	330	NO	ND
Anthracene	7800	ND	27	NO	26 J
Phenanthrene	6800	280	300	NO	30
C1-Phenanthrenes/anthracenes	ND	630	570	NO	68
C2-Phenanthrenes/anthracenes	ND	700	540	NO	140
C3-Phenanthrenes/anthracenes	ND	540	300	NO	200
C4-Phenanthrenes/anthracenes	ND	410	160	NO	220
Dibenzothiophene	ND	230	120	NO	8.5 J
C1-Dibenzothiophenes	ND	480	250	NO	36
C2-Dibenzothiophenes	ND	640	300	NO	120
C3-Dibenzothiophenes	NO	590	250	NO	160
Fluoranthene	5900	ND	5.2	NO	150
Pyrene	6000	12	15	NO	140
C1-Fluoranthenes/pyrenes	ND	85	51	NO	160
C2-Fluoranthenes/pyrenes	ND	150	69	NO	140
C3-Fluoranthenes/pyrenes	ND	180	67	NO	100
Benzo[a]anthracene	3500	ND	ND	NO	52
Chrysene	6500	44	12	NO	94
C1-Chrysenes	ND	80	29	NO	110
C2-Chrysenes	ND	100	49	NO	100
C3-Chrysenes	ND	110	58	NO	ND
C4-Chrysenes	ND	84	56	NO	ND
Benzo[b]fluoranthene	5100	6	2.9 J	NO	80
Benzo[k]fluoranthene	5600	ND	ND	NO	19 J
Benzo[e]pyrene	5700	12	6.7	NO	110
Benzo[a]pyrene	7100	ND	2.3 J	NO	37
Perylene	7200	ND	2.2 J	NO	9 J
Indeno[1,2,3-c,d]pyrene	6000	ND	ND	NO	23 J
Dibenzo[a,h]anthracene	5100	ND	ND	NO	18 J
Benzo[g,h,i]perylene	5100	ND	3.5 J	14 J	51 B
Total PAH	120000	13000	9200	39	2500
%d8-Naphthalene	105	110	89	85	82
%d10-Acenaphthene	99	104	91	80	87
%d10-Phenanthrene	95	100	95	91	89
%d12-Benzo[a]pyrene	95	99	95	86	79

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro
Data Package: B0301
Data Table: PAH - Main - Surrogate Corrected

Field ID	Blackfoot 1	Blackfoot 6	Yellow Foot 1	Blackfoot 4A/4B	Blackfoot 4A/4B
Lab ID	98D3047 PCA	98D3051 PCA	98D3052 PCA	98D3057 PCA	98D3057MS PCA
Lab Batch	B0301	B0301	B0301	B0301	B0301
File	DZ5478.D	DZ5479.D	DZ5480.D	DZ5481.D	DZ5482.D
Sample Type	SAMP	SAMP	SAMP	SAMP	QC
Weight Basis	DRY	DRY	DRY	DRY	DRY
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	1.42 g	1.7 g	1.45 g	1.44 g	1.34 g
Percent Moisture	83.8	81.7	81.5	82.5	82.5
Associated Blank	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA
Field Date	09/23/98	09/23/98	09/23/98	09/23/98	09/23/98
Extract Date	12/08/98	12/08/98	12/08/98	12/08/98	12/08/98
Analysis Date	12/17/98	12/17/98	12/17/98	12/17/98	12/17/98
Min Reporting Limit	35	29	34	35	37
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	42 JB 35 U	46 JB 29 U	24 JB 34 U	32 JB 35 U	730
C1-Naphthalenes	ND	ND	ND	ND	ND
C2-Naphthalenes	ND	ND	ND	ND	ND
C3-Naphthalenes	ND	ND	ND	ND	ND
C4-Naphthalenes	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	680
Acenaphthene	ND	ND	ND	ND	700
Biphenyl	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	730
C1-Fluorenes	ND	ND	ND	ND	ND
C2-Fluorenes	ND	ND	ND	ND	ND
C3-Fluorenes	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	50	530
Phenanthrene	29 J	39	14 J	43	760
C1-Phenanthrenes/anthracenes	42	95	ND	97	88
C2-Phenanthrenes/anthracenes	65	80	ND	91	95
C3-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C4-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
Dibenzothiophene	ND	11 J	ND	ND	12 J
C1-Dibenzothiophenes	ND	55	ND	55	55 J
C2-Dibenzothiophenes	ND	56	ND	76	65
C3-Dibenzothiophenes	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	760
Pyrene	ND	ND	ND	ND	720
C1-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C2-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C3-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
Benzo[a]anthracene	ND	ND	ND	ND	790
Chrysene	ND	ND	ND	ND	730
C1-Chrysenes	ND	ND	ND	ND	ND
C2-Chrysenes	ND	ND	ND	ND	ND
C3-Chrysenes	ND	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	ND	ND	ND	ND	790
Benzo[k]fluoranthene	ND	ND	ND	ND	790
Benzo[e]pyrene	ND	ND	ND	ND	ND
Benzo[a]pyrene	ND	ND	ND	ND	780
Perylene	ND	ND	ND	ND	ND
Indeno[1,2,3,-c,d]pyrene	ND	ND	ND	ND	720
Dibenzo[a,h]anthracene	ND	ND	ND	ND	710
Benzo[g,h,i]perylene	ND	ND	ND	ND	690
Total PAH	150	350	38	440	12000
%d8-Naphthalene	78	58	68	48	75
%d10-Acenaphthene	81	62	68	52	75
%d10-Phenanthrene	82	67	69	55	79
%d12-Benzo[a]pyrene	82	63	64	53	78

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro
Data Package: B0301
Data Table: PAH - Main - Surrogate Corrected

Field ID	Blackfoot 4A/4B	SITE1-AHU	SITE2S-KIPU	SITE2N-KIPU	SITE3-KIPU
Lab ID	98D3057MSD PCA	98D4265 PCA	98D4266 PCA	98D4267 PCA	98D4268 PCA
Lab Batch	B0301	B0301	B0301	B0301	B0301
File	DZ5483.D	DZ5484.D	DZ5486.D	DZ5487.D	DZ5488.D
Sample Type	QC	SAMP	SAMP	SAMP	SAMP
Weight Basis	DRY	DRY	DRY	DRY	DRY
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	1.3 g	1.62 g	1.72 g	1.99 g	1.43 g
Percent Moisture	82.5	78.7	80.5	78.2	79.1
Associated Blank	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA
Field Date	09/23/98	11/02/98	11/02/98	11/02/98	11/02/98
Extract Date	12/08/98	12/08/98	12/08/98	12/08/98	12/08/98
Analysis Date	12/17/98	12/17/98	12/17/98	12/17/98	12/17/98
Min Reporting Limit	38	31	29	25	35
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	730	31 B μ	17 JB 29 μ	12 JB 25 μ	17 JB 36 μ
C1-Naphthalenes	25 J	ND	14 J	ND	ND
C2-Naphthalenes	ND	ND	ND	ND	ND
C3-Naphthalenes	ND	ND	ND	ND	ND
C4-Naphthalenes	ND	ND	ND	ND	ND
Acenaphthylene	710	14 J	ND	ND	ND
Acenaphthene	710	18 J	ND	ND	ND
Biphenyl	ND	ND	ND	ND	ND
Fluorene	750	ND	ND	ND	ND
C1-Fluorenes	ND	ND	ND	ND	ND
C2-Fluorenes	ND	ND	ND	ND	ND
C3-Fluorenes	ND	ND	ND	ND	ND
Anthracene	530	8.1 J	ND	ND	ND
Phenanthrene	790	26 J	20 J	14 J	21 J
C1-Phenanthrenes/anthracenes	150	ND	19 J	ND	ND
C2-Phenanthrenes/anthracenes	220	ND	ND	ND	ND
C3-Phenanthrenes/anthracenes	130	ND	ND	ND	ND
C4-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
Dibenzothiophene	18 J	ND	ND	ND	ND
C1-Dibenzothiophenes	50	ND	ND	ND	ND
C2-Dibenzothiophenes	130	ND	ND	ND	ND
C3-Dibenzothiophenes	140	ND	ND	ND	ND
Fluoranthene	770	15 J	7 J	ND	ND
Pyrene	750	14 J	0.9 J	ND	ND
C1-Fluoranthenes/pyrenes	69	ND	ND	ND	ND
C2-Fluoranthenes/pyrenes	84	ND	ND	ND	ND
C3-Fluoranthenes/pyrenes	64	ND	ND	ND	ND
Benzo[a]anthracene	800	ND	ND	ND	ND
Chrysene	740	15 J	ND	ND	ND
C1-Chrysenes	40	ND	ND	ND	ND
C2-Chrysenes	31 J	ND	ND	ND	ND
C3-Chrysenes	34 J	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	820	16 J	ND	ND	ND
Benzo[k]fluoranthene	790	14 J	ND	ND	ND
Benzo[e]pyrene	ND	ND	ND	ND	ND
Benzo[a]pyrene	790	13 J	ND	ND	ND
Perylene	ND	ND	ND	ND	ND
Indeno[1,2,3-c,d]pyrene	710	10 J	ND	ND	ND
Dibenzo[a,h]anthracene	720	10 J	ND	ND	ND
Benzo[g,h,i]perylene	640	15 JB 31 μ	ND	ND	ND
Total PAH	13000	220	80	26	38
%d8-Naphthalene	89	65	88	72	76
%d10-Acenaphthene	93	66	88	74	74
%d10-Phenanthrene	97	70	89	76	78
%d12-Benzo[a]pyrene	97	67	85	73	78

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro
Data Package: B0301
Data Table: PAH - Main - Surrogate Corrected

	SITE4-KIPU	SITE5-NINI	SITE6-KEE	SITE 1 AHU - JAR	SITE 2S KIPU - JAR 2
Field ID	98D4269 PCA	98D4270 PCA	98D4271 PCA	98D4411 PCA	98D4412 PCA
Lab Batch	B0301	B0301	B0301	B0301	B0301
File	DZ5489.D	DZ5490.D	DZ5491.D	DZ5492.D	DZ5493.D
Sample Type	SAMP	SAMP	SAMP	SAMP	SAMP
Weight Basis	DRY	DRY	DRY	DRY	DRY
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	1.47 g	2.14 g	1.78 g	1.76 g	2.17 g
Percent Moisture	80	79.6	80.3	80.1	79.7
Associated Blank	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA
Field Date	11/02/98	11/03/98	11/03/98	11/02/98	11/02/98
Extract Date	12/08/98	12/08/98	12/08/98	12/08/98	12/08/98
Analysis Date	12/17/98	12/17/98	12/17/98	12/18/98	12/18/98
Min Reporting Limit	34	23	28	28	23
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	17 JB 34u	0.1 JB 237u	15 JB 287u	16 JB 287u	40 JB 237u
C1-Naphthalenes	ND	ND	ND	ND	16 J
C2-Naphthalenes	ND	ND	ND	ND	ND
C3-Naphthalenes	ND	ND	ND	ND	ND
C4-Naphthalenes	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND
Biphenyl	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND
C1-Fluorenes	ND	ND	ND	ND	ND
C2-Fluorenes	ND	ND	ND	ND	ND
C3-Fluorenes	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND
Phenanthrene	15 J	8 J	10 J	13 J	13 J
C1-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C2-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C3-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C4-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
Dibenzothiophene	ND	ND	ND	ND	ND
C1-Dibenzothiophenes	ND	ND	ND	ND	ND
C2-Dibenzothiophenes	ND	ND	ND	ND	ND
C3-Dibenzothiophenes	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND	ND
C1-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C2-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C3-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
Benzo[a]anthracene	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND
C1-Chrysenes	ND	ND	ND	ND	ND
C2-Chrysenes	ND	ND	ND	ND	ND
C3-Chrysenes	ND	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	ND	ND	ND	ND	ND
Benzo[k]fluoranthene	ND	ND	ND	ND	ND
Benzo[e]pyrene	ND	ND	ND	ND	ND
Benzo[a]pyrene	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND
Indeno[1,2,3,-c,d]pyrene	ND	ND	ND	ND	ND
Dibenzo[a,h]anthracene	ND	ND	ND	ND	ND
Benzo[g,h,i]perylene	ND	ND	ND	ND	ND
Total PAH	32	17	25	29	47
%d8-Naphthalene	76	92	90	67	69
%d10-Acenaphthene	75	81	82	68	72
%d10-Phenanthrene	79	81	84	69	76
%d12-Benzo[a]pyrene	81	80	86	68	73

Arthur D. Little
Environmental Monitoring and Analysis Unit

Project Title : Tesoro
Data Package: B0301
Data Table: PAH - Main - Surrogate Corrected

	SITE 2S KIPU -	SITE 2N KIPU -	SITE 3 KIPU - JAR	SITE 4 KIPU - JAR	SITE 5 NINI - JAR
Field ID	JAR 3	JAR 2	2	2	2
Lab ID	98D4413 PCA	98D4414 PCA	98D4415 PCA	98D4416 PCA	98D4417 PCA
Lab Batch	B0301	B0301	B0301	B0301	B0301
File	DZ5494.D	DZ5495.D	DZ5496.D	DZ5497.D	DZ5499.D
Sample Type	SAMP	SAMP	SAMP	SAMP	SAMP
Weight Basis	DRY	DRY	DRY	DRY	DRY
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	2.06 g	2.48 g	1.78 g	1.49 g	2.35 g
Percent Moisture	80.1	77.2	80.4	82.2	79.6
Associated Blank	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA	CA-S-20PB PCA
Field Date	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98
Extract Date	12/08/98	12/08/98	12/08/98	12/08/98	12/08/98
Analysis Date	12/18/98	12/18/98	12/18/98	12/18/98	12/18/98
Min Reporting Limit	24	20	28	34	31
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	42 JB 2474	47 JB 2074	29 JB 2874	41 B 14	44 JB 2174
C1-Naphthalenes	ND	ND	10 J	25 J	ND
C2-Naphthalenes	ND	ND	ND	ND	ND
C3-Naphthalenes	ND	ND	ND	ND	ND
C4-Naphthalenes	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND
Biphenyl	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND
C1-Fluorenes	ND	ND	ND	ND	ND
C2-Fluorenes	ND	ND	ND	ND	ND
C3-Fluorenes	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND
Phenanthrene	13 J	7.6 J	8.7 J	15 J	6.3 J
C1-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C2-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C3-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
C4-Phenanthrenes/anthracenes	ND	ND	ND	ND	ND
Dibenzothiophene	ND	ND	ND	ND	ND
C1-Dibenzothiophenes	ND	ND	ND	ND	ND
C2-Dibenzothiophenes	ND	ND	ND	ND	ND
C3-Dibenzothiophenes	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND	ND
C1-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C2-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
C3-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND
Benzo[a]anthracene	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND
C1-Chrysenes	ND	ND	ND	ND	ND
C2-Chrysenes	ND	ND	ND	ND	ND
C3-Chrysenes	ND	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	ND	ND	ND	ND	ND
Benzo[k]fluoranthene	ND	ND	ND	ND	ND
Benzo[e]pyrene	ND	ND	ND	ND	ND
Benzo[a]pyrene	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND
Indeno[1,2,3-c,d]pyrene	ND	ND	ND	ND	ND
Dibenzo[a,h]anthracene	ND	ND	ND	ND	ND
Benzo[g,h,i]perylene	ND	ND	ND	ND	ND
Total PAH	25	25	39	81	20
%d8-Naphthalene	77	67	85	77	73
%d10-Acenaphthene	75	67	86	78	78
%d10-Phenanthrene	77	67	88	80	79
%d12-Benzo[a]pyrene	75	66	87	81	81