ADDENDUM NO. 1

BASELINE RISK ASSESSMENT
95TH TERRACE SITE

DEPARTMENT OF ENERGY
KANSAS CITY PLANT
PURCHASE ORDER NO. G605502
REVISION NO. 7

Prepared for
Honeywell International Inc.
Federal Manufacturing & Technologies
Kansas City, Missouri

fish tissue level of
0.159 ppm = 10^{-5} cancer risk

July 2003

URS

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Addendum No. 1
Baseline Risk Assessment – 95th Terrace Site
Department of Energy Kansas City Plant

Introduction

The purpose of this Addendum No. 1 is to update the assessment of potential risks to adult and child recreational receptors from ingestion of fish in Indian Creek or the Blue River downstream from the 95th Terrace Site and the 002 Outfall. Exposure assumptions used in this addendum were the same as those used in the original human health risk assessment (HHRA) of the Baseline Risk Assessment – 95th Terrace Site (URS 2001)

This Addendum updates the risk assessment calculations by incorporating the newly collected data from fish samples collected by Oak Ridge National Laboratory (ORNL) in October/November 2002 as reported in "Polychlorinated Biphenyl Bioaccumulation in Fish From Streams Near the U.S. Department of Energy's Kansas City Plant: 2003 Report." (ORNL 2003). Estimated exposure concentrations for surface soil, sediment and surface water from the HHRA were not changed for this Addendum. The sampling locations, species selection, and methodology used in this addendum and the HHRA are discussed in detail in the 2003 Bioaccumulation Study referenced above. This document presented data from fish sampled by ORNL from the spring of 1991 through the summer of 1998. As with the HHRA, the chemicals of potential concern (COPCs) were limited to polychlorinated biphenyls (PCBs). Tables A-1 and A-2 present the new data and the estimation of exposure point concentrations to channel catfish and green sunfish, respectively, (replacing Tables 5.27 and 5.26, respectively of the HHRA).

Risk Assessment Results

Updated noncarcinogenic hazards and carcinogenic risks for adult and child recreational receptors were estimated using surface soil, sediment and surface water values from the HHRA and the new fish data.

Adult Recreational Receptor

Tables A-3 and A-4 (replacing Tables 5.46 and 5.47 of the HHRA), present the calculation of the adult recreator's potential hazards and risks from exposure to channel catfish and green sunfish, respectively. Table A-5 (replaces Table 5.48 of the HHRA) summarizes total risks for the adult recreational receptor and presents the estimated risks from the HHRA for comparison. The reasonable maximum exposure (RME) Hazard Index (HI) from ingestion of channel catfish decreased from 5.22 in the HHRA (Sampled between 1991 and 1998) to 0.83 from fish samples collected in the fall of 2002. For green sunfish, the RME HI decreased from 0.5 in the HHRA to 0.2. Table A-5 also shows that the estimated noncarcinogenic hazards and carcinogenic risks for adult recreational receptors have decreased to approximately one-half of the HHRA health risks. Although potential hazards still exceed the EPA target value of 1, the data indicate that concentrations of PCBs in the fish downstream from the 95th Terrace Site and the 002 Outfall have generally decreased using the recent fish data. Likewise, estimated hazards and cancer risks have also decreased since the HHRA data was collected.

Child Recreational Receptor

Tables A-6 and A-7 (replacing Tables 5.53 and 5.54 of the HHRA), present the calculation of the child recreator's potential hazards and risks from exposure to channel catfish and green sunfish, respectively based on the 2002 data. Table A-8 (replaces Table 5.55 of the HHRA) summarizes total risks for the child recreational receptor and presents the estimated risks from the HHRA for comparison. The RME HI from ingestion of channel catfish decreased from 4.21 in the HHRA to 0.67 from the fish samples collected in 2002. For green sunfish, the RME HI decreased from 0.4 in the HHRA to 0.2. As with the adult recreational receptor, the new data show that the estimated noncarcinogenic hazards and carcinogenic risks for child recreational receptors have decreased to approximately one-half of the HHRA health risks. Although potential hazards still exceed the EPA target value of 1, the data indicate that concentrations of PCBs in the fish downstream from the 95th Terrace Site and the 002 Outfall have generally decreased since the HHRA data was collected. Likewise, estimated hazards and cancer risks have also decreased.

Summary

A revised summary of human health risks is presented in Table A-9, (replacing Table 5.56).

References

Oak Ridge National Laboratory (ORNL). 2000. Habitat, Water Quality, and Aquatic Community Assessment of Indian Creek and Blue River at the U.S. Department of Energy's Kansas City Plant. Oak Ridge National Laboratory, Oak Ridge, Tennessee. ORNL/TM-2000/79

Oak Ridge National Laboratory (ORNL). 2003. (Forecast publication date September 2003) Polychlorinated Biphenyl Bioaccumulation in Fish From Streams Near the U.S. Department of Energy's Kansas City Plant: 2003 Report. September

URS Group, Inc. (URS). 2001. Baseline Risk Assessment. 95th Terrace Site. Department of Energy, Kansas City Plant. Draft Final Report. July

TABLE A-1
CONCENTRATIONS OF PCBs IN INDIAN CREEK/BLUE RIVER CHANNEL CATFISH

	Aroclor - 1242 (mg/kg)				Aroclor - 1254 (mg/kg)				Aroclor - 1260 (mg/kg)				Total PCBs (mg/kg)			
Sample ID	Result	Log Result	RL	Qual.	Result	Log Result	RL	Qual.	Result	Log Result	RL	Qual.	Result	Log Result	RL	Qual
11525	**0.015**	-4.1997	0.0061	J	0.0034	-5.6840	0.0068	U	**0.048**	-3.0366	0.0023		**0.06**	-2.7646		
11470	**0.26**	-1.3471	0.0072		0.00325	-5.7291	0.0065	U	**0.21**	-1.5606	0.0074		**0.47**	-0.7550		
11471	0.003	-5.6694	0.0069	U	0.00315	-5.7604	0.0063	U	**0.11**	-2.2073	0.0071		**0.11**	-2.2073		
11472	**0.05**	-2.9957	0.0069		0.00315	-5.7604	0.0063	U	**0.15**	-1.8971	0.0071		**0.20**	-1.6094		
11473	**0.046**	-3.0791	0.0069		0.00315	-5.7604	0.0063	U	**0.23**	-1.4697	0.0071		**0.28**	-1.2874		
11474	0.003	-5.6694	0.0069	U	0.00315	-5.7604	0.0063	U	**0.16**	-1.8326	0.0071		**0.16**	-1.8326		
11475	**0.026**	-3.6497	0.0069		0.00315	-5.7604	0.0063	U	**0.22**	-1.5141	0.0071		**0.25**	-1.4024		
11476	0.004	-5.6408	0.0071	U	0.00325	-5.7291	0.0065	U	**0.14**	-1.9661	0.0073		**0.14**	-1.9661		
11477	**0.15**	-1.8971	0.007		**0.28**	-1.2730	0.0065		**0.2**	-1.6094	0.0072		**0.35**	-1.0498		
11510	0.003	-5.7604	0.0063	U	0.0029	-5.8430	0.0058	U	**0.06**	-2.8134	0.0065		**0.06**	-2.8134		
11511	0.004	-5.6550	0.007	U	0.0032	-5.7446	0.0064	U	**0.024**	-3.7297	0.0072	J	**0.02**	-3.7297		J
11512	0.003	-5.7138	0.0066	U	0.00305	-5.7926	0.0061	U	**0.033**	-3.4112	0.0068		**0.03**	-3.4112		
11513	0.003	-5.6840	0.0068	U	0.0031	-5.7764	0.0062	U	**0.036**	-3.3242	0.007		**0.04**	-3.3242		
11514	0.003	-5.6988	0.0067	U	0.00305	-5.7926	0.0061	U	**0.023**	-3.7723	0.0069		**0.02**	-3.7723		
11515	0.004	-5.6550	0.007	U	0.0032	-5.7446	0.0064	U	**0.045**	-3.1011	0.0072		**0.05**	-3.1011		
11516	0.004	-5.6550	0.007	U	0.0032	-5.7446	0.0064	U	**0.024**	-3.7297	0.0072	J	**0.02**	-3.7297		J
11517	0.004	-5.6408	0.0071	U	0.00325	-5.7291	0.0065	U	**0.025**	-3.6889	0.0073		**0.03**	-3.6889		
11490	**0.054**	-2.9188	0.0061		0.0034	-5.6840	0.0068	U	**0.052**	-2.9565	0.0024		**0.11**	-2.2443		
11491	**0.015**	-4.1997	0.0062	J	0.00345	-5.6694	0.0069	U	**0.042**	-3.1701	0.0024		**0.06**	-2.8647		
11492	**0.028**	-3.5756	0.0063		0.0035	-5.6550	0.007	U	**0.045**	-3.1011	0.0024		**0.07**	-2.6173		
11493	**0.023**	-3.7723	0.0062	J	0.00345	-5.6694	0.0069	U	**0.057**	-2.8647	0.0024		**0.08**	-2.5257		
11494	**0.025**	-3.6889	0.0062		0.00345	-5.6694	0.0069	U	**0.047**	-3.0576	0.0024		**0.07**	-2.6311		
11495	**0.034**	-3.3814	0.0063		0.00345	-5.6694	0.0069	U	**0.054**	-2.9188	0.0024		**0.09**	-2.4304		
11528	**0.022**	-3.8167	0.0062	J	0.00345	-5.6694	0.0069	U	**0.033**	-3.4112	0.0024		**0.06**	-2.9004		
11529	**0.066**	-2.7181	0.0061		0.0034	-5.6840	0.0068	U	**0.033**	-3.4112	0.0023		**0.10**	-2.3126		
Number	25				25				25				25			
Minimum Detection	0.015				0.28				0.023				0.02			
Maximum Detection	0.26				0.28				0.23				0.47			
Average	0.034	-4.31			0.0143	-5.550			0.084	-2.782			0.117	-2.52		
Standard Deviation	0.057	1.38			0.0553	0.892			0.070	0.778			0.113	0.865		
H Statistic		3.024				2.380				2.262				2.320		
95% UCL		0.082				0.009				0.120				0.176		
RME		0.082				0.009				0.120				0.176		

This Table Replaces Table 5.27 in the HHRA
RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected concentration
J = Estimated value below reporting limit or estimated based on data quality review
U = Analyte not detected. Value shown is one-half the reporting limit.
Bold = Analyte detected in sample
Log result is the natural logarithm of the result; used to calculate the 95% UCL of the mean.
95% UCL = 95 percent Upper Confidence Limit. See Section V.C.1.3.2.

TABLE A-2
CONCENTRATIONS OF PCBs IN INDIAN CREEK/BLUE RIVER GREEN SUNFISH

	Aroclor - 1242 (mg/kg)				Aroclor - 1260 (mg/kg)				Total PCBs (mg/kg)			
Sample ID	Result	Log Result	RL	Qual	Result	Log Result	RL	Qual	Result	Log Result	RL	Qual
11390	**0.061**	-2.7969	0.017	J	**0.038**	-3.2702	0.0065	J	**0.10**	-2.3126		
11391	**0.033**	-3.4112	0.013	J	**0.062**	-2.7806	0.0051		**0.10**	-2.3539		
11392	**0.064**	-2.7489	0.011		**0.026**	-3.6497	0.0041	J	**0.09**	-2.4079		
11393	**0.05**	-2.9957	0.028	J	**0.082**	-2.5010	0.011	J	**0.13**	-2.0250		
11394	0.0125	-4.3820	0.025	U	0.00475	-5.3496	0.0095	U	0.02	-4.0599		U
11395	0.0115	-4.4654	0.023	U	0.00435	-5.4376	0.0087	U	0.02	-4.1446		U
11396	0.007	-4.9618	0.014	U	0.00265	-5.9332	0.0053	U	0.01	-4.6408		U
11397	0.0085	-4.7677	0.017	U	0.0033	-5.7138	0.0066	U	0.01	-4.4397		U
11460	0.007	-4.9618	0.014	U	0.00265	-5.9332	0.0053	U	0.01	-4.6408		U
11461	0.0065	-5.0360	0.013	U	0.0025	-5.9915	0.005	U	0.01	-4.7105		U
11462	0.0065	-5.0360	0.013	U	0.0025	-5.9915	0.005	U	0.01	-4.7105		U
11463	0.006	-5.1160	0.012	U	0.00225	-6.0968	0.0045	U	0.01	-4.7975		U
11464	0.009	-4.7105	0.018	U	0.00345	-5.6694	0.0069	U	0.01	-4.3860		U
11465	0.0095	-4.6565	0.019	U	0.00365	-5.6130	0.0073	U	0.01	-4.3313		U
11466	0.0085	-4.7677	0.017	U	0.00325	-5.7291	0.0065	U	0.01	-4.4439		U
11467	0.0105	-4.5564	0.021	U	0.00395	-5.5340	0.0079	U	0.01	-4.2371		U
11590	0.008	-4.8283	0.016	U	0.003	-5.8091	0.006	U	0.01	-4.5099		U
11591	0.0075	-4.8929	0.015	U	0.00295	-5.8260	0.0059	U	0.01	-4.5612		U
11592	0.0135	-4.3051	0.027	U	0.005	-5.2983	0.01	U	0.02	-3.9900		U
11593	0.009	-4.7105	0.018	U	0.0035	-5.6550	0.007	U	0.01	-4.3820		U
11594	0.01	-4.6052	0.02	U	0.00375	-5.5860	0.0075	U	0.01	-4.2867		U
11595	0.008	-4.8283	0.016	U	0.0031	-5.7764	0.0062	U	0.01	-4.5008		U
11596	0.009	-4.7105	0.018	U	0.0035	-5.6550	0.007	U	0.01	-4.3820		U
11597	0.0105	-4.5564	0.021	U	0.0041	-5.4968	0.0082	U	0.01	-4.2267		U
11480	0.006	-5.1160	0.012	U	0.00225	-6.0968	0.0045	U	0.01	-4.7975		U
11481	0.0125	-4.3820	0.025	U	0.0048	-5.3391	0.0096	U	0.02	-4.0570		U
11485	0.0075	-4.8929	0.015	U	0.0029	-5.8430	0.0058	U	0.01	-4.5659		U
11486	**0.26**	-1.3471	0.018		**0.12**	-2.1203	0.0067		**0.380**	-0.9676		
11520	**0.061**	-2.7969	0.013		**0.052**	-2.9565	0.0048		**0.113**	-2.1804		
11521	0.0135	-4.3051	0.027	U	0.005	-5.2983	0.010	U	0.02	-3.9900		U
11522	0.013	-4.3428	0.026	U	0.005	-5.2983	0.010	U	0.02	-4.0174		U
11523	**0.067**	-2.7031	0.025	J	**0.07**	-2.6593	0.0096	J	**0.14**	-1.9878		
11450	0.0075	-4.8929	0.015	U	**0.036**	-3.3242	0.0056	J	**0.04**	-3.1350		J
11451	0.008	-4.8283	0.016	U	0.00305	-5.7926	0.0061	U	0.01	-4.5053		U
11452	0.0125	-4.3820	0.025	U	**0.041**	-3.1942	0.0097	J	**0.05**	-2.9281		J
11453	**0.13**	-2.0402	0.022		**0.07**	-2.6593	0.0083	J	**0.20**	-1.6094		
11454	0.0105	-4.5564	0.021	U	**0.055**	-2.9004	0.0079	J	**0.07**	-2.7257		J
11455	0.0115	-4.4654	0.023	U	0.0043	-5.4491	0.0086	U	0.02	-4.1477		U
11456	0.014	-4.2687	0.028	U	**0.076**	-2.5770	0.011	J	**0.09**	-2.4079		J
11457	0.0125	-4.3820	0.025	U	**0.039**	-3.2442	0.0097	J	**0.05**	-2.9662		J
11500	0.0065	-5.0360	0.013	U	0.00255	-5.9717	0.0051	U	0.01	-4.7050		U
11501	0.008	-4.8283	0.016	U	**0.037**	-3.2968	0.0061	J	**0.05**	-3.1011		J
11502	0.009	-4.7105	0.018	U	**0.031**	-3.4738	0.0067	J	**0.04**	-3.2189		J
11503	0.01	-4.6052	0.02	U	0.00385	-4.8665	0.0077	U	0.01	-4.2795		U
11504	0.0115	-4.4654	0.023	U	0.00445	-4.7217	0.0089	U	0.02	-4.1383		U
11505	0.0105	-4.5564	0.021	U	0.0105	-3.8632	0.021	U	0.02	-3.8632		U
11506	0.008	-4.8283	0.016	U	0.008	-4.1352	0.016	U	0.02	-4.1352		U
11507	0.015	-4.1997	0.03	U	0.0155	-3.4738	0.031	U	0.03	-3.4900		U
Number	48				48				48			
Minimum Detection	0.033				0.026				0.04			
Maximum Detection	0.26				0.12				0.38			
Average	0.023	-4.33			0.020	-4.68			0.043	-3.74		
Standard Deviation	0.042	0.849			0.028	1.293			0.065	0.990		
H Statistic		2.172				2.602				2.322		
95% UCL		0.025				0.035				0.054		
RME		0.025				0.035				0.054		

This Table Replaces Table 5.26 in the HHRA
RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected
J = Estimated value below reporting limit or estimated based on data quality review
U = Analyte not detected. Value shown is one-half the reporting limit.
Bold = Analyte detected in sample
Log result is the natural logarithm of the result; used to calculate the 95% UCL of the mean.
95% UCL = 95 percent Upper Confidence Limit. See Section V.C.1.3.2.

TABLE A-3
ADULT RECREATIONAL RECEPTOR HEALTH RISK: INGESTION OF CHANNEL CATFISH

	RME Channel Catfish Tissue Concentration (mg/kg)	Noncarcinogenic IF Average (kg/kg-day)	Noncarcinogenic IF RME (kg/kg-day)	Carcinogenic IF Average (kg/kg-day)	Carcinogenic IF RME (kg/kg-day)	Chronic RfD (mg/kg-day)	Slope Factor $(mg/kg\text{-}day)^{-1}$	Hazard Quotient Average	Hazard Quotient RME	Cancer Risk Average	Cancer Risk RME
PCBs											
Aroclor 1242	8.20E-02	1.11E-05	7.87E-05	1.34E-06	3.15E-05	2.00E-05		4.57E-02	3.23E-01		
Aroclor 1254	9.00E-03	1.11E-05	7.87E-05	1.34E-06	3.15E-05	2.00E-05		5.01E-03	3.54E-02		
Aroclor 1260	1.20E-01	1.11E-05	7.87E-05	1.34E-06	3.15E-05	2.00E-05		6.69E-02	4.72E-01		
Total PCBs	1.76E-01	1.11E-05	7.87E-05	1.34E-06	3.15E-05		2.00E+00			4.71E-07	1.11E-05
							Totals	**0.12**	**0.83**	**5E-07**	**1E-05**

This Table Replaces Table 5.46 in the HHRA
RME channel catfish concentrations from Table A-1
RME = Reasonable Maximum Exposure
IF = Intake Factor (Table 5.28 of HHRA)
RfD = Reference Dose (Table 5.29 of HHRA)
Slope Factors (Table 5.30 of HHRA)
Hazard Quotient = RME * Noncarcinogenic IF/RfD
Cancer Risk = RME * Carcinogenic IF * Slope Factor

TABLE A-4
ADULT RECREATIONAL RECEPTOR HEALTH RISK: INGESTION OF GREEN SUNFISH

	RME Sunfish Tissue Concentration (mg/kg)	Noncarcinogenic IF		Carcinogenic IF		Chronic RfD (mg/kg-d)	Slope Factor $(mg/kg\text{-}d)^{-1}$	Hazard Quotient		Cancer Risk	
		Average (kg/kg-day)	RME (kg/kg-day)	Average (kg/kg-day)	RME (kg/kg-day)			Average	RME	Average	RME
PCBs											
Aroclor 1242	2.50E-02	1.11E-05	7.87E-05	1.34E-06	3.15E-05	2.00E-05		1.39E-02	9.84E-02		
Aroclor 1260	3.50E-02	1.11E-05	7.87E-05	1.34E-06	3.15E-05	2.00E-05		1.95E-02	1.38E-01		
Total PCBs	5.40E-02	1.11E-05	7.87E-05	1.34E-06	3.15E-05		2.00E+00			1.44E-07	3.40E-06
							Totals	**0.03**	**0.2**	**1E-07**	**3E-06**

This Table Replaces Table 5.47 in the HHRA
RME green sunfish concentrations from Table A-1
RME = Reasonable Maximum Exposure
IF = Intake Factor (Table 5.28 of HHRA)
RfD = Reference Dose (Table 5.29 of HHRA)
Slope Factors (Table 5.30 of HHRA)
Hazard Quotient = Adjusted RME * Noncarcinogenic IF/RfD
Cancer Risk = Adjusted RME * Carcinogenic IF * Slope Factor

TABLE A-5
SUMMARY OF HEALTH RISKS FOR ADULT RECREATIONAL RECEPTOR

Receptor/Pathway	HHRA (Sampled 1991 to 1998)				Addendum No. 1 (Sampled Oct./Nov. 2002)			
	Average Exposure		Reasonable Maximum Exposure		Average Exposure		Reasonable Maximum Exposure	
	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk
Adult Recreational Receptor								
Incidental Ingestion of Surface Water	0.0002	8E-10	0.001	1E-08	0.0002	8E-10	0.001	1E-08
Dermal Contact with Surface Water	0.20	1E-06	1.70	2E-05	0.20	1E-06	1.70	2E-05
Ingestion of Channel Catfish	0.74	3E-06	5.22	6E-05	0.12	5E-07	0.83	1E-05
Ingestion of Green Sunfish	0.07	5E-07	0.50	1E-05	0.03	1E-07	0.20	3E-06
Incidental Ingestion of Sediments	0.003	1E-08	0.03	4E-07	0.003	1E-08	0.03	4E-07
Dermal Contact with Sediments	0.008	3E-08	0.29	4E-06	0.008	3E-08	0.29	4E-06
	1.0	**5E-06**	**7.7**	**9E-05**	**0.4**	**2E-06**	**3.1**	**4E-05**

This Table Replaces Table 5.48 in the HHRA

TABLE A-6
CHILD RECREATIONAL RECEPTOR HEALTH RISK: INGESTION OF CHANNEL CATFISH

	Channel Catfish Concentrations RME (mg/kg)	Noncarcinogenic IF Average (kg/kg-day)	Noncarcinogenic IF RME (kg/kg-day)	Carcinogenic IF Average (kg/kg-day)	Carcinogenic IF RME (kg/kg-day)	Chronic RfD (mg/kg-day)	Slope Factor $(mg/kg\text{-}day)^{-1}$	Hazard Quotient Average	Hazard Quotient RME	Cancer Risk Average	Cancer Risk RME
PCBs											
Aroclor 1242	8.20E-02	8.83E-06	6.35E-05	1.06E-06	7.62E-06	2.00E-05		3.62E-02	2.60E-01		
Aroclor 1254	9.00E-03	8.83E-06	6.35E-05	1.06E-06	7.62E-06	2.00E-05		3.97E-03	2.86E-02		
Aroclor 1260	1.20E-01	8.83E-06	6.35E-05	1.06E-06	7.62E-06	2.00E-05		5.30E-02	3.81E-01		
Total PCBs	1.76E-01	8.83E-06	6.35E-05	1.06E-06	7.62E-06		2.00E+00			3.73E-07	2.68E-06
							Totals	**0.09**	**0.67**	**4E-07**	**3E-06**

This Table Replaces Table 5.53 in the HHRA
RME Channel Catfish concentrations from Table A-1
RME = Reasonable Maximum Exposure
IF = Intake Factor (Table 5.28 of HHRA)
RfD = Reference Dose (Table 5.29 of HHRA)
Slope Factors (Table 5.30 of HHRA)
Hazard Quotient = RME * Noncarcinogenic IF/RfD
Cancer Risk = RME * Carcinogenic IF * Slope Factor

TABLE A-7
CHILD RECREATIONAL RECEPTOR HEALTH RISK: INGESTION OF GREEN SUNFISH

	RME Sunfish Tissue Concentration (mg/kg)	Noncarcinogenic IF Average (kg/kg-day)	Noncarcinogenic IF RME (kg/kg-day)	Carcinogenic IF Average (kg/kg-day)	Carcinogenic IF RME (kg/kg-day)	Chronic RfD (mg/kg-d)	Slope Factor $(mg/kg\text{-}d)^{-1}$	Hazard Quotient Average	Hazard Quotient RME	Cancer Risk Average	Cancer Risk RME
PCBs											
Aroclor 1242	2.50E-02	8.83E-06	6.35E-05	1.06E-06	7.62E-06	2.00E-05		1.10E-02	7.93E-02		
Aroclor 1260	3.50E-02	8.83E-06	6.35E-05	1.06E-06	7.62E-06	2.00E-05		1.55E-02	1.11E-01		
Total PCBs	5.40E-02	8.83E-06	6.35E-05	1.06E-06	7.62E-06		2.00E+00			1.14E-07	8.23E-07
							Totals	**0.03**	**0.19**	**1E-07**	**8E-07**

This Table Replaces Table 5.54 in the HHRA
RME Green Sunfish concentrations from Table A-2
RME = Reasonable Maximum Exposure
IF = Intake Factor (Table 5.28 of HHRA)
RfD = Reference Dose (Table 5.29 of HHRA)
Slope Factors (Table 5.30 of HHRA)
Hazard Quotient = Adjusted RME * Noncarcinogenic IF/RfD
Cancer Risk = Adjusted RME * Carcinogenic IF * Slope Factor

TABLE A-8
SUMMARY OF HEALTH RISKS FOR CHILD RECREATIONAL RECEPTOR

Receptor/Pathway	HHRA (Sampled 1991 to 1998)				Addendum No. 1 (Sampled Oct./Nov. 2002)			
	Average Exposure		Reasonable Maximum Exposure		Average Exposure		Reasonable Maximum Exposure	
	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk	Chronic H.I.	Cancer Risk
Child Recreational Receptor								
Incidental Ingestion of Surface Water	0.0003	1E-09	0.001	5E-09	0.0003	1E-09	0.001	5E-09
Dermal Contact with Surface Water	0.35	2E-06	2.69	1E-05	0.35	2E-06	2.69	1E-05
Ingestion of Channel Catfish	0.59	2E-06	4.21	2E-05	0.09	4E-07	0.67	3E-06
Ingestion of Green Sunfish	0.06	4E-07	0.40	3E-06	0.03	1E-07	0.19	8E-07
Incidental Ingestion of Sediments	0.01	4E-08	0.08	4E-07	0.01	4E-08	0.08	4E-07
Dermal Contact with Sediments	0.012	5E-08	0.50	2E-06	0.012	5E-08	0.50	2E-06
	1.0	**4E-06**	**7.9**	**4E-05**	**0.5**	**3E-06**	**4.1**	**2E-05**

This Table Replaces Table 5.55 in the HHRA

TABLE A-9
SUMMARY OF HEALTH RISKS

Receptor/Pathway	Average Exposure		Reasonable Maximum Exposure		
	Chronic H.I.	Cancer Risk	Chronic H.I.		Cancer Risk
			original		
Excavation Worker					
Incidental Ingestion of Deep Soil	0.003	5E-09	0.01		4E-08
Dermal Contact with Deep Soil	0.006	9E-09	0.09		3E-07
	0.01	**1E-08**	**0.10**		**3E-07**
Utility Worker					
Incidental Ingestion of Shallow Soil	0.01	8E-10	0.04		6E-09
Dermal Contact with Shallow Soil	0.018	1E-09	0.29		5E-08
	0.03	**2E-09**	**0.33**		**6E-08**
Construction Worker					
Incidental Ingestion of Surface Water	0.001	7E-11	0.002		3E-10
Dermal Contact with Surface Water	1.91	1E-07	3.16		4E-07
Incidental Ingestion of Sediment	1.88	1E-07	7.5		1E-06
Dermal Contact with Sediment	3.32	2E-07	55.0		8E-06
	7.1	**4E-07**	**66**		**9E-06**
Adult Recreational Receptor					
Incidental Ingestion of Surface Water	0.0002	8E-10	0.001		1E-08
Dermal Contact with Surface Water	0.2	1E-06	1.70		2E-05
Ingestion of Channel Catfish*	0.12	5E-07	0.83	5.22	1E-05
Ingestion of Green Sunfish*	0.03	1E-07	0.20	0.5	3E-06
Incidental Ingestion of Sediment	0.003	1E-08	0.03		4E-07
Dermal Contact with Sediment	0.008	3E-08	0.29		4E-06
	0.4	**2E-06**	**3.1**	7.7	**4E-05**
Child Recreational Receptor					
Incidental Ingestion of Surface Water	0.0003	1E-09	0.001		5E-09
Dermal Contact with Surface Water	0.35	2E-06	2.69		1E-05
Ingestion of Channel Catfish**	0.09	4E-07	0.67	4.21	3E-06
Ingestion of Green Sunfish**	0.03	1E-07	0.19	0.4	8E-07
Incidental Ingestion of Sediment	0.01	4E-08	0.08		4E-07
Dermal Contact with Sediment	0.012	5E-08	0.5		2E-06
	0.5	**3E-06**	**4.1**	7.9	**2E-05**

used 002 recovery data plus ½ MDL plug in 1668 data to get lower H.I

This Table Replaces Table 5.56 in the HHRA
Risk values are from Tables 5.31 through 5.55 of the HHRA except as noted below by * & **.
*Risk values are from Tables A-3 & A-4 for Adult Recreational Receptor
**Risk values are from Tables A-6 & A-7 for Child Recreational Receptor
Discrepancies in numbers are due to rounding.

Fish consumption rate in RA assumes 8 g/day in adult
4 g/day in child