APPENDIX E

CALCULATION OF
FINFISH TISSUE POLLUTANT CONCENTRATIONS

Exhibit E-1. Recreational Finfish Tissue Pollutant Concentrations - Gulf of Mexico Current Technology

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	1.170		1.01e-04	7.15e-07	426	3.04e-04
Fluorene	0.6382		5.49e-05	3.90e-07	30	1.17e-05
Phenanthrene	1.5136		1.30e-04	9.25e-07	2630	2.43e-03
Phenol	0.0001		8.60e-09	6.11e-11	1.4	8.55e-11
Cadmium	0.1707	0.11	1.62e-06	1.15e-08	64	7.34e-07
Mercury	0.0155	0.018	2.40e-08	1.70e-10	5500	9.37e-07
Antimony	0.8843		7.61e-05	5.40e-07	1	5.40e-07
Arsenic	1.1015	0.005	4.74e-07	3.36e-09	44	1.48e-07
Beryllium	0.1086		9.34e-06	6.63e-08	19	1.26e-06
Chromium	37.233	0.034	1.09e-04	7.73e-07	16	1.24e-05
Copper	2.9011	0.0063	1.57e-06	1.12e-08	36	4.02e-07
Lead	5.4453	0.02	9.37e-06	6.65e-08	49	3.26e-06
Nickel	2.0944	0.043	7.75e-06	5.50e-08	47	2.59e-06
Selenium	0.1707		1.47e-05	1.04e-07	4.8	5.00e-07
Silver	0.1086		9.34e-06	6.63e-08	0.5	3.32e-08
Thallium	0.1862		1.60e-05	1.14e-07	116	1.32e-05
Zinc	31.11	0.0041	1.10e-05	7.79e-08	47	3.66e-06
Aluminum	1,407		1.21e-01	8.59e-04	231	1.99e-01
Barium	18,516		1.59e+00	1.13e-02		
Iron	2,380		2.05e-01	1.45e-03		
Tin	2.265		1.95e-04	1.38e-06		
Titanium	13.575		1.17e-03	8.29e-06		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 11,624

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =
(11.1 min. * 0.0175 m^3/min) * 11,624 dilutions = 2,257.9

Mixing zone cylinder volume = 314,000 m^3; based on 100 m radius and
10 m depth = time to reach 100 m (11 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =
0.72% = fractional area of mixing zone affected by plume (2,257.9/314,000)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)

D= C * 0.0072 (SBF plume portion of cylinder)

F= D * E (exposure conc. * BCF)

Exhibit E-2. Recreational Finfish Tissue Pollutant Concentrations - Gulf of Mexico Discharge Option

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	0.811		6.98e-05	4.95e-07	426	2.11e-04
Fluorene	0.4424		3.81e-05	2.70e-07	30	8.11e-06
Phenanthrene	1.0494		9.03e-05	6.41e-07	2630	1.69e-03
Phenol	0.0001		8.60e-09	6.11e-11	1.4	8.55e-11
Cadmium	0.1183	0.11	1.12e-06	7.95e-09	64	5.09e-07
Mercury	0.0108	0.018	1.67e-08	1.19e-10	5500	6.53e-07
Antimony	0.6128		5.27e-05	3.74e-07	1	3.74e-07
Arsenic	0.7634	0.005	3.28e-07	2.33e-09	44	1.03e-07
Beryllium	0.0753		6.48e-06	4.60e-08	19	8.74e-07
Chromium	25.804	0.034	7.55e-05	5.36e-07	16	8.57e-06
Copper	2.011	0.0063	1.09e-06	7.74e-09	36	2.79e-07
Lead	3.774	0.02	6.49e-06	4.61e-08	49	2.26e-06
Nickel	1.4515	0.043	5.37e-06	3.81e-08	47	1.79e-06
Selenium	0.1183		1.02e-05	7.23e-08	4.8	3.47e-07
Silver	0.0753		6.48e-06	4.60e-08	0.5	2.30e-08
Thallium	0.129		1.11e-05	7.88e-08	116	9.14e-06
Zinc	21.56	0.0041	7.60e-06	5.40e-08	47	2.54e-06
Aluminum	975.2		8.39e-02	5.96e-04	231	1.38e-01
Barium	12,902		1.11e+00	7.88e-03		
Iron	1,650		1.42e-01	1.01e-03		
Tin	1.570		1.35e-04	9.59e-07		
Titanium	9.408		8.09e-04	5.75e-06		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 11,624

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =

(11.1 min. * 0.0175 m^3/min) * 11,624 dilutions = 2,257.9

Mixing zone cylinder volume = 314,000 m^3; based on 100 m radius and

10 m depth = time to reach 100 m (11 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =

0.72% = fractional area of mixing zone affected by plume (2,257.9/314,000)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)

D= C * 0.0072 (SBF plume portion of cylinder)

F= D * E (exposure conc. * BCF)

Exhibit E-3. Recreational Finfish Tissue Pollutant Concentrations - Cook Inlet, Alaska Current Technology

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	1.170		4.04e-04	7.25e-07	426	3.09e-04
Fluorene	0.6382		2.21e-04	3.96e-07	30	1.19e-05
Phenanthrene	1.5136		5.23e-04	9.38e-07	2630	2.47e-03
Phenol	0.0001		3.46e-08	6.20e-11	1.4	8.68e-11
Cadmium	0.1707	0.11	6.49e-06	1.16e-08	64	7.45e-07
Mercury	0.0155	0.018	9.64e-08	1.73e-10	5500	9.51e-07
Antimony	0.8843		3.06e-04	5.48e-07	1	5.48e-07
Arsenic	1.1015	0.005	1.90e-06	3.41e-09	44	1.50e-07
Beryllium	0.1086		3.75e-05	6.73e-08	19	1.28e-06
Chromium	37.233	0.034	4.38e-04	7.85e-07	16	1.26e-05
Copper	2.9011	0.0063	6.32e-06	1.13e-08	36	4.08e-07
Lead	5.4453	0.02	3.76e-05	6.75e-08	49	3.31e-06
Nickel	2.0944	0.043	3.11e-05	5.58e-08	47	2.62e-06
Selenium	0.1707		5.90e-05	1.06e-07	4.8	5.08e-07
Silver	0.1086		3.75e-05	6.73e-08	0.5	3.37e-08
Thallium	0.1862		6.44e-05	1.15e-07	116	1.34e-05
Zinc	31.11	0.0041	4.41e-05	7.90e-08	47	3.72e-06
Aluminum	1,407		4.86e-01	8.72e-04	231	2.01e-01
Barium	18,516		6.40e+00	1.15e-02		
Iron	2,380		8.23e-01	1.48e-03		
Tin	2.265		7.83e-04	1.40e-06		
Titanium	13.575		4.69e-03	8.41e-06		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 2,893

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =

(4.2 min. * 0.0175 m^3/min) * 2,893 dilutions = 211.1 m^3

Mixing zone cylinder volume = 117,750 m^3; based on 100 m radius and

3.75 m depth = time to reach 100 m (4.2 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =

0.18% = fractional area of mixing zone affected by plume (211.1/117,750)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)

D= C * 0.0018 (SBF plume portion of cylinder)

F= D * E (exposure conc. x BCF)

Exhibit E-4. Recreational Finfish Tissue Pollutant Concentrations - Cook Inlet, Alaska Discharge Option

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	0.811		2.80e-04	5.03e-07	426	2.14e-04
Fluorene	0.4424		1.53e-04	2.74e-07	30	8.23e-06
Phenanthrene	1.0494		3.63e-04	6.50e-07	2630	1.71e-03
Phenol	0.0001		3.46e-08	6.20e-11	1.4	8.68e-11
Cadmium	0.1183	0.11	4.50e-06	8.07e-09	64	5.16e-07
Mercury	0.0108	0.018	6.72e-08	1.21e-10	5500	6.63e-07
Antimony	0.6128		2.12e-04	3.80e-07	1	3.80e-07
Arsenic	0.7634	0.005	1.32e-06	2.37e-09	44	1.04e-07
Beryllium	0.0753		2.60e-05	4.67e-08	19	8.87e-07
Chromium	25.804	0.034	3.03e-04	5.44e-07	16	8.70e-06
Copper	2.011	0.0063	4.38e-06	7.85e-09	36	2.83e-07
Lead	3.774	0.02	2.61e-05	4.68e-08	49	2.29e-06
Nickel	1.4515	0.043	2.16e-05	3.87e-08	47	1.82e-06
Selenium	0.1183		4.09e-05	7.33e-08	4.8	3.52e-07
Silver	0.0753		2.60e-05	4.67e-08	0.5	2.33e-08
Thallium	0.129		4.46e-05	8.00e-08	116	9.27e-06
Zinc	21.56	0.0041	3.05e-05	5.48e-08	47	2.57e-06
Aluminum	975.2		3.37e-01	6.04e-04	231	1.40e-01
Barium	12,902		4.46+00	8.00e-03		
Iron	1,650		5.70e-01	1.02e-03		
Tin	1.570		5.43e-04	9.73e-07		
Titanium	9.408		3.25e-03	5.83e-06		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 2,893

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =

(4.2 min. * 0.0175 m^3/min) * 2,893 dilutions = 211.1 m^3

Mixing zone cylinder volume = 117,750 m^3; based on 100 m radius and

3.75 m depth = time to reach 100 m (4.2 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =

0.18% = fractional area of mixing zone affected by plume (211.1/117,750)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)

D= C * 0.0018 (SBF plume portion of cylinder)

F= D * E (exposure conc. x BCF)

Exhibit E-5. Recreational Finfish Tissue Pollutant Concentrations - Offshore California Current Technology

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	1.170		3.40e-04	6.90e-08	426	2.94e-05
Fluorene	0.6382		1.85e-04	3.77e-08	30	1.13e-06
Phenanthrene	1.5136		4.40e-04	8.93e-08	2630	2.35e-04
Phenol	0.0001		2.91e-08	5.90e-12	1.4	8.26e-12
Cadmium	0.1707	0.11	5.46e-06	1.11e-09	64	7.09e-08
Mercury	0.0155	0.018	8.11e-08	1.65e-11	5500	9.06e-08
Antimony	0.8843		2.57e-04	5.22e-08	1	5.22e-08
Arsenic	1.1015	0.005	1.60e-06	3.25e-10	44	1.43e-08
Beryllium	0.1086		3.16e-05	6.41e-09	19	1.22e-07
Chromium	37.233	0.034	3.68e-04	7.47e-08	16	1.20e-06
Copper	2.9011	0.0063	5.31e-06	1.08e-09	36	3.88e-08
Lead	5.4453	0.02	3.16e-05	6.43e-09	49	3.15e-07
Nickel	2.0944	0.043	2.62e-05	5.31e-09	47	2.50e-07
Selenium	0.1707		4.96e-05	1.01e-08	4.8	4.84e-08
Silver	0.1086		3.16e-05	6.41e-09	0.5	3.20e-09
Thallium	0.1862		5.41e-05	1.10e-08	116	1.27e-06
Zinc	31.11	0.0041	3.71e-05	7.53e-09	47	3.54e-07
Aluminum	1,407		4.09e-01	8.30e-05	231	1.92e-02
Barium	18,516		5.38e+00	1.09e-03		
Iron	2,380		6.92e-01	1.41e-04		
Tin	2.265		6.58e-04	1.34e-07		
Titanium	13.575		3.94e-03	8.01e-07		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 3,442

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =

(5.5 min. * 0.0175 m^3/min) * 3,442 dilutions = 331 m^3

Mixing zone cylinder volume = 157,000 m^3; based on 100 m radius and

5 m depth = time to reach 100 m (5.5 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =

0.21% = fractional area of mixing zone affected by plume (331/157,000)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)

D= C * 0.0021 (SBF plume portion of cylinder)

F= D * E (exposure conc. x BCF)

Exhibit E-6. Recreational Finfish Tissue Pollutant Concentrations - Offshore California Discharge Option

Pollutant	(A) Average Concentration (mg/l)	(B) Leach Factor	(C) Ambient Bioavailable Conc. in Plume (mg/l)	(D) Average Exposure Concentration (mg/l)	(E) BCF (l/kg) (a)	(F) Fish Tissue Concentration (mg/kg)
Naphthalene	0.811		2.36e-04	4.79e-08	426	2.039e-05
Fluorene	0.4424		1.29e-04	2.61e-08	30	7.831e-07
Phenanthrene	1.0494		3.05e-04	6.19e-08	2630	1.629e-04
Phenol	0.0001		2.91e-08	5.90e-12	1.4	8.261e-12
Cadmium	0.1183	0.11	3.78e-06	7.68e-10	64	4.914e-08
Mercury	0.0108	0.018	5.65e-08	1.15e-11	5500	6.309e-08
Antimony	0.6128		1.78e-04	3.62e-08	1	3.616e-08
Arsenic	0.7634	0.005	1.11e-06	2.25e-10	44	9.910e-09
Beryllium	0.0753		2.19e-05	4.43e-09	19	8.442e-08
Chromium	25.804	0.034	2.55e-04	5.18e-08	16	8.283e-07
Copper	2.0106	0.0063	3.68e-06	7.47e-10	36	2.691e-08
Lead	3.7738	0.02	2.19e-05	4.45e-09	49	2.182e-07
Nickel	1.4515	0.043	1.81e-05	3.68e-09	47	1.731e-07
Selenium	0.1183		3.44e-05	6.98e-09	4.8	3.351e-08
Silver	0.0753		2.19e-05	4.44e-09	0.5	2.222e-09
Thallium	0.129		3.75e-05	7.61e-09	116	8.830e-07
Zinc	21.56	0.0041	2.57e-05	5.22e-09	47	2.451e-07
Aluminum	975		2.83e-01	5.75e-05	231	1.329e-02
Barium	12,902		3.75e+00	7.61e-04		
Iron	1,649		4.79e-01	9.74e-05		
Tin	1.570		4.56e-04	9.26e-08		
Titanium	9.408		2.73e-03	5.55e-07		

(a) There are no BCFs for specific SBF compounds.

Table Calculations:

Average number of dilutions in area within mixing zone (100 m radius) = 3,442

SBF plume volume = time to reach 100 m * discharge rate * no. of dilutions =
(5.5 min. * 0.0175 m^3/min) * 3,442 dilutions = 331 m^3

Mixing zone cylinder volume = 157,000 m^3; based on 100 m radius and
5 m depth = time to reach 100 m (5.5 min) * fall velocity (0.015 m/sec)

SBF plume portion of cylinder volume =
0.21% = fractional area of mixing zone affected by plume (331/157,000)

C= A * B/dilutions (B is assumed to be 1 unless otherwise noted)
D= C * 0.0021 (SBF plume portion of cylinder)
F= D * E (exposure conc. x BCF)

APPENDIX F

CALCULATION OF
SEDIMENT PORE WATER POLLUTANT CONCENTRATIONS
FOR SHRIMP TISSUE
POLLUTANT CONCENTRATION CALCULATION

Exhibit F-1. Gulf of Mexico Shallow Water Development Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Current Technology

Technology = Discharge Assuming 11% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination in SBF

Dry Cuttings Generated per Well: 514,150 lbs

Whole Drilling Fluid Discharged per Well: 389 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Current Technology (11%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/l) (a)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		51,818				
TSS (associated with dry cuttings)		514,150				
TSS (total)		565,968				
Total Oil (synthetic plus crude)		74,062		6,629		
Priority Pollutant Organics	**lbs/bbl drilling fluid**					
Naphthalene	1.01e-03	3.91e-01	1.77e+05	0.0026	0.0795	2.28e-04
Fluorene	5.48e-04	2.13e-01	9.67e+04	0.0014	0.0407	6.38e-05
Phenanthrene	1.30e-03	5.06e-01	2.29e+05	0.0034	0.0113	4.19e-05
Phenol	7.22e-08	2.81e-05	1.27e+01	1.89e-07	11.3380	2.33e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	1.10e-06	5.70e-02	2.59e+04	0.0004	0.1100	4.61e-05
Mercury	1.00e-07	5.18e-03	2.35e+03	3.48e-05	0.0180	6.85e-07
Antimony	5.70e-06	2.95e-01	1.34e+05	0.0020	1.0000	2.17e-03
Arsenic	7.10e-06	3.68e-01	1.67e+05	0.0025	0.0050	1.35e-05
Beryllium	7.00e-07	3.63e-02	1.65e+04	0.0002	1.0000	2.66e-04
Chromium	2.40e-04	1.24e+01	5.64e+06	0.0836	0.0340	3.10e-03
Copper	1.87e-05	9.69e-01	4.40e+05	0.0065	0.0063	4.49e-05
Lead	3.51e-05	1.82e+00	8.25e+05	0.0122	0.0200	2.68e-04
Nickel	1.35e-05	7.00e-01	3.17e+05	0.0047	0.0430	2.20e-04
Selenium	1.10e-06	5.70e-02	2.59e+04	0.0004	1.0000	4.18e-04
Silver	7.00e-07	3.63e-02	1.65e+04	0.0002	1.0000	2.66e-04
Thallium	1.20e-06	6.22e-02	2.82e+04	0.0004	1.0000	4.57e-04
Zinc	2.00e-04	1.04e+01	4.71e+06	0.0699	0.0041	3.12e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	9.07e-03	4.70e+02	2.13e+08	3.1606	1.0000	3.45e+00
Barium	1.20e-01	6.22e+03	2.82e+09	41.8164	0.0021	9.59e-02
Iron	1.53e-02	7.95e+02	3.61e+08	5.3470	0.1300	7.59e-01
Tin	1.46e-05	7.57e-01	3.43e+05	0.0051		
Titanium	8.75e-05	4.53e+00	2.06e+06	0.0305		
Alkylated benzenes	5.66e-03	2.20e+00	9.98e+05	0.0148		
Alkylated naphthalenes	5.32e-02	2.07e+01	9.39e+06	0.1392		
Alkylated fluorenes	6.40e-03	2.49e+00	1.13e+06	0.0168		
Alkylated phenanthrenes	8.09e-03	3.15e+00	1.43e+06	0.0212		
Alkylated phenols	6.37e-07	2.48e-04	1.12e+02	1.67e-06		
Total biphenyls	1.05e-02	4.09e+00	1.86e+06	0.0275		
Total dibenzothiophenes	9.15e-06	3.56e-03	1.61e+03	2.39e-05		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

Exhibit F-2. Gulf of Mexico Shallow Water Development Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Discharge Option

Technology = Discharge Assuming 7% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol) Crude Contamination in SBF

Dry Cuttings Generated per Well: 514,150 lbs

Whole Drilling Fluid Discharged Per Well: 223 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Discharge Option (7%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/l) (a)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		29,661				
TSS (associated with dry cuttings)		514,150				
TSS (total)		543,811				
Total Oil (synthetic plus crude)		42,418		3,796.48		
Priority Pollutants, Organics	**lbs/bbl drilling fluid**					
Naphthalene	1.01e-03	2.24e-01	101,605	1.51e-02	0.0795	5.62e-02
Fluorene	5.48e-04	1.22e-01	55,338	8.20e-03	0.0407	1.10e-03
Phenanthrene	1.30e-03	2.90e-01	131,542	1.95e-02	0.0113	2.40e-05
Phenol	7.22e-08	1.61e-05	7	1.04e-06	11.3380	1.34e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	1.10e-06	3.26e-02	14,787	2.19e-03	0.1100	2.63e-05
Mercury	1.00e-07	2.97e-03	1,347	2.00e-04	0.0180	3.92e-07
Antimony	5.70e-06	1.69e-01	76,657	1.14e-02	1.0000	1.24e-03
Arsenic	7.10e-06	2.11e-01	95,708	1.42e-02	0.0050	7.73e-06
Beryllium	7.00e-07	2.08e-02	9,435	1.40e-03	1.0000	1.53e-04
Chromium	2.40e-04	7.12e+00	3,229,582	4.79e-01	0.0340	1.78e-03
Copper	1.87e-05	5.55e-01	251,744	3.73e-02	0.0063	2.57e-05
Lead	3.51e-05	1.04e+00	471,737	6.99e-02	0.0200	1.53e-04
Nickel	1.35e-05	4.00e-01	181,437	2.69e-02	0.0430	1.27e-04
Selenium	1.10e-06	3.26e-02	14,787	2.19e-03	1.0000	2.39e-04
Silver	7.00e-07	2.08e-02	9,435	1.40e-03	1.0000	1.53e-04
Thallium	1.20e-06	3.56e-02	16,148	2.39e-03	1.0000	2.61e-04
Zinc	2.00e-04	5.95e+00	2,698,878	4.00e-01	0.0041	1.79e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	9.07e-03	2.69e+02	122,016,517	1.81e+01	1.0000	1.98e+00
Barium	1.20e-01	3.56e+03	1,614,791,080	2.39e+02	0.0021	5.49e-02
Iron	1.53e-02	4.55e+02	206,384,815	3.06e+01	0.1300	4.34e-01
Tin	1.46e-05	4.33e-01	196,406	2.91e-02		
Titanium	8.75e-05	2.60e+00	1,179,342	1.75e-01		
Alkylated benzenes	5.66e-03	1.26e+00	571,527	8.47e-02		
Alkylated naphthalenes	5.32e-02	1.19e+01	5,397,757	8.00e-01		
Alkylated fluorenes	6.40e-03	1.43e+00	648,638	9.62e-02		
Alkylated phenanthrenes	8.09e-03	1.80e+00	816,467	1.21e-01		
Alkylated phenols	6.37e-07	1.42e-04	64	9.49e-06		
Total biphenyls	1.05e-02	2.35e+00	1,065,944	1.58e-01		
Total dibenzothiophenes	9.15e-06	2.04e-03	925	0		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

Exhibit F-3. Gulf of Mexico Shallow Exploratory Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Current Technology

Technology = Discharge Assuming 11% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination in SBF

Dry Cuttings Generated per Well: 1,077,440 lbs

Whole Drilling Fluid Discharged per Well: 814 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Current Technology (11%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/l) (a)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		108,588				
TSS (associated with dry cuttings)		1,077,440				
TSS (total)		1,186,028				
Total Oil (synthetic plus crude)		155,202		13,891.64		
Priority Pollutant Organics	**lbs/bbl drilling fluid**					
Naphthalene	1.01e-03	8.18e-01	3.71e+05	5.50e-03	0.0795	4.77e-04
Fluorene	5.48e-04	4.46e-01	2.02e+05	3.00e-03	0.0407	1.33e-04
Phenanthrene	1.30e-03	1.06e+00	4.80e+05	7.12e-03	0.0113	8.78e-05
Phenol	7.22e-08	5.88e-05	2.67e+01	3.95e-07	11.3380	4.89e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	1.10e-06	1.19e-01	5.42e+04	8.03e-04	0.1100	9.66e-05
Mercury	1.00e-07	1.09e-02	4.93e+03	7.30e-05	0.0180	1.43e-06
Antimony	5.70e-06	6.19e-01	2.81e+05	4.16e-03	1.0000	4.54e-03
Arsenic	7.10e-06	7.71e-01	3.50e+05	5.18e-03	0.0050	2.83e-05
Beryllium	7.00e-07	7.60e-02	3.45e+04	5.11e-04	1.0000	5.58e-04
Chromium	2.40e-04	2.61e+01	1.18e+07	1.75e-01	0.0340	6.51e-03
Copper	1.87e-05	2.03e+00	9.21e+05	1.37e-02	0.0063	9.39e-05
Lead	3.51e-05	3.81e+00	1.73e+06	2.56e-02	0.0200	5.60e-04
Nickel	1.35e-05	1.47e+00	6.65e+05	9.86e-03	0.0430	4.63e-04
Selenium	1.10e-06	1.19e-01	5.42e+04	8.03e-04	1.0000	8.77e-04
Silver	7.00e-07	7.60e-02	3.45e+04	5.11e-04	1.0000	5.58e-04
Thallium	1.20e-06	1.30e-01	5.91e+04	8.76e-04	1.0000	9.57e-04
Zinc	2.00e-04	2.18e+01	9.88e+06	1.46e-01	0.0041	6.55e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	9.07e-03	9.85e+02	4.47e+08	6.62e+00	1.0000	7.23e+00
Barium	1.20e-01	1.30e+04	5.91e+09	8.76e+01	0.0021	2.00e-01
Iron	1.53e-02	1.67e+03	7.56e+08	1.12e+01	0.1300	1.59e+00
Tin	1.46e-05	1.59e+00	7.19e+05	1.07e-02		
Titanium	8.75e-05	9.50e+00	4.31e+06	6.39e-02		
Alkylated benzenes	5.66e-03	4.61e+00	2.09e+06	3.10e-02		
Alkylated naphthalenes	5.32e-02	4.33e+01	1.96e+07	2.91e-01		
Alkylated fluorenes	6.40e-03	5.21e+00	2.36e+06	3.51e-02		
Alkylated phenanthrenes	8.09e-03	6.59e+00	2.99e+06	4.43e-02		
Alkylated phenols	6.37e-07	5.18e-04	2.35e+02	3.49e-06		
Total biphenyls	1.05e-02	8.56e+00	3.88e+06	5.76e-02		
Total dibenzothiophenes	9.15e-06	7.45e-03	3.38e+03	5.01e-05		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

Exhibit F-4. Gulf of Mexico Shallow Exploratory Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Discharge Option

Technology = Discharge Assuming 7% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol) Crude Contamination in SBF

Dry Cuttings Generated per Well: 1,077,440 lbs

Whole Drilling Fluid Discharged Per Well: 466 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Discharge Option (7%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/l)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		62,158				
TSS (associated with dry cuttings)		1,077,440				
TSS (total)		1,139,598				
Total Oil (synthetic plus crude)		88,890		7,955.74		
Priority Pollutants, Organics	**lbs/bbl drilling fluid**					
Naphthalene	0.0010052	0.4684	212,463	3.15e-02	0.0795	2.73e-04
Fluorene	0.0005483	0.2555	115,893	1.72e-02	0.0407	7.64e-05
Phenanthrene	0.0013004	0.6060	274,877	4.08e-02	0.0113	5.04e-05
Phenol	7.22e-08	3.37e-05	15	2.22e-06	11.3380	2.81e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	0.0000011	0.0684	31,026	4.60e-03	0.1100	5.53e-05
Mercury	0.0000001	0.0062	2,812	4.17e-04	0.0180	8.21e-07
Antimony	0.0000057	0.3543	160,708	2.38e-02	1.0000	2.60e-03
Arsenic	0.0000071	0.4413	200,171	2.97e-02	0.0050	1.62e-05
Beryllium	0.0000007	0.0435	19,731	2.93e-03	1.0000	3.20e-04
Chromium	0.0002400	14.9179	6,766,655	1.00e+00	0.0340	3.72e-03
Copper	0.0000187	1.1624	527,257	7.82e-02	0.0063	5.37e-05
Lead	0.0000351	2.1817	989,604	1.47e-01	0.0200	3.20e-04
Nickel	0.0000135	0.8391	380,610	5.64e-02	0.0430	2.65e-04
Selenium	0.0000011	0.0684	31,026	4.60e-03	1.0000	5.02e-04
Silver	0.0000007	0.0435	19,731	2.93e-03	1.0000	3.20e-04
Thallium	0.0000012	0.0746	33,838	5.02e-03	1.0000	5.02e-04
Zinc	0.0002005	12.4627	5,652,993	8.38e-01	0.0041	3.76e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	0.0090699	563.7668	255,720,674	3.79e+01	1.0000	4.14e+00
Barium	0.1200000	7,458.9600	3,383,332,043	5.02e+02	0.0021	1.15e-01
Iron	0.0153443	953.7710	432,623,849	6.41e+01	0.1300	9.11e-01
Tin	0.0000146	0.9075	411,636	6.10e-02		
Titanium	0.0000875	5.4388	2,467,002	3.66e-01		
Alkylated benzenes	0.0056587	2.6369	1,196,079	1.77e-01		
Alkylated naphthalenes	0.0531987	24.7906	11,244,843	1.67e+00		
Alkylated fluorenes	0.0064038	2.9842	1,353,612	2.01e-01		
Alkylated phenanthrenes	0.0080909	3.7703	1,710,182	2.54e-01		
Alkylated phenols	0.0000006	0.0003	136	2.02e-05		
Total biphenyls	0.0105160	4.9005	2,222,832	3.30e-01		
Total dibenzothiophenes	0.0000092	0.0043	1,950	2.89e-04		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

Exhibit F-5. California Shallow Water Development Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Current Technology

Technology = Discharge Assuming 11% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination in SBF

Dry Cuttings Generated per Well: 514,150 lbs

Whole Drilling Fluid Discharged per Well: 389 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Current Technology (11%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/kg)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		51,818				
TSS (associated with dry cuttings)		514,150				
TSS (total)		565,968				
Total Oil (synthetic plus crude)		74,062		4,130		
Priority Pollutant Organics	**lbs/bbl drilling fluid**					
Naphthalene	1.01e-03	3.91e-01	1.77e+05	0.0026	0.0795	2.28e-04
Fluorene	5.48e-04	2.13e-01	9.67e+04	0.0014	0.0407	6.38e-05
Phenanthrene	1.30e-03	5.06e-01	2.29e+05	0.0034	0.0113	4.19e-05
Phenol	7.22e-08	2.81e-05	1.27e+01	1.89e-07	11.3380	2.34e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	1.10e-06	5.70e-02	2.59e+04	0.0004	0.1100	4.61e-05
Mercury	1.00e-07	5.18e-03	2.35e+03	3.48e-05	0.0180	6.85e-07
Antimony	5.70e-06	2.95e-01	1.34e+05	0.0020		2.17e-03
Arsenic	7.10e-06	3.68e-01	1.67e+05	0.0025	0.0050	1.35e-05
Berylium	7.00e-07	3.63e-02	1.65e+04	0.0002		2.66e-04
Chromium	2.40e-04	1.24e+01	5.64e+06	0.0836	0.0340	3.10e-03
Copper	1.87e-05	9.69e-01	4.40e+05	0.0065	0.0063	4.49e-05
Lead	3.51e-05	1.82e+00	8.25e+05	0.0122	0.0200	2.68e-04
Nickel	1.35e-05	7.00e-01	3.17e+05	0.0047	0.0430	2.21e-04
Selenium	1.10e-06	5.70e-02	2.59e+04	0.0004		4.18e-04
Silver	7.00e-07	3.63e-02	1.65e+04	0.0002		2.67e-04
Thallium	1.20e-06	6.22e-02	2.82e+04	0.0004		4.57e-04
Zinc	2.00e-04	1.04e+01	4.71e+06	0.0699	0.0041	3.12e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	9.07e-03	4.70e+02	2.13e+08	3.1606		3.45e+00
Barium	1.20e-01	6.22e+03	2.82e+09	41.8164	0.0021	9.59e-02
Iron	1.53e-02	7.95e+02	3.61e+08	5.3470	0.1300	7.59e-01
Tin	1.46e-05	7.57e-01	3.43e+05	0.0051		
Titanium	8.75e-05	4.53e+00	2.06e+06	0.0305		
Alkylated benzenes	5.66e-03	2.20e+00	9.98e+05	0.0148		
Alkylated naphthalenes	5.32e-02	2.07e+01	9.39e+06	0.1392		
Alkylated fluorenes	6.40e-03	2.49e+00	1.13e+06	0.0168		
Alkylated phenanthrenes	8.09e-03	3.15e+00	1.43e+06	0.0212		
Alkylated phenlos	6.37e-07	2.48e-04	1.12e+02	1.67e-06		
Total biphenyls	1.05e-02	4.09e+00	1.86e+06	0.0275		
Total dibenzothiophenes	9.15e-06	3.56e-03	1.61e+03	2.39e-05		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

Exhibit F-6. California Shallow Water Development Model Well

Pore Water Concentrations for Calculation of Shrimp Tissue Pollutant Concentrations: Discharge Option

Technology = Discharge Assuming 7% (wt) Base Fluid Retention on Discharged Cuttings and 0.2% (vol) Crude Contamination in SBF

Dry Cuttings Generated per Well: 514,150 lbs

Whole Drilling Fluid Discharged per Well: 223 bbls

Impact Area per Well: 1.9 km^2

Pollutant Name	Avg. Conc. of Pollutants in Drilling Waste	Pollutant Loadings per Well (lbs) Discharge Option (7%)	Pollutant Loadings per Well (mg)	Pollutant Sediment Concentration (mg poll./kg sed.)	Sediment Partition Coefficient or Leach Percentage Factors	Estimated Pore Water Conc. (mg/kg)
Conventional Pollutants	**lbs/lb disch. cuttings**					
TSS (associated with adhering SBF)		29,661				
TSS (associated with dry cuttings)		514,150				
TSS (total)		543,811				
Total Oil (synthetic plus crude)		42,418		2,365.35		
Priority Pollutants, Organics	**lbs/bbl drilling fluid**					
Naphthalene	1.01e-03	2.24e-01	1.02e+05	1.51e-03	0.0795	1.31e-04
Fluorene	5.48e-04	1.22e-01	5.53e+04	8.20e-04	0.0407	3.66e-05
Phenanthrene	1.30e-03	2.90e-01	1.32e+05	1.95e-03	0.0113	2.40e-05
Phenol	7.22e-08	1.61e-05	7.31e+00	1.08e-07	11.3380	1.34e-06
Priority Pollutants, Metals	**lbs/lb dry SBF**					
Cadmium	1.10e-06	3.26e-02	1.48e+04	2.19e-04	0.1100	2.63e-05
Mercury	1.00e-07	2.97e-03	1.35e+03	2.00e-05	0.0180	3.92e-07
Antimony	5.70e-06	1.69e-01	7.67e+04	1.14e-03		1.24e-03
Arsenic	7.10e-06	2.11e-01	9.57e+04	1.42e-03	0.0050	7.73e-06
Berylium	7.00e-07	2.08e-02	9.43e+03	1.40e-04		1.53e-04
Chromium	2.40e-04	7.12e+00	3.23e+06	4.79e-02	0.0340	1.78e-03
Copper	1.87e-05	5.55e-01	2.52e+05	3.73e-03	0.0063	2.57e-05
Lead	3.51e-05	1.04e+00	4.72e+05	6.99e-03	0.0200	1.53e-04
Nickel	1.35e-05	4.00e-01	1.81e+05	2.69e-03	0.0430	1.27e-04
Selenium	1.10e-06	3.26e-02	1.48e+04	2.19e-04		2.39e-04
Silver	7.00e-07	2.08e-02	9.43e+03	1.40e-04		1.53e-04
Thallium	1.20e-06	3.56e-02	1.61e+04	2.39e-04		2.61e-04
Zinc	2.00e-04	5.95e+00	2.70e+06	4.00e-02	0.0041	1.79e-04
Non-Conventional Pollutants	**lbs/lb dry SBF or bbl SBF**					
Aluminum	9.07e-03	2.69e+02	1.22e+08	1.81e+00		1.98e+00
Barium	1.20e-01	3.56e+03	1.61e+09	2.39e+01	0.0021	5.49e-02
Iron	1.53e-02	4.55e+02	2.06e+08	3.06e+00	0.1300	4.35e-01
Tin	1.46e-05	4.33e-01	1.96e+05	2.91e-03		
Titanium	8.75e-05	2.60e+00	1.18e+06	1.75e-02		
Alkylated benzenes	5.66e-03	1.26e+00	5.72e+05	8.47e-03		
Alkylated naphthalenes	5.32e-02	1.19e+01	5.40e+06	8.00e-02		
Alkylated fluorenes	6.40e-03	1.43e+00	6.49e+05	9.62e-03		
Alkylated phenanthrenes	8.09e-03	1.80e+00	8.16e+05	1.21e-02		
Alkylated phenols	6.37e-07	1.42e-04	6.44e+01	9.55e-07		
Total biphenyls	1.05e-02	2.35e+00	1.07e+06	1.58e-02		
Total dibenzothiophenes	9.15e-06	2.04e-03	9.25e+02	1.37e-05		

(a) Estimated pore water conc. = Poll. sediment conc. * Sed. partition coeff. or leach factor * 35.5 kg of sediment / 32.5 liter pore water unit volume

APPENDIX G

CALCULATION OF
SHRIMP TISSUE POLLUTANT CONCENTRATIONS

Exhibit G-1. Commercial Shrimp Tissue Pollutant Concentrations - Gulf of Mexico Shallow Water Development Model Well, Current Technology

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	2.60e-03	0.0795	2.28e-04	426	9.80e-02
Fluorene	1.40e-03	0.0407	6.38e-05	30	1.93e-03
Phenanthrene	3.40e-03	0.0113	4.19e-05	2630	1.11e-01
Phenol	1.89e-07	11.338	2.33e-06	1.4	3.30e-06
Cadmium	4.00e-04	0.11	4.61e-05	64	2.70e-03
Mercury	3.48e-05	0.018	6.85e-07	5500	3.45e-03
Antimony	2.00e-03		2.17e-03	1	1.99e-03
Arsenic	2.50e-03	0.005	1.35e-05	44	5.44e-04
Beryllium	2.00e-04		2.66e-04	19	4.63e-03
Chromium	8.36e-02	0.034	3.10e-03	16	4.55e-02
Copper	6.50e-03	0.0063	4.49e-05	36	1.48e-03
Lead	1.20e-02	0.02	2.68e-04	49	1.20e-02
Nickel	4.70e-03	0.043	2.20e-04	47	9.51e-03
Selenium	4.00e-04		4.18e-04	4.8	1.84e-03
Silver	2.00e-04		2.66e-04	0.5	1.22e-04
Thallium	4.00e-04		4.57e-04	116	4.85e-02
Zinc	6.99e-02	0.0041	3.12e-04	47	1.35e-02
Aluminum	3.16e+00		3.45e+00	231	7.30e+02
Barium	4.18e+01	0.0021	9.59e-02		
Iron	5.34e+00	0.13	7.59e-01		
Tin	5.10e-03				
Titanium	3.05e-02				
Alkylated benzenes	1.48e-02				
Alkylated naphthalenes	1.39e-01				
Alkylated fluorenes	1.68e-02				
Alkylated phenanthrenes	2.12e-02				
Alkylated phenols	1.67e-06				
Total biphenyls	2.75e-02				
Total dibenzothiophenes	2.39e-05				

(a) There are no BCFs for specific SBF compounds.

See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)

Exhibit G-2. Commercial Shrimp Tissue Pollutant Concentrations - Gulf of Mexico Shallow Water Development Model Well, Discharge Option

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	1.50e-03	0.0795	1.31e-04	426	5.62e-02
Fluorene	8.00e-04	0.0407	3.66e-05	30	1.10e-03
Phenanthrene	2.00e-03	0.0113	2.40e-05	2630	6.38e-02
Phenol	1.08e-07	11.338	1.34e-06	1.4	1.89e-06
Cadmium	2.00e-04	0.11	2.63e-05	64	1.54e-03
Mercury	1.99e-05	0.018	3.92e-07	5500	1.97e-03
Antimony	1.10e-03		1.24e-03	1	1.14e-03
Arsenic	1.40e-03	0.005	7.73e-06	44	3.12e-04
Beryllium	1.00e-04		1.53e-04	19	2.65e-03
Chromium	4.79e-02	0.034	1.78e-03	16	2.60e-02
Copper	3.70e-03	0.0063	2.57e-05	36	8.46e-04
Lead	7.00e-03	0.02	1.53e-04	49	6.86e-03
Nickel	2.70e-03	0.043	1.27e-04	47	5.44e-03
Selenium	2.00e-04		2.39e-04	4.8	1.05e-03
Silver	1.00e-04		1.53e-04	0.5	6.98e-05
Thallium	2.00e-04		2.61e-04	116	2.78e-02
Zinc	4.00e-02	0.0041	1.79e-04	47	7.71e-03
Aluminum	1.81e+00		1.98e+00	231	4.18e+02
Barium	2.39e+01	0.0021	5.49e-02		
Iron	3.06e+00	0.13	4.34e-01		
Tin	2.90e-03				
Titanium	1.75e-02				
Alkylated benzenes	8.50e-03				
Alkylated naphthalenes	7.98e-02				
Alkylated fluorenes	9.60e-03				
Alkylated phenanthrenes	1.21e-02				
Alkylated phenols	9.55e-07				
Total biphenyls	1.58e-02				
Total dibenzothiophenes	1.37e-05				

(a) There are no BCFs for specific SBF compounds.
See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)

Exhibit G-3. Commercial Shrimp Tissue Pollutant Concentrations - Gulf of Mexico Shallow Water Exploratory Model Well, Current Technology

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	5.50e-03	0.0795	4.77e-04	426	2.05e-01
Fluorene	3.00e-03	0.0407	1.33e-04	30	4.03e-03
Phenanthrene	7.10e-03	0.0113	8.78e-05	2630	2.33e-01
Phenol	3.95e-07	11.338	4.89e-06	1.4	6.91e-06
Cadmium	8.00e-04	0.11	9.66e-05	64	5.65e-03
Mercury	7.30e-05	0.018	1.43e-06	5500	7.23e-03
Antimony	4.20e-03		4.54e-03	1	4.16e-03
Arsenic	5.20e-03	0.005	2.83e-05	44	1.14e-03
Beryllium	5.00e-04		5.58e-04	19	9.71e-03
Chromium	1.75e-01	0.034	6.51e-03	16	9.53e-02
Copper	1.14e-02	0.0063	9.39e-05	36	3.10e-03
Lead	2.56e-02	0.02	5.60e-04	49	2.51e-02
Nickel	9.90e-03	0.043	4.63e-04	47	1.99e-02
Selenium	8.00e-04		8.77e-04	4.8	3.86e-03
Silver	5.00e-04		5.58e-04	0.5	2.56e-04
Thallium	9.00e-04		9.57e-04	116	1.02e-01
Zinc	1.46e-01	0.0041	6.55e-04	47	2.82e-02
Aluminum	6.62e+00		7.23e+00	231	1.53e+02
Barium	8.76e+01	0.0021	2.00e-01		
Iron	1.12e+01	0.13	1.59e+00		
Tin	1.07e-02				
Titanium	6.39e-02				
Alkylated benzenes	3.10e-02				
Alkylated naphthalenes	2.91e-01				
Alkylated fluorenes	3.51e-02				
Alkylated phenanthrenes	4.43e-02				
Alkylated phenols	3.49e-06				
Total biphenyls	5.76e-02				
Total dibenzothiophenes	5.01e-05				

(a) There are no BCFs for specific SBF compounds.
See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)

Exhibit G-4. Commercial Shrimp Tissue Pollutant Concentrations - Gulf of Mexico Shallow Water Exploratory Model Well, Discharge Option

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	3.20e-03	0.0795	2.73e-04	426	1.17e-01
Fluorene	1.70e-03	0.0407	7.64e-05	30	2.31e-03
Phenanthrene	4.10e-03	0.0113	5.04e-05	2630	1.33e-01
Phenol	2.26e-07	11.338	2.81e-06	1.4	3.95e-06
Cadmium	5.00e-04	0.11	5.53e-05	64	3.24e-03
Mercury	4.18e-05	0.018	8.21e-07	5500	4.14e-03
Antimony	2.40e-03		2.60e-03	1	2.38e-03
Arsenic	3.00e-03	0.005	1.62e-05	44	6.53e-04
Beryllium	3.00e-04		3.20e-04	19	5.56e-03
Chromium	1.00e-01	0.034	3.72e-03	16	5.46e-02
Copper	7.80e-03	0.0063	5.37e-05	36	1.77e-03
Lead	1.47e-02	0.02	3.20e-04	49	1.44e-02
Nickel	5.60e-03	0.043	2.65e-04	47	1.14e-02
Selenium	5.00e-04		5.02e-04	4.8	2.21e-03
Silver	3.00e-04		3.20e-04	0.5	1.46e-04
Thallium	5.00e-04		5.48e-04	116	5.82e-02
Zinc	8.38e-02	0.0041	3.76e-04	47	1.62e-02
Aluminum	3.79e+00		4.14e+00	231	8.76e+02
Barium	5.02e+01	0.0021	1.15e-01		
Iron	6.41e+00	0.13	9.11e-01		
Tin	6.10e-03				
Titanium	3.66e-02				
Alkylated benzenes	1.77e-02				
Alkylated naphthalenes	1.67e-01				
Alkylated fluorenes	2.01e-02				
Alkylated phenanthrenes	2.54e-02				
Alkylated phenols	2.00e-06				
Total biphenyls	3.30e-02				
Total dibenzothiophenes	2.87e-05				

(a) There are no BCFs for specific SBF compounds.

See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)

Exhibit G-5. Commercial Shrimp Tissue Pollutant Concentrations - Offshore California Shallow Development Model Well, Current Technology

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	2.60e-03	0.0795	2.28e-04	426	9.80e-02
Fluorene	1.40e-03	0.0407	6.38e-05	30	1.93e-03
Phenanthrene	3.40e-03	0.0113	4.19e-05	2630	1.11e-01
Phenol	1.89e-07	11.338	2.34e-06	1.4	3.30e-06
Cadmium	4.00e-04	0.11	4.61e-05	64	2.70e-03
Mercury	3.48e-05	0.018	6.85e-07	5500	3.45e-03
Antimony	2.00e-03		2.17e-03	1	1.99e-03
Arsenic	2.50e-03	0.005	1.35e-05	44	5.44e-04
Beryllium	2.00e-04		2.66e-04	19	4.63e-03
Chromium	8.36e-02	0.034	3.10e-03	16	4.55e-02
Copper	6.50e-03	0.0063	4.49e-05	36	1.48e-03
Lead	1.22e-02	0.02	2.68e-04	49	1.20e-02
Nickel	4.70e-03	0.043	2.21e-04	47	9.51e-03
Selenium	4.00e-04		4.18e-04	4.8	1.84e-03
Silver	2.00e-04		2.67e-04	0.5	1.22e-04
Thallium	4.00e-04		4.57e-04	116	4.85e-02
Zinc	6.99e-02	0.0041	3.12e-04	47	1.35e-02
Aluminum	3.16e+00		3.45e+00	231	7.31e+02
Barium	4.18e+01	0.0021	9.59e-02		
Iron	5.35e+00	0.13	7.59e-01		
Tin	5.10e-03				
Titanium	3.05e-02				
Alkylated benzenes	1.48e-02				
Alkylated naphthalenes	1.39e-01				
Alkylated fluorenes	1.68e-02				
Alkylated phenanthrenes	2.12e-02				
Alkylated phenols	1.67e-06				
Total biphenyls	2.75e-02				
Total dibenzothiophenes	2.39e-05				

(a) There are no BCFs for specific SBF compounds.

See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)

Exhibit G-6. Commercial Shrimp Tissue Pollutant Concentrations - Offshore California, Shallow Water Development Model Well, Discharge Option

Pollutant	(A) Pollutant Sediment Concentration (mg poll./kg sed.)	(B) Sediment Partition Coeff.^1 or Leach Factor	(C) Estimated Pore Water Conc. (mg/l)	(D) BCF (l/kg) (a)	(E) Shrimp Tissue Conc. (mg/kg)
Naphthalene	1.50e-03	0.0795	1.31e-04	426	5.62e-02
Fluorene	8.00e-04	0.0407	3.66e-05	30	1.10e-03
Phenanthrene	2.00e-03	0.0113	2.40e-05	2630	6.38e-02
Phenol	1.08e-07	11.338	1.34e-06	1.4	1.89e-06
Cadmium	2.00e-04	0.11	2.63e-05	64	1.54e-03
Mercury	1.99e-05	0.018	3.92e-07	5500	1.97e-03
Antimony	1.10e-03		1.24e-03	1	1.40e-03
Arsenic	1.40e-03	0.005	7.73e-06	44	3.12e-04
Beryllium	1.00e-04		1.53e-04	19	2.65e-03
Chromium	4.79e-02	0.034	1.78e-03	16	2.60e-02
Copper	3.70e-03	0.0063	2.57e-05	36	8.46e-04
Lead	7.00e-03	0.02	1.53e-04	49	6.86e-03
Nickel	2.70e-03	0.043	1.27e-04	47	5.44e-03
Selenium	2.00e-04		2.39e-04	4.8	1.05e-03
Silver	1.00e-04		1.53e-04	0.5	6.98e-05
Thallium	2.00e-04		2.61e-04	116	2.78e-02
Zinc	4.00e-02	0.0041	1.79e-04	47	7.71e-03
Aluminum	1.81e+00		1.98e+00	231	4.18e+02
Barium	2.39e+01	0.0021	5.49e-02		
Iron	3.06e+00	0.13	4.35e-01		
Tin	2.90e-03				
Titanium	1.75e-02				
Alkylated benzenes	8.50e-03				
Alkylated naphthalenes	7.98e-02				
Alkylated fluorenes	9.60e-03				
Alkylated phenanthrenes	1.21e-02				
Alkylated phenols	9.55e-07				
Total biphenyls	1.58e-02				
Total dibenzothiophenes	1.37e-05				

(a) There are no BCFs for specific SBF compounds.
See Appendix F for pollutant sediment concentration calculations.

Table Calculations:

C= A * B (B is assumed to be 1 unless otherwise noted) * 35.5 kg sediment / 32.5 liter pore water unit volume

E= C * D * 1.1% (pore water conc. * BCF * shrimp lipid percent)