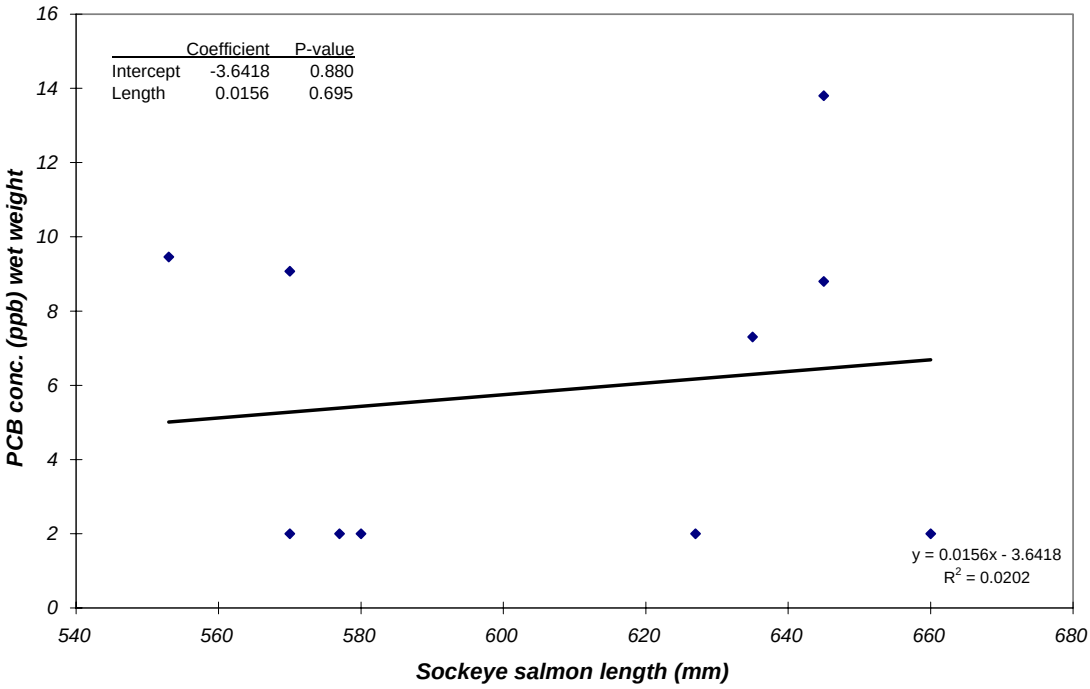

Figure C15. Correlation between sockeye salmon length (mm) and associated PCB concentration (ppb) measured in whole body tissue samples on wet weight basis. Data represents the sum of PCB aroclors 1254 and 1260. N=10.

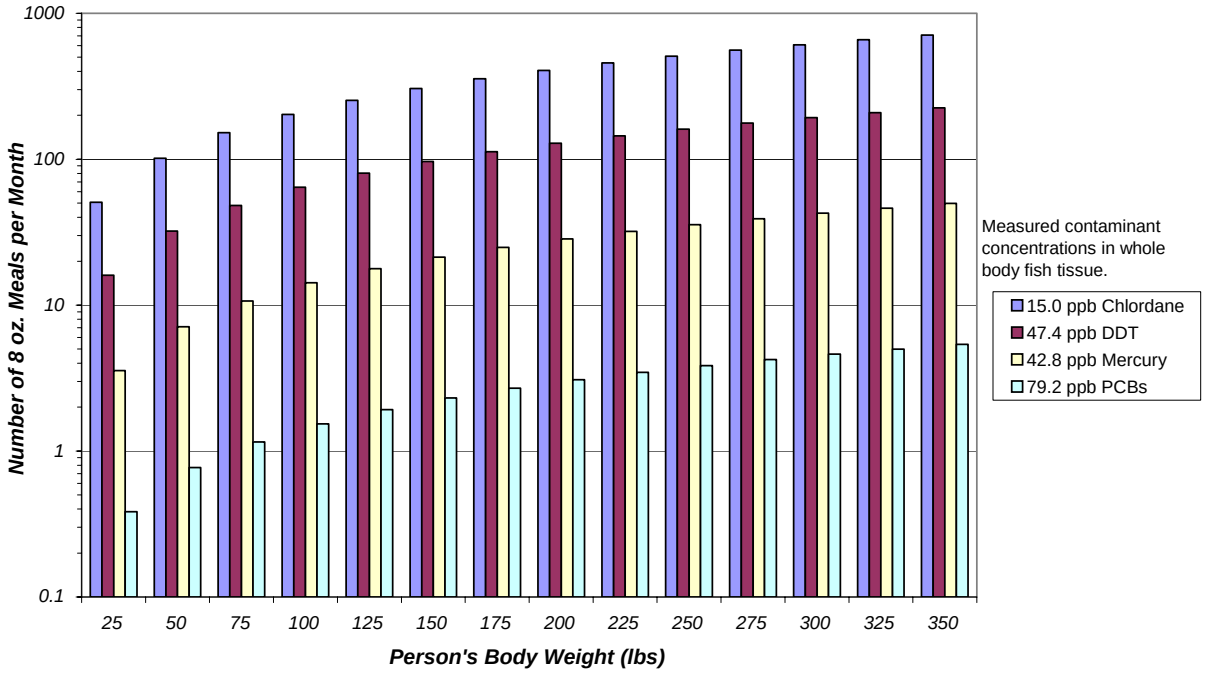

Figure C16. Allowable number of 8 oz. meals per month of cutthroat trout < 12 inches (300 mm) from Lake Washington for varying body weights based on contaminant concentration.

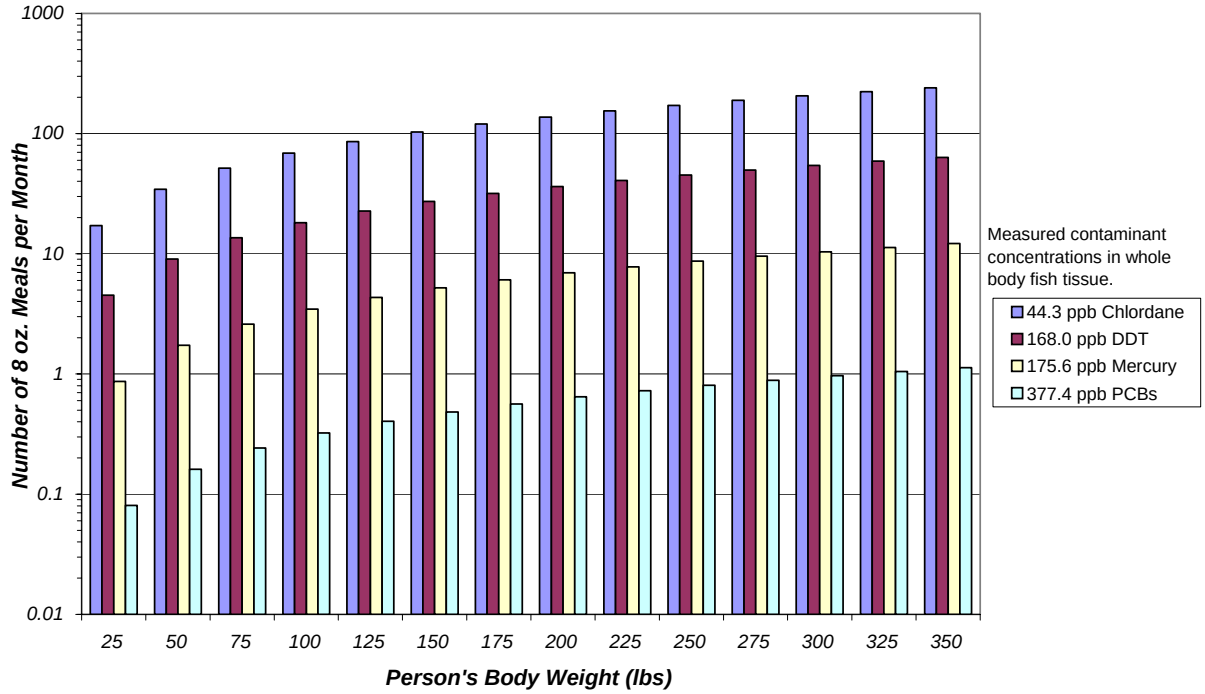

Figure C17. Allowable number of 8 oz. meals per month of cutthroat trout > 12 inches (300 mm) from Lake Washington for varying body weights based on contaminant concentration.

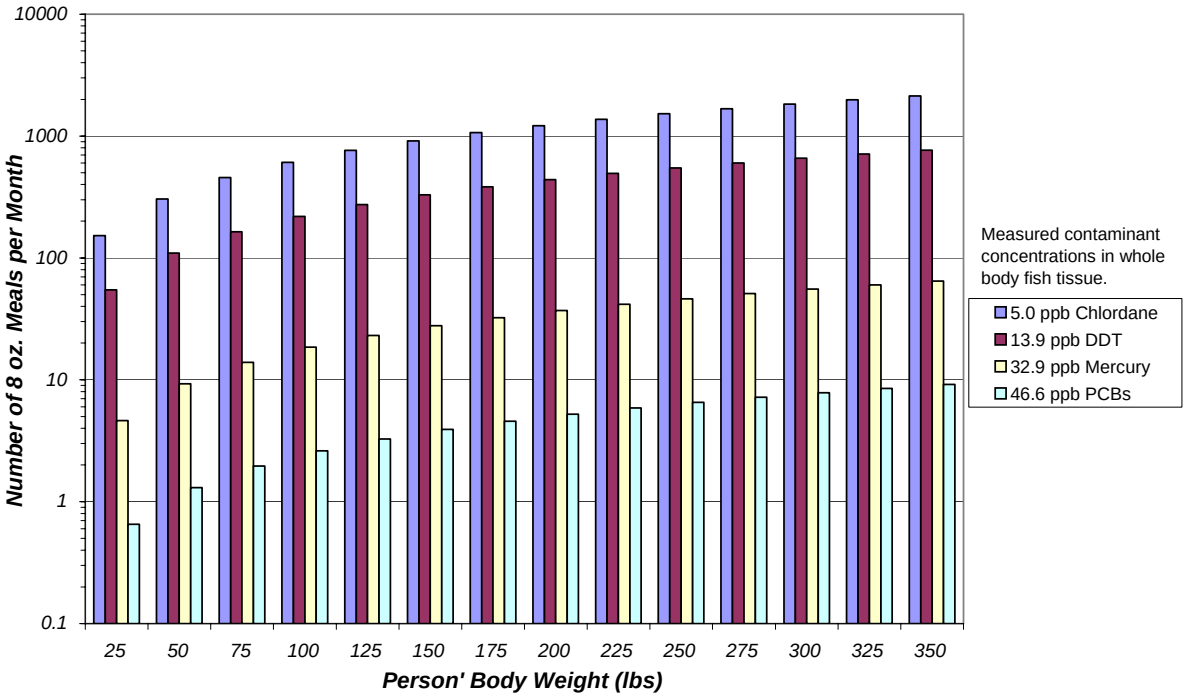

Figure C18. Allowable number of 8 oz. meals per month of yellow perch <8 inches (200 mm) from Lake Washington for varying body weights based on contaminant concentration.

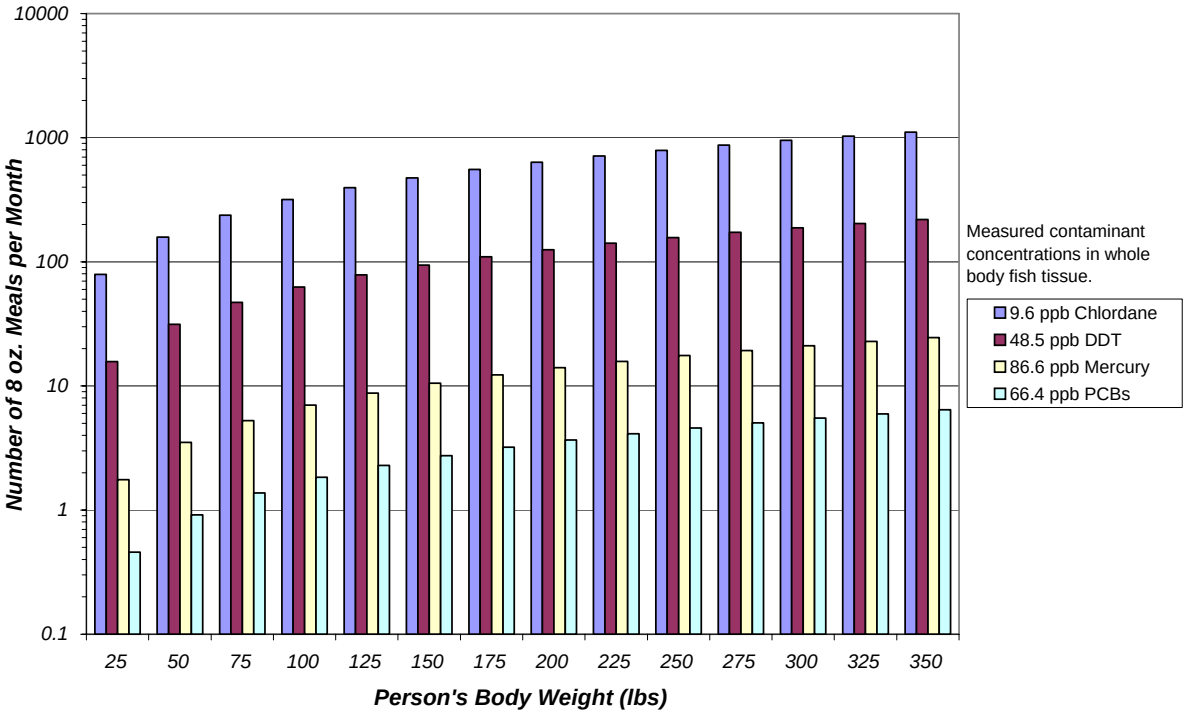

Figure C19. Allowable number of 8 oz. meals per month of yellow perch 8 -10.5 inches (201 - 270 mm) from Lake Washington for varying body weights based on contaminant concentration.

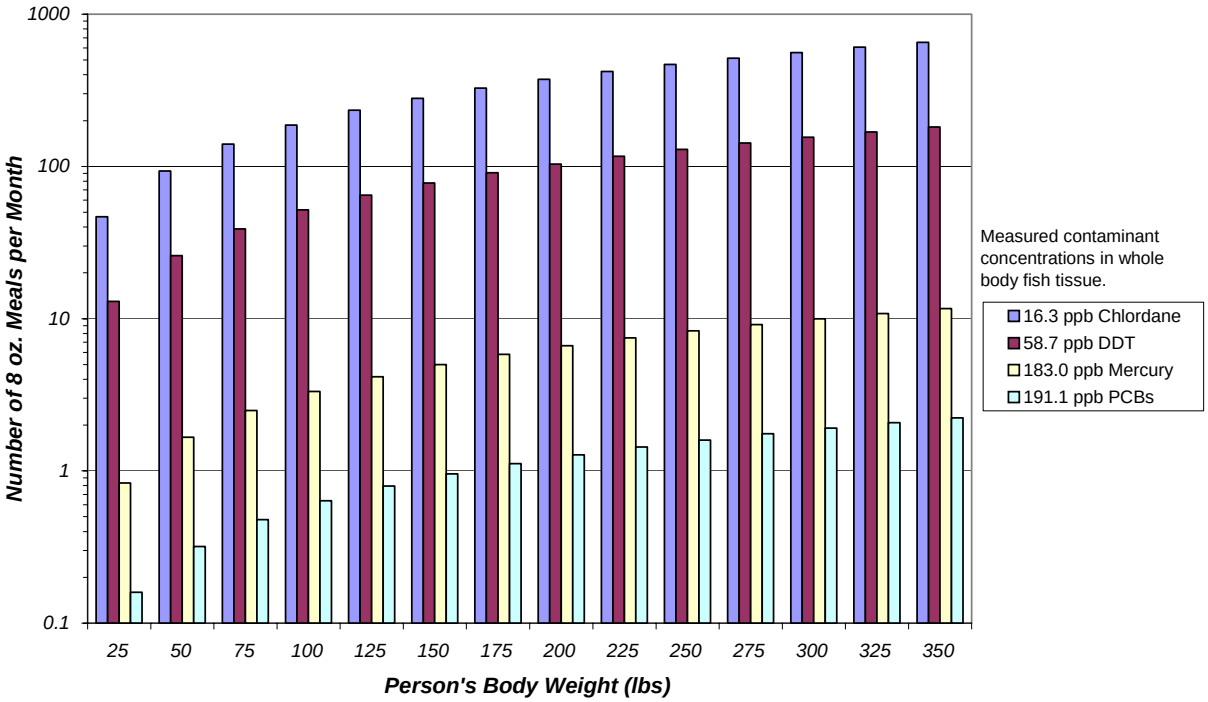

Figure C20. Allowable number of 8 oz. meals per month of yellow perch >10.5 inches (270 mm) from Lake Washington for varying body weights based on contaminant concentration.

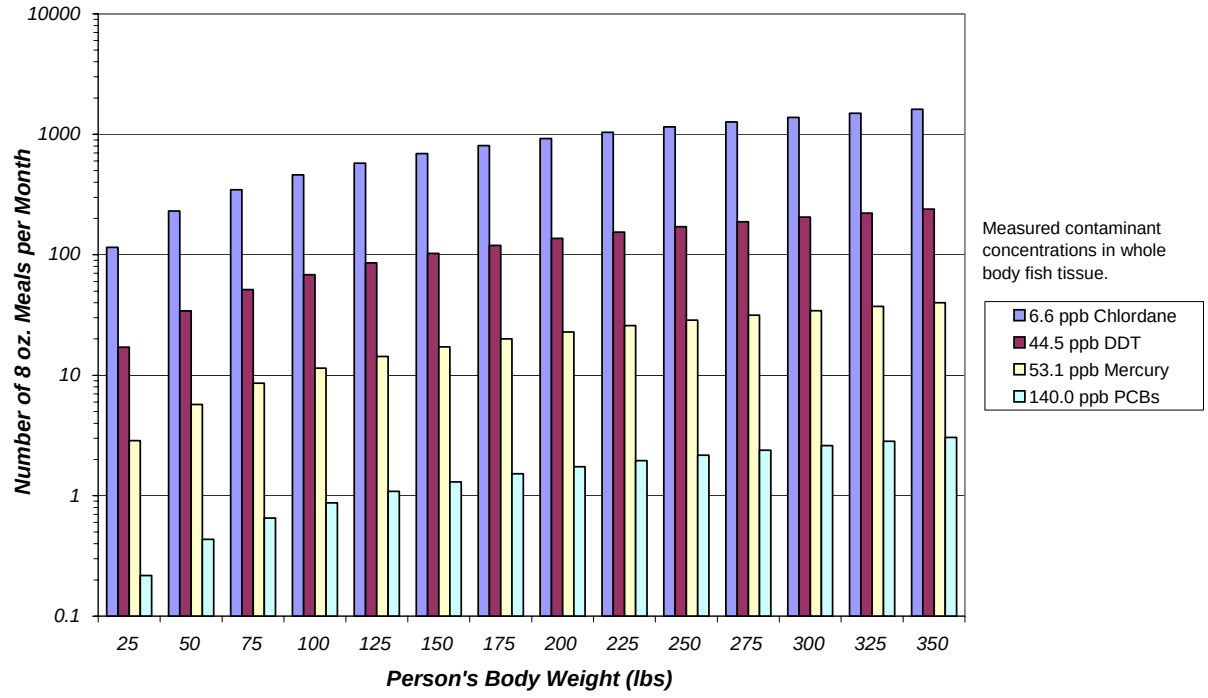

Figure C21. Allowable number of 8 oz. meals per month of northern pikeminnow <12 inches (300 mm) from Lake Washington for varying body weights based on contaminant concentration.

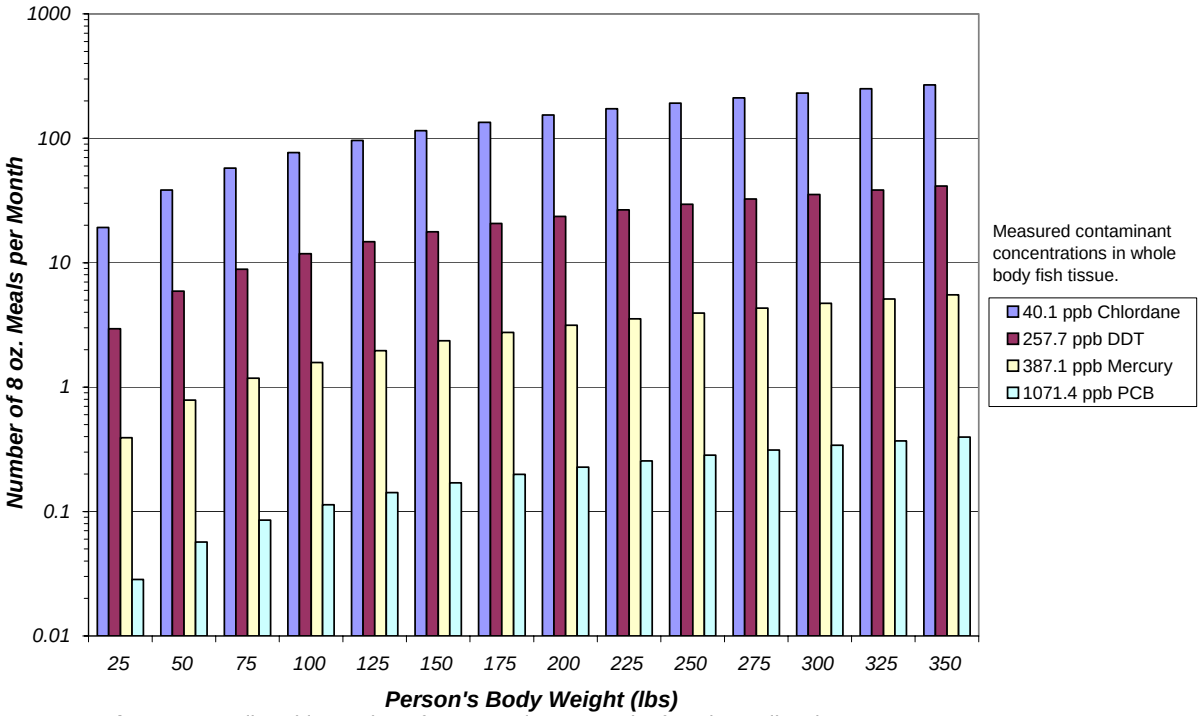

Figure C22. Allowable number of 8 oz. meals per month of northern pikeminnow >12 inches (300 mm) from Lake Washington for varying body weights based on contaminant concentration.

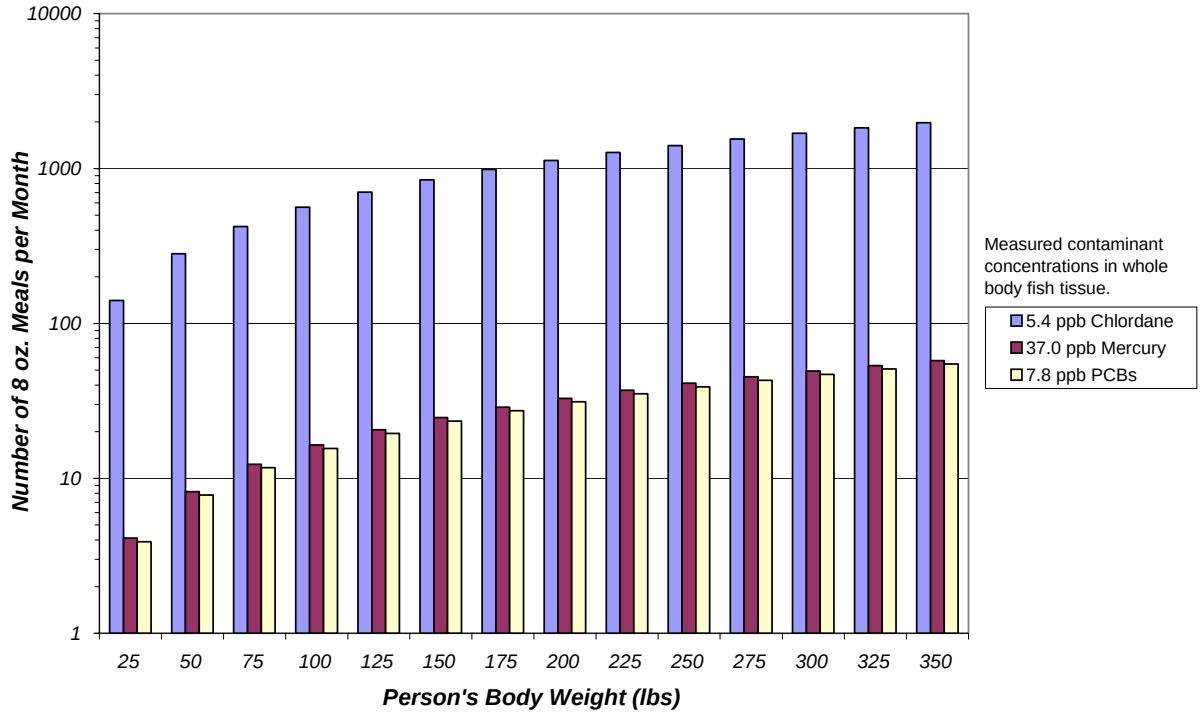

Figure C23. Allowable number of 8 oz. meals per month of sockeye salmon from Lake Washington for varying body weights based on contaminant concentration.

APPENDIX D

Multiple Chemical Exposure Calculations

Table D1. Cancer and non-cancer calculations for multiple chemicals for large northern pikeminnow using the mean consumption rate (i.e., 1.5 eight-ounce meals per month).

Large Pikeminnow	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	1071.4	387.1	257.7	40.1	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 1.5

* based on King County DNRP consumption study (ave. consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.200	0.072	0.048	0.007	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	10.00	0.72	0.10	0.01	10.8

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0857	na	0.0206	0.0032	**Potential Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	1.7E-04	na	7.0E-06	1.1E-06	1.8E-04

Table D2. Cancer and non-cancer calculations for multiple chemicals for large cutthroat trout using the mean consumption rate (i.e., 1.5 eight-ounce meals per month).

Large Cutthroat trout	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	377.4	175.6	168	44.3	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 1.5

* based on King County DNRP consumption study (ave. consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.070	0.033	0.031	0.008	**Noncaner**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	3.52	0.33	0.06	0.02	3.9

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0302	na	0.0134	0.0035	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	6.0E-05	na	4.6E-06	1.2E-06	6.6E-05

Table D3. Cancer and non-cancer calculations for multiple chemicals for large yellow perch using the mean consumption rate (i.e., 1.5 eight-ounce meals per month).

Large perch	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	191.1	183	58.7	16.3	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 1.5

* based on King County DNRP consumption study (ave. consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.036	0.034	0.011	0.003	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	1.78	0.34	0.02	0.01	2.2

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0153	na	0.0047	0.0013	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	3.1E-05	na	1.6E-06	4.6E-07	3.3E-05

Table D4. Cancer and non-cancer calculations for multiple chemicals for large yellow perch using the mean consumption rate (i.e., 1.5 eight-ounce meals per month).

Smallmouth bass	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	371.2	244.3	62.9	11	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 1.5

* based on King County DNRP consumption study (ave. consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.069	0.046	0.012	0.002	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	3.46	0.46	0.02	0.004	3.9

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0297	na	0.0050	0.0009	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	5.9E-05	na	1.7E-06	3.1E-07	6.1E-05

Table D5. Cancer and non-cancer calculations for multiple chemicals for large yellow perch using the mean consumption rate (i.e., 1.5 eight-ounce meals per month).

Sockeye	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
30.4	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	7.8	37	5.4	1	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 1.5

* based on King County DNRP consumption study (ave. consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.001	0.007	0.001	0.0002	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	0.07	0.07	0.002	0.0004	0.1

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0006	na	0.0004	0.0001	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	1.2E-06	na	1.5E-07	2.8E-08	1.4E-06

Table D6. Cancer and non-cancer calculations for multiple chemicals for large northern pikeminnow using the 95th percentile consumption rate (i.e., four eight-ounce meals per month).

Large Pikeminnow	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
3	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	1071.4	387.1	257.7	40.1	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 4

* based on King County DNRP consumption study (95 percentile consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.533	0.193	0.128	0.020	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	26.67	1.93	0.26	0.04	28.9

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.2286	na	0.0550	0.0086	**Potential Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	4.6E-04	na	1.9E-05	3.0E-06	4.8E-04

Table D7. Cancer and non-cancer calculations for multiple chemicals for large cutthroat trout using the 95th percentile consumption rate (i.e., four eight-ounce meals per month).

Large Cutthroat trout	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	377.4	175.6	168	44.3	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 4

* based on King County DNRP consumption study (95 percentile consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.188	0.087	0.084	0.022	**Noncaner**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	9.39	0.87	0.17	0.04	10.5

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0805	na	0.0358	0.0095	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	1.6E-04	na	1.2E-05	3.3E-06	1.8E-04

Table D8. Cancer and non-cancer calculations for multiple chemicals for large yellow perch using the 95th percentile consumption rate (i.e., four eight-ounce meals per month).

Large perch	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	191.1	183	58.7	16.3	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 4

* based on King County DNRP consumption study (95 percentile consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.095	0.091	0.029	0.008	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	4.76	0.91	0.06	0.02	5.7

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0408	na	0.0125	0.0035	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	8.2E-05	na	4.3E-06	1.2E-06	8.7E-05

Table D9. Cancer and non-cancer calculations for multiple chemicals for smallmouth bass using the 95th percentile consumption rate (i.e., four eight-ounce meals per month).

Smallmouth bass	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	371.2	244.3	62.9	11	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 4

* based on King County DNRP consumption study (95 percentile consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.185	0.122	0.031	0.005	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	9.24	1.22	0.06	0.011	10.5

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0792	na	0.0134	0.0023	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	1.6E-04	na	4.6E-06	8.2E-07	1.6E-04

Table D10. Cancer and non-cancer calculations for multiple chemicals for sockeye salmon using the 95th percentile consumption rate (i.e., four eight-ounce meals per month).

Sockeye	PCB	Hg	DDT	Chlordane	
Exposure parameters	**Value**	**Value**	**Value**	**Value**	**Units**
30.4	30.4	30.4	30.4	30.4	Days/month
BW body weight	60	60	60	60	kg
MS meal size	0.227	0.227	0.227	0.227	kg/meal
C conc.	7.8	37	5.4	1	ug/kg
ED exposure duration - cancer	30	na	30	30	years
AT averaging time - cancer	70	na	70	70	years

meals/month* 4

* based on King County DNRP consumption study (95 percentile consumption rate)

	Noncancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose (ug/kg/day)	0.004	0.018	0.003	0.0005	**Noncancer**
RfD (ug/kg/day)	0.02	0.10	0.50	0.50	**Hazard Index**
Hazard Quotient (HQ)	0.19	0.18	0.005	0.0010	0.4

intake = (conc x Ingestion freq x exp freq x exp duration) / (bw x ave time)

	Cancer Endpoints				
	PCB	**Hg**	**DDT**	**Chlordane**	
Dose cancer (ug/kg/day)	0.0017	na	0.0012	0.0002	**Cancer**
Slope Factor (kg-day/ug)	2.0E-03	na	3.4E-04	3.5E-04	**Risk**
Risk	3.3E-06	na	3.9E-07	7.5E-08	3.8E-06

APPENDIX E

Cancer Evaluation

Introduction

Some chemicals detected in Lake Washington fish have the ability to cause cancer. In order to quantify a fish consumer's increased cancer risk, a cancer slope factor describing the potency of a chemical's carcingenicity must be determined through scientific study. Some cancer slope factors are derived from human population data. Others are derived from laboratory animal studies involving doses much higher than those encountered in the environment. Use of animal data requires extrapolation of the cancer potency obtained from these high dose studies down to real-world exposures. This process involves much uncertainty. Despite uncertainties associated with cancer slope factors for each contaminant, it is possible to calculate the potential cancer risk by applying the following equation (EPA 1986):

Risk of cancer = (Chronic Daily Intake) x (Cancer Slope Factor).

In this equation, the chronic daily intake is replaced with the chemical-specific reference dose (RfD) with units of mg/kg-day. The cancer slope factor is also chemical specific with units of $(mg/kg\text{-}day)^{-1}$. CSFs for each chemical are listed above. The product of the RfD and CSF results in a unitless value that represents the population risk, expressed as the probability of developing cancer over a lifetime. The resulting calculated cancer risks ranged from 2 in 10,000 for chlordane and DDT, to 4 in 100,000 for PCBs. These risks are upper bound estimates, while true risks may be as low as zero. These calculated values fall under current typical regulatory guidelines used by EPA for acceptable risk levels and range from 1 in one million to one in ten thousand.

The following summaries provide an overview of available cancer data and assessment for each contaminant of concern in Lake Washington fish.

Chlordane

Chlordane is classified by EPA as B2 (probable human carcinogen) using the 1986 Guidelines for Carcinogen Risk Assessment. These characterizations are based on the following summaries of the evidence available: (1) human epidemiology studies showing non-Hodgkin's lymphoma in farmers exposed to chlordane and case reports of aplastic anemia (chlordane data associated with home use are inadequate to demonstrate carcinogenicity); (2) animal studies in which benign and malignant liver tumors were induced in both sexes of four strains of mice and occurred with an elevated, but not statistically significant, incidence in a fifth strain, as well as liver toxicity but no tumors in rats of two strains; and (3) structural similarity to other rodent liver carcinogens. EPA's IRIS has assigned a cancer slope factor (CSF) for chlordane of 0.35 $(mg/kg\text{-}day)^{-1}$.

Dichlorodiphenyltrichloroethane (DDT)

DDT is classified also as B2 (probable human carcinogen). The basis for this classification is from observations of tumors (generally of the liver) in seven studies in various mouse strains and three studies in rats. DDT is structurally similar to other probable carcinogens, DDE and DDD. The existing human epidemiological data are inadequate and autopsy studies relating tissue levels of DDT to cancer incidence have yielded conflicting results. Three studies reported that

tissue levels of DDT and DDE were higher in cancer victims than in those dying of other diseases (Casarett et al.1968, Dacre and Jennings 1970, Wasserman et al.1976). In other studies, no such relationship was seen (Robinson et al.1965, Hoffman et al.1967). Studies of occupationally exposed workers and volunteers have been of insufficient duration to be useful in assessment of the carcinogenicity of DDT to humans. EPA's IRIS database shows a CSF for DDT of 0.34 $(mg/kg\text{-}day)^{-1}$.

Mercury

Mercury has been classified as C (possible human carcinogen). This is based on inadequate data in humans and limited evidence of carcinogenicity in animals. Three studies were identified that examined the relationship between methylmercury exposure and cancer in humans. No persuasive evidence of increased carcinogenicity attributable to methylmercury exposure was observed in any of the studies. In animal studies, male mice exposed to methylmercuric chloride in the diet had an increased incidence of renal adenomas, adenocarcinomas, and carcinomas. The tumors were observed at a single site and in a single species and single sex. Renal epithelial cell hyperplasia and tumors were observed only in the presence of profound nephrotoxicity and were suggested to be a consequence of reparative changes in the cells. A CSF has not been calculated for mercury in the IRIS database.

Polychlorinated biphenyls (PCBs)

PCBs are also classified as a B2 (probable carcinogen) and the following studies showed possible associations between PCBs and occupational exposure. A cohort study by Bertazzi et al. (1987) analyzed cancer mortality among 2,100 workers at a capacitor manufacturing plant in Italy. Male workers showed a statistically significant increase in death from gastrointestinal tract cancer compared with national and local rates. In females, a statistically significant excess risk of death from hematologic cancer was reported. Analyses by exposure duration, latency, and year of first exposure revealed no trend; however, the numbers were small. A cohort study by Brown (1987) analyzed cancer mortality among workers at two capacitor manufacturing plants in New York and Massachusetts. The cohort included 2,588 workers employed at least three months in areas of the plants considered to have potential for heavy exposure to PCBs. Cancer rates of workers were compared with national rates. Analyses by time since first employment or length of employment revealed no trend; again, the numbers were considered small. A third study involving 3,588 workers at a capacitor manufacturing plant in Indiana by Sinks et al. (1992) analyzed cancer mortality. Workers were classified into five exposure zones based on distance from the impregnation ovens. Compared with national rates, a statistically significant excess risk of death from skin cancer was reported. A proportional hazards analysis revealed no pattern of association with exposure zone; however, the numbers are small.

Other occupational studies by NIOSH (1977), Gustavsson et al. (1986) and Shalat et al. (1989) looked for an association between occupational PCB exposure and cancer mortality. The studies examining the cancer causing effect of PCBs often have methodological limitations. However, the evidence, taken in totality, indicates a potential cancer causing effect for PCBs. EPA determined that the human data are inadequate, but suggestive of carcinogenicity (EPA IRIS 2000), and IARC (1998) concluded that the evidence for carcinogenicity to humans is limited.

Cancer studies in animals are more conclusive in demonstrating a link with PCB exposure. A 1996 study found liver tumors in female rats exposed to Aroclors 1260, 1254, 1242, and 1016, and in male rats exposed to 1260. These mixtures contain overlapping groups of congeners that, together, span the range of congeners most often found in environmental mixtures. Earlier studies found high, statistically significant incidences of liver tumors in rats ingesting Aroclor 1260 or Clophen A 60 (Kimbrough et al., 1975; Norback and Weltman, 1985; Schaeffer et al., 1984). Mechanistic studies are beginning to identify several congeners that have dioxin-like activity and may promote tumors by different modes of action. PCBs are absorbed through ingestion, inhalation, and dermal exposure, after which they are transported similarly through the circulation. This provides a reasonable basis for expecting similar internal effects from different routes of environmental exposure. The current CSF for PCBs is 2 $(mg/kg\text{-}day)^{-1}$.

References

Bertazzi, P.A., L. Riboldi, A. Pesatori, L. Radice and C. Zocchetti. 1987. Cancer mortality of capacitor manufacturing workers. Am. J. Ind. Med. 11(2):165-176.

Brown DP. 1987. Mortality of workers exposed to polychlorinated biphenyls - An update. Arch. Environ. Health. 42(6):333-339.

Casarett LJ, Fryer GC, Yauger WL, and Klemmer HW. 1968. Organochlorine pesticide residues in human tissue-Hawaii. Arch. Environ. Health. 17:306-311.

Dacre JC and Jennings RW. 1970. Organochlorine insecticides in normal and carcinogenic human lung tissues. Toxicol. Appl. Pharmacol. 17:277.

EPA 1986. *Guidelines for Carcinogen Risk Assessment*. U.S. Environmental Protection Agency, Office of Research and Development. 1986. 51 Federal Register 33992 (September 24, 1986).

EPA IRIS – Integrated Risk Information System
http://www.epa.gov/iris/index.html.

Gustavsson P, Hogstedt C, and Rappe C. 1986. Short-term mortality and cancer incidence in capacitor manufacturing workers exposed to polychlorinated biphenyls (PCBs). Am. J. Ind. Med. 10:341-344.

Hoffman WS, Adler H, Fishbein WI, and Bauer FC. 1967. Relation of pesticide concentrations in fat to pathological changes in tissues. Arch. Environ. Health. 15:758-765.

IARC 1998. http://193.51.164.11/htdocs/monographs/suppl7/polychlorinatedbiphenyls.html

Kimbrough RD, Squire RA, Linder RE, Strandberg JD, Montali RJ, and Burse VW. 1975. Induction of liver tumors in Sherman strain female rats by polychlorinated biphenyl Aroclor 1260. J. Natl. Cancer Inst. 55(6):1453- 1459.

NIOSH (National Institute for Occupational Safety and Health). 1977. Criteria for a Recommended Standard: Occupational Exposure to Polychlorinated Biphenyls (PCBs). U.S. DHEW, PHS, CDC, Rockville, Md. Publ. No. 77-225.

Norback DH and Weltman RH. 1985. Polychlorinated biphenyl induction of hepatocellular carcinoma in the Sprague-Dawley rat. Environ. Health Perspect. 60:97-105.

Robinson J, Richardson A, Hunter CG, Crabtree AN, and Rees HS. 1965. Organo-chlorine insecticide content of human adipose tissue in south-eastern England. Br. J. Ind. Med. 22:220-229.

Schaeffer E, Greim H, and Goessner W. 1984. Pathology of chronic polychlorinated biphenyl (PCB) feeding in rats. Toxicol. Appl. Pharmacol. 75:278-288.

Shalat SL, True LD, Fleming LE, and Pace PE. 1989. Kidney cancer in utility workers exposed to polychlorinated biphenyls (PCBs). Br. J. Ind. Med. 46(11):823-824.

Sinks T, Steele G, Smith AB, Watkins K, and Shults RA. 1992. Mortality among workers exposed to polychlorinated biphenyls. Am. J. Epidemiol. 136(4):389-398.

Wasserman M, Nogueira DP, Tomatis L. 1976. Organochlorine compounds in neoplastic and adjacent apparently normal breast tissue. Bull. Environ. Contam. Toxicol. 15(4):478-484.