

Lower Duwamish Waterway Group

Port of Seattle / City of Seattle / King County / The Boeing Company

Appendix M Residual Risk Tables Draft Final Feasibility Study Lower Duwamish Waterway Seattle, Washington

FOR SUBMITTAL TO:

The U.S. Environmental Protection Agency
Region 10
Seattle, WA

The Washington State Department of Ecology
Northwest Regional Office
Bellevue, WA

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Table M-1 Summary Statistics for Core Stations Remaining with SMS Chemical Exceedances

SMS Chemical Exceedances at Depths ≤3 ft

Analyte	Statistics	All FS Dataset Cores (Baseline)	Cores Outside EAAs	Core Stations Excluding Stations in EAAs and Dredge Areas									Core Stations Excluding Stations in EAAs, Dredge, Partial Dredge and Cap, and Cap Areas								
				Remedial Alternative									Remedial Alternative								
				3C	4C	5C	6C	2R	3R	4R	5R	6R	3C	4C	5C	6C	2R	3R	4R	5R	6R
Total PCBs (µg/kg dw)	# of Stations	394	194	77	61	60	45	74	52	29	17	3	61	41	37	14	74	51	28	16	-
	Median	510	170	630	860	805	420	620	580	730	730	1,720	510	730	590	495	620	570	685	685	-
	Mean	5,311	665	1,308	1,500	1,500	722	1,250	1,070	1,140	1,049	3,133	1,067	1,184	1,031	854	1,250	960	942	696	-
	90th percentile	6,940	1,960	3,340	3,400	3,460	1,764	3,210	2,495	2,540	1,378	5,704	2,900	2,900	2,660	2,315	3,210	2,450	2,135	1,070	-
Arsenic (mg/kg dw)	# of Stations	229	191	73	57	56	45	70	48	25	13	3	57	37	33	13	70	47	24	12	-
	Median	12	12	18	19	18	20	17	16	13	11	9	16	14	13	12	17	16	13	11	-
	Mean	33	37	39	44	44	52	51	18	16	13	13	18	16	16	17	51	18	16	12	-
	90th percentile	30	34	62	86	91	148	40	31	25	19	19	30	27	25	37	40	32	25	16	-
cPAHs (µg TEQ/kg dw)	# of Stations	219	191	73	57	56	45	70	48	25	13	3	57	37	33	13	70	47	24	12	-
	Median	270	260	420	380	400	420	355	380	380	290	156	360	340	380	660	355	380	380	285	-
	Mean	535	538	758	767	779	722	806	786	905	880	301	737	785	855	1,080	806	789	917	901	-
	90th percentile	1,200	1,190	1,980	1,940	1,950	1,764	2,020	2,050	2,520	2,866	527	1,480	1,480	1,760	1,760	2,020	2,100	2,740	3,133	-

SMS Chemical Exceedances at Depths >3 ft

Analyte	Statistics	All FS Dataset Cores (Baseline)	Cores Outside EAAs	Core Stations Excluding Stations in EAAs and Dredge Areas									Core Stations Excluding Stations in EAAs, Dredge, Partial Dredge and Cap, and Cap Areas								
				Remedial Alternative									Remedial Alternative								
				3C	4C	5C	6C	2R	3R	4R	5R	6R	3C	4C	5C	6C	2R	3R	4R	5R	6R
Total PCBs (µg/kg dw)	# of Stations	139	35	27	24	24	18	20	14	9	6	1	17	13	11	2	20	14	9	6	-
	Median	930	415	790	780	780	815	640	800	770	625	-	790	770	770	-	640	800	770	625	-
	Mean	2172	992	1,240	1,232	1,232	1,496	1,140	1,389	1,259	552	-	1,292	1,126	1,221	-	1,140	1,389	1,259	552	-
	90th percentile	6000	2,500	2,840	2,960	2,960	0	2,680	3,160	3,020	855	-	2,920	2,310	2,400	-	2,680	3,160	3,020	855	-
Arsenic (mg/kg dw)	# of Stations	27	24	13	12	11	11	12	6	3	1	1	6	4	3	2	12	6	3	1	-
	Median	17	12	22	42	62	62	17	20	-	-	-	20	16	-	-	17	20	-	-	-
	Mean	133	146	262	282	308	308	38	23	-	-	-	23	25	-	-	38	23	-	-	-
	90th percentile	256	262	662	711	760	760	58	42	-	-	-	42	50	-	-	58	42	-	-	-
cPAHs (µg TEQ/kg dw)	# of Stations	30	24	15	13	12	11	12	8	4	3	1	9	6	4	2	12	8	4	3	-
	Median	280	320	430	430	590	430	301	301	301	-	-	281	236	301	-	301	301	301	-	-
	Mean	605	708	905	1,005	1,088	1,014	480	542	626	-	-	503	451	626	-	480	542	626	-	-
	90th percentile	1400	1,700	2,200	2,300	2,350	2,400	1,245	1,480	1,426	-	-	1,420	1,110	1,426	-	1,245	1,480	1,426	-	-

Notes:

1. Threshold depth of 3 ft is a conservative estimated depth at which re-exposure of contaminants could occur over time. FS dataset cores were queried and sorted into two depth intervals: ≤3 ft and >3 ft. The top end of the core interval was considered as the basis for comparison with the threshold depth. For example, a core sample in the 2- to 4-ft interval was included in the 0- to 3-ft range because 2 ft was the top end value of the core interval. Therefore, no core was double-counted based on depth.

2. Statistics for dioxins/furans were not calculated because of limited data.

3. Statistics calculated using statistical software ProUCL 4.00.05, using detected sample concentrations >SQS.

"-" = not calculated

C = combined technology alternative; cPAHs = carcinogenic polycyclic aromatic hydrocarbons; EAA = early action area; FS = feasibility study; PCBs = polychlorinated biphenyls; R = removal emphasis alternative; TEQ = toxic equivalent

Table M-2 Effectiveness Evaluation – Predicted Post-Construction Arsenic, Total PCB, cPAH and Dioxin/Furan Concentrations by Reach

Arsenic (mg/kg dw) (RAO 2)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Netfishing Direct Contact 10 ⁶ RBTC = 3.7 PRG = Background = 7.0 ^a , 90th percentile = 11																											
				Reach 1 Baseline = 17										Reach 2 Baseline = 16										Reach 3 Baseline = 10							
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)							
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	
EAA-Alternative 1	29	<5	5	17	13	11.0	9.9	9.5	9.4	9.3	9.3	9.2	16	12	11	11	12	11	11	10	10	10	9.4	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 3C	86	4	9	17	11	9.9	9.5	9.3	9.2	9.2	9.2	9.2	16	9.5	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 4C	143	7	12	17	10	9.8	9.5	9.3	9.2	9.2	9.2	9.2	16	9.6	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 5C	186	8	13	17	10	9.8	9.4	9.3	9.2	9.2	9.2	9.2	16	9.6	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 6C	328	18	23	17	10	9.8	9.4	9.1	9.1	9.1	9.1	9.1	16	9.6	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 2R	59	4	9	17	11	10	9.6	9.4	9.3	9.2	9.2	9.2	16	9.5	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 3R	86	6	11	17	11	9.9	9.5	9.3	9.2	9.2	9.2	9.2	16	9.5	9.3	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 4R	143	13	18	17	11	9.9	9.5	9.3	9.2	9.2	9.2	9.2	16	9.5	9.4	9.2	9.2	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Alternative 5R	186	19	24	17	11	9.9	9.5	9.4	9.3	9.3	9.2	9.2	16	9.5	9.4	9.2	9.3	9.2	9.2	9.2	9.1	10	9.3	9.2	9.1	9.2	9.1	9.1	9.1	9.1	
Alternative 6R	328	38	43	17	11	9.9	9.5	9.4	9.3	9.2	9.2	9.1	16	9.5	9.4	9.2	9.3	9.2	9.2	9.1	9.1	10	9.3	9.2	9.1	9.2	9.1	9.1	9.1	9.1	

Total PCBs (µg/kg dw) (RAOs 1, 2 and 4)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Site-wide Netfishing Direct Contact: PRG = 10 ⁶ RBTC = 1,300 Seafood Consumption - Human: PRG = Background = 2 Seafood Consumption - Ecological (otter): PRG = 128 - 159																											
				Reach 1 Baseline = 250										Reach 2 Baseline = 660										Reach 3 Baseline = 56							
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)							
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	
EAA-Alternative 1	29	<5	5	190	120	84	60	51	48	48	46	45	220	98	67	57	61	55	52	47	47	56	40	40	38	38	38	39	38	38	
Alternative 3C	86	4	9	190	99	73	55	48	45	45	44	44	220	83	61	54	57	53	50	45	45	56	41	40	38	38	38	38	38	38	
Alternative 4C	143	7	12	190	83	64	51	46	44	44	44	43	220	76	57	51	54	50	48	44	44	56	41	40	38	38	38	38	38	38	
Alternative 5C	186	8	13	190	83	58	49	45	44	44	44	43	220	76	57	50	53	50	48	44	44	56	41	40	38	38	38	38	38	38	
Alternative 6C	328	18	23	190	83	58	47	36	39	41	42	42	220	76	57	36	41	41	42	41	41	56	41	40	35	38	38	38	38	38	
Alternative 2R	59	4	9	190	106	77	58	50	47	47	46	45	220	85	63	55	58	54	51	46	46	56	40	40	38	38	38	39	38	38	
Alternative 3R	86	6	11	190	99	73	55	48	45	45	44	44	220	83	61	54	57	53	50	45	45	56	41	40	38	38	38	38	38	38	
Alternative 4R	143	13	18	190	99	73	53	47	45	45	44	44	220	83	59	51	54	50	48	44	44	56	41	41	38	38	38	38	38	38	
Alternative 5R	186	19	24	190	99	73	53	48	45	45	44	44	220	83	59	51	54	50	48	44	44	56	41	41	38	39	38	38	38	38	
Alternative 6R	328	38	43	190	99	73	53	48	45	45	43	41	38	220	83	59	51	54	39	38	40	41	56	41	41	38	39	35	38	38	38

Table M-2 Effectiveness Evaluation – Predicted Post-Construction Arsenic, Total PCB, cPAH and Dioxin/Furan Concentrations by Reach

cPAHs (µg TEQ/kg dw) (RAO 2)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Netfishing Direct Contact 10 ⁻⁶ RBTC = 380 PRG = 380																											
				Reach 1 Baseline = 450										Reach 2 Baseline = 370										Reach 3 Baseline = 200							
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)							
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	
EAA-Alternative 1	29	<5	5	430	280	200	140	120	110	110	110	110	280	150	130	120	130	120	120	107	108	200	107	97	87	90	86	92	85	87	
Alternative 3C	86	4	9	430	230	170	130	110	109	110	110	109	280	130	120	106	110	108	108	100	101	200	100	94	86	90	86	88	84	87	
Alternative 4C	143	7	12	430	200	150	120	109	107	110	110	109	280	130	110	104	110	106	106	100	101	200	100	94	86	90	86	88	84	86	
Alternative 5C	186	8	13	430	200	150	120	108	106	110	110	108	280	130	110	104	110	106	106	100	101	200	100	95	86	90	86	88	84	86	
Alternative 6C	328	18	23	430	200	150	120	105	104	108	108	107	280	130	110	104	104	102	103	98	100	200	100	95	85	89	86	88	84	86	
Alternative 2R	59	4	9	430	250	180	130	120	110	110	110	110	280	140	120	110	120	110	110	103	104	200	103	96	86	90	86	90	85	87	
Alternative 3R	86	6	11	430	230	170	130	110	109	110	110	109	280	130	120	106	110	108	108	100	101	200	100	94	86	90	86	88	84	87	
Alternative 4R	143	13	18	430	230	170	120	110	108	110	110	109	280	130	120	103	110	106	106	100	101	200	100	96	86	90	86	88	84	86	
Alternative 5R	186	19	24	430	230	170	120	120	110	110	110	109	280	130	120	103	110	106	106	100	101	200	100	96	86	91	86	88	84	86	
Alternative 6R	328	38	43	430	230	170	120	120	110	110	110	108	280	130	120	103	110	107	104	98	100	200	100	96	86	91	85	88	84	86	

Dioxin/Furan (ng TEQ/kg dw) (RAOs 1 and 2)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Site-wide Netfishing Direct Contact: PRG = 10 ⁻⁶ RBTC = 37 Seafood Consumption - Human: PRG = Background = 2																											
				Reach 1 Baseline = 39										Reach 2 Baseline = 9.7										Reach 3 Baseline = 4.8							
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)							
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45	
EAA-Alternative 1	29	<5	5	36	18	10	6.2	5.2	4.8	4.7	4.6	4.5	8	5	4.7	4.4	4.6	4.5	4.5	4.4	4.4	5	4	4.3	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 3C	86	4	9	36	6.8	5.7	4.9	4.6	4.5	4.5	4.5	4.5	8	4.7	4.5	4.3	4.5	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 4C	143	7	12	36	6.0	5.3	4.7	4.5	4.5	4.5	4.5	4.5	8	4.4	4.3	4.3	4.4	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 5C	186	8	13	36	6.0	4.9	4.5	4.4	4.4	4.5	4.5	4.5	8	4.4	4.3	4.3	4.4	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 6C	328	18	23	36	6.0	4.9	4.5	4.3	4.3	4.4	4.4	4.4	8	4.4	4.3	4.1	4.3	4.3	4.3	4.3	4.3	5	4.2	4.2	4.0	4.1	4.2	4.2	4.1	4.2	
Alternative 2R	59	4	9	36	7.2	5.9	5.0	4.7	4.6	4.6	4.5	4.5	8	4.8	4.5	4.4	4.5	4.5	4.5	4.3	4.3	5	4.2	4.3	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 3R	86	6	11	36	6.8	5.7	4.9	4.6	4.5	4.5	4.5	4.5	8	4.7	4.5	4.3	4.5	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 4R	143	13	18	36	6.8	5.7	4.7	4.5	4.5	4.5	4.5	4.5	8	4.7	4.3	4.3	4.4	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 5R	186	19	24	36	6.8	5.7	4.7	4.4	4.4	4.5	4.5	4.5	8	4.7	4.3	4.3	4.4	4.4	4.4	4.3	4.3	5	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	
Alternative 6R	328	38	43	36	6.8	5.7	4.7	4.4	4.4	4.4	4.4	4.4	8	4.7	4.3	4.3	4.4	4.3	4.3	4.3	4.3	5	4.2	4.2	4.1	4.2	4.1	4.2	4.1	4.2	

Notes:

1. BCM predictions use base case STM outputs revised June 2010 (Appendix C).
 2. Reach 1 = RM 0 to RM 2.2; Reach 2 = RM 2.2 to RM 4.0; Reach 3 = RM 4.0 to RM 5.0 from STM report (QEA 2008).
 3. BCM model area = 430 acres and FS study area = 441 acres
- a Background value is based on UCL95.
- b This is the start of construction for Alternatives 2 through 6. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.
- End of construction period.

Acronyms

- BCM = bed composition model
- EAA = early action area
- RAO = remedial action objective
- RBTC = risk-based threshold concentration
- RM = river mile
- SQS = sediment quality standard
- STM = sediment transport model
- SWAC = spatially-weighted average concentration
- UCL = upper confidence limit on the mean

Table M-3 Effectiveness Evaluation – Predicted Post-Construction Arsenic, Total PCB, cPAH and Dioxin/Furan Concentrations and Resulting Individual Chemical Risks in Intertidal Areas

Arsenic (mg/kg dw)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Intertidal SWAC ^a Baseline = 15									Intertidal Risk ^a																	
				Time from Issuance of Remedy Decision Documents (years)									Time from Issuance of Remedy Decision Documents (years)																	
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45									
EAA-Alternative 1	29	<5	5	15	12	11	11	10	10	10	10	10	9.1	5.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	4.E-06	3.E-06	
Alternative 3C	86	4	9	15	10	9.4	9.3	9.2	9.2	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 4C	143	7	12	15	10	9.4	9.3	9.2	9.2	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 5C	186	8	13	15	10	9.5	9.3	9.3	9.2	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 6C	328	18	23	15	10	9.5	9.3	9.2	9.2	9.2	9.2	9.2	9.2	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 2R	59	4	9	15	10	10	9.3	9.3	9.2	9.2	9.2	9.2	9.1	5.E-06	4.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 3R	86	6	11	15	10	9.4	9.3	9.2	9.2	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 4R	143	13	18	15	10	9.4	9.3	9.3	9.2	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 5R	186	19	24	15	10	9.4	9.3	9.3	9.3	9.2	9.2	9.2	9.1	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06
Alternative 6R	328	38	43	15	10	9.4	9.3	9.3	9.2	9.2	9.2	9.2	9.2	5.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06	3.E-06

Total PCBs (µg/kg dw)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Intertidal SWAC ^a Baseline = 500									Intertidal Risk ^a																
				Time from Issuance of Remedy Decision Documents (years)									Time from Issuance of Remedy Decision Documents (years)																
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45								
EAA-Alternative 1	29	<5	5	180	93	67	54	51	50	49	47	31	1.E-07	5.E-08	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 3C	86	4	9	180	68	57	50	48	47	47	45	35	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 4C	143	7	12	180	63	54	48	46	46	46	44	37	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 5C	186	8	13	180	63	53	47	46	45	45	44	39	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 6C	328	18	23	180	63	53	44	41	42	43	42	43	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	2.E-08	2.E-08	3.E-08	3.E-08	2.E-08	2.E-08	3.E-08	2.E-08	3.E-08	2.E-08	3.E-08	
Alternative 2R	59	4	9	180	74	60	52	49	48	48	46	33	1.E-07	4.E-08	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08	
Alternative 3R	86	6	11	180	68	57	50	48	47	47	45	35	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 4R	143	13	18	180	68	56	49	47	46	46	44	37	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 5R	186	19	24	180	68	56	49	48	46	46	45	39	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08
Alternative 6R	328	38	43	180	68	56	49	48	44	44	42	42	1.E-07	4.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	3.E-08	2.E-08	2.E-08	

Table M-3 Effectiveness Evaluation – Predicted Post-Construction Arsenic, Total PCB, cPAH and Dioxin/Furan Concentrations and Resulting Individual Chemical Risks in Intertidal Areas

cPAHs (µg TEQ/kg dw)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Intertidal SWAC ^a Baseline = 410										Intertidal Risk ^a									
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)									
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45		
EAA-Alternative 1	29	<5	5	330	210	160	130	120	120	120	110	107	4.E-06	2.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 3C	86	4	9	330	140	130	110	110	109	110	107	107	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 4C	143	7	12	330	140	120	110	109	108	110	107	107	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 5C	186	8	13	330	140	120	109	109	108	110	107	108	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 6C	328	18	23	330	140	120	108	108	107	109	107	108	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 2R	59	4	9	330	180	150	120	120	110	110	110	107	4.E-06	2.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 3R	86	6	11	330	140	130	110	110	109	110	107	107	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 4R	143	13	18	330	140	130	110	110	108	110	107	107	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 5R	186	19	24	330	140	130	110	110	110	110	108	108	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06
Alternative 6R	328	38	43	330	144	127	111	113	109	110	108	109	4.E-06	2.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06	1.E-06

Dioxin/Furan (ng TEQ/kg dw)

Alternative	Active Area in FS Study Area (acres)	Construction Period (years)	Implementation Period (years)	Intertidal SWAC ^a Baseline = 29										Intertidal Risk ^a									
				Time from Issuance of Remedy Decision Documents (years)										Time from Issuance of Remedy Decision Documents (years)									
				5 ^b	10	15	20	25	30	35	40	45	5 ^b	10	15	20	25	30	35	40	45		
EAA-Alternative 1	29	<5	5	27	13	8.1	5.5	4.9	4.7	4.6	4.5	4.2	1.E-06	5.E-07	3.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 3C	86	4	9	27	5.3	5.0	4.6	4.5	4.4	4.4	4.4	4.2	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 4C	143	7	12	27	5.2	4.9	4.5	4.5	4.4	4.4	4.4	4.3	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 5C	186	8	13	27	5.2	4.6	4.4	4.4	4.4	4.4	4.4	4.3	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 6C	328	18	23	27	5.2	4.6	4.4	4.3	4.3	4.4	4.4	4.4	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 2R	59	4	9	27	5.7	5.2	4.7	4.6	4.5	4.5	4.4	4.2	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 3R	86	6	11	27	5.3	5.0	4.6	4.5	4.4	4.4	4.4	4.2	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 4R	143	13	18	27	5.3	4.9	4.5	4.5	4.4	4.4	4.4	4.3	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 5R	186	19	24	27	5.3	4.9	4.5	4.4	4.4	4.4	4.4	4.3	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07
Alternative 6R	328	38	43	27	5.3	4.9	4.5	4.4	4.3	4.4	4.4	4.4	1.E-06	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07	2.E-07

Notes:

1. BCM predictions use base case STM outputs revised June 2010 (Appendix C).
2. BCM model area = 430 acres and FS study area = 441 acres

a Intertidal SWACs and individual chemical risk information are provided for informational purposes. Excess cancer risks are calculated using beachplay exposure assumptions.
 b This is the start of construction for Alternatives 2 through 6. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

Acronyms

BCM = bed composition model
 EAA = early action area
 RAO = remedial action objective
 SWAC = spatially-weighted average concentration


 End of construction period.

Table M-4 Seafood Consumption Excess Cancer Risk for non-RME Scenarios Associated with Alternative-Specific Residual Sediment Total PCB Concentrations Over Time

Time from Issuance of Decision Documents (years)	Alternative	Adult Tribal CT (Tulalip data)	Child Tribal CT (Tulalip data)	Adult API CT	Adult Tribal (Suquamish data)	One Meal Per Month			
						Benthic Fish	Pelagic Fish	Crab	Clam
10	EAA - Alternative 1	2 × 10 ⁻⁵	1 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻³	4 × 10 ⁻⁵	5 × 10 ⁻⁵	6 × 10 ⁻⁵	4 × 10 ⁻⁵
10	Alternative 2R	2 × 10 ⁻⁵	8 × 10 ⁻⁶	3 × 10 ⁻⁵	1 × 10 ⁻³	3 × 10 ⁻⁵	4 × 10 ⁻⁵	5 × 10 ⁻⁵	3 × 10 ⁻⁵
10	Alternative 3C	2 × 10 ⁻⁵	8 × 10 ⁻⁶	3 × 10 ⁻⁵	1 × 10 ⁻³	3 × 10 ⁻⁵	4 × 10 ⁻⁵	5 × 10 ⁻⁵	3 × 10 ⁻⁵
10	Alternative 3R	2 × 10 ⁻⁵	8 × 10 ⁻⁶	3 × 10 ⁻⁵	1 × 10 ⁻³	3 × 10 ⁻⁵	4 × 10 ⁻⁵	5 × 10 ⁻⁵	3 × 10 ⁻⁵
10	Alternative 4C	2 × 10 ⁻⁵	7 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	3 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	3 × 10 ⁻⁵
10	Alternative 4R								
10	Alternative 5C								
10	Alternative 5R								
10	Alternative 6C								
10	Alternative 6R								
15	EAA - Alternative 1	2 × 10 ⁻⁵	7 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	3 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	3 × 10 ⁻⁵
15	Alternative 2R	2 × 10 ⁻⁵	7 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	3 × 10 ⁻⁵
15	Alternative 3C	2 × 10 ⁻⁵	7 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	2 × 10 ⁻⁵
15	Alternative 3R	2 × 10 ⁻⁵	7 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	2 × 10 ⁻⁵
15	Alternative 4C	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	2 × 10 ⁻⁵
15	Alternative 4R								
15	Alternative 5C	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁵	2 × 10 ⁻⁵
15	Alternative 5R								
15	Alternative 6C								
15	Alternative 6R								
25	EAA - Alternative 1	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 2R	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 3C	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 3R	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	1 × 10 ⁻³	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 4C	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 4R	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 5C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 5R	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 6C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	8 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
25	Alternative 6R								
35	EAA - Alternative 1	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 2R	1 × 10 ⁻⁵	6 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	3 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 3C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 3R	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 4C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 4R	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 5C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 5R	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 6C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
35	Alternative 6R								
45	Alternative 6C	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵
45	Alternative 6R	1 × 10 ⁻⁵	5 × 10 ⁻⁶	2 × 10 ⁻⁵	9 × 10 ⁻⁴	2 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁵	2 × 10 ⁻⁵

Notes:

1. Risks estimated using the FWM (Windward 2010), alternative-specific total PCB concentrations in surface sediment (Table 9-2a), and assumed surface water dissolved concentrations of 0.6 ng/L, except Year 10 for Alternative 1 (0.9 ng/L).
2. Significant figures are displayed in accordance with the conventions established in the risk assessments
3. Risks were not estimated for construction period because of uncertainties in PCB exposure concentrations during construction.
4. Risks are shown at the end of the 5-year model-predicted interval. Time intervals are indexed to issuance of decision documents (i.e., 5 yr, 10 yr, etc.) and year 5 is the start of construction for Alternatives 2 through 6. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

API = Asian Pacific Islander; CT = central tendency; EAA = early action area; FWM = food web model.

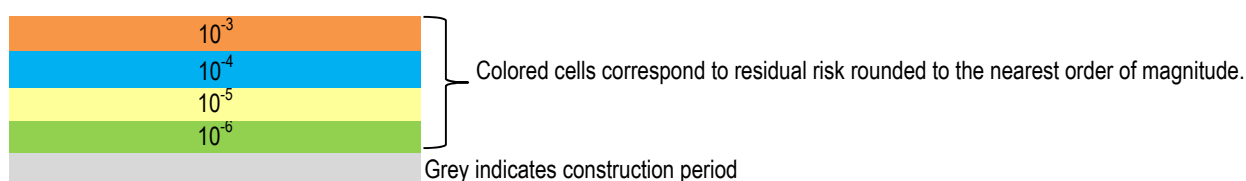


Table M-5 Site-related Seafood Consumption Excess Cancer Risks Associated with Residual Sediment Total PCB Concentrations for Reasonable Maximum Exposure Scenarios Over Time

Time from Issuance of Decision Documents (years)	Alternative	Adult Tribal RME (Tulip data)			Child Tribal RME (Tulip data)			Adult API RME		
		Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b	Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b	Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b
5	FS Baseline	9 × 10 ⁻⁴	8 × 10 ⁻⁴	n/a	2 × 10 ⁻⁴	2 × 10 ⁻⁴	n/a	3 × 10 ⁻⁴	2 × 10 ⁻⁴	n/a
10	EAA - Alternative 1	4 × 10 ⁻⁴	3 × 10 ⁻⁴	63%	7 × 10 ⁻⁵	5 × 10 ⁻⁵	75%	1 × 10 ⁻⁴	6 × 10 ⁻⁵	70%
10	Alternative 2R	3 × 10 ⁻⁴	2 × 10 ⁻⁴	88%	5 × 10 ⁻⁵	3 × 10 ⁻⁵	85%	9 × 10 ⁻⁵	5 × 10 ⁻⁵	75%
10	Alternative 3C	3 × 10 ⁻⁴	2 × 10 ⁻⁴	88%	5 × 10 ⁻⁵	3 × 10 ⁻⁵	85%	8 × 10 ⁻⁵	4 × 10 ⁻⁵	80%
10	Alternative 3R	3 × 10 ⁻⁴	2 × 10 ⁻⁴	88%	5 × 10 ⁻⁵	3 × 10 ⁻⁵	85%	8 × 10 ⁻⁵	4 × 10 ⁻⁵	80%
10	Alternative 4C	3 × 10 ⁻⁴	2 × 10 ⁻⁴	88%	5 × 10 ⁻⁵	3 × 10 ⁻⁵	85%	8 × 10 ⁻⁵	4 × 10 ⁻⁵	80%
10	Alternative 4R									
10	Alternative 5C									
10	Alternative 5R									
10	Alternative 6C									
10	Alternative 6R									
15	EAA - Alternative 1	2 × 10 ⁻⁴	1 × 10 ⁻⁴	88%	5 × 10 ⁻⁵	3 × 10 ⁻⁵	85%	7 × 10 ⁻⁵	3 × 10 ⁻⁵	85%
15	Alternative 2R	2 × 10 ⁻⁴	1 × 10 ⁻⁴	88%	4 × 10 ⁻⁵	2 × 10 ⁻⁵	90%	7 × 10 ⁻⁵	3 × 10 ⁻⁵	85%
15	Alternative 3C	2 × 10 ⁻⁴	1 × 10 ⁻⁴	88%	4 × 10 ⁻⁵	2 × 10 ⁻⁵	90%	7 × 10 ⁻⁵	3 × 10 ⁻⁵	85%
15	Alternative 3R	2 × 10 ⁻⁴	1 × 10 ⁻⁴	88%	4 × 10 ⁻⁵	2 × 10 ⁻⁵	90%	7 × 10 ⁻⁵	3 × 10 ⁻⁵	85%
15	Alternative 4C	2 × 10 ⁻⁴	1 × 10 ⁻⁴	88%	4 × 10 ⁻⁵	2 × 10 ⁻⁵	90%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
15	Alternative 4R									
15	Alternative 5C	2 × 10 ⁻⁴	1 × 10 ⁻⁴	91%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
15	Alternative 5R									
15	Alternative 6C									
15	Alternative 6R									
25	EAA - Alternative 1	2 × 10 ⁻⁴	7 × 10 ⁻⁵	91%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 2R	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 3C	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 3R	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 4C	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 4R	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 5C	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 5R	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
25	Alternative 6C	2 × 10 ⁻⁴	4 × 10 ⁻⁵	95%	3 × 10 ⁻⁵	7 × 10 ⁻⁶	97%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%
25	Alternative 6R									
35	EAA - Alternative 1	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 2R	2 × 10 ⁻⁴	6 × 10 ⁻⁵	93%	4 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 3C	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 3R	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 4C	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	9 × 10 ⁻⁶	96%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%
35	Alternative 4R	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 5C	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	9 × 10 ⁻⁶	96%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%
35	Alternative 5R	2 × 10 ⁻⁴	5 × 10 ⁻⁵	94%	3 × 10 ⁻⁵	1 × 10 ⁻⁵	95%	6 × 10 ⁻⁵	2 × 10 ⁻⁵	90%
35	Alternative 6C	2 × 10 ⁻⁴	4 × 10 ⁻⁵	95%	3 × 10 ⁻⁵	8 × 10 ⁻⁶	96%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%
35	Alternative 6R									
45	Alternative 6C	2 × 10 ⁻⁴	4 × 10 ⁻⁵	95%	3 × 10 ⁻⁵	8 × 10 ⁻⁶	96%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%
45	Alternative 6R	2 × 10 ⁻⁴	4 × 10 ⁻⁵	95%	3 × 10 ⁻⁵	8 × 10 ⁻⁶	96%	5 × 10 ⁻⁵	1 × 10 ⁻⁵	95%

Notes:

- Risks estimated using the FWM (Windward 2010), alternative-specific total PCB concentrations in surface sediment (Table 9-2a), and assumed surface water dissolved concentrations of 0.6 ng/L, except Year 10 for Alternative 1 (0.9 ng/L).
- Risks are shown at the end of the 5-year model-predicted interval. Time intervals are indexed to issuance of decision documents (i.e., 5 yr, 10 yr, etc.) and year 5 is the start of construction for Alternatives 2 through 6. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.
- Risks were not estimated for construction period because of uncertainties in PCB exposure concentrations during construction.

a Site-related risk is the difference between total risk and the contributions from mid upstream total PCB concentrations (35 µg/kg dw). Upstream contributions (Appendix B) for the different risk exposure scenarios are as follows:

Assumptions	Upstream Contributions for Total PCBs		
	Exposure Scenarios		
	Adult Tribal RME	Child Tribal RME	Adult API RME
35 µg/kg dw, 0.39 ng/L	1 × 10 ⁻⁴	2 × 10 ⁻⁵	4 × 10 ⁻⁵

≥ 90% Risk Reduction
≥ 95% Risk Reduction
Alternative Under Construction

b Percent reduction in site-related risk is the reduction from FS baseline that is site-related (FS baseline SWAC is 346 µg/kg dw). For comparative purposes to the alternative-specific estimates, the FS baseline risk was estimated using the FWM and the FS baseline dataset. This differs from the HHRA baseline risk estimate, which was based on actual tissue data and 95UCL.

API = Asian Pacific Islander; EAA = early action area; FS = feasibility study; FWM = food web model; HHRA = human health risk assessment; RME = reasonable maximum exposure; PCB = polychlorinated biphenyl; SWAC = spatially-weighted average concentration; UCL = upper confidence limit on the mean

Table M-6 Seafood Consumption Non-Cancer Risk for non-RME Scenarios Associated with Alternative-Specific Residual Sediment Total PCB Concentrations Over Time

Time from Issuance of Decision Documents (years)	Alternative	Adult Tribal CT (Tulalip data)	Child Tribal CT (Tulalip data)	Adult API CT	Adult Tribal (Suquamish data)	One Meal Per Month			
						Benthic Fish	Pelagic Fish	Crab	Clam
10	EAA - Alternative 1	1	3	0.5	44	2	3	0.3	0.2
10	Alternative 2R	1	2	0.4	36	2	2	0.3	0.2
10	Alternative 3C	1	2	0.4	35	2	2	0.3	0.2
10	Alternative 3R	1	2	0.4	35	2	2	0.3	0.2
10	Alternative 4C	1	2	0.3	31	2	2	0.2	0.2
10	Alternative 4R								
10	Alternative 5C								
10	Alternative 5R								
10	Alternative 6C								
10	Alternative 6R								
15	EAA - Alternative 1	1	2	0.3	31	2	2	0.2	0.2
15	Alternative 2R	0.9	2	0.3	29	1	2	0.2	0.1
15	Alternative 3C	0.9	2	0.3	29	1	2	0.2	0.1
15	Alternative 3R	0.9	2	0.3	29	1	2	0.2	0.1
15	Alternative 4C	0.8	2	0.3	27	1	2	0.2	0.1
15	Alternative 4R								
15	Alternative 5C	0.8	2	0.3	26	1	2	0.2	0.1
15	Alternative 5R								
15	Alternative 6C								
15	Alternative 6R								
25	EAA - Alternative 1	0.8	2	0.3	25	1	2	0.2	0.1
25	Alternative 2R	0.8	2	0.3	24	1	2	0.2	0.1
25	Alternative 3C	0.8	2	0.3	24	1	2	0.2	0.1
25	Alternative 3R	0.8	2	0.3	24	1	2	0.2	0.1
25	Alternative 4C	0.7	2	0.3	23	1	1	0.2	0.1
25	Alternative 4R	0.7	2	0.3	23	1	1	0.2	0.1
25	Alternative 5C	0.7	2	0.3	23	1	1	0.2	0.1
25	Alternative 5R	0.7	2	0.3	24	1	2	0.2	0.1
25	Alternative 6C	0.7	1	0.2	21	1	1	0.2	0.1
25	Alternative 6R								
35	EAA - Alternative 1	0.7	2	0.3	24	1	2	0.2	0.1
35	Alternative 2R	0.7	2	0.3	23	1	1	0.2	0.1
35	Alternative 3C	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 3R	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 4C	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 4R	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 5C	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 5R	0.7	2	0.2	23	1	1	0.2	0.1
35	Alternative 6C	0.7	1	0.2	22	1	1	0.2	0.1
35	Alternative 6R								
45	Alternative 6C	0.7	1	0.2	22	1	1	0.2	0.1
45	Alternative 6R	0.7	1	0.2	21	1	1	0.2	0.1

Notes:

1. Risks estimated using the FWM (Windward 2010), alternative-specific total PCB concentrations in surface sediment (Table 9-2a), and assumed surface water dissolved concentrations of 0.6 ng/L, except Year 10 for Alternative 1 (0.9 ng/L).
2. All tabulated risk units are Hazard Quotients.
3. Risks were not estimated for construction period because of uncertainties in PCB exposure concentrations during construction.
4. Risks are shown at the end of the 5-year model-predicted interval. Time intervals are indexed to issuance of decision documents (i.e., 5 yr, 10 yr, etc.) and year 5 is the start of construction Alternatives 2 through 6. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

API = Asian Pacific Islander; CT = central tendency; EAA = early action area; FWM = food web model

HQ > 1	Colored cells correspond to residual risk
HQ ≤ 1	
	Grey indicates construction period

Table M-7 Site-related Seafood Consumption Non-Cancer Risk Associated with Residual Sediment Total PCB Concentrations for Reasonable Maximum Exposure Human Health Scenarios Over Time

Time from Issuance of Decision Documents (years)	Alternative	Adult Tribal RME (Tulalip data)			Child Tribal RME (Tulalip data)			Adult API RME		
		Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b	Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b	Total Risk	Site-related Risk ^a	Percent Reduction in Site-related Risk ^b
5	FS Baseline	24	21	n/a	51	44	n/a	16	14	n/a
10	EAA - Alternative 1	9	6	71%	19	12	73%	6	4	71%
10	Alternative 2R	7	4	81%	16	9	80%	5	3	79%
10	Alternative 3C	7	4	81%	15	8	82%	5	3	79%
10	Alternative 3R	7	4	81%	15	8	82%	5	3	79%
10	Alternative 4C	6	3	86%	14	7	84%	4	2	86%
10	Alternative 4R									
10	Alternative 5C									
10	Alternative 5R									
10	Alternative 6C									
10	Alternative 6R									
15	EAA - Alternative 1	6	3	86%	13	6	86%	4	2	86%
15	Alternative 2R	6	3	86%	13	6	86%	4	2	86%
15	Alternative 3C	6	3	86%	12	5	89%	4	2	86%
15	Alternative 3R	6	3	86%	12	5	89%	4	2	86%
15	Alternative 4C	5	2	90%	12	5	89%	4	2	86%
15	Alternative 4R									
15	Alternative 5C	5	2	90%	11	4	91%	4	2	86%
15	Alternative 5R									
15	Alternative 6C									
15	Alternative 6R									
25	EAA - Alternative 1	5	2	90%	11	4	91%	3	1	93%
25	Alternative 2R	5	2	90%	11	4	91%	3	1	93%
25	Alternative 3C	5	2	90%	10	3	93%	3	1	93%
25	Alternative 3R	5	2	90%	10	3	93%	3	1	93%
25	Alternative 4C	5	2	90%	10	3	93%	3	1	93%
25	Alternative 4R	5	2	90%	10	3	93%	3	1	93%
25	Alternative 5C	5	2	90%	10	3	93%	3	1	93%
25	Alternative 5R	5	2	90%	10	3	93%	3	1	93%
25	Alternative 6C	4	1	95%	9	2	95%	3	1	93%
25	Alternative 6R									
35	EAA - Alternative 1	5	2	90%	10	3	93%	3	1	93%
35	Alternative 2R	5	2	90%	10	3	93%	3	1	93%
35	Alternative 3C	5	2	90%	10	3	93%	3	1	93%
35	Alternative 3R	5	2	90%	10	3	93%	3	1	93%
35	Alternative 4C	5	2	90%	10	3	93%	3	1	93%
35	Alternative 4R	5	2	90%	10	3	93%	3	1	93%
35	Alternative 5C	5	2	90%	10	3	93%	3	1	93%
35	Alternative 5R	5	2	90%	10	3	93%	3	1	93%
35	Alternative 6C	4	1	95%	9	2	95%	3	1	93%
35	Alternative 6R									
45	Alternative 6C	4	1	95%	9	2	95%	3	1	93%
45	Alternative 6R	4	1	95%	9	2	95%	3	1	93%

Notes:

- Risks estimated using the food web model (Windward 2010), alternative-specific total PCB concentrations in surface sediment (Table 9-2a), and assumed surface water dissolved concentrations of 0.6 ng/L, except Year 10 for Alternative 1 (0.9 ng/L).
- All tabulated risk units are Hazard Quotients.
- Risks are shown at the end of the 5-year model-predicted interval. Time intervals are indexed to issuance of decision documents (i.e., 5 yr, 10 yr, etc.) and year 5 is the start of construction Alternatives 2 through 6. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.
- Risks were not estimated for construction period because of uncertainties in PCB exposure concentrations during construction.

a Site-related risk is the difference between total risk and the contributions from mid upstream total PCB concentrations (35 µg/kg dw). Upstream contributions (Appendix B) for the different risk exposure scenarios are as follows:

Assumptions	Upstream Contributions for Total PCBs		
	Exposure Scenarios		
	Adult Tribal RME	Child Tribal RME	Adult API RME
35 µg/kg dw, 0.39 ng/L	3	7	2

≥ 90% Risk Reduction
≥ 95% Risk Reduction
Alternative Under Construction

b Percent reduction in site-related risk is the reduction from FS baseline that is site-related (FS baseline SWAC is 346 µg/kg dw). For comparative purposes to the alternative-specific estimates, the FS baseline risk was estimated using the FWM and the FS baseline dataset. This differs from the HHRA baseline risk estimate, which was based on actual tissue data and 95UCL.

API = Asian Pacific Islander; EAA = early action area; FS = feasibility study; FWM = food web model; HHRA = human health risk assessment; RME = reasonable maximum exposure; SWAC = spatially-weighted average concentration; UCL = upper confidence limit on the mean

Table M-8a Arsenic Excess Cancer Risks for Direct Contact Based on SWACs

Combined Alternatives

Receptor Group	Risk for Each Alternative																				
	EAAs-Alternative 1							Alternative 3 Combined (9 years ^a)							Alternative 4 Combined (12 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶		3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶		3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶
Tribal Clamming	1 × 10 ⁻⁵	9 × 10 ⁻⁶	8 × 10 ⁻⁶	8 × 10 ⁻⁶	8 × 10 ⁻⁶	8 × 10 ⁻⁶	8 × 10 ⁻⁶		7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶		7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶
Total Beach Play Area	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶		3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶		3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 1	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 2	5 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	5 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	5 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶
Beach 4	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 5	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 6	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 7	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 8	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶

Receptor Group	Risk for Each Alternative													
	Alternative 5 Combined (13 years ^a)							Alternative 6 Combined (23 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing			3 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶					2 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶
Tribal Clamming			7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶					7 × 10 ⁻⁶	7 × 10 ⁻⁶	7 × 10 ⁻⁶
Total Beach Play Area			3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶					3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 1	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 2	5 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	5 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶
Beach 4	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 5	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 6	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 7	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 8	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶

Table M-8a Arsenic Excess Cancer Risks for Direct Contact Based on SWACs

Removal Alternatives

Receptor Group	Risk for Each Alternative																				
	Alternative 2 Removal (9 years ^a)						Alternative 3 Removal (11 years ^a)						Alternative 4 Removal (18 years ^a)								
	Time from Issuance of Remedy Decision Documents (years)						Time from Issuance of Remedy Decision Documents (years)						Time from Issuance of Remedy Decision Documents (years)								
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing		3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶		3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶				3 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶
Tribal Clamming		7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶		7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶				7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶
Total Beach Play Area		3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶		3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶				3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 1	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 2	5 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	5 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	5 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 3	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶
Beach 4	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 5	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 6	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 7	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 8	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶

Receptor Group	Risk for Each Alternative													
	Alternative 5 Removal (24 years ^a)							Alternative 6 Removal (43 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing				3 x 10 ⁻⁶	3 x 10 ⁻⁶	2 x 10 ⁻⁶	2 x 10 ⁻⁶							2 x 10 ⁻⁶
Tribal Clamming				7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶	7 x 10 ⁻⁶							7 x 10 ⁻⁶
Total Beach Play Area				3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶							3 x 10 ⁻⁶
Beach 1	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 2	5 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	5 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 3	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶
Beach 4	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 5	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 6	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	4 x 10 ⁻⁶	4 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 7	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶
Beach 8	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶	3 x 10 ⁻⁶

>1 x 10⁻⁶ Colored cells indicate predicted residual risk
 Gray indicates alternative under construction

- Notes:
- Arsenic risk estimates are based on SWACs for netfishing, tribal clamming, total beach play area, and individual beaches predicted by the BCM and for each alternative.
 - The BCM arsenic input values used to predict concentrations at 5, 10, 15, 20, 25, 30, and 35 years after issuance of decision documents are: 9 mg/kg dw (upstream), 13 mg/kg dw (lateral), and 10 mg/kg dw (AOPC 1) and 9 mg/kg dw (AOPC 2) (post-remedy bed sediment replacement values).
 - Beach play excess cancer risk at 1 x 10⁻⁶ can not be achieved because the concentration of the upstream sediment contribution is assumed to be 9 mg/kg dw, which corresponds to a risk of 3.3 x 10⁻⁶.
 - Individual beaches are addressed in the first 5 years.
 - Risks are not shown during construction of each alternative in site-wide and tribal clamming areas because these areas are large and will be affected by construction activities.

a Implementation period (construction period plus 5 years from issuance of remedy decision documents).
 b This is the start of construction. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

AOPC = area of potential concern; EAA = early action area; BCM = bed composition model; SWAC = spatially-weighted average concentration

Table M-8b Total PCB Excess Cancer Risks for Direct Contact Based on SWACs

Combined Alternatives

Receptor Group	Risk for Each Alternative																				
	EAAs-Alternative 1							Alternative 3 Combined (9 years ^a)							Alternative 4 Combined (12 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing	1 × 10 ⁻⁷	8 × 10 ⁻⁸	6 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸		7 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸		6 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Tribal Clamming	4 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷		1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸		1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸
Total Beach Play Area	2 × 10 ⁻⁷	6 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸		4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸		3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 1	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 2	2 × 10 ⁻⁷	1 × 10 ⁻⁷	8 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁷	6 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁷	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 3	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸
Beach 4	6 × 10 ⁻⁷	2 × 10 ⁻⁷	6 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 5	7 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 6	3 × 10 ⁻⁷	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 7	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 8	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸

Receptor Group	Risk for Each Alternative													
	Alternative 5 Combined (13 years ^a)							Alternative 6 Combined (23 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing			4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸					3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Tribal Clamming			1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸					8 × 10 ⁻⁸	8 × 10 ⁻⁸	8 × 10 ⁻⁸
Total Beach Play Area			3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸					2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 1	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 2	2 × 10 ⁻⁷	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁷	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 3	6 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸
Beach 4	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 5	7 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 6	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 7	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 8	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸

Table M-8b Total PCB Excess Cancer Risks for Direct Contact Based on SWACs

Removal Alternatives

Receptor Group	Risk for Each Alternative																				
	Alternative 2 Removal (9 years ^a)							Alternative 3 Removal (11 years ^a)							Alternative 4 Removal (18 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing		7 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸		7 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸				4 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Tribal Clamming		1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	9 × 10 ⁻⁸		1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸				1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸	9 × 10 ⁻⁸
Total Beach Play Area		4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸		4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸				3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 1	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 2	2 × 10 ⁻⁷	8 × 10 ⁻⁸	6 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁷	6 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁷	6 × 10 ⁻⁸	5 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 3	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸
Beach 4	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 5	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 6	3 × 10 ⁻⁷	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 7	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 8	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸

Receptor Group	Risk for Each Alternative													
	Alternative 5 Removal (24 years ^a)							Alternative 6 Removal (43 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing					4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸							3 × 10 ⁻⁸
Tribal Clamming					1 × 10 ⁻⁷	9 × 10 ⁻⁸	9 × 10 ⁻⁸							9 × 10 ⁻⁸
Total Beach Play Area					3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸							3 × 10 ⁻⁸
Beach 1	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 2	2 × 10 ⁻⁷	6 × 10 ⁻⁸	5 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁷	6 × 10 ⁻⁸	5 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 3	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	6 × 10 ⁻⁸	5 × 10 ⁻⁸	5 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸	4 × 10 ⁻⁸
Beach 4	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	6 × 10 ⁻⁷	4 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 5	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	7 × 10 ⁻⁸	4 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸
Beach 6	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁷	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 7	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸
Beach 8	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	3 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸	2 × 10 ⁻⁸

Gray indicates alternative under construction

- Notes:
- Total PCB risk estimates are based on SWACs for netfishing, tribal clamming, total beach play area, and individual beaches predicted by the BCM and for each alternative.
 - The BCM total PCB input values used to predict concentrations at 5, 10, 15, 20, 25, 30, and 35 years after issuance of decision documents are: 35 µg/kg dw (upstream), 300 µg/kg dw (lateral), and 60 µg/kg dw (AOPC 1) and 20 µg/kg dw (AOPC 2) (post-remedy bed sediment replacement values).
 - Individual beaches are addressed in the first 5 years.
 - Risks are not shown in site-wide and tribal clamming areas during construction because these areas are large and will be affected by construction activities.

a Implementation period (construction period plus 5 years from issuance of remedy decision documents).
 b This is the start of construction. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

AOPC = area of potential concern; EAA = early action area; BCM = bed composition model; SWAC = spatially-weighted average concentration

Table M-8c cPAH Excess Cancer Risks for Direct Contact Based on SWACs

Combined Alternatives

Receptor Group	Risk for Each Alternative																				
	EAAs-Alternative 1							Alternative 3 Combined (9 years ^a)							Alternative 4 Combined (12 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing	9 × 10 ⁻⁷	6 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷		5 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷		4 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷
Tribal Clamming	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷		9 × 10 ⁻⁷	8 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷		9 × 10 ⁻⁷	8 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷
Total Beach Play Area	3 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶		2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶		2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 1	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 2	8 × 10 ⁻⁶	5 × 10 ⁻⁶	4 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 4	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 5	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 6	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 7	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 8	2 × 10 ⁻⁶	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷

Receptor Group	Risk for Each Alternative													
	Alternative 5 Combined (13 years ^a)							Alternative 6 Combined (23 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing			3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷					3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷
Tribal Clamming			8 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷					7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷
Total Beach Play Area			1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶					1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 1	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 2	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 4	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 5	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 6	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 7	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 8	2 × 10 ⁻⁶	9 × 10 ⁻⁷	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷

Table M-8c cPAH Excess Cancer Risks for Direct Contact Based on SWACs

Removal Alternatives

Receptor Group	Risk for Each Alternative																				
	Alternative 2 Removal (9 years ^a)							Alternative 3 Removal (11 years ^a)							Alternative 4 Removal (18 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing		5 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷		5 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷				3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷
Tribal Clamming		1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷		9 × 10 ⁻⁷	8 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷				7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷
Total Beach Play Area		2 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶		2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶				1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 1	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 2	8 × 10 ⁻⁶	3 × 10 ⁻⁶	2 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 4	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 5	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 6	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 7	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 8	2 × 10 ⁻⁶	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷

Receptor Group	Risk for Each Alternative													
	Alternative 5 Removal (24 years ^a)							Alternative 6 Removal (43 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing					3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷							3 × 10 ⁻⁷
Tribal Clamming					8 × 10 ⁻⁷	7 × 10 ⁻⁷	7 × 10 ⁻⁷							7 × 10 ⁻⁷
Total Beach Play Area					1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶							1 × 10 ⁻⁶
Beach 1	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 2	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 3	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	4 × 10 ⁻⁶	4 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Beach 4	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 5	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 6	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁶	2 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 7	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	8 × 10 ⁻⁷	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻⁶
Beach 8	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	2 × 10 ⁻⁶	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷	9 × 10 ⁻⁷	8 × 10 ⁻⁷	8 × 10 ⁻⁷

>1 × 10⁻⁶ Colored cells indicate predicted residual risk
 Gray indicates alternative under construction

- Notes:
- cPAH risk estimates are based on SWACs for netfishing, tribal clamming, total beach play area, and individual beaches predicted by the BCM and for each alternative.
 - The BCM cPAH input values used to predict concentrations at 5, 10, 15, 20, 25, 30 and 35 years after issuance of decision documents are: 70 µg TEQ/kg dw (upstream), 1400 µg TEQ/kg dw (lateral), and 140 µg TEQ/kg dw (AOPC 1) and 100 µg TEQ/kg dw (AOPC 2) (post-remedy bed sediment replacement value)
 - Individual beaches are addressed in the first 5 years.
 - Risks are not shown in site-wide and tribal clamming areas during construction because these areas are large and will be affected by construction activities.

a Implementation period (construction period plus 5 years from issuance of remedy decision documents).
 b This is the start of construction. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

AOPC = area of potential concern; EAA = early action area; BCM = bed composition model; SWAC = spatially-weighted average concentration; TEQ = toxic equivalent

Table M-8d Dioxin and Furan Excess Cancer Risks for Direct Contact Based on SWACs

Combined Alternatives

Receptor Group	Risk for Each Alternative																					
	EAAs-Alternative 1							Alternative 3 Combined (9 years ^a)							Alternative 4 Combined (12 years ^a)							
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	
Site-wide Netfishing	6 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷		2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷		1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Tribal Clamming	2 × 10 ⁻⁶	1 × 10 ⁻⁶	6 × 10 ⁻⁷	4 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷		4 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷		4 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷
Total Beach Play Area	5 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷		2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷		2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 1	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 2	8 × 10 ⁻⁷	6 × 10 ⁻⁷	4 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 3	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 4	2 × 10 ⁻⁶	5 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 5	2 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 6	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 7	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 8	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷

Receptor Group	Risk for Each Alternative													
	Alternative 5 Combined (13 years ^a)							Alternative 6 Combined (23 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing			1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷					1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Tribal Clamming			4 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷					3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷
Total Beach Play Area			2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷					2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 1	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 2	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 3	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 4	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 5	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 6	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 7	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 8	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷

Table M-8d Dioxin and Furan Excess Cancer Risks for Direct Contact Based on SWACs

Removal Alternatives

Receptor Group	Risk for Each Alternative																			
	Alternative 2 Removal (9 years ^a)							Alternative 3 Removal (11 years ^a)							Alternative 4 Removal (18 years ^a)					
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)					
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30
Site-wide Netfishing																				
Tribal Clamming																				
Total Beach Play Area																				
Beach 1	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 2	8 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 3	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 4	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 5	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 6	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 7	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 8	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷

Receptor Group	Risk for Each Alternative													
	Alternative 5 Removal (24 years ^a)							Alternative 6 Removal (43 years ^a)						
	Time from Issuance of Remedy Decision Documents (years)							Time from Issuance of Remedy Decision Documents (years)						
	5 ^b	10	15	20	25	30	35	5 ^b	10	15	20	25	30	35
Site-wide Netfishing					1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷							
Tribal Clamming					3 × 10 ⁻⁷	3 × 10 ⁻⁷	3 × 10 ⁻⁷							
Total Beach Play Area					2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷							
Beach 1	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 2	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	8 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 3	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 4	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁶	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 5	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷
Beach 6	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷	3 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 7	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	9 × 10 ⁻⁸	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷	2 × 10 ⁻⁷
Beach 8	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷	1 × 10 ⁻⁷

>1 × 10⁻⁶ Colored cells indicate predicted residual risk
 Gray indicates alternative under construction

Notes:

- Dioxin/Furan risk estimates are based on SWACs for netfishing, tribal clamming, total beach play area, and individual beaches predicted by the BCM and for each alternative.
- The BCM dioxin/furan input values used to predict concentrations at 5, 10, 15, 20, 25, 30 and 35 years after issuance of decision documents are: 4 ng TEQ/kg dw (upstream), 20 ng TEQ/kg dw (lateral), and 4 ng TEQ/kg dw (post-remedy bed sediment replacement value).
- Individual beaches are addressed in the first 5 years.
- Risks are not shown in site-wide and tribal clamming areas during construction because these areas are large and will be affected by construction activities.

a Implementation period (construction period plus 5 years from issuance of remedy decision documents).
 b This is the start of construction. The 5-year model-predicted intervals associated with the BCM SWAC output are indexed to issuance of remedy decision documents. Activities during the assumed 5-year period between signing of the documents and start of construction are completion of EAAs, priority source control, negotiations, and initial remedial design.

AOPC = area of potential concern; EAA = early action area; BCM = bed composition model; SWAC = spatially-weighted average concentration; TEQ = toxic equivalent