During the development of the allowable levels for PAHs in seafood in the wake of the BP Oil Spill, FDA staff reviewed multiple values for their risk assessment calculations and found many of them to be legitimate approaches. This included: 5 and 10 year contamination duration, 70 and 80 kg bodyweights, differing life expectancy rates, varying values for cancer potency, and alternative numbers for seafood consumption rates. See tables below which were included in correspondence between FDA staff.

The FDA Table uses EPA RfDs, EPA BaP equivalencies, and CDC stats on body weight and life expectancy (all referenced)

This Table assumes 80 kg body weight; 78 yr life expectancy; 10 yr exposure duration

Table I
Levels of Concern

Chemical[1]	Levels of Concern (ppm) 10 g/day (Shrimp and Crabs)	10 g/day (Oysters)	43 g/day (Finfish)	Basis
Naphthalene	160.0	160.0	37.2	Non-cancer EPA RfD[2]; 80kg bw
Fluorene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Anthracene	2400.0	2400.0	558.1	Non-cancer EPA RfD[2]; 80kg bw
Pyrene	240.0	240.0	55.8	Non-cancer EPA RfD[2]; 80kg bw
Fluoranthene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Chrysene	85.8	85.8	20.0	Cancer 0.001 B(a)P equivalent[3]
Benzo(k)fluoranthene	8.6	8.6	2.0	Cancer 0.01 B(a)P equivalent[3]
Benz(a)anthracene	0.86	0.86	0.20	Cancer 0.10 B(a)P equivalent[3]
Indo(1,2,3-cd)pyrene	0.86	0.86	0.20	Cancer 0.10 B(a)P equivalent[3]
Benzo(a)pyrene	0.086	0.086	0.020	10^{-5} Cancer risk = (110ng/p/d)(78/10yr)[3]

[1] Includes alkylated homologues and assumes they have similar toxicities to the parent compound.

[2] With respect to the Basis:

Chemical	RfD x Body Wt. / Intake
Naphthalene:	(0.02 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 80kg)/ Daily Intake (kg)
Pyrene	(0.03 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluoranthene	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)

[3] Cancer risk-(q*)-based criteria:

Chrysene	[110ng x (78/10)]/[Daily Intake (g) x 0.001]
Benzo(k)fluoranthene	[110ng x (78/10)]/[Daily Intake (g) x 0.01]
Benz(a)anthracene	[110ng x (78/10)]/[Daily Intake (g) x 0.1]
Indo(1,2,3-cd)pyrene	[110ng x (78/10)]/[Daily Intake (g) x 0.1]
Benzo(a)pyrene	[110ng x (78/10)]/[Daily Intake (g)]

One-in-a-one hundred thousand increase in the lifetime (78 yr) upper bound cancer risk adjusted to account for exposures which are expected to last longer than 10 years (78/10 yr). For any sample containing, chrysene, Benzo(k)fluoranthene, Benz(a)anthracene, Indo(1,2,3-cd)pyrene, or benzo(a)pyrene, the sum of the individual ratios of the detected levels to the levels of concern cannot exceed 1.

References

REF FOR AVERAGE WEIGHT OF AMERICAN 81.7 KG
McDowell MA, Fryar CD, Ogden CL, Flegal KM. Anthropometric reference data for children and adults: United States, 2003–2006. National health statistics reports; no 10. Hyattsville, MD: National Center for Health Statistics. 2008.

DRAFT FDA Table uses EPA RfDs, EPA BaP equivalencies, and CDC stats on body weight and life expectancy (referenced). This Table assumes 80 kg body weight; 78 yr life expectancy; and 5 yr exposure duration

Table I
Levels of Concern

Chemical[1]	Levels of Concern (ppm) 10 g/day (Shrimp and Crabs)	10 g/day (Oysters)	43 g/day (Finfish)	Basis
Naphthalene	160.0	160.0	37.2	Non-cancer EPA RfD[2]; 80kg bw
Fluorene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Anthracene	2400.0	2400.0	558.1	Non-cancer EPA RfD[2]; 80kg bw
Pyrene	240.0	240.0	55.8	Non-cancer EPA RfD[2]; 80kg bw
Fluoranthene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Chrysene	171.0	171.0	40.0	Cancer 0.001 B(a)P equivalent[3]
Benzo(k)fluoranthene	17.1	17.1	4.0	Cancer 0.01 B(a)P equivalent[3]
Benzo(b)fluoranthene	1.7	1.7	0.40	Cancer 0.10 B(a)P equivalent[3]
Benz(a)anthracene	1.7	1.7	0.40	Cancer 0.10 B(a)P equivalent[3]
Indeno(1,2,3-cd)pyrene	1.7	1.7	0.40	Cancer 0.10 B(a)P equivalent[3]
Dibenz(a,h)anthracene	0.17	0.17	0.040	Cancer 1.0 B(a)P equivalent[3]
Benzo(a)pyrene	0.17	0.17	0.040	10^{-5} Cancer risk = (110ng/p/d)(78/10yr)[3]

[1] Includes alkylated homologues assumed to have similar toxicities to the parent compound.

[2]With respect to the Basis:

Chemical	RfD x Body Wt. / Intake
Naphthalene:	(0.02 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 80kg)/ Daily Intake (kg)
Pyrene	(0.03 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluoranthene	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)

[3]Cancer risk-based criteria:

Chrysene	[110ng x (78/5)]/[Daily Intake (g) x 0.001]
Benzo(k)fluoranthene	[110ng x (78/5)]/[Daily Intake (g) x 0.01]
Benzo(b)fluoranthene	[110ng x (78/5)]/[Daily Intake (g) x 0.1]
Benz(a)anthracene	[110ng x (78/5)]/[Daily Intake (g) x 0.1]
Indo(1,2,3-cd)pyrene	[110ng x (78/5)]/[Daily Intake (g) x 0.1]
Dibenz(a,h)anthracene	[110ng x (78/5)]/[Daily Intake (g)]
Benzo(a)pyrene	[110ng x (78/5)]/[Daily Intake (g)]

[3]Criteria are based on a one-in-a-one hundred thousand increase in the lifetime (78 yr) upper bound cancer risk, adjusted to account for exposures which are expected to last longer than 5 years (78/5 yr). For any sample containing, chrysene, Benzo(k)fluoranthene, Benzo(b)fluoranthene, Benz(a)anthracene, Indo(1,2,3-cd)pyrene, Dibenz(a,h)anthracene or benzo(a)pyrene, the sum of the individual ratios of the detected levels to the levels of concern cannot exceed 1.

THIS TABLE OF STATE VALUES IS SHOWN IN FDA FORMAT FOR COMPARISON PURPOSES ONLY

State Calculations assume 70 kg body weight; 70 yr life expectancy;10 yr exposure duration

Table I
Levels of Concern

Chemical[1]	Levels of Concern (ppm) 8 g/day (Shrimp and Crabs)	14 g/day (Oysters)	32 g/day (Finfish)	Basis
Naphthalene	175.0	100.0	43.7	Non-cancer EPA RfD[2]; 70kg bw
Fluorene	350.0	200.0	87.5	Non-cancer EPA RfD[2]; 70kg bw
Anthracene	2625.0	1500.0	656.2	Non-cancer EPA RfD[2]; 70kg bw
Pyrene	262.5	150.0	65.6	Non-cancer EPA RfD[2]; 70kg bw
Fluoranthene	350.0	200.0	87.5	Non-cancer EPA RfD[2]; 70kg bw
Chrysene	83.9	47.9	20.9	Cancer 0.001 B(a)P equivalent[3]
Benzo(k)fluoranthene	8.4	4.8	2.1	Cancer 0.01 B(a)P equivalent[3]
Benzo(b)fluoranthene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Benz(a)anthracene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Indo(1,2,3-cd)pyrene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Dibenz(a,h)anthracene	0.084	0.048	0.021	Cancer 1.0 B(a)P equivalent[3]
Benzo(a)pyrene	0.084	0.048	0.021	10^{-5} Cancer risk = (95.9ng/p/d)(70/10yr)[3]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes; C-1, C-2 pyrenes. Alkylated homologues assumed to have similar toxicities to the parent compound.

[2] With respect to the Basis:

Chemical	RfD x Body Wt. / Intake
Naphthalene:	(0.02 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 70kg)/ Daily Intake (kg)
Pyrene	(0.03 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluoranthene	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)

[3] Cancer risk-(q*)-based criteria:

Chrysene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.001]
Benzo(k)fluoranthene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.01]
Benzo(b)fluoranthene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Benz(a)anthracene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Indo(1,2,3-cd)pyrene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Dibenz(a,h)anthracene	[95.9ng x (70/10)]/[Daily Intake (g)]
Benzo(a)pyrene	[95.9ng x (70/10)]/[Daily Intake (g)]

The States listed additional PAHs for completeness, and indicated that all available TEFs are included but may not be used depending on chemical analysis used.

One-in-a-one hundred thousand increase in the lifetime (assumes 70 yr life expectancy) upper bound cancer risk adjusted to account for exposures which are expected to last longer than 10 years (70/10 yr). The States did not address the Federal provision that the sum of the individual ratios of the PAH detected levels to the levels of concern should not exceed 1.

7.3 CSF; 80 kg body wt.; NHANES consumption rates

Table I

Levels of Concern

Chemical[1]	Levels of Concern (ppm) 90 g/day (Shrimp and Crabs)	120 g/day (Oysters)	160 g/day (Finfish)	Basis[2]
Naphthalene	17.78	13.33	10.00	Non-cancer EPA RfD; 80 kg bw
Fluorene	35.55	26.67	20.00	Non-cancer EPA RfD; 80 kg bw
Anthracene/phenanthracene	266.67	200.00	150.00	Non-cancer EPA RfD; 80 kg bw
Fluoranthene	19.55	14.67	11.00	Cancer 0.001 B(a)P equivalency
Pyrene	19.55	14.67	11.00	Cancer 0.001 B(a)P equivalency
Benz(a)anthracene	0.19	0.15	0.11	Cancer 0.10 B(a)P equivalency
Chrysene	1.95	1.47	1.10	Cancer 0.01 B(a)P equivalency
Benzo(a)pyrene	0.020	0.015	0.011	10^{-5} Cancer risk = (110 ng/p/d)(80/5yr)[3]

[1]Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes/phenanthracenes; C-1, C-2 pyrenes.

[2]With respect to the Basis:

RfD based criteria:	RfD
Naphthalene:	(0.02 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 80kg)/ Daily Intake (kg)

Alkylated homologues assumed to have similar toxicities to the parent compound. Anthracene and phenanthracene were combined because routine chemical analysis does not distinguish between the analogues of these two compounds.

[3]Cancer risk-(q*)-based criteria:

Fluoranthene:	[110ng x (80/5)]/[Daily Intake (g) x 0.001]
Pyrene:	[110ng x (80/5)]/[Daily Intake (g) x 0.001]
Benz(a)anthracene:	[110ng x (80/5)]/[Daily Intake (g) x 0.10]
Chrysene:	[110ng x (80/5)]/[Daily Intake (g) x 0.01]
Benzo(a)pyrene:	[110ng x (80/5)]/[Daily Intake (g)]

One-in-a-hundred thousand increase in the lifetime upper bound cancer risk adjusted to account for exposures that are expected to last longer than 5 years (80/5 yr). For any sample containing fluoranthene, pyrene, benz(a)anthracene, chrysene, or benzo(a)pyrene, the sum of the individual ratios of the detected levels to the levels of concern cannot exceed 1.

Calculations for BaPE cancer risk:

Dose for 10^{-5} lifetime upper-bound risk:	10^{-5} / 7.3 / (mg / kg/ d) = 1.37 ng / kg/ d
Dose for a 80 kg person corresponding to a 10^{-5} lifetime upper-bound risk:	1.37 ng / kg/ d x 80 kg = 110 ng / d

B(a)P cancer equivalency factors:
EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Vol. 2: Risk Assessment and Fish Consumption Limits, Third Edition. Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency, Washington, DC. EPA 823-B-00-008, November 2000.

Table I

Levels of Concern

Chemical[1]	Levels of Concern (ppm) 90 g/day (Shrimp and Crabs)	120 g/day (Oysters)	160 g/day (Finfish)	Basis[2]
Naphthalene	15.55	11.66	8.75	Non-cancer EPA RfD; 70 kg bw
Fluorene	31.11	23.33	17.50	Non-cancer EPA RfD; 70 kg bw
Anthracene/phenanthracene	233.33	175.00	131.25	Non-cancer EPA RfD; 70 kg bw
Fluoranthene	0.76	0.57	0.43	Cancer 0.02 B(a)P equivalency
Pyrene	0.12	0.09	0.06	Cancer 0.13 B(a)P equivalency
Benz(a)anthracene	1.05	0.81	0.62	Cancer 0.014 B(a)P equivalency
Chrysene	1.14	0.86	0.65	Cancer 0.013 B(a)P equivalency
Benzo(a)pyrene	0.01	0.01	0.008	10^{-5} Cancer risk = (98ng/p/d)(70/5yr)[5]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes/phenanthracenes; C-1, C-2 pyrenes.

[2] With respect to the Basis:

RfD based criteria:	RfD
Naphthalene:	(0.02 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 70kg)/ Daily Intake (kg)

Alkylated homologues assumed to have similar toxicities to the parent compound. Anthracene and phenanthracene were combined because routine chemical analysis does not distinguish between the analogues of these two compounds.

Cancer risk-(q*)-based criteria:	q*[18]
Fluoranthene:	[98ng x (70/5)]/[Daily Intake (g) x 0.02]
Pyrene:	[98ng x (70/5)]/[Daily Intake (g) x 0.13]
Benz(a)anthracene:	[98ng x (70/5)]/[Daily Intake (g) x 0.014]
Chrysene:	[98ng x (70/5)]/[Daily Intake (g) x 0.013]
Benzo(a)pyrene:	[98ng x (70/5)]/[Daily Intake (g)]

One-in-a-hundred thousand increase in the lifetime upper bound cancer risk adjusted to account for exposures which are expected to last longer than 5 years (70/5 yr). For any sample containing fluoranthene, pyrene, benz(a)anthracene, chrysene, or benzo(a)pyrene, the sum of the individual ratios of the detected levels cannot exceed 1.

*Note: table corrected for Naphthalene RfD, BaP slope factor, and upper bound risk. The values listed above for fluoranthene, pyrene, benz(a)anthracene, chrysene, and benzo(a)pyrene were calculated using the dose corresponding to a 10^{-5} lifetime upper-bound risk for a 70 kg person. In the **Cancer risk- (q*)-based criteria** the dose corresponding to a 10^{-5} lifetime upper-bound risk for a 70 kg person is 98 ng. REMOVE THIS NOTE IF THIS TABLE IS USED.

Table I

Levels of Concern

Chemical[1]	Levels of Concern (ppm) 90 g/day (Shrimp and Crabs)	120 g/day (Oysters)	160 g/day (Finfish)	Basis[2]
Naphthalene	17.78	13.33	10.00	Non-cancer EPA RfD; 80 kg bw
Fluorene	35.55	26.67	20.00	Non-cancer EPA RfD; 80 kg bw
Anthracene/phenanthracene	266.67	200.00	150.00	Non-cancer EPA RfD; 80 kg bw
Fluoranthene	3.10	2.33	1.75	Cancer 0.02 B(a)P equivalency
Pyrene	0.48	0.36	0.27	Cancer 0.13 B(a)P equivalency
Benz(a)anthracene	4.30	3.29	2.54	Cancer 0.014 B(a)P equivalency
Chrysene	4.65	3.49	2.66	Cancer 0.013 B(a)P equivalency
Benzo(a)pyrene	0.06	0.05	0.03	10^{-5} Cancer risk = (399ng/p/d)(70/5yr)[5]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes/phenanthracenes; C-1, C-2 pyrenes.

[2]With respect to the Basis:

RfD based criteria:	RfD
Naphthalene:	(0.02 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 80kg)/ Daily Intake (kg)

Alkylated homologues assumed to have similar toxicities to the parent compound. Anthracene and phenanthracene were combined because routine chemical analysis does not distinguish between the analogues of these two compounds.

Cancer risk-(q*)-based criteria:	q*[10]
Fluoranthene:	[399ng x (70/5)]/[Daily Intake (g) x 0.02]
Pyrene:	[399ng x (70/5)]/[Daily Intake (g) x 0.13]
Benz(a)anthracene:	[399ng x (70/5)]/[Daily Intake (g) x 0.014]
Chrysene:	[399ng x (70/5)]/[Daily Intake (g) x 0.013]
Benzo(a)pyrene:	[399ng x (70/5)]/[Daily Intake (g)]

One-in-a-hundred thousand increase in the lifetime upper bound cancer risk adjusted to account for exposures which are expected to last longer than 5 years (70/5 yr). For any sample containing fluoranthene, pyrene, benz(a)anthracene, chrysene, or benzo(a)pyrene, the sum of the individual ratios of the detected levels cannot exceed 1.

*Note: table corrected for Naphthalene RfD and upper bound risk. The values listed above for fluoranthene, pyrene, benz(a)anthracene, chrysene, and benzo(a)pyrene were calculated using the dose corresponding to a 10^{-5} lifetime upper-bound risk for a 70 kg person. In the **Cancer risk- (q*)-based criteria** the dose corresponding to a 10^{-5} lifetime upper-bound risk for a 70 kg person is 399 ng, not 34 ng. REMOVE THIS NOTE IF THIS TABLE IS USED.

The FDA Table uses EPA RfDs, EPA BaP equivalencies, and CDC stats on body weight and life expectancy (all referenced)

This Table assumes 80 kg body weight; 78 yr life expectancy; 10 yr exposure duration

Table I
Levels of Concern

Chemical[1]	Levels of Concern (ppm) 10 g/day (Shrimp and Crabs)	10 g/day (Oysters)	43 g/day (Finfish)	Basis
Naphthalene	160.0	160.0	37.2	Non-cancer EPA RfD[2]; 80kg bw
Fluorene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Anthracene	2400.0	2400.0	558.1	Non-cancer EPA RfD[2]; 80kg bw
Pyrene	240.0	240.0	55.8	Non-cancer EPA RfD[2]; 80kg bw
Fluoranthene	320.0	320.0	74.4	Non-cancer EPA RfD[2]; 80kg bw
Chrysene	85.8	85.8	20.0	Cancer 0.001 B(a)P equivalent[3]
Benzo(k)fluoranthene	8.6	8.6	2.0	Cancer 0.01 B(a)P equivalent[3]
Benzo(b)fluoranthene	0.86	0.86	0.20	Cancer 0.10 B(a)P equivalent[3]
Benz(a)anthracene	0.86	0.86	0.20	Cancer 0.10 B(a)P equivalent[3]
Indo(1,2,3-cd)pyrene	0.86	0.86	0.20	Cancer 0.10 B(a)P equivalent[3]
Dibenz(a,h)anthracene	0.086	0.086	0.020	Cancer 1.0 B(a)P equivalent[3]
Benzo(a)pyrene	0.086	0.086	0.020	10^{-5} Cancer risk = (110ng/p/d)(78/10yr)[3]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes; C-1, C-2 pyrenes. Alkylated homologues assumed to have similar toxicities to the parent compound.

[2]With respect to the Basis:

Chemical	RfD x Body Wt. / Intake
Naphthalene:	(0.02 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 80kg)/ Daily Intake (kg)
Pyrene	(0.03 mg/kg/d x 80kg)/ Daily Intake (kg)
Fluoranthene	(0.04 mg/kg/d x 80kg)/ Daily Intake (kg)

[3]Cancer risk-(q*)-based criteria:

Chrysene	[110ng x (78/10)]/[Daily Intake (g) x 0.001]
Benzo(k)fluoranthene	[110ng x (78/10)]/[Daily Intake (g) x 0.01]
Benzo(b)fluoranthene	[110ng x (78/10)]/[Daily Intake (g) x 0.1]
Benz(a)anthracene	[110ng x (78/10)]/[Daily Intake (g) x 0.1]
Indo(1,2,3-cd)pyrene	[110ng x (78/10)]/[Daily Intake (g) x 0.1]
Dibenz(a,h)anthracene	[110ng x (78/10)]/[Daily Intake (g)]
Benzo(a)pyrene	[110ng x (78/10)]/[Daily Intake (g)]

One-in-a-one hundred thousand increase in the lifetime (78 yr) upper bound cancer risk adjusted to account for exposures which are expected to last longer than 10 years (78/10 yr). For any sample containing, chrysene, Benzo(k)fluoranthene, Benzo(b)fluoranthene, Benz(a)anthracene, Indo(1,2,3-cd)pyrene, Dibenz(a,h)anthracene or benzo(a)pyrene, the sum of the individual ratios of the detected levels to the levels of concern cannot exceed 1.

THIS TABLE OF STATE VALUES IS SHOWN IN FDA FORMAT FOR COMPARISON PURPOSES ONLY .

State Calculations assume 70 kg body weight; 70 yr life expectancy;10 yr exposure duration

Table I
Levels of Concern

Chemical[1]	Levels of Concern (ppm) 8 g/day (Shrimp and Crabs)	14 g/day (Oysters)	32 g/day (Finfish)	Basis
Naphthalene	175.0	100.0	43.7	Non-cancer EPA RfD[2]; 70kg bw
Fluorene	350.0	200.0	87.5	Non-cancer EPA RfD[2]; 70kg bw
Anthracene	2625.0	1500.0	656.2	Non-cancer EPA RfD[2]; 70kg bw
Pyrene	262.5	150.0	65.6	Non-cancer EPA RfD[2]; 70kg bw
Fluoranthene	350.0	200.0	87.5	Non-cancer EPA RfD[2]; 70kg bw
Chrysene	83.9	47.9	20.9	Cancer 0.001 B(a)P equivalent[3]
Benzo(k)fluoranthene	8.4	4.8	2.1	Cancer 0.01 B(a)P equivalent[3]
Benzo(b)fluoranthene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Benz(a)anthracene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Indo(1,2,3-cd)pyrene	0.84	0.48	0.21	Cancer 0.10 B(a)P equivalent[3]
Dibenz(a,h)anthracene	0.084	0.048	0.021	Cancer 1.0 B(a)P equivalent[3]
Benzo(a)pyrene	0.084	0.048	0.021	10^{-5} Cancer risk = (95.9ng/p/d)(70/10yr)[3]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes; C-1, C-2 pyrenes. Alkylated homologues assumed to have similar toxicities to the parent compound.

[2]With respect to the Basis:

Chemical	RfD x Body Wt. / Intake
Naphthalene:	(0.02 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 70kg)/ Daily Intake (kg)
Pyrene	(0.03 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluoranthene	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)

[3]Cancer risk-(q*)-based criteria:

Chrysene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.001]
Benzo(k)fluoranthene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.01]
Benzo(b)fluoranthene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Benz(a)anthracene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Indo(1,2,3-cd)pyrene	[95.9ng x (70/10)]/[Daily Intake (g) x 0.1]
Dibenz(a,h)anthracene	[95.9ng x (70/10)]/[Daily Intake (g)]
Benzo(a)pyrene	[95.9ng x (70/10)]/[Daily Intake (g)]

The States listed additional PAHs for completeness, and indicated that all available TEFs are included but may not be used depending on chemical analysis used.

One-in-a-one hundred thousand increase in the lifetime (assumes 70 yr life expectancy) upper bound cancer risk adjusted to account for exposures which are expected to last longer than 10 years (70/10 yr). The

Table I

Levels of Concern

Chemical[1]	Levels of Concern (ppm) 90 g/day (Shrimp and Crabs)	120 g/day (Oysters)	160 g/day (Finfish)	Basis[2]
Naphthalene	15.55	11.66	8.75	Non-cancer EPA RfD; 70 kg bw
Fluorene	31.11	23.33	17.50	Non-cancer EPA RfD; 70 kg bw
Anthracene/phenanthracene	233.33	175.00	131.25	Non-cancer EPA RfD; 70 kg bw
Fluoranthene	3.10	2.33	1.75	Cancer 0.02 B(a)P equivalency
Pyrene	0.48	0.36	0.27	Cancer 0.13 B(a)P equivalency
Benz(a)anthracene	4.30	3.29	2.54	Cancer 0.014 B(a)P equivalency
Chrysene	4.65	3.49	2.66	Cancer 0.013 B(a)P equivalency
Benzo(a)pyrene	0.06	0.05	0.03	10^{-5} Cancer risk = (399ng/p/d)(70/5yr)[3]

[1] Includes alkylated homologues, specifically C-1, C-2, C-3, C-4 napthalenes; C-1, C-2, C-3 fluorenes; C-1, C-2, C-3 anthracenes/phenanthracenes; C-1, C-2 pyrenes.

[2] With respect to the Basis:

RfD based criteria:	RfD
Naphthalene:	(0.02 mg/kg/d x 70kg)/ Daily Intake (kg)
Fluorene:	(0.04 mg/kg/d x 70kg)/ Daily Intake (kg)
Anthracene:	(0.30 mg/kg/d x 70kg)/ Daily Intake (kg)

Alkylated homologues assumed to have similar toxicities to the parent compound. Anthracene and phenanthracene were combined because routine chemical analysis does not distinguish between the analogues of these two compounds.

[3] Cancer risk-(q*)-based criteria:	q*[10]
Fluoranthene:	[399ng x (70/5)]/[Daily Intake (g) x 0.02]
Pyrene:	[399ng x (70/5)]/[Daily Intake (g) x 0.13]
Benz(a)anthracene:	[399ng x (70/5)]/[Daily Intake (g) x 0.014]
Chrysene:	[399ng x (70/5)]/[Daily Intake (g) x 0.013]
Benzo(a)pyrene:	[399ng x (70/5)]/[Daily Intake (g)]

One-in-a-hundred thousand increase in the lifetime upper bound cancer risk adjusted to account for exposures which are expected to last longer than 5 years (70/5 yr). For any sample containing fluoranthene, pyrene, benz(a)anthracene, chrysene, or benzo(a)pyrene, the sum of the individual ratios of the detected levels to the levels of concern cannot exceed 1.