

TABLES

Table 16. Estimated Exposure Doses for Chemicals in Off-Site Soil Compared to Noncancer Screening Guidelines

Substance Name	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Concentration (ppm)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
Inorganics									
Arsenic	1	77.3	15	1.8E-04	8.4E-06	0.0003	CMRL	No	No
Cadmium	0.0702	41.3	11	1.3E-04	6.0E-06	0.0002	CMRL	No	No
Chromium	9.4	546 [§]	100	1.2E-03	5.8E-05	0.003	RfD (CrVI)	No	No
Iron	5,790	61,600 [§]	32,000	3.9E-01	1.8E-02	0.3	RfD	Yes	No
Lead	5.3	3,040 [§]	570	7.0E-03	3.3E-04	0.02	Acute LOAEL	No	No
Organics									
Benzidine*	4.0	4.13	1.8	4.1E-05	1.9E-06	0.003	RfD	No	No
Benzo(a)anthracene	0.12	158 [§]	39	Evaluated for carcinogenic effects (see Table 17)					
Benzo(a)pyrene	0.14	156 [§]	36	Evaluated for carcinogenic effects (see Table 17)					
Benzo(b)fluoranthene	0.29	206 [§]	47	Evaluated for carcinogenic effects (see Table 17)					
Benzo(k)fluoranthene	0.17	95.4 [§]	23	Evaluated for carcinogenic effects (see Table 17)					
bis(2-Chloroethyl) ether	0.42	4.13	2.6	Evaluated for carcinogenic effects (see Table 17)					
Chrysene	0.16	134 [§]	32	Evaluated for carcinogenic effects (see Table 17)					
trans-Chlordane	0.096	2.8	1.1	1.3E-05	6.0E-07	0.0006	CMRL (chlordane)	No	No
Dibenzo(a,h)anthracene	0.066	22.7 [§]	7.6	Evaluated for carcinogenic effects (see Table 17)					
3,3'-Dichlorobenzidine	0.79	4.13	2.4	Evaluated for carcinogenic effects (see Table 17)					
Heptachlor epoxide	0.0096	0.97	0.48	5.8E-06	2.7E-07	0.000013	RfD	No	No
Hexachlorobenzene	0.42	4.13	2.7	3.3E-05	1.5E-06	0.00005	CMRL	No	No
HCDD	2.47E-05	0.000801 [§]	0.00053	Evaluated for carcinogenic effects (see Table 17)					
Indeno(1,2,3-cd)pyrene	0.049	4.7 [§]	2.5	Evaluated for carcinogenic effects (see Table 17)					
n-Nitroso-di-n-butylamine*	4.0	4.13	1.8	5.1E-05	2.4E-06	0.095	AMRL (n-nitrosodi-n-propylamine)	No	No
n-Nitrosodi-n-propylamine	0.42	0.79	0.63	7.7E-06	3.6E-07	0.095	AMRL	No	No
TCDD	1.98E-08	0.000117 [§]	0.000039	4.8E-10	2.2E-11	1E-09	CMRL	No	No

Doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.0002 \text{ kg/day} \times 291.2 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.00005 \text{ kg/day} \times 291.2 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

ppm = parts per million

RfD = reference dose (EPA)

*Chemical was detected in less than 10% of the samples. The second-tier screening concentration was estimated using 1/2 the detection limit for nondetected samples.

[§]The maximum concentration was detected in an industrial area (Atomic City Auto Parts) that has since been remediated (i.e., all the contaminated soil has been removed).

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

LOAEL = lowest observed adverse effect level (ATSDR)

AMRL = acute minimal risk level (ATSDR)

CrVI = chromium VI

mg/kg/day = milligram per kilogram per day

Table 17. Estimated Exposure Doses for Chemicals in Off-Site Soil Compared to Cancer Screening Guidelines

<i>Substance Name</i>	<i>2nd Tier Screening Conc. (ppm)</i>	<i>Estimated Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
Inorganics					
Arsenic	15	3.6E-06	1.5	5.4E-06	No
Cadmium	11	<i>Evaluated for noncarcinogenic effects (see Table 16)</i>			
Chromium	100	<i>Evaluated for noncarcinogenic effects (see Table 16)</i>			
Iron	32,000	<i>Evaluated for noncarcinogenic effects (see Table 16)</i>			
Lead	570	<i>Evaluated for noncarcinogenic effects (see Table 16)</i>			
Organics					
Benzidine*	1.8	8.3E-07	230	1.9E-04	Yes
Benzo(a)anthracene	39	9.6E-06	0.73	7.0E-06	No
Benzo(a)pyrene	36	8.8E-06	7.3	6.4E-05	No
Benzo(b)fluoranthene	47	1.2E-05	0.73	8.5E-06	No
Benzo(k)fluoranthene	23	5.5E-06	0.073	4.0E-07	No
bis(2-Chloroethyl) ether	2.6	6.3E-07	1.1	7.0E-07	No
Chrysene	32	7.7E-06	0.0073	5.6E-08	No
trans-Chlordane	1.1	2.6E-07	0.35	9.1E-08	No
Dibenzo(a,h)anthracene	7.6	1.8E-06	7.3	1.3E-05	No
3,3'-Dichlorobenzidine	2.4	5.8E-07	0.45	2.6E-07	No
Heptachlor epoxide	0.48	1.2E-07	9.1	1.1E-06	No
Hexachlorobenzene	2.7	6.6E-07	1.6	1.1E-06	No
HCDD	0.00053	1.3E-10	6,200	8.1E-07	No
Indeno(1,2,3-cd)pyrene	2.5	6.0E-07	0.73	4.4E-07	No
n-Nitroso-di-n-butylamine*	1.8	6.0E-07	5.4	3.3E-06	No
n-Nitrosodi-n-propylamine	0.63	1.5E-07	7	1.1E-06	No
TCDD	0.000039	9.6E-12	150,000	1.4E-06	No

Doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.00005 \text{ kg/day} \times 291.2 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Risk was calculated by multiplying the cancer dose by EPA's oral cancer slope factor.

*Chemical was detected in less than 10% of the samples. The second-tier screening concentration was estimated using 1/2 the detection limit for nondetected samples.

The second-tier screening concentrations are rounded.

conc. = concentration

mg/kg/day = milligram per kilogram per day

ppm = parts per million

Table 18. Estimated Exposure Doses for Chemicals in Off-Site Sediment Compared to Noncancer Screening Guidelines

Substance Name	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
Inorganics									
Arsenic	0.3	432	37	9.3E-06	1.7E-06	0.0003	CMRL	No	No
Cadmium	0.05	98.1	7.3	1.9E-06	3.4E-07	0.0002	CMRL	No	No
Copper	1.1	14,500	650	1.6E-04	3.1E-05	0.04	RfD	No	No
Iron	1,410	113,000	33,000	8.4E-03	1.6E-03	0.3	RfD	No	No
Lead	0.72	1,520	120	3.0E-05	5.6E-06	0.02	Acute LOAEL	No	No
Manganese	140	7,230	2,700	6.8E-04	1.3E-04	0.05	RfD	No	No
Organics									
Aldrin	0.00007	1.8	0.47	1.2E-07	2.2E-08	0.00003	CMRL	No	No
Benzo(a)anthracene	0.011	23.2	2.1	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
Benzo(a)pyrene	0.013	30.1	2.5	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
Benzo(b)fluoranthene	0.013	42.4	3.1	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
Benzo(k)fluoranthene	0.0067	20.5	2.1	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
bis(2-Chloroethyl) ether	0.17	3.4	1.4	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
cis-Chlordane	0.00025	18	4.6	1.2E-06	2.2E-07	0.0006	CMRL (chlordane)	No	No
trans-Chlordane	0.00024	18	4.6	1.2E-06	2.2E-07	0.0006	CMRL (chlordane)	No	No
DDD, p,p'-	0.00018	4.3	1.1	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
DDE, p,p'-	0.00016	4.3	1.1	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
DDT, p,p'-	0.00024	4.3	1.1	2.8E-07	5.3E-08	0.0005	RfD	No	No
di(2-Ethylhexyl)phthalate	0.015	256	16	4.1E-06	7.6E-07	0.06	CMRL	No	No
Dibenzo(a,h)anthracene	0.014	4.2	1.4	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
3,3'-Dichlorobenzidine	0.22	6.7	2.7	<i>Evaluated for carcinogenic effects (see Table 19)</i>					
Dieldrin	0.00015	4.3	1.1	2.9E-07	5.3E-08	0.00005	CMRL	No	No
Heptachlor	0.00007	1.8	0.46	1.2E-07	2.2E-08	0.0005	RfD	No	No
Heptachlor epoxide	0.00044	1.8	0.48	1.2E-07	2.3E-08	0.000013	RfD	No	No
Hexachlorobenzene	0.17	3.4	1.4	3.4E-07	6.4E-08	0.00005	CMRL	No	No
HCH, alpha-	0.0001	1.8	0.48	1.2E-07	2.3E-08	0.008	CMRL	No	No
HCH, beta-	0.00044	1.8	0.48	1.2E-07	2.3E-08	0.0006	IMRL	No	No
HCH, delta-	0.00044	1.8	0.48	1.2E-07	2.3E-08	0.0003	RfD (gamma-HCH)	No	No
HCH, gamma-	0.00022	1.8	0.48	1.2E-07	2.3E-08	0.0003	RfD	No	No
HCDD	6.28E-05	0.000575	0.00068	<i>Evaluated for carcinogenic effects (see Table 19)</i>					

Table 18. Estimated Exposure Doses for Chemicals in Off-site Sediment Compared to Noncancer Screening Guidelines (continued)

Substance Name	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
				Indeno(1,2,3-cd)pyrene	0.017			13.4	1.8
n-Nitrosodi-n-propylamine	0.17	3.4	1.4	3.4E-07	6.4E-08	0.095	AMRL	No	No
Pentachlorophenol	0.026	16	6.4	1.6E-06	3.0E-07	0.001	CMRL	No	No
Toxaphene	0.044	43	12	2.9E-06	5.4E-07	0.001	IMRL	No	No

Doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

AMRL = acute minimal risk level (ATSDR)

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

IMRL = intermediate minimal risk level (ATSDR)

LOAEL = lowest observed adverse effect level (ATSDR)

mg/kg/day = milligram per kilogram per day

ppm = parts per million

RfD = reference dose (EPA)

Table 19. Estimated Exposure Doses for Chemicals in Off-Site Sediment Compared to Cancer Screening Guidelines

<i>Substance Name</i>	<i>2nd Tier Screening Conc. (ppm)</i>	<i>Estimated Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
Inorganics					
Arsenic	37	7.4E-07	1.5	1.1E-06	No
Cadmium	7.3	<i>Evaluated for noncarcinogenic effects (see Table 18)</i>			
Copper	650	<i>Evaluated for noncarcinogenic effects (see Table 18)</i>			
Iron	33,000	<i>Evaluated for noncarcinogenic effects (see Table 18)</i>			
Lead	120	<i>Evaluated for noncarcinogenic effects (see Table 18)</i>			
Manganese	2,700	<i>Evaluated for noncarcinogenic effects (see Table 18)</i>			
Organics					
Aldrin	0.47	9.5E-09	17	1.6E-07	No
Benzo(a)anthracene	2.1	4.3E-08	0.73	3.1E-08	No
Benzo(a)pyrene	2.5	5.1E-08	7.3	3.7E-07	No
Benzo(b)fluoranthene	3.1	6.3E-08	0.73	4.6E-08	No
Benzo(k)fluoranthene	2.1	4.2E-08	0.073	3.1E-09	No
bis(2-Chloroethyl) ether	1.4	2.7E-08	1.1	3.0E-08	No
cis-Chlordane	4.6	9.3E-08	0.35	3.3E-08	No
trans-Chlordane	4.6	9.3E-08	0.35	3.3E-08	No
DDD, p,p'-	1.1	2.3E-08	0.24	5.5E-09	No
DDE, p,p'-	1.1	2.3E-08	0.34	7.8E-09	No
DDT, p,p'-	1.1	2.3E-08	0.34	7.7E-09	No
di(2-Ethylhexyl)phthalate	16	3.2E-07	0.014	4.5E-09	No
Dibenzo(a,h)anthracene	1.4	2.8E-08	7.3	2.0E-07	No
3,3'-Dichlorobenzidine	2.7	5.4E-08	0.45	2.4E-08	No
Dieldrin	1.1	2.3E-08	16	3.6E-07	No
Heptachlor	0.46	9.3E-09	4.5	4.2E-08	No
Heptachlor epoxide	0.48	9.7E-09	9.1	8.8E-08	No
Hexachlorobenzene	1.4	2.7E-08	1.6	4.4E-08	No
HCH, alpha-	0.48	9.7E-09	6.3	6.1E-08	No
HCH, beta-	0.48	9.7E-09	1.8	1.7E-08	No
HCH, delta-	0.48	9.7E-09	1.3	1.3E-08	No
HCH, gamma-	0.48	9.7E-09	1.3	1.3E-08	No
HCDD	0.00068	1.4E-11	6,200	8.5E-08	No
Indeno(1,2,3-cd)pyrene	1.8	3.5E-08	0.73	2.6E-08	No
n-Nitrosodi-n-propylamine	1.4	2.7E-08	7	1.9E-07	No
Pentachlorophenol	6.4	1.3E-07	0.12	1.5E-08	No
Toxaphene	12	2.3E-07	1.1	2.6E-07	No

Doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Risk was calculated by multiplying the cancer dose by EPA's oral cancer slope factor.

The second-tier screening concentrations are rounded.

conc. = concentration

mg/kg/day = milligram per kilogram per day

ppm = parts per million

Table 20. Estimated Exposure Doses for Chemicals in Off-Site Surface Water Compared to Noncancer Screening Guidelines

Substance Name	Minimum (ppb)	Maximum (ppb)	2 nd Tier Screening Conc. (ppb)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
Inorganics									
Aluminum	6.2	21,000	1,400	1.8E-03	3.3E-04	1	RfD	No	No
Ammonia	20	13,000	5,700	7.2E-03	1.3E-03	0.3	IMRL	No	No
Antimony*	0.1	41	49	6.2E-05	1.2E-05	0.0004	RfD	No	No
Arsenic*	0.76	69	40	5.0E-05	9.4E-06	0.0003	CMRL/RfD	No	No
Barium	6.4	250	71.5	9.0E-05	1.7E-05	0.07	RfD	No	No
Beryllium*	0.03	26	1.6	2.0E-06	3.8E-07	0.002	CMRL/RfD	No	No
Boron	3.16	470	77	9.8E-05	1.8E-05	0.09	RfD	No	No
Cadmium*	0.2	13	2.9	3.7E-06	6.8E-07	0.0002	CMRL	No	No
Chlorine	2	1,400	430	5.4E-04	1.0E-04	0.1	RfD	No	No
Chromium	0.25	70	11.5	1.5E-05	2.7E-06	0.003	RfD (CrVI)	No	No
Copper	0.7	381	42	5.4E-05	9.9E-06	0.04	RfD	No	No
Iron	4.8	1,100,000	41,000	5.2E-02	9.7E-03	0.3	RfD	No	No
Lead	0.29	370	28	3.6E-05	6.7E-06	0.02	Acute LOAEL	No	No
Lithium	1.3	4,050	340	4.3E-04	8.1E-05	0.02	RfD	No	No
Manganese	1.07	2,430	220	2.8E-04	5.1E-05	0.05	RfD	No	No
Nickel	0.37	49	10	1.3E-05	2.4E-06	0.02	RfD	No	No
Nitrate	80	52,800	11,000	1.4E-02	2.5E-03	1.6	RfD	No	No
Nitrate and nitrite	100	47,500	6,300	7.9E-03	1.5E-03	0.1	RfD (nitrite)	No	No
Selenium*	0.97	54	55	6.9E-05	1.3E-05	0.005	CMRL/RfD	No	No
Silver	0.36	61	13	1.6E-05	3.0E-06	0.005	RfD	No	No
Thallium*§	0.5	39	46	5.8E-05	1.1E-05	0.00007	RfD	No	No
Vanadium	0.35	81	14	1.7E-05	3.2E-06	0.007	RfD	No	No
Zinc	0.88	1,270	150	1.9E-04	3.5E-05	0.3	CMRL	No	No
Organics									
Aldrin*	0.0063	0.052	0.07	9.4E-08	1.8E-08	0.00003	CMRL/RfD	No	No
Benzene*	0.3	10	4.6	5.8E-06	1.1E-06	0.003	RfD	No	No
Benzo(a)anthracene*	0.9	10	5.6	<i>Evaluated for carcinogenic effects (see Table 21)</i>					
Benzo(a)pyrene*	10	10	5.6	<i>Evaluated for carcinogenic effects (see Table 21)</i>					
Benzo(b)fluoranthene*	0.8	17	5.8	<i>Evaluated for carcinogenic effects (see Table 21)</i>					
Benzo(k)fluoranthene*	1.2	10	5.6	<i>Evaluated for carcinogenic effects (see Table 21)</i>					
Bis(2-chloroethyl) ether*	10	10	5.6	<i>Evaluated for carcinogenic effects (see Table 21)</i>					

Table 20. Estimated Exposure Doses for Chemicals in Off-Site Surface Water Compared to Noncancer Screening Guidelines (continued)

Substance Name	Minimum (ppb)	Maximum (ppb)	2 nd Tier Screening Conc. (ppb)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
Bromodichloromethane	1	10	3.1	3.9E-06	7.3E-07	0.02	CMRL	No	No
Bromoform*	1	10	4.2	5.3E-06	9.8E-07	0.2	CMRL/RfD	No	No
Carbazole*	10	10	5.3	Evaluated for carcinogenic effects (see Table 21)					
Carbon tetrachloride* ^s	1	10	13	1.7E-05	3.1E-06	0.0007	RfD	No	No
cis-Chlordane*	0.0063	0.5	0.13	Evaluated for carcinogenic effects (see Table 21)					
trans-Chlordane*	0.0063	0.5	0.13	Evaluated for carcinogenic effects (see Table 21)					
Chlorodibromomethane*	5	10	4.6	5.8E-06	1.1E-06	0.03	CMRL	No	No
Chloroethane*	1.6	34	6.5	8.2E-06	1.5E-06	0.4	RfD	No	No
Chloromethane*	1	10	5.9	Evaluated for carcinogenic effects (see Table 21)					
Chrysene*	1	10	5.6	Evaluated for carcinogenic effects (see Table 21)					
Dibenzo(a,h)anthracene*	10	10	5.8	Evaluated for carcinogenic effects (see Table 21)					
3,3'-Dichlorobenzidine*	10	20	11	Evaluated for carcinogenic effects (see Table 21)					
1,2-Dichloroethane*	1	100	9.1	1.1E-05	2.1E-06	0.03	RfD	No	No
1,3-Dichloropropene, cis-*	5	10	4.6	Evaluated for carcinogenic effects (see Table 21)					
1,3-Dichloropropene, trans-*	5	10	4.6	Evaluated for carcinogenic effects (see Table 21)					
Di(2-ethylhexyl)phthalate	0.6	230	39	4.9E-05	9.1E-06	0.06	CMRL	No	No
Dieldrin*	0.0049	0.1	0.2	1.9E-07	3.6E-08	0.00005	CMRL/RfD	No	No
2,4-Dinitrophenol*	25	50	27	3.4E-05	6.3E-06	0.002	RfD	No	No
4,6-Dinitro-o-cresol*	25	50	26	3.3E-05	6.1E-06	0.0001	RfD	No	No
HCDD	0.000013	0.000013	0.000013	Evaluated for carcinogenic effects (see Table 21)					
Heptachlor*	0.0063	0.052	0.07	9.4E-08	1.8E-08	0.0005	RfD	No	No
Heptachlor epoxide*	0.0034	0.052	0.07	9.4E-08	1.8E-08	0.000013	RfD	No	No
Hexachlorobenzene*	10	10	5.6	7.1E-06	1.3E-06	0.00005	CMRL	No	No
Hexachlorobutadiene*	10	10	5.6	7.1E-06	1.3E-06	0.0002	RfD	No	No
alpha-HCH*	0.0063	0.052	0.07	9.4E-08	1.7E-08	0.008	CMRL	No	No
beta-HCH*	0.0063	0.052	0.07	9.4E-08	1.7E-08	0.0006	IMRL	No	No
delta-HCH*	0.0063	0.052	0.07	Evaluated for carcinogenic effects (see Table 21)					
Hexachloroethane*	10	10	5.6	7.1E-06	1.3E-06	0.001	RfD	No	No
Indeno(1,2,3-cd)pyrene*	1	10	5.7	Evaluated for carcinogenic effects (see Table 21)					
Methoxychlor*	0.063	260	23	2.9E-05	5.5E-06	0.005	RfD	No	No
Methylene chloride	0.5	52	15	1.9E-05	3.5E-06	0.06	CMRL	No	No
2-Nitroaniline*	10	50	27	Evaluated for carcinogenic effects (see Table 21)					

Table 20. Estimated Exposure Doses for Chemicals in Off-Site Surface Water Compared to Noncancer Screening Guidelines (continued)

Substance Name	Minimum (ppb)	Maximum (ppb)	2 nd Tier Screening Conc. (ppb)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
				Child	Adult			Child	Adult
3-Nitroaniline*	10	50	27	Evaluated for carcinogenic effects (see Table 21)					
4-Nitroaniline*	10	50	26	Evaluated for carcinogenic effects (see Table 21)					
Nitrobenzene*	10	10	5.6	7.1E-06	1.3E-06	0.0005	RfD	No	No
n-Nitrosodi-n-propylamine*	10	10	5.6	7.1E-06	1.3E-06	0.095	AMRL	No	No
n-Nitrosodiphenylamine*	10	10	5.6	Evaluated for carcinogenic effects (see Table 21)					
Pentachlorophenol*	25	50	26			0.001	CMRL	No	No
TCDD	0.00002	0.00002	0.00002	2.5E-11	4.7E-12	1.0E-09	CMRL	No	No
1,1,2,2-Tetrachloroethane*	1	10	4.6	5.8E-06	1.1E-06	0.04	CMRL	No	No
1,1,2-Trichloroethane*	5	10	4.6	5.8E-06	1.1E-06	0.004	RfD	No	No
2,4,6-Trichlorophenol*	10	10	5.6	Evaluated for carcinogenic effects (see Table 21)					
Toxaphene*	0.63	5.2	2.7	3.4E-06	6.3E-07	0.001	IMRL	No	No
Trichloroethylene	0.34	23	8.1	1.0E-05	1.9E-06	0.0003	RfD	No	No
Vinyl chloride*	5	10	5.7	7.2E-06	1.3E-06	0.00002	CMRL	No	No

Doses were calculated using the following formulas:

$$\text{child dose} = ((\text{second-tier screening concentration}/1,000) \times 0.5 \text{ liters/day} \times 12 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = ((\text{second-tier screening concentration}/1,000) \times 0.5 \text{ liters/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

*Chemical was detected in less than 10% of the samples. The second-tier screening concentration was estimated using 1/2 the detection limit for nondetected samples.

§The thallium and carbon tetrachloride data contained outliers that were three orders of magnitude higher than the second highest concentration. These data points were removed.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

CrVI = chromium VI

IMRL = intermediate minimal risk level (ATSDR)

LOAEL = lowest observed adverse effect level (ATSDR)

mg/kg/day = milligram per kilogram per day

ppb = parts per billion

RfD = reference dose (EPA)

Table 21. Estimated Exposure Doses for Chemicals in Off-Site Surface Water Compared to Cancer Screening Guidelines

<i>Substance Name</i>	<i>2nd Tier Screening Conc. (ppb)</i>	<i>Estimated Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
Inorganics					
Aluminum	1,400	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Ammonia	5,700	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Antimony*	49	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Arsenic*	40	4.0E-06	1.5	6.0E-06	No
Barium	71.5	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Beryllium*	1.6	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Boron	77	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Cadmium*	2.9	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Chlorine	430	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Chromium	11.5	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Copper	42	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Iron	41,000	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Lead	28	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Lithium	340	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Manganese	220	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Nickel	10	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Nitrate	11,000	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Nitrate and nitrite	6,300	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Selenium*	55	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Silver	13	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Thallium*§	46	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Vanadium	14	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Zinc	150	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Organics					
Aldrin*	0.07	7.5E-09	17	1.3E-07	No
Benzene*	4.6	4.6E-07	0.055	2.5E-08	No
Benzo(a)anthracene*	5.6	5.6E-07	0.73	4.1E-07	No
Benzo(a)pyrene*	5.6	5.7E-07	7.3	4.1E-06	No
Benzo(b)fluoranthene*	5.8	5.8E-07	0.73	4.3E-07	No
Benzo(k)fluoranthene*	5.6	5.6E-07	0.073	4.1E-08	No
Bis(2-chloroethyl) ether*	5.6	5.6E-07	1.1	6.2E-07	No
Bromodichloromethane	3.1	3.1E-07	0.062	1.9E-08	No
Bromoform*	4.2	4.2E-07	0.0079	3.3E-09	No
Carbazole*	5.3	5.3E-07	0.02	1.1E-08	No
Carbon tetrachloride*§	13	1.3E-06	0.13	1.7E-07	No
cis-Chlordane*	0.13	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
trans-Chlordane*	0.13	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Chlorodibromomethane*	4.6	6.5E-07	0.0029	1.9E-09	No
Chloroethane*	6.5	5.9E-07	0.013	7.7E-09	No
Chloromethane*	5.9	5.6E-07	0.0073	4.1E-09	No
Chrysene*	5.6	5.8E-07	7.3	4.2E-06	No
Dibenzo(a,h)anthracene*	5.8	1.1E-06	0.45	5.0E-07	No
3,3'-Dichlorobenzidine*	11	9.1E-07	0.091	8.3E-08	No
1,2-Dichloroethane*	9.1	6.5E-07	0.0029	1.9E-09	No

Table 21. Estimated Exposure Doses for Chemicals in Off-Site Surface Water Compared to Cancer Screening Guidelines (continued)

<i>Substance Name</i>	<i>2nd Tier Screening Conc. (ppb)</i>	<i>Estimated Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
1,3-Dichloropropene, cis-*	4.6	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
1,3-Dichloropropene, trans-*	4.6	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Di(2-ethylhexyl)phthalate	39	3.9E-06	0.014	5.5E-08	No
Dieldrin*	0.2	1.5E-08	16	2.5E-07	No
2,4-Dinitrophenol*	27	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
4,6-Dinitro-o-cresol*	26	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
HCDD	0.000013	1.3E-12	6,200	8.2E-09	No
Heptachlor*	0.07	7.5E-09	4.5	3.4E-08	No
Heptachlor epoxide*	0.07	7.5E-09	9.1	6.8E-08	No
Hexachlorobenzene*	5.6	5.6E-07	1.6	9.0E-07	No
Hexachlorobutadiene*	5.6	5.6E-07	0.078	4.4E-08	No
alpha-HCH*	0.07	7.5E-09	6.3	4.7E-08	No
beta-HCH*	0.07	7.5E-09	1.8	1.3E-08	No
delta-HCH*	0.07	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Hexachloroethane*	5.6	5.6E-07	0.014	7.9E-09	No
Indeno(1,2,3-cd)pyrene*	5.7	5.8E-07	0.73	4.2E-07	No
Methoxychlor*	23	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Methylene chloride	15	1.5E-06	0.0075	1.1E-08	No
2-Nitroaniline*	27	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
3-Nitroaniline*	27	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
4-Nitroaniline*	26	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
Nitrobenzene*	5.6	<i>Evaluated for noncarcinogenic effects (see Table 20)</i>			
N-nitrosodi-n-propylamine*	5.6	5.6E-07	7	4.0E-06	No
N-nitrosodiphenylamine*	5.6	5.6E-07	0.0049	2.8E-09	No
Pentachlorophenol*	26	2.6E-06	0.12	3.1E-07	No
TCDD	0.00002	2.0E-12	150,000	3.0E-07	No
1,1,2,2-Tetrachloroethane*	4.6	4.6E-07	0.2	9.2E-08	No
1,1,2-Trichloroethane*	4.6	4.6E-07	0.057	2.6E-08	No
2,4,6-Trichlorophenol*	5.6	5.6E-07	0.011	6.2E-09	No
Toxaphene*	2.7	2.7E-07	1.1	3.0E-07	No
Trichloroethylene	8.1	8.2E-07	0.4	3.3E-07	No
Vinyl chloride*	5.7	5.8E-07	1.4	8.1E-07	No

Doses were calculated using the following formula:

$$\text{dose} = ((\text{second-tier screening concentration}/1,000) \times 0.5 \text{ liters/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Risk was calculated by multiplying the exposure dose by EPA's oral cancer slope factor.

The second-tier screening concentrations are rounded.

*Chemical was detected in less than 10% of the samples. The second-tier screening concentration was estimated using 1/2 the detection limit for nondetected samples.

§The thallium and carbon tetrachloride data contained outliers that were three orders of magnitude higher than the second highest concentration. These data points were removed.

conc. = concentration

mg/kg/day = milligram per kilogram per day

ppb = parts per billion

Table 22. Estimated Exposure Doses for Chemicals in Fish Caught in EFPC Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
							Inorganics							
Arsenic	Crayfish	0.2557	0.5122	0.51	0.0003	CMRL	7.9E-04	4.7E-04	Yes	Yes	1.2E-04	5.8E-05	No	No
Arsenic	Sunfish spp.	0.0484	0.1721	0.12	0.0003	CMRL	2.6E-04	1.5E-04	No	No	3.8E-05	1.9E-05	No	No
Cadmium	Crayfish	2.1588	3.7445	3.7	0.0002	CMRL	5.7E-03	3.4E-03	Yes	Yes	8.5E-04	4.2E-04	Yes	Yes
Cadmium	Sunfish spp.	0.3654	1.8589	1.7	0.0002	CMRL	2.7E-03	1.6E-03	Yes	Yes	4.0E-04	2.0E-04	Yes	No
Chromium	Crayfish	0.3473	3.2609	2.9	0.003	RfD	4.4E-03	2.7E-03	Yes	No	6.6E-04	3.3E-04	No	No
Chromium	Sunfish spp.	0.1997	0.7746	0.64	0.003	RfD	9.8E-04	5.9E-04	No	No	1.5E-04	7.3E-05	No	No
Organics														
Aldrin	Sunfish spp.	ND	ND	ND	0.00003	CMRL	ND	ND	No	No	ND	ND	No	No
Aldrin	Crayfish	0.00099	0.0012	0.0012	0.00003	CMRL	1.9E-06	1.2E-06	No	No	2.9E-07	1.4E-07	No	No
Benzo(a)pyrene	Sunfish spp.	ND	ND	ND	NA	NA	ND	ND	No	No	ND	ND	No	No
Benzo(a)pyrene	Crayfish	0.0023	0.041	0.033	<i>Evaluated for carcinogenic effects (see Table 23)</i>									
Dibenzo(a,h)anthracene	Sunfish spp.	ND	ND	ND	NA	NA	ND	ND	No	No	ND	ND	No	No
Dibenzo(a,h)anthracene	Crayfish	0.0011	0.047	0.037	<i>Evaluated for carcinogenic effects (see Table 23)</i>									
Dieldrin	Crayfish	0.002	0.0049	0.0052	0.00005	CMRL	7.9E-06	4.8E-06	No	No	1.2E-06	5.9E-07	No	No
Dieldrin	Sunfish spp.	0.0065	0.079	0.066	0.00005	CMRL	1.0E-04	6.1E-05	Yes	Yes	1.5E-05	7.5E-06	No	No
alpha-HCH	Sunfish spp.	ND	ND	ND	0.008	CMRL	ND	ND	No	No	ND	ND	No	No
alpha-HCH	Crayfish	0.0016	0.0057	0.0053	0.008	CMRL	8.2E-06	5.0E-06	No	No	1.2E-06	6.1E-07	No	No
Heptachlor epoxide	Crayfish	0.00027	0.0027	0.0027	0.000013	RfD	4.1E-06	2.5E-06	No	No	6.2E-07	3.1E-07	No	No
Heptachlor epoxide	Sunfish spp.	0.0021	0.08	0.068	0.000013	RfD	1.0E-04	6.3E-05	Yes	Yes	1.6E-05	7.7E-06	Yes	No
Toxaphene	Crayfish	ND	ND	ND	0.001	IMRL	ND	ND	No	No	ND	ND	No	No
Toxaphene	Sunfish spp.	ND	ND	ND	0.001	IMRL	ND	ND	No	No	ND	ND	No	No

Table 22. Estimated Exposure Doses for Chemicals in Fish Caught in EFPC Compared to Noncancer Screening Guidelines (continued)

Noncancer subsistence-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.02 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

Noncancer recreational-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.003 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

EFPC = East Fork Poplar Creek

IMRL = intermediate minimal risk level (ATSDR)

mg/kg/day = milligram per kilogram per day

NA = not available

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

spp = species

Unknown = “unknown aquatic animal”

Table 23. Estimated Exposure Doses for Chemicals in Fish Caught in EFPC Compared to Cancer Screening Guidelines

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
Inorganics									
Arsenic	Crayfish	0.51	1.5	2.0E-04	2.5E-05	3.0E-04	3.7E-05	Yes	No
Arsenic	Sunfish spp.	0.12	1.5	6.6E-05	8.1E-06	9.9E-05	1.2E-05	No	No
Cadmium	Crayfish	3.7		<i>Evaluated for noncarcinogenic effects (see Table 22)</i>					
Cadmium	Sunfish spp.	1.7		<i>Evaluated for noncarcinogenic effects (see Table 22)</i>					
Chromium	Crayfish	2.9		<i>Evaluated for noncarcinogenic effects (see Table 22)</i>					
Chromium	Sunfish spp.	0.64		<i>Evaluated for noncarcinogenic effects (see Table 22)</i>					
Organics									
Aldrin	Sunfish spp.	ND	17	ND	ND	ND	ND	No	No
Aldrin	Crayfish	0.0012	17	4.9E-07	6.1E-08	8.4E-06	1.0E-06	No	No
Benzo(a)pyrene	Sunfish spp.	ND	7.3	ND	ND	ND	ND	No	No
Benzo(a)pyrene	Crayfish	0.033	7.3	1.3E-05	1.6E-06	9.6E-05	1.2E-05	No	No
Dibenzo(a,h)anthracene	Sunfish spp.	ND	7.3	ND	ND	ND	ND	No	No
Dibenzo(a,h)anthracene	Crayfish	0.037	7.3	1.5E-05	1.8E-06	1.1E-04	1.3E-05	Yes	No
Dieldrin	Crayfish	0.0052	16	2.1E-06	2.5E-07	3.3E-05	4.0E-06	No	No
Dieldrin	Sunfish spp.	0.066	16	2.6E-05	3.2E-06	4.2E-04	5.2E-05	Yes	No
alpha-HCH	Sunfish spp.	ND	6.3	ND	ND	ND	ND	No	No
alpha-HCH	Crayfish	0.0053	6.3	2.1E-06	2.6E-07	1.3E-05	1.6E-06	No	No
Heptachlor epoxide	Crayfish	0.0027	9.1	1.1E-06	1.3E-07	9.7E-06	1.2E-06	No	No
Heptachlor epoxide	Sunfish spp.	0.068	9.1	2.7E-05	3.3E-06	2.5E-04	3.0E-05	Yes	No
Toxaphene	Crayfish	ND	1.1	ND	ND	ND	ND	No	No
Toxaphene	Sunfish spp.	ND	1.1	ND	ND	ND	ND	No	No

Cancer subsistence-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Cancer recreational-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

The second-tier screening concentrations are rounded.

conc. = concentration

EFPC = East Fork Poplar Creek

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

Unknown aquatic = "unknown aquatic animal"

Table 24. Estimated Exposure Doses for Chemicals in Fish Caught in the Clinch River Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
Inorganics														
Arsenic	Catfish	0.64	0.64	0.64	0.0003	CMRL	9.8E-04	5.9E-04	Yes	Yes	1.5E-04	7.3E-05	No	No
Arsenic	Sunfish spp.	0.018	1.1	0.79	0.0003	CMRL	1.2E-03	7.4E-04	Yes	Yes	1.8E-04	9.0E-05	No	No
Arsenic	Bass spp.	0.14	0.45	0.37	0.0003	CMRL	5.7E-04	3.4E-04	Yes	Yes	8.5E-05	4.2E-05	No	No
Cadmium	Sunfish spp.	ND	ND	ND	0.0002	CMRL	ND	ND	No	No	ND	ND	No	No
Cadmium	Catfish	ND	ND	ND	0.0002	CMRL	ND	ND	No	No	ND	ND	No	No
Cadmium	Bass spp.	ND	ND	ND	0.0002	CMRL	ND	ND	No	No	ND	ND	No	No
Chromium	Bass spp.	ND	ND	ND	0.003	RfD	ND	ND	No	No	ND	ND	No	No
Chromium	Catfish	0.12	0.406	0.47	0.003	RfD	7.2E-04	4.3E-04	No	No	1.1E-04	5.3E-05	No	No
Chromium	Sunfish spp.	0.044	0.822	0.38	0.003	RfD	5.8E-04	3.5E-04	No	No	8.7E-05	4.3E-05	No	No
Thallium	Bass spp.	ND	ND	ND	0.00007	RfD	ND	ND	No	No	ND	ND	No	No
Thallium	Catfish	0.0025	0.029	0.035	0.00007	RfD	5.3E-05	3.2E-05	No	No	8.0E-06	3.9E-06	No	No
Thallium	Sunfish spp.	0.0035	0.0075	0.0068	0.00007	RfD	1.0E-05	6.3E-06	No	No	1.6E-06	7.7E-07	No	No
Organics														
Aldrin	Bass spp.	0.0027	0.0027	0.0027	0.00003	CMRL	4.2E-06	2.5E-06	No	No	6.2E-07	3.1E-07	No	No
Aldrin	Catfish	0.013	0.013	0.013	0.00003	CMRL	2.0E-05	1.2E-05	No	No	3.0E-06	1.5E-06	No	No
Aldrin	Sunfish spp.	0.033	0.051	0.047	0.00003	CMRL	7.3E-05	4.4E-05	Yes	Yes	1.1E-05	5.4E-06	No	No
Dieldrin	Bass spp.	0.00097	0.015	0.0093	0.00005	CMRL	1.4E-05	8.6E-06	No	No	2.1E-06	1.1E-06	No	No
Dieldrin	Catfish	0.00047	0.027	0.021	0.00005	CMRL	3.2E-05	1.9E-05	No	No	4.8E-06	2.4E-06	No	No
Dieldrin	Sunfish spp.	0.0005	0.102	0.085	0.00005	CMRL	1.3E-04	7.9E-05	Yes	Yes	2.0E-05	9.8E-06	No	No
alpha-HCH	Bass spp.	0.0002	0.0014	0.0016	0.008	CMRL	2.5E-06	1.5E-06	No	No	3.8E-07	1.9E-07	No	No
alpha-HCH	Catfish	0.00045	0.013	0.016	0.008	CMRL	2.4E-05	1.4E-05	No	No	3.6E-06	1.8E-06	No	No
alpha-HCH	Sunfish spp.	0.033	0.051	0.047	0.008	CMRL	7.3E-05	4.4E-05	No	No	1.1E-05	5.4E-06	No	No
Heptachlor epoxide	Bass spp.	0.0016	0.008	0.0062	0.000013	RfD	9.5E-06	5.7E-06	No	No	1.4E-06	7.1E-07	No	No
Heptachlor epoxide	Catfish	0.00052	0.013	0.0098	0.000013	RfD	1.5E-05	9.1E-06	Yes	No	2.3E-06	1.1E-06	No	No
Heptachlor epoxide	Sunfish spp.	0.0006	0.051	0.051	0.000013	RfD	7.9E-05	4.8E-05	Yes	Yes	1.2E-05	5.9E-06	No	No

Table 24. Estimated Exposure Doses for Chemicals in Fish Caught in the Clinch River Compared to Noncancer Screening Guidelines (continued)

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
Toxaphene	Bass spp.	ND	ND	ND	0.001	IMRL	ND	ND	No	No	ND	ND	No	No
Toxaphene	Catfish	0.2	0.2	0.2	0.001	IMRL	3.1E-04	1.9E-04	No	No	4.6E-05	2.3E-05	No	No
Toxaphene	Sunfish spp.	0.656	1.024	0.94	0.001	IMRL	1.5E-03	8.8E-04	Yes	No	2.2E-04	1.1E-04	No	No

Noncancer subsistence-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.02 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

Noncancer recreational-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.003 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

IMRL = intermediate minimal risk level (ATSDR)

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

spp = species

Table 25. Estimated Exposure Doses for Chemicals in Fish Caught in the Clinch River Compared to Cancer Screening Guidelines

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
Inorganics									
Arsenic	Catfish	0.64	1.5	2.5E-04	3.1E-05	3.8E-04	4.7E-05	Yes	No
Arsenic	Sunfish spp.	0.79	1.5	3.2E-04	3.9E-05	4.7E-04	5.8E-05	Yes	No
Arsenic	Bass spp.	0.37	1.5	1.5E-04	1.8E-05	2.2E-04	2.7E-05	Yes	No
Cadmium	Sunfish spp.	ND	NA	ND	ND	ND	ND	No	No
Cadmium	Catfish	ND	NA	ND	ND	ND	ND	No	No
Cadmium	Bass spp.	ND	NA	ND	ND	ND	ND	No	No
Chromium	Bass spp.	ND	NA	ND	ND	ND	ND	No	No
Chromium	Catfish	0.47	<i>Evaluated for noncarcinogenic effects (see Table 24)</i>						
Chromium	Sunfish spp.	0.38	<i>Evaluated for noncarcinogenic effects (see Table 24)</i>						
Thallium	Bass spp.	ND	NA	ND	ND	ND	ND	No	No
Thallium	Catfish	0.035	<i>Evaluated for noncarcinogenic effects (see Table 24)</i>						
Thallium	Sunfish spp.	0.0068	<i>Evaluated for noncarcinogenic effects (see Table 24)</i>						
Organics									
Aldrin	Bass spp.	0.0027	17	1.1E-06	1.3E-07	1.8E-05	2.2E-06	No	No
Aldrin	Catfish	0.013	17	5.2E-06	6.4E-07	8.8E-05	1.1E-05	No	No
Aldrin	Sunfish spp.	0.051	17	1.9E-05	2.3E-06	3.2E-04	3.9E-05	Yes	No
Dieldrin	Bass spp.	0.015	16	3.7E-06	4.5E-07	5.9E-05	7.3E-06	No	No
Dieldrin	Catfish	0.027	16	8.3E-06	1.0E-06	1.3E-04	1.6E-05	Yes	No
Dieldrin	Sunfish spp.	0.102	16	3.4E-05	4.2E-06	5.4E-04	6.7E-05	Yes	No
alpha-HCH	Bass spp.	0.0014	6.3	6.6E-07	8.1E-08	4.1E-06	5.1E-07	No	No
alpha-HCH	Catfish	0.013	6.3	6.2E-06	7.6E-07	3.9E-05	4.8E-06	No	No
alpha-HCH	Sunfish spp.	0.051	6.3	1.9E-05	2.3E-06	1.2E-04	1.5E-05	Yes	No
Heptachlor epoxide	Bass spp.	0.008	9.1	2.5E-06	3.0E-07	2.2E-05	2.8E-06	No	No
Heptachlor epoxide	Catfish	0.013	9.1	3.9E-06	4.8E-07	3.5E-05	4.4E-06	No	No
Heptachlor epoxide	Sunfish spp.	0.051	9.1	2.0E-05	2.5E-06	1.9E-04	2.3E-05	Yes	No
Toxaphene	Bass spp.	ND	1.1	ND	ND	ND	ND	No	No
Toxaphene	Catfish	0.2	1.1	8.0E-05	9.8E-06	8.8E-05	1.1E-05	No	No
Toxaphene	Sunfish spp.	1.024	1.1	3.8E-04	4.6E-05	4.1E-04	5.1E-05	Yes	No

**Table 25. Estimated Exposure Doses for Chemicals in Fish Caught in the Clinch River Compared to Cancer Screening Guidelines
(continued)**

Cancer subsistence-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Cancer recreational-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

The second-tier screening concentrations are rounded.

conc. = concentration

mg/kg/day = milligram per kilogram per day

NA = not available

ND = not detected

ppm = parts per million

spp = species

Table 26. Estimated Exposure Doses for Chemicals in Fish Caught in WBR Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
Inorganics														
Arsenic	Catfish	0.012	1.1	0.66	0.0003	CMRL	1.0E-03	6.1E-04	Yes	Yes	1.5E-04	7.5E-05	No	No
Arsenic	Unknown	0.1	0.46	0.30	0.0003	CMRL	4.6E-04	2.8E-04	Yes	No	6.9E-05	3.4E-05	No	No
Arsenic	Bass spp.	0.008	0.32	0.26	0.0003	CMRL	3.9E-04	2.4E-04	Yes	No	5.9E-05	2.9E-05	No	No
Arsenic	Sunfish spp.	0.006	0.83	0.32	0.0003	CMRL	4.9E-04	3.0E-04	Yes	No	7.4E-05	3.7E-05	No	No
Cadmium	Catfish	ND	ND	ND	0.0002	CMRL	ND	ND	No	No	ND	ND	No	No
Cadmium	Sunfish spp.	ND	ND	ND	0.0002	CMRL	ND	ND	No	No	ND	ND	No	No
Cadmium	Unknown	0.05	0.06	0.062	0.0002	CMRL	9.5E-05	5.8E-05	No	No	1.4E-05	7.1E-06	No	No
Chromium	Catfish	0.043	0.28	0.33	0.003	RfD	5.1E-04	3.1E-04	No	No	7.6E-05	3.8E-05	No	No
Chromium	Sunfish spp.	0.12	0.8	0.46	0.003	RfD	7.0E-04	4.2E-04	No	No	1.1E-04	5.2E-05	No	No
Chromium	Unknown	0.1	44.6	16	0.003	RfD	2.5E-02	1.5E-02	Yes	Yes	3.7E-03	1.8E-03	Yes	No
Thallium	Catfish	0.0025	0.006	0.0067	0.00007	RfD	1.0E-05	6.2E-06	No	No	1.6E-06	7.7E-07	No	No
Thallium	Sunfish spp.	0.0045	0.022	0.014	0.00007	RfD	2.2E-05	1.3E-05	No	No	3.2E-06	1.6E-06	No	No
Organics														
Aldrin	Unknown	ND	ND	ND	0.00003	CMRL	ND	ND	No	No	ND	ND	No	No
Aldrin	Sunfish spp.	0.0056	0.048	0.049	0.00003	CMRL	7.5E-05	4.5E-05	Yes	Yes	1.1E-05	5.6E-06	No	No
Aldrin	Catfish	0.00083	0.018	0.013	0.00003	CMRL	2.0E-05	1.2E-05	No	No	3.0E-06	1.5E-06	No	No
Aldrin	Bass spp.	0.00054	0.014	0.009	0.00003	CMRL	1.4E-05	8.4E-06	No	No	2.1E-06	1.0E-06	No	No
Dieldrin	Unknown	ND	ND	ND	0.00005	CMRL	ND	ND	No	No	ND	ND	No	No
Dieldrin	Sunfish spp.	0.00148	0.096	0.079	0.00005	CMRL	1.2E-04	7.3E-05	Yes	Yes	1.8E-05	9.0E-06	No	No
Dieldrin	Catfish	0.00044	0.036	0.018	0.00005	CMRL	2.7E-05	1.6E-05	No	No	4.1E-06	2.0E-06	No	No
Dieldrin	Bass spp.	0.0005	0.03	0.013	0.00005	CMRL	2.0E-05	1.2E-05	No	No	3.0E-06	1.5E-06	No	No
alpha-HCH	Unknown	ND	ND	ND	0.008	CMRL	ND	ND	No	No	ND	ND	No	No
alpha-HCH	Catfish	0.01	0.01	0.01	0.008	CMRL	1.5E-05	9.3E-06	No	No	2.3E-06	1.1E-06	No	No
alpha-HCH	Bass spp.	0.01	0.02	0.022	0.008	CMRL	3.4E-05	2.0E-05	No	No	5.1E-06	2.5E-06	No	No
alpha-HCH	Sunfish spp.	0.0056	0.048	0.049	0.008	CMRL	7.5E-05	4.5E-05	No	No	1.1E-05	5.6E-06	No	No

Table 26. Estimated Exposure Doses for Chemicals in Fish Caught in WBR Compared to Noncancer Screening Guidelines (continued)

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
							Heptachlor epoxide	Unknown	ND	ND	ND	0.000013	RfD	ND
Heptachlor epoxide	Sunfish spp.	0.0013	0.048	0.048	0.000013	RfD	7.4E-05	4.5E-05	Yes	Yes	1.1E-05	5.5E-06	No	No
Heptachlor epoxide	Catfish	0.0012	0.018	0.0096	0.000013	RfD	1.5E-05	8.9E-06	Yes	No	2.2E-06	1.1E-06	No	No
Heptachlor epoxide	Bass spp.	0.00044	0.016	0.007	0.000013	RfD	1.1E-05	6.5E-06	No	No	1.6E-06	8.0E-07	No	No
TCDD	Unknown	8.7E-06	8.7E-06	9E-06	1E-09	CMRL	1.3E-08	8.1E-09	Yes	Yes	2.0E-09	9.9E-10	Yes	No
Toxaphene	Bass spp.	0.24	0.24	0.24	0.001	IMRL	3.7E-04	2.2E-04	No	No	5.5E-05	2.7E-05	No	No
Toxaphene	Catfish	0.12	0.28	0.31	0.001	IMRL	4.8E-04	2.9E-04	No	No	7.2E-05	3.6E-05	No	No
Toxaphene	Sunfish spp.	0.088	0.96	0.98	0.001	IMRL	1.5E-03	9.1E-04	Yes	No	2.3E-04	1.1E-04	No	No

Noncancer subsistence-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.02 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

Noncancer recreational-level doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.003 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

IMRL = intermediate minimal risk level (ATSDR)

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

spp = species

WBR = Watts Bar Reservoir

Unknown = "unknown aquatic animal"

Table 27. Estimated Exposure Doses for Chemicals in Fish Caught in WBR Compared to Cancer Screening Guidelines

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
Inorganics									
Arsenic	Catfish	0.66	1.5	2.6E-04	3.2E-05	3.9E-04	4.8E-05	Yes	No
Arsenic	Unknown aquatic	0.30	1.5	1.2E-04	1.5E-05	1.8E-04	2.2E-05	Yes	No
Arsenic	Bass spp.	0.26	1.5	1.0E-04	1.3E-05	1.5E-04	1.9E-05	Yes	No
Arsenic	Sunfish spp.	0.32	1.5	1.3E-04	1.6E-05	1.9E-04	2.4E-05	Yes	No
Cadmium	Catfish	ND	NA	ND	ND	ND	ND	No	No
Cadmium	Sunfish spp.	ND	NA	ND	ND	ND	ND	No	No
Cadmium	Unknown aquatic	0.062		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Chromium	Catfish	0.33		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Chromium	Sunfish spp.	0.46		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Chromium	Unknown aquatic	16		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Thallium	Catfish	0.0067		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Thallium	Sunfish spp.	0.014		<i>Evaluated for noncarcinogenic effects (see Table 26)</i>					
Organics									
Aldrin	Unknown aquatic	ND	17	ND	ND	ND	ND	No	No
Aldrin	Sunfish spp.	0.049	17	1.9E-05	2.4E-06	3.3E-04	4.0E-05	Yes	No
Aldrin	Catfish	0.013	17	5.2E-06	6.3E-07	8.8E-05	1.1E-05	No	No
Aldrin	Bass spp.	0.009	17	3.6E-06	4.4E-07	6.1E-05	7.5E-06	No	No
Dieldrin	Unknown aquatic	ND	16	ND	ND	ND	ND	No	No
Dieldrin	Sunfish spp.	0.079	16	3.1E-05	3.9E-06	5.0E-04	6.2E-05	Yes	No
Dieldrin	Catfish	0.018	16	7.1E-06	8.7E-07	1.1E-04	1.4E-05	Yes	No
Dieldrin	Bass spp.	0.013	16	5.2E-06	6.3E-07	8.2E-05	1.0E-05	No	No
alpha-HCH	Unknown aquatic	ND	6.3	ND	ND	ND	ND	No	No
alpha-HCH	Catfish	0.01	6.3	4.0E-06	4.9E-07	2.5E-05	3.1E-06	No	No
alpha-HCH	Bass spp.	0.022	6.3	8.8E-06	1.1E-06	5.5E-05	6.8E-06	No	No
alpha-HCH	Sunfish spp.	0.049	6.3	1.9E-05	2.4E-06	1.2E-04	1.5E-05	Yes	No
Heptachlor epoxide	Unknown aquatic	ND	9.1	ND	ND	ND	ND	No	No
Heptachlor epoxide	Sunfish spp.	0.048	9.1	1.9E-05	2.4E-06	1.7E-04	2.1E-05	Yes	No
Heptachlor epoxide	Catfish	0.0096	9.1	3.8E-06	4.7E-07	3.5E-05	4.3E-06	No	No
Heptachlor epoxide	Bass spp.	0.007	9.1	2.8E-06	3.4E-07	2.5E-05	3.1E-06	No	No

Table 27. Estimated Exposure Doses for Chemicals in Fish Caught in WBR Compared to Cancer Screening Guidelines (continued)

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
TCDD	Unknown aquatic	9E-06	150,000	3.5E-09	4.3E-10	5.2E-04	6.4E-05	Yes	No
Toxaphene	Bass spp.	0.24	1.1	9.6E-05	1.2E-05	1.1E-04	1.3E-05	Yes	No
Toxaphene	Catfish	0.31	1.1	1.2E-04	1.5E-05	1.4E-04	1.7E-05	Yes	No
Toxaphene	Sunfish spp.	0.98	1.1	3.9E-04	4.8E-05	4.3E-04	5.3E-05	Yes	No

Cancer subsistence-level doses were calculated using the following formula:

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Cancer recreational-level doses were calculated using the following formula:

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

The second-tier screening concentrations are rounded.

conc. = concentration

mg/kg/day = milligram per kilogram per day

NA = not available

ND = not detected

ppm = parts per million

spp = species

Unknown aquatic = "unknown aquatic animal"

WBR = Watts Bar Reservoir

Table 28. Estimated Exposure Doses for Chemicals in Fish Caught On Site Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
Inorganics														
Arsenic	Creek chub	0.0855	0.112	0.11	0.0003	CMRL	1.7E-04	1.0E-04	No	No	2.5E-05	1.3E-05	No	No
Arsenic	Crayfish	0.2196	0.2749	0.28	0.0003	CMRL	4.2E-04	2.6E-04	Yes	No	6.4E-05	3.1E-05	No	No
Arsenic	Unknown	0.137	0.39	0.38	0.0003	CMRL	5.8E-04	3.5E-04	Yes	Yes	8.8E-05	4.3E-05	No	No
Arsenic	Sunfish spp.	0.026	1.3	0.44	0.0003	CMRL	6.7E-04	4.1E-04	Yes	Yes	1.0E-04	5.0E-05	No	No
Arsenic	Bass spp.	0.045	0.96	0.34	0.0003	CMRL	5.3E-04	3.2E-04	Yes	Yes	7.9E-05	3.9E-05	No	No
Cadmium	Creek chub	0.529	1.11	1.2	0.0002	CMRL	1.8E-03	1.1E-03	Yes	Yes	2.7E-04	1.3E-04	Yes	No
Cadmium	Crayfish	1.9136	2.3827	2.4	0.0002	CMRL	3.6E-03	2.2E-03	Yes	Yes	5.4E-04	2.7E-04	Yes	Yes
Cadmium	Bass spp.	0.028	0.8282	0.63	0.0002	CMRL	9.7E-04	5.9E-04	Yes	Yes	1.5E-04	7.2E-05	No	No
Cadmium	Sunfish spp.	0.0416	1.9608	1.6	0.0002	CMRL	2.4E-03	1.5E-03	Yes	Yes	3.7E-04	1.8E-04	Yes	No
Cadmium	Unknown	0.12	1.8	1.4	0.0002	CMRL	2.2E-03	1.3E-03	Yes	Yes	3.3E-04	1.6E-04	Yes	No
Chromium	Creek chub	0.242	0.356	0.35	0.003	RfD	5.4E-04	3.3E-04	No	No	8.1E-05	4.0E-05	No	No
Chromium	Crayfish	0.5469	1.3066	1.3	0.003	RfD	1.9E-03	1.2E-03	No	No	2.9E-04	1.4E-04	No	No
Chromium	Bass spp.	0.12	2.1	1.5	0.003	RfD	2.2E-03	1.3E-03	No	No	3.3E-04	1.7E-04	No	No
Chromium	Unknown	0.27	0.69	0.61	0.003	RfD	9.4E-04	5.7E-04	No	No	1.4E-04	7.0E-05	No	No
Chromium	Sunfish spp.	0.062	0.7173	0.43	0.003	RfD	6.6E-04	4.0E-04	No	No	9.9E-05	4.9E-05	No	No
Thallium	Creek chub	ND	ND	ND	0.00007	RfD	ND	ND	No	No	ND	ND	No	No
Thallium	Unknown	0.01	0.024	0.027	0.00007	RfD	4.1E-05	2.5E-05	No	No	6.2E-06	3.1E-06	No	No
Thallium	Bass spp.	0.005	0.049	0.058	0.00007	RfD	8.9E-05	5.4E-05	Yes	No	1.3E-05	6.6E-06	No	No
Thallium	Sunfish spp.	0.009	9.2	4.1	0.00007	RfD	6.3E-03	3.8E-03	Yes	Yes	9.5E-04	4.7E-04	Yes	Yes
Organics														
Aldrin	Crayfish	ND	ND	ND	0.00003	CMRL	ND	ND	No	No	ND	ND	No	No
Aldrin	Catfish	0.0023	0.0055	0.0062	0.00003	CMRL	9.5E-06	5.7E-06	No	No	1.4E-06	7.0E-07	No	No
Aldrin	Bass spp.	0.00039	0.0042	0.0039	0.00003	CMRL	6.0E-06	3.6E-06	No	No	8.9E-07	4.4E-07	No	No
Aldrin	Sunfish spp.	0.033	0.042	0.043	0.00003	CMRL	6.5E-05	3.9E-05	Yes	Yes	9.8E-06	4.9E-06	No	No
Benzo(a)pyrene	Sunfish spp.	0.00041	0.00041	0.0004			<i>Evaluated for carcinogenic effects (see Table 29)</i>							

Table 28. Estimated Exposure Doses for Chemicals in Fish Caught On Site Compared to Noncancer Screening Guidelines (continued)

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Noncancer Screening Guideline (mg/kg/day)	Source	Subsistence Estimated Exposure Dose (mg/kg/day)		Does the Subsistence Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		Recreational Estimated Exposure Dose (mg/kg/day)		Does the Recreational Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
							Child	Adult	Child	Adult	Child	Adult	Child	Adult
Benzo(a)pyrene	Catfish	0.033	0.033	0.033			<i>Evaluated for carcinogenic effects (see Table 29)</i>							
Benzo(a)pyrene	Crayfish	0.0042	0.0071	0.0077			<i>Evaluated for carcinogenic effects (see Table 29)</i>							
Dibenzo(a,h)anthracene	Catfish	0.033	0.033	0.033			<i>Evaluated for carcinogenic effects (see Table 29)</i>							
Dibenzo(a,h)anthracene	Sunfish spp.	0.0056	0.0056	0.0056			<i>Evaluated for carcinogenic effects (see Table 29)</i>							
Dibenzo(a,h)anthracene	Crayfish	0.00093	0.0013	0.0014			<i>Evaluated for carcinogenic effects (see Table 29)</i>							
Dieldrin	Crayfish	0.0082	0.011	0.012	0.00005	CMRL	1.8E-05	1.1E-05	No	No	2.7E-06	1.3E-06	No	No
Dieldrin	Catfish	0.0012	0.028	0.023	0.00005	CMRL	3.5E-05	2.1E-05	No	No	5.3E-06	2.6E-06	No	No
Dieldrin	Bass spp.	0.00081	0.11	0.069	0.00005	CMRL	1.1E-04	6.4E-05	Yes	Yes	1.6E-05	7.8E-06	No	No
Dieldrin	Sunfish spp.	0.011	0.083	0.085	0.00005	CMRL	1.3E-04	7.9E-05	Yes	Yes	2.0E-05	9.7E-06	No	No
alpha-HCH	Crayfish	ND	ND	ND	0.008	CMRL	ND	ND	No	No	ND	ND	No	No
alpha-HCH	Catfish	ND	ND	ND	0.008	CMRL	ND	ND	No	No	ND	ND	No	No
alpha-HCH	Bass spp.	ND	ND	ND	0.008	CMRL	ND	ND	No	No	ND	ND	No	No
alpha-HCH	Sunfish spp.	0.0026	0.042	0.048	0.008	CMRL	7.4E-05	4.5E-05	No	No	1.1E-05	5.5E-06	No	No
Heptachlor epoxide	Crayfish	0.0016	0.0042	0.0047	0.000013	RfD	7.3E-06	4.4E-06	No	No	1.1E-06	5.4E-07	No	No
Heptachlor epoxide	Bass spp.	0.00057	0.011	0.0084	0.000013	RfD	1.3E-05	7.8E-06	No	No	1.9E-06	9.6E-07	No	No
Heptachlor epoxide	Catfish	0.0019	0.02	0.016	0.000013	RfD	2.4E-05	1.4E-05	Yes	Yes	3.6E-06	1.8E-06	No	No
Heptachlor epoxide	Sunfish spp.	0.0006	0.073	0.053	0.000013	RfD	8.2E-05	4.9E-05	Yes	Yes	1.2E-05	6.1E-06	No	No
Toxaphene	Catfish	ND	ND	ND	0.001	IMRL	ND	ND	No	No	ND	ND	No	No
Toxaphene	Crayfish	ND	ND	ND	0.001	IMRL	ND	ND	No	No	ND	ND	No	No
Toxaphene	Bass spp.	1.9	1.9	1.9	0.001	IMRL	2.9E-03	1.8E-03	Yes	Yes	4.4E-04	2.2E-04	No	No
Toxaphene	Sunfish spp.	0.656	0.832	0.85	0.001	IMRL	1.3E-03	7.9E-04	Yes	No	2.0E-04	9.7E-05	No	No

Noncancer subsistence-level doses were calculated using the following formulas:

child dose = (second-tier screening concentration × 0.02 kg/day × 365 days/year × 6 years) / (13 kg × (365 days/year × 6 years))

adult dose = (second-tier screening concentration × 0.065 kg/day × 365 days/year × 30 years) / (70 kg × (365 days/year × 30 years))

Noncancer recreational-level doses were calculated using the following formulas:

child dose = (second-tier screening concentration × 0.003 kg/day × 365 days/year × 6 years) / (13 kg × (365 days/year × 6 years))

adult dose = (second-tier screening concentration × 0.008 kg/day × 365 days/year × 30 years) / (70 kg × (365 days/year × 30 years))

Table 28. Estimated Exposure Doses for Chemicals in Fish Caught On Site Compared to Noncancer Screening Guidelines (continued)

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

IMRL = intermediate minimal risk level (ATSDR)

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

spp = species

Unknown = “unknown aquatic animal”

Table 29. Estimated Exposure Doses for Chemicals in Fish Caught On Site Compared to Cancer Screening Guidelines

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
Inorganics									
Arsenic	Creek chub	0.11	1.5	4.4E-05	5.4E-06	6.6E-05	8.1E-06	No	No
Arsenic	Crayfish	0.28	1.5	1.1E-04	1.3E-05	1.6E-04	2.0E-05	Yes	No
Arsenic	Unknown aquatic	0.38	1.5	1.5E-04	1.9E-05	2.3E-04	2.8E-05	Yes	No
Arsenic	Sunfish spp.	0.44	1.5	1.7E-04	2.1E-05	2.6E-04	3.2E-05	Yes	No
Arsenic	Bass spp.	0.34	1.5	1.4E-04	1.7E-05	2.0E-04	2.5E-05	Yes	No
Cadmium	Creek chub	1.2		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Cadmium	Crayfish	2.4		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Cadmium	Bass spp.	0.63		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Cadmium	Sunfish spp.	1.6		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Cadmium	Unknown aquatic	1.4		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Chromium	Creek chub	0.35		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Chromium	Crayfish	1.3		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Chromium	Bass spp.	1.5		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Chromium	Unknown aquatic	0.61		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Chromium	Sunfish spp.	0.43		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Thallium	Creek chub	ND	NA	ND	ND	ND	ND	No	No
Thallium	Unknown aquatic	0.027		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Thallium	Bass spp.	0.058		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Thallium	Sunfish spp.	4.1		<i>Evaluated for noncarcinogenic effects (see Table 28)</i>					
Organics									
Aldrin	Crayfish	ND	17	ND	ND	ND	ND	No	No
Aldrin	Catfish	0.0062	17	2.5E-06	3.0E-07	4.2E-05	5.1E-06	No	No
Aldrin	Bass spp.	0.0039	17	1.5E-06	1.9E-07	2.6E-05	3.2E-06	No	No
Aldrin	Sunfish spp.	0.043	17	1.7E-05	2.1E-06	2.9E-04	3.5E-05	Yes	No
Benzo(a)pyrene	Sunfish spp.	0.0004	7.3	1.6E-07	2.0E-08	1.2E-06	1.5E-07	No	No
Benzo(a)pyrene	Catfish	0.033	7.3	1.3E-05	1.6E-06	9.6E-05	1.2E-05	No	No
Benzo(a)pyrene	Crayfish	0.0077	7.3	3.1E-06	3.8E-07	2.2E-05	2.8E-06	No	No
Dibenzo(a,h)anthracene	Catfish	0.033	7.3	1.3E-05	1.6E-06	9.6E-05	1.2E-05	No	No
Dibenzo(a,h)anthracene	Sunfish spp.	0.0056	7.3	2.2E-06	2.7E-07	1.6E-05	2.0E-06	No	No

Table 29. Estimated Exposure Doses for Chemicals in Fish Caught On Site Compared to Cancer Screening Guidelines (continued)

Substance Name	Species	2 nd Tier Screening Conc. (ppm)	EPA's Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Estimated Exposure Dose (mg/kg/day)		Risk		Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10 ⁻⁴)?	
				Subsistence	Recreational	Subsistence	Recreational	Subsistence	Recreational
Dibenzo(a,h)anthracene	Crayfish	0.0014	7.3	5.5E-07	6.7E-08	4.0E-06	4.9E-07	No	No
Dieldrin	Crayfish	0.012	16	4.6E-06	5.7E-07	7.4E-05	9.1E-06	No	No
Dieldrin	Catfish	0.023	16	9.2E-06	1.1E-06	1.5E-04	1.8E-05	Yes	No
Dieldrin	Bass spp.	0.069	16	2.7E-05	3.4E-06	4.4E-04	5.4E-05	Yes	No
Dieldrin	Sunfish spp.	0.085	16	3.4E-05	4.2E-06	5.4E-04	6.7E-05	Yes	No
alpha-HCH	Crayfish	ND	6.3	ND	ND	ND	ND	No	No
alpha-HCH	Catfish	ND	6.3	ND	ND	ND	ND	No	No
alpha-HCH	Bass spp.	ND	6.3	ND	ND	ND	ND	No	No
alpha-HCH	Sunfish spp.	0.048	6.3	1.9E-05	2.4E-06	1.2E-04	1.5E-05	Yes	No
Heptachlor epoxide	Crayfish	0.0047	9.1	1.9E-06	2.3E-07	1.7E-05	2.1E-06	No	No
Heptachlor epoxide	Bass spp.	0.0084	9.1	3.3E-06	4.1E-07	3.0E-05	3.7E-06	No	No
Heptachlor epoxide	Catfish	0.016	9.1	6.2E-06	7.6E-07	5.7E-05	7.0E-06	No	No
Heptachlor epoxide	Sunfish spp.	0.053	9.1	2.1E-05	2.6E-06	1.9E-04	2.4E-05	Yes	No
Toxaphene	Catfish	ND	1.1	ND	ND	ND	ND	No	No
Toxaphene	Crayfish	ND	1.1	ND	ND	ND	ND	No	No
Toxaphene	Bass spp.	1.9	1.1	7.6E-04	9.3E-05	8.3E-04	1.0E-04	Yes	Yes
Toxaphene	Sunfish spp.	0.85	1.1	3.4E-04	4.1E-05	3.7E-04	4.6E-05	Yes	No

Cancer subsistence-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.065 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Cancer recreational-level doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.008 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

The second-tier screening concentrations are rounded.

conc. = concentration

mg/kg/day = milligram per kilogram per day

NA = not available

ND = not detected

ppm = parts per million

spp = species

Unknown aquatic = "unknown aquatic animal"

Table 30. Estimated Exposure Doses for Chemicals in Game Caught On Site Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
					Child	Adult			Child	Adult
					Inorganics					
Aluminum	Unknown terrestrial animal	0.0987	15,300	10,400	8.0E-01	3.0E-01	1	RfD	No	No
Antimony	Unknown terrestrial animal	0.0224	14.3	12	8.9E-04	3.3E-04	0.0004	RfD	Yes	No
Cadmium	Canadian goose	0.41	3.2	2.5	1.9E-04	7.2E-05	0.0002	CMRL	No	No
Cadmium	Unknown aquatic bird	1.53	7.21	7.1	5.5E-04	2.0E-04	0.0002	CMRL	Yes	Yes
Cadmium	Unknown terrestrial animal	0.0033	32.4	13	9.7E-04	3.6E-04	0.0002	CMRL	Yes	Yes
Cadmium	Unknown terrestrial bird	ND	ND	ND	ND	ND	0.0002	CMRL	ND	ND
Cadmium	Wood duck	ND	ND	ND	ND	ND	0.0002	CMRL	ND	ND
Iron	Unknown terrestrial animal	0.6878	36,200	18,000	1.4E+00	5.1E-01	0.3	RfD	Yes	Yes
Manganese	Unknown terrestrial animal	0.291	10,200	4,000	3.1E-01	1.1E-01	0.14	RfD	Yes	No
Manganese	Unknown terrestrial bird	0.36	0.5	0.53	4.1E-05	1.5E-05	0.14	RfD	No	No
Thallium	Unknown terrestrial animal	0.93	2.9	2.6	2.0E-04	7.5E-05	0.00007	RfD	Yes	Yes
Organics										
4,6-Dinitro-o-cresol	Unknown terrestrial animal	3.5	3.5	3.5	2.7E-04	1.0E-04	0.0001	RfD	Yes	No
2,4-Dinitrophenol	Unknown terrestrial animal	3.5	75	82	6.3E-03	2.3E-03	0.002	RfD	Yes	Yes

Noncancer doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.001 \text{ kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.002 \text{ kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

All chemicals detected in game species caught on site were evaluated for noncarcinogenic effects only—cancer screening guidelines are not available for these chemicals.

Table 31. Estimated Exposure Doses for Chemicals in Vegetation Species Collected Off Site Compared to Noncancer Screening Guidelines

Substance Name	Species	Minimum (ppm)	Maximum (ppm)	2 nd Tier Screening Conc. (ppm)	Estimated Exposure Dose (mg/kg/day)		Noncancer Screening Guideline (mg/kg/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?	
					Child	Adult			Child	Adult
					Inorganics					
Arsenic	Beets	0.0702	0.0702	0.07	1.1E-04	1.1E-04	0.0003	CMRL	No	No
Arsenic	Kale	0.0341	5.3428	3.0	4.8E-03	4.8E-03	0.0003	CMRL	Yes	Yes
Arsenic	Tomatoes	0.4371	3.6404	2.6	4.2E-03	4.2E-03	0.0003	CMRL	Yes	Yes
Arsenic	Unknown terrestrial plant	ND	ND	ND	ND	ND	0.0003	CMRL	ND	ND
Cadmium	Beets	0.6857	0.6857	0.69	1.1E-03	1.1E-03	0.0002	CMRL	Yes	Yes
Cadmium	Kale	0.2332	1.5643	1.0	1.7E-03	1.7E-03	0.0002	CMRL	Yes	Yes
Cadmium	Tomatoes	0.1084	2.7098	2.0	3.3E-03	3.3E-03	0.0002	CMRL	Yes	Yes
Cadmium	Unknown terrestrial plant	ND	ND	ND	ND	ND	0.0002	CMRL	ND	ND
Chromium	Beets	0.1446	0.5144	0.52	8.3E-04	8.3E-04	0.003	RfD	No	No
Chromium	Kale	0.061	24.446	16	2.6E-02	2.6E-02	0.003	RfD	Yes	Yes
Chromium	Tomatoes	0.0472	30.296	21	3.4E-02	3.4E-02	0.003	RfD	Yes	Yes
Chromium	Unknown terrestrial plant	0.3437	0.3437	0.34	5.5E-04	5.5E-04	0.003	RfD	No	No

Noncancer doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.0016 \text{ kg/kg/day} \times 365 \text{ days/year} \times 6 \text{ years}) / (365 \text{ days/year} \times 6 \text{ years})$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.0016 \text{ kg/kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (365 \text{ days/year} \times 30 \text{ years})$$

The second-tier screening concentrations are rounded.

CMRL = chronic minimal risk level (ATSDR)

conc. = concentration

mg/kg/day = milligram per kilogram per day

ND = not detected

ppm = parts per million

RfD = reference dose (EPA)

Table 32. Estimated Exposure Doses for Chemicals in Vegetation Collected Off Site Compared to Cancer Screening Guidelines

<i>Substance Name</i>	<i>Species</i>	<i>2nd Tier Screening Conc. (ppm)</i>	<i>Estimated Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
Inorganics						
Arsenic	Beets	0.07	4.8E-05	1.5	7.2E-05	No
Arsenic	Kale	3	2.1E-03	1.5	3.1E-03	Yes
Arsenic	Tomatoes	2.6	1.8E-03	1.5	2.7E-03	Yes
Arsenic	Unknown terrestrial plant	ND	ND	1.5	ND	No
Cadmium	Beets	0.69	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Cadmium	Kale	1	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Cadmium	Tomatoes	2	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Cadmium	Unknown terrestrial plant	ND	ND	NA	ND	No
Chromium	Beets	0.52	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Chromium	Kale	16	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Chromium	Tomatoes	21	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			
Chromium	Unknown terrestrial plant	0.34	<i>Evaluated for noncarcinogenic effects (see Table 31)</i>			

Cancer doses were calculated using the following formula:

$$\text{dose} = (\text{second-tier screening concentration} \times 0.0016 \text{ kg/kg/day} \times 365 \text{ days/year} \times 30 \text{ years}) / (365 \text{ days/year} \times 70 \text{ years})$$

Risk was calculated by multiplying the cancer dose by EPA's oral cancer slope factor.

The second-tier screening concentrations are rounded.

mg/kg/day = milligram per kilogram per day

NA = not available

ND = not detected

ppm = parts per million

Table 33. Chemicals Detected at Air Monitoring Stations

<i>Substance Name</i>	<i>Minimum (µg/m³)</i>	<i>Maximum (µg/m³)</i>	<i>Average (µg/m³)</i>	<i>2nd Tier Screening Conc. (µg/m³)</i>	<i>Number of Times Detected</i>	<i>Sample Total</i>	<i>Percent Detected</i>	<i>Comparison Value (µg/m³)</i>	<i>Source</i>	<i>Maximum Above CV?</i>	<i>2nd Tier Screening Conc. Above CV?</i>	<i>Number of Times Above CV</i>
Inorganics												
Arsenic	0.000001	0.00685	0.00056	0.00134	132	224	59%	0.0002	CREG	Yes	Yes	98
Beryllium	0.00001	0.00002	0.00001	0.00001	5	219	2%	0.0004	CREG	No	No	0
Cadmium	0.00004	0.00376	0.00065	0.00129	241	241	100%	0.0006	CREG	Yes	Yes	88
Chromium	0.00000	0.04560	0.00128	0.00565	179	219	82%	0.00008	CREG (CrVI)	Yes	Yes	161
Lead	0.00001	0.00888	0.00347	0.00535	242	243	100%	1.5	NAAQS	No	No	0

There are discrepancies between OREIS and DOE's annual reports for some of the air monitoring data. The highest values were used in this evaluation.

conc. = concentration

CREG = cancer risk evaluation guide

CrVI = chromium VI

CV = comparison value

µg/m³ = micrograms per cubic meter

NAAQS = National Ambient Air Quality Standard

Table 34. Chemicals Detected in the Soil in the Scarborough Community

<i>Substance Name</i>	<i>Minimum (ppm)</i>	<i>Maximum (ppm)</i>	<i>Average (ppm)</i>	<i>Number of Times Detected</i>	<i>Sample Total</i>	<i>Comparison Value (ppm)</i>	<i>Source</i>	<i>Maximum Above CV?</i>
Inorganics								
Aluminum	8,530	32,900	17,000	13	16	100,000	IEMEG	No
Antimony	0.0383	0.113	0.076	6	16	20	RMEG	No
Arsenic	1	6.39	4.0	13	16	0.5	CREG	Yes
Barium	36.6	206	95	13	16	4,000	RMEG	No
Beryllium	0.509	1.35	0.80	13	16	100	CEMEG	No
Cadmium	0.0702	0.57	0.38	13	16	10	CEMEG	No
Chromium	13.8	26.6	20	13	16	200	RMEG (CrVI)	No
Cobalt	4.7	60	14	13	16	500	IEMEG	No
Copper	13.3	44.3	22	13	16	2,000	IEMEG	No
Iron	14,900	29,700	21,000	13	16	23,000	Residential RBC	Yes
Lead	5.3	130	45	13	16	400	Soil Screening Level	No
Manganese	122	1,930	760	13	16	3,000	RMEG	No
Nickel	9.42	60.9	16	13	16	1,000	IEMEG	No
Selenium	1.46	1.87	1.7	3	16	300	CEMEG	No
Silver	0.39	0.39	0.39	2	16	300	RMEG	No
Thallium	0.287	0.377	0.34	6	16	5.5	Residential RBC	No
Vanadium	17.7	35.6	26	13	16	200	IEMEG	No
Zinc	24.8	153	74	13	16	20,000	CEMEG	No
Organics								
Acetone	0.0098	0.0098	0.0098	1	16	5,000	RMEG	No
Benzoic acid	0.0824	0.123	0.017	4	24	200,000	RMEG	No
Bromoform	0.0019	0.0025	0.0022	4	16	90	CREG	No
cis-Chlordane	0.011	1.7	0.86	4	16	2	CREG (chlordane)	No
DDE, p,p'-	0.0017	0.0017	0.0017	2	16	2	CREG	No
DDT, p,p'-	0.002	0.002	0.002	2	16	2	CREG	No
Fluoranthene	0.074	0.0824	0.10	4	16	2,000	RMEG	No
gamma-Chlordane	0.012	2.8	1.4	4	16	2	CREG (chlordane)	Yes

Table 34. Chemicals Detected in the Soil in the Scarborough Community (continued)

<i>Substance Name</i>	<i>Minimum (ppm)</i>	<i>Maximum (ppm)</i>	<i>Average (ppm)</i>	<i>Number of Times Detected</i>	<i>Sample Total</i>	<i>Comparison Value (ppm)</i>	<i>Source</i>	<i>Maximum Above CV?</i>
Heptachlor	0.013	0.19	0.13	3	16	0.2	CREG	No
Heptachlor epoxide	0.011	0.97	0.65	3	16	0.08	CREG	Yes
Pyrene	0.068	0.068	0.068	1	16	2,000	RMEG	No

Essential nutrients (calcium, magnesium, potassium, and sodium) are not included in the table.

CEMEG = chronic environmental media evaluation guide

CrVI = chromium VI

CREG = cancer risk evaluation guide

CV = comparison value

IEMEG = intermediate environmental media evaluation guide

ppm = parts per million

RBC = risk-based concentration

RMEG = reference dose media evaluation guide

Table 35. Chemicals Detected in the Sediment in the Scarborough Community

<i>Substance Name</i>	<i>Minimum (ppm)</i>	<i>Maximum (ppm)</i>	<i>Average (ppm)</i>	<i>Number of Times Detected</i>	<i>Sample Total</i>	<i>Comparison Value (ppm)</i>	<i>Source</i>	<i>Maximum Above CV?</i>
Inorganics								
Aluminum	5,830	21,000	10,000	4	5	100,000	IEMEG	No
Antimony	0.0507	0.0949	0.073	2	5	20	RMEG	No
Arsenic	1.62	5.17	3.7	4	5	0.5	CREG	Yes
Barium	76.4	91.4	81	4	5	4,000	RMEG	No
Beryllium	0.576	0.977	0.75	4	5	100	CEMEG	No
Cadmium	0.124	0.29	0.22	4	5	10	CEMEG	No
Chromium	14.3	26.6	20.6	4	5	200	RMEG (CrVI)	No
Cobalt	7.91	15	9.8	4	5	500	IEMEG	No
Copper	7.29	17.4	10	4	5	2,000	IEMEG	No
Iron	12,500	23,900	20,700	4	5	23,000	Residential RBC	Yes
Lead	9	101	32.5	4	5	400	Soil Screening Level	No
Manganese	542	680	590	4	5	3,000	RMEG	No
Nickel	9.3	16.1	11	4	5	1,000	IEMEG	No
Selenium	0.936	1.13	1.03	2	5	300	CEMEG	No
Thallium	0.23	0.31	0.27	2	5	5.5	Residential RBC	No
Vanadium	15.7	33	23	4	5	200	IEMEG	No
Zinc	51.7	94	74	4	5	20,000	CEMEG	No
Organics								
Benzoic acid	0.206	0.206	0.206	1	8	200,000	RMEG	No
Bromoform	0.0022	0.0022	0.0022	1	5	90	CREG	No
cis-Chlordane	0.0005	0.002	0.0015	3	5	2	CREG (chlordane)	No
Di-n-butyl phthalate	0.54	0.54	0.54	1	5	5,000	RMEG	No
gamma-Chlordane	0.00075	0.0017	0.0014	3	5	2	CREG (chlordane)	No

Essential nutrients (calcium, magnesium, potassium, and sodium) are not included in the table.

CEMEG = chronic environmental media evaluation guide

CREG = cancer risk evaluation guide

CrVI = chromium VI

CV = comparison value

IEMEG = intermediate environmental media evaluation guide

ppm = parts per million

RBC = risk-based concentration

RMEG = reference dose media evaluation guide

Table 36. Chemicals Detected in the Surface Water in the Scarborough Community

<i>Substance Name</i>	<i>Minimum (ppb)</i>	<i>Maximum (ppb)</i>	<i>Average (ppb)</i>	<i>Number of Times Detected</i>	<i>Sample Total</i>	<i>Comparison Value (ppb)</i>	<i>Source</i>	<i>Maximum Above CV?</i>
Inorganics								
Aluminum	261	1,640	798	4	5	20,000	IEMEG	No
Antimony	0.21	0.21	0.21	1	5	4	RMEG	No
Arsenic	0.83	0.88	0.86	2	5	0.023	CREG	Yes
Barium	17.6	106	68	4	5	700	RMEG	No
Beryllium	0.06	0.06	0.06	2	5	20	CEMEG	No
Chromium	2.36	2.56	2.46	2	5	100	LTHA	No
Cobalt	0.36	0.96	0.8	4	5	100	IEMEG	No
Copper	1.83	3.16	2.5	2	5	300	IEMEG	No
Iron	565	1,160	765	4	5	10,950	RBC	No
Lead	0.48	1.06	0.77	2	5	0	MCLG	Yes
Manganese	39.4	292	170	4	5	500	RMEG	No
Nickel	1.87	2.73	2.3	2	5	100	LTHA	No
Selenium	2.04	2.04	2.04	1	5	50	CEMEG	No
Silver	0.105	0.14	0.12	2	5	50	RMEG	No
Vanadium	1.87	2.48	2.2	2	5	30	IEMEG	No
Zinc	3.93	12.4	8.2	2	5	3,000	CEMEG	No
Organics								
Butyl benzyl phthalate	15.8	15.8	15.8	1	5	2,000	RMEG	No
Di-n-butyl phthalate	11.7	31.4	21.5	2	9	1,000	RMEG	No
Toluene	5	5	5	1	5	200	IEMEG	No

Essential nutrients (calcium, magnesium, potassium, and sodium) are not included in the table.

CEMEG = chronic environmental media evaluation guide for drinking water

CREG = cancer risk evaluation guide for drinking water

CV = comparison value

IEMEG = intermediate environmental media evaluation guide for drinking water

LTHA = lifetime health advisory for drinking water

MCLG = maximum contaminant level goal for drinking water

ppb = parts per billion

RBC = risk-based concentration for tap water

RMEG = reference dose media evaluation guide

Table 37. Estimated Exposure Doses for Chemicals in Scarborough Compared to Noncancer Screening Guidelines

Substance Name	Maximum Concentration (ppm)	2 nd Tier Screening Conc. (ppm)	Estimated Exposure Dose (mg/kg/day)			Acute Screening Guideline (mg/kg/day)	Source	Chronic Screening Guideline (mg/k/day)	Source	Does the Estimated Exposure Dose Exceed the Noncancer Screening Guideline?		
			Pica	Child	Adult					Pica	Child	Adult
Surface Soil												
Arsenic	6.39	6.03	4.6E-04	7.4E-05	3.4E-06	0.005	AMRL	0.0003	CMRL	No	No	No
gamma-Chlordane	2.8	3.01	2.0E-04	3.7E-05	1.7E-06	0.001	Acute MRL (chlordane)	0.0006	CMRL	No	No	No
Heptachlor epoxide	0.97	1.20	6.9E-05	1.5E-05	6.9E-07	0.008	Tox profile*	0.000013	RfD	No	Yes	No
Iron	29,700	25,600	149 mg/day	3.1E-01	1.5E-02	10 mg/day	DRI	0.3	RfD	Yes	Yes	No
Sediment												
Arsenic	5.17	5.25	NA	1.3E-06	2.5E-07	NA	NA	0.0003	CMRL	NA	No	No
Iron	23,900	26,200	NA	6.6E-03	1.2E-03	NA	NA	0.3	RfD	NA	No	No
Surface Water												
Arsenic	0.88	0.0009	NA	1.1E-06	2.1E-07	NA	NA	0.0003	CMRL	NA	No	No
Lead	1,160	0.0012	NA	1.5E-06	2.8E-07	NA	NA	0.02	Acute LOAEL	NA	No	No

Soil doses were calculated using the following formulas:

$$\text{pica dose} = (\text{maximum concentration} \times 0.005 \text{ kg/day} \times 52 \text{ days/year} \times 3 \text{ years}) / (10 \text{ kg} \times (365 \text{ days/year} \times 3 \text{ years}))$$

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.0002 \text{ kg/day} \times 291.2 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.00005 \text{ kg/day} \times 291.2 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

Sediment doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

Surface water doses were calculated using the following formulas:

$$\text{child dose} = (\text{second-tier screening concentration} \times 0.5 \text{ L/day} \times 12 \text{ days/year} \times 6 \text{ years}) / (13 \text{ kg} \times (365 \text{ days/year} \times 6 \text{ years}))$$

$$\text{adult dose} = (\text{second-tier screening concentration} \times 0.5 \text{ L/day} \times 12 \text{ days/year} \times 30 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 30 \text{ years}))$$

* The acute screening guideline was derived from limited acute toxicological data available in ATSDR's toxicological profile. A safety factor of 1,000 was applied. These acute screening guidelines should be considered unofficial and are for use in this health assessment only.

AMRL = acute minimal risk level

CMRL = chronic minimal risk level

conc. = concentration

DRI = dietary reference intake

LOAEL = lowest-observed-adverse-effect level

mg/kg/day = milligram per kilogram per day

NA = not applicable

ppm = parts per million

RfD = reference dose

Table 38. Estimated Exposure Doses for Chemicals in Scarborough Compared to Cancer Screening Guidelines

<i>Substance Name</i>	<i>2nd Tier Screening Concentration (ppm)</i>	<i>Estimated Lifetime Exposure Dose (mg/kg/day)</i>	<i>EPA's Oral Cancer Slope Factor (mg/kg/day)⁻¹</i>	<i>Risk</i>	<i>Does the Estimated Exposure Dose Exceed the Cancer Screening Guideline (10⁻⁴)?</i>
Surface Soil					
Arsenic	6.03	1.5E-06	1.5	2.2E-06	No
gamma-Chlordane	3.01	7.4E-07	0.35	2.6E-07	No
Heptachlor epoxide	1.20	2.9E-07	9.1	2.7E-06	No
Iron	25,600	<i>Evaluated for noncarcinogenic effects (see Table 37)</i>			
Sediment					
Arsenic	5.25	1.1E-07	1.5	1.6E-07	No
Iron	26,200	<i>Evaluated for noncarcinogenic effects (see Table 37)</i>			
Surface Water					
Arsenic	0.0009	9.0E-08	1.5	1.3E-07	No
Lead	0.0012	<i>Evaluated for noncarcinogenic effects (see Table 37)</i>			

Soil doses were calculated using the following formula:

$$\text{lifetime dose} = (\text{second-tier screening concentration} \times 0.00005 \text{ kg/day} \times 291.2 \text{ days/year} \times 70 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Sediment doses were calculated using the following formula:

$$\text{lifetime dose} = (\text{second-tier screening concentration} \times 0.0001 \text{ kg/day} \times 12 \text{ days/year} \times 70 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Surface water doses were calculated using the following formula:

$$\text{lifetime dose} = (\text{second-tier screening concentration} \times 0.5 \text{ L/day} \times 12 \text{ days/year} \times 70 \text{ years}) / (70 \text{ kg} \times (365 \text{ days/year} \times 70 \text{ years}))$$

Risk was calculated by multiplying the exposure dose by EPA's oral cancer slope factor.

mg/kg/day = milligram per kilogram per day

ppm = parts per million