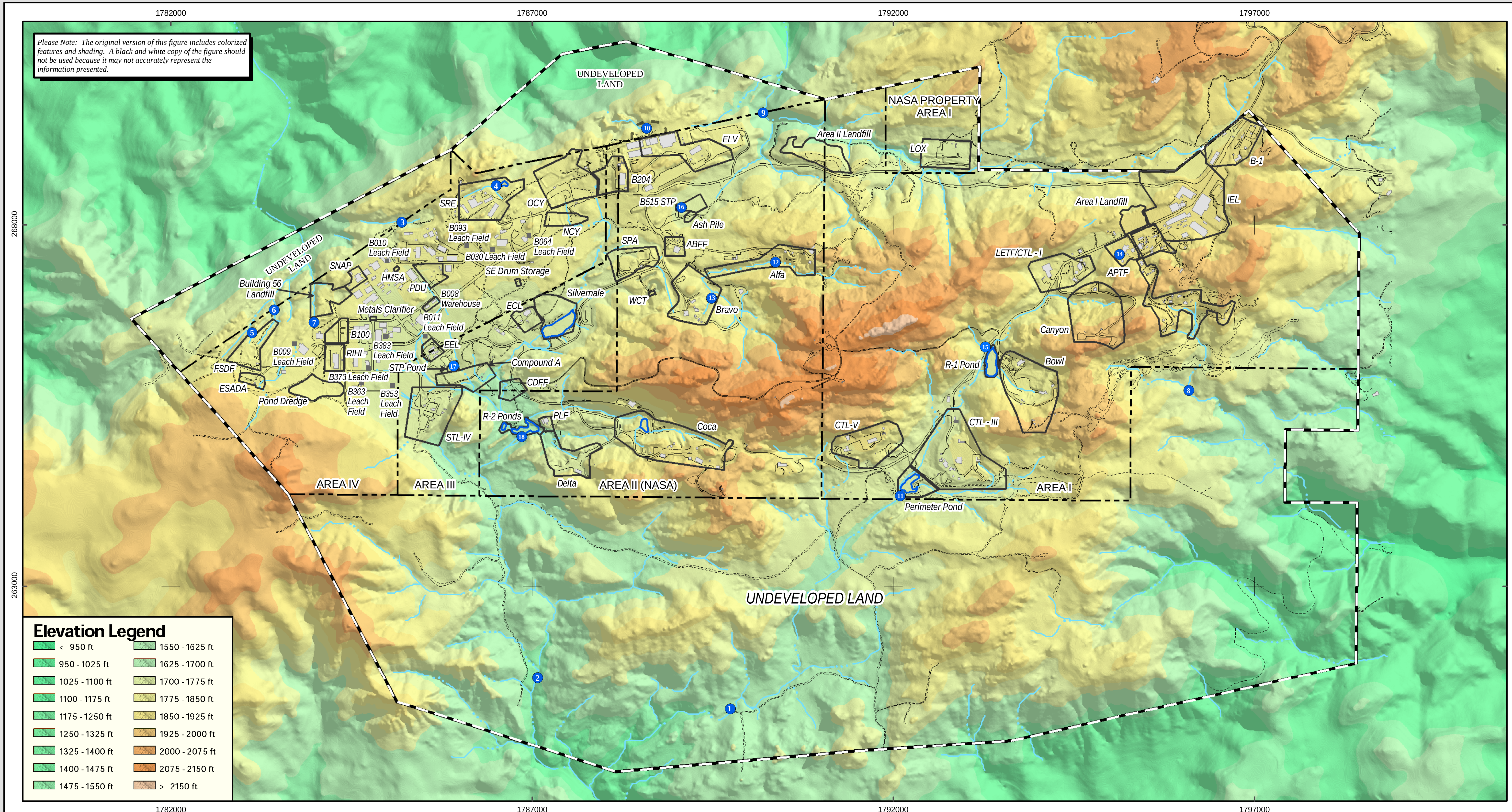


N

0 1,300
FEET

MAP COORDINATES IN STATEPLANE, NAD 27, ZONE V

AREA I
SWMU 4.1, AOC - B-1 Area
SWMU 4.2 - Area I Landfill
SWMUs 4.3, 4.4, AOCs - Instrument and Equipment Laboratories (IEL)
SWMUs 4.5, 4.6 - Liquid Oxygen (LOX) Plant Area
SWMU 4.7, AOCs - Component Test Laboratory III (CTL-III)
SWMU 4.9, AOC - Advanced Propulstion Test Facility (APTF)
SWMU 4.12, AOCs - Laser Engineering Test Facility (LETF)/ Component Test Lab I (CTL-I)
SWMU 4.14, AOCs - Canyon Area
SWMU 4.15, AOCs - Bowl Area
SWMU 4.16 - Area I Reservoir (R-1 Pond)
SWMU 4.17 - Perimeter Pond
AOCs - Building 359 Area
AOC - Happy Valley Area

AREA I (cont)
AOCs - Component Test Laboratory V (CTL-V)

AREA II
SWMU 5.1 - Area II Landfill
SWMU 5.2 - ELV Final Assembly, Building 206
SWMU 5.5 and AOC - Building 204 Area
SWMU 5.6 - Former Area II Incinerator Ash Pile
SWMU 5.7 - Hazardous Waste Storage Area Waste Coolant Tank (WCT)
SWMU 5.9, 5.10, 5.11, AOCs - Alfa Area
SWMU 5.13, 5.14, 5.15, AOCs - Bravo Area
SWMU 5.18, 5.19, AOCs - Coca Area
SWMU 5.20, 5.21, 5.22, AOCs - Propellant Load Facility (PLF)
SWMU 5.23, AOC - Delta Area
SWMU 5.26 - R-2 Ponds
AOCs - Building 515 Sewage Treatment Plant (STP) Area

AREA II (cont)
AOC - Storable Propellant Area (SPA)
AOC - Alfa/Bravo Fuel Farm (ABFF)
AOC - Coca/Delta Fuel Farm (CDFF)

AREA III
SWMUs 6.1, 6.2, 6.3, AOCs - ECL Area
SWMU 6.4 - Compound A Facility
SWMU 6.5, AOC - Systems Test Laboratory IV (STL-IV)
SWMU 6.8 - Silvernale Reservoir
SWMU 6.9 - Environmental Effects Laboratory (EEL)
AOC - Sewage Treatment Plant (STP) Pond

AREA IV
SWMU 7.1 - Building 56 Landfill
SWMU 7.3 - Former Sodium Disposal Facility (FSDF)
SWMU 7.4 - Old Conservation Yard (OCY)

AREA IV (cont)
SWMU 7.5 - Building 100 Trench
SWMU 7.7, AOC - Rockwell International Hot Laboratory (RIHL)
SWMU 7.8 - New Conservation Yard (NCY)
SWMU 7.9 - ESADA Chemical Storage Yard
SWMU 7.10, AOC - Former Coal Gasification Process Development Unit (PDU)
AOCs - Building 008 Warehouse/Building 011 Leach Field
AOC - Building 457 Former Hazardous Materials Storage Area (HMSA)
AOC - Building 65 Metals Laboratory Clarifier
AOC - Pond Dredge Area
AOC - Sodium Reactor Experiment (SRE) Area
AOC - Southeast Drum Storage Yard (SE Drum)
AOC - SNAP Facility
AOCs - DOE Leach Fields

Base Map Legend
Buildings
SSFL Property Boundary
Administrative Area Boundary
RFI Site Boundary
Drainages
Dirt Roads
Roads
Ponds
Leach Field
NPDES Location

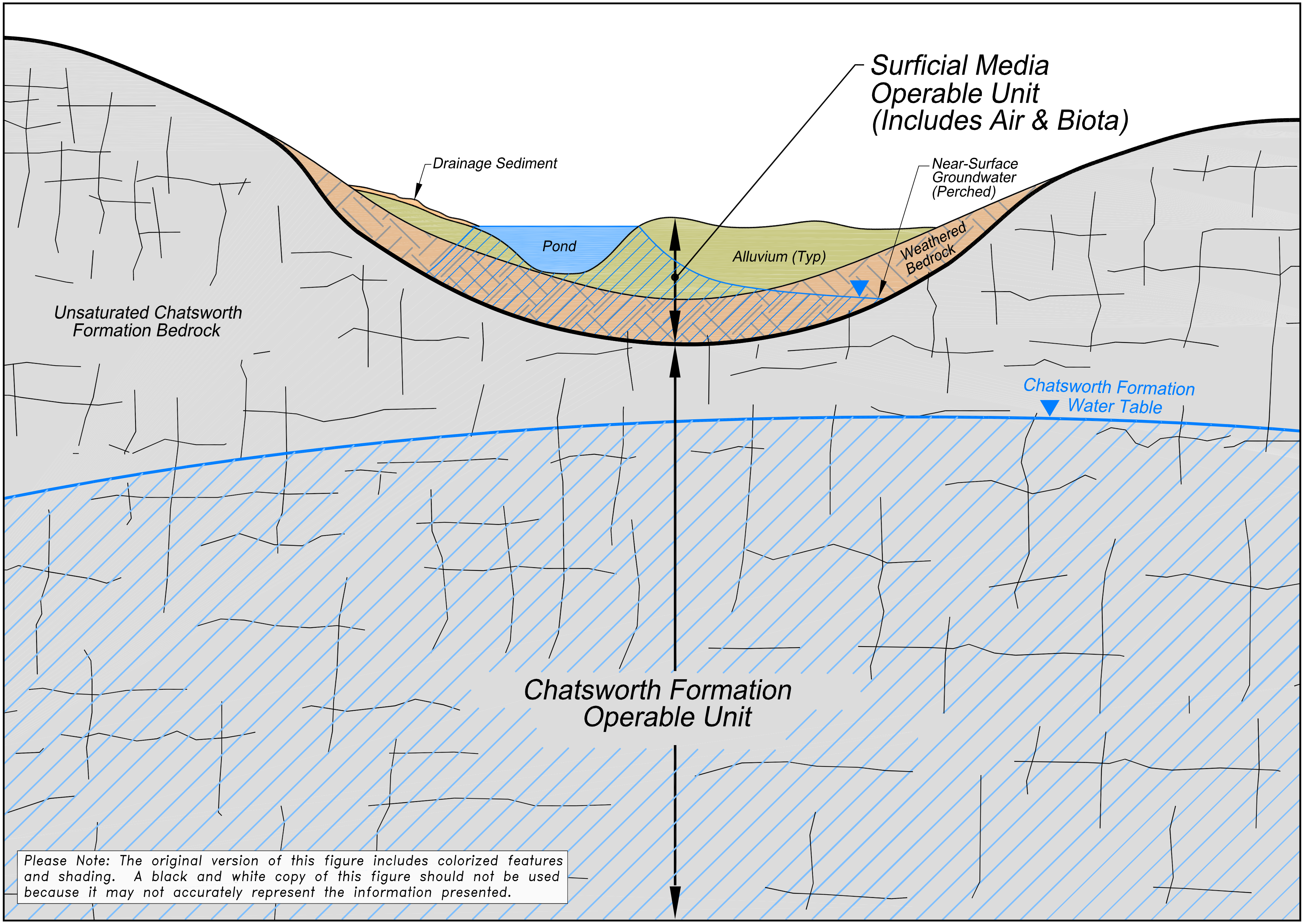
RFI Site Locations Santa Susana Field Laboratory

SANTA SUSANA FIELD LABORATORY

Date: Jun 30, 2005
File: r:\rock\plots\arcmap\rfi_location.mxd

MWH

FIGURE 1-6



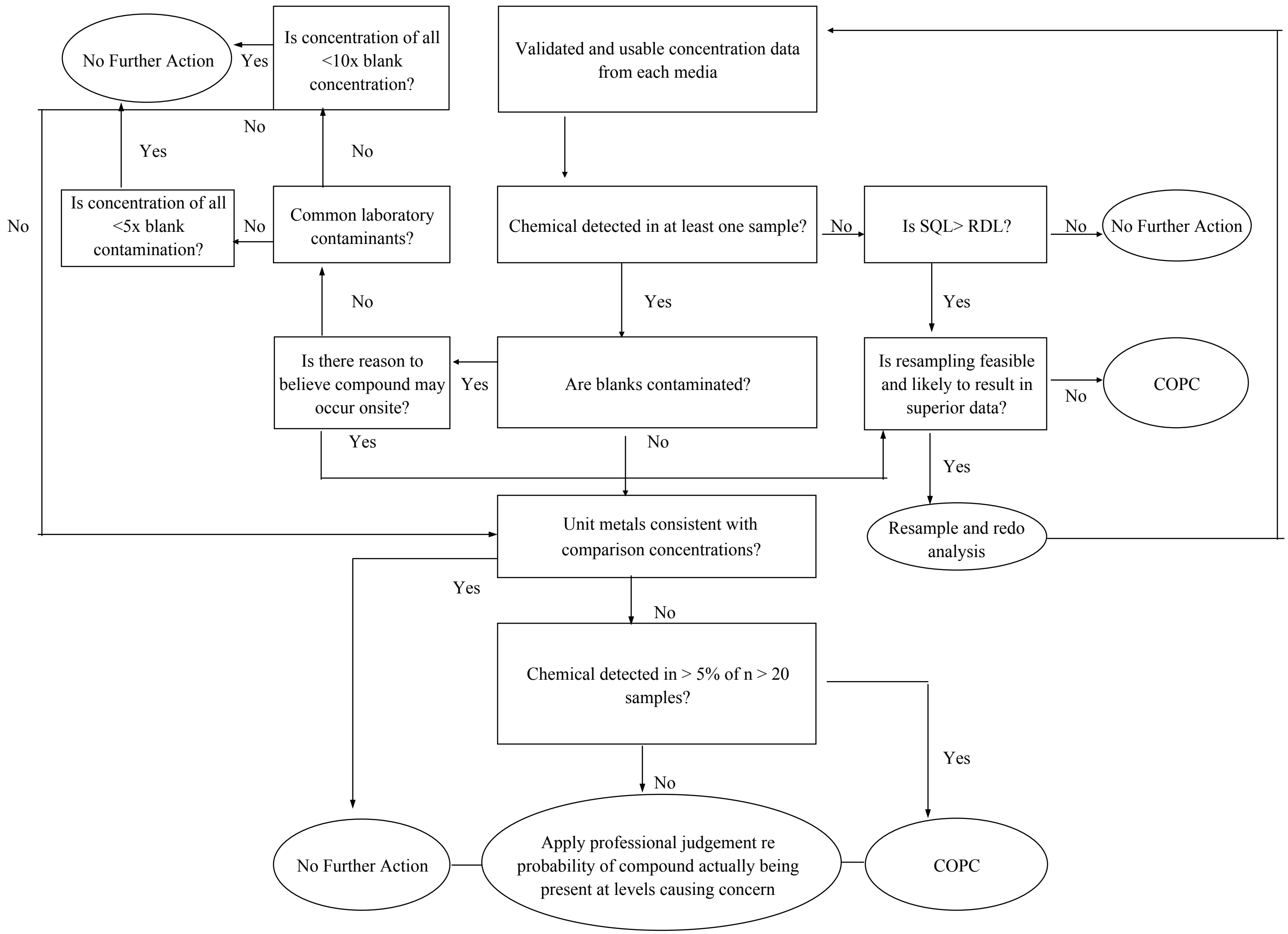
MWH

Santa Susana Field Laboratory (SSFL)
Cross Section Depiction of Operable Units

FIGURE 1-7

Project/Boeing SSFL RA/MWH_SRAM2005-Rev2/Figure 1-7.dwg

06/07/05



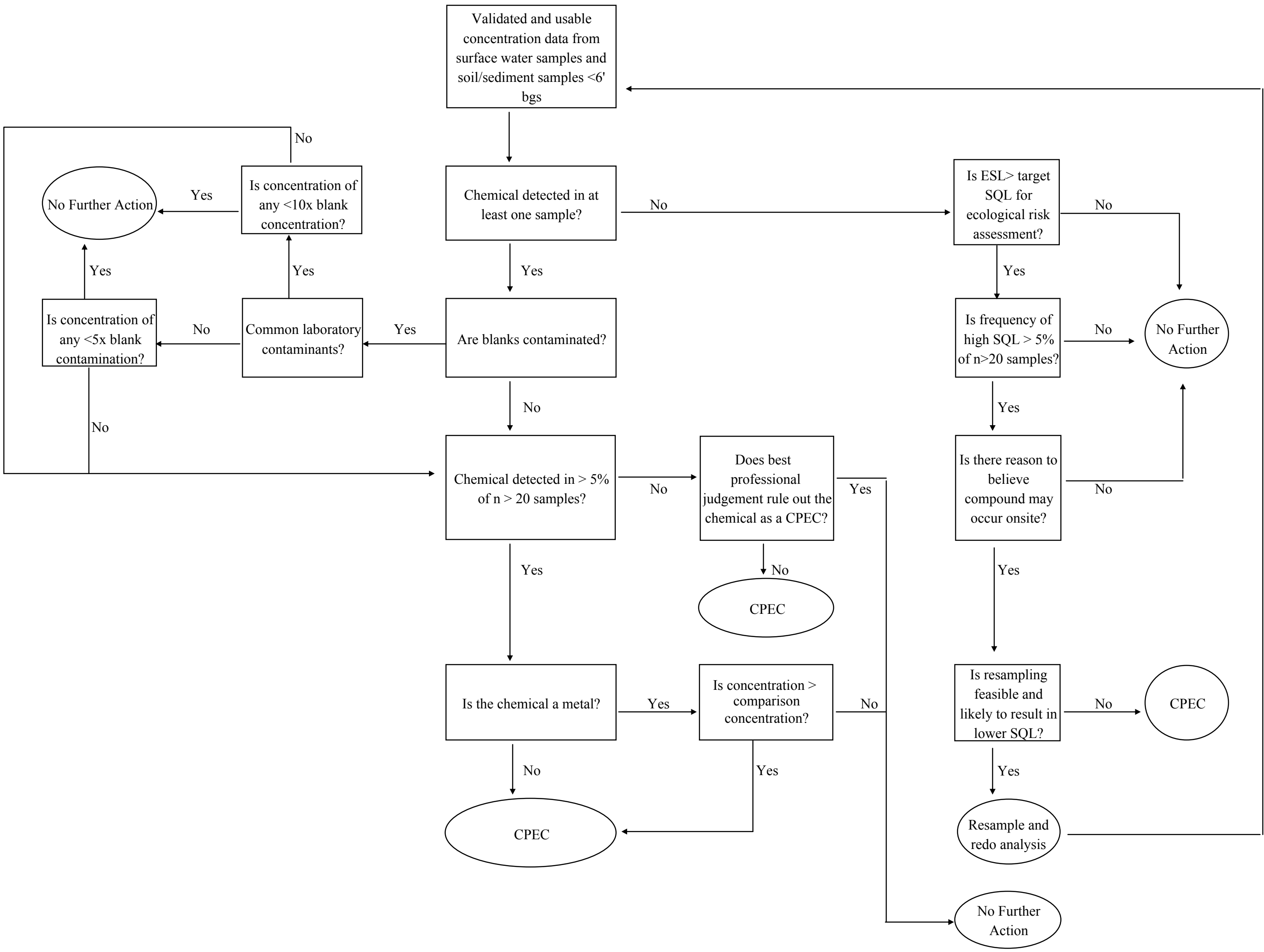
MWH

Santa Susana Field Laboratory (SSFL)
Human Health Risk Assessment Selection of Chemicals of Potential Concern

FIGURE
3-1

Project/Boeing SSFL RA/MWH_SRAM2005-Rev2/Figure 3-1.ai

06/07/05



MWH

Santa Susana Field Laboratory (SSFL)
Ecological Risk Assessment Selection of Chemicals of Potential Ecological Concern

FIGURE
3-2

Project/Boeing SSFL RA/MWH_SRAM2005-Rev2/Figure 3-2.ai

06/07/05

Representative Ecological Receptors:

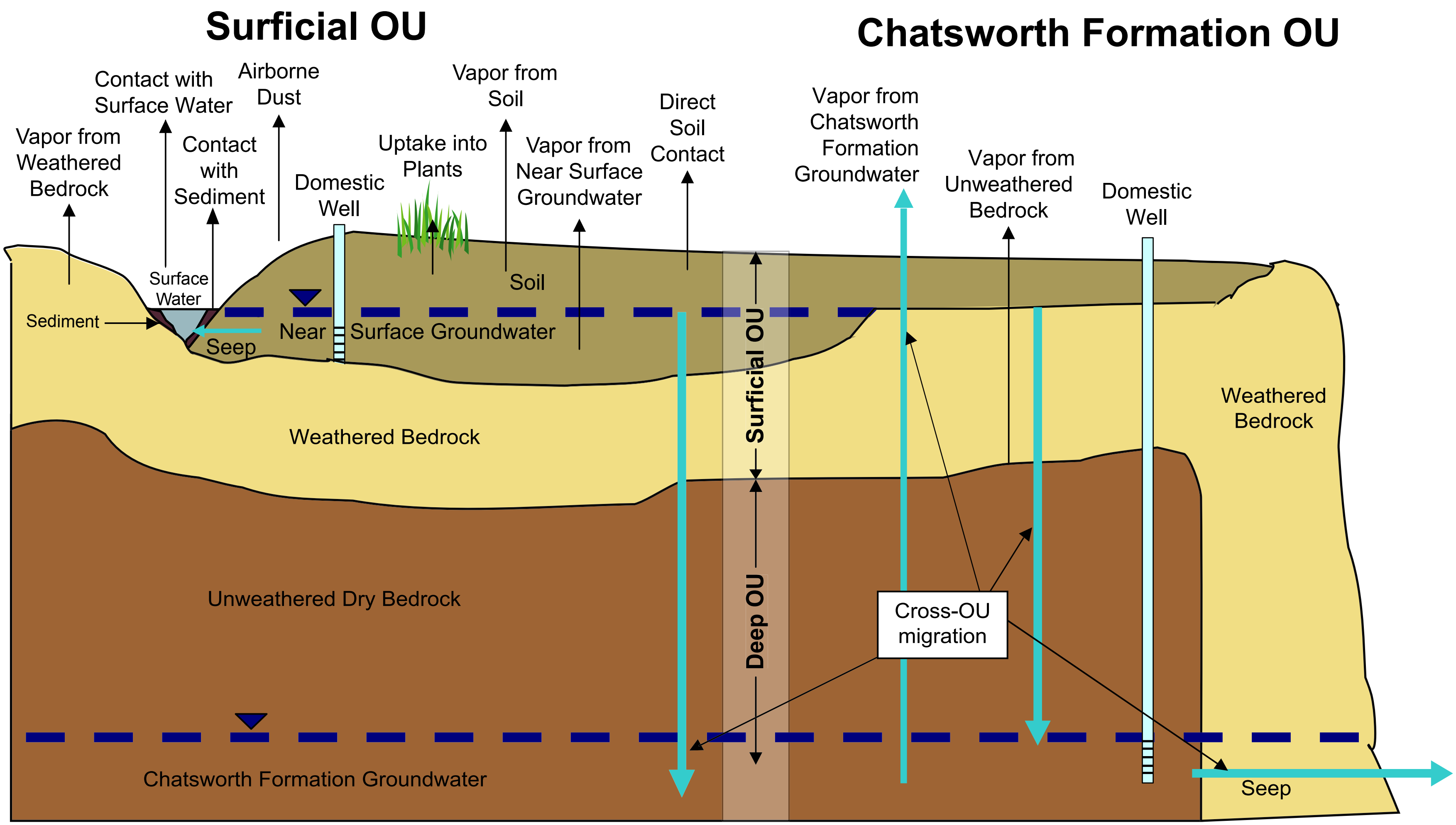
- Generic aquatic species (aquatic primary/secondary consumer)
- Great blue heron (aquatic tertiary consumer)
- Deer mouse (terrestrial primary/secondary consumer)
- Thrush (terrestrial primary/secondary consumer)
- Mule deer (terrestrial primary consumer)
- Red-tailed hawk (terrestrial secondary/tertiary consumer)
- Bobcat (terrestrial secondary/tertiary consumer)

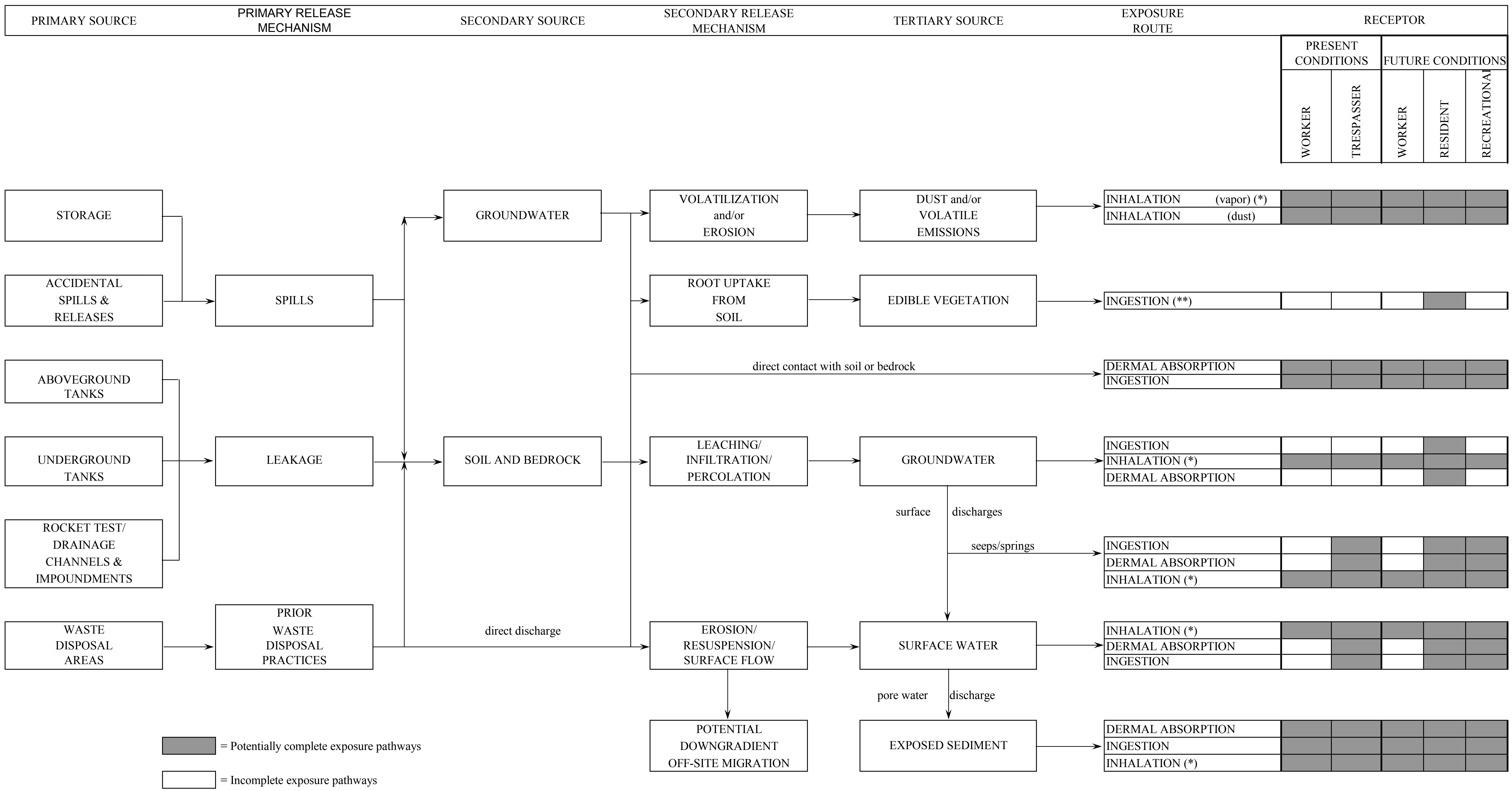
Worker Receptor:

- Inhalation of dust (Surficial OU)
- Inhalation of vapors from soil and groundwater (Surficial OU and CFOU)
- Dermal contact with soil (Surficial OU)
- Ingestion of soil (Surficial OU)
- Dermal contact with surface water and sediment (Surficial OU)
- Ingestion of surface water and sediment (Surficial OU)
- Inhalation of vapors from bedrock

Future Residential Receptor:

- Inhalation of dust (Surficial OU)
- Inhalation of vapors from soil and groundwater (Surficial OU and CFOU)
- Ingestion of plants (Surficial OU)
- Dermal contact with soil (Surficial OU)
- Ingestion of soil (Surficial OU)
- Dermal contact with surface water and sediment (Surficial OU)
- Ingestion of surface water and sediment (Surficial OU)
- Ingestion of groundwater (Surficial OU and CFOU)
- Inhalation of vapors during domestic use (Surficial OU and CFOU)
- Dermal contact with groundwater (Surficial OU and CFOU)
- Inhalation of vapors from bedrock





Notes:

See Figure 9-2 for a generalized Conceptual Site Model of ecological exposures.

(*) Exposure limited to volatile compounds as defined in the text; residential and worker receptors include both indoor and outdoor air exposure to volatiles; nonresidential and nonworker receptors include only outdoor air exposure. For residents, inhalation of volatiles from shallow groundwater includes pathways associated with both domestic use and migration to indoor air, whereas, nonresidential exposure includes only migration to indoor and outdoor air for workers and only outdoor air for recreators. Exposure to fugitive dust is limited to non-volatile organic compounds.

(**) Exposure limited to bioaccumulatable compounds as described in the text.

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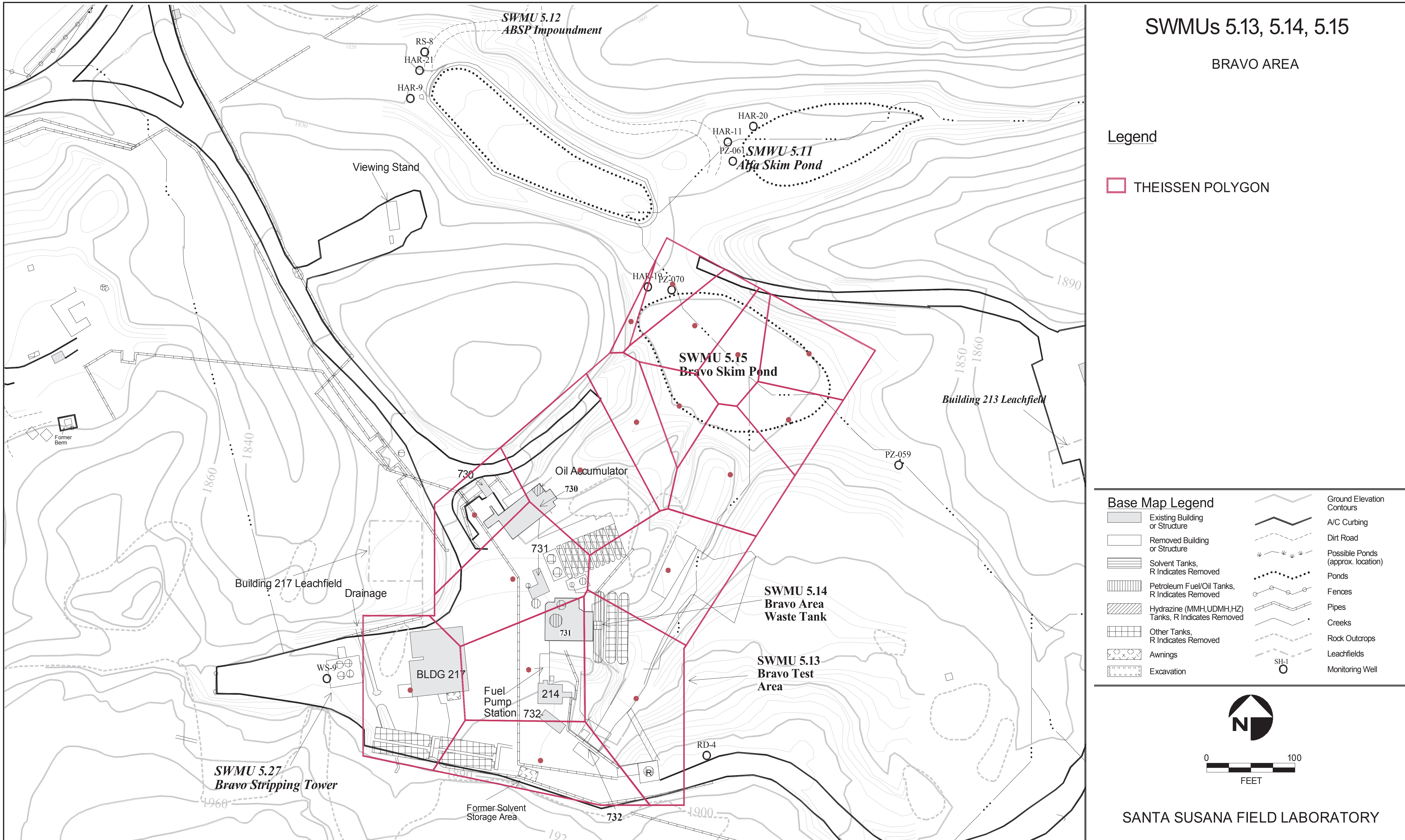
Santa Susana Field Laboratory (SSFL)
Generalized Conceptual Site Model of Human Health Exposures

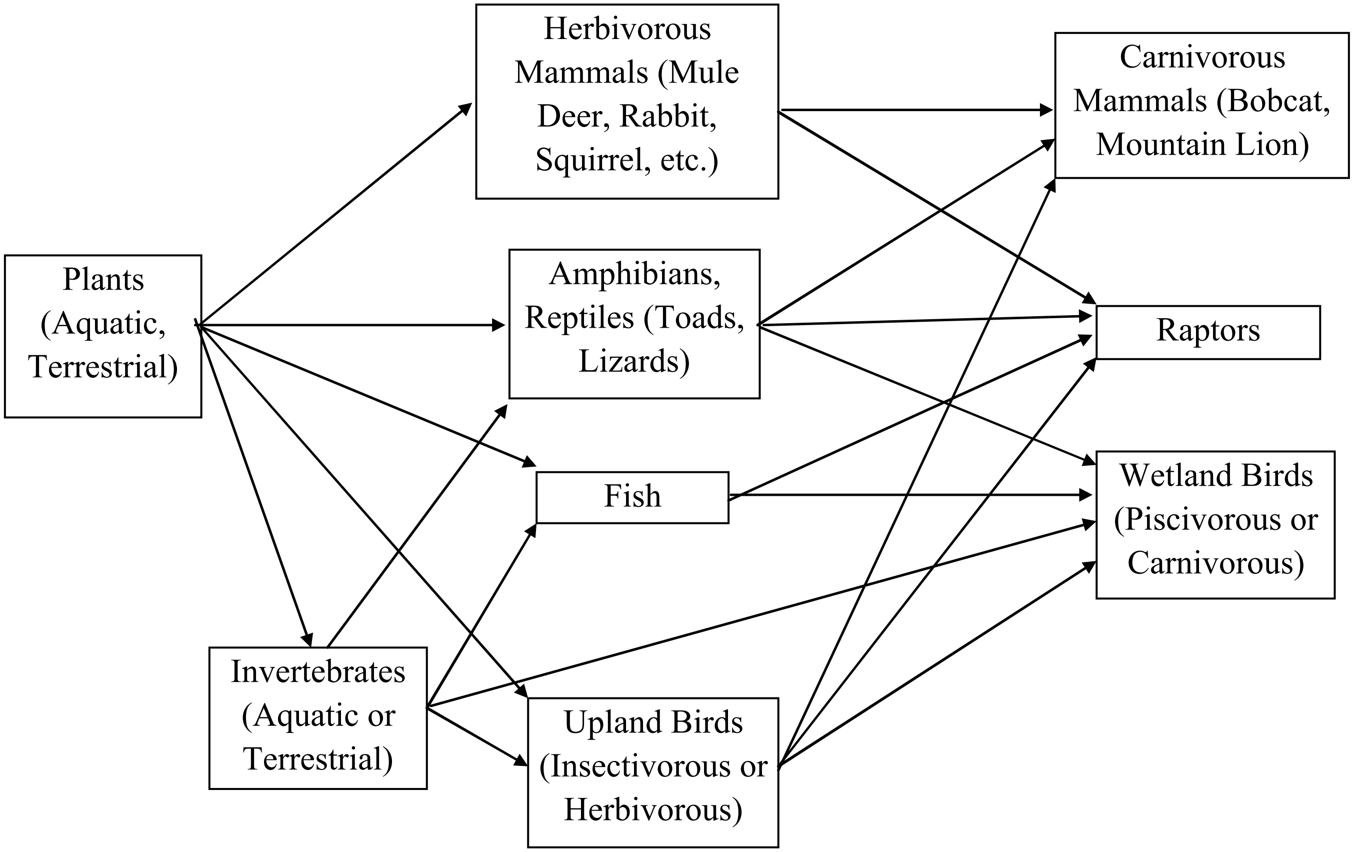
FIGURE **4-2**



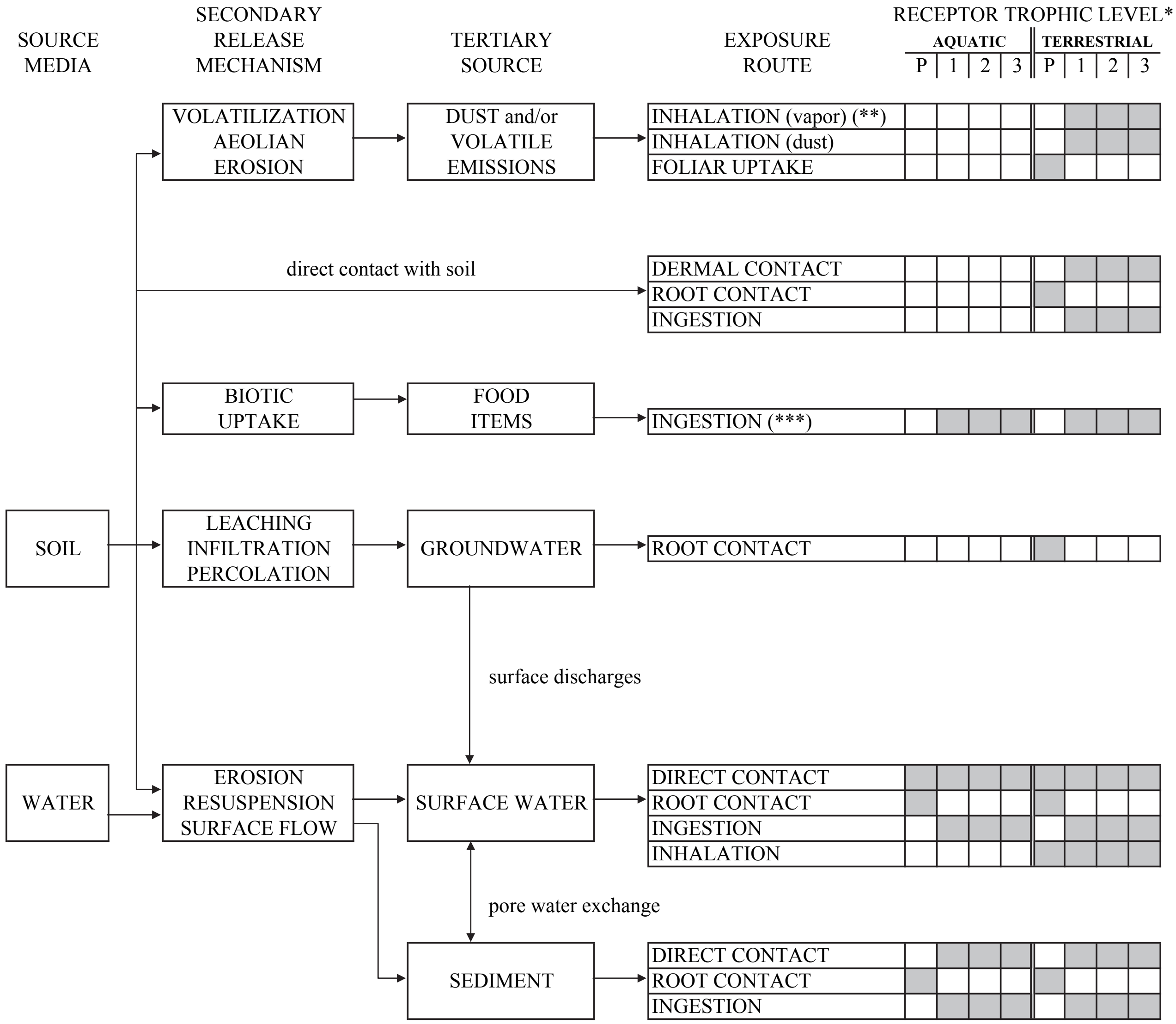
MWH

Santa Susana Field Laboratory (SSFL)
Thiessen Polygons for Surface Soil Sampling Locations - BRAVO

FIGURE 6-1



Herbivorous Mammals (Mule Deer, Rabbit, Squirrel, etc.)
Carnivorous Mammals (Bobcat, Mountain Lion)
Plants (Aquatic, Terrestrial)
Amphibians, Reptiles (Toads, Lizards)
Raptors
Fish
Wetland Birds (Piscivorous or Carnivorous)
Invertebrates (Aquatic or Terrestrial)
Upland Birds (Insectivorous or Herbivorous)



Notes:

See Figure 4-2 for a generalized Conceptual Site Model of human health exposures.

(*) Trophic Level: P= Primary producers (e.g., plants); 1=1st consumer (e.g., invertebrates); 2=2nd consumer (e.g., wading birds); 3=3rd consumer (e.g., fish-eating birds)

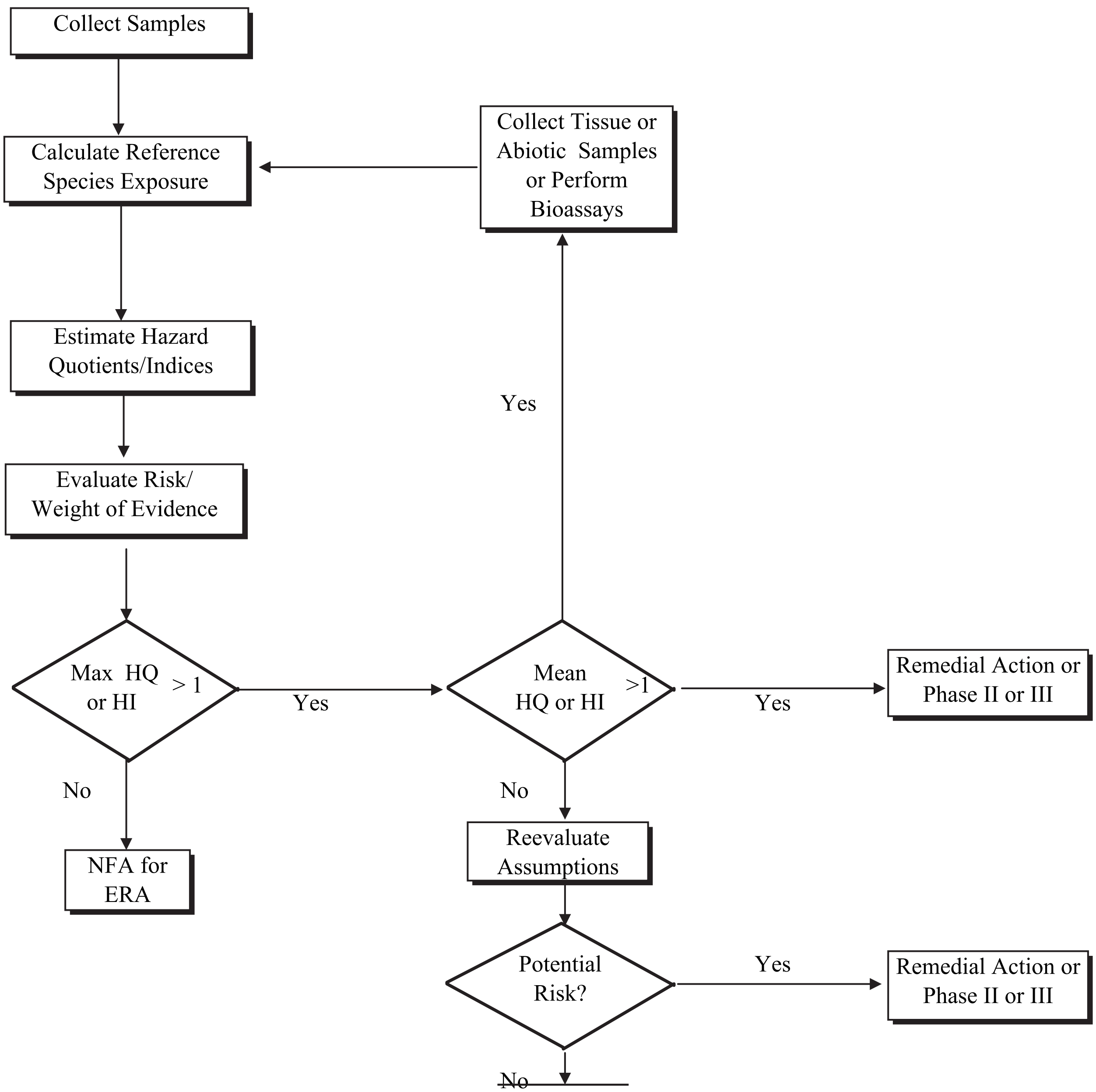
(**) Exposures limited to volatile compounds as defined in the text.

(***) Exposures limited to bioaccumulatable compounds as described in the text.

MWH

Santa Susana Field Laboratory (SSFL)
Generalized Conceptual Site Model of Ecological Exposures

FIGURE **9-2**



NFA = No Further Action
ERA = Ecological Risk Assessment
HQ = Hazard Quotient
HI = Hazard Index

APPENDIX A

DERIVATION OF POLYCHLORINATED BIPHENYL EXTRAPOLATION FACTORS

APPENDIX A (1 of 3)

Aroclor and PCB Congener Data and Calculation of Maximum Ratio Extrapolation Factors

CHEMICAL	EPA ID	OGDEN ID	DETECTED CONCENTRATION	ADJUSTED CONCENTRATION	UNIT	QUALIFIER	DETECTION LIMIT	CENSORED	PCB CONGENER : AROCLOR RATIO	
									PCB : AROCLOR-1254	PCB : AROCLOR-1260
Aroclor-1254	RB043	BVSS05S01	65	65	ug/kg					
Aroclor-1260	RB043	BVSS05S01	18	9	ug/kg	U	18	Yes		
PCB-105	RB043	BVSS05S01	3.3	3.3	ng/g				5.1E-02	
PCB-114	RB043	BVSS05S01	0.081	0.081	ng/g				1.2E-03	
PCB-118	RB043	BVSS05S01	6.6	6.6	ng/g				1.0E-01	
PCB-123	RB043	BVSS05S01	0.095	0.095	ng/g				1.5E-03	
PCB-126	RB043	BVSS05S01	0.069	0.069	ng/g				1.1E-03	
PCB-156	RB043	BVSS05S01	1.5	1.5	ng/g				2.3E-02	
PCB-157	RB043	BVSS05S01	0.43	0.43	ng/g				6.6E-03	
PCB-167	RB043	BVSS05S01	0.71	0.71	ng/g				1.1E-02	
PCB-169	RB043	BVSS05S01	0.0055	0.00275	ng/g	U	0.0055		4.2E-05	
PCB-189	RB043	BVSS05S01	0.088	0.088	ng/g				1.4E-03	
PCB-77	RB043	BVSS05S01	0.18	0.18	ng/g				2.8E-03	
PCB-81	RB043	BVSS05S01	0.059	0.059	ng/g				9.1E-04	
Aroclor-1254	RB047	BVSS07D01	62	62	ug/kg					
Aroclor-1260	RB047	BVSS07D01	24	24	ug/kg	J	41			
PCB-105	RB047	BVSS07D01	1.8	1.8	ng/g				2.9E-02	7.5E-02
PCB-114	RB047	BVSS07D01	0.03	0.03	ng/g	J			4.8E-04	1.3E-03
PCB-118	RB047	BVSS07D01	3.6	3.6	ng/g				5.8E-02	1.5E-01
PCB-123	RB047	BVSS07D01	0.053	0.053	ng/g				8.5E-04	2.2E-03
PCB-126	RB047	BVSS07D01	0.14	0.14	ng/g				2.3E-03	5.8E-03
PCB-156	RB047	BVSS07D01	1.1	1.1	ng/g				1.8E-02	4.6E-02
PCB-157	RB047	BVSS07D01	0.58	0.58	ng/g				9.4E-03	2.4E-02
PCB-167	RB047	BVSS07D01	0.99	0.99	ng/g				1.6E-02	4.1E-02
PCB-169	RB047	BVSS07D01	0.014	0.014	ng/g	J			2.3E-04	5.8E-04
PCB-189	RB047	BVSS07D01	0.15	0.15	ng/g				2.4E-03	6.3E-03
PCB-77	RB047	BVSS07D01	0.3	0.3	ng/g				4.8E-03	1.3E-02
PCB-81	RB047	BVSS07D01	0.054	0.054	ng/g				8.7E-04	2.3E-03
Aroclor-1254	RB045	BVSS07S01	48	48	ug/kg					
Aroclor-1260	RB045	BVSS07S01	22	22	ug/kg	J	37			
PCB-105	RB045	BVSS07S01	1.8	1.8	ng/g				3.8E-02	8.2E-02
PCB-114	RB045	BVSS07S01	0.032	0.032	ng/g	J			6.7E-04	1.5E-03
PCB-118	RB045	BVSS07S01	3.6	3.6	ng/g				7.5E-02	1.6E-01
PCB-123	RB045	BVSS07S01	0.51	0.51	ng/g				1.1E-02	2.3E-02
PCB-126	RB045	BVSS07S01	0.014	0.014	ng/g				2.9E-04	6.4E-04
PCB-156	RB045	BVSS07S01	1.2	1.2	ng/g				2.5E-02	5.5E-02

Aroclor and PCB Congener Data and Calculation of Maximum Ratio Extrapolation Factors

CHEMICAL	EPA ID	OGDEN ID	DETECTED CONCENTRATION	ADJUSTED CONCENTRATION	UNIT	QUALIFIER	DETECTION LIMIT	CENSORED	PCB CONGENER : AROCLOR RATIO	
									PCB : AROCLOR-1254	PCB : AROCLOR-1260
PCB-157	RB045	BVSS07S01	0.54	0.54	ng/g				1.1E-02	2.5E-02
PCB-167	RB045	BVSS07S01	0.94	0.94	ng/g				2.0E-02	4.3E-02
PCB-169	RB045	BVSS07S01	0.014	0.014	ng/g	J			2.9E-04	6.4E-04
PCB-189	RB045	BVSS07S01	0.14	0.14	ng/g				2.9E-03	6.4E-03
PCB-77	RB045	BVSS07S01	0.28	0.28	ng/g				5.8E-03	1.3E-02
PCB-81	RB045	BVSS07S01	0.049	0.049	ng/g				1.0E-03	2.2E-03
Aroclor-1254	RB078	CTSS02S01	3300	3300	ug/kg					
Aroclor-1260	RB078	CTSS02S01	860	430	ug/kg	U	860	Yes		
PCB-105	RB078	CTSS02S01	170	170	ng/g				5.2E-02	
PCB-114	RB078	CTSS02S01	4.6	4.6	ng/g				1.4E-03	
PCB-118	RB078	CTSS02S01	380	380	ng/g				1.2E-01	
PCB-123	RB078	CTSS02S01	5.4	5.4	ng/g				1.6E-03	
PCB-126	RB078	CTSS02S01	3.9	3.9	ng/g				1.2E-03	
PCB-156	RB078	CTSS02S01	84	84	ng/g				2.5E-02	
PCB-157	RB078	CTSS02S01	18	18	ng/g				5.5E-03	
PCB-167	RB078	CTSS02S01	32	32	ng/g				9.7E-03	
PCB-169	RB078	CTSS02S01	0.12	0.12	ng/g				3.6E-05	
PCB-189	RB078	CTSS02S01	3.7	3.7	ng/g				1.1E-03	
PCB-77	RB078	CTSS02S01	10	10	ng/g				3.0E-03	
PCB-81	RB078	CTSS02S01	3.4	3.4	ng/g				1.0E-03	
Aroclor-1254	RB077	OCSS03S01	97	97	ug/kg	J				
PCB-105	RB077	OCSS03S01	12	12	ng/g				1.2E-01	
PCB-114	RB077	OCSS03S01	0.44	0.44	ng/g				4.5E-03	
PCB-118	RB077	OCSS03S01	26	26	ng/g				2.7E-01	
PCB-123	RB077	OCSS03S01	0.29	0.29	ng/g				3.0E-03	
PCB-126	RB077	OCSS03S01	0.73	0.73	ng/g				7.5E-03	
PCB-156	RB077	OCSS03S01	6.1	6.1	ng/g				6.3E-02	
PCB-157	RB077	OCSS03S01	1.2	1.2	ng/g				1.2E-02	
PCB-167	RB077	OCSS03S01	2	2	ng/g				2.1E-02	
PCB-169	RB077	OCSS03S01	0.071	0.0355	ng/g	U	0.071		3.7E-04	
PCB-189	RB077	OCSS03S01	0.29	0.29	ng/g				3.0E-03	
PCB-77	RB077	OCSS03S01	1.5	1.5	ng/g				1.5E-02	
PCB-81	RB077	OCSS03S01	0.29	0.29	ng/g				3.0E-03	

APPENDIX A (3 of 3)

Aroclor and PCB Congener Data and Calculation of Maximum Ratio Extrapolation Factors

CHEMICAL	EPA ID	OGDEN ID	DETECTED CONCENTRATION	ADJUSTED CONCENTRATION	UNIT	QUALIFIER	DETECTION LIMIT	CENSORED	PCB CONGENER : AROCLOR RATIO	
									PCB : AROCLOR-1254	PCB : AROCLOR-1260

MAXIMUM RATIO EXTRAPOLATION FACTORS

CHEMICAL	PCB : AROCLOR-1254	PCB : AROCLOR-1260
PCB-105	1.2E-01	8.2E-02
PCB-114	4.5E-03	1.5E-03
PCB-118	2.7E-01	1.6E-01
PCB-123	1.1E-02	2.3E-02
PCB-126	7.5E-03	5.8E-03
PCB-156	6.3E-02	5.5E-02
PCB-157	1.2E-02	2.5E-02
PCB-167	2.1E-02	4.3E-02
PCB-169	3.7E-04	6.4E-04
PCB-189	3.0E-03	6.4E-03
PCB-77	1.5E-02	1.3E-02
PCB-81	3.0E-03	2.3E-03

APPENDIX B

DERIVATION OF TOTAL PETROLEUM HYDROCARBON EXTRAPOLATION FACTORS

APPENDIX B
TABLE OF CONTENTS

DERIVATION OF TOTAL PETROLEUM HYDROCARBON EXTRAPOLATION FACTORS

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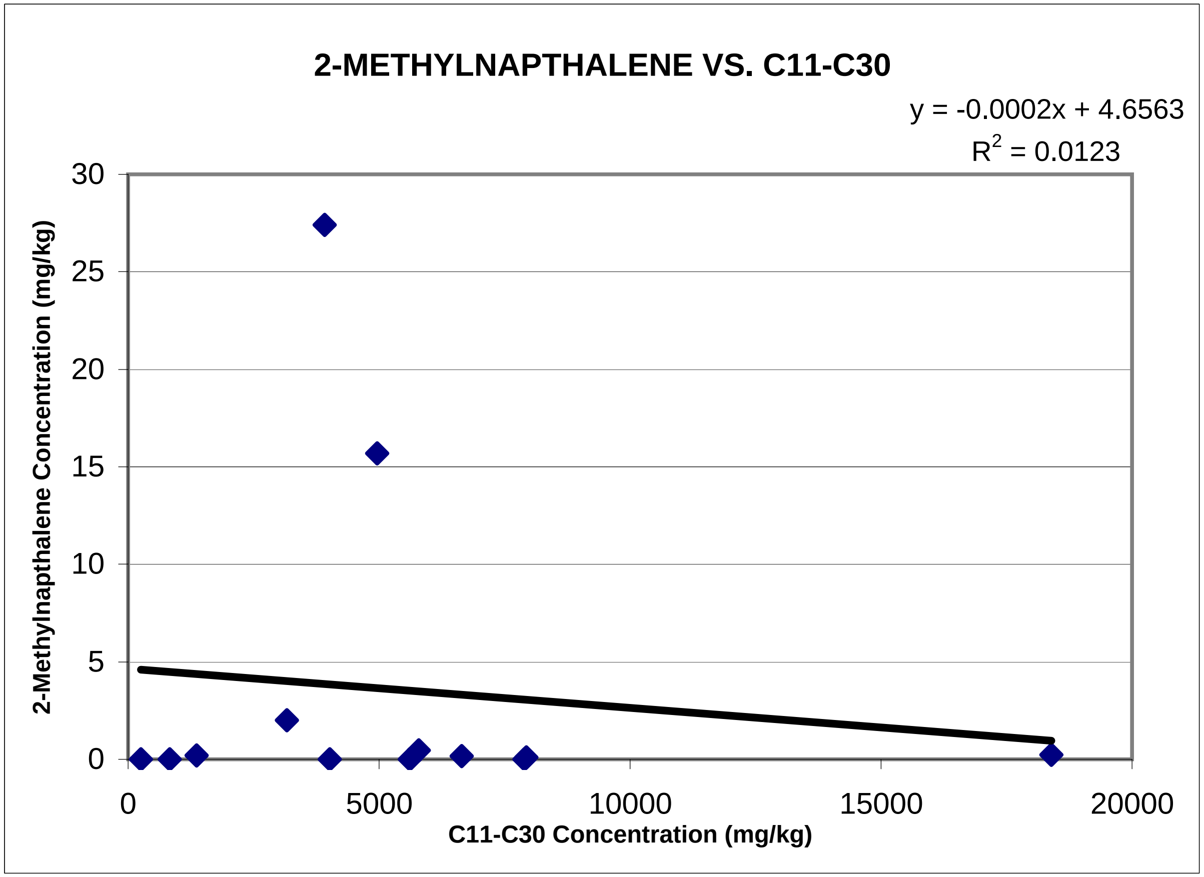
APPENDIX B

ATTACHMENT B-1-1

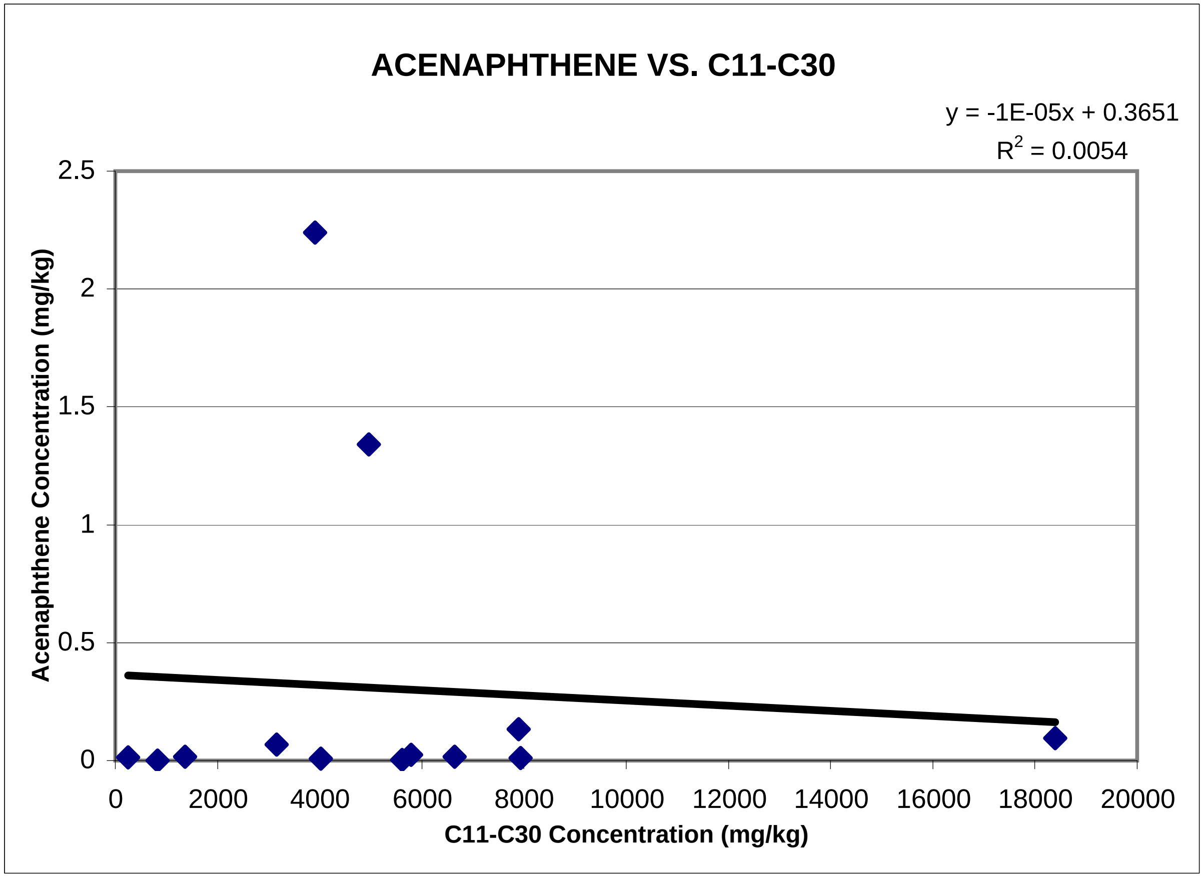
HCPC GRAPHS

Appendix B, Attachment 1 (1 of 18)

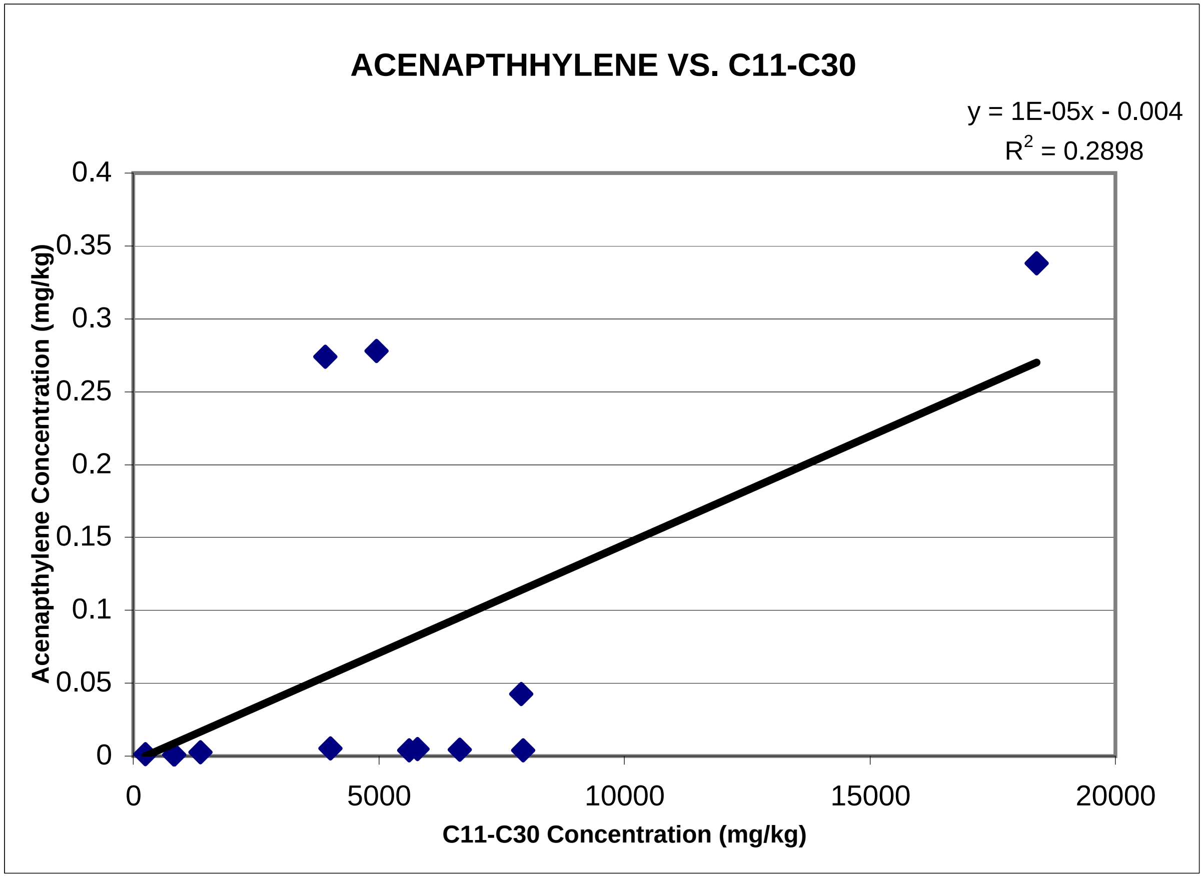
HCPC Graphs



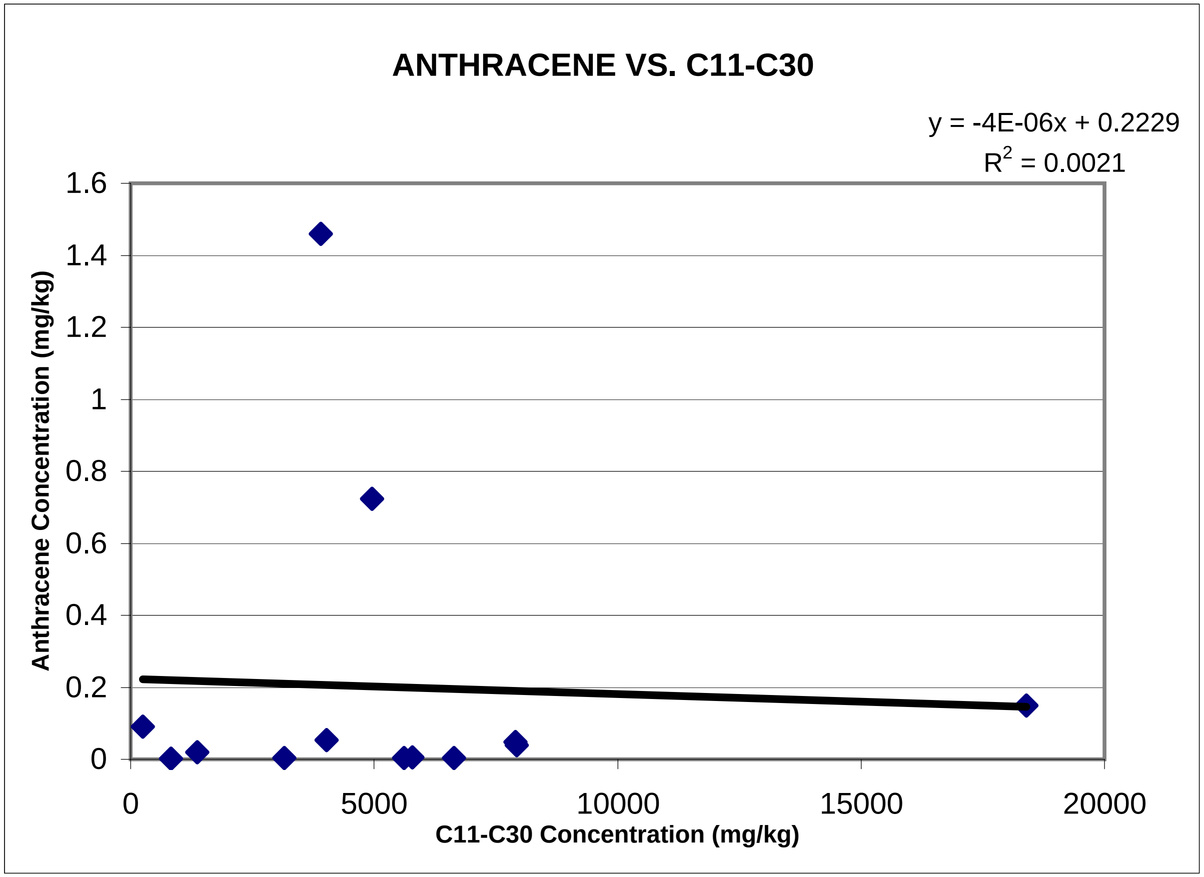
HCPC Graphs


ACENAPHTHENE VS. C11-C30
y = -1E-05x + 0.3651
R2 = 0.0054
Acenaphthene Concentration (mg/kg)
2.5
2
1.5
1
0.5
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
C11-C30 Concentration (mg/kg)

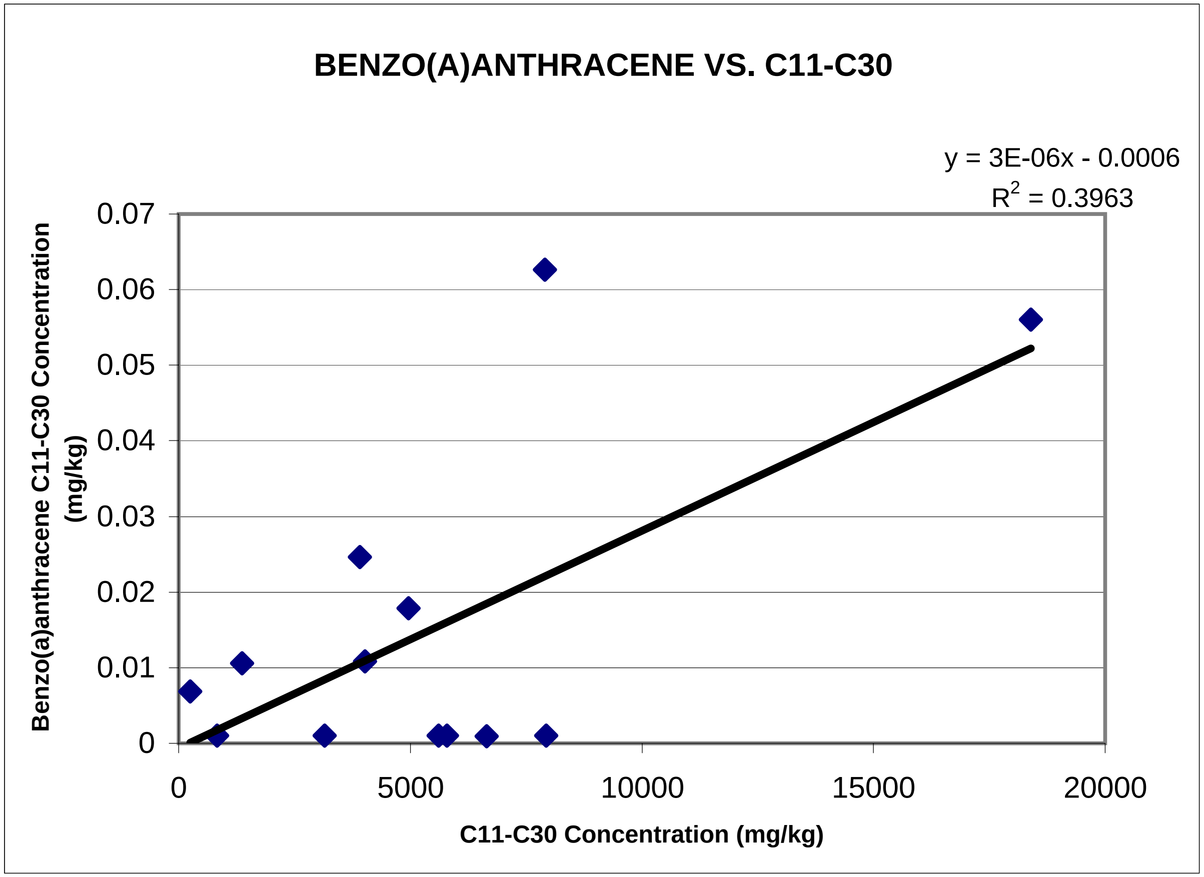
HCPC Graphs


ACENAPTHHYLENE VS. C11-C30
y = 1E-05x - 0.004
R2 = 0.2898
Acenapthylene Concentration (mg/kg)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

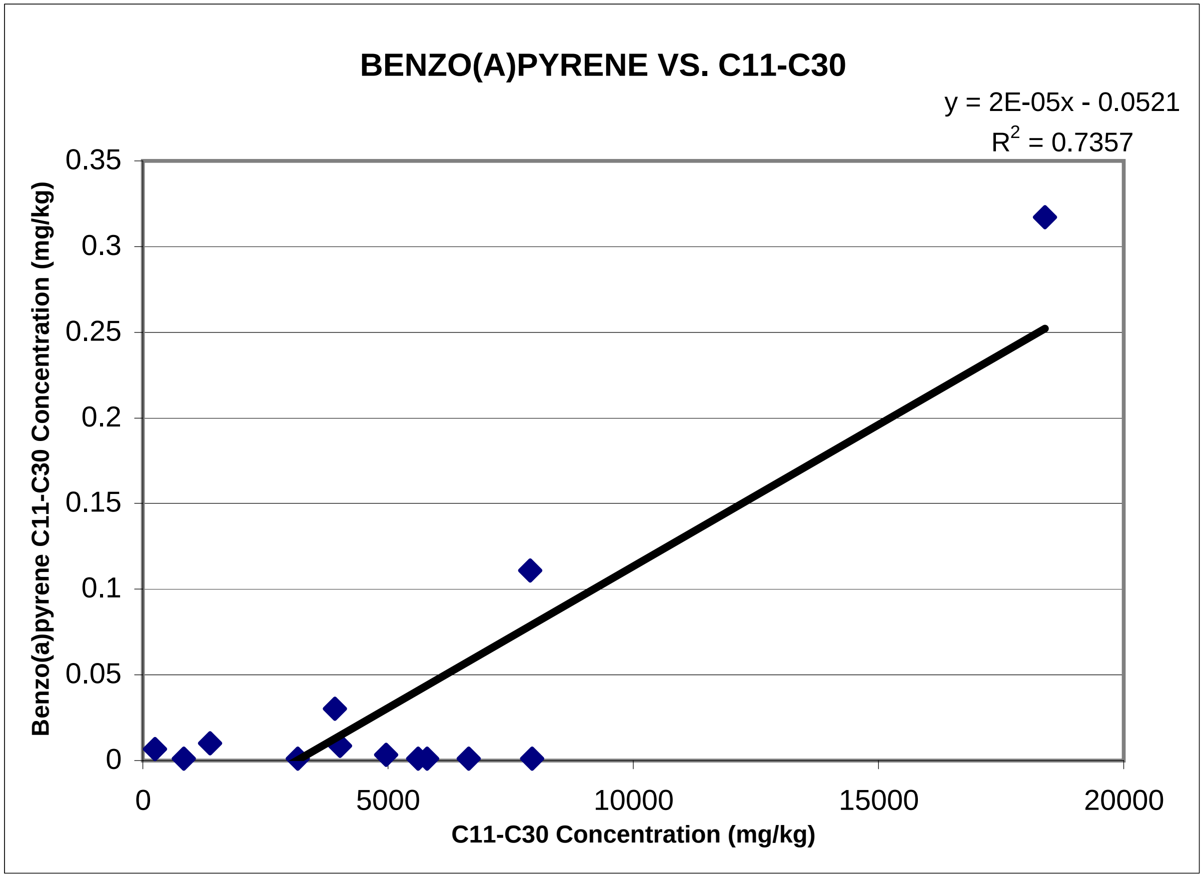
HCPC Graphs


ANTHRACENE VS. C11-C30
y = -4E-06x + 0.2229
R2 = 0.0021
Anthracene Concentration (mg/kg)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

HCPC Graphs


BENZO(A)ANTHRACENE VS. C11-C30
y = 3E-06x - 0.0006
R2 = 0.3963
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5000
10000
15000
20000
Benzo(a)anthracene C11-C30 Concentration (mg/kg)
C11-C30 Concentration (mg/kg)

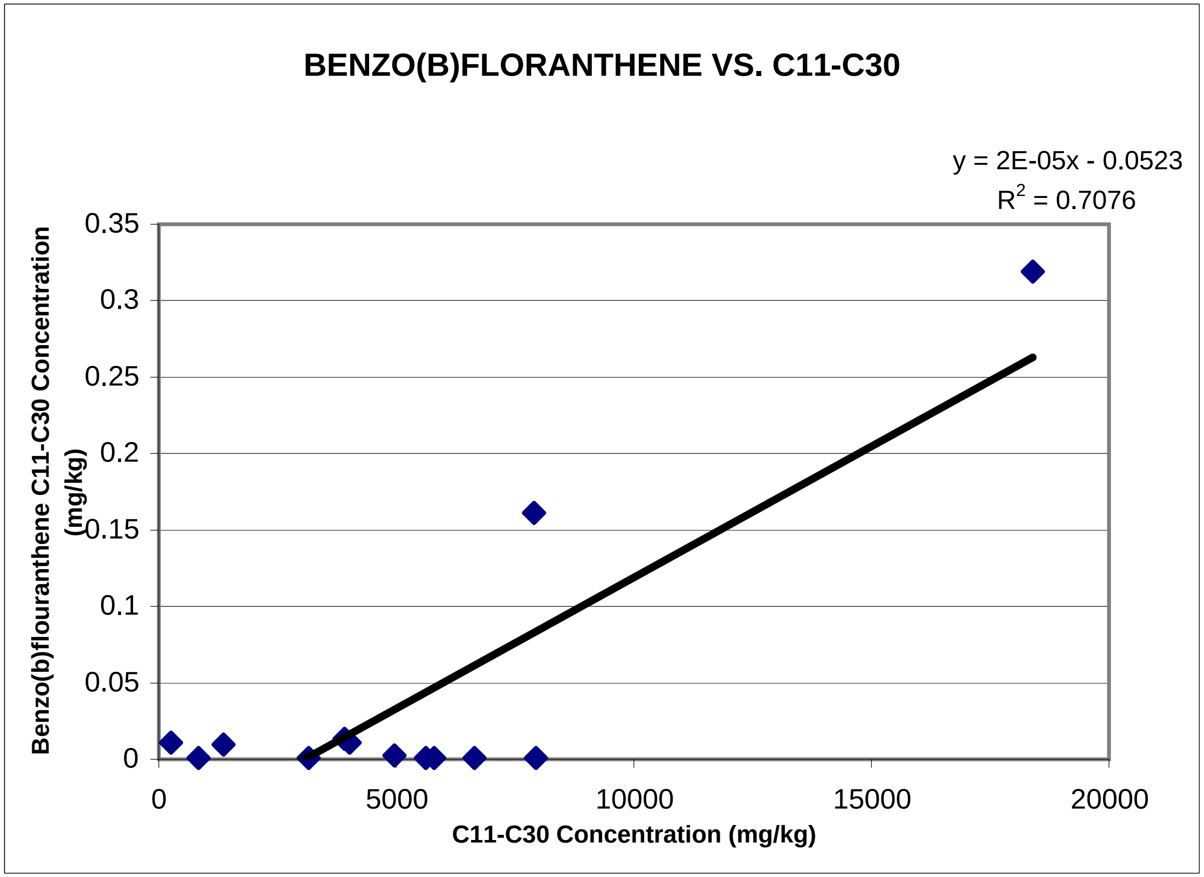
HCPC Graphs



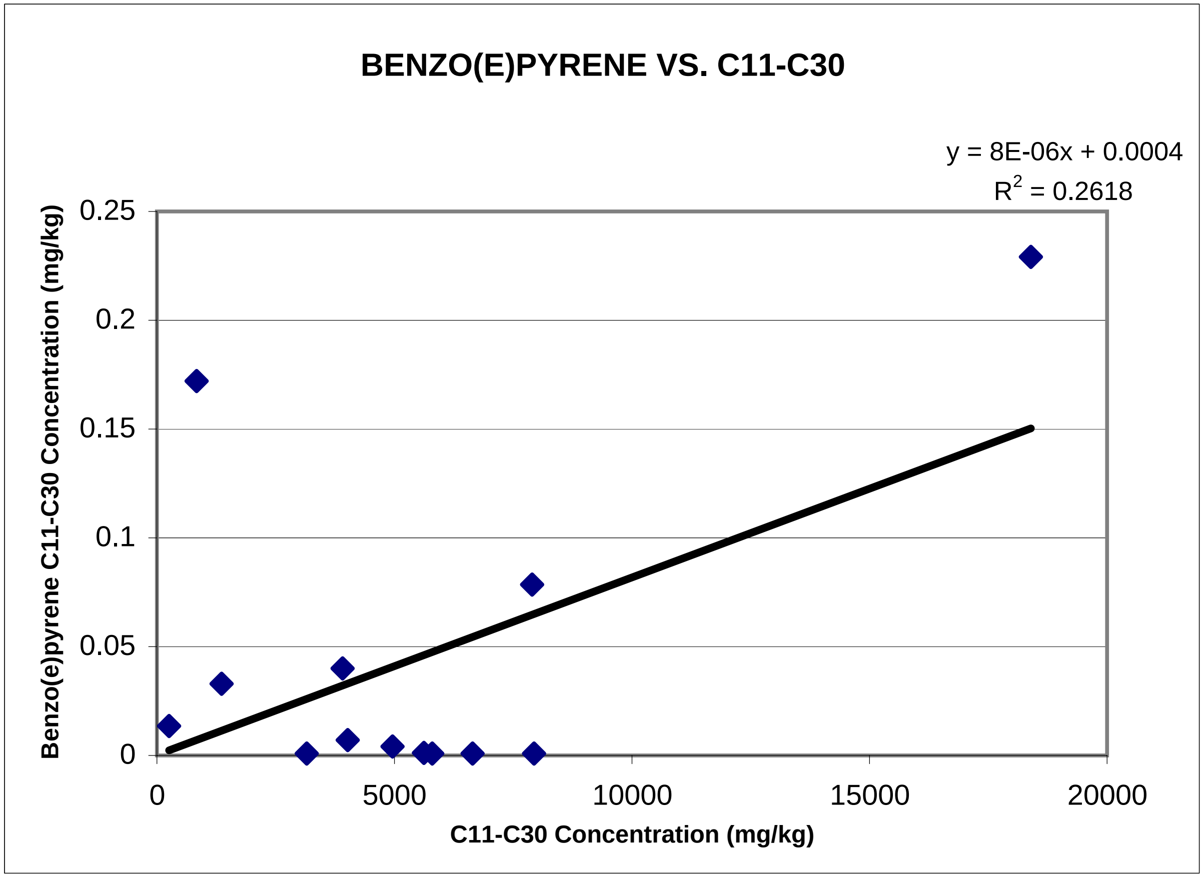
BENZO(A)PYRENE VS. C11-C30
y = 2E-05x - 0.0521
R2 = 0.7357
Benzo(a)pyrene C11-C30 Concentration (mg/kg)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

Appendix B, Attachment 1 (7 of 18)

HCPC Graphs

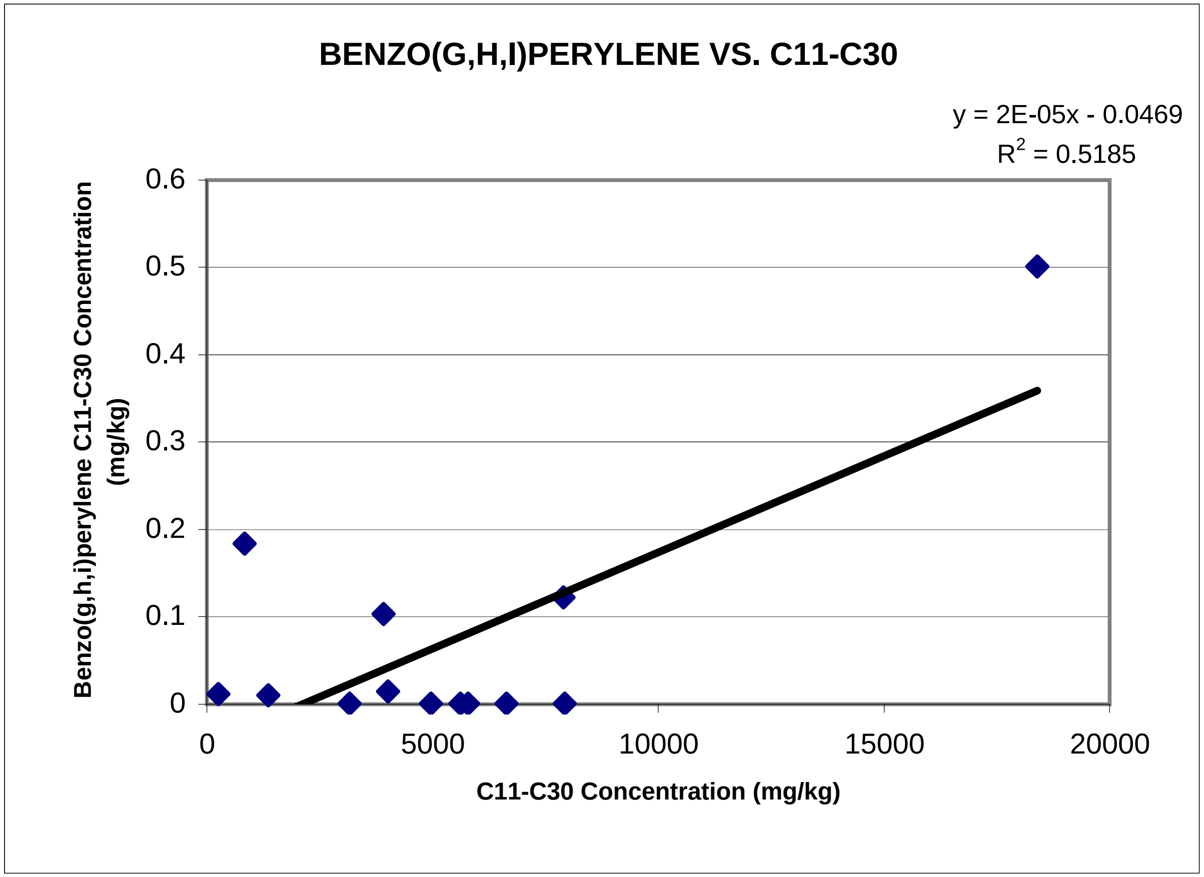


HCPC Graphs

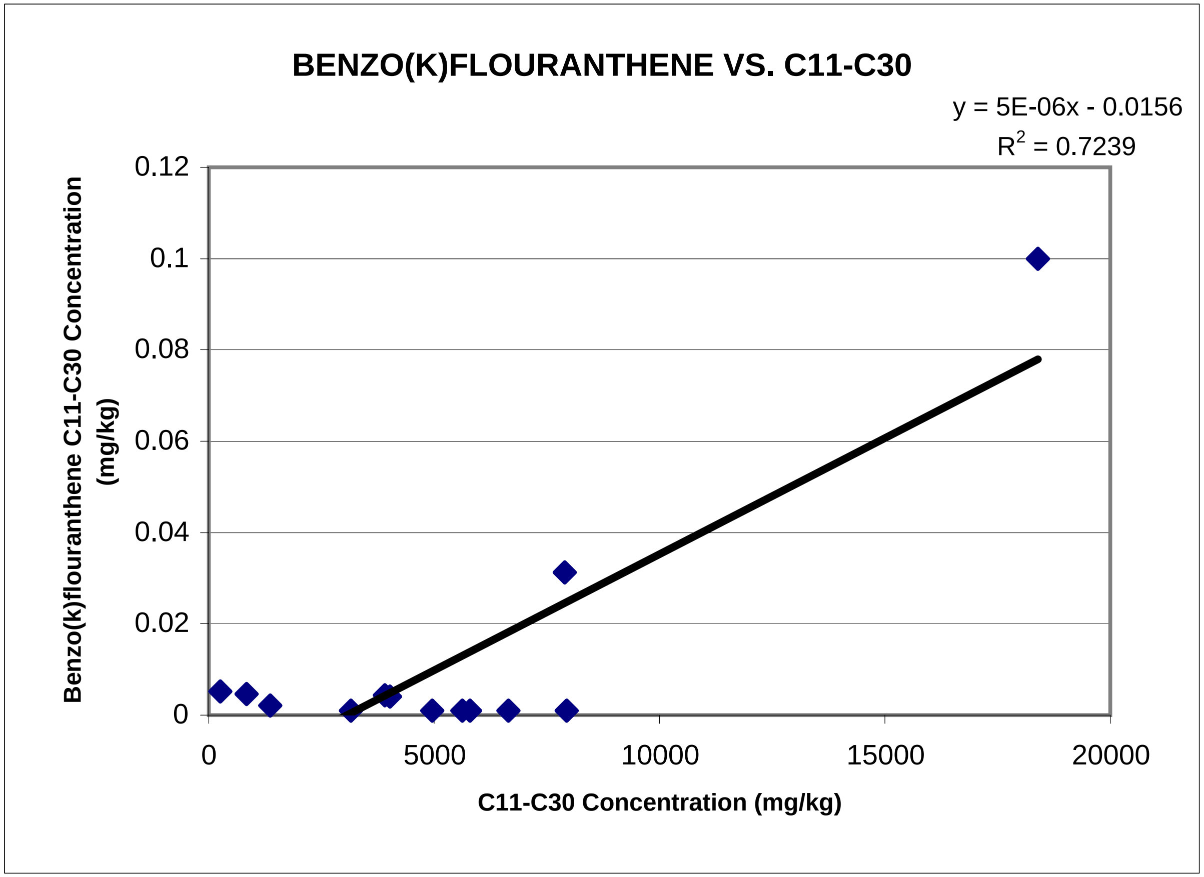

BENZO(E)PYRENE VS. C11-C30
y = 8E-06x + 0.0004
R2 = 0.2618
0.25
0.2
0.15
0.1
0.05
0
0
5000
10000
15000
20000
Benzo(e)pyrene C11-C30 Concentration (mg/kg)
C11-C30 Concentration (mg/kg)

Appendix B, Attachment 1 (9 of 18)

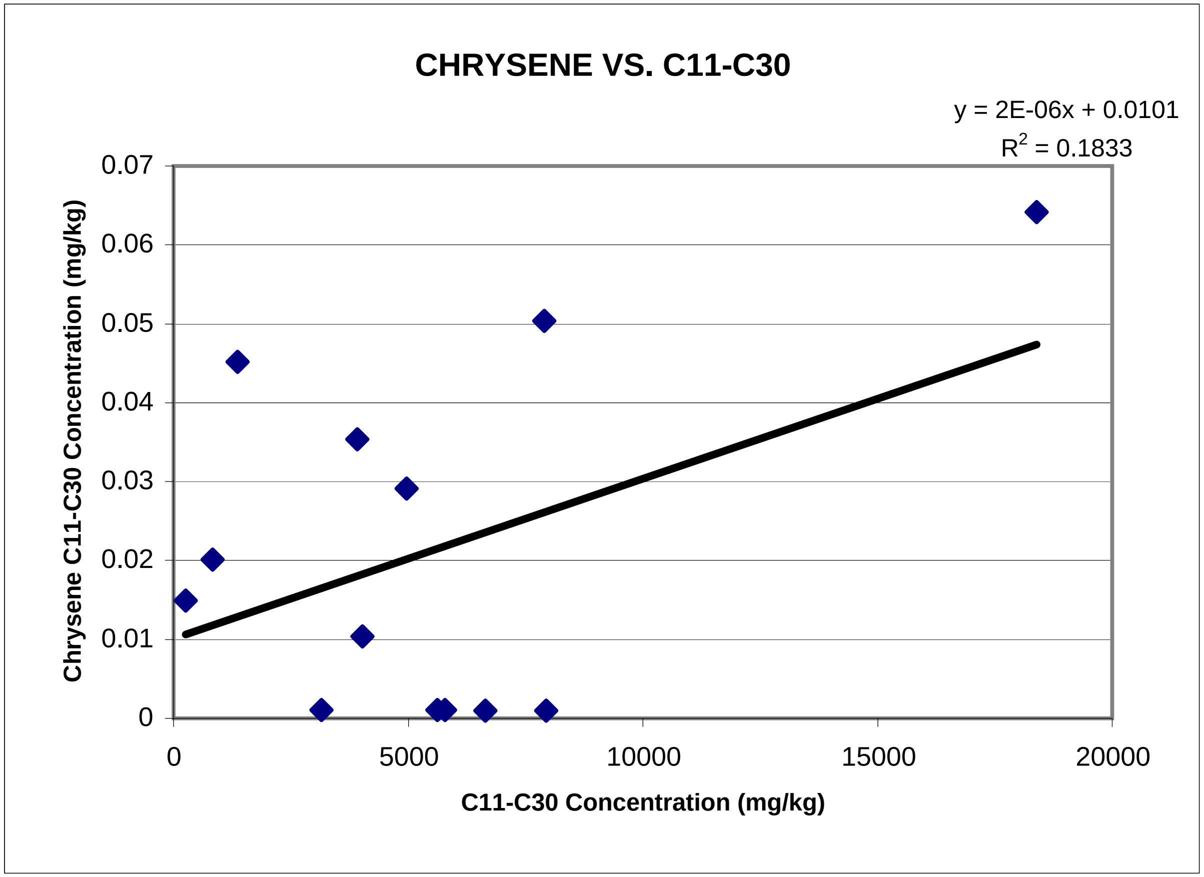
HCPC Graphs



HCPC Graphs

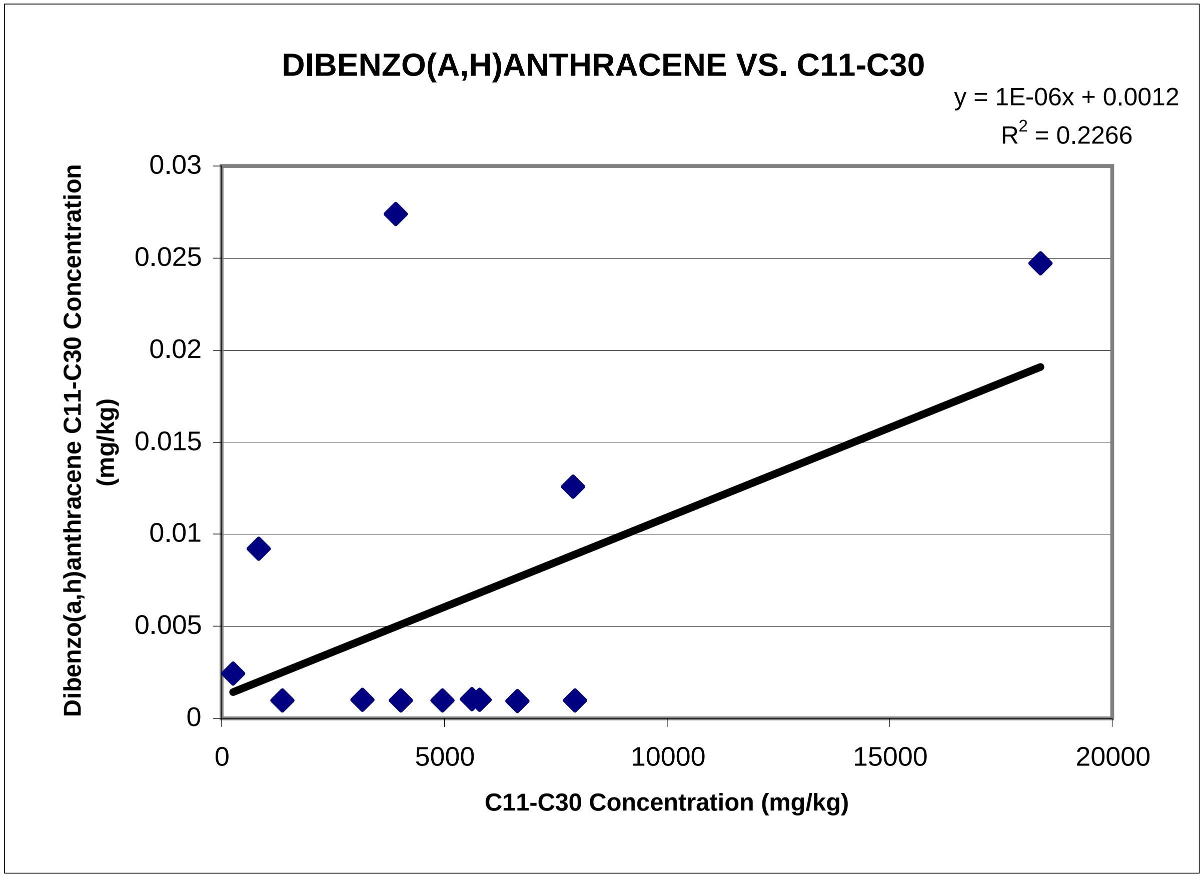

BENZO(K)FLOURANTHENE VS. C11-C30
y = 5E-06x - 0.0156
R2 = 0.7239
Benzo(k)flouranthene C11-C30 Concentration (mg/kg)
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

HCPC Graphs

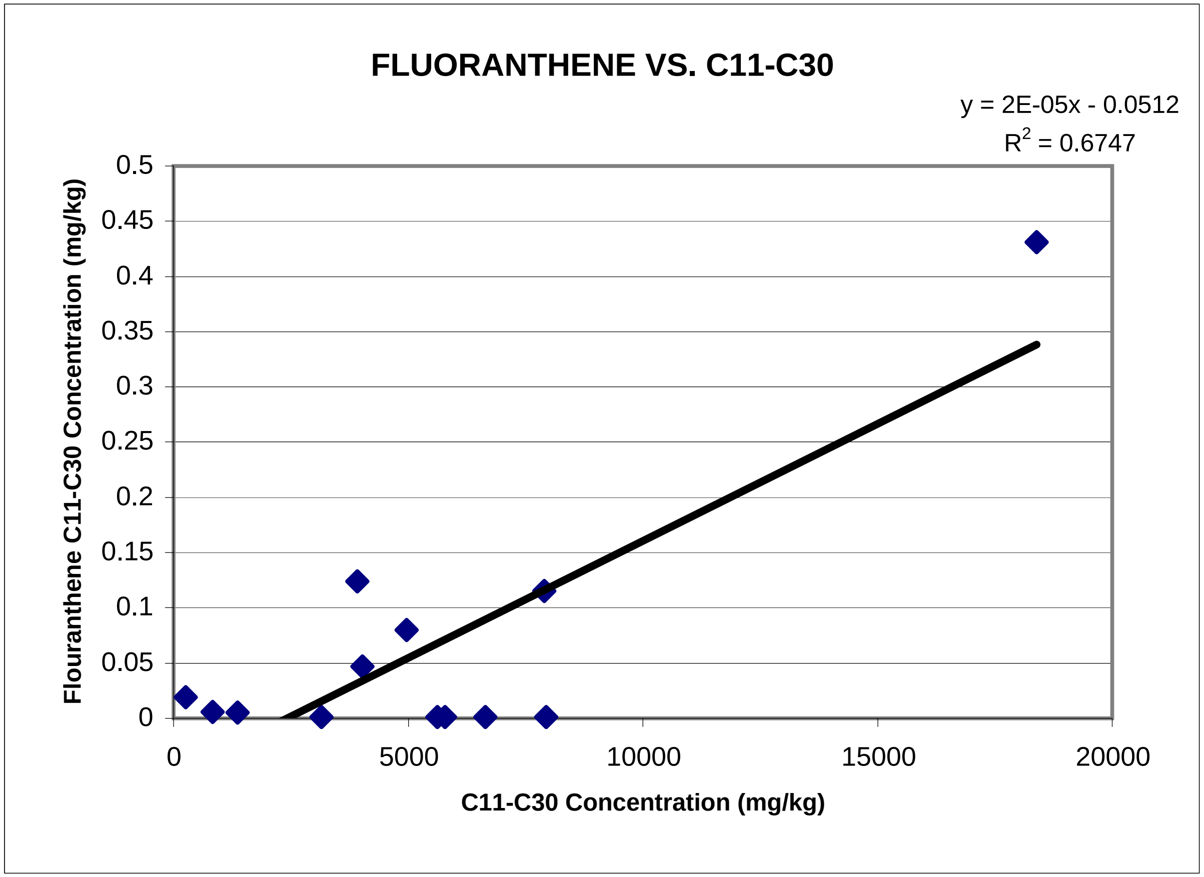

CHRYSENE VS. C11-C30
y = 2E-06x + 0.0101
R2 = 0.1833
Chrysene C11-C30 Concentration (mg/kg)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

Appendix B, Attachment 1 (12 of 18)

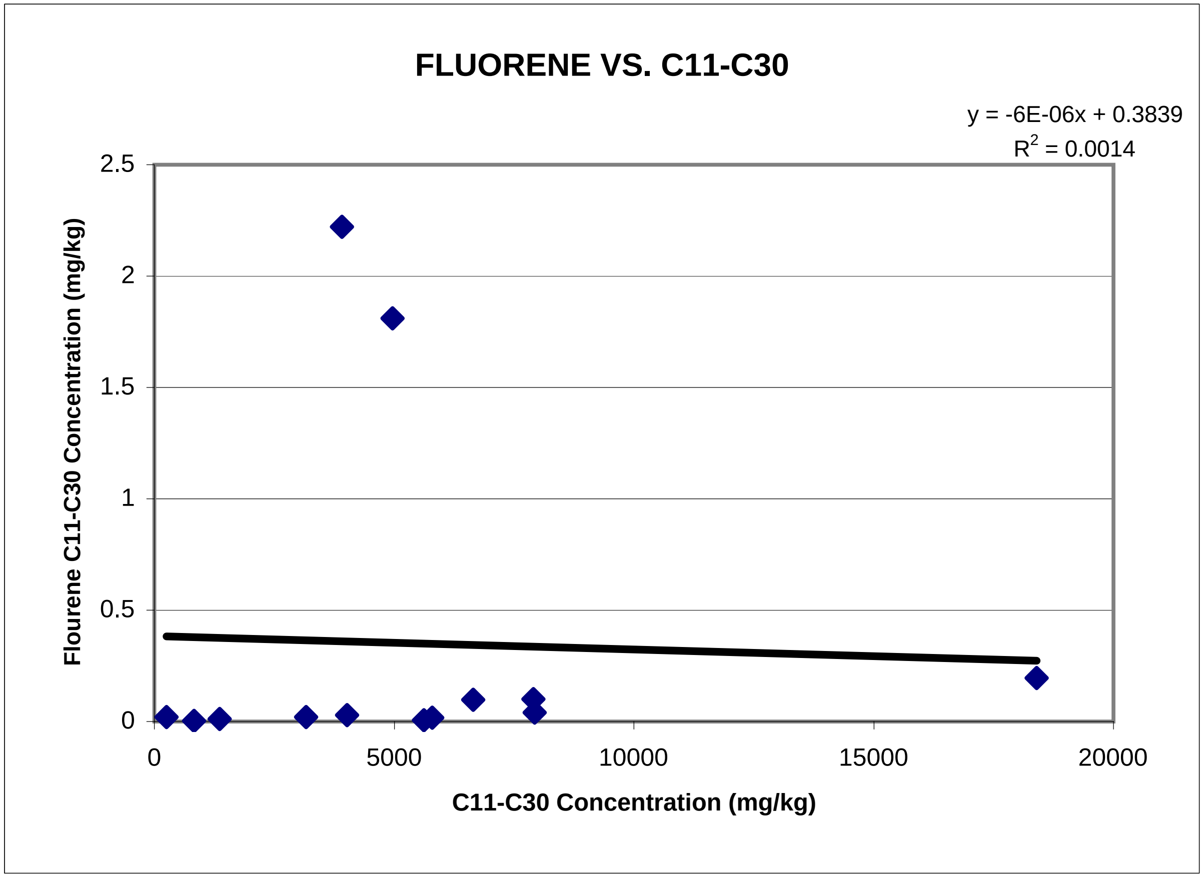
HCPC Graphs



HCPC Graphs

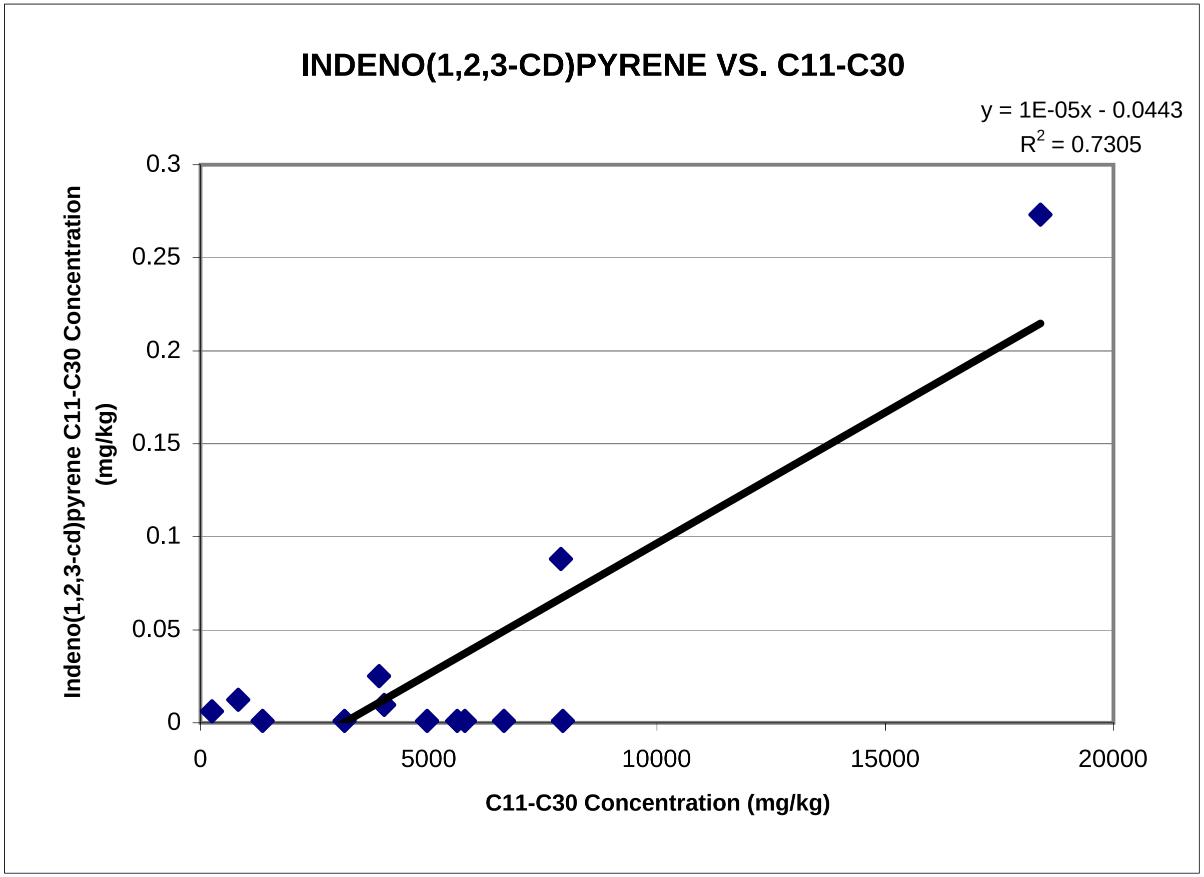

FLUORANTHENE VS. C11-C30
y = 2E-05x - 0.0512
R^2 = 0.6747
Flouranthene C11-C30 Concentration (mg/kg)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

HCPC Graphs

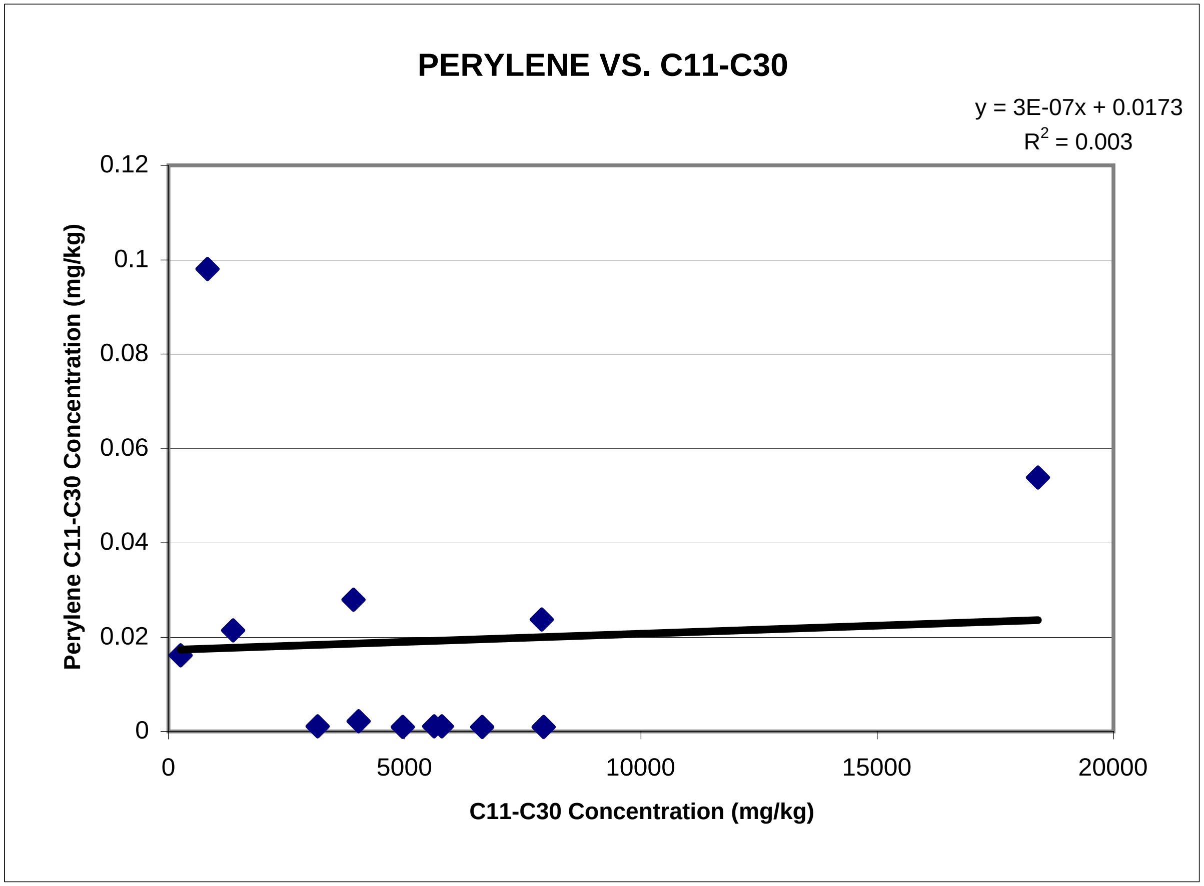


FLUORENE VS. C11-C30
y = -6E-06x + 0.3839
R2 = 0.0014
2.5
2
1.5
1
0.5
0
0
5000
10000
15000
20000
Flourene C11-C30 Concentration (mg/kg)
C11-C30 Concentration (mg/kg)

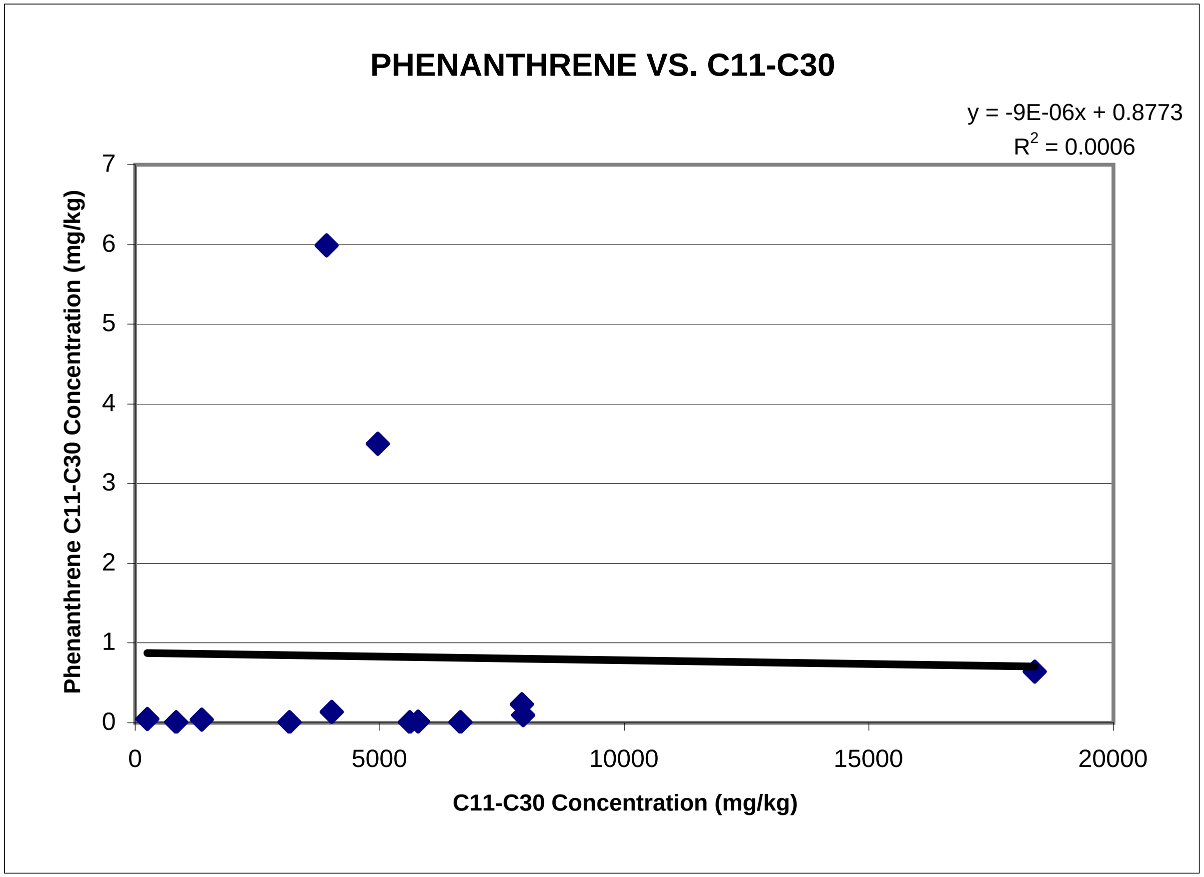
HCPC Graphs


INDENO(1,2,3-CD)PYRENE VS. C11-C30
y = 1E-05x - 0.0443
R2 = 0.7305
Indeno(1,2,3-cd)pyrene C11-C30 Concentration (mg/kg)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

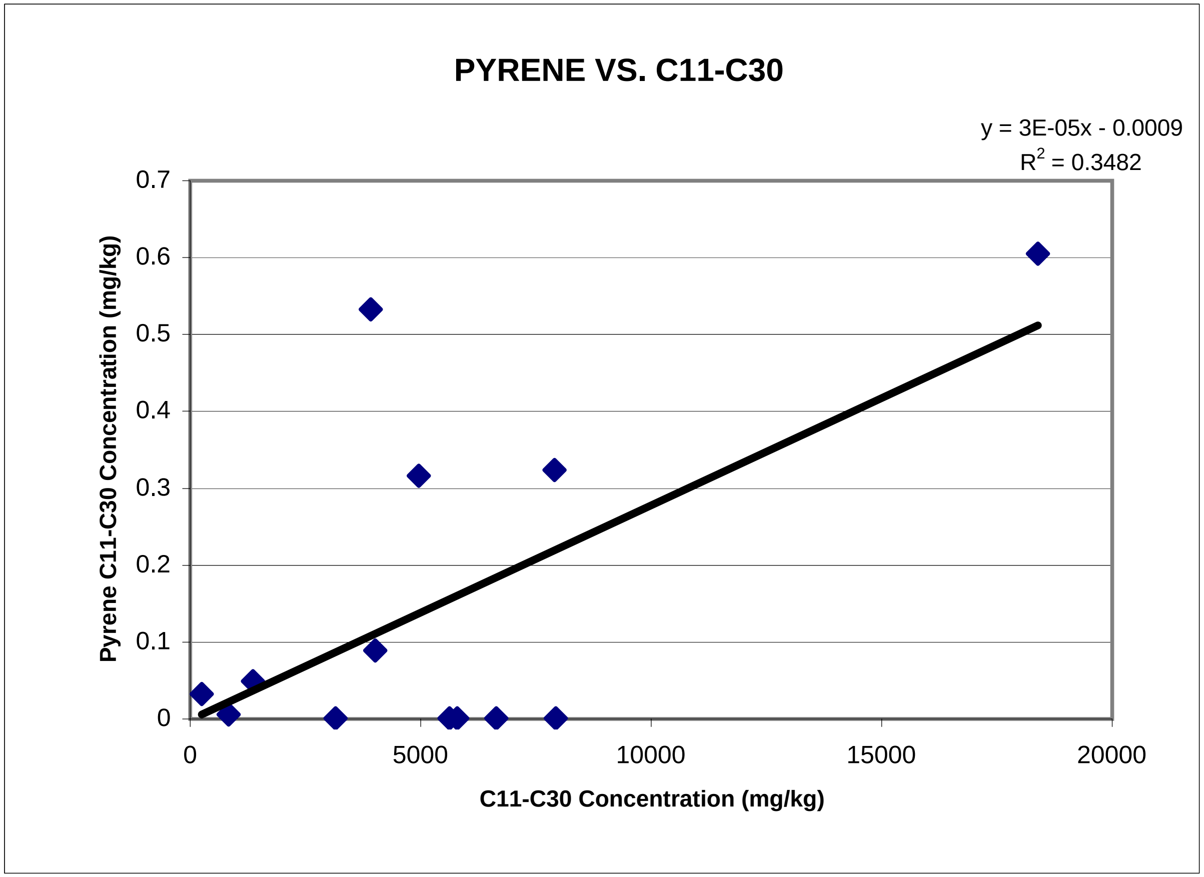
HCPC Graphs


PERYLENE VS. C11-C30
y = 3E-07x + 0.0173
R2 = 0.003
0.12
0.1
0.08
0.06
0.04
0.02
0
Perylene C11-C30 Concentration (mg/kg)
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

HCPC Graphs


PHENANTHRENE VS. C11-C30
y = -9E-06x + 0.8773
R2 = 0.0006
Phenanthrene C11-C30 Concentration (mg/kg)
0
1
2
3
4
5
6
7
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

HCPC Graphs


PYRENE VS. C11-C30
y = 3E-05x - 0.0009
R2 = 0.3482
Pyrene C11-C30 Concentration (mg/kg)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5000
10000
15000
20000
C11-C30 Concentration (mg/kg)

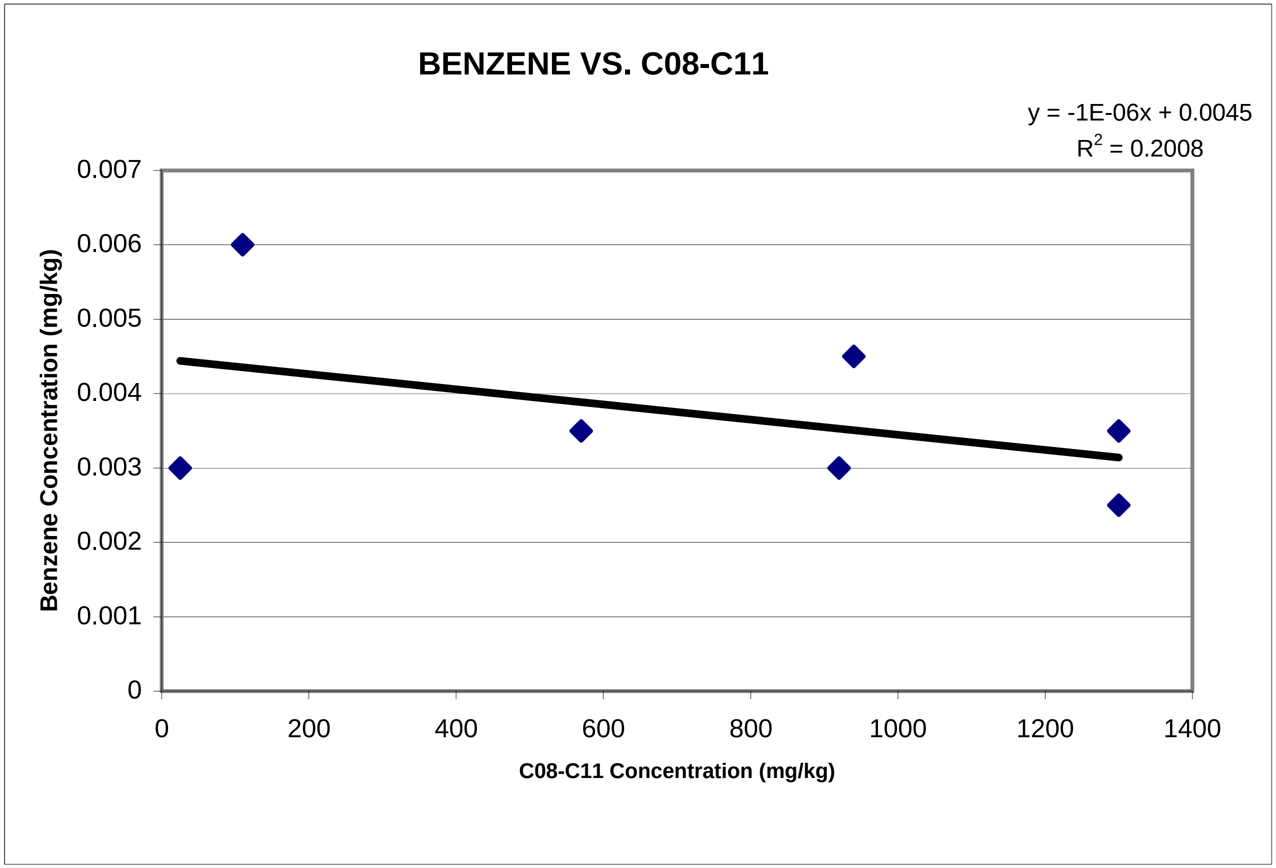
APPENDIX B

ATTACHMENT B-1-2

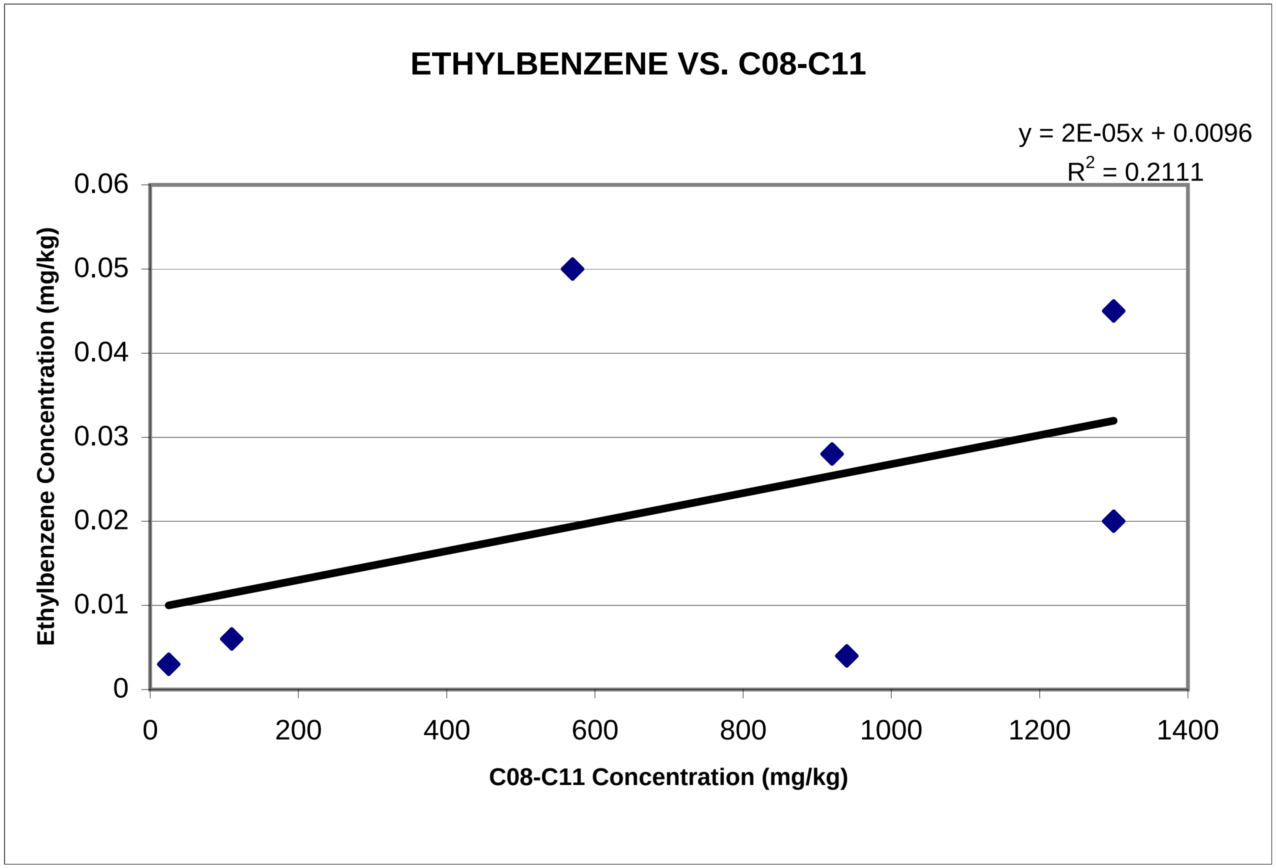
LCPC GRAPHS

Appendix B, Attachment 1 (1 of 8)

LCPC Graphs

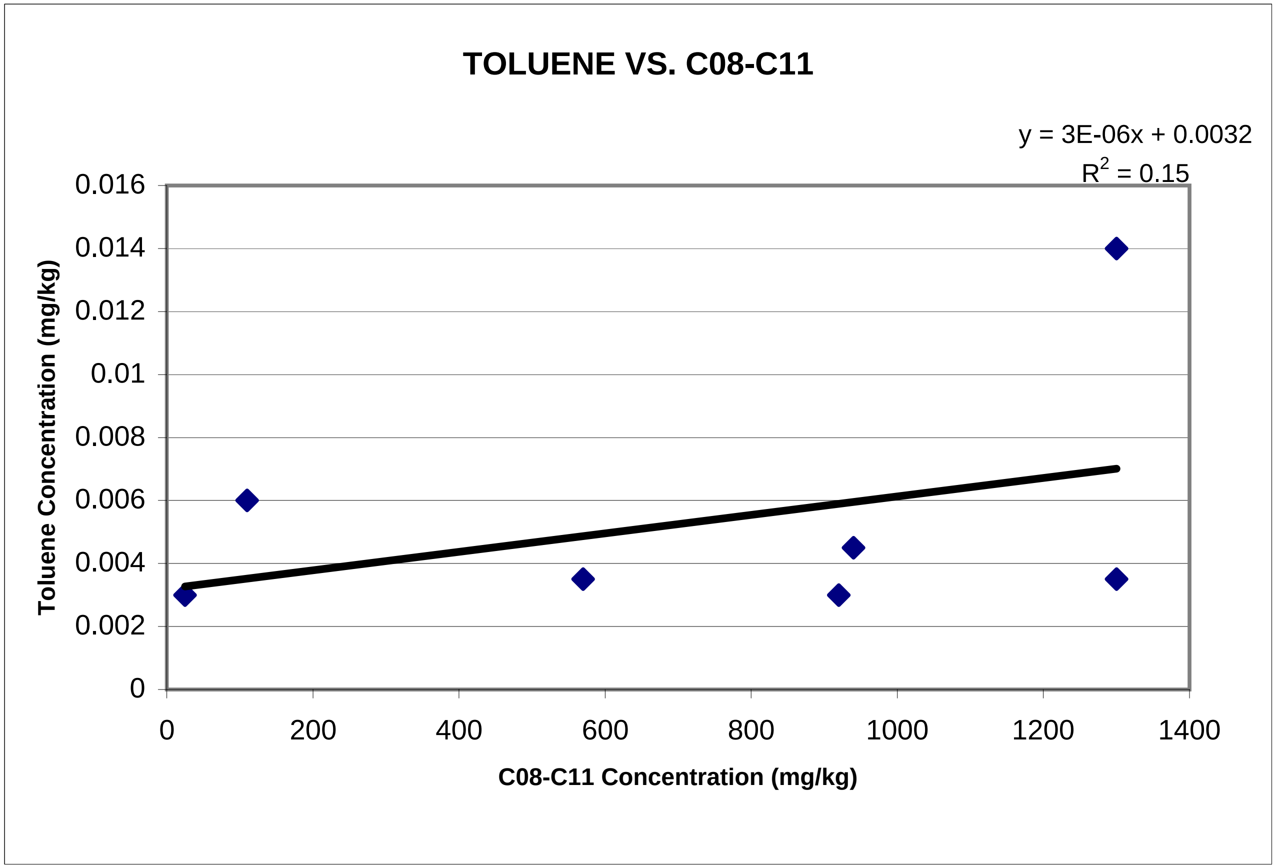


LCPC Graphs


ETHYLBENZENE VS. C08-C11
y = 2E-05x + 0.0096
R2 = 0.2111
Ethylbenzene Concentration (mg/kg)
0.06
0.05
0.04
0.03
0.02
0.01
0
0
200
400
600
800
1000
1200
1400
C08-C11 Concentration (mg/kg)

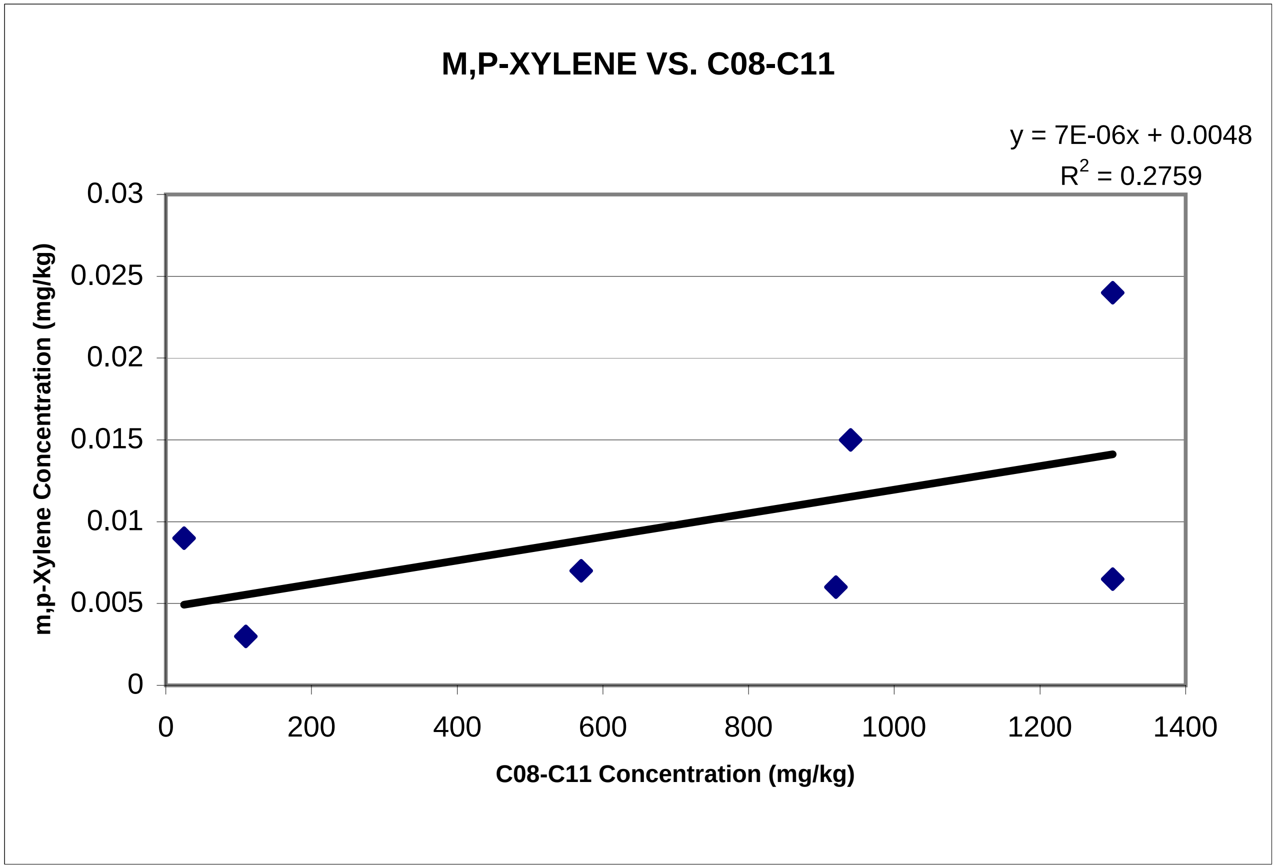
Appendix B, Attachment 1 (3 of 8)

LCPC Graphs



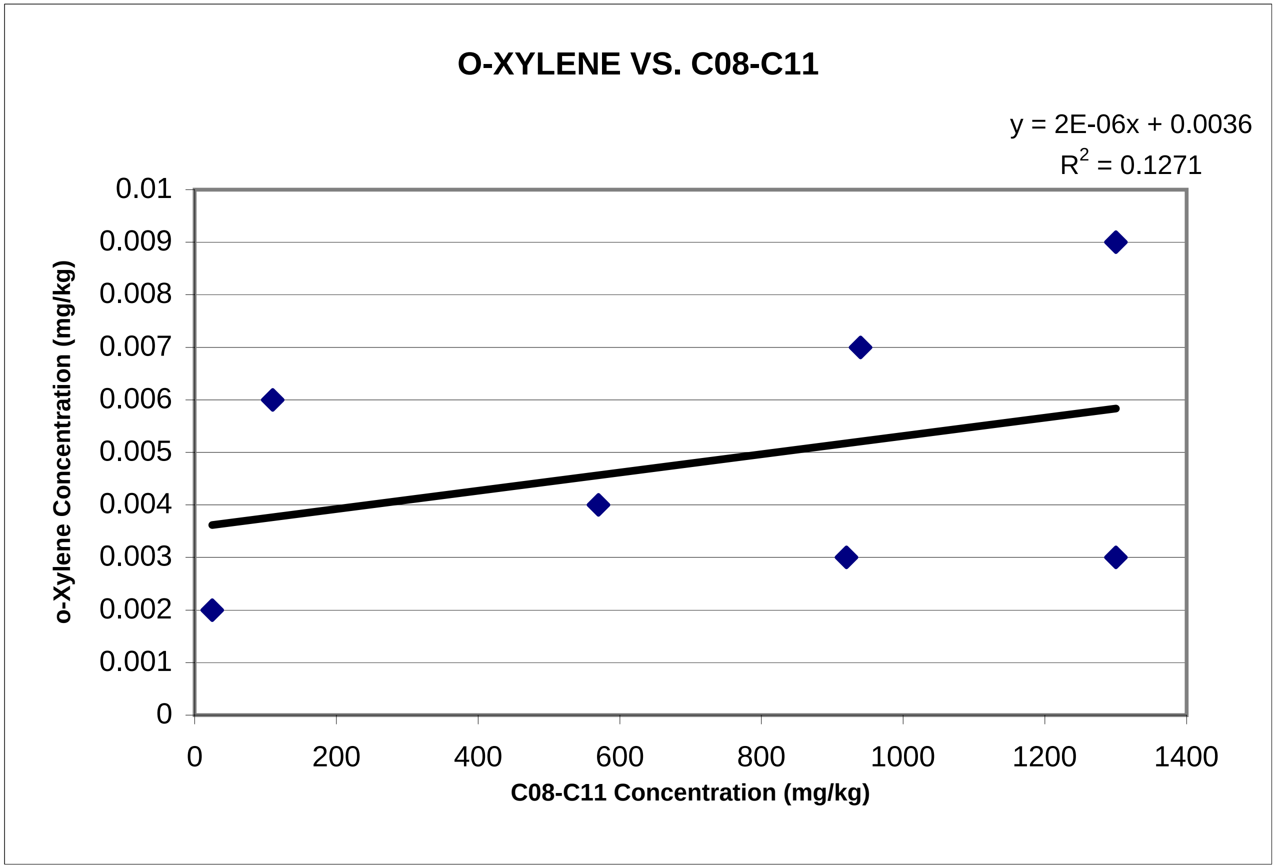
Appendix B, Attachment 1 (4 of 8)

LCPC Graphs



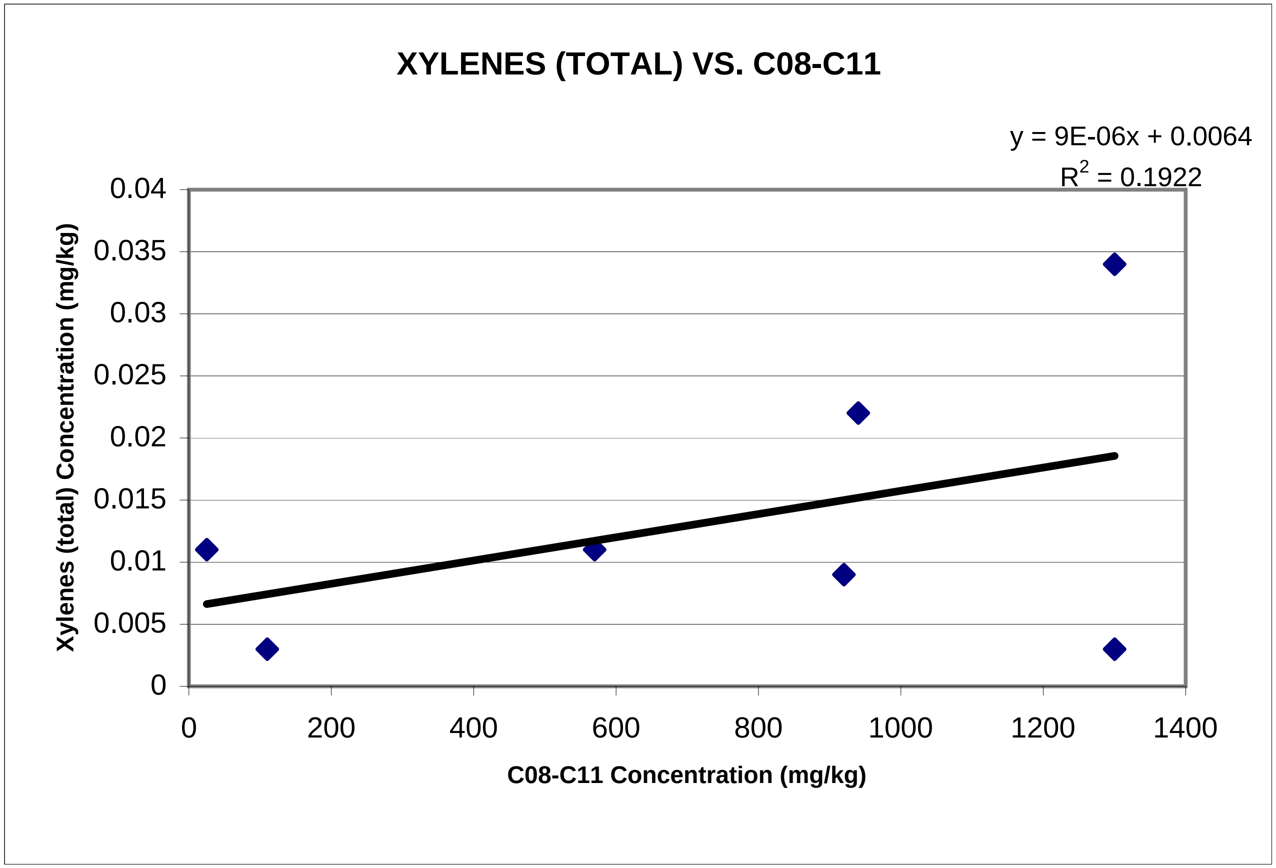
Appendix B, Attachment 1 (5 of 8)

LCPC Graphs

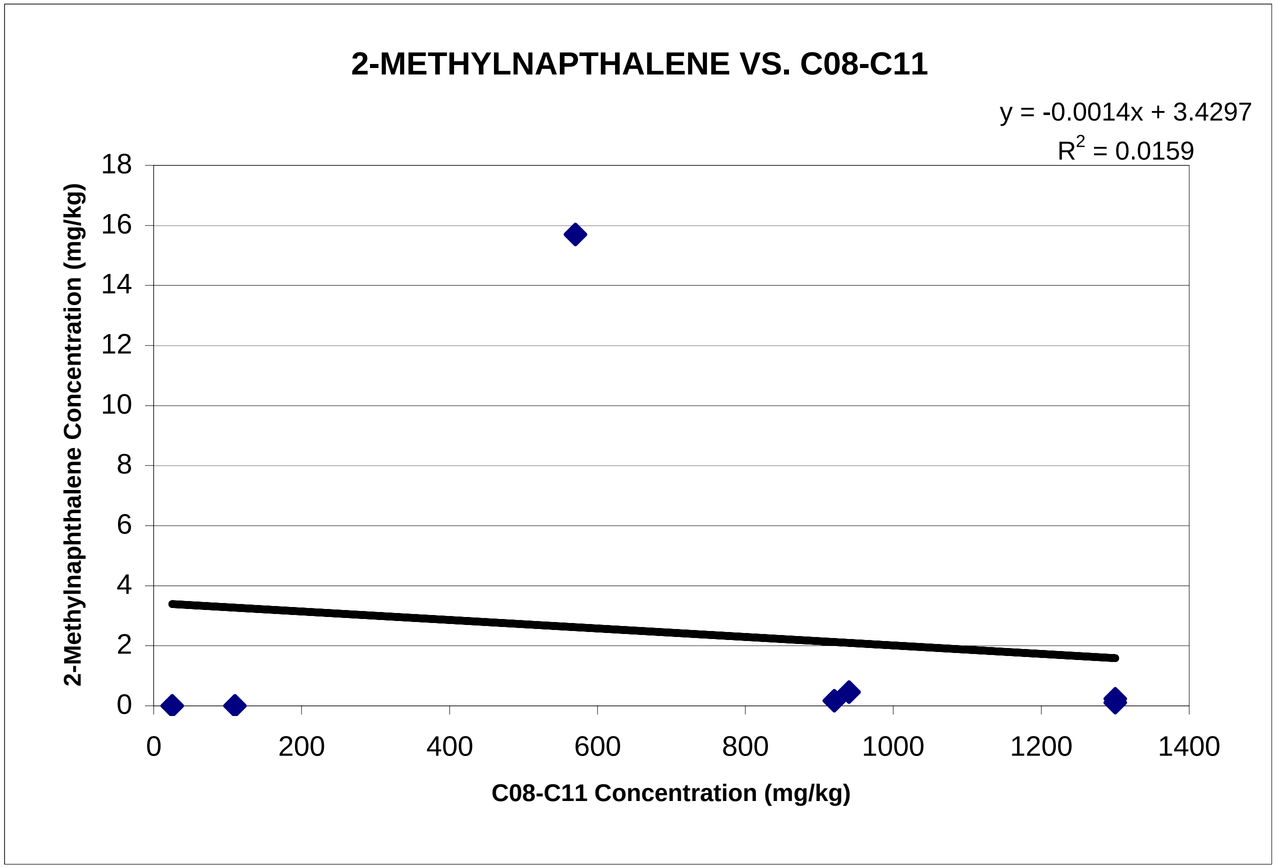


Appendix B, Attachment 1 (6 of 8)

LCPC Graphs

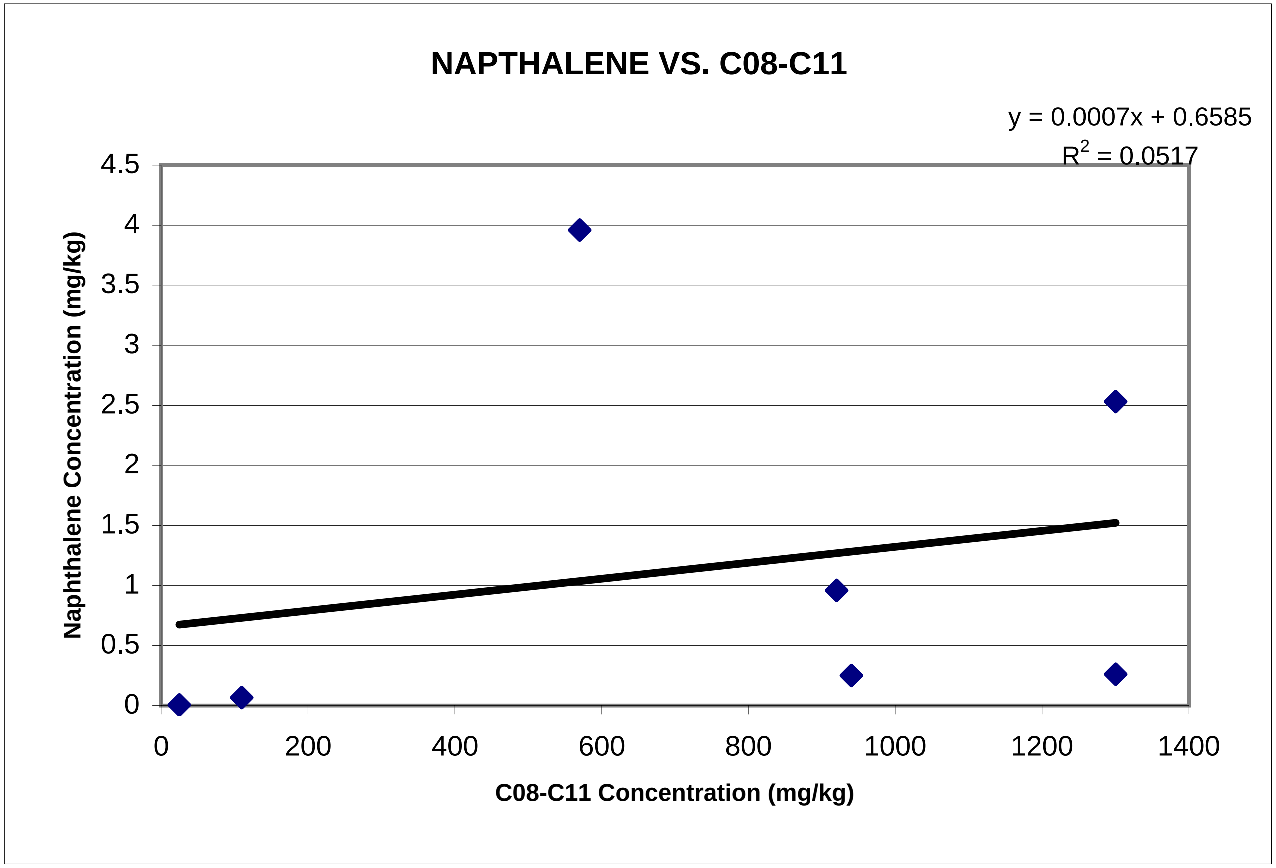


LCPC Graphs


2-METHYLNAPTHALENE VS. C08-C11
y = -0.0014x + 3.4297
R2 = 0.0159
2-Methylnaphthalene Concentration (mg/kg)
18
16
14
12
10
8
6
4
2
0
0
200
400
600
800
1000
1200
1400
C08-C11 Concentration (mg/kg)

Appendix B, Attachment 1 (8 of 8)

LCPC Graphs



APPENDIX B

ATTACHMENT B-2

COMPARISON OF 1997 TPH WITH 2002 DATA

Appendix B Attachment 2 (1 of 1)

Comparison of 1997 TPH Data with 2002 TPH Data

RFI Site	EPA ID	Sample ID	Date Collected	Depth bgs (feet)	Sample Type	C08-C11 (mg/kg)	C11-C14 (mg/kg)	C14-C20 (mg/kg)	C20-C30 (mg/kg)
Bowl Area	RD133	BABS12S02	10/28/1997	11	primary	250	2500	9700	< 12
	MJ094	BABS12S02	12/9/2002	11	primary	110	2300	3300	< 37
	MN006	BASV21S01	12/12/2002	11	primary	NA	NA	NA	NA
	RD135	BABS12S04	10/28/1997	20	primary	660	4400	17000	< 13
	MJ095	BABS12S04	12/9/2002	20	primary	920	5800	750	< 190
	RD197	BABS14S04	11/5/1997	21.5	primary	940	6400	28000	< 12
	MJ106	BABS14S04	12/11/2002	21	primary	1300	6900	940	< 190
	MN004	BASV20S01	12/12/2002	21	primary	NA	NA	NA	NA
	RJ555	BATS03S01	7/20/2000	3.5	primary	< 36	< 36	200	5400
	MJ112	BATS03S01	12/9/2002	3.5	primary	< 4	< 4	< 4	< 4
Bravo Area	RD352	BVBS23S01	11/24/1997	6	primary	1200	7300	23000	< 107
	MJ099	BVBS23S02	12/10/2002	6	primary	1300	15000	3200	< 390
	MN001	BVSV20S01	12/11/2002	6	primary	NA	NA	NA	NA
	RD206	BVBS15S01	11/6/1997	5	primary	330	1700	8600	< 12
	MJ098	BVBS15S02	12/10/2002	5.5	primary	960	6100	1700	< 200
Alfa-Bravo Fuel Farm	RD844	ABBS10S02	11/12/1997	5	primary	780	4900	15000	< 105
	MJ101	ABBS10S02	12/10/2002	5	primary	940	4500	1200	< 180
	MJ102	ABBS10D02	12/10/2002	5.5	duplicate	710	3700	1100	< 180
	MN002	ABSV01S01	12/11/2002	5	primary	NA	NA	NA	NA
	RD997	ABBS15S02	12/4/1997	5	primary	39	760	3700	< 11
	MJ103	ABBS15S03	12/10/2002	6.5	primary	280	2300	840	< 36
Alfa Test Stand	RD011	AABS06S03	10/13/1997	13	primary	540	4700	14000	1300
	MJ100	AABS06S03	12/10/2002	13	primary	< 4	< 4	< 4	< 4
	RD649	AABS14S02	10/16/1997	5	primary	15	380	2200	300
	MJ097	AABS14S02	12/10/2002	5.5	primary	260	2200	1500	320
Coca-Delta Fuel Farm	RD235	CDBS04S02	11/10/1997	3	primary	390	2500	10000	1100
	MJ105	CDBS04S02	12/10/2002	3	primary	570	3000	1800	160
	MN005	CDSV04S01	12/12/2002	3	primary	NA	NA	NA	NA
	RS155	CDBS17S01	1/26/1998	6	primary	260	1200	3200	190
	MJ104	CDBS17S01	12/10/2002	5	primary	< 170	970	2600	340
	MN003	CDSV03S01	12/12/2002	5	primary	NA	NA	NA	NA
B-1 Area	B-12-(7-7.5)	Boring 12		7	primary	NR	NR	3400	NR
	MJ107	B1BS06S01	12/11/2002	7.5	primary	25	36	120	98
	MN007	B1SV50S01	12/12/2002	7	primary	NA	NA	NA	NA
Old Conservation Yard	RD068	OCBS06S01	10/20/1997	0.5	primary	< 109	< 109	1200	3500
	MJ110	OCBS06S01	12/12/2002	0.5	primary	< 140	< 140	92	670
ELV	RD020	EVBS01S01	10/14/1997	1	primary	< 114	< 114	200	1900
	MJ111	EVBS01S01	12/12/2002	1	primary	< 3.7	< 3.7	< 3.7	< 3.7
Building 204	RF621	BUTS01S04	9/12/1997	13	primary	35	230	2700	18000
	MJ096	BUTS01S04	12/9/2002	13	primary	18	17	250	1100

Notes:

TPH - total petroleum hydrocarbons

bgs - below ground surface

APPENDIX B

ATTACHMENT B-3

TPH AND PETROLEUM CONSTITUENT DATA AND CALCULATION OF MAXIMUM RATIO EXTRAPOLATION FACTORS

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ094	BABS12S02	2-Methylnaphthalene	0.0076	0.0038	U		3.5E-05		
MJ094	BABS12S02	Acenaphthene	0.0076	0.0038	U			6.8E-07	
MJ094	BABS12S02	Acenaphthylene	0.0076	0.0038	UJ			6.8E-07	
MJ094	BABS12S02	Anthracene	0.0076	0.0038	U			6.8E-07	
MJ094	BABS12S02	Benzo(a)anthracene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Benzo(a)pyrene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Benzo(b)fluoranthene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Benzo(e)pyrene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Benzo(g,h,i)perylene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Benzo(k)fluoranthene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Chrysene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Dibenzo(a,h)anthracene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Fluoranthene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Fluorene	0.00912	0.00456	UJ			8.1E-07	
MJ094	BABS12S02	Indeno(1,2,3-cd)pyrene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Naphthalene	0.0673	0.0673	J		6.1E-04		
MJ094	BABS12S02	Perylene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	Phenanthrene	0.019	0.0095	U			1.7E-06	
MJ094	BABS12S02	Pyrene	0.00208	0.00104	U			1.9E-07	
MJ094	BABS12S02	C08-C11 (Gasoline Range)	110	110		1.9%			
MJ094	BABS12S02	C11-C14 (Kerosene Range)	2300	2300		40.2%			
MJ094	BABS12S02	C14-C20 (Diesel Range)	3300	3300		57.6%			
MJ094	BABS12S02	C20-C30 (Lubricant Oil Rang	37	18.5	U	0.3%			
MJ094	BABS12S02	C11-C30		5618.5					
MJ094	BABS12S02	Benzene	0.012	0.006	U		5.5E-05		
MJ094	BABS12S02	Ethylbenzene	0.012	0.006	U		5.5E-05		
MJ094	BABS12S02	Toluene	0.012	0.006	U		5.5E-05		
MJ094	BABS12S02	Xylene (total)	0.003	0.003	J		2.7E-05		
MJ094	BABS12S02	m,p-Xylene	0.003	0.003	J		2.7E-05		
MJ094	BABS12S02	o-Xylene	0.012	0.006	U		5.5E-05		
MJ095	BABS12S04	2-Methylnaphthalene	0.172	0.172			1.1E-05		
MJ095	BABS12S04	Acenaphthene	0.0153	0.0153				2.3E-06	
MJ095	BABS12S04	Acenaphthylene	0.00842	0.00421	U			6.3E-07	
MJ095	BABS12S04	Anthracene	0.00842	0.00421	U			6.3E-07	
MJ095	BABS12S04	Benzo(a)anthracene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Benzo(a)pyrene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Benzo(b)fluoranthene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Benzo(e)pyrene	0.00189	0.000945	U			1.4E-07	

Appendix B Attachment 3 (2 of 13)

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ095	BABS12S04	Benzo(g,h,i)perylene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Benzo(k)fluoranthene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Chrysene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Dibenzo(a,h)anthracene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Fluoranthene	0.00189	0.000945	UJ			1.4E-07	
MJ095	BABS12S04	Fluorene	0.0988	0.0988				1.5E-05	
MJ095	BABS12S04	Indeno(1,2,3-cd)pyrene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Naphthalene	0.96	0.96	J		4.6E-05		
MJ095	BABS12S04	Perylene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	Phenanthrene	0.0211	0.01055	U			1.6E-06	
MJ095	BABS12S04	Pyrene	0.00189	0.000945	U			1.4E-07	
MJ095	BABS12S04	C08-C11 (Gasoline Range)	920	920		12.2%			
MJ095	BABS12S04	C11-C14 (Kerosene Range)	5800	5800		76.7%			
MJ095	BABS12S04	C14-C20 (Diesel Range)	750	750		9.9%			
MJ095	BABS12S04	C20-C30 (Lubricant Oil Rang	190	95	U	1.3%			
MJ095	BABS12S04	C11-C30		6645					
MJ095	BABS12S04	Benzene	0.006	0.003	U		3.3E-06		
MJ095	BABS12S04	Ethylbenzene	0.028	0.028	J		3.0E-05		
MJ095	BABS12S04	Toluene	0.006	0.003	U		3.3E-06		
MJ095	BABS12S04	Xylene (total)	0.018	0.009	U		9.8E-06		
MJ095	BABS12S04	m,p-Xylene	0.012	0.006	U		6.5E-06		
MJ095	BABS12S04	o-Xylene	0.006	0.003	U		3.3E-06		
MJ096	BUTS01S04	2-Methylnaphthalene	0.209	0.209	J		1.2E-02		
MJ096	BUTS01S04	Acenaphthene	0.0175	0.0175	J			1.3E-05	
MJ096	BUTS01S04	Acenaphthylene	0.00277	0.00277				2.0E-06	
MJ096	BUTS01S04	Anthracene	0.02	0.02	J			1.5E-05	
MJ096	BUTS01S04	Benzo(a)anthracene	0.0106	0.0106				7.8E-06	
MJ096	BUTS01S04	Benzo(a)pyrene	0.0101	0.0101				7.4E-06	
MJ096	BUTS01S04	Benzo(b)fluoranthene	0.00942	0.00942				6.9E-06	
MJ096	BUTS01S04	Benzo(e)pyrene	0.0329	0.0329				2.4E-05	
MJ096	BUTS01S04	Benzo(g,h,i)perylene	0.0105	0.0105				7.7E-06	
MJ096	BUTS01S04	Benzo(k)fluoranthene	0.00211	0.00211				1.5E-06	
MJ096	BUTS01S04	Chrysene	0.0452	0.0452	J			3.3E-05	
MJ096	BUTS01S04	Dibenzo(a,h)anthracene	0.00197	0.000985	U			7.2E-07	
MJ096	BUTS01S04	Fluoranthene	0.011	0.0055	U			4.0E-06	
MJ096	BUTS01S04	Fluorene	0.0208	0.0104	UJ			7.6E-06	
MJ096	BUTS01S04	Indeno(1,2,3-cd)pyrene	0.00197	0.000985	U			7.2E-07	
MJ096	BUTS01S04	Naphthalene	0.0349	0.01745	UJ		9.7E-04		

Appendix B Attachment 3 (3 of 13)

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ096	BUTS01S04	Perylene	0.0214	0.0214				1.6E-05	
MJ096	BUTS01S04	Phenanthrene	0.0407	0.0407	J			3.0E-05	
MJ096	BUTS01S04	Pyrene	0.0489	0.0489				3.6E-05	
MJ096	BUTS01S04	C08-C11 (Gasoline Range)	18	18		1.3%			
MJ096	BUTS01S04	C11-C14 (Kerosene Range)	17	17	J	1.2%			
MJ096	BUTS01S04	C14-C20 (Diesel Range)	250	250		18.1%			
MJ096	BUTS01S04	C20-C30 (Lubricant Oil Range	1100	1100	J	79.4%			
MJ096	BUTS01S04	C11-C30		1367					
MJ097	AABS14S02	2-Methylnaphthalene	0.012	0.012	J		4.6E-05		
MJ097	AABS14S02	Acenaphthene	0.0088	0.0088	J			2.2E-06	
MJ097	AABS14S02	Acenaphthylene	0.00518	0.00518	J			1.3E-06	
MJ097	AABS14S02	Anthracene	0.0525	0.0525				1.3E-05	
MJ097	AABS14S02	Benzo(a)anthracene	0.0108	0.0108				2.7E-06	
MJ097	AABS14S02	Benzo(a)pyrene	0.00875	0.00875				2.2E-06	
MJ097	AABS14S02	Benzo(b)fluoranthene	0.0108	0.0108				2.7E-06	
MJ097	AABS14S02	Benzo(e)pyrene	0.00712	0.00712				1.8E-06	
MJ097	AABS14S02	Benzo(g,h,i)perylene	0.015	0.015				3.7E-06	
MJ097	AABS14S02	Benzo(k)fluoranthene	0.0041	0.0041				1.0E-06	
MJ097	AABS14S02	Chrysene	0.0104	0.0104				2.6E-06	
MJ097	AABS14S02	Dibenzo(a,h)anthracene	0.00198	0.00099	U			2.5E-07	
MJ097	AABS14S02	Fluoranthene	0.0468	0.0468				1.2E-05	
MJ097	AABS14S02	Fluorene	0.0563	0.02815	UJ			7.0E-06	
MJ097	AABS14S02	Indeno(1,2,3-cd)pyrene	0.00979	0.00979				2.4E-06	
MJ097	AABS14S02	Naphthalene	0.0278	0.0139	UJ		5.3E-05		
MJ097	AABS14S02	Perylene	0.00221	0.00221				5.5E-07	
MJ097	AABS14S02	Phenanthrene	0.14	0.14				3.5E-05	
MJ097	AABS14S02	Pyrene	0.0894	0.0894				2.2E-05	
MJ097	AABS14S02	C08-C11 (Gasoline Range)	260	260		6.1%			
MJ097	AABS14S02	C11-C14 (Kerosene Range)	2200	2200		51.4%			
MJ097	AABS14S02	C14-C20 (Diesel Range)	1500	1500		35.0%			
MJ097	AABS14S02	C20-C30 (Lubricant Oil Range	320	320	J	7.5%			
MJ097	AABS14S02	C11-C30		4020					
MJ098	BVBS15S02	2-Methylnaphthalene	0.0136	0.0136			1.4E-05		
MJ098	BVBS15S02	Acenaphthene	0.132	0.132				1.7E-05	
MJ098	BVBS15S02	Acenaphthylene	0.0427	0.0427				5.4E-06	
MJ098	BVBS15S02	Anthracene	0.0943	0.04715	U			6.0E-06	
MJ098	BVBS15S02	Benzo(a)anthracene	0.0626	0.0626				7.9E-06	
MJ098	BVBS15S02	Benzo(a)pyrene	0.111	0.111				1.4E-05	

Appendix B Attachment 3 (4 of 13)

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ098	BVBS15S02	Benzo(b)fluoranthene	0.161	0.161				2.0E-05	
MJ098	BVBS15S02	Benzo(e)pyrene	0.0785	0.0785				9.9E-06	
MJ098	BVBS15S02	Benzo(g,h,i)perylene	0.122	0.122				1.5E-05	
MJ098	BVBS15S02	Benzo(k)fluoranthene	0.0312	0.0312				3.9E-06	
MJ098	BVBS15S02	Chrysene	0.0504	0.0504				6.4E-06	
MJ098	BVBS15S02	Dibenzo(a,h)anthracene	0.0126	0.0126				1.6E-06	
MJ098	BVBS15S02	Fluoranthene	0.231	0.1155	U			1.5E-05	
MJ098	BVBS15S02	Fluorene	0.0996	0.0996				1.3E-05	
MJ098	BVBS15S02	Indeno(1,2,3-cd)pyrene	0.0881	0.0881				1.1E-05	
MJ098	BVBS15S02	Naphthalene	0.163	0.163	J		1.7E-04		
MJ098	BVBS15S02	Perylene	0.0237	0.0237				3.0E-06	
MJ098	BVBS15S02	Phenanthrene	0.236	0.236				3.0E-05	
MJ098	BVBS15S02	Pyrene	0.324	0.324				4.1E-05	
MJ098	BVBS15S02	C08-C11 (Gasoline Range)	960	960		10.8%			
MJ098	BVBS15S02	C11-C14 (Kerosene Range)	6100	6100		68.8%			
MJ098	BVBS15S02	C14-C20 (Diesel Range)	1700	1700		19.2%			
MJ098	BVBS15S02	C20-C30 (Lubricant Oil Range	200	100	U	1.1%			
MJ098	BVBS15S02	C11-C30		7900					
MJ099	BVBS23S02	2-Methylnaphthalene	0.239	0.239			1.8E-04		
MJ099	BVBS23S02	Acenaphthene	0.0947	0.0947				5.1E-06	
MJ099	BVBS23S02	Acenaphthylene	0.338	0.338				1.8E-05	
MJ099	BVBS23S02	Anthracene	0.15	0.15				8.2E-06	
MJ099	BVBS23S02	Benzo(a)anthracene	0.056	0.056				3.0E-06	
MJ099	BVBS23S02	Benzo(a)pyrene	0.317	0.317				1.7E-05	
MJ099	BVBS23S02	Benzo(b)fluoranthene	0.319	0.319				1.7E-05	
MJ099	BVBS23S02	Benzo(e)pyrene	0.229	0.229				1.2E-05	
MJ099	BVBS23S02	Benzo(g,h,i)perylene	0.501	0.501				2.7E-05	
MJ099	BVBS23S02	Benzo(k)fluoranthene	0.1	0.1				5.4E-06	
MJ099	BVBS23S02	Chrysene	0.0642	0.0642				3.5E-06	
MJ099	BVBS23S02	Dibenzo(a,h)anthracene	0.0247	0.0247				1.3E-06	
MJ099	BVBS23S02	Fluoranthene	0.431	0.431				2.3E-05	
MJ099	BVBS23S02	Fluorene	0.195	0.195				1.1E-05	
MJ099	BVBS23S02	Indeno(1,2,3-cd)pyrene	0.273	0.273				1.5E-05	
MJ099	BVBS23S02	Naphthalene	2.53	2.53	J		1.9E-03		
MJ099	BVBS23S02	Perylene	0.0538	0.0538				2.9E-06	
MJ099	BVBS23S02	Phenanthrene	0.644	0.644				3.5E-05	
MJ099	BVBS23S02	Pyrene	0.605	0.605				3.3E-05	
MJ099	BVBS23S02	C08-C11 (Gasoline Range)	1300	1300		6.6%			

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ099	BVBS23S02	C11-C14 (Kerosene Range)	15000	15000		76.2%			
MJ099	BVBS23S02	C14-C20 (Diesel Range)	3200	3200		16.2%			
MJ099	BVBS23S02	C20-C30 (Lubricant Oil Range	390	195	U	1.0%			
MJ099	BVBS23S02	C11-C30		18395					
MJ099	BVBS23S02	Benzene	0.005	0.0025	U		1.9E-06		
MJ099	BVBS23S02	Ethylbenzene	0.02	0.02	J		1.5E-05		
MJ099	BVBS23S02	Toluene	0.014	0.014	J		1.1E-05		
MJ099	BVBS23S02	Xylene (total)	0.034	0.034	J		2.6E-05		
MJ099	BVBS23S02	m,p-Xylene	0.024	0.024	J		1.8E-05		
MJ099	BVBS23S02	o-Xylene	0.009	0.009	J		6.9E-06		
MJ100	AABS06S03	2-Methylnaphthalene	0.00199	0.00199	R				Yes
MJ100	AABS06S03	Acenaphthene	0.00297	0.00297	J			5.0E-04	Yes
MJ100	AABS06S03	Acenaphthylene	0.00199	0.00199	R				Yes
MJ100	AABS06S03	Anthracene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(a)anthracene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(a)pyrene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(b)fluoranthene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(e)pyrene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(g,h,i)perylene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Benzo(k)fluoranthene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Chrysene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Dibenzo(a,h)anthracene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Fluoranthene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Fluorene	0.0155	0.00775	UJ			1.3E-03	Yes
MJ100	AABS06S03	Indeno(1,2,3-cd)pyrene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Naphthalene	0.0442	0.0442	R				Yes
MJ100	AABS06S03	Perylene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	Phenanthrene	0.00498	0.00249	U			4.2E-04	Yes
MJ100	AABS06S03	Pyrene	0.00199	0.000995	U			1.7E-04	Yes
MJ100	AABS06S03	C08-C11 (Gasoline Range)	4	2	U	25.0%			Yes
MJ100	AABS06S03	C11-C14 (Kerosene Range)	4	2	U	25.0%			Yes
MJ100	AABS06S03	C14-C20 (Diesel Range)	4	2	U	25.0%			Yes
MJ100	AABS06S03	C20-C30 (Lubricant Oil Range	4	2	U	25.0%			Yes
MJ100	AABS06S03	C11-C30		6					Yes
MJ101	ABBS10S02	2-Methylnaphthalene	0.458	0.458			4.9E-04		
MJ101	ABBS10S02	Acenaphthene	0.0244	0.0244				4.2E-06	
MJ101	ABBS10S02	Acenaphthylene	0.00996	0.00498	U			8.6E-07	
MJ101	ABBS10S02	Anthracene	0.00996	0.00498	U			8.6E-07	

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ101	ABBS10S02	Benzo(a)anthracene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Benzo(a)pyrene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Benzo(b)fluoranthene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Benzo(e)pyrene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Benzo(g,h,i)perylene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Benzo(k)fluoranthene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Chrysene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Dibenzo(a,h)anthracene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Fluoranthene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Fluorene	0.0352	0.0176	UJ			3.0E-06	
MJ101	ABBS10S02	Indeno(1,2,3-cd)pyrene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Naphthalene	0.25	0.25	J		2.7E-04		
MJ101	ABBS10S02	Perylene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	Phenanthrene	0.0249	0.01245	U			2.2E-06	
MJ101	ABBS10S02	Pyrene	0.00204	0.00102	U			1.8E-07	
MJ101	ABBS10S02	C08-C11 (Gasoline Range)	940	940		14.0%			
MJ101	ABBS10S02	C11-C14 (Kerosene Range)	4500	4500		66.9%			
MJ101	ABBS10S02	C14-C20 (Diesel Range)	1200	1200		17.8%			
MJ101	ABBS10S02	C20-C30 (Lubricant Oil Range	180	90	U	1.3%			
MJ101	ABBS10S02	C11-C30		5790					
MJ101	ABBS10S02	Benzene	0.009	0.0045	U		4.8E-06		
MJ101	ABBS10S02	Ethylbenzene	0.004	0.004	J		4.3E-06		
MJ101	ABBS10S02	Toluene	0.009	0.0045	U		4.8E-06		
MJ101	ABBS10S02	Xylene (total)	0.022	0.022	J		2.3E-05		
MJ101	ABBS10S02	m,p-Xylene	0.015	0.015	J		1.6E-05		
MJ101	ABBS10S02	o-Xylene	0.007	0.007	J		7.4E-06		
MJ103	ABBS15S03	2-Methylnaphthalene	2.01	2.01	J		7.2E-03		
MJ103	ABBS15S03	Acenaphthene	0.0685	0.0685	J			2.2E-05	
MJ103	ABBS15S03	Acenaphthylene	0.012	0.012	R				Yes
MJ103	ABBS15S03	Anthracene	0.00839	0.004195	U			1.3E-06	
MJ103	ABBS15S03	Benzo(a)anthracene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Benzo(a)pyrene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Benzo(b)fluoranthene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Benzo(e)pyrene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Benzo(g,h,i)perylene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Benzo(k)fluoranthene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Chrysene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Dibenzo(a,h)anthracene	0.00204	0.00102	U			3.2E-07	

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ103	ABBS15S03	Fluoranthene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Fluorene	0.0416	0.0208	UJ			6.6E-06	
MJ103	ABBS15S03	Indeno(1,2,3-cd)pyrene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Naphthalene	1.05	1.05	J		3.8E-03		
MJ103	ABBS15S03	Perylene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	Phenanthrene	0.021	0.0105	U			3.3E-06	
MJ103	ABBS15S03	Pyrene	0.00204	0.00102	U			3.2E-07	
MJ103	ABBS15S03	C08-C11 (Gasoline Range)	280	280		8.1%			
MJ103	ABBS15S03	C11-C14 (Kerosene Range)	2300	2300		66.9%			
MJ103	ABBS15S03	C14-C20 (Diesel Range)	840	840		24.4%			
MJ103	ABBS15S03	C20-C30 (Lubricant Oil Range	36	18	U	0.5%			
MJ103	ABBS15S03	C11-C30		3158					
MJ104	CDBS17S01	2-Methylnaphthalene	27.4	27.4	J		3.2E-01		Yes
MJ104	CDBS17S01	Acenaphthene	2.24	2.24	J			5.7E-04	
MJ104	CDBS17S01	Acenaphthylene	0.274	0.274	J			7.0E-05	
MJ104	CDBS17S01	Anthracene	1.46	1.46	J			3.7E-04	
MJ104	CDBS17S01	Benzo(a)anthracene	0.0246	0.0246	J			6.3E-06	
MJ104	CDBS17S01	Benzo(a)pyrene	0.0303	0.0303				7.7E-06	
MJ104	CDBS17S01	Benzo(b)fluoranthene	0.0134	0.0134				3.4E-06	
MJ104	CDBS17S01	Benzo(e)pyrene	0.04	0.04				1.0E-05	
MJ104	CDBS17S01	Benzo(g,h,i)perylene	0.103	0.103				2.6E-05	
MJ104	CDBS17S01	Benzo(k)fluoranthene	0.00432	0.00432				1.1E-06	
MJ104	CDBS17S01	Chrysene	0.0354	0.0354	J			9.1E-06	
MJ104	CDBS17S01	Dibenzo(a,h)anthracene	0.0274	0.0274				7.0E-06	
MJ104	CDBS17S01	Fluoranthene	0.124	0.124				3.2E-05	
MJ104	CDBS17S01	Fluorene	2.22	2.22	J			5.7E-04	
MJ104	CDBS17S01	Indeno(1,2,3-cd)pyrene	0.025	0.025				6.4E-06	
MJ104	CDBS17S01	Naphthalene	1.84	1.84	J		2.2E-02		Yes
MJ104	CDBS17S01	Perylene	0.028	0.028				7.2E-06	
MJ104	CDBS17S01	Phenanthrene	5.99	5.99	J			1.5E-03	
MJ104	CDBS17S01	Pyrene	0.533	0.533				1.4E-04	
MJ104	CDBS17S01	C08-C11 (Gasoline Range)	170	85	U	2.1%			Yes
MJ104	CDBS17S01	C11-C14 (Kerosene Range)	970	970		24.3%			
MJ104	CDBS17S01	C14-C20 (Diesel Range)	2600	2600		65.1%			
MJ104	CDBS17S01	C20-C30 (Lubricant Oil Range	340	340	J	8.5%			
MJ104	CDBS17S01	C11-C30		3910					
MJ105	CDBS04S02	2-Methylnaphthalene	15.7	15.7			2.8E-02		
MJ105	CDBS04S02	Acenaphthene	1.34	1.34				2.7E-04	

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TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ105	CDBS04S02	Acenaphthylene	0.278	0.278				5.6E-05	
MJ105	CDBS04S02	Anthracene	0.723	0.723				1.5E-04	
MJ105	CDBS04S02	Benzo(a)anthracene	0.0179	0.0179				3.6E-06	
MJ105	CDBS04S02	Benzo(a)pyrene	0.00328	0.00328				6.6E-07	
MJ105	CDBS04S02	Benzo(b)fluoranthene	0.00257	0.00257				5.2E-07	
MJ105	CDBS04S02	Benzo(e)pyrene	0.00401	0.00401				8.1E-07	
MJ105	CDBS04S02	Benzo(g,h,i)perylene	0.00194	0.00097	U			2.0E-07	
MJ105	CDBS04S02	Benzo(k)fluoranthene	0.00194	0.00097	U			2.0E-07	
MJ105	CDBS04S02	Chrysene	0.0291	0.0291				5.9E-06	
MJ105	CDBS04S02	Dibenzo(a,h)anthracene	0.00194	0.00097	U			2.0E-07	
MJ105	CDBS04S02	Fluoranthene	0.0799	0.0799				1.6E-05	
MJ105	CDBS04S02	Fluorene	1.81	1.81				3.6E-04	
MJ105	CDBS04S02	Indeno(1,2,3-cd)pyrene	0.00194	0.00097	U			2.0E-07	
MJ105	CDBS04S02	Naphthalene	3.96	3.96	J		6.9E-03		
MJ105	CDBS04S02	Perylene	0.00194	0.00097	U			2.0E-07	
MJ105	CDBS04S02	Phenanthrene	3.5	3.5				7.1E-04	
MJ105	CDBS04S02	Pyrene	0.316	0.316				6.4E-05	
MJ105	CDBS04S02	C08-C11 (Gasoline Range)	570	570		10.3%			
MJ105	CDBS04S02	C11-C14 (Kerosene Range)	3000	3000		54.2%			
MJ105	CDBS04S02	C14-C20 (Diesel Range)	1800	1800		32.5%			
MJ105	CDBS04S02	C20-C30 (Lubricant Oil Rang	160	160	J	2.9%			
MJ105	CDBS04S02	C11-C30		4960					
MJ105	CDBS04S02	Benzene	0.007	0.0035	UJ		6.1E-06		
MJ105	CDBS04S02	Ethylbenzene	0.05	0.05	J		8.8E-05		
MJ105	CDBS04S02	Toluene	0.007	0.0035	UJ		6.1E-06		
MJ105	CDBS04S02	Xylene (total)	0.011	0.011	J		1.9E-05		
MJ105	CDBS04S02	m,p-Xylene	0.007	0.007	J		1.2E-05		
MJ105	CDBS04S02	o-Xylene	0.004	0.004	J		7.0E-06		
MJ106	BABS14S04	2-Methylnaphthalene	0.107	0.107			8.2E-05		
MJ106	BABS14S04	Acenaphthene	0.0113	0.0113				1.4E-06	
MJ106	BABS14S04	Acenaphthylene	0.00777	0.003885	U			4.9E-07	
MJ106	BABS14S04	Anthracene	0.0777	0.03885	UJ			4.9E-06	
MJ106	BABS14S04	Benzo(a)anthracene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Benzo(a)pyrene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Benzo(b)fluoranthene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Benzo(e)pyrene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Benzo(g,h,i)perylene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Benzo(k)fluoranthene	0.00195	0.000975	U			1.2E-07	

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TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ106	BABS14S04	Chrysene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Dibenzo(a,h)anthracene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Fluoranthene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Fluorene	0.0777	0.03885	U			4.9E-06	
MJ106	BABS14S04	Indeno(1,2,3-cd)pyrene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Naphthalene	0.262	0.262	J		2.0E-04		
MJ106	BABS14S04	Perylene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	Phenanthrene	0.194	0.097	UJ			1.2E-05	
MJ106	BABS14S04	Pyrene	0.00195	0.000975	U			1.2E-07	
MJ106	BABS14S04	C08-C11 (Gasoline Range)	1300	1300		14.1%			
MJ106	BABS14S04	C11-C14 (Kerosene Range)	6900	6900		74.7%			
MJ106	BABS14S04	C14-C20 (Diesel Range)	940	940		10.2%			
MJ106	BABS14S04	C20-C30 (Lubricant Oil Range	190	95	U	1.0%			
MJ106	BABS14S04	C11-C30		7935					
MJ106	BABS14S04	Benzene	0.007	0.0035	UJ		2.7E-06		
MJ106	BABS14S04	Ethylbenzene	0.045	0.045	J		3.5E-05		
MJ106	BABS14S04	Toluene	0.007	0.0035	UJ		2.7E-06		
MJ106	BABS14S04	Xylene (total)	0.003	0.003	J		2.3E-06		
MJ106	BABS14S04	m,p-Xylene	0.013	0.0065	UJ		5.0E-06		
MJ106	BABS14S04	o-Xylene	0.003	0.003	J		2.3E-06		
MJ107	B1BS06S01	2-Methylnaphthalene	0.00509	0.002545	UJ		1.0E-04		
MJ107	B1BS06S01	Acenaphthene	0.0148	0.0148				5.8E-05	
MJ107	B1BS06S01	Acenaphthylene	0.00233	0.001165	U			4.6E-06	
MJ107	B1BS06S01	Anthracene	0.0912	0.0912				3.6E-04	
MJ107	B1BS06S01	Benzo(a)anthracene	0.00685	0.00685				2.7E-05	
MJ107	B1BS06S01	Benzo(a)pyrene	0.00691	0.00691				2.7E-05	
MJ107	B1BS06S01	Benzo(b)fluoranthene	0.011	0.011				4.3E-05	
MJ107	B1BS06S01	Benzo(e)pyrene	0.0134	0.0134				5.3E-05	
MJ107	B1BS06S01	Benzo(g,h,i)perylene	0.0115	0.0115				4.5E-05	
MJ107	B1BS06S01	Benzo(k)fluoranthene	0.00521	0.00521				2.1E-05	
MJ107	B1BS06S01	Chrysene	0.0149	0.0149				5.9E-05	
MJ107	B1BS06S01	Dibenzo(a,h)anthracene	0.00244	0.00244				9.6E-06	
MJ107	B1BS06S01	Fluoranthene	0.019	0.019				7.5E-05	
MJ107	B1BS06S01	Fluorene	0.0399	0.01995	UJ			7.9E-05	
MJ107	B1BS06S01	Indeno(1,2,3-cd)pyrene	0.00611	0.00611				2.4E-05	
MJ107	B1BS06S01	Naphthalene	0.00853	0.004265	UJ		1.7E-04		
MJ107	B1BS06S01	Perylene	0.0161	0.0161				6.3E-05	
MJ107	B1BS06S01	Phenanthrene	0.0462	0.0462				1.8E-04	

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TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ107	B1BS06S01	Pyrene	0.0326	0.0326				1.3E-04	
MJ107	B1BS06S01	C08-C11 (Gasoline Range)	25	25		9.0%			
MJ107	B1BS06S01	C11-C14 (Kerosene Range)	36	36		12.9%			
MJ107	B1BS06S01	C14-C20 (Diesel Range)	120	120		43.0%			
MJ107	B1BS06S01	C20-C30 (Lubricant Oil Range	98	98	J	35.1%			
MJ107	B1BS06S01	C11-C30		254					
MJ107	B1BS06S01	Benzene	0.006	0.003	UJ		1.2E-04		
MJ107	B1BS06S01	Ethylbenzene	0.003	0.003	J		1.2E-04		
MJ107	B1BS06S01	Toluene	0.006	0.003	UJ		1.2E-04		
MJ107	B1BS06S01	Xylene (total)	0.011	0.011	J		4.4E-04		
MJ107	B1BS06S01	m,p-Xylene	0.009	0.009	J		3.6E-04		
MJ107	B1BS06S01	o-Xylene	0.002	0.002	J		8.0E-05		
MJ110	OCBS06S01	2-Methylnaphthalene	0.00648	0.00324	UJ		4.6E-05		Yes
MJ110	OCBS06S01	Acenaphthene	0.00196	0.00098	U			1.2E-06	
MJ110	OCBS06S01	Acenaphthylene	0.00196	0.00098	U			1.2E-06	
MJ110	OCBS06S01	Anthracene	0.00196	0.00098	UJ			1.2E-06	
MJ110	OCBS06S01	Benzo(a)anthracene	0.00196	0.00098	U			1.2E-06	
MJ110	OCBS06S01	Benzo(a)pyrene	0.00196	0.00098	U			1.2E-06	
MJ110	OCBS06S01	Benzo(b)fluoranthene	0.00196	0.00098	U			1.2E-06	
MJ110	OCBS06S01	Benzo(e)pyrene	0.172	0.172				2.1E-04	
MJ110	OCBS06S01	Benzo(g,h,i)perylene	0.184	0.184				2.2E-04	
MJ110	OCBS06S01	Benzo(k)fluoranthene	0.00463	0.00463				5.6E-06	
MJ110	OCBS06S01	Chrysene	0.0201	0.0201				2.4E-05	
MJ110	OCBS06S01	Dibenzo(a,h)anthracene	0.00921	0.00921				1.1E-05	
MJ110	OCBS06S01	Fluoranthene	0.0056	0.0056				6.7E-06	
MJ110	OCBS06S01	Fluorene	0.00428	0.00214	UJ			2.6E-06	
MJ110	OCBS06S01	Indeno(1,2,3-cd)pyrene	0.0123	0.0123				1.5E-05	
MJ110	OCBS06S01	Naphthalene	0.0108	0.0054	UJ		7.7E-05		Yes
MJ110	OCBS06S01	Perylene	0.0981	0.0981				1.2E-04	
MJ110	OCBS06S01	Phenanthrene	0.00911	0.00911	J			1.1E-05	
MJ110	OCBS06S01	Pyrene	0.00587	0.00587				7.1E-06	
MJ110	OCBS06S01	C08-C11 (Gasoline Range)	140	70	U	7.8%			
MJ110	OCBS06S01	C11-C14 (Kerosene Range)	140	70	U	7.8%			
MJ110	OCBS06S01	C14-C20 (Diesel Range)	92	92	J	10.2%			
MJ110	OCBS06S01	C20-C30 (Lubricant Oil Range	670	670		74.3%			
MJ110	OCBS06S01	C11-C30		832					
MJ111	EVBS01S01	2-Methylnaphthalene	0.00315	0.001575	UJ		8.5E-04		Yes
MJ111	EVBS01S01	Acenaphthene	0.00205	0.001025	UJ			1.8E-04	Yes

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TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ111	EVBS01S01	Acenaphthylene	0.00205	0.001025	UJ			1.8E-04	Yes
MJ111	EVBS01S01	Anthracene	0.00221	0.00221				4.0E-04	Yes
MJ111	EVBS01S01	Benzo(a)anthracene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Benzo(a)pyrene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Benzo(b)fluoranthene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Benzo(e)pyrene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Benzo(g,h,i)perylene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Benzo(k)fluoranthene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Chrysene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Dibenzo(a,h)anthracene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Fluoranthene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Fluorene	0.0455	0.02275	UJ			4.1E-03	Yes
MJ111	EVBS01S01	Indeno(1,2,3-cd)pyrene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Naphthalene	0.0162	0.0162	R				Yes
MJ111	EVBS01S01	Perylene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	Phenanthrene	0.00513	0.002565	U			4.6E-04	Yes
MJ111	EVBS01S01	Pyrene	0.00205	0.001025	U			1.8E-04	Yes
MJ111	EVBS01S01	C08-C11 (Gasoline Range)	3.7	1.85	U	25.0%			Yes
MJ111	EVBS01S01	C11-C14 (Kerosene Range)	3.7	1.85	U	25.0%			Yes
MJ111	EVBS01S01	C14-C20 (Diesel Range)	3.7	1.85	U	25.0%			Yes
MJ111	EVBS01S01	C20-C30 (Lubricant Oil Rang	3.7	1.85	U	25.0%			Yes
MJ111	EVBS01S01	C11-C30		5.55					Yes
MJ112	BATS03S01	2-Methylnaphthalene	0.00205	0.001025	UJ		5.1E-04		Yes
MJ112	BATS03S01	Acenaphthene	0.00198	0.00099	UJ			1.2E-04	Yes
MJ112	BATS03S01	Acenaphthylene	0.00198	0.00099	UJ			1.2E-04	Yes
MJ112	BATS03S01	Anthracene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Benzo(a)anthracene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Benzo(a)pyrene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Benzo(b)fluoranthene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Benzo(e)pyrene	0.00246	0.00246				3.1E-04	Yes
MJ112	BATS03S01	Benzo(g,h,i)perylene	0.002	0.002				2.5E-04	Yes
MJ112	BATS03S01	Benzo(k)fluoranthene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Chrysene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Dibenzo(a,h)anthracene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Fluoranthene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Fluorene	0.00503	0.002515	UJ			3.1E-04	Yes
MJ112	BATS03S01	Indeno(1,2,3-cd)pyrene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	Naphthalene	0.00935	0.00935	R				Yes

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TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MJ112	BATS03S01	Perylene	0.00515	0.00515				6.4E-04	Yes
MJ112	BATS03S01	Phenanthrene	0.00495	0.002475	U			3.1E-04	Yes
MJ112	BATS03S01	Pyrene	0.00198	0.00099	U			1.2E-04	Yes
MJ112	BATS03S01	C08-C11 (Gasoline Range)	4	2	U	25.0%			Yes
MJ112	BATS03S01	C11-C14 (Kerosene Range)	4	2	U	25.0%			Yes
MJ112	BATS03S01	C14-C20 (Diesel Range)	4	2	U	25.0%			Yes
MJ112	BATS03S01	C20-C30 (Lubricant Oil Range	4	2	U	25.0%			Yes
MJ112	BATS03S01	C11-C30		8					Yes

TPH and Petroleum Constituent Data and Calculation of Maximum Ratio Extrapolation Factors

EPA ID	RFI SITE ID	CHEMICAL	CONCENTRATION	ADJ CONC	REV QUAL	PERCENT OF TOTAL TPH	LCPC:C08-C11	HCPC:C11-C30	CENSORED
MAXIMUM RATIOS OF PETROLEUM CONSTITUENTS TO TPH ([MG/KG]/[MG/KG])									
		2-Methylnaphthalene					2.8E-02		
		Acenaphthene						5.7E-04	
		Acenaphthylene						7.0E-05	
		Anthracene						3.7E-04	
		Benzo(a)anthracene						2.7E-05	
		Benzo(a)pyrene						2.7E-05	
		Benzo(b)fluoranthene						4.3E-05	
		Benzo(e)pyrene						2.1E-04	
		Benzo(g,h,i)perylene						2.2E-04	
		Benzo(k)fluoranthene						2.1E-05	
		Chrysene						5.9E-05	
		Dibenzo(a,h)anthracene						1.1E-05	
		Fluoranthene						7.5E-05	
		Fluorene						5.7E-04	
		Indeno(1,2,3-cd)pyrene						2.4E-05	
		Naphthalene					6.9E-03		
		Perylene						1.2E-04	
		Phenanthrene						1.5E-03	
		Pyrene						1.4E-04	
		Benzene					1.2E-04		
		Ethylbenzene					1.2E-04		
		Toluene					1.2E-04		
		Xylene (total)					4.4E-04		
		m,p-Xylene					3.6E-04		
		o-Xylene					8.0E-05		

Notes:
TPH - total petroleum hydrocarbon
LCPC - low carbon petroleum constituent; includes benzene, toluene, ethylbenzene, xylenes, 2-methynaphthalene, and naphthalene.
HCPC - high carbon petroleum constituent; includes polycyclic aromatic hyrdrocarbons.
Concentration - either the detected concentration or sample quantitation limit (SQL) as reported by the analytical laboratory.
Adj Conc - either the detected concentration or, if not detected, the estimated concentration calculated as one-half the SQL.
Rev Qual - data qualifier deterimined during data validation.
Censored - data not included in the calculation of maximum ratios either because data were rejected or because the relevant TPH data were not detected.

APPENDIX C

ECOLOGICAL SCREENING LEVEL CALCULATIONS

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ECOLOGICAL SCREENING LEVEL CALCULATIONS

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APPENDIX C

DERIVATION OF ECOLOGICAL SCREENING LEVELS

1.0 INTRODUCTION

The following sections describe the methods used to derive ecological screening levels (ESLs) for use in the selection of chemicals of potential ecological concern (CPECs) in ecological risk assessments at the Santa Susana Field Laboratory (SSFL). The application of ESLs in the CPEC selection process was previously described and summarized in Section 3.2 of the SRAM.

2.0 AQUATIC HABITAT ECOLOGICAL SCREENING LEVELS

Chronic freshwater National Ambient Water Quality Criteria (NAWQC), developed by USEPA (1986), and National Recommended Water Quality Criteria (NRWQC), developed by USEPA (1998), were established to protect aquatic life from adverse effects. These criteria will be used in the development of ESLs for the evaluation of surface water and near-surface groundwater SQLs, as applicable. Of the various criteria or screening benchmarks proposed for consideration (e.g., NAWQC, NRWQC), the lowest criterion or screening benchmark established for each candidate CPEC will be adopted as the ESL for screening purposes. It should be noted that ESLs based on these criteria should not be considered site-specific since NAWQC and NRWQC for many chemicals are based on toxic effect in aquatic species that do not occur at the SSFL. Further these criteria are often based on toxic end-points that are not relevant to population effects, which is the focus of ecological risk assessments at the SSFL. Therefore, ESLs based on these criteria should not be used for making risk management decisions including remedial decisions and cleanup goals.

Surface water and near-surface groundwater ESLs that are based on NAWQC or NRWQC are summarized in Table 3-2. For CPECs that do not have established NAWQC or NRWQC, SQLs will be compared to literature derived reference concentrations RfCs that represent no-observable-effect-concentrations (NOECs) and lowest-observable-effect-concentrations (LOECs) for that chemical (see Section 11.2). If no toxicity data are available, the SQL will be compared to a water quality criterion or RfCs that exists for the most closely related chemical (i.e., by chemical structure).

An exceedance of an Aquatic ESL will not necessarily trigger a remedial action. However, an exceedance of an Aquatic ESL may trigger a review of the basis for the Aquatic ESL or water quality criterion, the applicability of that criterion to SSFL habitats and receptors, a refinement of the surface or groundwater exposure point concentration, toxicity bioassays, and/or further chemical and biological monitoring.

3.0 TERRESTRIAL HABITAT ECOLOGICAL SCREENING LEVELS

In contrast to water quality criteria (i.e., NAWQC) that are readily available for the protection of aquatic receptors in surface water, similar criteria for soil are not available for the protection of ecological receptors in the terrestrial environment. Therefore, site-specific soil ESLs were developed using the standard ecological risk assessment equations specified in Section 10.4 and screening-level toxicity reference values (TRVs) for terrestrial mammals and avian species. ESLs were also derived for soil invertebrates as described in Section 3.2.1.2.3.

3.1 Selection of Toxicity Reference Values

Toxicological data were compiled for chemicals and representative species with available information. Ecotoxicological databases were searched for chronic mammalian and avian no-observable-adverse-effect-level (NOAEL) TRVs for chemicals that were analyzed in soil at the SSFL. The chronic NOAEL is the toxicity value used in the derivation of ESLs.

Sources of ecotoxicological data included the U.S. Navy (EFA West 1998, as cited in HERD 2000), USEPA's IRIS database, ATSDR chemical-specific Toxicological Profiles, USEPA Region 6 Combustor Guidance (USEPA 1999), and Oak Ridge National Laboratory (Sample et al. 1996). The selection of appropriate TRVs focused on identifying NOAELs for growth, reproduction, mortality, and other less serious effects that are relevant to assessment endpoints described in Section 9.6 (i.e., protection of receptor populations and communities and their food sources). In cases where toxicity data for these toxic endpoints were not available, toxicity data for other toxic endpoints were used even if those endpoints were less relevant to receptors and attributes identified in assessment endpoints. EFA West (1998) values were used where available. For compounds without TRV values from EFA West (1998), the lowest available TRV for a particular chemical was selected from the other sources cited above.

For chemicals without chronic dose-response-based NOAELs, but for which other toxicity values were available, uncertainty factors were applied to extrapolate these other toxicity values to chronic NOAELs. These other toxicity values include less than chronic NOAELs (e.g., subchronic NOAELs), lowest-observable-adverse-effect-levels (LOAELS), and the lethal dose for 50 percent of a study population (LD_{50}). Consistent with DTSC guidance (1996), a UF of 5 was used to adjust LOAEL TRVs to NOAEL a UF of 2 was used to extrapolate TRVs derived from subchronic studies to chronic TRVs. An uncertainty factor of 100 was used to adjust LD_{50} values to chronic NOAEL equivalent values. Finally, laboratory studies may have been conducted on species other than the receptor species selected for ecological risk assessment at the SSFL. If toxicity values used were not based on data for that specific species, an allometric conversion based on body size (*i.e.*, weight and surface area) was used to extrapolate between species, but only in cases where there was a 100-fold difference between test species' and representative species' body weights as recommended by DTSC (1999c). The body size adjusted TRVs, referred to here as "adjusted NOAEL-equivalent toxicity values," were calculated using the following allometric conversion equation (Sample and Arenal 1999):

$$TRV_{adj} = TRV_t \, (BW_t/BW_r)^{SF} \qquad \text{(C3-1)}$$

Where:

TRV_{adj}	=	Adjusted NOAEL-equivalent TRV (mg/kg of body weight per day)
TRV_t	=	NOAEL-equivalent toxicity reference value for test organism (mg of chemical/kg of body weight per day)
BW_t	=	Body weight for test organism (kg)
BW_r	=	Body weight for deer mouse (kg)
SF	=	Body size scaling factor (unitless)

Sample and Arenal (1999) developed chemical-specific mammalian scaling factors (SFs) for 167 chemicals and avian SFs for 194 chemicals. A body size SF of (1 – 0.94), or 0.06, was used to extrapolate TRVs between mammalian species for which chemical-specific SFs were not available (Sample and Arenal 1999). A SF of zero was used in Equation C3-1 to extrapolate TRVs between avian species. Mineau *et al*. (1996) identified a mean SF of (1 - 1.15) for birds; Sample and Arenal (1999) recently reported a mean SF of (1 - 1.2) for birds. However, in an earlier study, Sample *et al*. (1996) reported that scaling factors for a majority of the chemicals evaluated (29 of 37) were not significantly different from 1. Therefore, a SF of zero for TRV extrapolation between avian species was determined to be more appropriate for scaling between avian species.

If no toxicity values were available for a particular compound, appropriate surrogate chemical chronic NOAELs were used as the mammalian TRVs. Surrogate chemicals were selected based on structural chemistry, specifically, the active moiety/functional group of the chemical. These surrogate chemicals have been selected to have expected toxicity equal to, or greater than, the particular compound without toxicity values. Therefore, uncertainty factors were not included to account for surrogate use. This process was only performed for chemicals for which a NOAEL, LOAEL, or LD_{50} toxicity value was available. In those cases where appropriate chemical surrogates were not identified, the most conservative TRV within the chemical class (e.g., VOCs, metals, etc.) was used as the TRV for ESL derivation.

Because avian toxicology is less well understood than mammalian toxicology, no attempt was made to apply structure-activity relationships to select surrogate compounds, unless already selected by one of the above references. Consequently, TRVs for fewer compounds were derived for avian species than were derived for mammalian species.

3.2. Calculation of Terrestrial Mammalian and Avian ESLs

The risk model presented in the SRAM uses the ratio of the chemical-specific dose to the TRV to estimate a hazard quotient (Equation 3-2). Soil ESLs for the deer mouse or thrush were calculated by setting the hazard quotient in Equation 3-2 equal to 1, rearranging that equation, and solving for soil concentration (mg/kg) as shown in Equation 3-3:

$$HQ_i = 1 = EPV_i / TRV_i = (ESL_i * \{(BAF_{ti} * F_{ti}\ FIR) + (BAF_{tp} * F_{tp}\ FIR) + F_t\}) / TRV_i \qquad (3\text{-}2)$$

or

$$ESL_i = TRV_i / \{(BAF_{ti} * F_{ti}\ FIR) + (BAF_{tp} * F_{tp}\ FIR) + F_t\} \qquad (3\text{-}3)$$

Where:

HQ_i	=	Hazard quotient for chemical *i* (unitless)
EPV_i	=	Exposure point value for chemical *i* (mg of chemical/kg of body weight per day)
TRV_i	=	NOAEL-equivalent TRV for chemical *i* (mg of chemical/kg of body weight per day)
ESL_i	=	Ecological screening level in soil for chemical *i* (mg of chemical/kg of soil)
FIR	=	Food/incidental soil ingestion rate (mg of food/soil per kg of body weight per day)
BAF_{ti}	=	Soil-to-biota bioaccumulation factor for terrestrial invertebrates for chemical *i* (unitless)
BAF_{tp}	=	Soil-to-biota bioaccumulation factor for terrestrial plants for chemical *i* (unitless)

F_{ti} = Fraction of terrestrial invertebrates in diet (unitless)
F_{tp} = Fraction of terrestrial plants in diet (unitless)
F_t = Fraction of soil in diet (unitless)

All concentration data, BAFs, and food intake rates used to derive ESLs are on a dry weight basis. Standardized exposure parameters presented in the SRAM were incorporated in the derivation of soil ESLs. Exposure parameters used in Equation 3-3 that were not defined in the SRAM or required modification are discussed below.

Derived BAFs for the SSFL are presented in Section 10.4 of the SRAM. Biota to soil BAFs for invertebrates (i.e., BAF_{ti}), presented in Section 10.4 of the SRAM, were used in Equation 3-3. For chemicals not addressed in Section 10.4, a default BAF of 1 was assumed.

The BAFs presented in Section 10.0 are expressed on a dry weight basis. All applicable exposure parameters used to calculate ESLs are expressed on a dry weight basis. It should be noted that the deer mouse and thrush food intake rate equations presented in the SRAM indicate that these rates, taken from USEPA (1993), are on a wet weight basis. Therefore, deer mouse and thrush food intake rates were derived on a dry weight basis using allometric equations presented by Nagy (2001). These allometric equations relate food intake rate to body weight using estimated field metabolic rates and general dietary composition.

Dermal and inhalation routes were not included in the development of the soil ESLs because the contribution from these routes of exposure to overall risks has been shown to be generally less than 1 percent (USEPA 2000b,c). However, as described in Section 10.3, inhalation exposure will be assessed for burrowing animals using soil vapor data.

3.3 Summary of Terrestrial Mammalian and Avian ESLs

Terrestrial mammal ESLs for soil derived according to the protocol described in Section 3.2.1.2 are presented in Table 3-3. Mammalian ESLs were developed for 256 compounds. Of these 256 compounds, 115 compounds had sufficient data to derive chemical-specific ESLs. Surrogate compounds were used where available for 130 compounds, and the most conservative NOAEL toxicity value within a chemical class (e.g., VOCs, metals, etc.) was used as the TRV for 11 compounds. The spreadsheets used to derive mammalian ESLs for soil are presented in Appendix C, Attachment C-1.

Avian ESLs derived according to the protocol described in Section 3.2.1.2 are presented in Table 3-4. Avian ESLs were developed for 68 compounds. As discussed above, chemical surrogates were not used in the development of avian ESLs. The spreadsheets used to derive avian ESLs are presented in Appendix C, Attachment C-2.

In several cases, the avian TRVs reported in USEPA (1999) were found to not be applicable for deriving avian ESLs due to misinterpretation of toxicity test results or the inappropriate calculation of estimated doses. Each of these cases is discussed below.

The USEPA (1999) derived TRVs for acetone, hexachlorobenzene, and pentachlorophenol from LD_{50} determinations for 5-day exposures of 14-day-old Japanese quail (Hill and Camardese 1986). However, Hill and Camardese (1986) reported no mortality at the lowest concentration tested and no overt signs of toxicity at that concentration. USEPA (1999) selected an uncertainty factor of 100 for deriving TRVs for acetone, hexachlorobenzene, and pentachlorophenol, perhaps because these were meant to be LD_{50} determinations. For the purpose of deriving ESLs, an uncertainty factor of 10 was used to account for the shorter duration of exposure. Because these were NOAELs, no other uncertainty factors were necessary.

Also with respect to acetone, hexachlorobenzene, and pentachlorophenol, USEPA (1999) converted the chemical concentration in food to a dose in mg/kg-day using the method of Sample et al. (1996). Body weight was not reported in Hill and Camardese (1986) so USEPA's calculation was based on an assumed body weight of 100 grams (0.1 kg) and the average daily food intake rate reported in the study. A multi-generational study of body weight in Japanese quail found that at 14 days, the male and female combined average body weight was 0.0413 kg (Sefton and Siegel 1974). This body weight value was used with the food consumption rate from Hill and Camardese (1986) to calculate the dose for use in the TRV derivation.

The chemical concentration in food was converted by USEPA (1999) to an estimated dose (mg/kg-day) based on body weight and intake rate using the method of Sample et al. (1996). However, the heptachlor study reported the actual rate of food consumption in the control group (Sefton and Siegel 1974); the control group food consumption rate was used with the body weight data from Sefton and Siegel (1974) to calculate a dose for use in the TRV derivation.

3.4 Summary of Terrestrial Invertebrate ESLs

Toxicity data for terrestrial invertebrates are generally limited to RfCs reported as NOECs and LOECs. Similar to the methods used to derive mammalian and avian ESLs, preference was given to population effects endpoints such as reproduction, growth/development, and mortality. Sources of toxicity data that were reviewed for terrestrial invertebrates include Efroymson et al.

(1997), Will and Suter (1995), USEPA Region 6 Combustor Guidance (USEPA 1999), USEPA EcoSSLs (USEPA 2003), Sample et al. (1996), and Sverdrup et al. (2002). Extrapolation of LOECs to NOECs and from non-chronic values to chronic values followed the same methods as described for mammals and avian species described in Section 3.2.1.2. Terrestrial invertebrate ESLs are summarized in Table 3-5. The spreadsheets used to calculate terrestrial invertebrate ESLs for soil are presented in Appendix C, Attachment C-3.

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APPENDIX C

ATTACHMENT C-1

CALCULATION OF ECOLOGICAL SCREENING LEVELS FOR TERRESTRIAL MAMMALS

Calculation of Soil Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory

Chemical	TEF	Test Species Common Name	Test Species Body Weight (kg)	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	Subchronic to Chronic UF	LOAEL to NOAEL UF	Rodent NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Mammalian ESL[b] (mg/kg soil)	Plant BAFc (unitless)	Invertebrate BAFc (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source
1,2,3,4,6,7,8-HpCDD	0.01	rat	0.35				0.000001			1.00E-04	2,3,7,8-TCDD	9.58E-04	0.32	0.54			TEF from Van den Berg et al. 1998
1,2,3,4,6,7,8-HpCDF	0.01	rat	0.35				0.000001			1.00E-04	2,3,7,8-TCDD	4.88E-04	1.00	0.54	Yes		TEF from Van den Berg et al. 1998
1,2,3,4,7,8,9-HpCDF	0.01	rat	0.35				0.000001			1.00E-04	2,3,7,8-TCDD	4.27E-04	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998
1,2,3,4,7,8-HxCDD	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.54E-05	1.00	0.78	Yes		TEF from Van den Berg et al. 1998
1,2,3,4,7,8-HxCDF	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.72E-05	1.00	0.65	Yes		TEF from Van den Berg et al. 1998
1,2,3,6,7,8-HxCDD	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.57E-05	1.00	0.76	Yes		TEF from Van den Berg et al. 1998
1,2,3,6,7,8-HxCDF	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	5.35E-05	1.00	0.26	Yes		TEF from Van den Berg et al. 1998
1,2,3,7,8,9-HxCDD	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.35E-05	1.00	0.93	Yes		TEF from Van den Berg et al. 1998
1,2,3,7,8,9-HxCDF	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.27E-05	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998
1,2,3,7,8-PeCDD	1	rat	0.35				0.000001			1.00E-06	2,3,7,8-TCDD	4.42E-06	1.00	0.88	Yes		TEF from Van den Berg et al. 1998
1,2,3,7,8-PeCDF	0.05	rat	0.35				0.000001			2.00E-05	2,3,7,8-TCDD	1.01E-04	1.00	0.43	Yes		TEF from Van den Berg et al. 1998
2,3,4,6,7,8-HxCDF	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.85E-05	1.00	0.56	Yes		TEF from Van den Berg et al. 1998
2,3,4,7,8-PeCDF	0.5	rat	0.35				0.000001			2.00E-06	2,3,7,8-TCDD	9.85E-06	1.00	0.51	Yes		TEF from Van den Berg et al. 1998
2,3,7,8-TCDD	1	rat	0.35	NOAEL	chronic	growth, organ toxicity, blood chemistry	0.000001			1.00E-06		4.27E-06	1.00	1.00	Yes	Yes	Sample et al. 1996
2,3,7,8-TCDF	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	4.25E-05	1.00	1.02	Yes		TEF from Van den Berg et al. 1998
OCDD	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	1.16E-01	0.23	0.47			TEF from Van den Berg et al. 1998
OCDF	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	9.70E-02	0.33	0.50			TEF from Van den Berg et al. 1998
Aluminum	1	mouse	0.03	NOAEL	chronic	reproduction	1.93			1.93E+00		1.24E+01	0.74	0.37			Sample et al. 1996
Antimony	1	mouse	0.03	NOAEL	chronic	longevity	0.125		Y	1.25E-01		9.48E-02	5.36	7.79			Sample et al. 1996
Arsenic	1	mouse	0.03	NOAEL	chronic	reproduction	0.32			3.20E-01		1.93E+00	0.75	0.52			EFA West 1998
Barium	1	rat	0.435	NOAEL	chronic	growth, development	5.1			5.10E+00		1.46E+01	1.00	2.80			Sample et al. 1996
Beryllium	1	rat	0.35	NOAEL	chronic	longevity	0.66			6.60E-01		5.00E+00	0.61	0.32			Sample et al. 1996
Boron	1	dog	12.7	NOAEL	chronic	reproduction	8.8			1.30E+01		9.19E+00	7.40	4.64			IRIS
Cadmium	1	mouse	0.0322	NOAEL	chronic	reproduction	0.06			6.00E-02		2.08E-02	10.80	19.69			EFA West 1998
Chromium	1	rat	0.35	NOAEL	chronic	growth, organ weight, blood chemistry	1468			1.47E+03		9.27E+02	9.45	2.43			IRIS
Cobalt	1	rat	0.35	LOAEL	chronic	reproduction (decreased pup growth)	1.2		Y	1.20E+00		8.90E+00	0.66	0.23			EFA West 1998
Copper	1	mouse	0.03	NOAEL	subchronic	growth, thymic cell count, mortality	2.667	Y		2.67E+00		2.15E+00	1.88	14.72			EFA West 1998
Hexavalent Chromium	1	rat	0.35	NOAEL	chronic	growth	3.28			3.28E+00		1.40E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Lead	1	rat	0.35	NOAEL	chronic	kidney function	1			1.00E+00		2.81E+00	2.14	0.24			Region 9 BTAG 2002
Manganese	1	mouse	0.0346	LOAEL	subchronic	reproductive organ toxicity	13.7	Y	Y	1.37E+01		5.85E+01	1.00	1.00	Yes	Yes	EFA West 1998
Mercury	1	mink	1	NOAEL	chronic	reproduction	1.01			1.01E+00		2.86E+00	0.82	3.28			Sample et al. 1996
Methyl mercury	1	rat	0.1875	NOAEL	chronic	reproductive, developmental	0.25			2.50E-01		1.07E+00	1.00	1.00	Yes	Yes	EFA West 1998
Molybdenum	1	mouse	0.03	NOAEL	chronic	reproduction	0.26		Y	2.60E-01		1.07E-01	13.58	5.91			Sample et al. 1996
Nickel	1	rat	0.35	LOAEL	chronic	reproduction (decreased pup viability)	0.133		Y	1.33E-01		1.02E-01	7.70	2.10			EFA West 1998
Selenium	1	rats	0.35	NOAEL	chronic	hepatic lesions	0.05			5.00E-02		1.74E-01	1.00	1.84	Yes		EFA West 1998
Silver	1	mouse	0.03	LOAEL	chronic	*	0.375		Y	3.75E-01		5.39E-01	1.69	6.63			EPA Region 6
Thallium	1	rat	0.35	NOAEL	subchronic	hair loss	0.48	Y		4.80E-01		2.88E+00	0.51	1.09			EFA West 1998
Vanadium	1	rat	0.26	NOAEL	chronic	reproduction	0.21			2.10E-01		1.45E+00	0.69	0.32			Sample et al. 1996
Zinc	1	mouse	0.0255	LOAEL	chronic	pancreatic,adrenal	9.6		Y	9.60E+00		2.07E+01	1.62	3.13			EFA West 1998
Aroclor 1016	1	mink	1	NOAEL	chronic	reproduction	1.37			1.37E+00		1.56E+00	2.97	6.47			Sample et al. 1996
Aroclor 1221	1	mink	1				1.37			1.37E+00	Aroclor 1016	1.56E+00	2.97	6.47			Sample et al. 1996
Aroclor 1232	1	mouse	0.014				0.068			6.80E-02	Aroclor 1254	7.75E-02	2.97	6.47			Sample et al. 1996
Aroclor 1242	1	mink	1	LOAEL	chronic	reproduction	0.069		Y	6.90E-02		7.86E-02	2.97	6.47			Sample et al. 1996
Aroclor 1248	1	Rhesus monkey	5	LOAEL	chronic	reproduction	0.01		Y	1.40E-02		1.60E-02	2.97	6.47			Sample et al. 1996
Aroclor-1254	1	mouse	0.014	NOAEL	chronic	reproduction	0.068			6.80E-02		7.75E-02	2.97	6.47			Sample et al. 1996
Aroclor-1260	1	mouse	0.014				0.068			6.80E-02	Aroclor 1254	7.75E-02	2.97	6.47			Sample et al. 1996
Aroclor 1262	1	mouse	0.014				0.068			6.80E-02	Aroclor 1254	7.75E-02	2.97	6.47			Sample et al. 1996
PCB-105	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	8.51E-03	3.30	10.36			TEF from Van den Berg et al. 1998
PCB-114	0.0005	rat	0.35				0.000001			2.00E-03	2,3,7,8-TCDD	8.81E-04	3.68	26.61			TEF from Van den Berg et al. 1998
PCB-118	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	8.18E-03	3.15	11.47			TEF from Van den Berg et al. 1998
PCB-123	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	7.49E-03	3.42	12.59			TEF from Van den Berg et al. 1998
PCB-126	0.1	rat	0.35				0.000001			1.00E-05	2,3,7,8-TCDD	1.44E-05	2.23	5.32			TEF from Van den Berg et al. 1998
PCB-156	0.0005	rat	0.35				0.000001			2.00E-03	2,3,7,8-TCDD	2.62E-03	2.49	5.80			TEF from Van den Berg et al. 1998
PCB-157	0.0005	rat	0.35				0.000001			2.00E-03	2,3,7,8-TCDD	2.54E-03	2.63	5.87			TEF from Van den Berg et al. 1998
PCB-167	0.00001	rat	0.35				0.000001			1.00E-01	2,3,7,8-TCDD	1.24E-01	2.77	5.88			TEF from Van den Berg et al. 1998
PCB-169	0.01	rat	0.35				0.000001			1.00E-04	2,3,7,8-TCDD	4.27E-04	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998
PCB-189	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	2.02E-02	2.16	2.39			TEF from Van den Berg et al. 1998
PCB-77	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	1.29E-02	2.38	6.24			TEF from Van den Berg et al. 1998
PCB-81	0.0001	rat	0.35				0.000001			1.00E-02	2,3,7,8-TCDD	1.18E-02	3.00	5.98			TEF from Van den Berg et al. 1998
Perchlorate	1	rat	0.35	NOAEL	chronic	thyroid effects	0.001			1.00E-03		2.38E-05	282.00	1.00	Yes	Yes	US EPA 1995
1,1,1,2-Tetrachloroethane	1	rat	0.35	LOAEL	chronic	kidney/liver toxicity	89.3		5	1.79E+01		7.63E+01	1.00	1.00	Yes	Yes	IRIS
1,1,1-Trichloroethane	1	mouse	0.035	NOAEL	chronic	reproductive	1000			1.00E+03		4.27E+03	1.00	1.00	Yes	Yes	Sample et al. 1996
1,1,2,2-Tetrachloroethane	1	mouse	0.03				1.4	Y		1.40E+00	1,1,2,2-Tetrachloroethylene	5.98E+00	1.00	1.00	Yes	Yes	Sample et al. 1996
1,1,2-Trichloro-1,2,2-trifluoroethane	1	human	70	NOAEL	subchronic	no adverse medical symptoms observed	30	Y		4.93E+01		2.10E+02	1.00	1.00	Yes	Yes	IRIS
1,1,2-Trichloroethane	1	mouse	0.03	NOAEL	subchronic	hematology	3.9	2		1.95E+00		8.33E+00	1.00	1.00	Yes	Yes	IRIS
1,1-Dichloroethane	1	mouse	0.035				50			5.00E+01	1,2 Dichloroethane	2.14E+02	1.00	1.00	Yes	Yes	Sample et al. 1996
1,1-Dichloroethene	1	dog	14	NOAEL	subchronic	organ toxicity, mortality	2.5	Y		6.89E-02		2.94E-01	1.00	1.00	Yes	Yes	Sample et al. 1996
1,1-Dichloropropene	1	rat	0.35				5.1			5.10E+00	1,3-Dichloropropene	2.18E+01	1.00	1.00	Yes	Yes	IRIS
1,2,3-Trichlorobenzene	1	rat	0.35				14.8			1.48E+01	1,2,4-Trichlorobenzene	6.32E+01	1.00	1.00	Yes	Yes	IRIS
1,2,3-Trichloropropane	1	rat	0.35	NOAEL	subchronic	clinical chemistry, hematology	5.71	2		2.86E+00		1.22E+01	1.00	1.00	Yes	Yes	IRIS
1,2,4-Trichlorobenzene	1	rat	0.35	NOAEL	chronic	reproduction	14.8			1.48E+01		6.32E+01	1.00	1.00	Yes	Yes	IRIS
1,2,4-Trimethylbenzene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
1,2-Dibromo-3-chloropropane	1	rat	0.35				5.1			5.10E+00	1,3-Dichloropropene	2.18E+01	1.00	1.00	Yes	Yes	IRIS
1,2-Dibromoethane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
1,2-Dichloro-1,1,2-Trifluoroethane	1	human	70				273			4.48E+02	1,1,2-Trichloro-1,2,2-trifluoroethane	1.92E+03	1.00	1.00	Yes	Yes	IRIS
1,2-Dichlorobenzene	1	rat	0.35	NOAEL	chronic	organ toxicity	85.7			8.57E+01		3.66E+02	1.00	1.00	Yes	Yes	IRIS
1,2-Dichloroethane	1	mouse	0.035	NOAEL	chronic	reproduction	50			5.00E+01		2.14E+02	1.00	1.00	Yes	Yes	Sample et al. 1996
1,2-Dichloropropane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
1,2-Diphenylhydrazine	1	rat	0.35	NOAEL	chronic	survival	2			2.00E+00		8.54E+00	1.00	1.00	Yes	Yes	ATSDR
1,3,5-Trimethylbenzene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
1,3,5-Trinitrobenzene	1	rat	0.35	NOAEL	chronic	growth, organ toxicity	2.68			2.68E+00		1.14E+01	1.00	1.00	Yes	Yes	IRIS
1,3-Dichlorobenzene	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR
1,3-Dichlorobenzene	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR

Calculation of Soil Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory

Chemical	TEF	Test Species Common Name	Test Species Body Weight (kg)	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	Subchronic to Chronic UF	LOAEL to NOAEL UF	Rodent NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Mammalian ESL[b] (mg/kg soil)	Plant BAFc (unitless)	Invertebrate BAFc (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source
1,3-Dichloropropane	1	rat	0.35				5.1			5.10E+00	1,3-Dichloropropene	2.18E+01	1.00	1.00	Yes	Yes	IRIS
1,3-Dichloropropene	1	rat	0.35	LOAEL	chronic	growth, histology	5.1		5	1.02E+00		4.36E+00	1.00	1.00	Yes	Yes	IRIS
1,3-Dinitrobenzene	1	rat	0.35	NOAEL	subchronic	testicular degeneration	0.35	2		1.75E-01		7.47E-01	1.00	1.00	Yes	Yes	Talmage et al. 1999
1,4-Dichlorobenzene	1	rat	0.35	NOAEL	subchronic	body weight gain	75	2		3.75E+01		1.60E+02	1.00	1.00	Yes	Yes	ATSDR
2,2-Dichloropropane	1	rat	0.35				5.1			5.10E+00	1,3-Dichloropropene	2.18E+01	1.00	1.00	Yes	Yes	IRIS
2,4,5-Trichlorophenol	1	rat	0.35	NOAEL	subchronic	liver and kidney toxicity	100	2		5.00E+01		2.14E+02	1.00	1.00	Yes	Yes	IRIS
2,4,6-Trichlorophenol	1	rat	0.35				100			1.00E+02	2,4,5-Trichlorophenol	4.27E+02	1.00	1.00	Yes	Yes	IRIS
2,4,6-Trinitrotoluene	1	dog	14	LOAEL	subchronic	liver toxicity	0.5	2	5	7.46E-02		3.18E-01	1.00	1.00	Yes	Yes	IRIS
2,4-Dichlorophenol	1	rat	0.35	NOAEL	chronic	reproduction	0.3			3.00E-01		1.28E+00	1.00	1.00	Yes	Yes	IRIS
2,4-Dimethylphenol	1	rat	0.35	NOAEL	subchronic	growth, hematology	50	2		2.50E+01		1.07E+02	1.00	1.00	Yes	Yes	IRIS
2,4-Dinitrophenol	1	rat	0.35	NOAEL	subchronic	growth	5.4	2		2.70E+00		1.15E+01	1.00	1.00	Yes	Yes	IRIS[d]
2,4-Dinitrotoluene	1	dog	14	NOAEL	chronic	behavioral, neurotoxicity	0.2			2.98E-01		1.27E+00	1.00	1.00	Yes	Yes	ATSDR
2,6-Dinitrotoluene	1	dog	14	LOAEL	acute	*	0.4	Y	Y	5.97E-01		2.55E+00	1.00	1.00	Yes	Yes	EPA Region 6
2-AMINO-4,6-DNT	1	dog	14				0.2			2.98E-01	2,4-Dinitrotoluene	1.27E+00	1.00	1.00	Yes	Yes	ATSDR
2-Butanone	1	rat	0.35	NOAEL	chronic	reproduction	1771			1.77E+03		7.56E+03	1.00	1.00	Yes	Yes	IRIS
2-Chloroethylvinylether	1	rat	0.35				0.17			1.70E-01	Vinyl chloride	7.26E-01	1.00	1.00	Yes	Yes	Sample et al. 1996
2-Chloronaphthalene	1	mouse	0.03	NOAEL	subchronic	growth, mortality, organ toxicity	250	2		1.25E+02		5.34E+02	1.00	1.00	Yes	Yes	IRIS
2-Chlorophenol	1	rat	0.35	NOAEL	chronic	reproduction	5			5.00E+00		2.14E+01	1.00	1.00	Yes	Yes	IRIS
2-Chlorotoluene	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR
2-Hexanone	1	rat	0.35				570			5.70E+02	Hexane	2.43E+03	1.00	1.00	Yes	Yes	HEAST FY 1997
2-Methylnaphthalene	1	mouse	0.03				50			5.00E+01	Naphthalene	2.14E+02	1.00	1.00	Yes	Yes	EFA West 1998
2-Methylphenol	1	rat	0.35	NOAEL	subchronic	growth, neurotoxicity	50	2		2.50E+01		1.07E+02	1.00	1.00	Yes	Yes	IRIS
2-Nitroaniline	1	rat	0.35				5.4			5.40E+00	2,4-Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
2-Nitrophenol	1	rat	0.35				5.4			5.40E+00	2,4-Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
2-Nitrotoluene	1	dog	14				0.2			2.98E-01	2,4-Dinitrotoluene	1.27E+00	1.00	1.00	Yes	Yes	ATSDR
3,3'-Dichlorobenzidine	1	rat	0.35				0.3			3.00E-01	2,4-Dichlorophenol	1.28E+00	1.00	1.00	Yes	Yes	IRIS
3,5-Dimethylphenol	1	rat	0.35				50			5.00E+01	2,4-Dimethylphenol	2.14E+02	1.00	1.00	Yes	Yes	IRIS
3-Methylphenol	1	rat	0.35				50			5.00E+01	2-Methylphenol	2.14E+02	1.00	1.00	Yes	Yes	IRIS
3-Nitroaniline	1	rat	0.35				5.4			5.40E+00	2,4 Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
3-Nitrotoluene	1	dog	14				0.2			2.98E-01	2,4-Dinitrotoluene	1.27E+00	1.00	1.00	Yes	Yes	ATSDR
4,4'-DDD	1	rat	0.32				0.8			8.00E-01	4,4'-DDT	3.42E+00	1.00	1.00	Yes	Yes	EFA West 1998
4,4'-DDE	1	rat	0.32				0.8			8.00E-01	4,4'-DDT	3.42E+00	1.00	1.00	Yes	Yes	EFA West 1998
4,4'-DDT	1	rat	0.32	NOAEL	chronic	reproductive	0.8			8.00E-01		3.42E+00	1.00	1.00	Yes	Yes	EFA West 1998
4,6-Dinitro-2-methylphenol	1	rat	0.35				5.4			5.40E+00	2,4 Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
4-AMINO-2,6-DNT	1	dog	14				0.2			2.98E-01	2,4-Dinitrotoluene	1.27E+00	1.00	1.00	Yes	Yes	ATSDR
4-bromofluorobenzene	1	rat	0.35				14.8			1.48E+01	1,2,4-Trichlorobenzene	6.32E+01	1.00	1.00	Yes	Yes	IRIS
4-Bromophenyl phenyl ether	1	rat	0.35				1			1.00E+00	Decabromodiphenyl ether	4.27E+00	1.00	1.00	Yes	Yes	IRIS
4-Chloro-3-methylphenol	1	rat	0.35				5			5.00E+00	2-Chlorophenol	2.14E+01	1.00	1.00	Yes	Yes	IRIS
4-Chloroaniline	1	rat	0.35	LOAEL	chronic	growth, histology	12.5		5	2.50E+00		1.07E+01	1.00	1.00	Yes	Yes	IRIS
4-Chlorophenyl phenyl ether	1	rat	0.35				0.3			3.00E-01	2,4-Dichlorophenol	1.28E+00	1.00	1.00	Yes	Yes	IRIS
4-Chlorotoluene	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR
4-Methyl-2-Pentanone	1	rat	0.35				570			5.70E+02	Hexane	2.43E+03	1.00	1.00	Yes	Yes	HEAST FY 1997
4-Methylphenol	1	rat	0.35				50			5.00E+01	2-Methylphenol	2.14E+02	1.00	1.00	Yes	Yes	IRIS
4-Nitroaniline	1	rat	0.35				5.4			5.40E+00	2,4-Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
4-Nitrophenol	1	rat	0.35				5.4			5.40E+00	2,4-Dinitrophenol	2.31E+01	1.00	1.00	Yes	Yes	IRIS
4-Nitrotoluene	1	dog	14				0.2			2.98E-01	2,4-Dinitrotoluene	1.27E+00	1.00	1.00	Yes	Yes	ATSDR
Acenaphthene	1	mouse	0.03	NOAEL	subchronic	growth, organ toxicity	175	2		8.75E+01		2.70E+02	1.00	2.41	Yes		IRIS
Acenaphthylene	1	mouse	0.03				175			1.75E+02	Acenaphthene	7.47E+02	1.00	1.00	Yes	Yes	IRIS
Acetone	1	rat	0.35	NOAEL	subchronic	kidney and liver toxicity	10	Y		1.00E+01		4.27E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Acrolein	1	rat	0.35				53			5.30E+01	Acrylic acid	2.26E+02	1.00	1.00	Yes	Yes	IRIS
Acrylonitrile	1	rat	0.35	NOAEL	chronic	early mortality	0.1			1.00E-01		4.27E-01	1.00	1.00	Yes	Yes	ATSDR
Aldrin	1	rat	0.065	LOAEL	subchronic	Decrease in conditioned avoidance response	1	Y	Y	1.00E+00		4.27E+00	1.00	1.00	Yes	Yes	EFA West 1998
alpha-BHC	1	rat	0.176				0.05			5.00E-02	Lindane	2.14E-01	1.00	1.00	Yes	Yes	EFA West 1998
Aniline	1	rat	0.35				12.5			1.25E+01	4-Chloroaniline	5.34E+01	1.00	1.00	Yes	Yes	IRIS
Anthracene	1	mouse	0.03	NOAEL	subchronic	growth, histology	1000	2		5.00E+02		1.43E+03	1.00	2.82	Yes		IRIS
Azobenzene	1	rat	0.35				1.0			1.00E+00	Benzene	4.27E+00	1.00	1.00	Yes	Yes	Sample et al. 1996
Benzene	1	rat	0.35	NOAEL	chronic	hematopoetic	1.0			1.00E+00		4.27E+00	1.00	1.00	Yes	Yes	ATSDR
Benzidine	1	mouse	0.03	LOAEL	chronic	growth, organ toxicity	2.7		5	5.40E-01		2.31E+00	1.00	1.00	Yes	Yes	IRIS
Benzo(a)anthracene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	5.60E+00	1.00	1.00	Yes	Yes	EFA West 1998
Benzo(a)pyrene	1	mouse	0.03	NOAEL	chronic	longevity, pulmonary edema	1.31			1.31E+00		5.60E+00	1.00	1.00	Yes	Yes	EFA West 1998
Benzo(b)fluoranthene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	5.60E+00	1.00	1.00	Yes	Yes	EFA West 1998
Benzo(g,h,i)perylene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	6.42E+00	1.00	0.53	Yes		EFA West 1998
Benzo(k)fluoranthene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	5.76E+00	1.00	0.89	Yes		EFA West 1998
Benzoic Acid	1	human	70	NOAEL	chronic	no adverse medical symptoms observed	4.4			7.23E+00		3.09E+01	1.00	1.00	Yes	Yes	IRIS
Benzyl Alcohol	1	human	70				4.4			7.23E+00	Benzoic Acid	3.09E+01	1.00	1.00	Yes	Yes	IRIS
beta-BHC	1	rat	0.176				0.05			5.00E-02	Lindane	2.14E-01	1.00	1.00	Yes	Yes	EFA West 1998
bis(2-Chloroethoxy)methane	1	mouse	0.03				35.8			3.58E+01	bis(2-Chloroisopropyl) ether	1.53E+02	1.00	1.00	Yes	Yes	IRIS
bis(2-Chloroethyl)ether	1	mouse	0.03				35.8			3.58E+01	bis(2-Chloroisopropyl) ether	1.53E+02	1.00	1.00	Yes	Yes	IRIS
bis(2-Chloroisopropyl) ether	1	mouse	0.03	NOAEL	chronic	hematopoetic	35.8			3.58E+01		1.53E+02	1.00	1.00	Yes	Yes	IRIS
Bis(2-ethylhexyl)phthalate	1	mouse	0.03	NOAEL	chronic	reproduction	18.33			1.83E+01		7.83E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Bromobenzene	1	mouse	0.03				1			1.00E+00	Benzene	4.27E+00	1.00	1.00	Yes	Yes	Sample et al. 1996
Bromochloromethane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Bromodichloromethane	1	mouse	0.03	LOAEL	chronic	kidney toxicity	17.9		5	3.58E+00		1.53E+01	1.00	1.00	Yes	Yes	IRIS
Bromoform	1	rat	0.35	NOAEL	subchronic	organ toxicity	17.9	2		8.95E+00		3.82E+01	1.00	1.00	Yes	Yes	IRIS
Bromomethane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Butyl benzyl phthalate	1	rat	0.35	NOAEL	subchronic	growth, organ toxicity	159	2		7.95E+01		3.40E+02	1.00	1.00	Yes	Yes	IRIS
Carbazole	1	mouse	0.03				1000			1.00E+03	Anthracene	4.27E+03	1.00	1.00	Yes	Yes	IRIS
Carbon disulfide	1	rabbit	1.13	NOAEL	chronic	fetal toxicity/malformations	11			1.10E+01		4.70E+01	1.00	1.00	Yes	Yes	IRIS
Carbon tetrachloride	1	rat	0.35	NOAEL	subchronic	liver toxicity	0.71	2		3.55E-01		1.52E+00	1.00	1.00	Yes	Yes	IRIS
Chlordane	1	rat	0.35	NOAEL	chronic	liver toxicity	0.08			8.00E-02		3.42E-01	1.00	1.00	Yes	Yes	Khasawinah and Grutsch 1989
Chlorobenzene	1	dog	14	NOAEL	subchronic	organ toxicity	27.25	2		2.03E+01		8.68E+01	1.00	1.00	Yes	Yes	IRIS
Chlorodibromomethane	1	mouse	0.03				17.9			1.79E+01	Bromodichloromethane	7.65E+01	1.00	1.00	Yes	Yes	IRIS
Chloroethane	1	mouse	0.03				17			1.70E+01	trans-1,2-dichloroethene	7.26E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Chloroform	1	dog	14	LOAEL	chronic	liver toxicity	1		5	5.57E-02		2.38E-01	1.00	1.00	Yes	Yes	IRIS[e]

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Chemical	TEF	Test Species Common Name	Test Species Body Weight (kg)	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	Subchronic to Chronic UF	LOAEL to NOAEL UF	Rodent NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Mammalian ESL[b] (mg/kg soil)	Plant BAFc (unitless)	Invertebrate BAFc (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source
Chloromethane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Chlorotrifluoroethene	1	dog	14				2.5	Y		3.73E+00	1,1-Dichloroethene	1.59E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Chlorotrifluoromethane	1	rat	0.35				15			1.50E+01	Dichlorodifluoromethane	6.41E+01	1.00	1.00	Yes	Yes	IRIS
Chrysene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	2.36E+00	2.78	1.86			EFA West 1998
cis-1,2-Dichloroethene	1	rat	0.35	NOAEL	subchronic	body weight gain	32	2		1.60E+01		6.83E+01	1.00	1.00	Yes	Yes	ATSDR
cis-1,3-Dichloropropene	1	rat	0.35				5.1			5.10E+00	1,3-Dichloropropene	2.18E+01	1.00	1.00	Yes	Yes	IRIS
Decahydronaphthalene	1	rat	0.28				50			5.00E+01	Naphthalene	2.14E+02	1.00	1.00	Yes	Yes	EFA West 1998
delta-BHC	1	mouse	0.03				0.05			5.00E-02	Lindane	2.14E-01	1.00	1.00	Yes	Yes	EFA West 1998
Dibenz(a,h)anthracene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	5.60E+00	1.00	1.00	Yes	Yes	EFA West 1998
Dibenzofuran	1	mouse	0.03				1000			1.00E+03	Anthracene	4.27E+03	1.00	1.00	Yes	Yes	IRIS
Dibromochloromethane	1	rat	0.35	NOAEL	subchronic	hepatic lesions	21.4	2		1.07E+01		4.57E+01	1.00	1.00	Yes	Yes	IRIS
Dibromomethane	1	rat	0.35				5.85			5.85E+00	Methylene chloride	2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Dichlorobenzenes	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR
Dichlorodifluoromethane	1	rat	0.35	NOAEL	chronic	growth	15			1.50E+01		6.41E+01	1.00	1.00	Yes	Yes	IRIS
Dieldrin	1	rat	0.35	NOAEL	chronic	reproduction	0.02			2.00E-02		8.54E-02	1.00	1.00	Yes	Yes	Sample et al. 1996
Diethylphthalate	1	mouse	0.03	NOAEL	*	body weight gain	1625			1.63E+03		6.94E+03	1.00	1.00	Yes	Yes	ATSDR
Dimethyl phthalate	1	mouse	0.03				1625			1.63E+03	Diethylphthalate	6.94E+03	1.00	1.00	Yes	Yes	ATSDR
Dimethylphenol isomer	1	rat	0.35				50			5.00E+01	2,4-Dimethylphenol	2.14E+02	1.00	1.00	Yes	Yes	IRIS
Di-n-butylphthalate	1	rat	0.35	NOAEL	chronic	reproduction (decreased pup weight)	120			1.20E+02		5.13E+02	1.00	1.00	Yes	Yes	ATSDR
Di-n-octyl phthalate	1	rat	0.35	NOAEL	chronic	reproduction	350			3.50E+02		1.49E+03	1.00	1.00	Yes	Yes	ATSDR
Endosulfan Sulfate	1	rat	0.35	NOAEL	subchronic	reproduction	0.15	Y		1.50E-01		6.41E-01	1.00	1.00	Yes	Yes	Sample et al. 1996
Endrin	1	dog	14	NOAEL	chronic	neurologic/systemic	0.025			3.11E-02		1.33E-01	1.00	1.00	Yes	Yes	ATSDR
Ethylbenzene	1	rat	0.35	NOAEL	subchronic	liver and kidney toxicity	97.1	2		4.86E+01		2.07E+02	1.00	1.00	Yes	Yes	IRIS
Fluoranthene	1	mouse	0.03	NOAEL	subchronic	liver and kidney toxicity, hematology	125	2		6.25E+01		1.24E+02	2.84	0.91			IRIS
Fluorene	1	mouse	0.03	NOAEL	subchronic	hematology	125	2		6.25E+01		1.48E+02	1.00	3.94	Yes		IRIS
Formaldehyde	1	dog	12	NOAEL	chronic	reproduction	9.4			1.39E+01		5.93E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Freon 113	1	human	70				273			4.48E+02	1,1,2-Trichloro-1,2,2-trifluoroethane	1.92E+03	1.00	1.00	Yes	Yes	IRIS
Heptachlor	1	rat	0.1	LOAEL	chronic	weight gain, prostate androgenic receptor effects	0.13		Y	1.30E-01		5.55E-01	1.00	1.00	Yes	Yes	EFA WEST 1998
Heptachlor Epoxide	1	dog	14	LOAEL	chronic	liver toxicity	0.0125		5	3.73E-03		1.59E-02	1.00	1.00	Yes	Yes	IRIS
Hexachlorobenzene	1	rat	0.35	NOAEL	chronic	liver toxicity	0.08			8.00E-02		3.42E-01	1.00	1.00	Yes	Yes	IRIS
Hexachlorobutadiene	1	rat	0.35	NOAEL	chronic	kidney toxicity	0.2			2.00E-01		8.54E-01	1.00	1.00	Yes	Yes	ATSDR
Hexachlorocyclopentadiene	1	rat	0.35	NOAEL	subchronic	stomach lesions	6	2		3.00E+00		1.28E+01	1.00	1.00	Yes	Yes	IRIS[e]
Hexachloroethane	1	rat	0.35	NOAEL	subchronic	kidney toxicity	1	2		5.00E-01		2.14E+00	1.00	1.00	Yes	Yes	IRIS
Hexanal	1	rat	0.35				570			5.70E+02	Hexane	2.43E+03	1.00	1.00	Yes	Yes	HEAST FY 1997
HMX	1	mouse	0.03	NOAEL	subchronic	mortality	30	2		1.50E+01		6.41E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
Hydrazine	1	mouse	0.03	LOAEL	chronic	survival and histopathology	0.059		5	1.18E-02	1,2 dimethylhydrazine	5.04E-02	1.00	1.00	Yes	Yes	ATSDR
Indeno(1,2,3-cd)pyrene	1	mouse	0.03				1.31			1.31E+00	Benzo(a)pyrene	5.82E+00	1.00	0.86	Yes		EFA West 1998
Isophorone	1	dog	14	NOAEL	subchronic	kidney toxicity	150	2		1.12E+02		4.78E+02	1.00	1.00	Yes	Yes	IRIS
Isopropylbenzene	1	rat	0.35				97.1			9.71E+01	Ethylbenzene	4.15E+02	1.00	1.00	Yes	Yes	IRIS
Lindane	1	rat	0.176	NOAEL	chronic	reproduction, development	0.05			5.00E-02		2.14E-01	1.00	1.00	Yes	Yes	EFA West 1998
m,p-Xylene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
Methyl Isobutyl Ketone	1	rat	0.35				1771			1.77E+03	2-Butanone	7.56E+03	1.00	1.00	Yes	Yes	IRIS
Methyl tert-butyl ether	1	rat	0.35	LOAEL	subchronic	mortality	143	2	5	1.43E+01		6.10E+01	1.00	1.00	Yes	Yes	ATSDR
Methylene chloride	1	rat	0.35	NOAEL	chronic	organ toxicity	5.85			5.85E+00		2.50E+01	1.00	1.00	Yes	Yes	Sample et al. 1996
Methylphenol	1	rat	0.35				50			5.00E+01	2-Methylphenol	2.14E+02	1.00	1.00	Yes	Yes	IRIS
Monochlorobenzene	1	rat	0.35				75			7.50E+01	1,4-Dichlorobenzene	3.20E+02	1.00	1.00	Yes	Yes	ATSDR
Monomethylhydrazine	1	mouse	0.03	LOAEL	chronic	survival and histopathology	0.059		5	1.18E-02	1,2 dimethylhydrazine	5.04E-02	1.00	1.00	Yes	Yes	ATSDR
Naphthalene	1	rat	0.28	NOAEL	chronic	reproductive, systemic effects	50			5.00E+01		2.14E+02	1.00	1.00	Yes	Yes	EFA West 1998
Naphthalene	1	rat	0.28	NOAEL	chronic	reproductive, systemic effects	50			5.00E+01		2.14E+02	1.00	1.00	Yes	Yes	EFA West 1998
n-Butylbenzene	1	rat	0.35				97.1			9.71E+01	Ethylbenzene	4.15E+02	1.00	1.00	Yes	Yes	IRIS
Nitrobenzene	1	mouse/rat	0.03	LOAEL	subchronic	organ toxicity	4.6	2	5	4.60E-01		1.96E+00	1.00	1.00	Yes	Yes	IRIS
Nitrobenzene	1	mouse	0.03	LOAEL	subchronic	organ toxicity	4.6	2	5	4.60E-01		1.96E+00	1.00	1.00	Yes	Yes	IRIS
Nitrosodimethylamine	1	rat	0.35				13			1.30E+01	Tetryl	5.55E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
N-Nitrosodimethylamine	1	rat	0.35				13			1.30E+01	Tetryl	5.55E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
N-Nitrosodi-n-propylamine	1	rat	0.35				13			1.30E+01	Tetryl	5.55E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
N-Nitrosodiphenylamine	1	rat	0.35				13			1.30E+01	Tetryl	5.55E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
Nonane	1	rat	0.35				570			5.70E+02	Hexane	2.43E+03	1.00	1.00	Yes	Yes	HEAST FY 1997
n-Propylbenzene	1	rat	0.35				97.1			9.71E+01	Ethylbenzene	4.15E+02	1.00	1.00	Yes	Yes	IRIS
o-Xylene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
Pentachlorophenol	1	rat	0.35	NOAEL	chronic	liver and kidney toxicity	3			3.00E+00		1.28E+01	1.00	1.00	Yes	Yes	Schwetz et al. 1978 (IRIS)
Pentanal	1	rat	0.35				570			5.70E+02	Hexane	2.43E+03	1.00	1.00	Yes	Yes	HEAST FY 1997
Phenanthrene	1	mouse	0.03				75			7.50E+01	Pyrene	6.20E+01	7.19	1.85			IRIS
Phenol	1	rat	0.35	NOAEL	chronic	reproduction	60			6.00E+01		2.56E+02	1.00	1.00	Yes	Yes	IRIS
p-Isopropyltoluene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
Pyrene	1	mouse	0.03	NOAEL	subchronic	kidney toxicity	75	2		3.75E+01		7.63E+01	1.91	2.92			IRIS
Pyridine	1	rat	0.35	NOAEL	subchronic	liver toxicity	1	2		5.00E-01		2.14E+00	1.00	1.00	Yes	Yes	IRIS
RDX	1	rat	0.35	NOAEL	chronic	organ toxicity	10			1.00E+01		4.27E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
sec-Butylbenzene	1	rat	0.35				97.1			9.71E+01	Ethylbenzene	4.15E+02	1.00	1.00	Yes	Yes	IRIS
Styrene	1	dog	14	NOAEL	subchronic	growth, hematotogy	200	2		1.49E+02		6.37E+02	1.00	1.00	Yes	Yes	IRIS
tert-Butylbenzene	1	rat	0.35				97.1			9.71E+01	Ethylbenzene	4.15E+02	1.00	1.00	Yes	Yes	IRIS
Tetrachloroethene	1	mouse	0.011	LOAEL	subchronic	behavior	5	2	5	5.00E-01		2.14E+00	1.00	1.00	Yes	Yes	Fredriksson et al. 1993
Tetramethylcyclohexane Isomer	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
Tetryl	1	rat	0.35	NOAEL	subchronic	organ weight, kidney, blood cell counts	13	2		6.50E+00		2.78E+01	1.00	1.00	Yes	Yes	Talmage et al. 1999
Thiobismethane	1	rabbit	1.13				11			1.10E+01	Carbon disulfide	4.70E+01	1.00	1.00	Yes	Yes	IRIS
Toluene	1	mouse	0.03	LOAEL	chronic	behavior	2.88		5	5.76E-01		2.46E+00	1.00	1.00	Yes	Yes	Kostas and Hotchin 1981
Total xylenes	1	rat	0.35	LOAEL	subchronic	liver and kidney toxicity	150	2	5	1.50E+01		6.41E+01	1.00	1.00	Yes	Yes	Condie et al.1988
trans-1,2-Dichloroethene	1	mouse	0.03	NOAEL	subchronic	organ toxicity	452	2		2.26E+02		9.65E+02	1.00	1.00	Yes	Yes	ATSDR
trans-1,3-Dichloropropene	1	rat	0.35	LOAEL	chronic	organ toxicity	5.1		5	1.02E+00		4.36E+00	1.00	1.00	Yes	Yes	IRIS
Trichloroethene	1	mouse	0.03	LOAEL	subchronic	liver toxicity	0.7	Y	Y	7.00E-01		2.99E+00	1.00	1.00	Yes	Yes	Sample et al. 1996
Trichlorofluoromethane	1	rat/mice	0.35	LOAEL	chronic	survival and histopathology	349		5	6.98E+01		2.98E+02	1.00	1.00	Yes	Yes	IRIS
Trimethyl benzene	1	rat	0.35				150			1.50E+02	Xylenes	6.41E+02	1.00	1.00	Yes	Yes	Condie et al.1988
Unsymetricaldimethylhydrazine	1	mouse	0.03	LOAEL	chronic	survival and histopathology	0.059		5	1.18E-02	1,2 dimethylhydrazine	5.04E-02	1.00	1.00	Yes	Yes	ATSDR
Vinyl acetate	1	rat	0.35	NOAEL	chronic	pup body weight gain	117			1.17E+02		5.00E+02	1.00	1.00	Yes	Yes	ATSDR

Appendix C Attachment C-1 (4 of 4)

Calculation of Soil Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory

Chemical	TEF	Test Species Common Name	Test Species Body Weight (kg)	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	Subchronic to Chronic UF	LOAEL to NOAEL UF	Rodent NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Mammalian ESL[b] (mg/kg soil)	Plant BAFc (unitless)	Invertebrate BAFc (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source
Vinyl chloride	1	rat	0.35	NOAEL	chronic	longevity	0.17			1.70E-01		7.26E-01	1.00	1.00	Yes	Yes	Sample et al. 1996

Notes:
(a) # Indicates no appropriate structurally related surrogate available. Surrogate chosen is the lowest within the chemical group.
(b) Food and incidental soil intake values calculated as described in the text.

Deer Mouse Exposure Factors:

Default deer mouse bodyweight (kg)	0.0179
Ingestion rate(kg/day-kg body weight) =	0.213
Fraction plant consumed (dry weight) (unitless) =	0.7
Fraction invertebrate consumed (dry weight) (unitless) =	0.3
Soil consumed (dry weight) at 10% of intake (kg/day-kg bodyweight) =	0.0213

(c) BAFs are actual data or a default of 1.
(d) Secondary study selected because primary study was an anectdotal account of human cataract formation, not necessarily relevant to ecological endpoints.
(e) BMDL10
* Indicates that experimental detail not available in cited source document.
BAF - bioaccumulation factor
ESL - ecological screening level
kg - kilogram
LOAEL - lowest-observable-adverse-effect-level
mg - milligram
NOAEL - no-observable-adverse-effect-level
PCB - polychlorinated biphenyl
SVOC - semivolatile organic compound
TEF - toxicity equivalence factor
TRV - toxicity reference value
UF - uncertainty factor
VOC - volatile organic compound
Y - uncertainty factor used to derive TRV was included by original source

APPENDIX C

ATTACHMENT C-2

CALCULATION OF ECOLOGICAL SCREENING LEVELS FOR TERRESTRIAL AVIAN SPECIES

Calculation of Soil Ecological Screening Levels for Terrestrial Avian Species
Santa Susana Field Laboratory

Chemical	TEF	Test Species Common Name	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	LD_{50} to NOAEL UF	Subchronic to Chronic UF	LOAEL to NOAEL UF	Avian NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Avian ESL[b] (mg/kg soil)	Plant BAF[b] (unitless)	Invertebrate BAF[b] (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source	
1,2,3,4,6,7,8-HpCDD	0.001	Ring-Necked Pheasant				1.43E-02				1.43E-02	2,3,7,8-TCDD	1.33E-01	0.32	0.54			TEF from Van den Berg et al. 1998	
1,2,3,4,6,7,8-HpCDF	0.01	Ring-Necked Pheasant				1.43E-03				1.43E-03	2,3,7,8-TCDD	8.69E-03	1.00	0.54	Yes		TEF from Van den Berg et al. 1998	
1,2,3,4,7,8,9-HpCDF	0.01	Ring-Necked Pheasant				1.43E-03				1.43E-03	2,3,7,8-TCDD	6.35E-03	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998	
1,2,3,4,7,8-HxCDD	0.05	Ring-Necked Pheasant				2.86E-04				2.86E-04	2,3,7,8-TCDD	1.46E-03	1.00	0.78	Yes		TEF from Van den Berg et al. 1998	
1,2,3,4,7,8-HxCDF	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	7.97E-04	1.00	0.65	Yes		TEF from Van den Berg et al. 1998	
1,2,3,6,7,8-HxCDD	0.01	Ring-Necked Pheasant				1.43E-03				1.43E-03	2,3,7,8-TCDD	7.40E-03	1.00	0.76	Yes		TEF from Van den Berg et al. 1998	
1,2,3,6,7,8-HxCDF	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	1.12E-03	1.00	0.26	Yes		TEF from Van den Berg et al. 1998	
1,2,3,7,8,9-HxCDD	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	6.60E-04	1.00	0.93	Yes		TEF from Van den Berg et al. 1998	
1,2,3,7,8,9-HxCDF	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	6.35E-04	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998	
1,2,3,7,8-PeCDD	1	Ring-Necked Pheasant				1.43E-05				1.43E-05	2,3,7,8-TCDD	6.84E-05	1.00	0.88	Yes		TEF from Van den Berg et al. 1998	
1,2,3,7,8-PeCDF	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	9.57E-04	1.00	0.43	Yes		TEF from Van den Berg et al. 1998	
2,3,4,6,7,8-HxCDF	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	8.56E-04	1.00	0.56	Yes		TEF from Van den Berg et al. 1998	
2,3,4,7,8-PeCDF	1	Ring-Necked Pheasant				1.43E-05				1.43E-05	2,3,7,8-TCDD	8.88E-05	1.00	0.51	Yes		TEF from Van den Berg et al. 1998	
2,3,7,8-TCDD	1	Ring-Necked Pheasant	NOAEL	chronic	reproduction	1.43E-05				1.43E-05		6.35E-05	1.00	1.00	Yes	Yes	Sample et al. 1996	
2,3,7,8-TCDF	1	Chicken	LOAEL	sub-chronic	mortality	0.000001		Y	Y	1.00E-06		4.39E-06	1.00	1.02	Yes		TEF from Van den Berg et al. 1998	
OCDD	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	1.58E+00	0.23	0.47			TEF from Van den Berg et al. 1998	
OCDF	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	1.38E+00	0.33	0.50			TEF from Van den Berg et al. 1998	
Aroclor-1254	1	Screech Owl	NOAEL	chronic	reproduction	0.41				4.10E-01		3.68E-01	2.97	6.47			Sample et al. 1996	
Aroclor-1260	1	Chicken	LOAEL	chronic	reproduction	0.09			Y	9.00E-02		8.07E-02	2.97	6.47			EFA West 1998	
PCB-105	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	8.63E-02	3.30	10.36			TEF from Van den Berg et al. 1998	
PCB-114	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	3.73E-02	3.68	26.61			TEF from Van den Berg et al. 1998	
PCB-118	0.00001	Ring-Necked Pheasant				1.43E+00				1.43E+00	2,3,7,8-TCDD	7.99E-01	3.15	11.47			TEF from Van den Berg et al. 1998	
PCB-123	0.00001	Ring-Necked Pheasant				1.43E+00				1.43E+00	2,3,7,8-TCDD	7.29E-01	3.42	12.59			TEF from Van den Berg et al. 1998	
PCB-126	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	1.59E-04	2.23	5.32			TEF from Van den Berg et al. 1998	
PCB-156	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	1.45E-01	2.49	5.80			TEF from Van den Berg et al. 1998	
PCB-157	0.0001	Ring-Necked Pheasant				1.43E-01				1.43E-01	2,3,7,8-TCDD	1.42E-01	2.63	5.87			TEF from Van den Berg et al. 1998	
PCB-167	0.00001	Ring-Necked Pheasant				1.43E+00				1.43E+00	2,3,7,8-TCDD	1.40E+00	2.77	5.88			TEF from Van den Berg et al. 1998	
PCB-169	0.001	Ring-Necked Pheasant				1.43E-02				1.43E-02	2,3,7,8-TCDD	6.35E-02	1.00	1.00	Yes	Yes	TEF from Van den Berg et al. 1998	
PCB-189	0.00001	Ring-Necked Pheasant				1.43E+00				1.43E+00	2,3,7,8-TCDD	2.82E+00	2.16	2.39			TEF from Van den Berg et al. 1998	
PCB-77	0.05	Ring-Necked Pheasant				2.86E-04				2.86E-04	2,3,7,8-TCDD	2.76E-04	2.38	6.24			TEF from Van den Berg et al. 1998	
PCB-81	0.1	Ring-Necked Pheasant				1.43E-04				1.43E-04	2,3,7,8-TCDD	1.36E-04	3.00	5.98			TEF from Van den Berg et al. 1998	
Aluminum	1	Mallard Duck	NOAEL	chronic	reproduction	109.7				1.10E+02		9.12E+02	0.74	0.37			Sample et al. 1996	
Arsenic	1	Mallard Duck	NOAEL	chronic	growth/development	5.14				5.14E+00		3.66E+01	0.75	0.52			Sample et al. 1996	
Barium	1	Chicken	NOAEL	sub-chronic	mortality	20.8		Y		2.08E+01		4.49E+01	1.00	2.80			Sample et al. 1996	
Boron	1	Mallard Duck	NOAEL	chronic	reproduction	28.8				2.88E+01		2.31E+01	7.40	4.64			Sample et al. 1996	
Cadmium	1	Mallard Duck	LOAEL	chronic	growth/development	0.08			Y	8.00E-02		2.27E-02	10.80	19.69			EFA West 1998	
Copper	1	Broiler chicks	NOAEL	sub-chronic	weight gain	2.3		Y		2.30E+00		1.09E+00	1.88	14.72			EFA West 1998	
Lead	1	Japanese Quail	LOAEL	chronic	reproduction	0.014			Y	1.40E-02		6.32E-02	2.14	0.24			EFA West 1998	
Manganese	1	Japanese Quail	NOAEL	chronic	development, behavior	77.6			Y	7.76E+01		3.44E+02	1.00	1.00	Yes	Yes	EFA West 1998	
Mercury	1	Japanese Quail	NOAEL	chronic	reproduction	0.45				4.50E-01		8.79E-01	0.82	3.28			Sample et al. 1996	
Methyl Mercury	1	Mallard Duck	LOAEL	chronic	reproduction	0.039			Y	3.90E-02		1.73E-01	1.00	1.00	Yes	Yes	EFA West 1998	
Molybdenum	1	Chicken	LOAEL	chronic	reproduction	3.5			Y	3.50E+00		1.81E+00	13.58	5.91			Sample et al. 1996	
Nickel	1	Mallard Duck	NOAEL	sub-chronic	growth/development	1.38		Y		1.38E+00		1.47E+00	7.70	2.10			EFA West 1998	
Selenium	1	Mallard Duck	NOAEL	chronic	reproduction	0.23				2.30E-01		6.83E-01	1.00	1.84	Yes		EFA West 1998	
Vanadium	1	Mallard Duck	NOAEL	chronic	mortality	11.4				1.14E+01		1.04E+02	0.69	0.32			Sample et al. 1996	
Zinc	1	Chicken	NOAEL	chronic	reproduction	14.5				1.45E+01		2.59E+01	1.62	3.13			Sample et al. 1996	
1,2-Dichloroethane	1	Chicken	NOAEL	chronic	reproduction	17.2				1.72E+01		7.63E+01	1.00	1.00	Yes	Yes	Sample et al. 1996	
1,3-Dinitrobenzene	1	Red-Winged Blackbird	LD_{50}	acute	mortality	42.2	100			4.22E-01		1.87E+00	1.00	1.00	Yes	Yes	Schafer, 1972[c]	*
2,4-Dinitrophenol	1	Red-Winged Blackbird	LD_{50}	acute	mortality	13.3	100			1.33E-01		5.90E-01	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
2-Nitroaniline	1	Red-Winged Blackbird	LD_{50}	acute	mortality	750	100			7.50E+00		3.33E+01	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
3-Nitroaniline	1	Red-Winged Blackbird	LD_{50}	acute	mortality	133	100			1.33E+00		5.90E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
4,4'-DDE	1	Brown Pelican	LOAEL	chronic	reproduction	0.0028			Y	2.80E-03	4,4'-DDT	1.24E-02	1.00	1.00	Yes	Yes	Sample et al. 1996	
4,4'-DDT	1	Brown Pelican	LOAEL	chronic	reproduction	0.0028			Y	2.80E-03		1.24E-02	1.00	1.00	Yes	Yes	Sample et al. 1996	
4-Chloroaniline	1	House Sparrow	LD_{50}	acute	mortality	100	100			1.00E+00		4.44E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
4-Methylphenol	1	Red-Winged Blackbird	LD_{50}	acute	mortality	96	100			9.60E-01		4.26E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
4-Nitroaniline	1	Red-Winged Blackbird	LD_{50}	acute	mortality	75	100			7.50E-01		3.33E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
Acenaphthene	1	Red-Winged Blackbird	LD_{50}	acute	mortality	101	100			1.01E+00		2.46E+00	1.00	2.41	Yes		Schafer et al. 1983[c]	
Acetone	1	Japanese Quail	NOAEL	acute	*	10928		2		5.46E+03		2.43E+04	1.00	1.00	Yes	Yes	Hill and Camardese, 1986[d]	*
alpha-BHC	1	Japanese Quail	NOAEL	chronic	reproduction	0.563				5.63E-01		2.50E+00	1.00	1.00	Yes	Yes	Sample et al. 1996	
Aniline Surrogate	1	Red-Winged Blackbird	LD_{50}	acute	mortality	562	100			5.62E+00		2.49E+01	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
Anthracene	1	Red-Winged Blackbird	LD_{50}	acute	mortality	111	100			1.11E+00		2.38E+00	1.00	2.82	Yes		Schafer et al. 1983[c]	
Benzoic Acid	1	Red-Winged Blackbird	LD_{50}	acute	mortality	100	100			1.00E+00		4.44E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	

Calculation of Soil Ecological Screening Levels for Terrestrial Avian Species
Santa Susana Field Laboratory

Chemical	TEF	Test Species Common Name	Endpoint	Study Type	Effect to Test Organism	Toxicity Value (mg/kg-day)	LD_{50} to NOAEL UF	Subchronic to Chronic UF	LOAEL to NOAEL UF	Avian NOAEL-Equiv TRV (mg/kg-day)	Toxicity Value Surrogate[a]	Avian ESL[b] (mg/kg soil)	Plant BAF[b] (unitless)	Invertebrate BAF[b] (unitless)	Default Plant BAF (unitless)	Default Invertebrate BAF (unitless)	Initial Compilation Source	
Benzyl Alcohol	1	Red-Winged Blackbird	LD_{50}	acute	mortality	100	100			1.00E+00		4.44E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
beta-BHC	1	Japanese Quail	NOAEL	chronic	reproduction	0.563				5.63E-01		2.50E+00	1.00	1.00	Yes	Yes	Sample et al. 1996	
Bis(2-ethylhexyl)phthalate	1	Ringed Dove	NOAEL	sub-chronic	reproduction	1.11		Y		1.11E+00		4.93E+00	1.00	1.00	Yes	Yes	Sample et al. 1996	
Chlordane	1	European Starling	LD50	acute	mortality	23.4	100			2.34E-01		1.04E+00	1.00	1.00	Yes	Yes	Stickel et al. 1979[e]	*
delta-BHC	1	Japanese Quail	NOAEL	chronic	reproduction	0.563				5.63E-01		2.50E+00	1.00	1.00	Yes	Yes	Sample et al. 1996	
Dieldrin	1	Barn Owl	NOAEL	chronic	reproduction	0.077				7.70E-02		3.42E-01	1.00	1.00	Yes	Yes	Sample et al. 1996	
Dimethylphthalate	1	Red-Winged Blackbird	LD_{50}	acute	mortality	100	100			1.00E+00		4.44E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	
Di-n-butylphthalate	1	Ringed Dove	LOAEL	chronic	reproduction	0.11			Y	1.10E-01		4.88E-01	1.00	1.00	Yes	Yes	Sample et al. 1996	
Di-n-octylphthalate	1	Ring-Necked Pheasant	LD_{50}	acute	mortality	293.3	100			2.93E+00		1.30E+01	1.00	1.00	Yes	Yes	Hill et al., 1975[f]	*
Endosulfan Sulfate	1	Gray Partridge	NOAEL	chronic	reproduction	10				1.00E+01		4.44E+01	1.00	1.00	Yes	Yes	Sample et al. 1996	
Endrin	1	Screech Owl	LOAEL	chronic	reproduction	0.01			Y	1.00E-02		4.44E-02	1.00	1.00	Yes	Yes	Sample et al. 1996	
Fluorene	1	Red-Winged Blackbird	LD_{50}	acute	mortality	101	100			1.01E+00		1.65E+00	1.00	3.94	Yes		Schafer et al. 1983[c]	
Heptachlor	1	Japanese Quail	LOAEL	acute	mortality	13.358		2	5	1.34E+00		5.93E+00	1.00	1.00	Yes	Yes	Hill and Camardese, 1986[d]	*
Hexachlorobenzene	1	Japanese Quail	NOAEL	acute	mortality	54.5		2		2.73E+01		1.21E+02	1.00	1.00	Yes	Yes	Hill and Camardese, 1986[d]	*
Hexachlorobutadiene	1	Japanese Quail	NOAEL	chronic	*	3.185				3.19E+00		1.41E+01	1.00	1.00	Yes	Yes	Schwetz et al. 1974	
Lindane	1	Mallard Duck	LOAEL	chronic	reproduction	2			Y	2.00E+00		8.88E+00	1.00	1.00	Yes	Yes	Sample et al. 1996	
Pentachlorophenol	1	Japanese Quail	LD_{50}	acute	mortality	871	100			8.71E+00		3.87E+01	1.00	1.00	Yes	Yes	Hill and Camardese, 1986[d]	*
Phenanthrene	1	Red-Winged Blackbird	LD_{50}	acute	mortality	113	100			1.13E+00		1.31E+00	7.19	1.85			Schafer et al. 1983[c]	
Phenol	1	Red-Winged Blackbird	LD_{50}	acute	mortality	113	100			1.13E+00		5.02E+00	1.00	1.00	Yes	Yes	Schafer et al. 1983[c]	

Notes:

(a) Food and incidental soil intake values calculated as described in the text.

(b) BAFs are actual data or a default of 1

(c) In the Schafer et al. 1972 and 1983 studies birds were dosed by oral gavage on a mg/kg bodyweight basis.

(d) In the Hill and Camardese, 1986 study, 14 day old quail were administered test compound in feed.
Feed concentration was converted to daily dose by dividing intake by bodyweight.
Bodyweight for a 14 day old quail was estimated to be 0.04125kg from Sefton and Siegel, 1974.
Intake was calculated from reported food consumption of control and low dose groups over the 5 day exposure period;
pentachlorophenol 0.0116 kg/day calculated using the overall average control group values reported in the study.
acetone 0.01127 kg/day calculated using the average of control and treatment group food consumption in the acetone exposure.
heptachlor 0.01082 kg/day calculated using the average of control group food consumption in the heptachlor exposure.
hexachlorobenzene 0.01087 kg/day calculated using the average of control and treatment group food consumption in the hexachlorobenzene exposure.

(e) Stickel et al. 1979, exposed birds to 150 ppm in diet for 6 days. Using an approximate body weight for an adult starling (obtained from Stickel et al., 1983)
Intake was calculated using the equation of Nagy (2001), the daily intake is 0.630 x (82.1g)^0.683 = 12.79 g/day. The concentration in food may be converted to a daily dose as follows:
150 mg/kg food x 12.79 g/day x 1 kg/1000 g / 0.0821 kg = 23.4 mg/kg/day.

(f) The study by Hill et al. (1975), as cited in USEPA ECOTOX, exposed 10 day old pheasants n-dioctylphthalate at 5000 ppm in feed for 5-6 days.
The LC50 was reported as greater than the maximum concentration fed. Intake was calculated using the equation of Nagy (2001),
assuming a body weight for a juvenile Galliformes of approximately 0.04125 (Sefton and Siegel, 1974) as follows; 0.088(41.25)^0.891= 2.42 g/day,
for the calculation of dose 5000 mg/kg in feed x 2.42 g/day x 1kg/1000g * 1/0.04125 kg BW = 293.3 mg/kg BW - day

Thrush Exposure Factors:

Body weight (kg)	0.029
Ingestion rate (Nagy 2001 for passerines),(kg/day-kg body weight) =	0.22
Fraction plant consumed (dry weight) (unitless)=	0.39
Fraction invertebrate consumed (dry weight) (unitless) =	0.61
Fraction soil consumed (dry weight) (unitless) =	0.04

* Indicates experimental detail not available in cited source document.

BAF - bioaccumulation factor
ESL - ecological screening level
kg - kilogram
LD_{50} - lethal dose for 50% of study population
LOAEL - lowest-observable-adverse-effect-level
mg - milligram
NOAEL - no-observable-adverse-effect-level
PCB - polychlorinated biphenyl
SVOC - semivolatile organic compound
TEF - toxicity equivalency factor
TRV - toxicity reference value
UF - uncertainty factor
VOC - volatile organic compound
Y - uncertainty factor used to derive TRV was included by original source

APPENDIX C

ATTACHMENT C-3

CALCULATION OF ECOLOGICAL SCREENING LEVELS FOR TERRESTRIAL INVERTEBRATES

Calculation of Soil Ecological Screening Levels for Terrestrial Invertebrates
Santa Susana Field Laboratory

Chemical	Chemical Group	Test Species Common Name	Growth Medium	Exposure (days)	Endpoint	Response Parameter	Subchronic to Chronic UF	LOEC to NOEC UF	Invertebrate ESL (mg/kg soil)	Initial Compilation Source
2,3,7,8-TCDD	Dioxin	Earthworm	*	85	LOEC	*		Y	500	EPA Combustor Guidance
Antimony	Metal	Soil Invertebrate							78	EPA Eco-SSL
Arsenic	Metal	Soil Invertebrate							NA	EPA Eco-SSL
Barium	Metal	Soil Invertebrate							330	EPA Eco-SSL
Beryllium	Metal	Soil Invertebrate							40	EPA Eco-SSL
Cadmium	Metal	Soil Invertebrate							140	EPA Eco-SSL
Chromium	Metal	Soil Invertebrate							NA	EPA Eco-SSL
Copper	Metal	Earthworm	*	56	NOEC	cocoon production			32	EPA Combustor Guidance
Hexavalent Chromium	Metal	Earthworm	*	60	LOEC	reduced survival			0.2	EPA Combustor Guidance
Lead	Metal	Soil Invertebrate							1700	EPA Eco-SSL
Mercury	Metal	Earthworm	soil & dung	60	LOEC	survival, cocoon production		Y	0.10	ORNL (BMD)
Methyl mercury	Metal	Earthworm	*	84	NOEC	segment regeneration			2.50	ORNL
Nickel	Metal	Earthworm	*	100	NOEC	cocoon production			100	EPA Combustor Guidance
Selenium	Metal	Earthworm	*	chronic	LOEC	cocoon production		Y	8	EPA Combustor Guidance
Vanadium	Metal	Soil Invertebrate							NA	EPA Eco-SSL
Zinc	Metal	Earthworm	*	56	NOEC	cocoon production			199	EPA Combustor Guidance
Aroclor 1016	PCB	Earthworm	*	7	NOEC	*	Y		50	Parmelee et al. 1997
Aroclor 1254	PCB	Earthworm	*	7	NOEC	*	Y		50	Parmelee et al. 1997
1,4-Dichlorobenzene	SVOC	Earthworm	sandy soil	14	LOEC	survival LC_{50}		Y	20	ORNL (BMD)
2,4,5-Trichlorophenol	VOC	Earthworm	sandy soil	14	LOEC	survival LC_{50}		Y	9	ORNL (BMD)
2,4,6-Trichlorophenol	SVOC	Earthworm	horse manure	56	LOEC	cocoon production		Y	10	ORNL (BMD)
4-Nitrophenol	SVOC	Earthworm	sandy soil	56	LOEC	cocoon production		Y	7	ORNL (BMD)
Benzo(a)pyrene	SVOC	Woodlouse		28	NOEC	growth			25000	EPA Combustor Guidance
Dimethyl phthalate	SVOC	Earthworm	horse manure	56	NOEC	cocoon production			200	ORNL (BMD)
Fluorene	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			27	Sverdrup et al. 2002
Nitrobenzene	SVOC	Earthworm	*	14 (subchronic)	LOEC	*	Y	Y	40	EPA Combustor Guidance
N-Nitrosodiphenylamine	SVOC	Earthworm	horse manure	56	LOEC	cocoon production		Y	20	ORNL (BMD)
Pentachlorophenol	SVOC	Earthworm	*	21 (chronic)	NOEC	hatching success			6	EPA Combustor Guidance
Phenol	SVOC	Earthworm	horse manure	56	NOEC	cocoon production			30	ORNL (BMD)
1,2,3-Trichlorobenzene	VOC	Earthworm	sandy soil	14	LOEC	survival LC_{50}		Y	20	ORNL (BMD)
1,2,4-Trichlorobenzene	VOC	Earthworm	OECD soil	14	LOEC	survival LC_{50}		Y	20	ORNL (BMD)
1,2-Dichloropropane	VOC	Earthworm	horse manure	56	NOEC	growth			700	ORNL (BMD)
Pyrene	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			18	Sverdrup et al. 2002
Fluoranthene	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			38	Sverdrup et al. 2002
Phenanthrene	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			34	Sverdrup et al. 2002
Carbazole	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			34	Sverdrup et al. 2002
Dibenzofuran	SVOC	Enchytraeid	sandy soil	21	NOEC	NOEC reproduction			62	Sverdrup et al. 2002
Chlorobenzene	VOC	Earthworm	sandy soil	14	LOEC	survival LC_{50}		Y	40	ORNL (BMD)
Dieldrin	Pesticide	Soil Invertebrate							NA	EPA Eco-SSL

Notes:
These data are concentration and not dose based.
* Indicates experimental detail not available in cited source document.
(BMD) indicated a Bench Mark Dose calculated by primary source, incorporating appropriate uncertainty factors.
SVOC - semi-volatile organic compound
LD_{50} - lethal concentration for 50% of study population
LOEC - lowest-observable-effect-concentration
NOEC - no-observable-effect-concentration
NA - Not available. Data were insufficient. USEPA EcoSSL (2005)
UF - uncertainty factor
Y - uncertainty factor used to derive RfC was included by original source

APPENDIX C

ATTACHMENT C-4

CALCULATION OF INHALATION ECOLOGICAL SCREENING LEVELS FOR TERRESTRIAL MAMMALS

Calculation of Inhalation Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory[1]

	Primary Study Information:												Uncertainty Factors				
Chemical:	Test Species	Endpoint	Chronic/ Subchronic	Effect level	Exposure Duration	Body Weight (kg)	Formula Weight	Dose Reported in the Study (ppm)	Non-adjusted TRV (mg/m^3)	Non-adjusted TRV (mg/m^3)	Dose-time Adjustment (to 24-hrs/day, 7-days/week)	Dose - Time Adjustment (to 24 hrs/day, 7 days/week)	Toxicologically non-sensitive to sensitive endpoint	Subchronic to Chronic UF	LOAEL to NOAEL UF	Adjusted NOAEL-Equivalent TRV (mg/m^3)	Adjusted NOAEL-Equivalent TRV (mg/m^3)
1,1,1-Trichloroethane	Gerbil	neurological	Subchronic	NOAEL	24 hr day	0.1	133.42	70	382.0	76.4	-	-	-	2	-	191.0	38.2
1,1,2-Trichloroethane	Mouse	survival, LC50	Subchronic	LC50	6 hour	0.03	133.42	416	2270.0	22.7	2270*6hrs/24hrs = 567.5	22.7*6hrs/24hrs = 5.675	-	100 (*LD_{50} to NOAEL*)		5.7	0.05675
1,1-Dichloroethane	Cat	hepatic, renal, hematopoetic	Subchronic	NOAEL	6 hrs/day, 5 days/wk	2	98.97	500	2023.9	404.8	2023.9*6hrs/24hrs*5days/7days = 361	404.8*6hrs/24hrs*5days/7days = 72.29	-	2		180.5	36.15
1,1-Dichloroethene	Guinea Pig	survival	Subchronic	LOAEL	24 hrs/day	0.5	96.94	15	59.5	6	-	-	***	2	5	6.0	0.6
1,1-Dichloropropene	Mouse	respiratory	Chronic	NOAEL	6 hrs/day, 5 days/wk	0.03	110.97	5	22.7	22.7	22.7*5days/7days*6hrs/24hrs = 4.05	22.7*5 days/7 days*6 hrs/24 hrs = 4.05	-	-	-	4.1	4.05
1,2,3-Trichlorobenzene	Rat	hepatic	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.35	181.44	66	489.8	397	489.9*6hrs/24hrs = 122.5	397*6 hrs/24 hours = 99.25	-	2	-	61.3	49.625
1,2,4-Trichlorobenzene	Rat	hepatic	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.35	181.44	66	489.8	397	489.9*6hrs/24hrs = 122.5	397*6 hrs/24 hours = 99.25	-	2	-	61.3	49.625
1,2,4-Trimethylbenzene	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	120.19	100	434.0	434	434*6hrs/24hrs*5days/7days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5
1,2-Dichlorobenzene	Rat	hepatic	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.35	151.02	66	407.7	397	407.7*6hrs/24hrs = 102	397*6 hrs/24 hours = 99.25	-	2	-	51.0	49.625
1,2-Dichloroethane	Rat	systemic	Chronic	NOAEL	7 hrs/day, 5 days/wk	0.35	98.97	50	202.4	202.4	202.4*7hrs/24hrs*5days/7days = 42.167	202.4*7 hrs/24 hrs*5 days/7 days = 42.167	-	-	-	42.2	42.167
1,2-Dichloroethene	Rat	systemic	Subchronic	LOAEL	8 hrs/day; 5 days/wk	0.35	96.94	200	793.0	79.3	793*8hrs/24hrs*5days/7days = 188.8	79.3*8 hrs/24 hrs*5 days/7 days = 18.88	-	2	5	18.9	1.89
1,2-Dichloropropane	Rat	respiratory	Subchronic	LOAEL	6 hrs/day; 5 d/wk	0.35	112.98	15	69.3	69	69.6hrs/24hrs*5days/7days = 12.3	69*6 hrs/24 hrs*5days/7days = 12.3	-	2	5	1.2	1.23
1,2-Dichlorotetrafluoroethane (Freon 114)	Rat	maternal wt. gain	Chronic	NOAEL	24hrs/day, 7days/week	0.35	170.92	1000	884.2	909	000 ppm * 86.47/24.45 * 6 hrs/24 hrs = 884.2 mg/m	-	10	-	-	90.9	90.9
1,3,5-Trimethylbenzene	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	120.19	100	434.0	434	434*6hrs/24hrs*5days/7days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5
1,3-Dichlorobenzene	Rat	hepatic	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.35	147	66	396.8	397	397*6hrs/24hours = 99.25	397*6 hrs/24 hours = 99.25	-	2	-	49.6	49.625
1,4-Dichlorobenzene	Rat	hepatic	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.35	147	66	396.8	397	397*6hrs/24hours = 99.25	397*6 hrs/24 hours = 99.25	-	2	-	49.6	49.625
2-Butanone (MEK)	Mouse	development	Chronic	NOAEL	7 hrs/day	0.03	72.1	1000	2948.9	2978	2948.9*7hrs/24hrs = 860	2978*7 hrs/24 hrs = 868.58	-	-	-	860.0	868.58
2-Hexanone	Rat	neurological	Subchronic	LOAEL	8 hrs/day; 5 days/wk	0.35	100.16	50	204.8	20.5	204.8*8hrs/24hrs*5days/7days = 48.8	20.5*8 hrs/24 hrs*5 days/7 days =4.88	-	2	5	4.9	2.44
2-Methylnaphthalene	Mouse	olfactory	Chronic	LOAEL	6 hrs/day; 5 days/wk	0.03	142.2	10	58.2	10.5	58.2*6hrs/24hrs*5days/7days = 10.4	10.5*6 hrs/24 hrs*5 days/7 days = 1.875	-	-	5	2.1	0.375
Acetone	Rat	developmental	Chronic	NOAEL	6 hr/day; 7 days/wk	0.35	58.08	2200	5220.0	5220	5220*6hrs/24hrs = 1305	5220*6 hrs/24 hrs = 1305	-	-	-	1305.0	1305
Benzene	Mouse	systemic (decreased CFU-E lympocytes and RBCs)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.03	78.11	10	32.0	32	32*6hrs/24hrs*5days/7days = 5.714	32*6 hrs/24 hrs*5 days/7 days = 5.714	-	2	5	0.6	0.5714
Carbon disulfide	Rat	cardio	Subchronic	NOAEL	8 hrs/day; 5 days/wk	0.35	76.13	3.2	10.0	2	10*8hrs/24hrs*5days/7days = 2.38	2*8 hrs/24 hrs*5 days/7 days = 0.476	-	2	-	1.2	0.238
Carbon tetrachloride	Guinea Pig	survival	Subchronic	LOAEL	24 hrs/day	0.5	153.8	10	62.9	6.3		-	***	2	5	0.6	0.63
Chlorobenzene	Rat	hepatic, renal	Chronic	NOAEL	6 hr/day; 7 days/wk	0.35	112.55	50	230.2	230.2	230.2*6hrs/24hrs = 57.75	230.2*6 hrs/24 hrs = 57.55	-	-	-	57.6	57.55
Chloroethane	Mouse	development	Chronic	NOAEL	6 hrs/day	0.03	64.52	1504	3968.8	3968.2	3968.2*6hrs/24hrs = 992.05	3968.2*6 hrs/24 hrs = 992.05	-	-	-	992.1	992.05
Chloroform	Mouse	renal	Subchronic	NOAEL	6 hrs/day; 7 days/wk	0.03	119.38	1.99	9.7	1.94	9.7*6hrs/24hrs = 2.4	1.94*6 hrs/24 hrs = 0.485	-	2	-	1.2	0.243
Chloromethane	Mouse	neurological, hepatic	Chronic	LOAEL	6 hrs/day; 5 days/wk	0.03	64.52	51	134.6	20.7	134.6*6hrs/24hrs*5days/7days = 24	20.7*6 hrs/24 hrs*5 days/7 days = 3.696	-	-	5	4.8	0.7392
cis-1,2-Dichloroethene	Rat	systemic	Subchronic	LOAEL	8 hrs/day; 5 days/wk	0.35	96.94	200	793.0	79.3	809.5*8hrs/24hrs*5days/7days = 192.6	79.3*8 hrs/24 hrs*5 days/7 days = 18.88	-	2	5	19.3	1.888
Dichlorodifluoromethane (Freon 12)	Rat	maternal wt. gain	Chronic	NOAEL	24hrs/day, 7days/week	0.35	120.9	1000	909.0	909	-	-	10	-	-	90.9	90.9
Ethylbenzene	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	106.16	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.2	23.232
Ethylene dibromide	Rat	respiratory	Subchronic	NOAEL	6 hrs/day	0.35	187.88	3	23.1	4.62	23.1*6hrs/24hrs = 5.8	4.62*6 hrs/24 hrs = 1.155	-	2	-	2.9	0.5775
Fluorene	Hamster	tumors	Chronic	NOAEL	4.5 hrs/day; 7 days/wk	0.125	166.22	9.5	0.9	0.9	0.9*4.5 hrs/24 hrs = 0.169	0.9*4.5 hrs/24 hrs = 0.169	-	-	-	0.2	0.169
Freon 113	Rat	maternal wt. gain	Chronic	NOAEL	24hrs/day, 7days/week	0.35	187.38	1000	909.0	909	-	-	10	-	-	90.9	90.9

Appendix C Attachment C-4 (2 of 4)

Calculation of Inhalation Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory[1]

Primary Study Information:													Uncertainty Factors				
Chemical:	**Test Species**	**Endpoint**	**Chronic/ Subchronic**	**Effect level**	**Exposure Duration**	**Body Weight (kg)**	**Formula Weight**	**Dose Reported in the Study (ppm)**	**Non-adjusted TRV (mg/m^3)**	**Non-adjusted TRV (mg/m^3)**	**Dose-time Adjustment (to 24-hrs/day, 7-days/week)**	**Dose - Time Adjustment (to 24 hrs/day, 7 days/week)**	**Toxicologically non-sensitive to sensitive endpoint**	**Subchronic to Chronic UF**	**LOAEL to NOAEL UF**	**Adjusted NOAEL-Equivalent TRV (mg/m^3)**	**Adjusted NOAEL-Equivalent TRV (mg/m^3)**
Isopropylbenzene (cumene)	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	120.19	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.2	23.232
m,p-Xylenes	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	106.16	100	434.0	434	434*6 hrs/24 hrs*5 days/7 days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5
Methyl tert-butyl ether (MTBE)	Rat	hepatic, renal, development, endocrin	Chronic	NOAEL	6 hrs/day, 5 days/wk	0.35	88.14	400	1442.0	1442.1	1442.1*6 hrs/24 hrs*5 days/7 days = 257.5	1442.1*6 hrs/24 hrs*5 days/7 days = 257.5	-	-	-	257.5	257.5
Methylene Chloride	Rat	hepatic, renal	Subchronic	LOAEL	24 hrs/day	0.35	84.9	25	86.8	1.74		-	-	2	5	8.7	0.87
Naphthalene	Mouse	olfactory	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.03	128.18	10	52.4	10.5	52*6hrs/24hrs*5days/7days = 9.3	10.5*6 hrs/24 hrs*5 days/7 days =1.875	-	-	5	1.9	0.375
n-butylbenzene	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	134.22	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.3	23.232
n-Propylbenzene	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	120.19	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.3	23.232
o-Xylene	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	106.16	100	434.0	434	434*6 hrs/24 hrs*5 days/7 days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5
p-cymene (p-isopropyltoluene)	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	134.22	100	434.0	434	434*6 hrs/24 hrs*5 days/7 days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5
Phenanthrene	Hamster	tumors	Chronic	LOAEL	4.5 hrs/day; 7 days/wk	0.125	178.23	9.5	69.3	0.9	69.3*4.5hrs/24hrs = 12.9	0.9*4.5 hrs/24 hrs = 0.169	-	-	5	2.6	0.169
sec-butylbenzene	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	134.22	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.2	23.232
Styrene	Rat	neurological	Subchronic	NOAEL	24 hrs/day	0.35	104.14	90	383.3	76.7	-	-	-	2	-	191.7	38.35
t-butylbenzene	Rat	systemic (blood and renal effects)	Subchronic	LOAEL	6 hrs/day, 5 days/wk	0.35	134.21	300	1301.0	1301	1301*6 hours/24 hrs*5 days/7 days = 232.32	1301*6 hours/24 hrs*5 days/7 days = 232.32	-	2	5	23.2	23.232
Tetrachloroethene	Mouse	systemic (lung congestion, heptatocellular degeneration, necrosis)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.03	165.83	100	679.0	679	679*6 hrs/24 hrs*5 days/7 days = 121.25	679*6 hrs/24 hrs*5 days/7 days = 121.25	-	-	5	24.3	24.25
Toluene	Rat	immune (increased susceptibility to infection)	Subchronic	LOAEL	3 hrs/day, 5 days/wk	0.35	92.13	2.5	9.4	9.4	9.4*3 hrs/24 hrs*5 days/7 days = 0.839	9.4*3 hrs/24 hrs*5 days/7 days = 0.839	-	2	5	0.1	0.0839
trans-1,2-Dichloroethene	Rat	systemic	Subchronic	LOAEL	8 hrs/day; 5 days/wk	0.35	96.94	200	793.0	79.3	793*8hrs/24hrs*5days/7days = 188.8	79.3*8 hrs/24 hrs*5 days/7 days = 18.88	-	2	5	18.9	1.888
Trichloroethene	Rat	behavior (decrased wakefulness, heart rate)	Subchronic	LOAEL	24 hrs/day; 5 days/wk	0.35	131.4	50	270.0	270	270*8 hrs/24 hrs*5 days/7 days =64.29	270*8 hrs/24 hrs*5 days/7 days =64.29	-	2	5	6.4	6.429
Trichlorofluoromethane (Freon 11)	Rat	maternal wt. gain	Chronic	NOAEL	24hrs/day, 7days/week	0.35	137.36	1000	909.0	909	-	-	10	-	-	90.9	90.9
Vinyl chloride	Rat	hepatic, testes	Subchronic	LOAEL	6 hrs/day; 6 days/wk	0.35	62.5	10	25.6	26	26*6 hrs/24 hrs*6 days/7 days = 5.57	26*6 hrs/24 hrs*6 days/7 days = 5.57	-	2	5	0.6	0.557
Xylenes (total)	Rat	behavior (rotorod performance, spontaneity)	Chronic	LOAEL	6 hrs/day, 5 days/wk	0.35	106.16	100	434.0	434	434*6 hrs/24 hrs*5 days/7 days = 77.5	434*6 hrs/24 hrs*5 days/7 days = 77.5	-	-	5	15.5	15.5

Appendix C Attachment C-4 (3 of 4)

Calculation of Inhalation Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory[1]

Chemical:	Primary Source	Source/TRV Provided by:	Source Cited in:	Source Article(s)
1,1,1-Trichloroethane	Rosengren et al. 1985	Recommended by HERD	ATSDR	Rosengren LE, Aurell A, Kjellstrand P, et al. 1985. Astrogliosis in the cerebral cortex of gerbils after long-term exposure to 1,1,1-trichloroethane. Scand J Work Environ Health 11:447-456.
1,1,2-Trichloroethane	Gradiski et al. 1978	Recommended by HERD	ATSDR	Gradiski D, Bonnet P, Raoult G, et al. 1978. [Comparative acute inhalation toxicity of the principal chlorinated aliphatic solvents.] Arch Mal Prof Med Trav Secur Soc 39:249-257. (French)
1,1-Dichloroethane	Hofmann et al. 1971	Recommended by HERD	ATSDR	Hofmann HT, Birnstiel H, Jobst P. 1971. [Inhalation toxicity of 1,1- and 1,2-dichloroethane]. Arch Toxikol 27:248- 265. (German).
1,1-Dichloroethene	Prendergast et al. 1967	Recommended by HERD	ATSDR	Prendergast JA, Jones RA, Jenkins LJ, et al. 1967. Effects on experimental animals of long-term inhalation of trichloroethylene, carbon tetrachloride,1,1,1-trichloroethene, dichlorodifluoromethane, and 1,1-dichloroethylene.Toxicol Appl Pharmacol 10:270-289.
1,1-Dichloropropene	Lomax et al. 1989 (1,3-DCP)	Recommended by HERD	ATSDR (1,3-DCP)	Lomax L, Stott W, Johnson K, et al. 1989. The chronic toxicity and oncogenicity of inhaled technical grade 1,3-dichloropropene in rats and mice. Fundam Appl Toxicol 12:418-431.
1,2,3-Trichlorobenzene	1,4-Dichlorobenzene as surrogate	Recommended by HERD	ATSDR	Tyl RW, Neeper-Bradley TL. 1989. Paradichlorobenzene: Two generation reproductive study of inhaled paradichlorobenzene in Sprague-Dawley (CD) rats. Laboratory Project 86-81-90605. Washington, DC: Chemical Manufacturers Association, Chlorobenzene Producers Association.
1,2,4-Trichlorobenzene	1,4-Dichlorobenzene as surrogate	Recommended by HERD	ATSDR	Tyl RW, Neeper-Bradley TL. 1989. Paradichlorobenzene: Two generation reproductive study of inhaled paradichlorobenzene in Sprague-Dawley (CD) rats. Laboratory Project 86-81-90605. Washington, DC: Chemical Manufacturers Association, Chlorobenzene Producers Association.
1,2,4-Trimethylbenzene	Tech Memo (Xylenes)	Tetra Tech, 2002	Tech Memo (Xylenes)	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.
1,2-Dichlorobenzene	1,4-Dichlorobenzene as surrogate	Recommended by HERD	ATSDR	Tyl RW, Neeper-Bradley TL. 1989. Paradichlorobenzene: Two generation reproductive study of inhaled paradichlorobenzene in Sprague-Dawley (CD) rats. Laboratory Project 86-81-90605. Washington, DC: Chemical Manufacturers Association, Chlorobenzene Producers Association.
1,2-Dichloroethane	Cheever et al. 1990	Recommended by HERD	ATSDR	Cheever KL, Cholakis JM, el-Hawari AM, et al. 1990. Ethylene dichloride: The influence of disulfiram or ethanol on oncogenicity, metabolism, and DNA covalent binding in rats. Fundam Appl Toxicol 14:243-261.
1,2-Dichloroethene	Freundt et al. 1977	Recommended by HERD	ATSDR	Freundt KJ, Liebaldt GP, Lieberwirth E. 1977. Toxicity studies on trans-1,2-dichloroethylene. Toxicology 7:141-153.
1,2-Dichloropropane	Nitschke et al. 1988	Recommended by HERD	IRIS	Nitschke K.D., K.A. Johnson, D.L. Wackerle, J.E. Phillips and D.A. Dittenber. 1988. Propylene dichloride: A 13-week inhalation toxicity study with rats, mice, and rabbits. Dow Chemical Company, Mammalian and Environmental Toxicology Research Laboratory, Midland, MI. OTS Doc. #86-870001397
1,2-Dichlorotetrafluoroethane (Freon 1	Palmer et al. 1978 (Freon 22)	Recommended by HERD	IRIS (Freon 22)	Palmer, A.K., D.D. Cozens, R. Clark, and G.C. Clark. 1978a. Effect of Arcton 22 on pregnant rats: Relationship to anophthalmia and microphthalmia. Report No. ICI 174/78208. Huntingdon Research Centre, Huntingdon, UK.
1,3,5-Trimethylbenzene	Tech Memo (Xylenes)	Tetra Tech, 2002	Tech Memo (Xylenes)	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.
1,3-Dichlorobenzene	1,4-Dichlorobenzene as surrogate	Recommended by HERD	ATSDR	Tyl RW, Neeper-Bradley TL. 1989. Paradichlorobenzene: Two generation reproductive study of inhaled paradichlorobenzene in Sprague-Dawley (CD) rats. Laboratory Project 86-81-90605. Washington, DC: Chemical Manufacturers Association, Chlorobenzene Producers Association.
1,4-Dichlorobenzene	Tyl and Neeper-Bradley, 1989	Recommended by HERD	ATSDR	Tyl RW, Neeper-Bradley TL. 1989. Paradichlorobenzene: Two generation reproductive study of inhaled paradichlorobenzene in Sprague-Dawley (CD) rats. Laboratory Project 86-81-90605. Washington, DC: Chemical Manufacturers Association, Chlorobenzene Producers Association.
2-Butanone (MEK)	Mast et al. 1989	Recommended by HERD	ATSDR	Mast T, Dill J, Evanoff J, et al. 1989. Inhalation developmental toxicology studies: teratology study of methyl ethyl ketone in mice. Report by Pacific Northwest Laboratory, Richland, WA to National Institute of Environmental Health Science, National Toxicology Program. PNL-6833 DE89 009563.
2-Hexanone	Duckett et al. 1979	Recommended by HERD	ATSDR	Duckett S, Streletz LJ, Chambers RA, et al. 1979. 50 ppm MnBK subclinical neuropathy in rats. Experientia 35:1365-1367.
2-Methylnaphthalene	NTP 1992 (Naphthalene)	Recommended by HERD	ATSDR (Naphthalene)	NTP. 1992. National Toxicology Program. Technical report series No. 410. Toxicology and carcinogenesis studies of naphthalene (CAS No. 91-20-3) in B6C3F1 mice (inhalation studies). Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 92-3141.
Acetone	NTP 1998	U.S. Air Force, 2004	Vandenberg Tox Profiles	NTP. 1988. National Toxicology Program--report no. PNL-6768. Inhalation developmental toxicology studies: Teratology study of acetone in mice and rats. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institute of Health. NTIS DE89- 005671.
Benzene	Tech Memo	Tetra Tech, 2002	Tech Memo	Baarson, K.A., C.A. Snyder, and R.E. Albert. 1984 Repeated exposures of C57BL mice to inhaled benzene at 10 ppm markedly depressed erythropoietic colony formation. Toxicol. Lett. 20:337-342.
Carbon disulfide	Antov et al. 1985	Recommended by HERD	ATSDR	Antov G, Kazakova B, Spasovski M, et al. 1985. Effect of carbon disulphide on the cardiovascular system. J Hyg Epidemiol Microbiol Immunol 29:329-335.
Carbon tetrachloride	Prendergast et al. 1967	Recommended by HERD	ATSDR	Prendergast JA, Jones RA, Jenkins LJ, et al. 1967. Effects on experimental animals of long-term inhalation of trichloroethylene, carbon tetrachloride, 1,1,1,-trichloroethane, dichlorofluoromethane, and 1,1-dichloroethylene. Toxicol Appl Pharmacol 10:270-289.
Chlorobenzene	Nair et al. 1987	Recommended by HERD	ATSDR	Nair RS, Barter JA, Schroeder RE, et al. 1987. A two generation reproduction study with monochlorobenzene vapor in rats. Fundam Appl Toxicol 9:678-686.
Chloroethane	Scortichini et al. 1986	Recommended by HERD	ATSDR	Scortichini BH, Johnson KA, Momany-Pfruenderd JJ, et al. 1986. Ethyl chloride: Inhalation teratology study in CF-1 mice. Dow Chemical Company, Mammalian and Environmental Toxicology Research Laboratory, Health and Environmental Sciences, Midland, MI. NTIS no. OTS0001135.
Chloroform	Larson et al. 1996	Recommended by HERD	ATSDR	Larson JL, Templin MV, Wolf DC. 1996. A 90-day chloroform inhalation study in female and male B6C3F mice: Implications for cancer risk assessment. Fundamental and Applied Toxicology 1 30:118-137.
Chloromethane	CIIT 1981, McKenna et al. 1981	Recommended by HERD	ATSDR	CIIT. 1981. Final report on a chronic inhalation toxicology study in rats and mice exposed to methyl chloride. Unpublished study prepared by Battelle-Columbus Laboratories, Columbus, OH. OTS Submission Document ID 40-8120717. Microfiche 511310. McKenna MJ, Burek JD, Henck JW, et al. 1981b. Methyl chloride: A 90-day inhalation toxicity study in rats, mice and beagle dogs. Toxicology Research Laboratory, Dow Chemical USA, Midland MI. OTS submission document 40-8120723. Microfiche 511317.
cis-1,2-Dichloroethene	Freundt et al. 1977 (1,2-DCE)	Recommended by HERD	ATSDR (1,2-DCE)	Freundt KJ, Liebaldt GP, Lieberwirth E. 1977. Toxicity studies on trans-1,2-dichloroethylene. Toxicology 7:141-153.
Dichlorodifluoromethane (Freon 12)	Palmer et al. 1978 (Freon 22)	Recommended by HERD	IRIS (Freon 22)	Palmer, A.K., D.D. Cozens, R. Clark, and G.C. Clark. 1978a. Effect of Arcton 22 on pregnant rats: Relationship to anophthalmia and microphthalmia. Report No. ICI 174/78208. Huntingdon Research Centre, Huntingdon, UK.
Ethylbenzene	Tech Memo	Tetra Tech, 2002	Tech Memo	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
Ethylene dibromide	Nitschke et al. 1981; Reznik et al. 1980	Recommended by HERD	ATSDR	Nitschke KD, Kociba RJ, Keyes DG, et al. 1981. A thirteen week repeated inhalation study of ethylene dibromide in rats. Fundam Appl Toxicol 1:437-442. Reznik G, Stinson SF, Ward JM. 1980. Respiratory pathology in rats and mice after inhalation of 1,2-dibromo-3-chloropropane or 1,2-dibromoethane for 13 weeks. Arch Toxicol 46:233-240.
Fluorene	Thyssen et al. 1981 (BaP)	Recommended by HERD	ATSDR	Thyssen J, Althoff JKG, Mohr U. 1981. Inhalation studies with benzo[a]pyrene in Syrian golden hamsters. J Natl Cancer Inst 66:575-577.
Freon 113	Palmer et al. 1978 (Freon 22)	Recommended by HERD	IRIS (Freon 22)	Palmer, A.K., D.D. Cozens, R. Clark, and G.C. Clark. 1978a. Effect of Arcton 22 on pregnant rats: Relationship to anophthalmia and microphthalmia. Report No. ICI 174/78208. Huntingdon Research Centre, Huntingdon, UK.

Appendix C Attachment C-4 (4 of 4)

Calculation of Inhalation Ecological Screening Levels for Terrestrial Mammals
Santa Susana Field Laboratory[1]

Chemical:		Primary Source	Source/TRV Provided by:	Source Cited in:	Source Article(s)
Isopropylbenzene (cumene)		Tech Memo (Ethylbenzene)	Tetra Tech, 2002	Tech Memo (Ethylbenzene)	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
m,p-Xylenes		Tech Memo (Xylenes)	Tetra Tech, 2002	Tech Memo (Xylenes)	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.
Methyl tert-butyl ether (MTBE)		Chun et al. 1992	Recommended by HERD	ATSDR	Chun, J.S., H.D. Burleigh-Flayer, and W.J. Kintigh. 1992. Methyl tertiary butyl ether: vapor inhalation oncogenicity study in Fischer 344 rats (unpublished material). Prepared for the MTBE Committee by Bushy Run Research Center, Union Carbide Chemicals and Plastics Company Inc. Docket No. OPTS- 42098.
Methylene Chloride		Haun et al. 1972	Recommended by HERD	ATSDR	Haun CC, Vernot EH, Darmer KI, et al. 1972. Continuous animal exposure to low levels of dichloromethane. In: Proceedings of the 3rd annual conference on environmental toxicology. Wright Patterson Air Force Base, OH: Aerospace Medical Research Laboratory, 199-208. AMRL-TR-72-130. AD 773766.
Naphthalene		NTP 1992	Recommended by HERD	ATSDR	NTP. 1992. National Toxicology Program. Technical report series No. 410. Toxicology and carcinogenesis studies of naphthalene (CAS No. 91-20-3) in B6C3F1 mice (inhalation studies). Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 92-3141.
n-butylbenzene		Tech Memo (Ethylbenzene)	Tetra Tech, 2002	Tech Memo (Ethylbenzene)	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
n-Propylbenzene		Tech Memo (Ethylbenzene)	Tetra Tech, 2002	Tech Memo (Ethylbenzene)	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
o-Xylene		Tech Memo (Xylenes)	Tetra Tech, 2002	Tech Memo (Xylenes)	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.
p-cymene (p-isopropyltoluene)		Tech Memo (Xylenes)	Tetra Tech, 2002	Tech Memo (Xylenes)	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.
Phenanthrene		Thyssen et al. 1981 (BaP)	Recommended by HERD	ATSDR	Thyssen J, Althoff JKG, Mohr U. 1981. Inhalation studies with benzo[a]pyrene in Syrian golden hamsters. J Natl Cancer Inst 66:575-577.
sec-butylbenzene		Tech Memo (Ethylbenzene)	Tetra Tech, 2002	Tech Memo (Ethylbenzene)	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
Styrene		Rosengren and Haglid 1989	Recommended by HERD	ATSDR	Rosengren LE, Haglid KG. 1989. Long term neurotoxicity of styrene. A quantitative study of glial fibrillary acidic protein (GFA) and S-100. Br J Ind Med 46:316-320.
t-butylbenzene		Tech Memo (Ethylbenzene)	Tetra Tech, 2002	Tech Memo (Ethylbenzene)	Elovaara, E., K. Engstrom, J. Nickels, et al. 1985 Biochemical and morphological effects of long-term inhalation exposure of rats to ethylbenzene. Xenobiotica 15:299-308.
Tetrachloroethene		Tech Memo	Tetra Tech, 2002	Tech Memo	NTP 1986. National Toxicology Program--technical report series no. 311. Toxicology and carcinogenesis studies of tetrachloroethylene (perchloroethylene) (CAS No. 127-18-4) in F344/N rats and B6C3F1 mice (inhalation studies). Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, NIH publication no. 86-2567.
Toluene		Tech Memo	Tetra Tech, 2002	Tech Memo	Aranyi, C., W.J. O'Shea, R.L. Sherwood, J.A. Grahm, and F.J. Miller. 1985 Effects of Toluene Inhalation on Pulmonary Host Defenses of Mice. Toxicol. Letters 25: 103-110.
trans-1,2-Dichloroethene		Freundt et al. 1977 (1,2-DCE)	Recommended by HERD	ATSDR (1,2-DCE)	Freundt KJ, Liebaldt GP, Lieberwirth E. 1977. Toxicity studies on trans-1,2-dichloroethylene. Toxicology 7:141-153.
Trichloroethene		Tech Memo	Tetra Tech, 2002	Tech Memo	Arito H, Takahashi M, Ishikawa T. 1994 Effect of subchronic inhalation exposure to low-level trichloroethylene on heart rate and wakefulness-sleep in freely moving rats. Sangyo Igaku 36:1-8.
Trichlorofluoromethane (Freon 11)		Palmer et al. 1978 (Freon 22)	Recommended by HERD	IRIS (Freon 22)	Palmer, A.K., D.D. Cozens, R. Clark, and G.C. Clark. 1978a. Effect of Arcton 22 on pregnant rats: Relationship to anophthalmia and microphthalmia. Report No. ICI 174/78208. Huntingdon Research Centre, Huntingdon, UK.
Vinyl chloride		Bi et al. 1985	Recommended by HERD	ATSDR	Bi, WF; Wang, YS; Huang, MY; et al. (1985) Effect of vinyl chloride on testis in rats. Ecotoxicol Environ Saf 10(3):281-289.
Xylenes (total)		Tech memo	Tetra Tech, 2002	Tech Memo	Korsak, Z., J.A. Sokal, and R. Gorny. 1992 Toxic effects of combined exposure to toluene and m-xylene in animals. III. Subchronic inhalation study. Polish Journal of Occupational Medicine and Environmental Health 5(1):27-33.

Notes:
*** - Determined by DTSC to be the lowest dose at which an adverse effect occurred, therefore no non-sensitive to sensitive endpoint needs to be applied.

[1] Inhalation ESLs and calculation were provided by HERD/DTSC (August 2005)