APPENDIX A

STACK DATA

Appendix A-1a
Unit 1 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Dioxin/Furans						
2,3,7,8-TCDD	g/s	1.88E-11	5.39E-10	9.29E-12	2.61E-10	28/67
1,2,3,7,8-PeCDD	g/s	5.03E-11	2.03E-09	2.41E-11	7.84E-10	43/67
1,2,3,4,7,8-HxCDD	g/s	4.21E-11	1.21E-09	2.34E-11	2.95E-10	41/67
1,2,3,6,7,8-HxCDD	g/s	5.37E-11	1.97E-09	5.69E-11	8.72E-10	57/67
1,2,3,7,8,9-HxCDD	g/s	3.80E-11	1.97E-09	3.01E-11	8.72E-10	52/67
1,2,3,4,6,7,8-HpCDD	g/s	3.36E-10	2.49E-08	2.61E-09	2.61E-09	66/67
OCDD	g/s	5.07E-10	1.41E-07	1.52E-09	6.10E-09	65/67
2,3,7,8-TCDF	g/s	3.74E-11	2.90E-09	3.53E-11	2.69E-10	59/67
1,2,3,7,8-PeCDF	g/s	6.20E-11	7.28E-09	3.27E-11	4.36E-10	56/67
2,3,4,7,8-PeCDF	g/s	6.54E-11	6.12E-09	4.96E-11	4.36E-10	58/67
1,2,3,4,7,8-HxCDF	g/s	4.56E-11	7.89E-09	3.37E-11	8.72E-10	63/67
1,2,3,6,7,8-HxCDF	g/s	3.58E-11	9.19E-09	3.95E-11	6.10E-10	61/67
2,3,4,6,7,8-HxCDF	g/s	3.25E-11	7.10E-09	4.35E-11	8.72E-10	61/67
1,2,3,7,8,9-HxCDF	g/s	2.60E-11	2.90E-09	9.85E-12	8.72E-10	35/67
1,2,3,4,6,7,8-HpCDF	g/s	7.94E-11	2.24E-08	1.72E-10	7.87E-09	62/67
1,2,3,4,7,8,9-HpCDF	g/s	5.40E-11	5.92E-09	1.89E-11	1.74E-09	46/67
OCDF	g/s	7.25E-11	5.37E-08	8.06E-11	5.23E-09	53/67
PAHs						
Acenaphthene	g/s	3.44E-08	7.85E-06	5.21E-06	9.53E-06	17/23
Acenaphthylene	g/s	2.64E-08	7.30E-07	1.39E-06	5.25E-06	14/23
Anthracene	g/s	2.87E-08	4.05E-07	1.70E-06	5.52E-06	14/23
Benzo(a)anthracene	g/s	5.02E-09	2.01E-06	1.47E-06	4.36E-06	14/23
Benzo(a)pyrene	g/s	1.00E-08	4.30E-06	8.95E-09	4.54E-06	13/23
Benzo(b)fluoranthene	g/s	2.13E-08	6.11E-06	1.44E-06	4.36E-05	15/23
Benzo(g,h,i)perylene	g/s	6.88E-08	5.64E-06	1.35E-06	5.07E-06	14/23
Benzo(k)fluoranthene	g/s	4.10E-09	2.48E-06	1.61E-06	4.71E-06	14/23
Chrysene	g/s	1.38E-08	2.62E-06	1.65E-06	4.71E-06	16/23
Dibenzo(a,h)anthracene	g/s	2.95E-08	1.12E-06	2.29E-08	5.08E-06	2/23
Fluoranthene	g/s	1.54E-07	3.72E-06	1.30E-06	4.80E-06	15/23
Fluorene	g/s	1.36E-07	4.94E-06	4.36E-06	8.19E-06	17/23
Indeno(1,2,3-cd)pyrene	g/s	2.12E-08	4.42E-06	1.25E-06	4.98E-06	14/23
Methylnaphthalene, 2-	g/s	4.95E-07	9.17E-06	4.74E-06	8.92E-06	17/23
Naphthalene	g/s	2.90E-06	8.59E-05	--	--	23/23
Phenanthrene	g/s	5.85E-07	6.00E-06	3.11E-06	5.52E-06	17/23
Pyrene	g/s	1.01E-07	4.19E-06	1.56E-06	4.38E-06	14/23

Appendix A-1a
Unit 1 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Total PCBs	g/s	1.67E-07	1.09E-04	--	--	20/20
Acid Gasses						
Hydrogen Chloride	g/s	1.58E-01	1.20E+00	--	--	39/39
Hydrogen Fluoride (as Total Fluoride)	g/s	2.90E-03	9.88E-03	2.52E-03	5.08E-02	9/36
Sulfuric Acid	g/s	2.81E-03	1.13E-01	3.90E-04	7.26E-03	23/35
Metals						
Antimony	g/s	1.15E-05	1.20E-05	2.08E-07	4.03E-05	2/18
Arsenic	g/s	1.06E-05	2.07E-04	4.80E-06	2.67E-05	23/42
Beryllium	g/s	--	--	2.08E-08	4.89E-06	0/69
Cadmium	g/s	5.10E-06	2.77E-04	4.43E-06	5.10E-06	36/42
Chromium total	g/s	1.31E-06	3.64E-04	4.80E-06	1.36E-05	55/63
Chromium +6	g/s	3.28E-06	9.46E-06	5.07E-05	5.17E-05	6/9
Cobalt	g/s	5.53E-06	1.92E-05	6.53E-07	5.00E-06	2/6
Copper	g/s	7.09E-07	7.64E-05	4.99E-06	5.05E-06	12/15
Lead	g/s	4.08E-05	3.97E-03	8.82E-06	9.06E-06	39/42
Manganese	g/s	5.03E-05	1.46E-04	--	--	6/6
Mercury as HgCl2	g/s	1.17E-04	2.63E-03	7.46E-05	7.46E-05	68/69
Nickel	g/s	1.17E-05	2.51E-04	1.33E-05	1.36E-05	39/42
Selenium	g/s	2.95E-06	1.84E-05	2.08E-07	4.03E-05	3/15
Zinc	g/s	3.87E-04	3.00E-03	--	--	6/6
Aldehyde Ketones						
Formaldehyde	g/s	3.96E-04	4.93E-04	--	--	3/3

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	July/August 1995			December 1995			February 1996			April/May 1996		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Constituent	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s	Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD				3.34E-11	4.92E-11	2.98E-11	2.61E-10 <			1.77E-10 <	8.83E-11 <	1.72E-10 <
1,2,3,7,8-PeCDD				8.09E-11	2.46E-10	1.90E-10	7.84E-10 <			2.66E-10 <	1.77E-10 <	1.72E-10 <
1,2,3,4,7,8-HxCDD				8.71E-11	3.05E-10	2.57E-10	1.74E-10 <			2.66E-10 <	1.77E-10 <	2.57E-10 <
1,2,3,6,7,8-HxCDD				1.75E-10	4.55E-10	3.35E-10	8.72E-10 <			2.66E-10 <	1.77E-10 <	8.58E-11
1,2,3,7,8,9-HxCDD				2.13E-10	6.77E-10	4.73E-10	8.72E-10 <			1.77E-10	8.83E-11 <	8.58E-11 <
1,2,3,4,6,7,8-HpCDD				1.61E-09	4.29E-09	2.86E-09	2.61E-09 <			1.06E-09	6.17E-10	6.02E-10
OCDD				5.80E-09	1.06E-08	7.28E-09	6.10E-09 <			1.60E-09	7.07E-10	1.03E-09
2,3,7,8-TCDF				1.70E-10	1.85E-10	1.49E-10	2.61E-10 <			1.77E-10	3.53E-11 <	8.58E-11 <
1,2,3,7,8-PeCDF				3.42E-10	4.91E-10	3.24E-10	4.36E-10 <			1.77E-10 <	8.83E-11 <	1.72E-10 <
2,3,4,7,8-PeCDF				3.66E-10	7.02E-10	4.88E-10	4.36E-10 <			1.77E-10 <	8.83E-11 <	1.72E-10 <
1,2,3,4,7,8-HxCDF				7.85E-10	2.28E-09	1.53E-09	8.72E-10 <			3.55E-10	1.77E-10	1.72E-10
1,2,3,6,7,8-HxCDF				3.96E-10	1.01E-09	6.91E-10	6.10E-10 <			1.77E-10	8.83E-11 <	1.72E-10 <
2,3,4,6,7,8-HxCDF				4.04E-10	1.50E-09	1.30E-09	8.72E-10 <			2.66E-10 <	1.77E-10 <	1.72E-10
1,2,3,7,8,9-HxCDF				5.44E-11	1.00E-10	5.97E-11	8.72E-10 <			2.66E-10 <	1.77E-10 <	1.72E-10 <
1,2,3,4,6,7,8-HpCDF				1.25E-09	3.84E-09	2.54E-09	8.72E-10 <			3.55E-10	1.77E-10	1.72E-10 <
1,2,3,4,7,8,9-HpCDF				2.19E-10	5.40E-10	4.02E-10	1.74E-09 <			3.55E-10 <	2.65E-10 <	2.57E-10 <
OCDF				1.33E-09	3.55E-09	2.38E-09	5.23E-09 <			4.42E-10 <	2.65E-10 <	3.43E-10 <
PAHs												
Acenaphthene	9.26E-06 <	9.53E-06 <	9.37E-06 <	5.21E-06 <	7.38E-06 <	7.36E-06 <						
Acenaphthylene	5.03E-06 <	5.25E-06 <	5.10E-06 <	3.03E-06 <	4.33E-06 <	4.28E-06 <						
Anthracene	5.38E-06 <	5.52E-06 <	5.19E-06 <	3.27E-06 <	4.72E-06 <	4.47E-06 <						
Benzo(a)anthracene	4.23E-06 <	4.36E-06 <	4.28E-06 <	2.18E-06	2.56E-06 <	2.59E-06 <						
Benzo(a)pyrene	4.41E-06 <	4.54E-06 <	4.46E-06 <	2.57E-06 <	3.35E-06 <	3.38E-06 <						
Benzo(b)fluoranthene	4.15E-05 <	4.36E-05 <	4.28E-05 <	2.57E-06 <	3.35E-06 <	3.28E-06 <						
Benzo(g,h,i)perylene	4.59E-06 <	4.71E-06 <	4.64E-06 <	3.81E-06 <	5.02E-06 <	5.07E-06 <						
Benzo(k)fluoranthene	4.50E-06 <	4.71E-06 <	4.64E-06 <	2.64E-06 <	3.44E-06 <	3.38E-06 <						
Chrysene	4.59E-06 <	4.71E-06 <	4.64E-06 <	1.63E-06	2.56E-06	2.68E-06 <						
Dibenzo(a,h)anthracene	4.85E-06 <	5.08E-06 <	5.00E-06 <	3.73E-06 <	4.92E-06 <	4.87E-06 <						
Fluoranthene	4.67E-06 <	4.80E-06 <	4.55E-06 <	2.10E-06 <	9.84E-07	2.88E-06 <						
Fluorene	7.94E-06 <	8.19E-06 <	8.01E-06 <	4.36E-06 <	6.20E-06 <	6.16E-06 <						
Indeno(1,2,3-cd)pyrene	4.76E-06 <	4.98E-06 <	4.83E-06 <	3.03E-06 <	3.94E-06 <	3.98E-06 <						
2-Methylnaphthalene	8.82E-06 <	8.92E-06 <	8.19E-06 <	4.74E-06 <	6.89E-06 <	6.86E-06 <						
Naphthathalene	2.33E-05	2.99E-05	2.72E-05	9.88E-06	5.21E-06	7.46E-06						
Phenanthrene	5.38E-06 <	5.52E-06 <	5.28E-06 <	3.11E-06 <	4.43E-06 <	4.28E-06 <						
Pyrene	4.06E-06 <	4.18E-06 <	4.18E-06 <	3.27E-06 <	4.33E-06 <	4.38E-06 <						
Total PCBs	1.52E-05	1.85E-05	1.60E-05	9.00E-05	1.09E-04	8.04E-05						
Acid Gasses												
Hydrogen Chloride												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony	1.33E-05 <	1.35E-05 <	1.36E-05 <	3.73E-05 <	3.73E-05 <	4.03E-05 <						
Arsenic	1.77E-05 <	1.79E-05 <	1.81E-05 <									
Beryllium	4.43E-06 <	4.56E-06 <	4.53E-06 <	3.73E-06 <	3.73E-06 <	4.03E-06 <	4.73E-06 <	4.69E-06 <	4.89E-06 <	4.73E-06 <	4.69E-06 <	4.79E-06 <
Cadmium	4.43E-06 <	4.49E-06 <	4.53E-06 <									
Chromium (total)	1.33E-05 <	1.35E-05 <	1.36E-05 <	2.12E-05	1.34E-05	1.50E-05						
Chromium (total) extra runs 8/2012												
Hexavalent Chromium	3.78E-06	3.53E-06	3.28E-06									
Cobalt	4.43E-06 <	6.53E-07 <	4.53E-06 <									
Copper	1.15E-05	9.75E-06	1.07E-05	7.64E-05	3.72E-05	3.01E-05						
Lead	8.82E-06 <	8.96E-06 <	9.06E-06 <									
Manganese												
Mercury	2.02E-04	1.84E-04	1.39E-04	2.18E-03	1.90E-03	2.63E-03	4.81E-04	9.26E-04	5.86E-04	1.80E-03	1.04E-03	1.20E-03
Nickel	1.33E-05 <	1.35E-05 <	1.36E-05 <									
Selenium	1.77E-05 <	1.79E-05 <	1.81E-05 <	3.75E-05 <	3.73E-05 <	4.03E-05 <						
Zinc	3.87E-04	4.89E-04	4.26E-04									
Formaldehyde												

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	August 1996			May 1997				November 1997			February 1998		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 4 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans													
2,3,7,8-TCDD	8.82E-11 <	3.58E-11 <	5.19E-11 <	3.08E-11 <	2.77E-11 <	4.86E-11 <	6.33E-11 <	7.46E-11 <	7.96E-11 <	2.75E-11 <			
1,2,3,7,8-PeCDD	8.82E-11	5.37E-11 <	8.66E-11 <	9.67E-11	5.03E-11	2.08E-10	1.13E-10	5.29E-10	5.08E-10	1.32E-10			
1,2,3,4,7,8-HxCDD	8.82E-11	4.47E-11 <	8.66E-11	2.11E-10	4.21E-11	5.19E-10	1.49E-10	9.95E-10	7.65E-10	2.04E-10			
1,2,3,6,7,8-HxCDD	1.77E-10	5.37E-11	1.73E-10	5.01E-10	9.14E-11	1.35E-09	3.10E-10	1.33E-09	1.10E-09	3.05E-10			
1,2,3,7,8,9-HxCDD	1.77E-10	5.37E-11	2.60E-10	2.90E-10	4.32E-11	8.73E-10	2.11E-10	1.08E-09	9.95E-10	2.14E-10			
1,2,3,4,6,7,8-HpCDD	8.82E-10	4.47E-10	1.13E-09	5.01E-09	4.32E-10	1.66E-08	2.61E-09	2.49E-08	8.44E-09	4.27E-09			
OCDD	3.62E-09	6.26E-10	1.73E-09	1.05E-08	1.34E-09	3.64E-08	6.21E-09	1.41E-07	2.39E-08	2.14E-08			
2,3,7,8-TCDF	8.82E-11	2.69E-10 <	8.66E-11	9.67E-11	9.14E-11	1.97E-10	1.61E-10	2.81E-10	2.09E-10	8.97E-11			
1,2,3,7,8-PeCDF	1.77E-10 <	3.58E-11 <	8.66E-11	2.20E-10	1.23E-10	5.92E-10	2.73E-10	9.95E-10	5.17E-10	2.75E-10			
2,3,4,7,8-PeCDF	1.77E-10	5.37E-11 <	1.73E-10	3.43E-10	1.44E-10	9.56E-10	3.72E-10	1.16E-09	6.37E-10	2.95E-10			
1,2,3,4,7,8-HxCDF	2.65E-10	8.05E-11 <	4.33E-10	5.89E-10	1.85E-10	1.56E-09	4.84E-10	3.32E-09	1.69E-09	7.01E-10			
1,2,3,6,7,8-HxCDF	1.77E-10	3.58E-11	1.73E-10	5.54E-10	1.34E-10	1.56E-09	3.97E-10	2.82E-09	1.79E-09	6.39E-10			
2,3,4,6,7,8-HxCDF	2.65E-10	8.95E-11	3.46E-10	9.67E-10	1.23E-10	2.91E-09	5.71E-10	2.98E-09	1.79E-09	6.30E-10			
1,2,3,7,8,9-HxCDF	8.82E-11	3.58E-11 <	6.06E-11 <	6.42E-10	4.32E-11	2.08E-09	3.60E-10	1.24E-09	5.57E-10	2.75E-10			
1,2,3,4,6,7,8-HpCDF	3.53E-10	8.95E-11	5.19E-10	2.37E-09	3.19E-10	7.69E-09	1.49E-09	2.24E-08	9.46E-09	4.07E-09			
1,2,3,4,7,8,9-HpCDF	8.82E-11	3.58E-11 <	1.73E-10	1.41E-09	6.99E-11	5.92E-09	8.69E-10	4.71E-09	1.99E-09	8.97E-10			
OCDF	5.29E-10	8.95E-11 <	5.19E-10	2.20E-09	2.88E-09	1.04E-08	1.74E-09	5.37E-08	5.97E-09	7.63E-09			
PAHs													
Acenaphthene	7.85E-06	4.21E-06	4.16E-06										
Acenaphthylene	1.94E-06 <	1.44E-06 <	1.39E-06 <										
Anthracene	2.38E-06 <	1.70E-06 <	1.73E-06 <										
Benzo(a)anthracene	2.12E-06 <	1.61E-06 <	1.47E-06 <										
Benzo(a)pyrene	2.12E-06 <	1.61E-06 <	1.65E-06 <										
Benzo(b)fluoranthene	1.15E-06	1.44E-06 <	1.47E-06 <										
Benzo(g,h,i)perylene	1.76E-06 <	1.35E-06 <	1.39E-06 <										
Benzo(k)fluoranthene	2.03E-06 <	1.61E-06 <	1.65E-06 <										
Chrysene	2.29E-06 <	1.70E-06 <	1.65E-06 <										
Dibenzo(a,h)anthracene	2.12E-06 <	1.61E-06 <	1.73E-06 <										
Fluoranthene	1.85E-06 <	1.35E-06 <	1.30E-06 <										
Fluorene	4.94E-06	2.51E-06	3.20E-06										
Indeno(1,2,3-cd)pyrene	1.59E-06 <	1.25E-06 <	1.30E-06 <										
2-Methylnaphthalene	9.17E-06	4.03E-06	5.10E-06										
Naphthathalene	7.72E-05	7.32E-05	8.59E-05										
Phenanthrene	6.00E-06	4.30E-06	3.64E-06										
Pyrene	2.29E-06 <	1.70E-06 <	1.56E-06 <										
Total PCBs	8.42E-05	8.58E-05	8.38E-05	1.21E-06	1.33E-06		1.17E-06				2.62E-05	1.23E-05	1.27E-05
Acid Gasses													
Hydrogen Chloride													
Hydrogen Fluoride (as Total Fluoride)													
Sulfuric Acid													
Metals													
Antimony	1.15E-05	1.72E-05 <	1.20E-05	2.05E-05 <	2.08E-07 <		2.05E-05 <				7.11E-06 <	7.14E-06 <	6.96E-06 <
Arsenic													
Beryllium	4.26E-06 <	4.30E-06 <	4.26E-06 <	2.05E-06 <	2.08E-08 <		2.05E-06 <	1.83E-06 <	1.97E-06 <	1.81E-06 <			
Cadmium													
Chromium (total)	2.56E-05	2.41E-05	2.56E-05	3.84E-05	1.31E-06		2.26E-05				5.33E-06 <	5.36E-06 <	5.22E-06 <
Chromium (total) extra runs 8/2012													
Hexavalent Chromium													
Cobalt													
Copper	1.59E-05	1.80E-05	7.07E-05	6.41E-05	7.09E-07		3.77E-05						
Lead													
Manganese													
Mercury	2.48E-04	2.39E-04	2.37E-04	4.45E-04	4.41E-04		3.57E-04	2.00E-04	2.14E-04	1.55E-04			
Nickel													
Selenium	8.29E-06	2.95E-06	1.84E-05	2.05E-05 <	2.08E-07 <		2.05E-05 <						
Zinc													
Formaldehyde													

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	November 1998			November 1999			November 2000			November 2001		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	1.20E-10	1.24E-10	1.12E-10	9.18E-11 <	3.04E-11 <	3.73E-11 <	5.39E-10	3.35E-11	2.68E-10	2.53E-11 <	3.09E-11 <	3.39E-11 <
1,2,3,7,8-PeCDD	1.91E-10	2.12E-10	1.25E-10	2.89E-11 <	2.41E-11 <	2.41E-11 <	2.03E-09	2.39E-10	4.35E-10	1.05E-10	4.97E-11 <	2.62E-11 <
1,2,3,4,7,8-HxCDD	2.16E-10	3.87E-10	1.25E-10	2.89E-11 <	3.67E-11 <	3.37E-11 <	1.21E-09	2.75E-10	1.12E-10	1.12E-10 <	2.95E-10 <	8.01E-11 <
1,2,3,6,7,8-HxCDD	5.60E-10	7.34E-10	4.12E-10	7.40E-11 <	9.74E-11	6.86E-11	1.97E-09	4.08E-10	1.97E-10	3.63E-10	3.36E-10	2.71E-10
1,2,3,7,8,9-HxCDD	4.72E-10	8.87E-10	2.87E-10	3.90E-11	3.80E-11	3.01E-11 <	1.97E-09	3.17E-10	1.12E-10	2.24E-10	1.62E-10	1.58E-10
1,2,3,4,6,7,8-HpCDD	2.54E-09	6.10E-09	2.12E-09	5.06E-10	7.40E-10	4.91E-10	6.62E-09	2.61E-09	3.36E-10	3.87E-09	2.42E-09	2.28E-09
OCDD	2.16E-09	1.11E-08	2.24E-09	7.70E-10	1.15E-09	6.99E-10	8.12E-09	4.07E-09	5.07E-10	1.09E-08	4.90E-09	4.14E-09
2,3,7,8-TCDF	2.92E-10	3.50E-10	2.62E-10	9.81E-11	5.31E-11	5.10E-11 <	2.90E-09	6.93E-10	1.72E-09	2.43E-10	3.34E-10	1.26E-10
1,2,3,7,8-PeCDF	3.31E-10	4.49E-10	2.12E-10	6.54E-11	2.78E-10 <	3.27E-11 <	7.28E-09	1.71E-09	2.78E-09	4.17E-10	5.30E-10	2.08E-10
2,3,4,7,8-PeCDF	5.74E-10	7.34E-10	3.49E-10	6.54E-11	5.01E-11 <	4.96E-11 <	6.12E-09	1.47E-09	1.81E-09	5.08E-10	5.74E-10	2.96E-10
1,2,3,4,7,8-HxCDF	9.53E-10	2.37E-09	5.60E-10	6.04E-11	4.56E-11	3.37E-11 <	7.89E-09	1.92E-09	1.14E-09	4.53E-10	4.75E-10	2.50E-10
1,2,3,6,7,8-HxCDF	4.32E-10	9.87E-10	2.24E-10	5.66E-11	4.94E-11	3.95E-11 <	9.19E-09	2.23E-09	1.25E-09	5.33E-10	5.91E-10	2.91E-10
2,3,4,6,7,8-HxCDF	4.58E-10	1.19E-09	2.62E-10	4.53E-11	4.35E-11 <	3.25E-11	5.57E-09	1.41E-09	3.83E-10	5.31E-10	4.30E-10	2.56E-10
1,2,3,7,8,9-HxCDF	4.81E-11	9.25E-11	2.62E-11 <	1.38E-11 <	1.52E-11 <	1.81E-11 <	1.89E-09	5.51E-10	9.97E-11	1.89E-10	1.24E-10	7.85E-11
1,2,3,4,6,7,8-HpCDF	1.27E-09 <	7.87E-09 <	8.72E-10 <	1.13E-10	9.74E-11	7.94E-11	1.71E-08	4.11E-09	6.80E-10	1.89E-09	1.38E-09	9.27E-10
1,2,3,4,7,8,9-HpCDF	1.65E-10	9.11E-10	1.13E-10	5.66E-11 <	7.47E-11 <	6.98E-11 <	1.89E-09	7.25E-10	6.59E-11 <	4.51E-10	1.82E-10	2.13E-10
OCDF	4.72E-10	2.99E-09	3.74E-10	1.41E-10 <	1.72E-10 <	1.53E-10 <	2.30E-09	1.07E-09	2.19E-10	1.94E-09	6.42E-10	7.32E-10
PAHs												
Acenaphthene												
Acenaphthylene												
Anthracene												
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene												
Chrysene												
Dibenzo(a,h)anthracene												
Fluoranthene												
Fluorene												
Indeno(1,2,3-cd)pyrene												
2-Methylnaphthalene												
Naphthathalene												
Phenanthrene												
Pyrene												
Total PCBs												
Acid Gasses												
Hydrogen Chloride										3.90E-01	6.60E-01	4.90E-01
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony												
Arsenic										1.32E-05 <	1.34E-05 <	1.31E-05 <
Beryllium	2.78E-06 <	2.77E-06 <	2.77E-06 <	2.46E-06 <	2.49E-06 <	2.46E-06 <	2.29E-06 <	2.28E-06 <	2.27E-06 <	1.32E-06 <	1.34E-06 <	1.31E-06 <
Cadmium										8.18E-06	9.12E-06	7.95E-06
Chromium (total)				5.91E-05	2.81E-05	2.17E-05	1.95E-05	8.06E-05	9.85E-05	5.14E-05	2.70E-05	4.89E-05
Chromium (total) extra runs 8/2012												
Hexavalent Chromium												
Cobalt												
Copper												
Lead										7.04E-05	2.38E-04	5.37E-05
Manganese				1.04E-04	5.15E-05	7.52E-05						
Mercury	8.82E-04	8.82E-04	7.56E-04	6.33E-04	6.16E-04	6.40E-04	1.93E-04	3.65E-04	7.46E-05 <	2.43E-04	2.41E-04	2.90E-04
Nickel										9.75E-05	5.36E-05	6.56E-05
Selenium												
Zinc												
Formaldehyde				4.93E-04	3.96E-04	4.07E-04						

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	October 2002			October 2003			October 2004			November 2005		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	1.88E-11	1.53E-11 <	2.85E-11	9.29E-12 <	1.03E-10	1.85E-11 <	2.59E-11 <	2.04E-11 <	1.85E-11 <	5.01E-11 <	6.30E-11 <	7.64E-11 <
1,2,3,7,8-PeCDD	6.52E-11 <	6.47E-11 <	1.07E-10	8.33E-11 <	6.83E-10	5.70E-11 <	6.40E-11 <	6.54E-11	3.60E-11 <	1.17E-10 <	1.72E-10	1.74E-10
1,2,3,4,7,8-HxCDD	6.52E-11 <	6.47E-11 <	1.11E-10	5.95E-11 <	8.59E-10	4.17E-11 <	7.97E-11 <	7.01E-11	4.70E-11 <	1.58E-10 <	1.10E-10 <	2.46E-10
1,2,3,6,7,8-HxCDD	1.15E-10	1.01E-10	2.50E-10	1.06E-10	1.28E-09	6.22E-11 <	3.34E-10	2.62E-10	2.76E-10	3.46E-10 <	3.38E-10	4.84E-10
1,2,3,7,8,9-HxCDD	7.01E-11	6.47E-11 <	1.77E-10	6.35E-11 <	1.32E-09	3.94E-11 <	1.78E-10	1.11E-10	9.83E-11	2.05E-10 <	2.04E-10 <	2.88E-10 <
1,2,3,4,6,7,8-HpCDD	6.50E-10	6.25E-10	1.65E-09	9.37E-10	1.18E-08	4.21E-10	2.38E-09	1.42E-09	1.33E-09	3.34E-09	2.47E-09	3.97E-09
OCDD	8.56E-10	7.78E-10	2.46E-09	1.33E-09	2.09E-08	7.97E-10	4.43E-09	2.23E-09	1.60E-09	5.45E-09	3.38E-09	6.31E-09
2,3,7,8-TCDF	8.86E-11	6.31E-11	1.42E-10	3.88E-11 <	1.29E-09	3.74E-11	8.39E-11	1.28E-10	6.87E-11	1.99E-10	2.23E-10	2.26E-10
1,2,3,7,8-PeCDF	1.55E-10	1.09E-10	3.38E-10	7.83E-11	3.31E-09	6.22E-11 <	1.45E-10	1.82E-10	8.78E-11	3.80E-10	4.25E-10	4.72E-10
2,3,4,7,8-PeCDF	2.02E-10	1.53E-10	3.97E-10	8.15E-11	3.90E-09	6.22E-11 <	1.98E-10	2.16E-10	1.37E-10	4.10E-10	4.27E-10	5.04E-10
1,2,3,4,7,8-HxCDF	1.30E-10	9.39E-11	4.27E-10	9.39E-11	4.81E-09	6.47E-11	1.93E-10	1.96E-10	1.17E-10	5.41E-10	4.42E-10	6.66E-10
1,2,3,6,7,8-HxCDF	1.37E-10	9.13E-11	4.68E-10	8.72E-11	5.84E-09	6.22E-11 <	2.06E-10	2.11E-10	1.18E-10	5.55E-10	4.46E-10	6.78E-10
2,3,4,6,7,8-HxCDF	1.49E-10	1.02E-10	4.50E-10	1.10E-10	7.10E-09	6.24E-11	2.57E-10	1.90E-10	1.35E-10	5.63E-10	4.13E-10	6.60E-10
1,2,3,7,8,9-HxCDF	6.52E-11 <	6.47E-11 <	9.43E-11	1.11E-11 <	2.90E-09	1.12E-11 <	8.53E-11	2.75E-11 <	2.43E-11 <	1.49E-10 <	1.36E-10 <	1.87E-10 <
1,2,3,4,6,7,8-HpCDF	2.87E-10	2.09E-10	1.17E-09	2.89E-10	2.09E-08	1.67E-10	5.91E-10	4.54E-10	2.78E-10	1.73E-09	1.09E-09	2.14E-09
1,2,3,4,7,8,9-HpCDF	6.52E-11 <	6.47E-11 <	1.18E-10	2.65E-11 <	3.57E-09	1.89E-11 <	1.51E-10	7.67E-11	2.73E-11 <	3.96E-10	1.59E-10 <	4.28E-10
OCDF	1.33E-10	1.29E-10 <	3.13E-10	2.09E-10	1.04E-08	1.57E-10	5.73E-10	1.78E-10	1.37E-10	1.20E-09	5.99E-10	1.50E-09
PAHs												
Acenaphthene	1.32E-07	1.83E-07	1.36E-07									
Acenaphthylene	4.85E-08	3.74E-08	3.78E-08									
Anthracene	1.21E-07	1.55E-07	1.55E-07									
Benzo(a)anthracene	2.88E-08	3.68E-08	2.22E-08									
Benzo(a)pyrene	1.62E-07	3.00E-07	9.14E-08									
Benzo(b)fluoranthene	1.16E-07	1.85E-07	6.81E-08									
Benzo(g,h,i)perylene	1.97E-06	5.34E-06	9.50E-07									
Benzo(k)fluoranthene	2.86E-08	4.06E-08	1.68E-08									
Chrysene	6.40E-08	8.88E-08	4.00E-08									
Dibenzo(a,h)anthracene	5.21E-08 <	5.17E-08 <	5.16E-08 <									
Fluoranthene	8.99E-07	9.90E-07	5.94E-07									
Fluorene	6.19E-07	6.60E-07	5.83E-07									
Indeno(1,2,3-cd)pyrene	2.99E-07	8.23E-07	1.57E-07									
2-Methylnaphthalene	1.53E-06	1.58E-06	1.24E-06									
Naphthathalene	1.72E-05	1.81E-05	1.54E-05									
Phenanthrene	1.81E-06	1.84E-06	1.67E-06									
Pyrene	2.12E-06	2.64E-06	1.30E-06									
Total PCBs												
Acid Gasses												
Hydrogen Chloride	8.00E-01	7.00E-01	7.20E-01	5.80E-01	5.26E-01	5.73E-01	2.49E-01	1.58E-01	2.78E-01	3.07E-01	3.02E-01	3.11E-01
Hydrogen Fluoride (as Total Fluoride)	5.29E-03	2.52E-03 <	2.90E-03	1.99E-02 <	1.99E-02 <	1.95E-02 <	1.92E-02 <	1.90E-02 <	1.95E-02 <	5.10E-03 <	5.14E-03 <	5.08E-03 <
Sulfuric Acid	9.55E-02		6.45E-02	1.13E-01	8.32E-02	7.69E-02	2.81E-03	2.96E-03	3.00E-03	1.81E-02	2.60E-02	2.63E-02
Metals												
Antimony												
Arsenic	1.30E-05 <	1.27E-05 <	1.27E-05 <	1.26E-05 <	2.67E-05	1.27E-05 <	2.67E-05	2.13E-05	1.88E-05	2.18E-05	1.12E-04	1.51E-05
Beryllium	2.58E-06 <	2.55E-06 <	2.55E-06 <	1.26E-06 <	1.25E-06 <	1.27E-06 <	1.26E-06 <	1.27E-06 <	1.25E-06 <	1.29E-06 <	1.26E-06 <	1.26E-06 <
Cadmium	1.27E-05	1.04E-05	1.12E-05	5.81E-06	6.53E-06	5.08E-06 <	7.28E-05	3.14E-05	3.33E-05	9.77E-06	8.58E-06	9.82E-06
Chromium (total)	3.83E-05	3.77E-05	4.35E-05	2.27E-05	3.68E-05	2.51E-05	3.18E-05	2.34E-05	1.78E-05	4.37E-05	5.04E-05	4.56E-05
Chromium (total) extra runs 8/2012												
Hexavalent Chromium	5.07E-05 <	5.17E-05 <	5.07E-05 <									
Cobalt												
Copper												
Lead	2.13E-04	1.60E-04	1.32E-04	5.73E-05	2.66E-04	4.26E-05	4.66E-04	3.45E-04	3.10E-04	4.15E-04	7.61E-05	1.61E-04
Manganese												
Mercury	7.84E-04	7.40E-04	7.98E-04	6.17E-04	7.06E-04	5.32E-04	1.19E-04	1.24E-04	1.29E-04	1.40E-04	1.17E-04	1.36E-04
Nickel	5.43E-05	4.52E-05	2.51E-04	1.69E-04	6.93E-05	2.09E-04	1.56E-04	6.00E-05	9.02E-05	8.30E-05	6.97E-05	4.64E-05
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

Constituent	November 2006 Run 1 Emission Rate g/s	November 2006 Run 2 Emission Rate g/s	November 2006 Run 3 Emission Rate g/s	November 2007 Run 1 Emission Rate g/s	November 2007 Run 2 Emission Rate g/s	November 2007 Run 3 Emission Rate g/s	October 2008 Run 1 Emission Rate g/s	October 2008 Run 2 Emission Rate g/s	October 2008 Run 3 Emission Rate g/s	October 2009 Run 1 Emission Rate g/s	October 2009 Run 2 Emission Rate g/s	October 2009 Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	2.44E-11	1.95E-11 <	5.13E-11	6.12E-11 <	4.98E-11 <	4.25E-11 <	9.81E-11	1.29E-10	1.41E-10	4.29E-11	1.10E-10 <	2.82E-11
1,2,3,7,8-PeCDD	8.52E-11	6.33E-11 <	3.54E-10	7.50E-11 <	7.36E-11 <	6.61E-11	2.62E-10	4.02E-10	3.96E-10	1.50E-10	6.53E-10	5.61E-10
1,2,3,4,7,8-HxCDD	9.98E-11	8.30E-11 <	6.76E-10	1.03E-10 <	1.17E-10 <	1.10E-10	2.43E-10	3.64E-10	3.44E-10	1.19E-10	6.90E-10	3.88E-11 <
1,2,3,6,7,8-HxCDD	3.33E-10	3.32E-10	1.27E-09	3.40E-10 <	5.72E-10	2.87E-10	7.06E-10	8.73E-10	7.94E-10	2.88E-10	1.22E-09	9.45E-11 <
1,2,3,7,8,9-HxCDD	1.73E-10	1.48E-10 <	9.62E-10	1.97E-10	2.83E-10	1.68E-10	4.07E-10	6.96E-10	4.07E-10	1.92E-10	8.32E-10 <	6.60E-11 <
1,2,3,4,6,7,8-HpCDD	2.26E-09	2.30E-09	1.45E-08	3.09E-09	5.92E-09	2.23E-09	4.88E-09	9.16E-09	4.64E-09	2.17E-09	7.99E-09	7.89E-10
OCDD	2.71E-09	2.81E-09	2.40E-08	5.29E-09	1.13E-08	3.29E-09	8.17E-09	3.39E-08	6.08E-09	5.42E-09	1.39E-08	1.52E-09 <
2,3,7,8-TCDF	1.09E-10	9.95E-11	3.91E-10	1.20E-10	8.30E-11 <	8.00E-11 <	4.82E-10	6.82E-10	4.30E-10	2.71E-10	9.37E-10	9.69E-11
1,2,3,7,8-PeCDF	1.73E-10	1.63E-10	1.17E-09	1.44E-10	1.70E-10	1.38E-10 <	7.45E-10	1.26E-09	5.41E-10	4.14E-10	2.05E-09	1.20E-10 <
2,3,4,7,8-PeCDF	2.57E-10	2.11E-10	1.33E-09	2.03E-10 <	2.31E-10	2.15E-10	8.58E-10	1.40E-09	6.20E-10	4.27E-10	2.79E-09	1.80E-10
1,2,3,4,7,8-HxCDF	2.42E-10	1.76E-10	2.40E-09	2.32E-10	2.49E-10	2.06E-10	8.72E-10	1.73E-09	5.75E-10	4.52E-10	1.98E-09	1.81E-10
1,2,3,6,7,8-HxCDF	2.64E-10	1.71E-10	2.80E-09	2.59E-10	2.72E-10	2.16E-10	9.81E-10	2.05E-09	6.65E-10	4.85E-10	2.65E-09	1.36E-10
2,3,4,6,7,8-HxCDF	2.82E-10	2.38E-10	2.66E-09	3.51E-10	4.62E-10	2.73E-10	1.05E-09	2.52E-09	6.92E-10	4.89E-10	2.79E-09	1.50E-10 <
1,2,3,7,8,9-HxCDF	8.58E-11	6.79E-11	7.18E-10	9.27E-11	9.67E-11 <	6.41E-11	3.11E-10	7.66E-10	1.99E-10	1.35E-10	3.63E-10	4.03E-11 <
1,2,3,4,6,7,8-HpCDF	6.74E-10	4.74E-10	1.38E-08	9.40E-10	1.16E-09	6.44E-10	2.96E-09	9.72E-09	1.69E-09	1.26E-09	5.43E-09	4.27E-10
1,2,3,4,7,8,9-HpCDF	1.39E-10	1.05E-10	1.63E-09	1.82E-10	3.79E-10	1.19E-10	6.05E-10	2.34E-09	3.21E-10	1.61E-10 <	4.83E-10 <	2.73E-11 <
OCDF	3.50E-10	2.86E-10	6.13E-09	5.99E-10 <	1.52E-09	4.86E-10	2.20E-09	1.63E-08	1.11E-09	6.87E-10	1.38E-09 <	1.89E-10 <
PAHs												
Acenaphthene	3.57E-08	4.60E-08	3.44E-08							5.91E-07	9.55E-07	4.77E-07
Acenaphthylene	3.77E-08	4.85E-08	3.01E-08							1.44E-07	2.65E-07	1.14E-07
Anthracene	7.74E-08	3.10E-07	9.47E-08							2.62E-07	4.05E-07	1.12E-07
Benzo(a)anthracene	5.71E-08	3.22E-08	3.98E-08							2.01E-06	3.91E-07	7.18E-08
Benzo(a)pyrene	8.74E-08	4.57E-08	5.21E-08							4.30E-06	5.60E-08	7.20E-08
Benzo(b)fluoranthene	1.81E-07	7.41E-08	1.45E-07							6.11E-06	1.97E-06	1.50E-07
Benzo(g,h,i)perylene	1.11E-06	7.91E-07	7.22E-07							5.64E-06	1.06E-06	1.05E-06
Benzo(k)fluoranthene	4.82E-08	3.17E-08	3.96E-08							2.48E-06	5.89E-07	4.77E-08
Chrysene	1.75E-07	6.79E-08	1.46E-07							2.62E-06	1.07E-06	1.40E-07
Dibenzo(a,h)anthracene	4.48E-08 <	5.07E-08 <	4.45E-08 <							1.12E-06	2.95E-08	5.07E-08 <
Fluoranthene	5.85E-07	4.04E-07	6.86E-07							3.72E-06	2.16E-06	9.58E-07
Fluorene	1.77E-07	3.48E-07	2.47E-07							9.09E-07	1.52E-06	6.75E-07
Indeno(1,2,3-cd)pyrene	1.70E-07	1.20E-07	1.01E-07							4.42E-06	3.07E-07	1.98E-07
2-Methylnaphthalene	4.95E-07	6.34E-07	6.34E-07							1.93E-06	1.89E-06	1.62E-06
Naphthathalene	3.72E-06	4.69E-06	3.93E-06							2.48E-05	1.43E-05	2.14E-05
Phenanthrene	6.84E-07	6.76E-07	9.63E-07							3.19E-06	5.08E-06	2.60E-06
Pyrene	1.01E-06	4.98E-07	1.26E-06							4.19E-06	2.40E-06	1.33E-06
Total PCBs												
Acid Gasses												
Hydrogen Chloride	8.30E-01	7.75E-01	7.27E-01	7.99E-01	8.25E-01	6.79E-01	7.72E-01	6.49E-01	7.32E-01	8.71E-01	7.52E-01	7.17E-01
Hydrogen Fluoride (as Total Fluoride)	5.10E-03 <	5.25E-03 <	5.22E-03 <	5.04E-03 <	5.04E-03 <	5.04E-03 <	4.93E-03 <	4.91E-03 <	5.00E-03 <	8.06E-03	5.04E-03 <	5.04E-03 <
Sulfuric Acid	4.32E-03	3.84E-02	3.83E-02	6.30E-03	1.01E-02	1.01E-02	5.37E-03 <	5.27E-03 <	5.33E-03 <	5.27E-03 <	4.99E-03 <	3.69E-03 <
Metals												
Antimony												
Arsenic	4.10E-05	3.38E-05	2.80E-05	3.21E-05	2.66E-05	2.24E-05	1.97E-04	2.07E-04	1.99E-04	3.02E-05	1.70E-05	1.56E-05
Beryllium	1.12E-06 <	1.34E-06 <	1.27E-06 <	1.24E-06 <	1.27E-06 <	1.26E-06 <	1.25E-06 <	1.29E-06 <	1.26E-06 <	1.25E-06 <	1.26E-06 <	1.27E-06 <
Cadmium	3.26E-05	3.83E-05	2.87E-05	3.58E-05	3.84E-05	4.07E-05	2.33E-04	2.58E-04	2.77E-04	2.23E-05	1.66E-05	1.54E-05
Chromium (total)	2.61E-04	1.51E-04	1.19E-04	8.04E-05	7.42E-05	6.41E-05	7.40E-05	1.36E-04	1.06E-04	1.14E-04	3.64E-04	4.40E-05
Chromium (total) extra runs 8/2012												
Hexavalent Chromium												
Cobalt												
Copper												
Lead	1.84E-03	1.02E-03	9.51E-04	9.15E-04	6.35E-04	1.31E-03	3.74E-03	3.97E-03	3.64E-03	2.94E-04	2.51E-04	2.10E-04
Manganese												
Mercury	2.68E-04	2.67E-04	3.07E-04	3.21E-04	3.53E-04	3.55E-04	2.86E-04	2.41E-04	2.85E-04	4.69E-04	3.70E-04	1.56E-04
Nickel	1.74E-04	1.80E-04	1.14E-04	5.37E-05	7.79E-05	4.85E-05	5.73E-05	1.10E-04	7.16E-05	6.07E-05	2.19E-04	2.77E-05
Selenium												
Zinc												
Formaldehyde									`			

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	October 2010			August 2011			August 2012			September 2012		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	2.19E-11 <	2.89E-10	3.25E-11 <	1.58E-10	4.57E-11	1.38E-11 <	2.94E-11	1.81E-10		2.23E-11	2.09E-11 <	3.67E-11
1,2,3,7,8-PeCDD	3.02E-11 <	7.82E-10	4.02E-11 <	5.11E-10	1.11E-10	5.57E-11	1.22E-10	6.55E-10		7.80E-11	1.30E-10	1.23E-10
1,2,3,4,7,8-HxCDD	3.19E-11 <	4.18E-10	4.91E-11 <	3.11E-10	9.07E-11	5.16E-11	1.25E-10	5.13E-10		6.02E-11	1.55E-10	9.26E-11
1,2,3,6,7,8-HxCDD	5.85E-11 <	4.22E-10	5.69E-11 <	4.55E-10	2.13E-10	1.71E-10	3.45E-10	8.86E-10		1.66E-10	5.61E-10	3.09E-10
1,2,3,7,8,9-HxCDD	3.89E-11 <	2.69E-10	5.37E-11 <	2.33E-10	1.40E-10	9.38E-11	2.12E-10	8.67E-10		1.02E-10	2.69E-10	1.84E-10
1,2,3,4,6,7,8-HpCDD	4.78E-10	1.25E-09	4.74E-10	1.76E-09	1.32E-09	9.24E-10	2.74E-09	6.49E-09		9.87E-10	3.10E-09	1.81E-09
OCDD	1.08E-09	1.47E-09	7.45E-10	2.11E-09	2.34E-09	1.39E-09	6.12E-09	1.45E-08		1.45E-09	3.34E-09	2.53E-09
2,3,7,8-TCDF	5.36E-11	2.24E-10	7.58E-11	2.50E-10	2.27E-10	1.10E-10	2.19E-10	1.02E-09		1.72E-10	3.25E-10	2.73E-10
1,2,3,7,8-PeCDF	8.02E-11	1.86E-10	9.33E-11	2.17E-10	3.67E-10	1.65E-10	3.40E-10	2.37E-09		2.51E-10	3.60E-10	3.91E-10
2,3,4,7,8-PeCDF	1.02E-10	2.25E-10	1.09E-10	3.06E-10	3.72E-10	1.96E-10	4.41E-10	2.21E-09		2.82E-10	5.36E-10	4.80E-10
1,2,3,4,7,8-HxCDF	8.78E-11	1.23E-10 <	9.03E-11	2.44E-10	4.11E-10	1.98E-10	3.88E-10	2.89E-09		2.82E-10	4.40E-10	4.21E-10
1,2,3,6,7,8-HxCDF	8.61E-11	1.41E-10	7.85E-11 <	2.41E-10	4.27E-10	2.29E-10	4.45E-10	3.32E-09		3.04E-10	4.51E-10	4.57E-10
2,3,4,6,7,8-HxCDF	7.43E-11 <	1.24E-10	7.95E-11	2.38E-10	3.71E-10	1.97E-10	4.72E-10	2.72E-09		2.67E-10	4.95E-10	4.14E-10
1,2,3,7,8,9-HxCDF	4.75E-11 <	4.25E-11 <	6.09E-11 <	9.85E-12 <	1.69E-11 <	1.15E-11 <	2.47E-11 <	4.21E-11 <		2.60E-11	2.86E-11	4.13E-11
1,2,3,4,6,7,8-HpCDF	2.09E-10	2.61E-10	2.53E-10	5.61E-10	1.06E-09	4.98E-10	1.22E-09	8.92E-09		7.23E-10	1.07E-09	1.12E-09
1,2,3,4,7,8,9-HpCDF	5.40E-11	5.25E-11 <	7.36E-11 <	9.30E-11	2.31E-10	5.57E-11	2.36E-10	1.89E-09		1.47E-10	1.62E-10	2.00E-10
OCDF	1.14E-10 <	1.37E-10	8.06E-11 <	2.45E-10	6.95E-10	1.39E-10	6.34E-10	5.26E-09		3.29E-10	3.93E-10	5.70E-10
PAHs												
Acenaphthene							2.20E-07	1.97E-07		4.67E-08	1.49E-07	9.75E-08
Acenaphthylene							6.03E-08	6.91E-08		2.64E-08	7.30E-07	3.81E-08
Anthracene							6.73E-08	7.27E-08		2.87E-08	1.13E-07	4.05E-08
Benzo(a)anthracene							1.62E-08	2.47E-08		5.02E-09	2.94E-08	9.90E-09
Benzo(a)pyrene							1.35E-08	2.16E-08		8.95E-09 <	2.11E-08	1.00E-08
Benzo(b)fluoranthene							4.42E-08	6.35E-08		2.13E-08	1.28E-07	3.06E-08
Benzo(g,h,i)perylene							1.59E-07	9.95E-07		6.88E-08	3.69E-07	1.19E-07
Benzo(k)fluoranthene							1.08E-08	1.77E-08		4.10E-09	4.07E-08	1.20E-08
Chrysene							3.83E-08	4.64E-08		1.38E-08	1.53E-07	2.47E-08
Dibenzo(a,h)anthracene							4.94E-08 <	4.88E-08 <		2.29E-08 <	5.05E-08 <	4.91E-08 <
Fluoranthene							4.24E-07	7.27E-07		1.54E-07	1.86E-06	3.24E-07
Fluorene							3.56E-07	3.71E-07		1.36E-07	4.33E-07	2.05E-07
Indeno(1,2,3-cd)pyrene							3.26E-08	1.54E-07		2.12E-08	9.07E-08	3.13E-08
2-Methylnaphthalene							2.46E-06	2.22E-06		5.30E-07	1.25E-06	8.67E-07
Naphthathalene							8.93E-06	7.69E-06		2.90E-06	6.22E-06	5.21E-06
Phenanthrene							1.47E-06	1.62E-06		5.85E-07	3.92E-06	9.98E-07
Pyrene							3.78E-07	5.91E-07		1.01E-07	1.14E-06	2.36E-07
Total PCBs							1.88E-07	3.66E-07		1.67E-07	7.42E-07	4.02E-07
Acid Gasses												
Hydrogen Chloride	9.48E-01	7.94E-01	9.08E-01	1.19E+00	8.96E-01	7.91E-01	1.20E+00	7.59E-01	1.13E+00			
Hydrogen Fluoride (as Total Fluoride)	4.95E-03	4.91E-03 <	5.13E-03 <	5.36E-03	2.19E-02 <	4.96E-03 <	9.88E-03	8.01E-03	8.53E-03			
Sulfuric Acid	6.38E-03 <	6.44E-03 <	7.26E-03 <	9.74E-03	1.22E-02	6.43E-03	4.90E-03	5.25E-03	4.71E-03 <			
Metals												
Antimony							5.00E-06 <	5.05E-06 <	4.99E-06 <			
Arsenic	5.07E-06 <	5.12E-06 <	5.13E-06 <	5.29E-06 <	1.42E-05	4.80E-06 <	1.29E-05	1.06E-05	1.42E-05			
Beryllium	1.27E-06 <	1.27E-06 <	1.29E-06 <	1.26E-06 <	1.21E-06 <	1.20E-06 <	1.25E-06 <	1.26E-06 <	1.25E-06 <			
Cadmium	9.30E-06	6.12E-06	6.67E-06	5.07E-06 <	9.60E-06	4.80E-06 <	1.59E-05	1.40E-05	1.89E-05			
Chromium (total)	4.33E-05	6.36E-05	4.13E-05	2.15E-05	4.85E-06 <	4.80E-06 <	1.47E-05	8.16E-05	3.62E-05			
Chromium (total) extra runs 8/2012							2.02E-05	1.98E-05	1.17E-05			
Hexavalent Chromium							7.13E-06	9.46E-06	4.44E-06			
Cobalt							5.00E-06 <	1.92E-05	5.53E-06			
Copper							5.00E-06 <	5.05E-06 <	4.99E-06 <			
Lead	3.00E-04	1.07E-04	1.22E-04	8.56E-05	3.60E-04	4.08E-05	2.41E-04	5.28E-04	2.47E-04			
Manganese							5.03E-05	6.85E-05	1.46E-04			
Mercury	2.91E-04	2.81E-04	2.82E-04	9.10E-04	5.49E-04	5.08E-04	4.78E-04	4.47E-04	4.60E-04			
Nickel	1.17E-05	3.57E-05	1.95E-05	2.13E-05	2.49E-05	5.17E-05	5.43E-05	9.54E-05	5.88E-05			
Selenium							5.00E-06 <	5.05E-06 <	4.99E-06 <			
Zinc							3.00E-03	1.27E-03	2.70E-03			
Formaldehyde												

< = Not Detected

Appendix A-1b
Unit 1 Stack Emissions
Montgomery County RRF
Dickerson, MD

	August 2013		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans			
2,3,7,8-TCDD	1.89E-11 <	1.92E-10	1.10E-10
1,2,3,7,8-PeCDD	2.90E-11 <	6.56E-10	4.02E-10
1,2,3,4,7,8-HxCDD	2.34E-11 <	6.17E-10	3.36E-10
1,2,3,6,7,8-HxCDD	5.51E-11	9.15E-10	1.02E-09
1,2,3,7,8,9-HxCDD	3.96E-11	9.45E-10	3.38E-10
1,2,3,4,6,7,8-HpCDD	3.64E-10	7.48E-09	2.73E-09
OCDD	6.20E-10	1.60E-08	2.09E-09
2,3,7,8-TCDF	5.51E-11	1.27E-09	3.36E-10
1,2,3,7,8-PeCDF	6.20E-11	2.56E-09	3.10E-10
2,3,4,7,8-PeCDF	7.76E-11	2.53E-09	5.14E-10
1,2,3,4,7,8-HxCDF	6.14E-11	3.44E-09	4.02E-10
1,2,3,6,7,8-HxCDF	6.16E-11	3.82E-09	4.13E-10
2,3,4,6,7,8-HxCDF	6.82E-11	3.24E-09	2.96E-10
1,2,3,7,8,9-HxCDF	1.78E-11 <	5.70E-11 <	3.04E-11 <
1,2,3,4,6,7,8-HpCDF	1.73E-10	1.06E-08	8.53E-10
1,2,3,4,7,8,9-HpCDF	2.77E-11 <	1.78E-09	1.63E-10
OCDF	7.25E-11	4.28E-09	3.47E-10
PAHs			
Acenaphthene			
Acenaphthylene			
Anthracene			
Benzo(a)anthracene			
Benzo(a)pyrene			
Benzo(b)fluoranthene			
Benzo(g,h,i)perylene			
Benzo(k)fluoranthene			
Chrysene			
Dibenzo(a,h)anthracene			
Fluoranthene			
Fluorene			
Indeno(1,2,3-cd)pyrene			
2-Methylnaphthalene			
Naphthathalene			
Phenanthrene			
Pyrene			
Total PCBs			
Acid Gasses			
Hydrogen Chloride	1.14E+00	9.21E-01	1.05E+00
Hydrogen Fluoride (as Total Fluoride)	4.98E-03 <	5.08E-02 <	5.04E-03
Sulfuric Acid	2.87E-03	2.09E-03 <	3.90E-04 <
Metals			
Antimony			
Arsenic	5.07E-06 <	5.10E-06 <	5.08E-06 <
Beryllium	1.26E-06 <	1.27E-06 <	1.27E-06 <
Cadmium	1.14E-05	5.10E-06 <	1.21E-05
Chromium (total)	3.99E-05	3.09E-05	5.13E-05
Chromium (total) extra runs 8/2012			
Hexavalent Chromium			
Cobalt			
Copper			
Lead	1.02E-04	4.51E-05	9.89E-05
Manganese			
Mercury	1.31E-04	1.98E-04	2.05E-04
Nickel	5.59E-05	5.48E-05	9.84E-05
Selenium			
Zinc			
Formaldehyde			

< = Not Detected

Appendix A-2a
Unit 2 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Dioxin/Furans						
2,3,7,8-TCDD	g/s	2.24E-11	1.94E-09	9.19E-12	1.68E-09	26/67
1,2,3,7,8-PeCDD	g/s	4.03E-11	3.63E-09	2.25E-11	1.68E-09	44/67
1,2,3,4,7,8-HxCDD	g/s	3.72E-11	1.94E-09	1.95E-11	3.36E-10	47/67
1,2,3,6,7,8-HxCDD	g/s	3.32E-11	2.75E-09	1.25E-10	1.60E-09	64/67
1,2,3,7,8,9-HxCDD	g/s	3.63E-11	3.62E-09	2.28E-11	5.23E-10	53/67
1,2,3,4,6,7,8-HpCDD	g/s	2.70E-10	3.32E-08	1.05E-09	1.09E-08	65/67
OCDD	g/s	5.82E-10	1.12E-07	5.14E-09	5.14E-09	66/67
2,3,7,8-TCDF	g/s	4.32E-11	9.30E-09	1.87E-11	1.67E-10	59/67
1,2,3,7,8-PeCDF	g/s	3.08E-11	1.68E-08	4.37E-11	3.47E-10	57/67
2,3,4,7,8-PeCDF	g/s	2.62E-11	1.19E-08	1.37E-10	6.97E-10	60/67
1,2,3,4,7,8-HxCDF	g/s	1.82E-11	1.48E-08	1.44E-10	1.69E-10	65/67
1,2,3,6,7,8-HxCDF	g/s	2.30E-11	3.95E-08	8.28E-11	8.36E-11	65/67
2,3,4,6,7,8-HxCDF	g/s	2.59E-11	1.19E-08	1.74E-10	2.51E-10	64/67
1,2,3,7,8,9-HxCDF	g/s	4.98E-12	3.66E-09	3.94E-12	1.68E-09	25/67
1,2,3,4,6,7,8-HpCDF	g/s	7.90E-11	3.84E-08	3.48E-10	4.71E-09	59/67
1,2,3,4,7,8,9-HpCDF	g/s	2.17E-11	7.95E-09	1.44E-11	6.10E-10	47/67
OCDF	g/s	3.39E-11	4.43E-08	6.07E-11	8.71E-10	54/67
PAHs						
Acenaphthene	g/s	1.60E-07	1.05E-05	1.04E-05	1.24E-04	11/18
Acenaphthylene	g/s	7.09E-08	1.50E-05	5.04E-06	7.14E-06	9/18
Anthracene	g/s	9.59E-08	6.24E-06	5.14E-06	7.77E-06	9/18
Benzo(a)anthracene	g/s	1.11E-08	1.24E-06	4.07E-06	7.42E-06	9/18
Benzo(a)pyrene	g/s	6.67E-09	3.39E-07	4.79E-06	1.06E-05	9/18
Benzo(b)fluoranthene	g/s	3.51E-08	9.01E-07	4.30E-06	9.65E-06	9/18
Benzo(g,h,i)perylene	g/s	1.59E-07	2.63E-06	6.56E-06	1.17E-05	9/18
Benzo(k)fluoranthene	g/s	1.38E-08	3.49E-07	4.38E-06	9.65E-06	9/18
Chrysene	g/s	4.82E-08	1.89E-06	4.51E-06	7.60E-06	9/18
Dibenzo(a,h)anthracene	g/s	--	--	2.00E-09	1.47E-05	0/18
Fluoranthene	g/s	6.94E-07	3.99E-05	3.45E-06	6.39E-06	11/18
Fluorene	g/s	3.97E-07	8.00E-06	7.08E-06	1.09E-05	10/18
Indeno(1,2,3-cd)pyrene	g/s	4.25E-08	3.95E-07	6.00E-06	1.07E-05	9/18
Methylnaphthalene, 2-	g/s	1.91E-06	9.56E-06	9.94E-06	1.23E-05	11/18
Naphthalene	g/s	8.27E-06	4.79E-05	--	--	18/18
Phenanthrene	g/s	1.04E-06	6.28E-05	5.23E-06	7.51E-06	12/18
Pyrene	g/s	5.62E-07	3.42E-05	3.70E-06	5.93E-06	11/18

Appendix A-2a
Unit 2 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Total PCBs	g/s	1.03E-06	1.73E-04	1.46E-05	2.01E-05	9/12
Acid Gasses						
Hydrogen Chloride	g/s	2.52E-01	5.13E+00	--	--	43/43
Hydrogen Fluoride (as Total Fluoride)	g/s	5.15E-03	1.66E-02	4.93E-03	2.08E-02	4/36
Sulfuric Acid	g/s	1.64E-03	1.21E-01	1.92E-03	7.21E-03	24/36
Metals						
Antimony	g/s	1.71E-06	7.18E-05	9.58E-06	1.90E-05	5/15
Arsenic	g/s	6.55E-06	4.74E-05	5.01E-06	1.81E-05	23/43
Beryllium	g/s	1.24E-06	1.32E-06	1.21E-06	4.76E-06	4/70
Cadmium	g/s	5.34E-06	4.51E-04	4.43E-06	5.13E-06	38/43
Chromium total	g/s	2.39E-06	1.64E-04	4.93E-06	1.42E-05	50/58
Chromium +6	g/s	3.40E-06	5.10E-05	5.07E-05	5.17E-05	4/7
Cobalt	g/s	--	--	4.43E-06	4.53E-06	0/3
Copper	g/s	1.10E-05	2.18E-05	--	--	6/6
Lead	g/s	1.58E-05	7.94E-04	9.06E-06	9.09E-06	41/43
Manganese	g/s	1.09E-04	1.27E-04	--	--	3/3
Mercury as HgCl2	g/s	8.74E-05	2.77E-03	--	--	73/73
Nickel	g/s	1.85E-05	1.66E-04	4.96E-06	1.36E-05	39/43
Selenium	g/s	--	--	2.00E-05	3.93E-05	0/6
Zinc	g/s	3.55E-04	5.28E-04	--	--	3/3
Aldehyde Ketones						
Formaldehyde	g/s	3.96E-04	4.93E-04	--	--	3/3

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

	July/August 1995			December 1995			February 1996			April/May 1996		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate
Constituent	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Dioxins/Furans												
2,3,7,8-TCDD				1.12E-10	1.31E-10	7.89E-11 <	1.68E-09 <	4.33E-10 <	4.36E-10 <	2.52E-10 <	1.67E-10 <	8.28E-11 <
1,2,3,7,8-PeCDD				9.07E-10	9.55E-10	8.98E-11	1.68E-09 <	6.93E-10 <	1.74E-10 <	3.36E-10 <	1.67E-10 <	8.28E-11 <
1,2,3,4,7,8-HxCDD				1.52E-09	1.29E-09	6.71E-11	5.05E-10	1.73E-10	2.61E-10	3.36E-10 <	1.67E-10 <	8.28E-11 <
1,2,3,6,7,8-HxCDD				2.58E-09	1.98E-09	2.24E-10	1.60E-09 <	4.33E-10 <	6.10E-10	2.52E-10	1.67E-10	1.66E-10
1,2,3,7,8,9-HxCDD				3.62E-09	2.78E-09	2.41E-09	2.28E-09	6.07E-10	5.23E-10 <	3.36E-10 <	1.67E-10	2.49E-10
1,2,3,4,6,7,8-HpCDD				3.32E-08	2.08E-08	1.26E-09	1.09E-08 <	2.86E-09	2.88E-09	1.60E-09	1.42E-09	1.33E-09
OCDD				1.12E-07	6.32E-08	2.02E-09	1.76E-08	5.29E-09	5.14E-09 <	3.02E-09	2.17E-09	2.32E-09
2,3,7,8-TCDF				4.89E-10	5.48E-10	1.40E-10	1.52E-09	3.47E-10	6.10E-10	8.41E-11 <	1.67E-10 <	8.28E-11 <
1,2,3,7,8-PeCDF				1.30E-09	1.50E-09	1.44E-10	1.35E-09	3.47E-10 <	2.61E-10 <	2.52E-10 <	1.67E-10 <	8.28E-11 <
2,3,4,7,8-PeCDF				2.27E-09	2.19E-09	2.64E-10	3.03E-09	6.93E-10 <	6.97E-10 <	2.52E-10	3.34E-10	2.49E-10
1,2,3,4,7,8-HxCDF				9.97E-09	8.43E-09	6.07E-10	5.81E-09	1.48E-09	1.48E-09	4.20E-10	3.34E-10	3.31E-10
1,2,3,6,7,8-HxCDF				4.59E-09	3.95E-08	2.54E-10	1.76E-09	4.33E-10	5.23E-10	1.68E-10	8.36E-11 <	8.28E-11 <
2,3,4,6,7,8-HxCDF				9.65E-09	5.88E-09	3.67E-10	3.37E-09	1.13E-09	9.58E-10	3.36E-10	2.51E-10 <	2.49E-10 <
1,2,3,7,8,9-HxCDF				4.38E-10	2.95E-10	8.09E-11 <	1.68E-09 <	6.07E-10 <	6.10E-10 <	2.52E-10 <	1.67E-10 <	8.28E-11 <
1,2,3,4,6,7,8-HpCDF				3.35E-08	2.33E-08	1.03E-09	4.71E-09 <	1.30E-09 <	1.48E-09	5.03E-10 <	5.00E-10 <	4.14E-10 <
1,2,3,4,7,8,9-HpCDF				6.71E-09	3.81E-09	1.32E-10	7.59E-10	1.73E-10	6.10E-10 <	4.20E-10 <	1.67E-10 <	8.28E-11 <
OCDF				4.43E-08	2.24E-08	5.58E-10	2.36E-09	5.20E-10 <	8.71E-10 <	4.20E-10 <	2.51E-10	2.49E-10
PAHs												
Acenaphthene	1.30E-05 <	1.32E-05 <	1.24E-04 <				1.04E-05 <	1.09E-05 <	1.06E-05 <			
Acenaphthylene	7.01E-06 <	7.14E-06 <	6.72E-06 <				5.81E-06 <	6.15E-06 <	5.92E-06 <			
Anthracene	7.36E-06 <	6.97E-06 <	6.98E-06 <				5.14E-06 <	5.54E-06 <	5.32E-06 <			
Benzo(a)anthracene	6.11E-06 <	6.07E-06 <	5.83E-06 <				4.13E-06 <	4.07E-06 <	4.18E-06 <			
Benzo(a)pyrene	6.83E-06 <	6.88E-06 <	6.72E-06 <				4.80E-06 <	4.85E-06 <	4.79E-06 <			
Benzo(b)fluoranthene	6.39E-06 <	6.51E-06 <	6.27E-06 <				4.30E-06 <	4.33E-06 <	4.36E-06 <			
Benzo(g,h,i)perylene	8.06E-06 <	8.13E-06 <	7.95E-06 <				6.56E-06 <	6.68E-06 <	6.62E-06 <			
Benzo(k)fluoranthene	6.59E-06 <	6.69E-06 <	6.54E-06 <				4.38E-06 <	4.42E-06 <	4.45E-06 <			
Chrysene	6.65E-06 <	6.69E-06 <	6.36E-06 <				4.55E-06 <	4.51E-06 <	4.61E-06 <			
Dibenzo(a,h)anthracene	8.06E-06 <	8.22E-06 <	7.95E-06 <				7.41E-06 <	7.46E-06 <	7.48E-06 <			
Fluoranthene	6.39E-06 <	6.07E-06 <	6.01E-06 <				3.45E-06 <	3.73E-06 <	3.65E-06 <			
Fluorene	1.07E-05 <	1.09E-05 <	1.02E-05 <				7.08E-06 <	7.55E-06 <	7.32E-06 <			
Indeno(1,2,3-cd)pyrene	7.71E-06 <	7.76E-06 <	7.60E-06 <				6.49E-06 <	6.50E-06 <	6.45E-06 <			
2-Methylnaphthalene	1.23E-05 <	1.23E-05 <	1.15E-05 <				9.94E-06 <	1.05E-05 <	1.04E-05 <			
Naphthathalene	2.48E-05	3.11E-05	3.79E-05				1.36E-05	1.02E-05	1.24E-05			
Phenanthrene	7.27E-06 <	6.88E-06 <	6.89E-06 <				1.17E-05	5.38E-06 <	5.23E-06 <			
Pyrene	5.93E-06 <	5.90E-06 <	5.66E-06 <				3.70E-06 <	3.73E-06 <	3.83E-06 <			
Total PCBs	9.90E-06	1.49E-05	9.94E-06				1.73E-04	1.38E-04	1.11E-04			
Acid Gasses												
Hydrogen Chloride												
Additional Hydrogen Chloride (8/2012)												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony	1.33E-05 <	1.36E-05 <	1.36E-05 <				1.84E-05 <	1.89E-05 <	1.90E-05 <			
Arsenic	1.77E-05 <	1.81E-05 <	1.81E-05 <									
Beryllium	4.43E-06 <	4.53E-06 <	4.53E-06 <	3.77E-06 <	3.90E-06 <	3.70E-06 <	4.59E-06 <	4.73E-06 <	4.76E-06 <	4.53E-06 <	4.59E-06 <	4.56E-06 <
Cadmium	4.43E-06 <	4.53E-06 <	4.53E-06 <									
Chromium (total)	1.33E-05 <	1.36E-05 <	1.86E-05				1.38E-05 <	1.42E-05 <	1.42E-05 <			
Hexavalent Chromium	3.40E-06	3.65E-06	5.54E-06									
Cobalt	4.43E-06 <	4.53E-06 <	4.53E-06 <									
Copper	1.10E-05	1.47E-05	2.18E-05				1.73E-05	1.65E-05	1.61E-05			
Lead	3.43E-04	9.09E-06 <	9.06E-06 <									
Manganese												
Mercury	5.39E-04	5.67E-04	4.78E-04	6.68E-04	8.18E-04	6.60E-04	6.99E-04	4.80E-04	8.15E-04	1.31E-03	1.50E-03	1.59E-03
Mercury extra runs 8/2012												
Nickel	1.33E-05 <	1.36E-05 <	1.36E-05 <									
Selenium	2.13E-05 <	3.93E-05 <	2.00E-05 <				2.30E-05 <	2.36E-05 <	2.38E-05 <			
Zinc	4.81E-04	5.28E-04	3.55E-04									
Formaldehyde												

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

	August 1996			November 1996			July 1997			November 1997		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	8.69E-11 <	6.98E-11 <	6.74E-11 <	1.74E-11 <	4.35E-11 <	3.49E-11 <				4.37E-11 <	2.20E-11 <	4.23E-11 <
1,2,3,7,8-PeCDD	1.74E-10	1.75E-10 <	1.69E-10	2.61E-11 <	8.71E-11 <	6.09E-11 <				1.16E-10	1.24E-10	2.56E-10
1,2,3,4,7,8-HxCDD	2.61E-10	2.62E-10	1.69E-10	4.35E-11 <	4.35E-11	3.49E-11 <				3.49E-10	3.34E-10	3.74E-10
1,2,3,6,7,8-HxCDD	9.56E-10	7.86E-10	5.90E-10	8.71E-11	8.71E-11	8.71E-11				5.90E-10	6.50E-10	4.53E-10
1,2,3,7,8,9-HxCDD	8.69E-10	6.98E-10	5.90E-10	8.71E-11 <	4.35E-11	6.98E-11 <				3.98E-10	3.44E-10	4.23E-10
1,2,3,4,6,7,8-HpCDD	6.17E-10	5.42E-09	4.12E-09	1.04E-09	7.84E-10	6.09E-10				7.67E-09	1.15E-08	3.74E-09
OCDD	7.56E-09	7.07E-09	5.39E-09	2.52E-09	2.00E-09	1.49E-09				3.30E-08	5.73E-08	7.00E-09
2,3,7,8-TCDF	2.61E-10	2.62E-10	1.69E-10	8.71E-11	8.71E-11	8.71E-11				1.07E-10	1.05E-10	8.37E-11
1,2,3,7,8-PeCDF	2.61E-10	2.62E-10 <	2.52E-10	8.71E-11 <	7.84E-11	4.37E-11 <				2.13E-10	2.67E-10	3.15E-10
2,3,4,7,8-PeCDF	6.09E-10	6.98E-10	4.21E-10 <	1.74E-10 <	1.74E-10 <	8.71E-11				3.59E-10	4.49E-10	3.94E-10
1,2,3,4,7,8-HxCDF	1.13E-09	1.22E-09	7.57E-10	3.48E-10	2.61E-10	2.62E-10				7.08E-10	8.34E-10	8.87E-10
1,2,3,6,7,8-HxCDF	4.35E-10	5.24E-10	2.52E-10	8.71E-11	8.71E-11	6.98E-11				7.49E-10	9.16E-10	9.46E-10
2,3,4,6,7,8-HxCDF	9.56E-10	1.05E-09	6.74E-10	1.74E-10 <	1.74E-10	8.71E-11				1.36E-09	1.72E-09	8.78E-10
1,2,3,7,8,9-HxCDF	8.69E-11 <	6.11E-11 <	6.74E-11 <	3.48E-11 <	8.71E-11 <	3.49E-11 <				5.72E-10	6.23E-10	2.07E-10
1,2,3,4,6,7,8-HpCDF	1.65E-09	1.75E-09	9.26E-10	3.48E-10 <	2.61E-10	1.75E-10				6.13E-09	9.57E-09	4.23E-09
1,2,3,4,7,8,9-HpCDF	8.69E-11 <	1.74E-09	8.42E-11	4.35E-11 <	5.22E-11 <	6.09E-11 <				1.65E-09	1.43E-09	5.90E-10
OCDF	2.61E-10	4.36E-10	2.52E-10	4.35E-10	1.74E-10 <	8.71E-11 <				5.22E-09	8.34E-09	2.66E-09
PAHs												
Acenaphthene				1.05E-05	2.87E-06	1.18E-05 <						
Acenaphthylene				5.04E-06 <	5.22E-06 <	6.29E-06 <						
Anthracene				5.39E-06 <	5.48E-06 <	7.77E-06 <						
Benzo(a)anthracene				5.56E-06 <	6.17E-06 <	7.42E-06 <						
Benzo(a)pyrene				6.00E-06 <	1.06E-05 <	6.11E-06 <						
Benzo(b)fluoranthene				5.39E-06 <	9.65E-06 <	5.51E-06 <						
Benzo(g,h,i)perylene				6.60E-06 <	1.17E-05 <	6.73E-06 <						
Benzo(k)fluoranthene				5.48E-06 <	9.65E-06 <	5.51E-06 <						
Chrysene				5.73E-06 <	6.35E-06 <	7.60E-06 <						
Dibenzo(a,h)anthracene				8.25E-06 <	1.47E-05 <	8.38E-06 <						
Fluoranthene				3.39E-06	2.87E-06	6.29E-06 <						
Fluorene				8.00E-06	8.25E-06 <	9.95E-06 <						
Indeno(1,2,3-cd)pyrene				6.00E-06 <	1.07E-05 <	6.11E-06 <						
2-Methylnaphthalene				9.56E-06	3.30E-06	1.10E-05 <						
Naphthathalene				4.79E-05	3.12E-05	3.29E-05						
Phenanthrene				1.86E-05	6.69E-06	7.51E-06 <						
Pyrene				3.48E-06	2.96E-06	5.42E-06 <						
Total PCBs							1.17E-06	1.07E-06	1.03E-06			
Acid Gasses												
Hydrogen Chloride												
Additional Hydrogen Chloride (8/2012)												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony				4.83E-06	1.17E-05	1.71E-06	1.70E-05 <	1.75E-05 <	1.52E-05 <			
Arsenic												
Beryllium	4.26E-06 <	4.33E-06 <	4.30E-06 <	1.73E-06 <	1.70E-06 <	1.68E-06 <				1.95E-06 <	1.94E-06 <	1.98E-06 <
Cadmium												
Chromium (total)				5.18E-06 <	2.21E-05	2.02E-05						
Hexavalent Chromium												
Cobalt												
Copper												
Lead												
Manganese												
Mercury	5.56E-04	5.17E-04	5.67E-04	3.55E-04	4.12E-04	4.04E-04				1.55E-04	1.69E-04	2.32E-04
Mercury extra runs 8/2012												
Nickel												
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

	April 1998			November 1998			November 1999			November 2000		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD				1.15E-10	1.13E-10	1.11E-10	5.44E-11 <	7.74E-11 <	1.43E-10 <	6.47E-10	1.67E-10	1.22E-10
1,2,3,7,8-PeCDD				8.44E-11	8.11E-11	1.25E-10	6.23E-11	8.27E-11	5.30E-11	2.09E-09	4.85E-10	5.39E-10
1,2,3,4,7,8-HxCDD				6.20E-11	7.88E-11	1.75E-10	1.33E-10 <	2.24E-10 <	1.62E-10 <	1.15E-09	3.07E-10	4.34E-10
1,2,3,6,7,8-HxCDD				1.77E-10	2.54E-10	3.75E-10	5.57E-10	5.67E-10	3.68E-10	2.02E-09	5.46E-10	7.31E-10
1,2,3,7,8,9-HxCDD				1.64E-10	1.78E-10	4.25E-10	2.20E-10	2.06E-10 <	1.48E-10 <	1.98E-09	4.76E-10	6.97E-10
1,2,3,4,6,7,8-HpCDD				1.10E-09	1.20E-09	3.50E-09	2.85E-09	3.23E-09	2.64E-09	6.97E-09	2.14E-09	3.43E-09
OCDD				1.39E-09	1.39E-09	5.23E-09	2.98E-09	3.46E-09	2.72E-09	1.15E-08	5.33E-09	5.60E-09
2,3,7,8-TCDF				2.52E-10	1.78E-10	3.37E-10	1.50E-10	1.50E-10 <	8.61E-11	3.64E-09	8.85E-10	7.45E-10
1,2,3,7,8-PeCDF				1.77E-10	1.18E-10	3.50E-10	1.07E-10	1.09E-10	7.95E-11	8.30E-09	1.96E-09	2.00E-09
2,3,4,7,8-PeCDF				2.15E-10	1.78E-10	5.50E-10	2.65E-10	2.01E-10	2.19E-10	6.65E-09	1.50E-09	1.64E-09
1,2,3,4,7,8-HxCDF				3.91E-10	3.67E-10	2.37E-09	1.33E-10	1.44E-10 <	1.01E-10	7.94E-09	1.88E-09	2.48E-09
1,2,3,6,7,8-HxCDF				1.64E-10	1.39E-10	8.51E-10	1.44E-10	1.56E-10	1.11E-10	9.10E-09	2.15E-09	2.89E-09
2,3,4,6,7,8-HxCDF				1.77E-10	1.90E-10	1.25E-09	1.80E-10	2.16E-10	1.46E-10	5.44E-09	1.28E-09	1.78E-09
1,2,3,7,8,9-HxCDF				2.65E-11 <	3.29E-11 <	1.10E-10	1.26E-10 <	1.30E-10 <	1.17E-10 <	1.85E-09	4.72E-10	7.40E-10
1,2,3,4,6,7,8-HpCDF				6.30E-10 <	6.20E-10 <	8.37E-09	4.94E-10	5.38E-10	3.55E-10	1.61E-08	3.76E-09	6.08E-09
1,2,3,4,7,8,9-HpCDF				8.70E-11	1.11E-10	1.04E-09	6.63E-11 <	7.61E-11 <	8.88E-11 <	1.82E-09	4.96E-10	9.45E-10
OCDF				2.52E-10	4.71E-10	3.37E-09	1.46E-10	2.28E-10 <	1.68E-10 <	2.77E-09	1.37E-09	1.50E-09
PAHs												
Acenaphthene												
Acenaphthylene												
Anthracene												
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene												
Chrysene												
Dibenzo(a,h)anthracene												
Fluoranthene												
Fluorene												
Indeno(1,2,3-cd)pyrene												
2-Methylnaphthalene												
Naphthathalene												
Phenanthrene												
Pyrene												
Total PCBs	1.50E-05 <	2.01E-05 <	1.46E-05 <									
Acid Gasses												
Hydrogen Chloride												
Additional Hydrogen Chloride (8/2012)												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony	9.58E-06 <	3.15E-05	7.18E-05									
Arsenic												
Beryllium				2.75E-06 <	2.72E-06 <	2.73E-06 <	2.66E-06 <	2.66E-06 <	2.65E-06 <	2.31E-06 <	2.29E-06 <	2.29E-06 <
Cadmium												
Chromium (total)	2.39E-06	2.65E-05	9.07E-06				4.76E-05	6.92E-05	8.15E-05	4.17E-05	1.24E-04	6.39E-05
Hexavalent Chromium												
Cobalt												
Copper												
Lead												
Manganese							1.11E-04	1.27E-04	1.09E-04			
Mercury				2.27E-03	2.77E-03	2.14E-03	4.10E-04	4.32E-04	4.23E-04	7.59E-04	5.24E-04	6.33E-04
Mercury extra runs 8/2012												
Nickel												
Selenium												
Zinc												
Formaldehyde							4.18E-04	3.69E-04	3.79E-04			

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

	November 2001			October 2002				October 2003		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 4 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans										
2,3,7,8-TCDD	3.50E-11	2.62E-11 <	9.19E-12 <	2.34E-11	3.37E-11	1.01E-11 <	2.24E-11	1.59E-10	2.05E-11 <	4.43E-11 <
1,2,3,7,8-PeCDD	8.63E-11	1.76E-10	6.40E-11 <	7.13E-11	1.10E-10	7.03E-11	8.39E-11	7.80E-10	1.43E-10	2.24E-10
1,2,3,4,7,8-HxCDD	1.35E-10	2.37E-10	9.32E-11	6.87E-11	1.25E-10	7.87E-11	9.08E-11	1.14E-09	1.54E-10	2.40E-10
1,2,3,6,7,8-HxCDD	3.41E-10	5.06E-10	2.85E-10	2.94E-10	4.54E-10	2.73E-10	3.40E-10	2.19E-09	5.31E-10	5.86E-10
1,2,3,7,8,9-HxCDD	2.06E-10	4.29E-10	1.61E-10	1.27E-10	2.31E-10	1.31E-10	1.63E-10	2.13E-09	2.50E-10	4.72E-10
1,2,3,4,6,7,8-HpCDD	2.72E-09	5.37E-09	2.10E-09	1.54E-09	3.17E-09	1.71E-09	2.14E-09	2.32E-08	3.00E-09	4.25E-09
OCDD	5.74E-09	8.90E-09	2.89E-09	2.03E-09	3.53E-09	1.99E-09	2.52E-09	4.82E-08	3.62E-09	6.69E-09
2,3,7,8-TCDF	1.76E-10	2.83E-10	1.28E-10	1.04E-10	1.43E-10	1.27E-10	1.25E-10	1.20E-09	2.14E-10	3.30E-10
1,2,3,7,8-PeCDF	3.29E-10	7.39E-10	2.73E-10	1.53E-10	2.32E-10	1.79E-10	1.88E-10	2.39E-09	2.64E-10	5.87E-10
2,3,4,7,8-PeCDF	4.48E-10	7.70E-10	3.12E-10	2.31E-10	3.10E-10	2.27E-10	2.56E-10	3.72E-09	4.59E-10	8.60E-10
1,2,3,4,7,8-HxCDF	3.52E-10	1.02E-09	3.16E-10	1.71E-10	2.49E-10	1.61E-10	1.94E-10	4.54E-09	3.01E-10	7.94E-10
1,2,3,6,7,8-HxCDF	4.23E-10	1.22E-09	3.44E-10	1.72E-10	2.82E-10	1.69E-10	2.08E-10	5.50E-09	3.21E-10	9.28E-10
2,3,4,6,7,8-HxCDF	3.93E-10	1.14E-09	3.19E-10	2.46E-10	3.66E-10	2.38E-10	2.83E-10	9.22E-09	4.67E-10	1.46E-09
1,2,3,7,8,9-HxCDF	1.25E-10	3.20E-10	9.74E-11	5.16E-12 <	3.94E-12 <	5.86E-12 <	4.98E-12	3.66E-09	1.14E-10	6.07E-10
1,2,3,4,6,7,8-HpCDF	1.35E-09	5.99E-09	1.10E-09	6.29E-10	9.38E-10	4.77E-10	6.81E-10	3.17E-08	9.27E-10	3.89E-09
1,2,3,4,7,8,9-HpCDF	2.04E-10	8.63E-10	1.45E-10	6.92E-11	1.13E-10	6.50E-11 <	8.24E-11	6.01E-09	1.54E-10	8.42E-10
OCDF	8.00E-10	2.66E-09	4.13E-10	2.21E-10	2.98E-10	2.00E-10	2.40E-10	2.37E-08	3.95E-10	2.63E-09
PAHs										
Acenaphthene										
Acenaphthylene										
Anthracene										
Benzo(a)anthracene										
Benzo(a)pyrene										
Benzo(b)fluoranthene										
Benzo(g,h,i)perylene										
Benzo(k)fluoranthene										
Chrysene										
Dibenzo(a,h)anthracene										
Fluoranthene										
Fluorene										
Indeno(1,2,3-cd)pyrene										
2-Methylnaphthalene										
Naphthathalene										
Phenanthrene										
Pyrene										
Total PCBs										
Acid Gasses										
Hydrogen Chloride	8.30E-01	1.03E+00	5.13E+00	7.30E-01	8.10E-01	7.50E-01	7.60E-01	1.49E+00	1.64E+00	1.46E+00
Additional Hydrogen Chloride (8/2012)										
Hydrogen Fluoride (as Total Fluoride)				5.42E-03 <	5.17E-03 <	5.17E-03 <		2.08E-02 <	2.07E-02 <	2.04E-02 <
Sulfuric Acid				7.82E-02	6.88E-02	6.90E-02		7.94E-02	5.42E-02	1.21E-01
Metals										
Antimony										
Arsenic	1.32E-05 <	1.31E-05 <	1.31E-05 <	1.29E-05 <	1.29E-05 <	1.26E-05 <	1.28E-05 <	1.29E-05 <	1.29E-05 <	1.27E-05 <
Beryllium	1.32E-06	1.31E-06	1.31E-06 <	2.57E-06 <	2.57E-06 <	2.53E-06 <	2.56E-06 <	1.29E-06 <	1.29E-06 <	1.27E-06 <
Cadmium	6.87E-06	7.75E-06	1.39E-05	8.98E-06	9.15E-06	1.16E-05	9.92E-06	5.12E-06 <	5.13E-06 <	1.05E-05
Chromium (total)	3.93E-05	2.28E-05	5.09E-05	4.37E-05	2.76E-05	3.39E-05	3.51E-05	1.61E-05	1.15E-05	2.73E-05
Hexavalent Chromium				5.07E-05 <	5.17E-05 <	5.07E-05 <	5.10E-05			
Cobalt										
Copper										
Lead	4.83E-05	3.04E-05	5.93E-05	7.17E-05	7.70E-05	6.15E-05	7.01E-05	8.86E-05	3.78E-05	9.70E-05
Manganese										
Mercury	2.49E-04	2.61E-04	2.37E-04	1.24E-03	9.90E-04	1.01E-03	1.08E-03	2.22E-04	2.36E-04	2.14E-04
Mercury extra runs 8/2012										
Nickel	1.01E-04	3.20E-05	1.25E-04	9.65E-05	3.94E-05	4.84E-05	6.14E-05	6.73E-05	4.50E-05	5.15E-05
Selenium										
Zinc										
Formaldehyde										

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

	October 2004			November 2005			November 2006			November 2007		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	2.36E-11 <	2.69E-11 <	2.47E-11 <	5.21E-11 <	1.61E-10 <	7.02E-11 <	2.53E-11	5.08E-11	2.13E-11 <	6.30E-11 <	6.12E-11	3.65E-11 <
1,2,3,7,8-PeCDD	6.23E-11 <	2.25E-11 <	3.73E-11 <	1.06E-10 <	1.78E-10 <	1.15E-10 <	6.92E-11	1.46E-10	9.96E-11	8.08E-11 <	1.75E-10 <	7.94E-11
1,2,3,4,7,8-HxCDD	6.57E-11 <	5.68E-11 <	6.27E-11 <	1.24E-10 <	2.45E-10 <	1.22E-10 <	1.03E-10	2.14E-10	1.29E-10	1.45E-10 <	1.97E-10	9.53E-11 <
1,2,3,6,7,8-HxCDD	1.24E-10	9.75E-11	1.25E-10 <	5.45E-10	4.12E-10	3.50E-10	3.80E-10	5.52E-10	4.38E-10	4.39E-10	4.82E-10	3.47E-10
1,2,3,7,8,9-HxCDD	8.32E-11	6.38E-11	7.46E-11 <	2.17E-10 <	2.67E-10 <	2.17E-10	1.53E-10	3.51E-10	2.39E-10	2.56E-10 <	3.34E-10	1.93E-10 <
1,2,3,4,6,7,8-HpCDD	9.80E-10	6.61E-10	1.05E-09	3.68E-09	3.76E-09	2.49E-09	2.46E-09	5.04E-09	3.46E-09	3.39E-09	3.47E-09	3.03E-09
OCDD	1.74E-09	1.05E-09	2.07E-09	4.74E-09	5.61E-09	3.36E-09	3.07E-09	9.10E-09	5.81E-09	5.50E-09	4.63E-09	3.85E-09
2,3,7,8-TCDF	8.55E-11	6.19E-11 <	1.06E-10	9.68E-11 <	1.47E-10 <	1.02E-10	1.12E-10	2.21E-10	1.54E-10	1.54E-10	3.17E-10	1.59E-10
1,2,3,7,8-PeCDF	9.94E-11 <	8.95E-11	1.59E-10	1.45E-10 <	2.61E-10	1.75E-10	1.49E-10	4.10E-10	2.47E-10	2.25E-10	5.47E-10	2.08E-10
2,3,4,7,8-PeCDF	1.86E-10	1.37E-10 <	2.36E-10	2.45E-10	3.00E-10	2.41E-10	2.52E-10	5.16E-10	3.48E-10	3.45E-10	6.64E-10	3.28E-10
1,2,3,4,7,8-HxCDF	1.48E-10	1.28E-10	2.18E-10	2.45E-10	2.92E-10	3.06E-10	1.96E-10	7.04E-10	3.62E-10	3.24E-10	5.51E-10	2.73E-10
1,2,3,6,7,8-HxCDF	1.60E-10	1.29E-10	2.17E-10	2.55E-10	2.79E-10	2.86E-10	2.02E-10	7.56E-10	4.24E-10	3.17E-10	6.39E-10	2.68E-10
2,3,4,6,7,8-HxCDF	1.77E-10	1.39E-10	2.26E-10	3.08E-10	3.32E-10	3.48E-10	2.66E-10	8.47E-10	4.93E-10	4.59E-10	6.67E-10	3.43E-10
1,2,3,7,8,9-HxCDF	1.70E-11 <	2.04E-11 <	7.87E-11	7.33E-11 <	1.44E-10 <	7.20E-11 <	6.53E-11 <	2.80E-10	1.69E-10	1.04E-10	1.62E-10	8.86E-11
1,2,3,4,6,7,8-HpCDF	4.45E-10	3.38E-10	7.04E-10	6.62E-10	7.38E-10	9.33E-10	5.73E-10	3.26E-09	1.35E-09	1.28E-09	1.49E-09	8.41E-10
1,2,3,4,7,8,9-HpCDF	9.00E-11	6.28E-11 <	1.17E-10	7.50E-11 <	1.44E-10 <	2.35E-10	1.08E-10	5.86E-10	3.51E-10	2.59E-10	2.26E-10	1.50E-10 <
OCDF	2.59E-10	6.07E-11 <	4.36E-10	1.84E-10 <	2.65E-10 <	5.43E-10	3.66E-10	2.29E-09	1.46E-09	1.16E-09	7.11E-10	6.44E-10
PAHs												
Acenaphthene										1.60E-07	1.85E-07	1.63E-07
Acenaphthylene										9.92E-08	1.19E-07	1.08E-07
Anthracene										1.42E-07	1.17E-07	9.59E-08
Benzo(a)anthracene										6.59E-08	5.00E-08	1.38E-07
Benzo(a)pyrene										1.46E-07	3.39E-07	9.58E-08
Benzo(b)fluoranthene										1.90E-07	1.61E-07	1.88E-07
Benzo(g,h,i)perylene										2.38E-06	2.57E-06	1.51E-06
Benzo(k)fluoranthene										4.17E-08	3.84E-08	5.58E-08
Chrysene										1.69E-07	9.60E-08	3.26E-07
Dibenzo(a,h)anthracene										4.86E-08 <	5.14E-08 <	5.05E-08 <
Fluoranthene										1.07E-06	1.63E-06	6.94E-07
Fluorene										3.97E-07	5.29E-07	4.18E-07
Indeno(1,2,3-cd)pyrene										3.57E-07	3.95E-07	2.25E-07
2-Methylnaphthalene										5.80E-06	3.47E-06	5.95E-06
Naphthathalene										2.48E-05	1.70E-05	2.73E-05
Phenanthrene										1.16E-06	1.39E-06	1.04E-06
Pyrene										2.31E-06	4.11E-06	1.08E-06
Total PCBs												
Acid Gasses												
Hydrogen Chloride	6.44E-01	5.75E-01	4.55E-01	2.52E-01	2.80E-01	2.67E-01	7.79E-01	8.72E-01	7.45E-01	6.60E-01	5.13E-01	5.13E-01
Additional Hydrogen Chloride (8/2012)												
Hydrogen Fluoride (as Total Fluoride)	2.04E-02 <	1.95E-02 <	1.99E-02 <	5.15E-03 <	5.33E-03 <	5.20E-03 <	5.22E-03 <	5.36E-03 <	5.24E-03 <	5.04E-03 <	5.04E-03 <	5.04E-03 <
Sulfuric Acid	2.48E-03	7.60E-03	6.45E-03	1.64E-03	1.27E-02	3.28E-03	3.89E-03	3.94E-03	3.94E-03	3.78E-03 <	3.78E-03 <	8.82E-03
Metals												
Antimony												
Arsenic	1.26E-05 <	1.25E-05 <	1.25E-05 <	1.76E-05	1.37E-05	1.46E-05	1.11E-05	1.24E-05	1.05E-05	1.46E-05	1.47E-05	1.36E-05
Beryllium	1.26E-06 <	1.25E-06 <	1.25E-06 <	1.27E-06 <	1.29E-06 <	1.31E-06 <	1.32E-06 <	1.29E-06 <	1.31E-06 <	1.26E-06 <	1.27E-06 <	1.25E-06 <
Cadmium	5.97E-05	4.51E-04	3.98E-05	1.69E-05	1.42E-05	1.51E-05	1.54E-05	1.34E-05	1.45E-05	2.38E-05	2.38E-05	2.17E-05
Chromium (total)	6.20E-06	6.26E-06	5.27E-06	4.02E-05	2.32E-05	4.41E-05	4.85E-05	1.18E-04	5.30E-05	5.29E-05	3.74E-05	3.81E-05
Hexavalent Chromium												
Cobalt												
Copper												
Lead	5.42E-05	1.08E-04	5.75E-05	1.92E-04	1.83E-04	1.80E-04	3.38E-04	2.71E-04	2.75E-04	4.22E-04	4.17E-04	5.47E-04
Manganese												
Mercury	5.34E-04	5.46E-04	4.88E-04	1.71E-04	1.58E-04	1.85E-04	3.30E-04	3.59E-04	3.40E-04	2.77E-04	2.66E-04	2.99E-04
Mercury extra runs 8/2012												
Nickel	9.31E-05	1.66E-04	6.12E-05	1.37E-04	4.52E-05	8.40E-05	1.09E-04	1.10E-04	6.51E-05	4.33E-05	2.39E-05	2.03E-05
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

Constituent	October 2008 Run 1 Emission Rate g/s	October 2008 Run 2 Emission Rate g/s	October 2008 Run 3 Emission Rate g/s	October 2009 Run 1 Emission Rate g/s	October 2009 Run 2 Emission Rate g/s	October 2009 Run 3 Emission Rate g/s	October 2010 Run 1 Emission Rate g/s	October 2010 Run 2 Emission Rate g/s	October 2010 Run 3 Emission Rate g/s	August 2011 Run 1 Emission Rate g/s	August 2011 Run 2 Emission Rate g/s	August 2011 Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	8.51E-11	3.78E-11 <	7.54E-11	1.21E-10	4.99E-11 <	2.31E-11	3.92E-11 <	3.13E-10	5.73E-11 <	1.11E-11 <	1.94E-09	1.12E-10
1,2,3,7,8-PeCDD	2.74E-10	1.02E-10	1.94E-10	2.72E-10	1.54E-10	5.54E-11 <	9.49E-11	7.92E-10 <	7.39E-11	7.08E-11	3.63E-09	3.38E-10
1,2,3,4,7,8-HxCDD	2.26E-10	7.29E-11 <	1.57E-10	1.99E-10	1.54E-10	7.02E-11	6.17E-11	5.62E-10	4.23E-11 <	6.68E-11	1.94E-09	2.00E-10
1,2,3,6,7,8-HxCDD	4.64E-10	2.12E-10	2.65E-10	3.73E-10	3.28E-10	1.72E-10	2.09E-10	6.66E-10	1.98E-10	2.47E-10	2.75E-09	3.31E-10
1,2,3,7,8,9-HxCDD	3.88E-10	1.29E-10	1.32E-10	2.63E-10	2.45E-10	1.03E-10	1.19E-10 <	3.82E-10	7.97E-11 <	1.34E-10	3.49E-09	1.96E-10
1,2,3,4,6,7,8-HpCDD	5.03E-09	1.50E-09	1.52E-09	2.87E-09	2.48E-09	1.27E-09	1.05E-09 <	2.02E-09	9.61E-10	1.54E-09	1.88E-08	1.37E-09
OCDD	1.97E-08	2.70E-09	3.46E-09	6.44E-09	5.22E-09	2.30E-09	1.92E-09	1.63E-09	1.50E-09	2.10E-09	3.92E-08	1.48E-09
2,3,7,8-TCDF	3.51E-10	2.22E-10	1.82E-10	5.70E-10	3.38E-10	1.19E-10	1.39E-10	3.65E-10	8.22E-11	9.91E-11	9.30E-09	2.00E-10
1,2,3,7,8-PeCDF	6.20E-10	2.83E-10	2.46E-10	1.03E-09	5.61E-10	1.50E-10	1.86E-10	3.55E-10	2.01E-10	1.30E-10	1.68E-08	2.21E-10
2,3,4,7,8-PeCDF	7.28E-10	3.50E-10	3.00E-10	1.02E-09	5.61E-10 <	2.19E-10	2.41E-10	4.70E-10	2.86E-10	2.02E-10	1.19E-08	2.81E-10
1,2,3,4,7,8-HxCDF	8.67E-10	3.01E-10	2.74E-10	1.17E-09	6.21E-10	1.69E-10 <	2.17E-10	3.86E-10	2.05E-10	1.75E-10	1.48E-08	2.64E-10
1,2,3,6,7,8-HxCDF	1.02E-09	3.20E-10	2.86E-10	1.24E-09	6.60E-10	1.81E-10	1.92E-10	3.46E-10	2.20E-10	1.72E-10	1.63E-08	2.60E-10
2,3,4,6,7,8-HxCDF	1.28E-09	3.41E-10	2.95E-10	1.04E-09	6.33E-10	2.06E-10	2.11E-10	2.85E-10	2.59E-10	2.25E-10	1.19E-08	2.50E-10
1,2,3,7,8,9-HxCDF	3.89E-10 <	1.16E-10	8.71E-11 <	3.26E-10	1.99E-10	4.68E-11 <	5.79E-11 <	7.12E-11 <	5.95E-11 <	1.19E-11 <	7.38E-11 <	1.36E-11 <
1,2,3,4,6,7,8-HpCDF	4.97E-09	8.95E-10	9.07E-10	3.14E-09	2.12E-09	5.79E-10	4.21E-10	7.00E-10	4.78E-10	4.67E-10	3.84E-08	6.41E-10
1,2,3,4,7,8,9-HpCDF	1.59E-09	1.70E-10	2.20E-10	6.39E-10	5.08E-10	1.61E-11 <	8.39E-11 <	1.02E-10	9.69E-11	1.03E-10	7.95E-09	1.24E-10
OCDF	1.11E-08	6.07E-10	1.22E-09	2.45E-09	1.84E-09	3.53E-10 <	1.16E-10 <	1.42E-10 <	1.84E-10	3.21E-10	2.28E-08	4.04E-10
PAHs												
Acenaphthene							2.27E-07	5.91E-07	4.96E-07			
Acenaphthylene							7.09E-08	1.50E-07	1.13E-07			
Anthracene							9.96E-08	2.26E-07	2.00E-07			
Benzo(a)anthracene							8.18E-07	2.93E-08	7.07E-07			
Benzo(a)pyrene							2.22E-07	1.11E-07	2.05E-07			
Benzo(b)fluoranthene							7.85E-07	1.04E-07	9.01E-07			
Benzo(g,h,i)perylene							2.63E-06	1.68E-06	2.51E-06			
Benzo(k)fluoranthene							3.49E-07	4.00E-08	3.48E-07			
Chrysene							1.22E-06	7.92E-08	1.06E-06			
Dibenzo(a,h)anthracene							5.02E-08 <	4.97E-08 <	4.98E-08 <			
Fluoranthene							1.55E-06	2.13E-06	1.69E-06			
Fluorene							7.85E-07	1.39E-06	1.20E-06			
Indeno(1,2,3-cd)pyrene							3.76E-07	2.11E-07	3.24E-07			
2-Methylnaphthalene							2.37E-06	4.08E-06	3.38E-06			
Naphthathalene							1.02E-05	1.14E-05	9.71E-06			
Phenanthrene							3.07E-06	5.92E-06	4.68E-06			
Pyrene							1.79E-06	2.28E-06	1.54E-06			
Total PCBs												
Acid Gasses												
Hydrogen Chloride	1.10E+00	9.29E-01	1.14E+00	7.74E-01	5.43E-01	6.72E-01	7.48E-01	7.85E-01	7.12E-01	1.05E+00	7.76E-01	7.11E-01
Additional Hydrogen Chloride (8/2012)												
Hydrogen Fluoride (as Total Fluoride)	5.12E-03 <	5.10E-03 <	5.08E-03 <	5.17E-03 <	5.17E-03 <	5.04E-03 <	4.99E-03 <	5.03E-03 <	5.08E-03 <	9.75E-03 <	4.93E-03 <	4.98E-03 <
Sulfuric Acid	5.28E-03 <	5.52E-03 <	5.27E-03 <	3.50E-03 <	3.11E-03 <	3.31E-03 <	7.28E-03	7.21E-03 <	1.94E-02	9.75E-03	5.85E-03	6.21E-03
Metals												
Antimony												
Arsenic	5.01E-06 <	7.21E-06 <	5.01E-06 <	1.56E-05	4.54E-05	4.74E-05	3.64E-05	2.99E-05	2.96E-05	1.71E-05	6.55E-06	7.57E-06
Beryllium	1.25E-06 <	1.21E-06 <	1.26E-06 <	1.24E-06 >	1.23E-06 <	1.24E-06	1.26E-06 <	1.25E-06 <	1.26E-06	1.21E-06 <	1.24E-06 <	1.23E-06 <
Cadmium	8.30E-06	1.04E-05	5.47E-06	2.37E-05	4.56E-05	4.86E-05	5.76E-05	4.65E-05	4.79E-05	1.50E-05	8.76E-06	1.12E-05
Chromium (total)	3.78E-05	7.30E-05	3.40E-05	1.64E-05	4.18E-05	3.69E-05	7.09E-05	1.14E-04	6.48E-05	1.64E-04	4.96E-06 <	4.93E-06 <
Hexavalent Chromium												
Cobalt												
Copper												
Lead	2.68E-05	5.36E-05	1.58E-05	3.04E-04	7.77E-04	7.40E-04	7.45E-04	7.17E-04	7.94E-04	2.36E-04	1.41E-04	1.71E-04
Manganese												
Mercury	4.36E-04	4.76E-04	4.27E-04	4.06E-04	8.74E-05	1.49E-04	4.10E-04	4.22E-04	4.07E-04	7.47E-04	6.25E-04	6.39E-04
Mercury extra runs 8/2012												
Nickel	4.38E-05	4.35E-05	1.85E-05	3.18E-05	3.65E-05	8.20E-05	4.60E-05	1.99E-05	8.76E-05	6.68E-05	4.96E-06 <	4.71E-05
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-2b
Unit 2 Stack Emissions
Montgomery County RRF
Dickerson, MD

Constituent	August 2012 Run 1 Emission Rate g/s	August 2012 Run 2 Emission Rate g/s	August 2012 Run 3 Emission Rate g/s	August 2013 Run 1 Emission Rate g/s	August 2013 Run 2 Emission Rate g/s	August 2013 Run 3 Emission Rate g/s
Dioxins/Furans						
2,3,7,8-TCDD	2.11E-11 <	7.13E-11	2.63E-11 <	6.25E-11	4.42E-11	1.85E-11 <
1,2,3,7,8-PeCDD	2.73E-11 <	2.57E-10	2.44E-11 <	2.52E-10	1.66E-10	4.03E-11
1,2,3,4,7,8-HxCDD	2.21E-11 <	1.53E-10	1.95E-11 <	1.45E-10	1.49E-10	3.72E-11
1,2,3,6,7,8-HxCDD	3.32E-11	3.39E-10	3.34E-11	6.01E-10	2.63E-10	7.27E-11
1,2,3,7,8,9-HxCDD	2.28E-11 <	2.71E-10	3.63E-11	1.42E-10	2.36E-10	5.73E-11
1,2,3,4,6,7,8-HpCDD	2.70E-10	2.09E-09	2.80E-10	1.16E-09	2.10E-09	4.36E-10
OCDD	5.82E-10	4.89E-09	7.13E-10	8.58E-10	4.02E-09	7.51E-10
2,3,7,8-TCDF	4.32E-11	3.33E-10	1.87E-11 <	2.33E-10	3.21E-10	1.01E-10
1,2,3,7,8-PeCDF	4.82E-11	6.45E-10	3.08E-11	1.31E-10	5.80E-10	1.44E-10
2,3,4,7,8-PeCDF	4.35E-11	6.46E-10	2.62E-11	3.18E-10	6.75E-10	1.35E-10
1,2,3,4,7,8-HxCDF	5.16E-11	8.78E-10	1.82E-11	1.30E-10	7.13E-10	1.36E-10
1,2,3,6,7,8-HxCDF	5.75E-11	1.05E-09	2.30E-11	1.14E-10	7.61E-10	1.39E-10
2,3,4,6,7,8-HxCDF	4.92E-11	8.17E-10	2.59E-11	9.39E-11	6.41E-10	1.09E-10
1,2,3,7,8,9-HxCDF	1.79E-11 <	2.18E-11 <	1.84E-11 <	1.46E-11 <	1.92E-11 <	1.27E-11 <
1,2,3,4,6,7,8-HpCDF	1.35E-10	3.08E-09	7.90E-11	1.73E-10	2.03E-09	3.02E-10
1,2,3,4,7,8,9-HpCDF	1.44E-11 <	5.70E-10	2.46E-11 <	2.17E-11	3.36E-10	3.82E-11
OCDF	6.30E-11	1.93E-09	3.39E-11	5.93E-11	8.57E-10	1.03E-10
PAHs						
Acenaphthene				4.38E-07	3.30E-07	3.19E-07
Acenaphthylene				1.50E-05	3.55E-07	7.87E-07
Anthracene				6.24E-06	2.36E-07	4.80E-07
Benzo(a)anthracene				1.24E-06	1.11E-08	9.15E-08
Benzo(a)pyrene				1.51E-07	6.67E-09	1.43E-07
Benzo(b)fluoranthene				3.89E-07	3.51E-08	3.80E-07
Benzo(g,h,i)perylene				1.59E-07	2.12E-07	1.99E-06
Benzo(k)fluoranthene				3.40E-07	1.38E-08	5.51E-08
Chrysene				1.89E-06	4.82E-08	1.57E-07
Dibenzo(a,h)anthracene				1.32E-08 <	2.49E-09 <	2.00E-09 <
Fluoranthene				3.99E-05	8.74E-07	3.00E-06
Fluorene				4.86E-06	1.07E-06	1.03E-06
Indeno(1,2,3-cd)pyrene				7.29E-08	4.25E-08	3.31E-07
2-Methylnaphthalene				2.06E-06	1.95E-06	1.91E-06
Naphthathalene				1.17E-05	8.43E-06	8.27E-06
Phenanthrene				6.28E-05	2.21E-06	5.56E-06
Pyrene				3.42E-05	5.62E-07	2.98E-06
Total PCBs						
Acid Gasses						
Hydrogen Chloride	9.66E-01	9.78E-01	9.29E-01	5.78E-01	6.94E-01	3.15E-01
Additional Hydrogen Chloride (8/2012)	9.75E-01	9.95E-01	9.68E-01			
Hydrogen Fluoride (as Total Fluoride)	1.66E-02	8.20E-03	1.37E-02	5.15E-03	5.05E-03 <	5.15E-03 <
Sulfuric Acid	4.84E-03	5.63E-03	5.33E-03 <	1.92E-03 <	1.95E-03	2.05E-03 <
Metals						
Antimony						
Arsenic	7.37E-06	1.06E-05	7.18E-06	8.76E-06	5.04E-06 <	8.13E-06
Beryllium	1.29E-06 <	1.27E-06 <	1.30E-06 <	1.27E-06 <	1.26E-06 <	1.29E-06 <
Cadmium	1.81E-05	1.75E-05	1.20E-05	7.43E-06	1.13E-05	5.34E-06
Chromium (total)	2.96E-05	3.12E-05	5.03E-05	6.77E-05	3.12E-05	4.54E-05
Hexavalent Chromium						
Cobalt						
Copper						
Lead	3.04E-04	3.19E-04	1.93E-04	1.30E-04	1.23E-04	7.18E-05
Manganese						
Mercury	2.76E-04	2.97E-04	3.45E-04	1.95E-04	2.42E-04	2.55E-04
Mercury extra runs 8/2012	3.84E-04	7.40E-04	4.23E-04			
Nickel	6.29E-05	7.70E-05	5.23E-05	1.29E-04	3.98E-05	6.34E-05
Selenium						
Zinc						
Formaldehyde						

< = Not Detected

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

	July/August 1995			December 1995			February 1996			April/May 1996		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD				7.78E-11 <	2.88E-11 <	4.29E-11 <			5.24E-10 <	4.32E-11 <	4.35E-11 <	5.99E-11 <
1,2,3,7,8-PeCDD				1.74E-10	9.89E-11	2.18E-10			1.75E-09 <	5.17E-11 <	4.35E-11 <	6.87E-11 <
1,2,3,4,7,8-HxCDD				1.31E-10	9.03E-11	2.28E-10			4.37E-09 <	6.06E-11 <	6.07E-11 <	8.58E-11 <
1,2,3,6,7,8-HxCDD				2.54E-10	1.91E-10	3.00E-10			3.50E-09 <	5.17E-11 <	8.70E-11	8.58E-11 <
1,2,3,7,8,9-HxCDD				3.98E-10	2.84E-10	4.98E-10			3.50E-09 <	5.17E-11 <	8.70E-11	8.58E-11 <
1,2,3,4,6,7,8-HpCDD				2.10E-09	1.41E-09	2.83E-09			4.73E-09 <	8.64E-10	8.70E-10	5.99E-10
OCDD				4.97E-09	3.39E-09	7.71E-09			2.10E-08 <	1.04E-09 <	3.57E-09	1.11E-09
2,3,7,8-TCDF				2.01E-10	1.37E-10	1.99E-10			8.74E-10	6.90E-11 <	8.70E-11	7.70E-11
1,2,3,7,8-PeCDF				3.93E-10	2.29E-10	3.32E-10			7.88E-10 <	3.46E-11 <	5.21E-11 <	5.15E-11 <
2,3,4,7,8-PeCDF				4.44E-10	3.22E-10	5.01E-10			7.88E-10 <	8.64E-11 <	8.70E-11 <	1.71E-10
1,2,3,4,7,8-HxCDF				1.21E-09	8.38E-10	1.62E-09			2.62E-09 <	2.59E-10	1.74E-10 <	1.71E-10
1,2,3,6,7,8-HxCDF				5.36E-10	3.35E-10	6.72E-10			1.75E-09 <	8.64E-11	8.70E-11	7.70E-11
2,3,4,6,7,8-HxCDF				8.64E-10	5.71E-10	1.05E-09			2.62E-09 <	1.73E-10	1.74E-10	1.71E-10 <
1,2,3,7,8,9-HxCDF				8.83E-11	4.51E-11	6.18E-11			2.62E-09 <	4.32E-11 <	5.21E-11 <	6.87E-11 <
1,2,3,4,6,7,8-HpCDF				2.05E-09	1.24E-09	2.91E-09			1.31E-09 <	2.59E-10 <	2.61E-10 <	2.57E-10 <
1,2,3,4,7,8,9-HpCDF				3.25E-10	2.95E-10	5.03E-10			5.24E-09 <	5.17E-11 <	5.21E-11 <	6.87E-11 <
OCDF				1.66E-09	1.18E-09	2.17E-09			3.24E-08 <	8.64E-11 <	2.61E-10 <	1.71E-10
PAHs												
Acenaphthene	1.29E-05 <	1.21E-04 <	1.03E-05 <							1.44E-05 <	1.54E-05 <	3.52E-06 <
Acenaphthylene	6.98E-06 <	6.51E-06 <	5.61E-06 <							7.69E-06 <	8.27E-06 <	5.83E-06 <
Anthracene	7.14E-06 <	6.60E-06 <	5.80E-06 <							1.05E-05 <	1.11E-05 <	3.18E-06 <
Benzo(a)anthracene	6.02E-06 <	5.48E-06 <	4.81E-06 <							4.57E-06 <	4.79E-06 <	4.38E-06 <
Benzo(a)pyrene	6.63E-06 <	6.17E-06 <	5.52E-06 <							3.45E-06 <	3.30E-06 <	4.55E-06
Benzo(b)fluoranthene	6.27E-06 <	5.82E-06 <	5.25E-06 <							3.20E-06 <	3.05E-06 <	3.09E-06
Benzo(g,h,i)perylene	7.85E-06 <	7.30E-06 <	6.59E-06 <							3.28E-06 <	3.21E-06 <	4.46E-06
Benzo(k)fluoranthene	6.45E-06 <	6.00E-06 <	5.43E-06 <							3.45E-06 <	3.30E-06 <	3.94E-06
Chrysene	6.63E-06 <	6.00E-06 <	5.34E-06 <							4.84E-06 <	5.13E-06 <	2.14E-06
Dibenzo(a,h)anthracene	7.94E-06 <	7.30E-06 <	6.59E-06 <							4.06E-06 <	3.92E-06 <	4.11E-06
Fluoranthene	6.19E-06 <	5.73E-06 <	4.99E-06 <							8.38E-06 <	8.78E-06 <	3.52E-06 <
Fluorene	1.07E-05 <	9.99E-06 <	8.56E-06 <							1.23E-05 <	1.34E-05 <	9.00E-06
Indeno(1,2,3-cd)pyrene	7.50E-06 <	6.96E-06 <	6.24E-06 <							2.94E-06 <	2.78E-06 <	3.34E-06
2-Methylnaphthalene	1.19E-05 <	1.09E-05 <	9.89E-06 <							9.50E-06 <	1.11E-05 <	1.02E-05 <
Naphthathalene	3.96E-05	3.49E-05	2.58E-05							6.58E-05	7.37E-05	8.10E-05
Phenanthrene	1.51E-05	6.51E-06 <	5.70E-06 <							1.01E-05	1.06E-05 <	5.57E-06
Pyrene	5.85E-06 <	5.30E-06 <	4.73E-06 <							6.05E-06 <	6.35E-06 <	3.43E-06
Total PCBs	3.31E-04	3.84E-04	2.99E-04							8.46E-05	5.88E-05	7.55E-05
Acid Gasses												
Hydrogen Chloride												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony	1.33E-05 <	5.14E-06	1.33E-05 <							9.66E-05	9.50E-05	1.04E-04
Arsenic	7.81E-06 <	1.74E-05 <	1.77E-05 <									
Beryllium	4.43E-06 <	1.66E-06	4.43E-06 <				4.69E-06 <	4.73E-06 <	4.59E-06	4.53E-06 <	4.53E-06 <	4.56E-06 <
Cadmium	4.43E-06 <	4.36E-06 <	4.43E-06 <									
Chromium (total)	1.10E-05	5.80E-06	1.33E-05 <							1.88E-04	1.86E-04	1.93E-04
Hexavalent Chromium	5.29E-06	4.91E-06	4.16E-06									
Cobalt	4.43E-06 <	4.36E-06 <	4.43E-06 <									
Copper	4.79E-05	2.38E-05	2.60E-05							3.00E-05	2.58E-05	2.78E-05
Lead	8.86E-06 <	1.35E-03	8.86E-06 <									
Manganese												
Mercury	3.49E-04	3.05E-04	1.02E-03	1.07E-03	1.31E-03	1.27E-03	1.66E-03	1.56E-03	1.49E-03	5.75E-05	4.59E-05	5.42E-05
Nickel	1.65E-05	1.31E-05 <	1.33E-05 <									
Selenium	2.19E-05	9.29E-06	2.99E-05							1.02E-04	1.01E-04	1.10E-04
Zinc	5.80E-04	3.11E-04	2.47E-04									
Formaldehyde												

< = Not Detected

Appendix A-3a
Unit 3 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Dioxin/Furans						
2,3,7,8-TCDD	g/s	1.12E-11	6.26E-10	1.12E-11	5.24E-10	25/64
1,2,3,7,8-PeCDD	g/s	3.98E-11	1.98E-09	2.28E-11	1.75E-09	48/64
1,2,3,4,7,8-HxCDD	g/s	3.77E-11	1.15E-09	1.78E-11	4.37E-09	47/64
1,2,3,6,7,8-HxCDD	g/s	5.69E-11	2.22E-09	5.17E-11	3.50E-09	54/64
1,2,3,7,8,9-HxCDD	g/s	3.21E-11	1.65E-09	1.43E-11	3.50E-09	46/64
1,2,3,4,6,7,8-HpCDD	g/s	3.01E-10	2.30E-08	5.91E-10	4.73E-09	61/64
OCDD	g/s	4.67E-10	1.40E-07	5.91E-10	2.10E-08	58/64
2,3,7,8-TCDF	g/s	3.25E-11	4.38E-09	6.90E-11	2.40E-10	55/64
1,2,3,7,8-PeCDF	g/s	4.19E-11	8.82E-09	3.46E-11	7.88E-10	55/64
2,3,4,7,8-PeCDF	g/s	6.24E-11	8.37E-09	8.43E-11	7.88E-10	57/64
1,2,3,4,7,8-HxCDF	g/s	5.43E-11	2.07E-08	1.69E-10	2.62E-09	59/64
1,2,3,6,7,8-HxCDF	g/s	4.04E-11	9.22E-09	1.59E-10	1.75E-09	59/64
2,3,4,6,7,8-HxCDF	g/s	4.81E-11	5.45E-09	6.44E-11	2.62E-09	59/64
1,2,3,7,8,9-HxCDF	g/s	2.34E-11	3.18E-09	4.58E-12	2.62E-09	33/64
1,2,3,4,6,7,8-HpCDF	g/s	1.10E-10	3.33E-08	1.73E-10	5.65E-09	55/64
1,2,3,4,7,8,9-HpCDF	g/s	1.90E-11	2.29E-08	1.46E-11	5.24E-09	44/64
OCDF	g/s	4.86E-11	2.36E-07	7.99E-11	3.24E-08	50/64
PAHs						
Acenaphthene	g/s	3.20E-08	1.09E-06	3.52E-06	1.21E-04	9/15
Acenaphthylene	g/s	2.67E-08	2.13E-06	5.61E-06	8.27E-06	9/15
Anthracene	g/s	4.13E-08	2.17E-07	3.18E-06	1.11E-05	9/15
Benzo(a)anthracene	g/s	2.72E-08	1.06E-07	6.60E-08	6.02E-06	11/18
Benzo(a)pyrene	g/s	3.69E-08	4.55E-06	7.11E-08	6.63E-06	10/18
Benzo(b)fluoranthene	g/s	5.97E-08	3.09E-06	4.32E-07	6.27E-06	12/18
Benzo(g,h,i)perylene	g/s	4.97E-07	4.46E-06	3.21E-06	7.85E-06	10/15
Benzo(k)fluoranthene	g/s	1.28E-08	1.31E-05	3.30E-06	6.60E-06	12/18
Chrysene	g/s	5.10E-08	2.26E-04	4.84E-06	9.01E-05	12/18
Dibenzo(a,h)anthracene	g/s	1.39E-08	4.11E-06	4.91E-08	7.94E-06	2/18
Fluoranthene	g/s	5.44E-07	2.17E-06	3.52E-06	8.78E-06	9/15
Fluorene	g/s	2.76E-07	9.00E-06	8.56E-06	1.34E-05	10/15
Indeno(1,2,3-cd)pyrene	g/s	8.26E-08	3.34E-06	4.69E-07	7.50E-06	12/18
Methylnaphthalene, 2-	g/s	4.41E-07	5.30E-05	9.50E-06	1.19E-05	9/15
Naphthalene	g/s	5.02E-06	8.10E-05	--	--	15/15
Phenanthrene	g/s	6.15E-07	1.51E-05	5.70E-06	1.06E-05	12/15
Pyrene	g/s	8.71E-07	5.49E-06	4.73E-06	6.35E-06	10/15

Appendix A-3a
Unit 3 Stack Emissions Summary Statistics
Montgomery County RRF
Dickerson, MD

Chemical	Units	Minimum Concentration	Maximum Concentration	Minimum Non-Detect	Maximum Non-Detect	Detection Frequency
Total PCBs	g/s	9.21E-07	3.84E-04	1.10E-06	1.30E-06	13/15
Acid Gasses						
Hydrogen Chloride	g/s	2.66E-01	1.15E+00	--	--	38/38
Hydrogen Fluoride (as Total Fluoride)	g/s	7.89E-03	1.95E-02	4.88E-03	7.18E-02	5/36
Sulfuric Acid	g/s	1.97E-03	1.64E-01	1.61E-03	5.36E-03	27/35
Metals						
Antimony	g/s	5.14E-06	1.04E-04	1.33E-05	1.33E-05	13/15
Arsenic	g/s	6.98E-06	8.93E-05	4.75E-06	1.77E-05	27/41
Beryllium	g/s	1.31E-06	4.59E-06	1.19E-06	4.73E-06	3/65
Cadmium	g/s	4.90E-06	7.06E-05	4.36E-06	4.43E-06	38/41
Chromium total	g/s	5.80E-06	2.15E-04	4.64E-06	2.15E-05	53/59
Chromium +6	g/s	4.16E-06	5.29E-06	--	--	3/3
Cobalt	g/s	--	--	4.36E-06	4.43E-06	0/3
Copper	g/s	2.38E-05	4.47E-04	--	--	12/12
Lead	g/s	2.65E-05	1.04E-03	8.86E-06	8.86E-06	38/41
Manganese	g/s	1.30E-05	9.29E-05	--	--	3/3
Mercury as $HgCl_2$	g/s	4.59E-05	1.66E-03	1.52E-05	1.52E-05	67/68
Nickel	g/s	6.50E-06	2.75E-04	1.31E-05	1.33E-05	39/41
Selenium	g/s	9.29E-06	1.10E-04	1.49E-05	2.03E-05	6/12
Zinc	g/s	2.47E-04	5.80E-04	--	--	3/3
Aldehyde Ketones						
Formaldehyde	g/s	4.99E-04	2.00E-03	--	--	3/3

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

	August 1996			February 1997			November 1997			August 1998		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	7.59E-11	6.06E-11 <	5.70E-11	3.27E-11 <	9.61E-11 <	2.24E-11 <	6.27E-11 <	2.36E-11 <	3.60E-11 <			
1,2,3,7,8-PeCDD	8.43E-11	8.66E-11 <	8.13E-11	7.61E-11	4.43E-10	3.98E-11	2.60E-10	9.94E-11	1.90E-10			
1,2,3,4,7,8-HxCDD	8.43E-11	8.66E-11 <	1.63E-10	1.14E-10	1.11E-09	3.90E-11	6.13E-10	1.57E-10	7.30E-10			
1,2,3,6,7,8-HxCDD	8.43E-11 <	8.66E-11 <	1.63E-10 <	2.21E-10	1.26E-09	7.80E-11	1.17E-09	2.06E-10	1.10E-09			
1,2,3,7,8,9-HxCDD	8.43E-11 <	8.66E-11	3.25E-10 <	1.45E-10	8.87E-10	5.89E-11	7.44E-10	1.38E-10	6.30E-10			
1,2,3,4,6,7,8-HpCDD	5.91E-10 <	4.33E-10	1.46E-09 <	1.29E-09	9.61E-09	3.65E-10	1.34E-08	2.56E-09	2.30E-08			
OCDD	7.59E-10 <	6.06E-10	1.95E-09 <	4.64E-09	3.69E-08	1.16E-09	5.19E-08	1.18E-08	1.40E-07			
2,3,7,8-TCDF	8.43E-11 <	8.66E-11 <	8.13E-11 <	1.45E-10	7.32E-10	8.30E-11	2.10E-10	6.56E-11	1.40E-10			
1,2,3,7,8-PeCDF	8.43E-11	6.06E-11 <	1.63E-10 <	2.21E-10	3.62E-09	9.96E-11	3.77E-10	1.87E-10	4.11E-10			
2,3,4,7,8-PeCDF	8.43E-11 <	8.66E-11	2.44E-10 <	2.06E-10	1.70E-09	8.30E-11	7.12E-10	2.26E-10	6.80E-10			
1,2,3,4,7,8-HxCDF	2.53E-10	8.66E-11	4.88E-10 <	3.20E-10	2.07E-08	1.24E-10	1.34E-09	5.97E-10	1.90E-09			
1,2,3,6,7,8-HxCDF	8.44E-11	7.81E-11	2.44E-10 <	2.82E-10	5.32E-09	9.13E-11	1.42E-09	4.23E-10	1.70E-09			
2,3,4,6,7,8-HxCDF	1.69E-10	1.73E-10	3.25E-10 <	2.82E-10	2.73E-09	8.30E-11	2.68E-09	4.89E-10	4.01E-09			
1,2,3,7,8,9-HxCDF	8.43E-11 <	6.06E-11 <	5.70E-11	9.90E-11	3.18E-09	3.73E-11	1.26E-09	2.06E-10	1.40E-09			
1,2,3,4,6,7,8-HpCDF	2.53E-10	1.73E-10 <	7.32E-10 <	1.37E-09	3.33E-08	3.40E-10	1.01E-08	2.56E-09	2.20E-08			
1,2,3,4,7,8,9-HpCDF	8.43E-11 <	7.80E-11 <	4.88E-11	2.13E-10	2.29E-08	8.13E-11	2.94E-09	5.12E-10	2.90E-09			
OCDF	8.43E-11	8.66E-11 <	2.44E-10 <	1.07E-09	2.36E-07	5.15E-10	9.20E-09	4.71E-09	2.40E-08			
PAHs												
Acenaphthene												
Acenaphthylene												
Anthracene												
Benzo(a)anthracene										7.81E-08	9.85E-08	6.60E-08 <
Benzo(a)pyrene										7.11E-08 <	7.12E-08 <	7.21E-08 <
Benzo(b)fluoranthene										1.18E-06	1.66E-06	4.32E-07 <
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene										8.28E-06	1.31E-05	6.60E-06 <
Chrysene										1.65E-04	2.26E-04	9.01E-05 <
Dibenzo(a,h)anthracene										5.33E-08 <	5.34E-08 <	5.41E-08 <
Fluoranthene												
Fluorene												
Indeno(1,2,3-cd)pyrene										8.06E-07	1.55E-06	4.69E-07 <
2-Methylnaphthalene												
Naphthathalene												
Phenanthrene												
Pyrene												
Total PCBs				1.06E-06	9.21E-07	1.06E-06	1.10E-06 <	1.30E-06 <	1.46E-06	1.97E-05	1.59E-05	1.44E-05
Acid Gasses												
Hydrogen Chloride												
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony				4.08E-05	4.75E-05	6.30E-05	2.26E-05	2.51E-05	3.30E-05	2.47E-05	1.73E-05	3.12E-05
Arsenic												
Beryllium	4.36E-06 <	4.20E-06 <	4.23E-06 <	1.52E-06 <	1.50E-06 <	1.50E-06 <	1.49E-06 <	2.00E-06 <	2.03E-06 <			
Cadmium												
Chromium (total)				2.10E-05	1.98E-05	7.06E-06	5.38E-05	4.99E-05	4.07E-05	7.07E-06	2.15E-05 <	4.64E-06 <
Hexavalent Chromium												
Cobalt												
Copper				1.17E-04	1.23E-04	4.47E-04	5.47E-05	1.12E-04	6.39E-05			
Lead												
Manganese												
Mercury	1.55E-04	2.60E-04	1.42E-04	1.89E-04	2.07E-04	1.97E-04	1.15E-04	1.44E-04	1.15E-04			
Nickel												
Selenium				1.52E-05 <	1.50E-05 <	1.59E-05 <	1.49E-05 <	2.00E-05 <	2.03E-05 <			
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

Constituent	November 1998 Run 1 Emission Rate g/s	November 1998 Run 2 Emission Rate g/s	November 1998 Run 3 Emission Rate g/s	November 1999 Run 1 Emission Rate g/s	November 1999 Run 2 Emission Rate g/s	November 1999 Run 3 Emission Rate g/s	November 2000 Run 1 Emission Rate g/s	November 2000 Run 2 Emission Rate g/s	November 2000 Run 3 Emission Rate g/s	November 2001 Run 1 Emission Rate g/s	November 2001 Run 2 Emission Rate g/s	November 2001 Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	2.74E-10	1.23E-10	1.12E-10	1.02E-10 <	8.19E-11 <	1.61E-11 <	6.26E-10	3.13E-11	2.15E-10	3.13E-11	4.75E-11	4.71E-11 <
1,2,3,7,8-PeCDD	1.43E-10	6.30E-11	1.06E-10	1.25E-10	5.38E-11	4.03E-11	1.98E-09	1.93E-10	3.77E-10	1.21E-10	2.12E-10	1.26E-10
1,2,3,4,7,8-HxCDD	1.30E-10	4.55E-11	1.76E-10	9.90E-11 <	1.10E-10 <	3.77E-11	1.15E-09	2.48E-10	1.51E-10	1.18E-10	2.25E-10	1.36E-10
1,2,3,6,7,8-HxCDD	8.07E-11	7.20E-11	2.64E-10	3.18E-10	1.19E-10 <	1.52E-10	2.22E-09	4.86E-10	2.94E-10	4.36E-10	6.37E-10	4.76E-10
1,2,3,7,8,9-HxCDD	1.96E-10 <	9.74E-11	3.62E-10	1.74E-10	1.01E-10 <	1.43E-11 <	1.65E-09	2.79E-10	1.80E-10	2.13E-10	4.06E-10	2.28E-10
1,2,3,4,6,7,8-HpCDD	6.25E-10	4.68E-10	2.64E-09	1.56E-09	5.31E-10	6.64E-10	9.84E-09	2.93E-09	1.01E-09	2.66E-09	4.31E-09	2.96E-09
OCDD	8.35E-10	7.34E-10	4.78E-09	1.99E-09	5.91E-10 <	8.95E-10	1.98E-08	8.39E-09	1.55E-09	3.99E-09	5.73E-09	4.31E-09
2,3,7,8-TCDF	2.48E-10	1.90E-10	2.89E-10	3.43E-10	1.75E-10	1.22E-10	4.38E-09	6.84E-10	1.32E-09	2.73E-10	4.07E-10	3.08E-10
1,2,3,7,8-PeCDF	1.43E-10 <	1.05E-10	2.77E-10	4.05E-10	1.52E-10	9.89E-11	8.82E-09	1.55E-09	1.92E-09	4.48E-10	9.09E-10	5.84E-10
2,3,4,7,8-PeCDF	1.69E-10	1.27E-10	4.15E-10	6.63E-10	2.03E-10	1.33E-10	8.37E-09	1.37E-09	1.50E-09	5.30E-10	9.87E-10	6.29E-10
1,2,3,4,7,8-HxCDF	2.74E-10	2.53E-10	1.76E-09	3.46E-10	1.11E-10	8.59E-11	7.99E-09	1.46E-09	1.06E-09	4.49E-10	1.25E-09	5.62E-10
1,2,3,6,7,8-HxCDF	1.00E-10	1.16E-10	6.56E-10	3.92E-10	1.20E-10	9.63E-11	9.22E-09	1.80E-09	1.19E-09	5.12E-10	1.37E-09	6.20E-10
2,3,4,6,7,8-HxCDF	2.48E-10	1.03E-10	8.95E-10	3.46E-10	9.73E-11	1.01E-10	5.45E-09	1.08E-09	5.60E-10	4.32E-10	1.22E-09	4.75E-10
1,2,3,7,8,9-HxCDF	8.07E-11 <	3.16E-11 <	7.42E-11	2.94E-10 <	1.54E-11 <	2.34E-11	1.47E-09	3.99E-10	1.44E-10	1.20E-10	3.32E-10	1.39E-10
1,2,3,4,6,7,8-HpCDF	6.52E-10 <	4.18E-10 <	5.65E-09 <	8.37E-10	1.96E-10	2.00E-10	1.45E-08	3.52E-09	1.17E-09	1.28E-09	5.93E-09	1.59E-09
1,2,3,4,7,8,9-HpCDF	1.82E-10 <	6.07E-11 <	7.28E-10	1.07E-10	5.76E-11 <	3.38E-11	1.48E-09	7.33E-10	1.19E-10	2.05E-10	6.87E-10	2.41E-10
OCDF	5.34E-10	2.78E-10	2.39E-09	2.93E-10	7.99E-11 <	8.85E-11	3.31E-09	3.43E-09	2.69E-10	5.13E-10	1.85E-09	6.12E-10
PAHs												
Acenaphthene												
Acenaphthylene												
Anthracene												
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene												
Chrysene												
Dibenzo(a,h)anthracene												
Fluoranthene												
Fluorene												
Indeno(1,2,3-cd)pyrene												
2-Methylnaphthalene												
Naphthathalene												
Phenanthrene												
Pyrene												
Total PCBs												
Acid Gasses												
Hydrogen Chloride										7.80E-01	7.80E-01	
Hydrogen Fluoride (as Total Fluoride)												
Sulfuric Acid												
Metals												
Antimony												
Arsenic										1.32E-05 ,	1.31E-05 <	
Beryllium	2.73E-06 <	2.72E-06 <	2.72E-06 <	2.66E-06 <	2.63E-06 <	2.63E-06 <	2.28E-06 <	2.28E-06 <	2.28E-06 <	1.32E-06 <	1.31E-06 <	
Cadmium										7.90E-06	7.57E-06	
Chromium (total)				6.00E-05	9.70E-05	9.22E-05	2.15E-04	9.77E-05	9.88E-05	3.01E-05	1.36E-05	
Hexavalent Chromium												
Cobalt												
Copper												
Lead										4.50E-05	2.65E-05	
Manganese				1.30E-05	1.36E-05	9.29E-05						
Mercury	8.82E-04	8.82E-04	8.82E-04	4.62E-04	4.51E-04	4.67E-04	7.86E-04	8.66E-04	5.67E-04	3.50E-04	3.26E-04	
Nickel										5.46E-05	4.50E-05	
Selenium												
Zinc												
Formaldehyde				2.00E-03	9.54E-04	4.99E-04						

< = Not Detected

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

	October 2002			October 2003			October 2004			November 2005		
	Run 1	Run 2	Run 3	Run 1	Run 3	Run 4	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate	Emission Rate
Constituent	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Dioxins/Furans												
2,3,7,8-TCDD	3.15E-11 <	2.82E-11	2.82E-11	1.14E-11 <	1.51E-11 <	2.05E-11 <	1.84E-11 <	2.07E-11 <	3.85E-11	5.09E-11 <	4.01E-11 <	4.07E-11 <
1,2,3,7,8-PeCDD	1.15E-10	7.89E-11	8.29E-11	6.44E-11 <	9.70E-11	6.35E-11	8.04E-11 <	8.60E-11 <	8.69E-11	1.30E-10 <	8.73E-11 <	7.35E-11 <
1,2,3,4,7,8-HxCDD	1.19E-10	8.00E-11	6.54E-11 <	6.14E-11 <	8.88E-11	4.21E-11 <	6.36E-11 <	1.01E-10	8.45E-11	1.79E-10	1.35E-10 <	9.81E-11 <
1,2,3,6,7,8-HxCDD	4.05E-10	2.75E-10	2.35E-10	6.44E-11 <	2.10E-10	9.34E-11	1.55E-10	2.14E-10	1.73E-10	4.23E-10	1.98E-10	2.05E-10
1,2,3,7,8,9-HxCDD	1.93E-10	1.32E-10	1.12E-10	5.70E-11 <	1.51E-10	3.91E-11 <	6.97E-11 <	1.30E-10 <	1.23E-10	2.74E-10	1.62E-10 <	1.09E-10 <
1,2,3,4,6,7,8-HpCDD	2.32E-09	1.69E-09	1.41E-09	6.28E-10	1.73E-09	5.68E-10	9.47E-10	1.28E-09	1.09E-09	2.82E-09	1.59E-09	1.54E-09
OCDD	2.53E-09	2.08E-09	1.70E-09	1.21E-09	3.40E-09	9.24E-10	1.45E-09	2.02E-09	2.01E-09	4.08E-09	1.84E-09	1.78E-09
2,3,7,8-TCDF	2.05E-10	1.88E-10	1.73E-10	4.17E-11	8.01E-11	4.14E-11	1.55E-10	1.27E-10	1.54E-10	2.19E-10	9.10E-11 <	6.44E-11
1,2,3,7,8-PeCDF	3.15E-10	2.95E-10	3.02E-10	6.44E-11 <	1.49E-10	6.29E-11 <	2.33E-10	2.09E-10	2.77E-10	3.60E-10	1.50E-10	1.41E-10
2,3,4,7,8-PeCDF	3.96E-10	3.66E-10	3.39E-10	6.74E-11	2.10E-10	7.02E-11	3.00E-10	3.53E-10	3.27E-10	4.67E-10	1.39E-10 <	1.50E-10
1,2,3,4,7,8-HxCDF	2.80E-10	2.49E-10	2.41E-10	6.70E-11	2.17E-10	7.45E-11	2.25E-10	3.46E-10	2.86E-10	4.35E-10	1.72E-10	1.69E-10 <
1,2,3,6,7,8-HxCDF	3.04E-10	2.60E-10	2.48E-10	7.01E-11	2.29E-10	7.19E-11	2.24E-10	3.89E-10	3.09E-10	3.84E-10	1.49E-10	1.20E-10
2,3,4,6,7,8-HxCDF	3.42E-10	2.96E-10	2.64E-10	6.44E-11 <	2.58E-10	7.99E-11	2.00E-10	3.87E-10	2.67E-10	3.82E-10	1.45E-10	1.78E-10
1,2,3,7,8,9-HxCDF	8.60E-12 <	5.08E-12 <	4.58E-12 <	1.74E-11 <	9.45E-11	1.42E-11 <	1.83E-11 <	8.69E-11	8.32E-11	6.54E-11 <	5.97E-11 <	3.83E-11 <
1,2,3,4,6,7,8-HpCDF	7.12E-10	5.79E-10	5.73E-10	2.10E-10	8.17E-10	2.34E-10	4.81E-10	9.84E-10	8.21E-10	1.02E-09	3.39E-10	3.85E-10
1,2,3,4,7,8,9-HpCDF	9.80E-11	9.00E-11	8.98E-11	1.92E-11 <	1.32E-10	1.46E-11 <	6.36E-11 <	1.12E-10	1.35E-10	1.38E-10 <	7.18E-11 <	6.67E-11 <
OCDF	2.15E-10	2.22E-10	2.29E-10	1.29E-10 <	4.67E-10	1.25E-10	1.79E-10	1.99E-10 <	4.26E-10	5.17E-10	2.15E-10 <	1.31E-10 <
PAHs												
Acenaphthene							5.87E-08	5.21E-08	3.20E-08			
Acenaphthylene							4.20E-08	5.40E-08	2.67E-08			
Anthracene							7.55E-08	2.17E-07	4.13E-08			
Benzo(a)anthracene							4.34E-08	1.06E-07	3.20E-08			
Benzo(a)pyrene							1.45E-07	9.45E-08	6.21E-08			
Benzo(b)fluoranthene							1.01E-07	1.93E-07	7.42E-08			
Benzo(g,h,i)perylene							1.35E-06	7.39E-07	7.19E-07			
Benzo(k)fluoranthene							2.56E-08	5.84E-08	1.92E-08			
Chrysene							8.05E-08	1.92E-07	6.43E-08			
Dibenzo(a,h)anthracene							5.09E-08 <	1.39E-08	5.08E-08 <			
Fluoranthene							1.05E-06	7.63E-07	5.44E-07			
Fluorene							3.90E-07	3.35E-07	2.76E-07			
Indeno(1,2,3-cd)pyrene							1.86E-07	1.42E-07	1.10E-07			
2-Methylnaphthalene							6.51E-07	5.31E-07	4.41E-07			
Naphthathalene							6.98E-06	5.87E-06	5.02E-06			
Phenanthrene							1.02E-06	1.59E-06	6.15E-07			
Pyrene							2.22E-06	8.89E-07	1.02E-06			
Total PCBs												
Acid Gasses												
Hydrogen Chloride	1.00E+00	7.20E-01	7.51E-01	4.69E-01	2.67E-01	2.66E-01	5.04E-01	4.17E-01	2.91E-01	4.49E-01	4.74E-01	4.27E-01
Hydrogen Fluoride (as Total Fluoride)	1.40E-02	5.17E-03 <	1.95E-02	2.02E-02 <	2.03E-02 <	2.04E-02 <	7.18E-02 <	1.97E-02 <	1.98E-02 <	5.12E-03 <	5.24E-03 <	5.13E-03 <
Sulfuric Acid	1.15E-01	1.64E-01	8.08E-02	8.44E-02	8.06E-02	9.07E-02	1.02E-02	8.61E-03	6.14E-03	3.28E-03	9.83E-02	1.03E-02
Metals												
Antimony												
Arsenic	8.93E-05	7.13E-05	8.33E-05	1.31E-05 <	1.30E-05 <	1.30E-05 <	1.37E-05 <	1.26E-05 <	1.27E-05 <	2.33E-05	2.48E-05	2.99E-05
Beryllium	2.60E-06 <	2.61E-06 <	2.61E-06 <	1.31E-06	1.30E-06 <	1.30E-06 <	1.30E-06 <	1.26E-06 <	1.27E-06 <	1.29E-06 <	1.29E-06 <	1.27E-06 <
Cadmium	6.82E-05	6.15E-05	5.46E-05	8.09E-06	1.14E-05	1.22E-05	6.60E-05	1.45E-05	2.96E-05	2.90E-05	2.61E-05	3.48E-05
Chromium (total)	9.56E-05	4.89E-05	5.53E-05	1.73E-05	3.16E-05	2.38E-05	1.22E-05	1.08E-05	1.35E-05	3.93E-05	5.27E-05	1.04E-04
Hexavalent Chromium												
Cobalt												
Copper												
Lead	9.30E-04	7.42E-04	7.94E-04	8.15E-05	9.36E-05	7.47E-05	2.10E-04	1.60E-04	1.85E-04	3.41E-04	3.91E-04	4.54E-04
Manganese												
Mercury	5.48E-04	6.75E-04	5.72E-04	1.65E-04	1.29E-04	1.49E-04	3.11E-04	2.37E-04	2.85E-04	2.21E-04	2.02E-04	2.52E-04
Nickel	8.05E-05	4.84E-05	4.91E-05	4.55E-05	3.50E-05	3.79E-05	7.22E-05	4.75E-05	6.69E-05	5.10E-05	5.36E-05	1.19E-04
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

	November 2006			November 2007			October 2008			October 2009		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	2.53E-11 <	3.24E-10	3.45E-11 <	3.04E-11 <	2.63E-11 <	3.18E-11 <	7.73E-11	9.67E-11	1.00E-10	4.60E-11	3.66E-11	3.30E-11
1,2,3,7,8-PeCDD	6.35E-11 <	1.07E-09	1.25E-10	1.24E-10	1.20E-10	1.39E-10	1.95E-10	2.55E-10	3.87E-10	1.61E-10	1.53E-10	9.35E-11 <
1,2,3,4,7,8-HxCDD	8.52E-11 <	8.22E-10	1.73E-10	1.42E-10	1.86E-10	1.71E-10	1.70E-10	1.99E-10	5.52E-10	2.31E-10	1.62E-10	1.40E-10
1,2,3,6,7,8-HxCDD	3.68E-10	1.43E-09	4.56E-10	5.09E-10	5.43E-10	4.98E-10	3.15E-10	4.74E-10	1.43E-09	6.35E-10	5.32E-10	4.35E-10
1,2,3,7,8,9-HxCDD	1.78E-10	1.44E-09	2.27E-10	2.07E-10	2.55E-10	2.33E-10	1.54E-10 <	1.92E-10	1.10E-09	3.00E-10 <	2.26E-10	2.01E-10 <
1,2,3,4,6,7,8-HpCDD	2.14E-09	1.28E-08	3.33E-09	2.90E-09	3.77E-09	2.88E-09	2.05E-09	1.99E-09	1.69E-08	4.70E-09	3.22E-09	2.59E-09
OCDD	2.50E-09	3.65E-08	4.79E-09	3.99E-09	6.97E-09	4.57E-09	5.63E-09	3.05E-09	4.83E-08	1.11E-08	6.41E-09	4.23E-09
2,3,7,8-TCDF	8.57E-11 <	1.45E-09	1.31E-10	1.84E-10	2.12E-10	2.41E-10	2.64E-10	2.63E-10	5.31E-10	2.40E-10 <	2.12E-10 <	2.29E-10
1,2,3,7,8-PeCDF	1.38E-10	3.75E-09	2.25E-10	2.58E-10	2.82E-10	3.33E-10	3.32E-10	2.50E-10	9.98E-10	3.57E-10	3.31E-10	2.81E-10
2,3,4,7,8-PeCDF	1.68E-10 <	3.84E-09	2.81E-10	6.01E-10	6.17E-10	6.43E-10	4.24E-10	3.93E-10	1.42E-09	7.62E-10	6.58E-10	5.50E-10
1,2,3,4,7,8-HxCDF	1.68E-10	4.98E-09	3.63E-10	4.21E-10	4.92E-10	4.94E-10	3.81E-10	2.92E-10	1.82E-09	5.25E-10	4.25E-10	3.85E-10
1,2,3,6,7,8-HxCDF	1.60E-10	5.61E-09	3.71E-10	4.10E-10	4.66E-10	4.85E-10	4.08E-10	3.10E-10	2.21E-09	5.02E-10	4.30E-10	3.43E-10
2,3,4,6,7,8-HxCDF	2.30E-10	5.11E-09	4.10E-10	6.45E-10	7.75E-10	6.93E-10	4.60E-10	3.46E-10	3.40E-09	7.14E-10	5.67E-10	4.34E-10
1,2,3,7,8,9-HxCDF	6.35E-11 <	2.02E-09	1.15E-10	1.46E-10	1.85E-10	1.70E-10	1.41E-10	1.07E-10	1.11E-09	1.84E-10	1.71E-10	1.35E-10
1,2,3,4,6,7,8-HpCDF	4.77E-10	1.59E-08	1.63E-09	1.54E-09	2.20E-09	1.65E-09	1.32E-09	8.32E-10	1.11E-08	1.58E-09	1.13E-09	1.03E-09
1,2,3,4,7,8,9-HpCDF	7.52E-11	4.23E-09	2.80E-10	1.60E-10	2.28E-10	1.93E-10	3.56E-10	1.38E-10	3.08E-09	2.27E-10 <	2.19E-10	1.55E-10 <
OCDF	1.69E-10 <	1.63E-08	9.58E-10	4.83E-10	9.64E-10	6.26E-10	2.27E-09	4.71E-10	1.54E-08	6.89E-10	4.64E-10 <	3.30E-10 <
PAHs												
Acenaphthene							1.09E-06	3.42E-07	2.99E-07			
Acenaphthylene							2.13E-06	1.86E-07	1.18E-07			
Anthracene							2.05E-07	1.42E-07	1.62E-07			
Benzo(a)anthracene							2.73E-08	8.12E-08	4.80E-08			
Benzo(a)pyrene							3.69E-08	2.63E-07	3.94E-08			
Benzo(b)fluoranthene							5.97E-08	1.76E-07	1.09E-07			
Benzo(g,h,i)perylene							4.97E-07	2.34E-06	5.09E-07			
Benzo(k)fluoranthene							1.28E-08	6.15E-08	3.26E-08			
Chrysene							5.26E-08	1.13E-07	1.04E-07			
Dibenzo(a,h)anthracene							5.12E-08 <	5.03E-08 <	5.17E-08 <			
Fluoranthene							9.03E-07	2.17E-06	7.25E-07			
Fluorene							1.82E-06	6.32E-07	6.72E-07			
Indeno(1,2,3-cd)pyrene							8.26E-08	4.69E-07	9.88E-08			
2-Methylnaphthalene							5.30E-05	7.08E-06	5.65E-06			
Naphthathalene							2.50E-05	1.72E-05	1.38E-05			
Phenanthrene							5.06E-06	2.10E-06	2.09E-06			
Pyrene							9.40E-07	5.49E-06	8.71E-07			
Total PCBs												
Acid Gasses												
Hydrogen Chloride	7.33E-01	1.15E+00	9.14E-01	4.49E-01	4.74E-01	5.10E-01	6.17E-01	6.41E-01	5.56E-01	3.72E-01	3.36E-01	2.92E-01
Hydrogen Fluoride (as Total Fluoride)	5.13E-03 <	5.30E-03 <	5.22E-03 <	7.56E-03 <	5.04E-03 <	5.04E-03 <	5.15E-03 <	5.23E-03 <	5.04E-03 <	5.17E-03 <	5.17E-03 <	5.04E-03 <
Sulfuric Acid	3.84E-03	3.91E-03	3.82E-03	7.56E-03	1.39E-02	6.30E-03	5.34E-03 <	5.36E-03 <	5.20E-03 <	3.89E-03 <	2.95E-03 <	3.23E-03 <
Metals												
Antimony												
Arsenic	2.37E-05	2.32E-05	3.09E-05	1.30E-05	1.90E-05	8.08E-06	4.36E-05	4.49E-05	4.28E-05	2.71E-05	2.99E-05	2.38E-05
Beryllium	1.27E-06 <	1.32E-06 <	1.29E-06 <	1.27E-06 <	1.27E-06 <	1.27E-06 <	1.25E-06 <	1.25E-06 <	1.25E-06 <	1.29E-06 <	1.27E-06 <	1.29E-06 <
Cadmium	2.29E-05	2.22E-05	2.70E-05	1.66E-05	1.30E-05	1.65E-05	7.06E-05	6.12E-05	5.68E-05	3.38E-05	3.69E-05	2.85E-05
Chromium (total)	4.32E-05	1.12E-04	7.94E-05	1.12E-04	8.93E-05	1.16E-04	4.64E-05	3.04E-05	3.99E-05	5.56E-05	1.44E-04	5.37E-05
Hexavalent Chromium												
Cobalt												
Copper												
Lead	3.88E-04	3.74E-04	4.54E-04	3.41E-04	3.91E-04	2.60E-04	1.04E-03	8.87E-04	9.98E-04	4.44E-04	5.25E-04	3.91E-04
Manganese												
Mercury	5.01E-04	5.91E-04	3.83E-04	1.56E-04	1.37E-04	1.14E-04	2.33E-04	2.38E-04	2.42E-04	9.45E-05	1.52E-05 <	1.88E-04
Nickel	1.06E-04	7.11E-05	8.29E-05	1.02E-04	1.30E-04	1.26E-04	2.94E-05	1.12E-05	6.50E-06	5.71E-05	1.27E-04	4.75E-05
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

Appendix A-3b
Unit 3 Stack Emissions
Montgomery County RRF
Dickerson, MD

	October 2010			August 2011			August 2012			August 2013		
Constituent	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s	Run 1 Emission Rate g/s	Run 2 Emission Rate g/s	Run 3 Emission Rate g/s
Dioxins/Furans												
2,3,7,8-TCDD	3.66E-11 <	2.24E-10	5.27E-11 <	2.10E-11	8.64E-11 <	2.95E-11 <	2.58E-11 <	5.67E-11	2.26E-11 <	9.63E-11	2.89E-11	1.12E-11 <
1,2,3,7,8-PeCDD	6.66E-11	6.03E-10	6.76E-11 <	6.89E-11	2.61E-10	7.12E-11	2.49E-11 <	1.53E-10	2.28E-11 <	3.64E-10	1.10E-10	5.17E-11
1,2,3,4,7,8-HxCDD	8.41E-11	3.95E-10	7.54E-11	5.89E-11	2.81E-10	3.86E-11 <	2.10E-11 <	9.58E-11	1.78E-11 <	2.29E-10	1.08E-10	4.75E-11
1,2,3,6,7,8-HxCDD	2.15E-10 <	5.45E-10	2.48E-10 <	9.39E-11	5.37E-10	7.17E-11	7.24E-11	1.98E-10	5.69E-11	1.01E-09	3.16E-10	2.21E-10
1,2,3,7,8,9-HxCDD	1.67E-10	3.73E-10	1.24E-10 <	8.88E-11	4.36E-10	6.68E-11	5.66E-11	1.66E-10	3.21E-11	2.48E-10	1.81E-10	9.84E-11
1,2,3,4,6,7,8-HpCDD	1.46E-09	2.40E-09	1.68E-09	7.16E-10	6.62E-09	4.79E-10	4.33E-10	1.07E-09	3.01E-10	2.02E-09	1.71E-09	8.58E-10
OCDD	2.21E-09	2.30E-09 <	2.42E-09	1.45E-09	1.91E-08	9.75E-10	7.43E-10	2.20E-09	4.67E-10	8.72E-10	2.42E-09	7.79E-10
2,3,7,8-TCDF	1.03E-10 <	4.00E-10	9.98E-11	1.06E-10	5.40E-10	1.25E-10	3.25E-11	2.91E-10	3.28E-11	2.51E-10	1.69E-10	6.09E-11
1,2,3,7,8-PeCDF	1.61E-10	5.64E-10	1.41E-10	1.79E-10	1.08E-09	1.41E-10	5.23E-11	4.90E-10	4.19E-11	1.31E-10	3.26E-10	6.85E-11
2,3,4,7,8-PeCDF	2.33E-10	7.08E-10	2.17E-10	1.91E-10	1.01E-09	1.57E-10	8.47E-11	5.03E-10	6.24E-11	4.01E-10	3.94E-10	1.25E-10
1,2,3,4,7,8-HxCDF	1.63E-10	5.19E-10	2.08E-10 <	2.33E-10	1.32E-09	1.54E-10	5.69E-11	6.60E-10	5.43E-11	2.00E-10	4.04E-10	9.80E-11
1,2,3,6,7,8-HxCDF	1.59E-10 <	5.48E-10 <	1.62E-10 <	2.58E-10	1.42E-09	1.67E-10	7.39E-11	7.22E-10	4.04E-11	1.50E-10	4.21E-10	9.24E-11
2,3,4,6,7,8-HxCDF	2.24E-10	4.83E-10	2.02E-10 <	2.55E-10	1.27E-09	1.73E-10	7.64E-11	5.13E-10	4.81E-11	1.39E-10	3.91E-10	1.01E-10
1,2,3,7,8,9-HxCDF	7.01E-11 <	6.61E-11 <	9.49E-11 <	8.23E-11	1.70E-11 <	7.56E-12 <	1.96E-11 <	2.17E-11 <	1.30E-11 <	1.57E-11 <	2.02E-11 <	1.79E-11 <
1,2,3,4,6,7,8-HpCDF	5.38E-10	1.05E-09	5.50E-10	7.54E-10	4.57E-09	4.70E-10	1.61E-10	1.84E-09	1.10E-10	2.23E-10	1.12E-09	1.99E-10
1,2,3,4,7,8,9-HpCDF	9.01E-11	1.28E-10	1.08E-10 <	1.56E-10	8.54E-10	9.85E-11	1.90E-11	3.32E-10	1.58E-11 <	3.48E-11	1.98E-10	1.51E-11 <
OCDF	1.83E-10 <	3.17E-10	3.19E-10	5.14E-10	2.69E-09	3.19E-10	6.55E-11	1.08E-09	4.86E-11	8.81E-11	4.94E-10	7.91E-11
PAHs												
Acenaphthene				1.52E-07	1.76E-07	1.67E-07						
Acenaphthylene				7.32E-08	1.81E-07	1.22E-07						
Anthracene				5.95E-08	8.10E-08	1.35E-07						
Benzo(a)anthracene				2.72E-08	3.64E-08	3.88E-08						
Benzo(a)pyrene				4.39E-08	6.27E-08	7.11E-08						
Benzo(b)fluoranthene				6.54E-08	1.17E-07	8.70E-08						
Benzo(g,h,i)perylene				5.58E-07	9.45E-07	1.15E-06						
Benzo(k)fluoranthene				1.72E-08	2.86E-08	1.72E-08						
Chrysene				5.10E-08	8.27E-08	7.80E-08						
Dibenzo(a,h)anthracene				4.91E-08 <	4.93E-08 <	4.91E-08 <						
Fluoranthene				7.64E-07	1.56E-06	1.17E-06						
Fluorene				4.64E-07	5.58E-07	7.97E-07						
Indeno(1,2,3-cd)pyrene				1.04E-07	1.70E-07	2.13E-07						
2-Methylnaphthalene				2.02E-06	2.19E-06	2.71E-06						
Naphthathalene				6.76E-06	7.13E-06	6.74E-06						
Phenanthrene				1.80E-06	2.19E-06	2.36E-06						
Pyrene				1.01E-06	3.41E-06	1.54E-06						
Total PCBs												
Acid Gasses												
Hydrogen Chloride	3.84E-01	4.15E-01	4.20E-01	5.61E-01	5.57E-01	8.06E-01	1.08E+00	7.75E-01	8.30E-01	5.25E-01	4.46E-01	5.32E-01
Hydrogen Fluoride (as Total Fluoride)	4.88E-03 <	4.91E-03 <	4.96E-03 <	5.03E-03 <	5.00E-03 <	5.00E-03 <	9.78E-03	7.89E-03	1.70E-02	5.05E-03 <	4.94E-03 <	5.09E-03 <
Sulfuric Acid	1.78E-02	1.63E-01	9.55E-02	5.71E-02	5.25E-03	7.95E-03	4.55E-03	5.00E-03	4.79E-03 <	1.78E-03 <	1.97E-03	1.61E-03 <
Metals												
Antimony												
Arsenic	1.85E-05	1.76E-05	1.78E-05	4.75E-06 <	4.96E-06 <	4.90E-06 <	1.41E-05	6.98E-06	7.06E-06	1.65E-05	1.50E-05	1.79E-05
Beryllium	1.27E-06 <	1.31E-06 <	1.30E-06 <	1.19E-06 <	1.24E-06 <	1.23E-06 <	1.29E-06 <	1.26E-06 <	1.25E-06 <	1.27E-06 <	1.26E-06 <	1.27E-06 <
Cadmium	2.41E-05	2.76E-05	2.26E-05	4.91E-06	5.30E-06	4.90E-06	3.12E-05	1.00E-05	8.11E-06	1.61E-05	1.75E-05	1.54E-05
Chromium (total)	7.93E-05	8.18E-05	7.22E-05	4.75E-06 <	1.25E-04	4.90E-06 <	1.41E-04	6.51E-05	4.41E-05	5.15E-05	5.42E-05	7.32E-05
Hexavalent Chromium												
Cobalt												
Copper												
Lead	4.51E-04	4.11E-04	4.18E-04	7.65E-05	5.32E-05	6.72E-05	5.70E-04	1.88E-04	2.63E-04	2.48E-04	2.76E-04	3.47E-04
Manganese												
Mercury	9.20E-05	8.81E-05	8.68E-05	5.39E-04	5.29E-04	4.93E-04	2.48E-04	2.46E-04	2.44E-04	8.74E-05	9.68E-05	9.58E-05
Nickel	4.15E-05	2.33E-05	2.42E-05	2.44E-05	6.09E-05	2.68E-05	2.75E-04	7.21E-05	7.38E-05	6.45E-05	8.59E-05	1.24E-04
Selenium												
Zinc												
Formaldehyde												

< = Not Detected

APPENDIX B

ProUCL OUTPUT

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
Minimum	5.4532E-7	Mean	3.7734E-5
Maximum	1.0576E-4	Median	2.6751E-5
SD	3.2649E-5	Std. Error of Mean	7.6956E-6
Coefficient of Variation	N/A	Skewness	1.157

Normal GOF Test

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.1122E-5	95% Adjusted-CLT UCL (Chen-1995)	5.2634E-5
		95% Modified-t UCL (Johnson-1978)	5.1471E-5

Gamma GOF Test

A-D Test Statistic	0.512	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.163	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.232	k star (bias corrected MLE)	1.064
Theta hat (MLE)	3.0622E-5	Theta star (bias corrected MLE)	3.5467E-5
nu hat (MLE)	44.36	nu star (bias corrected)	38.3
MLE Mean (bias corrected)	3.7734E-5	MLE Sd (bias corrected)	3.6583E-5
		Approximate Chi Square Value (0.05)	25.13
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	24.11

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.7516E-5	95% Adjusted Gamma UCL (use when n<50)	5.9956E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.219	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.42	Mean of logged Data	-10.64
Maximum of Logged Data	-9.154	SD of logged Data	1.211

Assuming Lognormal Distribution

95% H-UCL	1.1842E-4	90% Chebyshev (MVUE) UCL	9.2139E-5
95% Chebyshev (MVUE) UCL	1.1276E-4	97.5% Chebyshev (MVUE) UCL	1.4139E-4
99% Chebyshev (MVUE) UCL	1.9762E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.0392E-5	95% Jackknife UCL	5.1122E-5
95% Standard Bootstrap UCL	4.9827E-5	95% Bootstrap-t UCL	5.4845E-5
95% Hall's Bootstrap UCL	5.1069E-5	95% Percentile Bootstrap UCL	4.9986E-5
95% BCA Bootstrap UCL	5.1036E-5		
90% Chebyshev(Mean, Sd) UCL	6.0821E-5	95% Chebyshev(Mean, Sd) UCL	7.1279E-5
97.5% Chebyshev(Mean, Sd) UCL	8.5793E-5	99% Chebyshev(Mean, Sd) UCL	1.1430E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 5.9956E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	42	Number of Distinct Observations	37
Minimum	1.0622E-5	Mean	3.9576E-5
Maximum	2.0664E-4	Median	2.6712E-5
SD	4.8360E-5	Std. Error of Mean	7.4621E-6
Coefficient of Variation	N/A	Skewness	2.87

Normal GOF Test

Shapiro Wilk Test Statistic	0.523	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.347	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.2133E-5	95% Adjusted-CLT UCL (Chen-1995)	5.5380E-5
		95% Modified-t UCL (Johnson-1978)	5.2684E-5

Gamma GOF Test

A-D Test Statistic	3.56	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.258	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.139	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.508	k star (bias corrected MLE)	1.416
Theta hat (MLE)	2.6240E-5	Theta star (bias corrected MLE)	2.7942E-5
nu hat (MLE)	126.7	nu star (bias corrected)	119
MLE Mean (bias corrected)	3.9576E-5	MLE Sd (bias corrected)	3.3254E-5
		Approximate Chi Square Value (0.05)	94.79
Adjusted Level of Significance	0.0443	Adjusted Chi Square Value	94.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.9674E-5	95% Adjusted Gamma UCL (use when n<50)	5.0079E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.45	Mean of logged Data	-10.5
Maximum of Logged Data	-8.485	SD of logged Data	0.75

Assuming Lognormal Distribution

95% H-UCL	4.6472E-5	90% Chebyshev (MVUE) UCL	4.9803E-5
95% Chebyshev (MVUE) UCL	5.6046E-5	97.5% Chebyshev (MVUE) UCL	6.4711E-5
99% Chebyshev (MVUE) UCL	8.1732E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.1850E-5	95% Jackknife UCL	5.2133E-5
95% Standard Bootstrap UCL	5.1635E-5	95% Bootstrap-t UCL	5.9486E-5
95% Hall's Bootstrap UCL	5.1694E-5	95% Percentile Bootstrap UCL	5.2610E-5
95% BCA Bootstrap UCL	5.5835E-5		
90% Chebyshev(Mean, Sd) UCL	6.1962E-5	95% Chebyshev(Mean, Sd) UCL	7.2102E-5
97.5% Chebyshev(Mean, Sd) UCL	8.6176E-5	99% Chebyshev(Mean, Sd) UCL	1.1382E-4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.2102E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Beryllium

General Statistics

Total Number of Observations	70	Number of Distinct Observations	43
Minimum	5.4532E-8	Mean	5.8686E-6
Maximum	1.2830E-5	Median	3.4868E-6
SD	3.4730E-6	Std. Error of Mean	4.1510E-7
Coefficient of Variation	N/A	Skewness	0.907

Normal GOF Test

Shapiro Wilk Test Statistic	0.779	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	2.265E-14	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.106	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.5606E-6	95% Adjusted-CLT UCL (Chen-1995)	6.5995E-6
		95% Modified-t UCL (Johnson-1978)	6.5681E-6

Gamma GOF Test

A-D Test Statistic	4.785	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.722	k star (bias corrected MLE)	2.615
Theta hat (MLE)	2.1560E-6	Theta star (bias corrected MLE)	2.2443E-6
nu hat (MLE)	381.1	nu star (bias corrected)	366.1
MLE Mean (bias corrected)	5.8686E-6	MLE Sd (bias corrected)	3.6292E-6
		Approximate Chi Square Value (0.05)	322.7
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	321.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.6567E-6	95% Adjusted Gamma UCL (use when n<50)	6.6742E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.696	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.106	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.72	Mean of logged Data	-12.24
Maximum of Logged Data	-11.26	SD of logged Data	0.751

Assuming Lognormal Distribution

95% H-UCL	7.7182E-6	90% Chebyshev (MVUE) UCL	8.2847E-6
95% Chebyshev (MVUE) UCL	9.1509E-6	97.5% Chebyshev (MVUE) UCL	1.0353E-5
99% Chebyshev (MVUE) UCL	1.2715E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.5513E-6	95% Jackknife UCL	6.5606E-6
95% Standard Bootstrap UCL	6.5561E-6	95% Bootstrap-t UCL	6.6487E-6
95% Hall's Bootstrap UCL	6.6109E-6	95% Percentile Bootstrap UCL	6.5817E-6
95% BCA Bootstrap UCL	6.6236E-6		
90% Chebyshev(Mean, Sd) UCL	7.1139E-6	95% Chebyshev(Mean, Sd) UCL	7.6779E-6
97.5% Chebyshev(Mean, Sd) UCL	8.4609E-6	99% Chebyshev(Mean, Sd) UCL	9.9987E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.6779E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	42	Number of Distinct Observations	42
Minimum	5.8086E-6	Mean	3.5831E-5
Maximum	2.7720E-4	Median	1.3352E-5
SD	6.3470E-5	Std. Error of Mean	9.7936E-6
Coefficient of Variation	N/A	Skewness	3.242

Normal GOF Test

Shapiro Wilk Test Statistic	0.451	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.2313E-5	95% Adjusted-CLT UCL (Chen-1995)	5.7175E-5
		95% Modified-t UCL (Johnson-1978)	5.3129E-5

Gamma GOF Test

A-D Test Statistic	4.333	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.782	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.228	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.141	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.901	k star (bias corrected MLE)	0.853
Theta hat (MLE)	3.9761E-5	Theta star (bias corrected MLE)	4.2022E-5
nu hat (MLE)	75.7	nu star (bias corrected)	71.63
MLE Mean (bias corrected)	3.5831E-5	MLE Sd (bias corrected)	3.8803E-5
		Approximate Chi Square Value (0.05)	53.14
Adjusted Level of Significance	0.0443	Adjusted Chi Square Value	52.57

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.8296E-5	95% Adjusted Gamma UCL (use when n<50)	4.8817E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.169	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.06	Mean of logged Data	-10.89
Maximum of Logged Data	-8.191	SD of logged Data	0.953

Assuming Lognormal Distribution

95% H-UCL	4.1557E-5	90% Chebyshev (MVUE) UCL	4.3836E-5
95% Chebyshev (MVUE) UCL	5.0538E-5	97.5% Chebyshev (MVUE) UCL	5.9839E-5
99% Chebyshev (MVUE) UCL	7.8109E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.1940E-5	95% Jackknife UCL	5.2313E-5
95% Standard Bootstrap UCL	5.1451E-5	95% Bootstrap-t UCL	6.1739E-5
95% Hall's Bootstrap UCL	5.0056E-5	95% Percentile Bootstrap UCL	5.3207E-5
95% BCA Bootstrap UCL	5.9619E-5		
90% Chebyshev(Mean, Sd) UCL	6.5212E-5	95% Chebyshev(Mean, Sd) UCL	7.8521E-5
97.5% Chebyshev(Mean, Sd) UCL	9.6992E-5	99% Chebyshev(Mean, Sd) UCL	1.3328E-4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.8521E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium (total)

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	1.3104E-6	Mean	5.5137E-5
Maximum	3.6414E-4	Median	3.6792E-5
SD	5.9215E-5	Std. Error of Mean	7.4604E-6
Coefficient of Variation	N/A	Skewness	3.175

Normal GOF Test

Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.224	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.7595E-5	95% Adjusted-CLT UCL (Chen-1995)	7.0598E-5
		95% Modified-t UCL (Johnson-1978)	6.8092E-5

Gamma GOF Test

A-D Test Statistic	1.261	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.127	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.455	k star (bias corrected MLE)	1.396
Theta hat (MLE)	3.7904E-5	Theta star (bias corrected MLE)	3.9497E-5
nu hat (MLE)	183.3	nu star (bias corrected)	175.9
MLE Mean (bias corrected)	5.5137E-5	MLE Sd (bias corrected)	4.6667E-5
		Approximate Chi Square Value (0.05)	146.2
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	145.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.6327E-5	95% Adjusted Gamma UCL (use when n<50)	6.6614E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.188	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0788	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.55	Mean of logged Data	-10.19
Maximum of Logged Data	-7.918	SD of logged Data	0.892

Assuming Lognormal Distribution

95% H-UCL	7.1679E-5	90% Chebyshev (MVUE) UCL	7.7121E-5
95% Chebyshev (MVUE) UCL	8.6893E-5	97.5% Chebyshev (MVUE) UCL	1.0046E-4
99% Chebyshev (MVUE) UCL	1.2710E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.7409E-5	95% Jackknife UCL	6.7595E-5
95% Standard Bootstrap UCL	6.7030E-5	95% Bootstrap-t UCL	7.4254E-5
95% Hall's Bootstrap UCL	7.6555E-5	95% Percentile Bootstrap UCL	6.7918E-5
95% BCA Bootstrap UCL	7.2468E-5		
90% Chebyshev(Mean, Sd) UCL	7.7519E-5	95% Chebyshev(Mean, Sd) UCL	8.7657E-5
97.5% Chebyshev(Mean, Sd) UCL	1.0173E-4	99% Chebyshev(Mean, Sd) UCL	1.2937E-4

Suggested UCL to Use

95% H-UCL 7.1679E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hexavalent Chromium

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
Minimum	3.2760E-6	Mean	4.8093E-5
Maximum	1.3550E-4	Median	7.1316E-6
SD	6.4271E-5	Std. Error of Mean	2.1424E-5
Coefficient of Variation	N/A	Skewness	0.854

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.643	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.295	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.7931E-5	95% Adjusted-CLT UCL (Chen-1995)	8.9849E-5
		95% Modified-t UCL (Johnson-1978)	8.8948E-5

Gamma GOF Test

A-D Test Statistic	1.294	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.339	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.294	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.53	k star (bias corrected MLE)	0.427
Theta hat (MLE)	9.0759E-5	Theta star (bias corrected MLE)	1.1254E-4
nu hat (MLE)	9.538	nu star (bias corrected)	7.692
MLE Mean (bias corrected)	4.8093E-5	MLE Sd (bias corrected)	7.3569E-5
		Approximate Chi Square Value (0.05)	2.558
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	1.978

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.4462E-4	95% Adjusted Gamma UCL (use when n<50)	1.8702E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.749	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.295	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.63	Mean of logged Data	-11.13
Maximum of Logged Data	-8.907	SD of logged Data	1.692

Assuming Lognormal Distribution

95% H-UCL	0.00117	90% Chebyshev (MVUE) UCL	1.2578E-4
95% Chebyshev (MVUE) UCL	1.6189E-4	97.5% Chebyshev (MVUE) UCL	2.1200E-4
99% Chebyshev (MVUE) UCL	3.1044E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.3332E-5	95% Jackknife UCL	8.7931E-5
95% Standard Bootstrap UCL	8.1232E-5	95% Bootstrap-t UCL	9.1675E-5
95% Hall's Bootstrap UCL	6.8065E-5	95% Percentile Bootstrap UCL	7.7292E-5
95% BCA Bootstrap UCL	9.0575E-5		
90% Chebyshev(Mean, Sd) UCL	1.1236E-4	95% Chebyshev(Mean, Sd) UCL	1.4148E-4
97.5% Chebyshev(Mean, Sd) UCL	1.8188E-4	99% Chebyshev(Mean, Sd) UCL	2.6126E-4

Suggested UCL to Use

95% Hall's Bootstrap UCL 6.8065E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cobalt

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	1.7136E-6	Mean	1.0502E-5
Maximum	1.9152E-5	Median	1.1746E-5
SD	6.1115E-6	Std. Error of Mean	2.4950E-6
Coefficient of Variation	N/A	Skewness	-0.174

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.5529E-5	95% Adjusted-CLT UCL (Chen-1995)	1.4416E-5
		95% Modified-t UCL (Johnson-1978)	1.5500E-5

Gamma GOF Test

A-D Test Statistic	0.436	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.703	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.313	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.286	k star (bias corrected MLE)	1.254
Theta hat (MLE)	4.5949E-6	Theta star (bias corrected MLE)	8.3755E-6
nu hat (MLE)	27.43	nu star (bias corrected)	15.05
MLE Mean (bias corrected)	1.0502E-5	MLE Sd (bias corrected)	9.3786E-6
		Approximate Chi Square Value (0.05)	7.294
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	5.462

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.1664E-5	95% Adjusted Gamma UCL (use when n<50)	2.8929E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.849	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.316	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.28	Mean of logged Data	-11.7
Maximum of Logged Data	-10.86	SD of logged Data	0.872

Assuming Lognormal Distribution

95% H-UCL	5.1242E-5	90% Chebyshev (MVUE) UCL	2.3156E-5
95% Chebyshev (MVUE) UCL	2.8546E-5	97.5% Chebyshev (MVUE) UCL	3.6028E-5
99% Chebyshev (MVUE) UCL	5.0723E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4606E-5	95% Jackknife UCL	1.5529E-5
95% Standard Bootstrap UCL	1.4319E-5	95% Bootstrap-t UCL	1.5385E-5
95% Hall's Bootstrap UCL	1.4383E-5	95% Percentile Bootstrap UCL	1.4215E-5
95% BCA Bootstrap UCL	1.4235E-5		
90% Chebyshev(Mean, Sd) UCL	1.7987E-5	95% Chebyshev(Mean, Sd) UCL	2.1377E-5
97.5% Chebyshev(Mean, Sd) UCL	2.6083E-5	99% Chebyshev(Mean, Sd) UCL	3.5327E-5

Suggested UCL to Use

95% Student's-t UCL 1.5529E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	7.0938E-7	Mean	2.8139E-5
Maximum	7.6356E-5	Median	1.5876E-5
SD	2.4212E-5	Std. Error of Mean	6.2515E-6
Coefficient of Variation	N/A	Skewness	1.089

Normal GOF Test

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.9150E-5	95% Adjusted-CLT UCL (Chen-1995)	4.0301E-5
		95% Modified-t UCL (Johnson-1978)	3.9443E-5

Gamma GOF Test

A-D Test Statistic	0.564	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.172	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.29	k star (bias corrected MLE)	1.077
Theta hat (MLE)	2.1805E-5	Theta star (bias corrected MLE)	2.6132E-5
nu hat (MLE)	38.71	nu star (bias corrected)	32.3
MLE Mean (bias corrected)	2.8139E-5	MLE Sd (bias corrected)	2.7117E-5
		Approximate Chi Square Value (0.05)	20.31
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	19.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	4.4749E-5	95% Adjusted Gamma UCL (use when n<50)	4.7473E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.848	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.16	Mean of logged Data	-10.91
Maximum of Logged Data	-9.48	SD of logged Data	1.15

Assuming Lognormal Distribution

95% H-UCL	8.8528E-5	90% Chebyshev (MVUE) UCL	6.5740E-5
95% Chebyshev (MVUE) UCL	8.0550E-5	97.5% Chebyshev (MVUE) UCL	1.0111E-4
99% Chebyshev (MVUE) UCL	1.4149E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8422E-5	95% Jackknife UCL	3.9150E-5
95% Standard Bootstrap UCL	3.8270E-5	95% Bootstrap-t UCL	4.2277E-5
95% Hall's Bootstrap UCL	3.7881E-5	95% Percentile Bootstrap UCL	3.8915E-5
95% BCA Bootstrap UCL	3.9151E-5		
90% Chebyshev(Mean, Sd) UCL	4.6894E-5	95% Chebyshev(Mean, Sd) UCL	5.5389E-5
97.5% Chebyshev(Mean, Sd) UCL	6.7180E-5	99% Chebyshev(Mean, Sd) UCL	9.0341E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 4.7473E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	42	Number of Distinct Observations	42
Minimum	2.3146E-5	Mean	5.8401E-4
Maximum	0.00397	Median	2.4885E-4
SD	9.7325E-4	Std. Error of Mean	1.5018E-4
Coefficient of Variation	1.666	Skewness	2.746

Normal GOF Test

Shapiro Wilk Test Statistic	0.552	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.3674E-4	95% Adjusted-CLT UCL (Chen-1995)	8.9902E-4
		95% Modified-t UCL (Johnson-1978)	8.4735E-4

Gamma GOF Test

A-D Test Statistic	1.785	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.195	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.142	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.687	k star (bias corrected MLE)	0.654
Theta hat (MLE)	8.5035E-4	Theta star (bias corrected MLE)	8.9352E-4
nu hat (MLE)	57.69	nu star (bias corrected)	54.9
MLE Mean (bias corrected)	5.8401E-4	MLE Sd (bias corrected)	7.2238E-4
		Approximate Chi Square Value (0.05)	38.88
Adjusted Level of Significance	0.0443	Adjusted Chi Square Value	38.4

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.2477E-4	95% Adjusted Gamma UCL (use when n<50)	8.3510E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0952	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-10.67	Mean of logged Data	-8.328
Maximum of Logged Data	-5.529	SD of logged Data	1.318

Assuming Lognormal Distribution

95% H-UCL	0.00101	90% Chebyshev (MVUE) UCL	9.8173E-4
95% Chebyshev (MVUE) UCL	0.00117	97.5% Chebyshev (MVUE) UCL	0.00144
99% Chebyshev (MVUE) UCL	0.00197		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.3103E-4	95% Jackknife UCL	8.3674E-4
95% Standard Bootstrap UCL	8.3187E-4	95% Bootstrap-t UCL	9.5129E-4
95% Hall's Bootstrap UCL	8.3215E-4	95% Percentile Bootstrap UCL	8.5122E-4
95% BCA Bootstrap UCL	9.0087E-4		
90% Chebyshev(Mean, Sd) UCL	0.00103	95% Chebyshev(Mean, Sd) UCL	0.00124
97.5% Chebyshev(Mean, Sd) UCL	0.00152	99% Chebyshev(Mean, Sd) UCL	0.00208

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 0.00124

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Manganese

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	5.0274E-5	Mean	8.2698E-5
Maximum	1.4616E-4	Median	7.1883E-5
SD	3.6823E-5	Std. Error of Mean	1.5033E-5
Coefficient of Variation	N/A	Skewness	1.191

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1299E-4	95% Adjusted-CLT UCL (Chen-1995)	1.1524E-4
		95% Modified-t UCL (Johnson-1978)	1.1421E-4

Gamma GOF Test

A-D Test Statistic	0.329	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.828	k star (bias corrected MLE)	3.525
Theta hat (MLE)	1.2112E-5	Theta star (bias corrected MLE)	2.3460E-5
nu hat (MLE)	81.94	nu star (bias corrected)	42.3
MLE Mean (bias corrected)	8.2698E-5	MLE Sd (bias corrected)	4.4046E-5
		Approximate Chi Square Value (0.05)	28.39
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	24.35

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.2322E-4	95% Adjusted Gamma UCL (use when n<50)	1.4364E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.898	Mean of logged Data	-9.475
Maximum of Logged Data	-8.831	SD of logged Data	0.415

Assuming Lognormal Distribution

95% H-UCL	1.3165E-4	90% Chebyshev (MVUE) UCL	1.2420E-4
95% Chebyshev (MVUE) UCL	1.4314E-4	97.5% Chebyshev (MVUE) UCL	1.6944E-4
99% Chebyshev (MVUE) UCL	2.2109E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0742E-4	95% Jackknife UCL	1.1299E-4
95% Standard Bootstrap UCL	1.0494E-4	95% Bootstrap-t UCL	1.5209E-4
95% Hall's Bootstrap UCL	2.6450E-4	95% Percentile Bootstrap UCL	1.0653E-4
95% BCA Bootstrap UCL	1.1141E-4		
90% Chebyshev(Mean, Sd) UCL	1.2780E-4	95% Chebyshev(Mean, Sd) UCL	1.4822E-4
97.5% Chebyshev(Mean, Sd) UCL	1.7658E-4	99% Chebyshev(Mean, Sd) UCL	2.3227E-4

Suggested UCL to Use

95% Student's-t UCL 1.1299E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Mercury

General Statistics

Total Number of Observations	70	Number of Distinct Observations	68
Minimum	7.4592E-5	Mean	5.2165E-4
Maximum	0.00263	Median	3.6099E-4
SD	4.7679E-4	Std. Error of Mean	5.6987E-5
Coefficient of Variation	0.914	Skewness	2.53

Normal GOF Test

Shapiro Wilk Test Statistic	0.729	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.106	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.1666E-4	95% Adjusted-CLT UCL (Chen-1995)	6.3380E-4
		95% Modified-t UCL (Johnson-1978)	6.1953E-4

Gamma GOF Test

A-D Test Statistic	1.103	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.765	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.104	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.108	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.863	k star (bias corrected MLE)	1.793
Theta hat (MLE)	2.8003E-4	Theta star (bias corrected MLE)	2.9102E-4
nu hat (MLE)	260.8	nu star (bias corrected)	251
MLE Mean (bias corrected)	5.2165E-4	MLE Sd (bias corrected)	3.8963E-4
		Approximate Chi Square Value (0.05)	215.3
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	214.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	6.0811E-4	95% Adjusted Gamma UCL (use when n<50)	6.1007E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.59	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0663	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.106	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.503	Mean of logged Data	-7.85
Maximum of Logged Data	-5.939	SD of logged Data	0.746

Assuming Lognormal Distribution

95% H-UCL	6.1930E-4	90% Chebyshev (MVUE) UCL	6.6468E-4
95% Chebyshev (MVUE) UCL	7.3375E-4	97.5% Chebyshev (MVUE) UCL	8.2963E-4
99% Chebyshev (MVUE) UCL	0.00102		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.1539E-4	95% Jackknife UCL	6.1666E-4
95% Standard Bootstrap UCL	6.1324E-4	95% Bootstrap-t UCL	6.4838E-4
95% Hall's Bootstrap UCL	6.4795E-4	95% Percentile Bootstrap UCL	6.1632E-4
95% BCA Bootstrap UCL	6.3446E-4		
90% Chebyshev(Mean, Sd) UCL	6.9261E-4	95% Chebyshev(Mean, Sd) UCL	7.7005E-4
97.5% Chebyshev(Mean, Sd) UCL	8.7754E-4	99% Chebyshev(Mean, Sd) UCL	0.00109

Suggested UCL to Use

95% Approximate Gamma UCL 6.0811E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel

General Statistics

Total Number of Observations	42	Number of Distinct Observations	41
Minimum	1.1655E-5	Mean	8.9087E-5
Maximum	2.5812E-4	Median	6.3189E-5
SD	6.4743E-5	Std. Error of Mean	9.9901E-6
Coefficient of Variation	N/A	Skewness	1.2

Normal GOF Test

Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.0590E-4	95% Adjusted-CLT UCL (Chen-1995)	1.0750E-4
		95% Modified-t UCL (Johnson-1978)	1.0621E-4

Gamma GOF Test

A-D Test Statistic	0.634	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.126	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.138	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.163	k star (bias corrected MLE)	2.024
Theta hat (MLE)	4.1195E-5	Theta star (bias corrected MLE)	4.4016E-5
nu hat (MLE)	181.7	nu star (bias corrected)	170
MLE Mean (bias corrected)	8.9087E-5	MLE Sd (bias corrected)	6.2620E-5
		Approximate Chi Square Value (0.05)	140.9
Adjusted Level of Significance	0.0443	Adjusted Chi Square Value	139.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.0752E-4	95% Adjusted Gamma UCL (use when n<50)	1.0825E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.079	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.36	Mean of logged Data	-9.575
Maximum of Logged Data	-8.262	SD of logged Data	0.73

Assuming Lognormal Distribution

95% H-UCL	1.1497E-4	90% Chebyshev (MVUE) UCL	1.2328E-4
95% Chebyshev (MVUE) UCL	1.3838E-4	97.5% Chebyshev (MVUE) UCL	1.5934E-4
99% Chebyshev (MVUE) UCL	2.0051E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0552E-4	95% Jackknife UCL	1.0590E-4
95% Standard Bootstrap UCL	1.0522E-4	95% Bootstrap-t UCL	1.0886E-4
95% Hall's Bootstrap UCL	1.0738E-4	95% Percentile Bootstrap UCL	1.0525E-4
95% BCA Bootstrap UCL	1.0866E-4		
90% Chebyshev(Mean, Sd) UCL	1.1906E-4	95% Chebyshev(Mean, Sd) UCL	1.3263E-4
97.5% Chebyshev(Mean, Sd) UCL	1.5148E-4	99% Chebyshev(Mean, Sd) UCL	1.8849E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 1.0825E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
Minimum	5.4532E-7	Mean	4.1351E-5
Maximum	1.0576E-4	Median	4.6379E-5
SD	3.6005E-5	Std. Error of Mean	9.2965E-6
Coefficient of Variation	N/A	Skewness	0.702

Normal GOF Test

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.7725E-5	95% Adjusted-CLT UCL (Chen-1995)	5.8444E-5
		95% Modified-t UCL (Johnson-1978)	5.8006E-5

Gamma GOF Test

A-D Test Statistic	0.442	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.21	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.228	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.943	k star (bias corrected MLE)	0.799
Theta hat (MLE)	4.3846E-5	Theta star (bias corrected MLE)	5.1758E-5
nu hat (MLE)	28.29	nu star (bias corrected)	23.97
MLE Mean (bias corrected)	4.1351E-5	MLE Sd (bias corrected)	4.6263E-5
		Approximate Chi Square Value (0.05)	13.82
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	12.88

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.1693E-5	95% Adjusted Gamma UCL (use when n<50)	7.6934E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.225	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.42	Mean of logged Data	-10.71
Maximum of Logged Data	-9.154	SD of logged Data	1.458

Assuming Lognormal Distribution

95% H-UCL	2.5599E-4	90% Chebyshev (MVUE) UCL	1.3034E-4
95% Chebyshev (MVUE) UCL	1.6355E-4	97.5% Chebyshev (MVUE) UCL	2.0964E-4
99% Chebyshev (MVUE) UCL	3.0017E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.6643E-5	95% Jackknife UCL	5.7725E-5
95% Standard Bootstrap UCL	5.6267E-5	95% Bootstrap-t UCL	6.1661E-5
95% Hall's Bootstrap UCL	5.7131E-5	95% Percentile Bootstrap UCL	5.7402E-5
95% BCA Bootstrap UCL	5.8908E-5		
90% Chebyshev(Mean, Sd) UCL	6.9241E-5	95% Chebyshev(Mean, Sd) UCL	8.1874E-5
97.5% Chebyshev(Mean, Sd) UCL	9.9408E-5	99% Chebyshev(Mean, Sd) UCL	1.3385E-4

Suggested UCL to Use

95% Student's-t UCL 5.7725E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	3.8682E-4	Mean	0.00138
Maximum	0.003	Median	8.8074E-4
SD	0.00119	Std. Error of Mean	4.8497E-4
Coefficient of Variation	0.862	Skewness	0.716

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00236	95% Adjusted-CLT UCL (Chen-1995)	0.00233
		95% Modified-t UCL (Johnson-1978)	0.00238

Gamma GOF Test

A-D Test Statistic	0.562	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.707	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.294	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.337	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.566	k star (bias corrected MLE)	0.894
Theta hat (MLE)	8.8016E-4	Theta star (bias corrected MLE)	0.00154
nu hat (MLE)	18.79	nu star (bias corrected)	10.73
MLE Mean (bias corrected)	0.00138	MLE Sd (bias corrected)	0.00146
		Approximate Chi Square Value (0.05)	4.402
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	3.064

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.00336	95% Adjusted Gamma UCL (use when n<50)	0.00483

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.858	Mean of logged Data	-6.939
Maximum of Logged Data	-5.81	SD of logged Data	0.936

Assuming Lognormal Distribution

95% H-UCL	0.00767	90% Chebyshev (MVUE) UCL	0.00293
95% Chebyshev (MVUE) UCL	0.00363	97.5% Chebyshev (MVUE) UCL	0.00461
99% Chebyshev (MVUE) UCL	0.00653		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00218	95% Jackknife UCL	0.00236
95% Standard Bootstrap UCL	0.00211	95% Bootstrap-t UCL	0.00414
95% Hall's Bootstrap UCL	0.00282	95% Percentile Bootstrap UCL	0.00212
95% BCA Bootstrap UCL	0.00223		
90% Chebyshev(Mean, Sd) UCL	0.00283	95% Chebyshev(Mean, Sd) UCL	0.00349
97.5% Chebyshev(Mean, Sd) UCL	0.00441	99% Chebyshev(Mean, Sd) UCL	0.0062

Suggested UCL to Use

95% Student's-t UCL 0.00236

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Chloride

General Statistics

Total Number of Observations	38	Number of Distinct Observations	35
Minimum	0.266	Mean	0.578
Maximum	1.153	Median	0.518
SD	0.226	Std. Error of Mean	0.0366
Coefficient of Variation	0.391	Skewness	0.812

Normal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.938	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.64	95% Adjusted-CLT UCL (Chen-1995)	0.644
		95% Modified-t UCL (Johnson-1978)	0.641

Gamma GOF Test

A-D Test Statistic	0.422	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.143	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.135	k star (bias corrected MLE)	6.589
Theta hat (MLE)	0.081	Theta star (bias corrected MLE)	0.0878
nu hat (MLE)	542.2	nu star (bias corrected)	500.8
MLE Mean (bias corrected)	0.578	MLE Sd (bias corrected)	0.225
		Approximate Chi Square Value (0.05)	449.9
Adjusted Level of Significance	0.0434	Adjusted Chi Square Value	447.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.644	95% Adjusted Gamma UCL (use when n<50)	0.646

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.938	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0916	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.325	Mean of logged Data	-0.62
Maximum of Logged Data	0.142	SD of logged Data	0.384

Assuming Lognormal Distribution

95% H-UCL	0.651	90% Chebyshev (MVUE) UCL	0.689
95% Chebyshev (MVUE) UCL	0.74	97.5% Chebyshev (MVUE) UCL	0.809
99% Chebyshev (MVUE) UCL	0.947		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.638	95% Jackknife UCL	0.64
95% Standard Bootstrap UCL	0.638	95% Bootstrap-t UCL	0.647
95% Hall's Bootstrap UCL	0.641	95% Percentile Bootstrap UCL	0.637
95% BCA Bootstrap UCL	0.642		
90% Chebyshev(Mean, Sd) UCL	0.688	95% Chebyshev(Mean, Sd) UCL	0.738
97.5% Chebyshev(Mean, Sd) UCL	0.807	99% Chebyshev(Mean, Sd) UCL	0.943

Suggested UCL to Use

95% Adjusted Gamma UCL	0.646

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Fluoride (as Total Fluoride)

General Statistics

Total Number of Observations	36	Number of Distinct Observations	29
Minimum	0.00488	Mean	0.0103
Maximum	0.0718	Median	0.00517
SD	0.012	Std. Error of Mean	0.00201
Coefficient of Variation	1.172	Skewness	4.085

Normal GOF Test

Shapiro Wilk Test Statistic	0.484	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0137	95% Adjusted-CLT UCL (Chen-1995)	0.015
		95% Modified-t UCL (Johnson-1978)	0.0139

Gamma GOF Test

A-D Test Statistic	5.353	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.373	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.149	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.821	k star (bias corrected MLE)	1.688
Theta hat (MLE)	0.00564	Theta star (bias corrected MLE)	0.00609
nu hat (MLE)	131.1	nu star (bias corrected)	121.5
MLE Mean (bias corrected)	0.0103	MLE Sd (bias corrected)	0.00791
		Approximate Chi Square Value (0.05)	97.06
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	96.07

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0129	95% Adjusted Gamma UCL (use when n<50)	0.013

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.677	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.373	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.323	Mean of logged Data	-4.877
Maximum of Logged Data	-2.634	SD of logged Data	0.668

Assuming Lognormal Distribution

95% H-UCL	0.012	90% Chebyshev (MVUE) UCL	0.0129
95% Chebyshev (MVUE) UCL	0.0144	97.5% Chebyshev (MVUE) UCL	0.0166
99% Chebyshev (MVUE) UCL	0.0208		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0136	95% Jackknife UCL	0.0137
95% Standard Bootstrap UCL	0.0136	95% Bootstrap-t UCL	0.017
95% Hall's Bootstrap UCL	0.0264	95% Percentile Bootstrap UCL	0.0138
95% BCA Bootstrap UCL	0.0155		
90% Chebyshev(Mean, Sd) UCL	0.0163	95% Chebyshev(Mean, Sd) UCL	0.019
97.5% Chebyshev(Mean, Sd) UCL	0.0228	99% Chebyshev(Mean, Sd) UCL	0.0302

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.019

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sulfuric Acid

General Statistics

Total Number of Observations	36	Number of Distinct Observations	36
Minimum	0.00161	Mean	0.0329
Maximum	0.164	Median	0.00622
SD	0.0476	Std. Error of Mean	0.00794
Coefficient of Variation	1.449	Skewness	1.557

Normal GOF Test

Shapiro Wilk Test Statistic	0.669	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.35	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0463	95% Adjusted-CLT UCL (Chen-1995)	0.0481
		95% Modified-t UCL (Johnson-1978)	0.0466

Gamma GOF Test

A-D Test Statistic	3.349	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.804	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.279	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.589	k star (bias corrected MLE)	0.558
Theta hat (MLE)	0.0558	Theta star (bias corrected MLE)	0.0589
nu hat (MLE)	42.38	nu star (bias corrected)	40.19
MLE Mean (bias corrected)	0.0329	MLE Sd (bias corrected)	0.044
		Approximate Chi Square Value (0.05)	26.66
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	26.16

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0496	95% Adjusted Gamma UCL (use when n<50)	0.0505

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.43	Mean of logged Data	-4.468
Maximum of Logged Data	-1.805	SD of logged Data	1.447

Assuming Lognormal Distribution

95% H-UCL	0.067	90% Chebyshev (MVUE) UCL	0.0594
95% Chebyshev (MVUE) UCL	0.0724	97.5% Chebyshev (MVUE) UCL	0.0903
99% Chebyshev (MVUE) UCL	0.126		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0459	95% Jackknife UCL	0.0463
95% Standard Bootstrap UCL	0.0457	95% Bootstrap-t UCL	0.0487
95% Hall's Bootstrap UCL	0.0471	95% Percentile Bootstrap UCL	0.0464
95% BCA Bootstrap UCL	0.0473		
90% Chebyshev(Mean, Sd) UCL	0.0567	95% Chebyshev(Mean, Sd) UCL	0.0675
97.5% Chebyshev(Mean, Sd) UCL	0.0824	99% Chebyshev(Mean, Sd) UCL	0.112

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0675

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	9.294E-12	Mean	7.763E-11
Maximum	5.390E-10	Median	4.570E-11
SD	8.574E-11	Std. Error of Mean	1.048E-11
Coefficient of Variation	N/A	Skewness	3.011

Normal GOF Test

Shapiro Wilk Test Statistic	0.694	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.511E-11	95% Adjusted-CLT UCL (Chen-1995)	9.898E-11
		95% Modified-t UCL (Johnson-1978)	9.575E-11

Gamma GOF Test

A-D Test Statistic	1.926	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.771	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.158	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.394	k star (bias corrected MLE)	1.342
Theta hat (MLE)	5.568E-11	Theta star (bias corrected MLE)	5.785E-11
nu hat (MLE)	186.9	nu star (bias corrected)	179.8
MLE Mean (bias corrected)	7.763E-11	MLE Sd (bias corrected)	6.702E-11
		Approximate Chi Square Value (0.05)	149.8
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	149.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.319E-11	95% Adjusted Gamma UCL (use when n<50)	9.356E-11

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.107	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-25.4	Mean of logged Data	-23.68
Maximum of Logged Data	-21.34	SD of logged Data	0.86

Assuming Lognormal Distribution

95% H-UCL	9.467E-11	90% Chebyshev (MVUE) UCL	1.018E-10
95% Chebyshev (MVUE) UCL	1.140E-10	97.5% Chebyshev (MVUE) UCL	1.310E-10
99% Chebyshev (MVUE) UCL	1.643E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.486E-11	95% Jackknife UCL	9.511E-11
95% Standard Bootstrap UCL	9.465E-11	95% Bootstrap-t UCL	1.009E-10
95% Hall's Bootstrap UCL	1.034E-10	95% Percentile Bootstrap UCL	9.618E-11
95% BCA Bootstrap UCL	9.880E-11		
90% Chebyshev(Mean, Sd) UCL	1.091E-10	95% Chebyshev(Mean, Sd) UCL	1.233E-10
97.5% Chebyshev(Mean, Sd) UCL	1.431E-10	99% Chebyshev(Mean, Sd) UCL	1.819E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.233E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	2.405E-11	Mean	2.362E-10
Maximum	2.0300E-9	Median	1.220E-10
SD	3.035E-10	Std. Error of Mean	3.708E-11
Coefficient of Variation	N/A	Skewness	3.545

Normal GOF Test

Shapiro Wilk Test Statistic	0.651	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.242	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.981E-10	95% Adjusted-CLT UCL (Chen-1995)	3.144E-10
		95% Modified-t UCL (Johnson-1978)	3.007E-10

Gamma GOF Test

A-D Test Statistic	1.789	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.07	k star (bias corrected MLE)	1.032
Theta hat (MLE)	2.207E-10	Theta star (bias corrected MLE)	2.288E-10
nu hat (MLE)	143.4	nu star (bias corrected)	138.3
MLE Mean (bias corrected)	2.362E-10	MLE Sd (bias corrected)	2.325E-10
		Approximate Chi Square Value (0.05)	112.1
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	111.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.913E-10	95% Adjusted Gamma UCL (use when n<50)	2.927E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.11	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0847	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.45	Mean of logged Data	-22.7
Maximum of Logged Data	-20.02	SD of logged Data	1.016

Assuming Lognormal Distribution

95% H-UCL	3.075E-10	90% Chebyshev (MVUE) UCL	3.311E-10
95% Chebyshev (MVUE) UCL	3.772E-10	97.5% Chebyshev (MVUE) UCL	4.413E-10
99% Chebyshev (MVUE) UCL	5.671E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.972E-10	95% Jackknife UCL	2.981E-10
95% Standard Bootstrap UCL	2.960E-10	95% Bootstrap-t UCL	3.230E-10
95% Hall's Bootstrap UCL	3.583E-10	95% Percentile Bootstrap UCL	3.025E-10
95% BCA Bootstrap UCL	3.232E-10		
90% Chebyshev(Mean, Sd) UCL	3.474E-10	95% Chebyshev(Mean, Sd) UCL	3.978E-10
97.5% Chebyshev(Mean, Sd) UCL	4.678E-10	99% Chebyshev(Mean, Sd) UCL	6.052E-10

Suggested UCL to Use

95% H-UCL 3.075E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	2.338E-11	Mean	2.286E-10
Maximum	1.2100E-9	Median	1.190E-10
SD	2.460E-10	Std. Error of Mean	3.005E-11
Coefficient of Variation	N/A	Skewness	2.063

Normal GOF Test

Shapiro Wilk Test Statistic	0.749	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	2.109E-15	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.787E-10	95% Adjusted-CLT UCL (Chen-1995)	2.861E-10
		95% Modified-t UCL (Johnson-1978)	2.800E-10

Gamma GOF Test

A-D Test Statistic	1.345	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.151	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.221	k star (bias corrected MLE)	1.176
Theta hat (MLE)	1.872E-10	Theta star (bias corrected MLE)	1.943E-10
nu hat (MLE)	163.6	nu star (bias corrected)	157.6
MLE Mean (bias corrected)	2.286E-10	MLE Sd (bias corrected)	2.107E-10
		Approximate Chi Square Value (0.05)	129.6
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	129.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.780E-10	95% Adjusted Gamma UCL (use when n<50)	2.792E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.181	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0957	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.48	Mean of logged Data	-22.66
Maximum of Logged Data	-20.53	SD of logged Data	0.962

Assuming Lognormal Distribution

95% H-UCL	2.978E-10	90% Chebyshev (MVUE) UCL	3.202E-10
95% Chebyshev (MVUE) UCL	3.627E-10	97.5% Chebyshev (MVUE) UCL	4.217E-10
99% Chebyshev (MVUE) UCL	5.375E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.780E-10	95% Jackknife UCL	2.787E-10
95% Standard Bootstrap UCL	2.774E-10	95% Bootstrap-t UCL	2.875E-10
95% Hall's Bootstrap UCL	2.873E-10	95% Percentile Bootstrap UCL	2.798E-10
95% BCA Bootstrap UCL	2.861E-10		
90% Chebyshev(Mean, Sd) UCL	3.187E-10	95% Chebyshev(Mean, Sd) UCL	3.595E-10
97.5% Chebyshev(Mean, Sd) UCL	4.162E-10	99% Chebyshev(Mean, Sd) UCL	5.275E-10

Suggested UCL to Use

95% H-UCL 2.978E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	66
Minimum	5.372E-11	Mean	4.469E-10
Maximum	1.9700E-9	Median	3.330E-10
SD	4.002E-10	Std. Error of Mean	4.890E-11
Coefficient of Variation	N/A	Skewness	1.592

Normal GOF Test

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	8.197E-11	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.284E-10	95% Adjusted-CLT UCL (Chen-1995)	5.375E-10
		95% Modified-t UCL (Johnson-1978)	5.300E-10

Gamma GOF Test

A-D Test Statistic	0.758	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.77	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.449	k star (bias corrected MLE)	1.394
Theta hat (MLE)	3.084E-10	Theta star (bias corrected MLE)	3.206E-10
nu hat (MLE)	194.2	nu star (bias corrected)	186.8
MLE Mean (bias corrected)	4.469E-10	MLE Sd (bias corrected)	3.785E-10
		Approximate Chi Square Value (0.05)	156.2
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	155.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.345E-10	95% Adjusted Gamma UCL (use when n<50)	5.366E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0399	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0917	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.65	Mean of logged Data	-21.91
Maximum of Logged Data	-20.05	SD of logged Data	0.92

Assuming Lognormal Distribution

95% H-UCL	5.971E-10	90% Chebyshev (MVUE) UCL	6.418E-10
95% Chebyshev (MVUE) UCL	7.237E-10	97.5% Chebyshev (MVUE) UCL	8.373E-10
99% Chebyshev (MVUE) UCL	1.0605E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.273E-10	95% Jackknife UCL	5.284E-10
95% Standard Bootstrap UCL	5.277E-10	95% Bootstrap-t UCL	5.403E-10
95% Hall's Bootstrap UCL	5.409E-10	95% Percentile Bootstrap UCL	5.274E-10
95% BCA Bootstrap UCL	5.384E-10		
90% Chebyshev(Mean, Sd) UCL	5.936E-10	95% Chebyshev(Mean, Sd) UCL	6.600E-10
97.5% Chebyshev(Mean, Sd) UCL	7.522E-10	99% Chebyshev(Mean, Sd) UCL	9.334E-10

Suggested UCL to Use

95% Approximate Gamma UCL 5.345E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	65
Minimum	3.010E-11	Mean	3.375E-10
Maximum	1.9700E-9	Median	2.035E-10
SD	3.703E-10	Std. Error of Mean	4.524E-11
Coefficient of Variation	N/A	Skewness	2.092

Normal GOF Test

Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.110E-15	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.130E-10	95% Adjusted-CLT UCL (Chen-1995)	4.243E-10
		95% Modified-t UCL (Johnson-1978)	4.149E-10

Gamma GOF Test

A-D Test Statistic	1.578	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.152	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.141	k star (bias corrected MLE)	1.1
Theta hat (MLE)	2.957E-10	Theta star (bias corrected MLE)	3.068E-10
nu hat (MLE)	152.9	nu star (bias corrected)	147.4
MLE Mean (bias corrected)	3.375E-10	MLE Sd (bias corrected)	3.218E-10
		Approximate Chi Square Value (0.05)	120.4
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	119.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.134E-10	95% Adjusted Gamma UCL (use when n<50)	4.152E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0585	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0831	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.23	Mean of logged Data	-22.31
Maximum of Logged Data	-20.05	SD of logged Data	1.018

Assuming Lognormal Distribution

95% H-UCL	4.566E-10	90% Chebyshev (MVUE) UCL	4.916E-10
95% Chebyshev (MVUE) UCL	5.602E-10	97.5% Chebyshev (MVUE) UCL	6.554E-10
99% Chebyshev (MVUE) UCL	8.423E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.119E-10	95% Jackknife UCL	4.130E-10
95% Standard Bootstrap UCL	4.103E-10	95% Bootstrap-t UCL	4.293E-10
95% Hall's Bootstrap UCL	4.281E-10	95% Percentile Bootstrap UCL	4.145E-10
95% BCA Bootstrap UCL	4.285E-10		
90% Chebyshev(Mean, Sd) UCL	4.732E-10	95% Chebyshev(Mean, Sd) UCL	5.347E-10
97.5% Chebyshev(Mean, Sd) UCL	6.200E-10	99% Chebyshev(Mean, Sd) UCL	7.877E-10

Suggested UCL to Use

95% H-UCL 4.566E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	66
Minimum	3.360E-10	Mean	3.4601E-9
Maximum	2.4873E-8	Median	2.2800E-9
SD	4.2098E-9	Std. Error of Mean	5.143E-10
Coefficient of Variation	N/A	Skewness	2.938

Normal GOF Test

Shapiro Wilk Test Statistic	0.686	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.3181E-9	95% Adjusted-CLT UCL (Chen-1995)	4.5033E-9
		95% Modified-t UCL (Johnson-1978)	4.3489E-9

Gamma GOF Test

A-D Test Statistic	1.077	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.12	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.1	k star (bias corrected MLE)	1.06
Theta hat (MLE)	3.1468E-9	Theta star (bias corrected MLE)	3.2634E-9
nu hat (MLE)	147.3	nu star (bias corrected)	142.1
MLE Mean (bias corrected)	3.4601E-9	MLE Sd (bias corrected)	3.3603E-9
		Approximate Chi Square Value (0.05)	115.5
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	115

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.2551E-9	95% Adjusted Gamma UCL (use when n<50)	4.2745E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.188	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0788	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-21.81	Mean of logged Data	-20
Maximum of Logged Data	-17.51	SD of logged Data	1.024

Assuming Lognormal Distribution

95% H-UCL	4.6230E-9	90% Chebyshev (MVUE) UCL	4.9795E-9
95% Chebyshev (MVUE) UCL	5.6781E-9	97.5% Chebyshev (MVUE) UCL	6.6476E-9
99% Chebyshev (MVUE) UCL	8.5521E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.3061E-9	95% Jackknife UCL	4.3181E-9
95% Standard Bootstrap UCL	4.3044E-9	95% Bootstrap-t UCL	4.6310E-9
95% Hall's Bootstrap UCL	4.7436E-9	95% Percentile Bootstrap UCL	4.3771E-9
95% BCA Bootstrap UCL	4.4952E-9		
90% Chebyshev(Mean, Sd) UCL	5.0031E-9	95% Chebyshev(Mean, Sd) UCL	5.7019E-9
97.5% Chebyshev(Mean, Sd) UCL	6.6720E-9	99% Chebyshev(Mean, Sd) UCL	8.5774E-9

Suggested UCL to Use

95% H-UCL 4.6230E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDD

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	5.070E-10	Mean	8.2847E-9
Maximum	1.4080E-7	Median	3.3400E-9
SD	1.8132E-8	Std. Error of Mean	2.2152E-9
Coefficient of Variation	N/A	Skewness	6.203

Normal GOF Test

Shapiro Wilk Test Statistic	0.407	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.334	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1980E-8	95% Adjusted-CLT UCL (Chen-1995)	1.3722E-8
		95% Modified-t UCL (Johnson-1978)	1.2260E-8

Gamma GOF Test

A-D Test Statistic	2.454	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.727	k star (bias corrected MLE)	0.705
Theta hat (MLE)	1.1391E-8	Theta star (bias corrected MLE)	1.1756E-8
nu hat (MLE)	97.46	nu star (bias corrected)	94.43
MLE Mean (bias corrected)	8.2847E-9	MLE Sd (bias corrected)	9.8690E-9
		Approximate Chi Square Value (0.05)	73.02
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	72.61

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.0714E-8	95% Adjusted Gamma UCL (use when n<50)	1.0775E-8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.135	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0672	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-21.4	Mean of logged Data	-19.44
Maximum of Logged Data	-15.78	SD of logged Data	1.192

Assuming Lognormal Distribution

95% H-UCL	1.0180E-8	90% Chebyshev (MVUE) UCL	1.1205E-8
95% Chebyshev (MVUE) UCL	1.2998E-8	97.5% Chebyshev (MVUE) UCL	1.5487E-8
99% Chebyshev (MVUE) UCL	2.0375E-8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1928E-8	95% Jackknife UCL	1.1980E-8
95% Standard Bootstrap UCL	1.1807E-8	95% Bootstrap-t UCL	1.6878E-8
95% Hall's Bootstrap UCL	2.5885E-8	95% Percentile Bootstrap UCL	1.2105E-8
95% BCA Bootstrap UCL	1.4501E-8		
90% Chebyshev(Mean, Sd) UCL	1.4930E-8	95% Chebyshev(Mean, Sd) UCL	1.7940E-8
97.5% Chebyshev(Mean, Sd) UCL	2.2118E-8	99% Chebyshev(Mean, Sd) UCL	3.0325E-8

Suggested UCL to Use

95% H-UCL 1.0180E-8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	3.532E-11	Mean	3.095E-10
Maximum	2.9000E-9	Median	1.775E-10
SD	4.528E-10	Std. Error of Mean	5.532E-11
Coefficient of Variation	N/A	Skewness	3.763

Normal GOF Test

Shapiro Wilk Test Statistic	0.564	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.018E-10	95% Adjusted-CLT UCL (Chen-1995)	4.277E-10
		95% Modified-t UCL (Johnson-1978)	4.061E-10

Gamma GOF Test

A-D Test Statistic	2.925	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.171	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.081	k star (bias corrected MLE)	1.042
Theta hat (MLE)	2.864E-10	Theta star (bias corrected MLE)	2.970E-10
nu hat (MLE)	144.8	nu star (bias corrected)	139.7
MLE Mean (bias corrected)	3.095E-10	MLE Sd (bias corrected)	3.032E-10
		Approximate Chi Square Value (0.05)	113.3
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	112.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.814E-10	95% Adjusted Gamma UCL (use when n<50)	3.831E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0346	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0849	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.07	Mean of logged Data	-22.43
Maximum of Logged Data	-19.66	SD of logged Data	0.945

Assuming Lognormal Distribution

95% H-UCL	3.692E-10	90% Chebyshev (MVUE) UCL	3.968E-10
95% Chebyshev (MVUE) UCL	4.487E-10	97.5% Chebyshev (MVUE) UCL	5.207E-10
99% Chebyshev (MVUE) UCL	6.621E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.005E-10	95% Jackknife UCL	4.018E-10
95% Standard Bootstrap UCL	3.989E-10	95% Bootstrap-t UCL	4.562E-10
95% Hall's Bootstrap UCL	4.640E-10	95% Percentile Bootstrap UCL	4.093E-10
95% BCA Bootstrap UCL	4.425E-10		
90% Chebyshev(Mean, Sd) UCL	4.755E-10	95% Chebyshev(Mean, Sd) UCL	5.507E-10
97.5% Chebyshev(Mean, Sd) UCL	6.550E-10	99% Chebyshev(Mean, Sd) UCL	8.600E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 5.507E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	3.274E-11	Mean	6.000E-10
Maximum	7.2800E-9	Median	2.747E-10
SD	1.0736E-9	Std. Error of Mean	1.312E-10
Coefficient of Variation	N/A	Skewness	4.325

Normal GOF Test

Shapiro Wilk Test Statistic	0.508	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.188E-10	95% Adjusted-CLT UCL (Chen-1995)	8.898E-10
		95% Modified-t UCL (Johnson-1978)	8.304E-10

Gamma GOF Test

A-D Test Statistic	3.665	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.789	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.21	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.822	k star (bias corrected MLE)	0.795
Theta hat (MLE)	7.303E-10	Theta star (bias corrected MLE)	7.550E-10
nu hat (MLE)	110.1	nu star (bias corrected)	106.5
MLE Mean (bias corrected)	6.000E-10	MLE Sd (bias corrected)	6.731E-10
		Approximate Chi Square Value (0.05)	83.68
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	83.23

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.636E-10	95% Adjusted Gamma UCL (use when n<50)	7.677E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0785	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.108	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.14	Mean of logged Data	-21.95
Maximum of Logged Data	-18.74	SD of logged Data	1.098

Assuming Lognormal Distribution

95% H-UCL	7.235E-10	90% Chebyshev (MVUE) UCL	7.842E-10
95% Chebyshev (MVUE) UCL	9.011E-10	97.5% Chebyshev (MVUE) UCL	1.0634E-9
99% Chebyshev (MVUE) UCL	1.3822E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.157E-10	95% Jackknife UCL	8.188E-10
95% Standard Bootstrap UCL	8.177E-10	95% Bootstrap-t UCL	9.990E-10
95% Hall's Bootstrap UCL	1.5444E-9	95% Percentile Bootstrap UCL	8.321E-10
95% BCA Bootstrap UCL	9.084E-10		
90% Chebyshev(Mean, Sd) UCL	9.935E-10	95% Chebyshev(Mean, Sd) UCL	1.1717E-9
97.5% Chebyshev(Mean, Sd) UCL	1.4191E-9	99% Chebyshev(Mean, Sd) UCL	1.9050E-9

Suggested UCL to Use

95% H-UCL 7.235E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,7,8-PeCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	65
Minimum	4.960E-11	Mean	6.438E-10
Maximum	6.1200E-9	Median	3.494E-10
SD	9.768E-10	Std. Error of Mean	1.193E-10
Coefficient of Variation	N/A	Skewness	3.66

Normal GOF Test

Shapiro Wilk Test Statistic	0.576	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.429E-10	95% Adjusted-CLT UCL (Chen-1995)	8.971E-10
		95% Modified-t UCL (Johnson-1978)	8.517E-10

Gamma GOF Test

A-D Test Statistic	2.338	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.783	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.166	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.943	k star (bias corrected MLE)	0.911
Theta hat (MLE)	6.824E-10	Theta star (bias corrected MLE)	7.066E-10
nu hat (MLE)	126.4	nu star (bias corrected)	122.1
MLE Mean (bias corrected)	6.438E-10	MLE Sd (bias corrected)	6.745E-10
		Approximate Chi Square Value (0.05)	97.56
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	97.08

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.055E-10	95% Adjusted Gamma UCL (use when n<50)	8.095E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.259	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0788	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.73	Mean of logged Data	-21.78
Maximum of Logged Data	-18.91	SD of logged Data	1.059

Assuming Lognormal Distribution

95% H-UCL	8.173E-10	90% Chebyshev (MVUE) UCL	8.824E-10
95% Chebyshev (MVUE) UCL	1.0099E-9	97.5% Chebyshev (MVUE) UCL	1.1868E-9
99% Chebyshev (MVUE) UCL	1.5343E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.401E-10	95% Jackknife UCL	8.429E-10
95% Standard Bootstrap UCL	8.399E-10	95% Bootstrap-t UCL	9.413E-10
95% Hall's Bootstrap UCL	1.0654E-9	95% Percentile Bootstrap UCL	8.707E-10
95% BCA Bootstrap UCL	9.356E-10		
90% Chebyshev(Mean, Sd) UCL	1.0018E-9	95% Chebyshev(Mean, Sd) UCL	1.1639E-9
97.5% Chebyshev(Mean, Sd) UCL	1.3890E-9	99% Chebyshev(Mean, Sd) UCL	1.8311E-9

Suggested UCL to Use

95% H-UCL 8.173E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	66
Minimum	3.371E-11	Mean	8.683E-10
Maximum	7.8900E-9	Median	4.210E-10
SD	1.2952E-9	Std. Error of Mean	1.582E-10
Coefficient of Variation	N/A	Skewness	3.231

Normal GOF Test

Shapiro Wilk Test Statistic	0.631	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1323E-9	95% Adjusted-CLT UCL (Chen-1995)	1.1953E-9
		95% Modified-t UCL (Johnson-1978)	1.1427E-9

Gamma GOF Test

A-D Test Statistic	1.944	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.79	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.162	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.796	k star (bias corrected MLE)	0.77
Theta hat (MLE)	1.0913E-9	Theta star (bias corrected MLE)	1.1277E-9
nu hat (MLE)	106.6	nu star (bias corrected)	103.2
MLE Mean (bias corrected)	8.683E-10	MLE Sd (bias corrected)	9.895E-10
		Approximate Chi Square Value (0.05)	80.74
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	80.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.1096E-9	95% Adjusted Gamma UCL (use when n<50)	1.1156E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.42	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0741	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.11	Mean of logged Data	-21.61
Maximum of Logged Data	-18.66	SD of logged Data	1.222

Assuming Lognormal Distribution

95% H-UCL	1.2032E-9	90% Chebyshev (MVUE) UCL	1.3333E-9
95% Chebyshev (MVUE) UCL	1.5513E-9	97.5% Chebyshev (MVUE) UCL	1.8538E-9
99% Chebyshev (MVUE) UCL	2.4481E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1286E-9	95% Jackknife UCL	1.1323E-9
95% Standard Bootstrap UCL	1.1413E-9	95% Bootstrap-t UCL	1.2269E-9
95% Hall's Bootstrap UCL	1.3450E-9	95% Percentile Bootstrap UCL	1.1342E-9
95% BCA Bootstrap UCL	1.1937E-9		
90% Chebyshev(Mean, Sd) UCL	1.3430E-9	95% Chebyshev(Mean, Sd) UCL	1.5580E-9
97.5% Chebyshev(Mean, Sd) UCL	1.8565E-9	99% Chebyshev(Mean, Sd) UCL	2.4427E-9

Suggested UCL to Use

95% H-UCL	1.2032E-9	95% Chebyshev(Mean, Sd) UCL	1.5580E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	3.579E-11	Mean	8.600E-10
Maximum	9.1900E-9	Median	3.970E-10
SD	1.4733E-9	Std. Error of Mean	1.800E-10
Coefficient of Variation	N/A	Skewness	3.691

Normal GOF Test

Shapiro Wilk Test Statistic	0.563	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1603E-9	95% Adjusted-CLT UCL (Chen-1995)	1.2428E-9
		95% Modified-t UCL (Johnson-1978)	1.1738E-9

Gamma GOF Test

A-D Test Statistic	2.552	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.724	k star (bias corrected MLE)	0.701
Theta hat (MLE)	1.1884E-9	Theta star (bias corrected MLE)	1.2264E-9
nu hat (MLE)	96.97	nu star (bias corrected)	93.96
MLE Mean (bias corrected)	8.600E-10	MLE Sd (bias corrected)	1.0270E-9
		Approximate Chi Square Value (0.05)	72.61
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	72.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.1130E-9	95% Adjusted Gamma UCL (use when n<50)	1.1193E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.271	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0883	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.05	Mean of logged Data	-21.71
Maximum of Logged Data	-18.51	SD of logged Data	1.251

Assuming Lognormal Distribution

95% H-UCL	1.1381E-9	90% Chebyshev (MVUE) UCL	1.2705E-9
95% Chebyshev (MVUE) UCL	1.4824E-9	97.5% Chebyshev (MVUE) UCL	1.7764E-9
99% Chebyshev (MVUE) UCL	2.3541E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1561E-9	95% Jackknife UCL	1.1603E-9
95% Standard Bootstrap UCL	1.1594E-9	95% Bootstrap-t UCL	1.3437E-9
95% Hall's Bootstrap UCL	1.5627E-9	95% Percentile Bootstrap UCL	1.1707E-9
95% BCA Bootstrap UCL	1.2502E-9		
90% Chebyshev(Mean, Sd) UCL	1.4000E-9	95% Chebyshev(Mean, Sd) UCL	1.6446E-9
97.5% Chebyshev(Mean, Sd) UCL	1.9840E-9	99% Chebyshev(Mean, Sd) UCL	2.6509E-9

Suggested UCL to Use

95% H-UCL 1.1381E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,6,7,8-HxCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	66
Minimum	3.250E-11	Mean	8.534E-10
Maximum	7.1000E-9	Median	3.830E-10
SD	1.2809E-9	Std. Error of Mean	1.565E-10
Coefficient of Variation	N/A	Skewness	2.935

Normal GOF Test

Shapiro Wilk Test Statistic	0.623	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1145E-9	95% Adjusted-CLT UCL (Chen-1995)	1.1708E-9
		95% Modified-t UCL (Johnson-1978)	1.1238E-9

Gamma GOF Test

A-D Test Statistic	2.363	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.791	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.789	k star (bias corrected MLE)	0.763
Theta hat (MLE)	1.0820E-9	Theta star (bias corrected MLE)	1.1179E-9
nu hat (MLE)	105.7	nu star (bias corrected)	102.3
MLE Mean (bias corrected)	8.534E-10	MLE Sd (bias corrected)	9.767E-10
		Approximate Chi Square Value (0.05)	79.96
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	79.53

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.0918E-9	95% Adjusted Gamma UCL (use when n<50)	1.0977E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.298	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0885	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.15	Mean of logged Data	-21.64
Maximum of Logged Data	-18.76	SD of logged Data	1.217

Assuming Lognormal Distribution

95% H-UCL	1.1668E-9	90% Chebyshev (MVUE) UCL	1.2917E-9
95% Chebyshev (MVUE) UCL	1.5022E-9	97.5% Chebyshev (MVUE) UCL	1.7943E-9
99% Chebyshev (MVUE) UCL	2.3682E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1108E-9	95% Jackknife UCL	1.1145E-9
95% Standard Bootstrap UCL	1.1039E-9	95% Bootstrap-t UCL	1.2236E-9
95% Hall's Bootstrap UCL	1.2318E-9	95% Percentile Bootstrap UCL	1.1276E-9
95% BCA Bootstrap UCL	1.1857E-9		
90% Chebyshev(Mean, Sd) UCL	1.3229E-9	95% Chebyshev(Mean, Sd) UCL	1.5355E-9
97.5% Chebyshev(Mean, Sd) UCL	1.8307E-9	99% Chebyshev(Mean, Sd) UCL	2.4105E-9

Suggested UCL to Use

95% H-UCL 1.1668E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
Minimum	9.851E-12	Mean	2.595E-10
Maximum	2.9000E-9	Median	7.850E-11
SD	5.093E-10	Std. Error of Mean	6.223E-11
Coefficient of Variation	N/A	Skewness	3.53

Normal GOF Test

Shapiro Wilk Test Statistic	0.519	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.323	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.633E-10	95% Adjusted-CLT UCL (Chen-1995)	3.905E-10
		95% Modified-t UCL (Johnson-1978)	3.677E-10

Gamma GOF Test

A-D Test Statistic	3.657	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.808	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.593	k star (bias corrected MLE)	0.576
Theta hat (MLE)	4.376E-10	Theta star (bias corrected MLE)	4.502E-10
nu hat (MLE)	79.46	nu star (bias corrected)	77.23
MLE Mean (bias corrected)	2.595E-10	MLE Sd (bias corrected)	3.418E-10
		Approximate Chi Square Value (0.05)	57.99
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	57.62

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.456E-10	95% Adjusted Gamma UCL (use when n<50)	3.478E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0253	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-25.34	Mean of logged Data	-23.12
Maximum of Logged Data	-19.66	SD of logged Data	1.363

Assuming Lognormal Distribution

95% H-UCL	3.346E-10	90% Chebyshev (MVUE) UCL	3.727E-10
95% Chebyshev (MVUE) UCL	4.394E-10	97.5% Chebyshev (MVUE) UCL	5.321E-10
99% Chebyshev (MVUE) UCL	7.140E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.618E-10	95% Jackknife UCL	3.633E-10
95% Standard Bootstrap UCL	3.611E-10	95% Bootstrap-t UCL	4.201E-10
95% Hall's Bootstrap UCL	4.030E-10	95% Percentile Bootstrap UCL	3.630E-10
95% BCA Bootstrap UCL	3.888E-10		
90% Chebyshev(Mean, Sd) UCL	4.461E-10	95% Chebyshev(Mean, Sd) UCL	5.307E-10
97.5% Chebyshev(Mean, Sd) UCL	6.481E-10	99% Chebyshev(Mean, Sd) UCL	8.786E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 5.307E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	66
Minimum	7.940E-11	Mean	2.8409E-9
Maximum	2.2386E-8	Median	9.400E-10
SD	4.7924E-9	Std. Error of Mean	5.855E-10
Coefficient of Variation	N/A	Skewness	2.638

Normal GOF Test

Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.8177E-9	95% Adjusted-CLT UCL (Chen-1995)	4.0056E-9
		95% Modified-t UCL (Johnson-1978)	3.8491E-9

Gamma GOF Test

A-D Test Statistic	2.974	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.806	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.198	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.608	k star (bias corrected MLE)	0.59
Theta hat (MLE)	4.6763E-9	Theta star (bias corrected MLE)	4.8130E-9
nu hat (MLE)	81.41	nu star (bias corrected)	79.09
MLE Mean (bias corrected)	2.8409E-9	MLE Sd (bias corrected)	3.6977E-9
		Approximate Chi Square Value (0.05)	59.6
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	59.23

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.7698E-9	95% Adjusted Gamma UCL (use when n<50)	3.7935E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0531	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0976	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.26	Mean of logged Data	-20.69
Maximum of Logged Data	-17.61	SD of logged Data	1.414

Assuming Lognormal Distribution

95% H-UCL	4.1486E-9	90% Chebyshev (MVUE) UCL	4.5908E-9
95% Chebyshev (MVUE) UCL	5.4382E-9	97.5% Chebyshev (MVUE) UCL	6.6145E-9
99% Chebyshev (MVUE) UCL	8.9249E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8039E-9	95% Jackknife UCL	3.8177E-9
95% Standard Bootstrap UCL	3.8079E-9	95% Bootstrap-t UCL	4.1941E-9
95% Hall's Bootstrap UCL	3.9603E-9	95% Percentile Bootstrap UCL	3.8742E-9
95% BCA Bootstrap UCL	3.9895E-9		
90% Chebyshev(Mean, Sd) UCL	4.5974E-9	95% Chebyshev(Mean, Sd) UCL	5.3930E-9
97.5% Chebyshev(Mean, Sd) UCL	6.4973E-9	99% Chebyshev(Mean, Sd) UCL	8.6664E-9

Suggested UCL to Use

95% H-UCL 4.1486E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8,9-HpCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	65
Minimum	1.890E-11	Mean	6.210E-10
Maximum	5.9200E-9	Median	1.820E-10
SD	1.0815E-9	Std. Error of Mean	1.321E-10
Coefficient of Variation	N/A	Skewness	3.127

Normal GOF Test

Shapiro Wilk Test Statistic	0.581	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.414E-10	95% Adjusted-CLT UCL (Chen-1995)	8.923E-10
		95% Modified-t UCL (Johnson-1978)	8.499E-10

Gamma GOF Test

A-D Test Statistic	3.031	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.805	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.184	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.621	k star (bias corrected MLE)	0.603
Theta hat (MLE)	9.995E-10	Theta star (bias corrected MLE)	1.0291E-9
nu hat (MLE)	83.26	nu star (bias corrected)	80.86
MLE Mean (bias corrected)	6.210E-10	MLE Sd (bias corrected)	7.994E-10
		Approximate Chi Square Value (0.05)	61.14
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	60.77

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.213E-10	95% Adjusted Gamma UCL (use when n<50)	8.264E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0486	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.091	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.69	Mean of logged Data	-22.19
Maximum of Logged Data	-18.94	SD of logged Data	1.378

Assuming Lognormal Distribution

95% H-UCL	8.694E-10	90% Chebyshev (MVUE) UCL	9.667E-10
95% Chebyshev (MVUE) UCL	1.1415E-9	97.5% Chebyshev (MVUE) UCL	1.3839E-9
99% Chebyshev (MVUE) UCL	1.8603E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.384E-10	95% Jackknife UCL	8.414E-10
95% Standard Bootstrap UCL	8.378E-10	95% Bootstrap-t UCL	9.609E-10
95% Hall's Bootstrap UCL	9.301E-10	95% Percentile Bootstrap UCL	8.389E-10
95% BCA Bootstrap UCL	9.385E-10		
90% Chebyshev(Mean, Sd) UCL	1.0174E-9	95% Chebyshev(Mean, Sd) UCL	1.1970E-9
97.5% Chebyshev(Mean, Sd) UCL	1.4462E-9	99% Chebyshev(Mean, Sd) UCL	1.9357E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.1970E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	64
Minimum	7.245E-11	Mean	2.5450E-9
Maximum	5.3744E-8	Median	5.730E-10
SD	6.9816E-9	Std. Error of Mean	8.529E-10
Coefficient of Variation	N/A	Skewness	6.314

Normal GOF Test

Shapiro Wilk Test Statistic	0.365	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.9680E-9	95% Adjusted-CLT UCL (Chen-1995)	4.6510E-9
		95% Modified-t UCL (Johnson-1978)	4.0776E-9

Gamma GOF Test

A-D Test Statistic	3.748	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.816	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.507	k star (bias corrected MLE)	0.494
Theta hat (MLE)	5.0179E-9	Theta star (bias corrected MLE)	5.1474E-9
nu hat (MLE)	67.96	nu star (bias corrected)	66.25
MLE Mean (bias corrected)	2.5450E-9	MLE Sd (bias corrected)	3.6194E-9
		Approximate Chi Square Value (0.05)	48.52
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	48.19

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.4750E-9	95% Adjusted Gamma UCL (use when n<50)	3.4991E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0279	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.35	Mean of logged Data	-21.04
Maximum of Logged Data	-16.74	SD of logged Data	1.456

Assuming Lognormal Distribution

95% H-UCL	3.1904E-9	90% Chebyshev (MVUE) UCL	3.5024E-9
95% Chebyshev (MVUE) UCL	4.1642E-9	97.5% Chebyshev (MVUE) UCL	5.0828E-9
99% Chebyshev (MVUE) UCL	6.8872E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.9480E-9	95% Jackknife UCL	3.9680E-9
95% Standard Bootstrap UCL	3.8925E-9	95% Bootstrap-t UCL	6.2057E-9
95% Hall's Bootstrap UCL	9.2098E-9	95% Percentile Bootstrap UCL	4.1706E-9
95% BCA Bootstrap UCL	5.1365E-9		
90% Chebyshev(Mean, Sd) UCL	5.1038E-9	95% Chebyshev(Mean, Sd) UCL	6.2629E-9
97.5% Chebyshev(Mean, Sd) UCL	7.8716E-9	99% Chebyshev(Mean, Sd) UCL	1.1032E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 6.2629E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total PCBs

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
Minimum	1.6692E-7	Mean	3.2022E-5
Maximum	1.0947E-4	Median	1.3986E-5
SD	3.9322E-5	Std. Error of Mean	8.7926E-6
Coefficient of Variation	N/A	Skewness	0.902

Normal GOF Test

Shapiro Wilk Test Statistic	0.751	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.198	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.7226E-5	95% Adjusted-CLT UCL (Chen-1995)	4.8380E-5
		95% Modified-t UCL (Johnson-1978)	4.7521E-5

Gamma GOF Test

A-D Test Statistic	0.875	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.819	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.198	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.207	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.424	k star (bias corrected MLE)	0.394
Theta hat (MLE)	7.5489E-5	Theta star (bias corrected MLE)	8.1295E-5
nu hat (MLE)	16.97	nu star (bias corrected)	15.76
MLE Mean (bias corrected)	3.2022E-5	MLE Sd (bias corrected)	5.1022E-5
		Approximate Chi Square Value (0.05)	7.79
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	7.35

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	6.4765E-5	95% Adjusted Gamma UCL (use when n<50)	6.8647E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.198	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.61	Mean of logged Data	-11.89
Maximum of Logged Data	-9.12	SD of logged Data	2.309

Assuming Lognormal Distribution

95% H-UCL	0.00131	90% Chebyshev (MVUE) UCL	1.9861E-4
95% Chebyshev (MVUE) UCL	2.5768E-4	97.5% Chebyshev (MVUE) UCL	3.3967E-4
99% Chebyshev (MVUE) UCL	5.0072E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.6485E-5	95% Jackknife UCL	4.7226E-5
95% Standard Bootstrap UCL	4.6199E-5	95% Bootstrap-t UCL	5.0365E-5
95% Hall's Bootstrap UCL	4.5941E-5	95% Percentile Bootstrap UCL	4.6196E-5
95% BCA Bootstrap UCL	4.7364E-5		
90% Chebyshev(Mean, Sd) UCL	5.8400E-5	95% Chebyshev(Mean, Sd) UCL	7.0348E-5
97.5% Chebyshev(Mean, Sd) UCL	8.6932E-5	99% Chebyshev(Mean, Sd) UCL	1.1951E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 6.8647E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	3.4400E-8	Mean	2.9403E-6
Maximum	9.5256E-6	Median	4.7700E-7
SD	3.6904E-6	Std. Error of Mean	7.6950E-7
Coefficient of Variation	N/A	Skewness	0.82

Normal GOF Test

Shapiro Wilk Test Statistic	0.745	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.313	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.2617E-6	95% Adjusted-CLT UCL (Chen-1995)	4.3467E-6
		95% Modified-t UCL (Johnson-1978)	4.2836E-6

Gamma GOF Test

A-D Test Statistic	1.448	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.82	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.223	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.194	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.43	k star (bias corrected MLE)	0.403
Theta hat (MLE)	6.8341E-6	Theta star (bias corrected MLE)	7.2941E-6
nu hat (MLE)	19.79	nu star (bias corrected)	18.54
MLE Mean (bias corrected)	2.9403E-6	MLE Sd (bias corrected)	4.6311E-6
		Approximate Chi Square Value (0.05)	9.784
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	9.324

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.5723E-6	95% Adjusted Gamma UCL (use when n<50)	5.8473E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.19	Mean of logged Data	-14.25
Maximum of Logged Data	-11.56	SD of logged Data	2.098

Assuming Lognormal Distribution

95% H-UCL	3.8654E-5	90% Chebyshev (MVUE) UCL	1.2233E-5
95% Chebyshev (MVUE) UCL	1.5705E-5	97.5% Chebyshev (MVUE) UCL	2.0523E-5
99% Chebyshev (MVUE) UCL	2.9989E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.2060E-6	95% Jackknife UCL	4.2617E-6
95% Standard Bootstrap UCL	4.1760E-6	95% Bootstrap-t UCL	4.4252E-6
95% Hall's Bootstrap UCL	4.1930E-6	95% Percentile Bootstrap UCL	4.2000E-6
95% BCA Bootstrap UCL	4.3333E-6		
90% Chebyshev(Mean, Sd) UCL	5.2488E-6	95% Chebyshev(Mean, Sd) UCL	6.2945E-6
97.5% Chebyshev(Mean, Sd) UCL	7.7458E-6	99% Chebyshev(Mean, Sd) UCL	1.0597E-5

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 7.7458E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	2.6400E-8	Mean	1.4554E-6
Maximum	5.2542E-6	Median	1.4400E-7
SD	1.9640E-6	Std. Error of Mean	4.0952E-7
Coefficient of Variation	N/A	Skewness	1.08

Normal GOF Test

Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.1586E-6	95% Adjusted-CLT UCL (Chen-1995)	2.2275E-6
		95% Modified-t UCL (Johnson-1978)	2.1740E-6

Gamma GOF Test

A-D Test Statistic	1.606	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.823	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.228	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.194	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.419	k star (bias corrected MLE)	0.393
Theta hat (MLE)	3.4756E-6	Theta star (bias corrected MLE)	3.7022E-6
nu hat (MLE)	19.26	nu star (bias corrected)	18.08
MLE Mean (bias corrected)	1.4554E-6	MLE Sd (bias corrected)	2.3213E-6
		Approximate Chi Square Value (0.05)	9.451
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.7847E-6	95% Adjusted Gamma UCL (use when n<50)	2.9243E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.45	Mean of logged Data	-15
Maximum of Logged Data	-12.16	SD of logged Data	2.067

Assuming Lognormal Distribution

95% H-UCL	1.6234E-5	90% Chebyshev (MVUE) UCL	5.4124E-6
95% Chebyshev (MVUE) UCL	6.9392E-6	97.5% Chebyshev (MVUE) UCL	9.0582E-6
99% Chebyshev (MVUE) UCL	1.3221E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.1290E-6	95% Jackknife UCL	2.1586E-6
95% Standard Bootstrap UCL	2.1241E-6	95% Bootstrap-t UCL	2.3304E-6
95% Hall's Bootstrap UCL	2.1167E-6	95% Percentile Bootstrap UCL	2.1306E-6
95% BCA Bootstrap UCL	2.2098E-6		
90% Chebyshev(Mean, Sd) UCL	2.6840E-6	95% Chebyshev(Mean, Sd) UCL	3.2404E-6
97.5% Chebyshev(Mean, Sd) UCL	4.0128E-6	99% Chebyshev(Mean, Sd) UCL	5.5300E-6

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 4.0128E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Anthracene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	2.8700E-8	Mean	1.5814E-6
Maximum	5.5188E-6	Median	2.6200E-7
SD	2.0645E-6	Std. Error of Mean	4.3049E-7
Coefficient of Variation	N/A	Skewness	1.024

Normal GOF Test

Shapiro Wilk Test Statistic	0.73	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.3206E-6	95% Adjusted-CLT UCL (Chen-1995)	2.3877E-6
		95% Modified-t UCL (Johnson-1978)	2.3360E-6

Gamma GOF Test

A-D Test Statistic	1.522	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.807	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.227	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.192	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.49	k star (bias corrected MLE)	0.455
Theta hat (MLE)	3.2306E-6	Theta star (bias corrected MLE)	3.4784E-6
nu hat (MLE)	22.52	nu star (bias corrected)	20.91
MLE Mean (bias corrected)	1.5814E-6	MLE Sd (bias corrected)	2.3454E-6
		Approximate Chi Square Value (0.05)	11.53
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	11.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.8691E-6	95% Adjusted Gamma UCL (use when n<50)	3.0004E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.37	Mean of logged Data	-14.66
Maximum of Logged Data	-12.11	SD of logged Data	1.829

Assuming Lognormal Distribution

95% H-UCL	9.9593E-6	90% Chebyshev (MVUE) UCL	4.7411E-6
95% Chebyshev (MVUE) UCL	6.0091E-6	97.5% Chebyshev (MVUE) UCL	7.7689E-6
99% Chebyshev (MVUE) UCL	1.1226E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.2895E-6	95% Jackknife UCL	2.3206E-6
95% Standard Bootstrap UCL	2.2689E-6	95% Bootstrap-t UCL	2.4350E-6
95% Hall's Bootstrap UCL	2.2986E-6	95% Percentile Bootstrap UCL	2.2832E-6
95% BCA Bootstrap UCL	2.3811E-6		
90% Chebyshev(Mean, Sd) UCL	2.8729E-6	95% Chebyshev(Mean, Sd) UCL	3.4579E-6
97.5% Chebyshev(Mean, Sd) UCL	4.2698E-6	99% Chebyshev(Mean, Sd) UCL	5.8647E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.4579E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)anthracene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	5.0200E-9	Mean	1.2255E-6
Maximum	4.3596E-6	Median	7.1800E-8
SD	1.5406E-6	Std. Error of Mean	3.2125E-7
Coefficient of Variation	N/A	Skewness	0.989

Normal GOF Test

Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.7771E-6	95% Adjusted-CLT UCL (Chen-1995)	1.8246E-6
		95% Modified-t UCL (Johnson-1978)	1.7881E-6

Gamma GOF Test

A-D Test Statistic	1.629	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.832	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.257	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.195	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.379	k star (bias corrected MLE)	0.358
Theta hat (MLE)	3.2371E-6	Theta star (bias corrected MLE)	3.4214E-6
nu hat (MLE)	17.41	nu star (bias corrected)	16.48
MLE Mean (bias corrected)	1.2255E-6	MLE Sd (bias corrected)	2.0476E-6
		Approximate Chi Square Value (0.05)	8.299
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	7.88

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.4329E-6	95% Adjusted Gamma UCL (use when n<50)	2.5624E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-19.11	Mean of logged Data	-15.37
Maximum of Logged Data	-12.34	SD of logged Data	2.37

Assuming Lognormal Distribution

95% H-UCL	3.7356E-5	90% Chebyshev (MVUE) UCL	7.1105E-6
95% Chebyshev (MVUE) UCL	9.2207E-6	97.5% Chebyshev (MVUE) UCL	1.2150E-5
99% Chebyshev (MVUE) UCL	1.7903E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.7539E-6	95% Jackknife UCL	1.7771E-6
95% Standard Bootstrap UCL	1.7511E-6	95% Bootstrap-t UCL	1.8774E-6
95% Hall's Bootstrap UCL	1.8202E-6	95% Percentile Bootstrap UCL	1.7654E-6
95% BCA Bootstrap UCL	1.8282E-6		
90% Chebyshev(Mean, Sd) UCL	2.1892E-6	95% Chebyshev(Mean, Sd) UCL	2.6258E-6
97.5% Chebyshev(Mean, Sd) UCL	3.2317E-6	99% Chebyshev(Mean, Sd) UCL	4.4218E-6

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 3.2317E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	8.9500E-9	Mean	1.4491E-6
Maximum	4.5360E-6	Median	1.6200E-7
SD	1.7751E-6	Std. Error of Mean	3.7013E-7
Coefficient of Variation	N/A	Skewness	0.778

Normal GOF Test

Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.0846E-6	95% Adjusted-CLT UCL (Chen-1995)	2.1220E-6
		95% Modified-t UCL (Johnson-1978)	2.0946E-6

Gamma GOF Test

A-D Test Statistic	1.377	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.828	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.194	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.397	k star (bias corrected MLE)	0.374
Theta hat (MLE)	3.6534E-6	Theta star (bias corrected MLE)	3.8757E-6
nu hat (MLE)	18.24	nu star (bias corrected)	17.2
MLE Mean (bias corrected)	1.4491E-6	MLE Sd (bias corrected)	2.3698E-6
		Approximate Chi Square Value (0.05)	8.814
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	8.38

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.8274E-6	95% Adjusted Gamma UCL (use when n<50)	2.9738E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.87	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.53	Mean of logged Data	-15.11
Maximum of Logged Data	-12.3	SD of logged Data	2.305

Assuming Lognormal Distribution

95% H-UCL	3.6989E-5	90% Chebyshev (MVUE) UCL	8.0198E-6
95% Chebyshev (MVUE) UCL	1.0377E-5	97.5% Chebyshev (MVUE) UCL	1.3649E-5
99% Chebyshev (MVUE) UCL	2.0077E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.0579E-6	95% Jackknife UCL	2.0846E-6
95% Standard Bootstrap UCL	2.0546E-6	95% Bootstrap-t UCL	2.1603E-6
95% Hall's Bootstrap UCL	2.0946E-6	95% Percentile Bootstrap UCL	2.0636E-6
95% BCA Bootstrap UCL	2.1330E-6		
90% Chebyshev(Mean, Sd) UCL	2.5594E-6	95% Chebyshev(Mean, Sd) UCL	3.0624E-6
97.5% Chebyshev(Mean, Sd) UCL	3.7605E-6	99% Chebyshev(Mean, Sd) UCL	5.1318E-6

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 3.7605E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	2.1300E-8	Mean	6.5406E-6
Maximum	4.3596E-5	Median	1.8500E-7
SD	1.4375E-5	Std. Error of Mean	2.9973E-6
Coefficient of Variation	N/A	Skewness	2.303

Normal GOF Test

Shapiro Wilk Test Statistic	0.481	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.414	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1687E-5	95% Adjusted-CLT UCL (Chen-1995)	1.3009E-5
		95% Modified-t UCL (Johnson-1978)	1.1927E-5

Gamma GOF Test

A-D Test Statistic	1.803	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.854	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.197	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.289	k star (bias corrected MLE)	0.281
Theta hat (MLE)	2.2612E-5	Theta star (bias corrected MLE)	2.3316E-5
nu hat (MLE)	13.31	nu star (bias corrected)	12.9
MLE Mean (bias corrected)	6.5406E-6	MLE Sd (bias corrected)	1.2349E-5
		Approximate Chi Square Value (0.05)	5.828
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	5.486

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.4481E-5	95% Adjusted Gamma UCL (use when n<50)	1.5386E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.21	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.66	Mean of logged Data	-14.34
Maximum of Logged Data	-10.04	SD of logged Data	2.375

Assuming Lognormal Distribution

95% H-UCL	1.0675E-4	90% Chebyshev (MVUE) UCL	2.0126E-5
95% Chebyshev (MVUE) UCL	2.6102E-5	97.5% Chebyshev (MVUE) UCL	3.4398E-5
99% Chebyshev (MVUE) UCL	5.0693E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1471E-5	95% Jackknife UCL	1.1687E-5
95% Standard Bootstrap UCL	1.1417E-5	95% Bootstrap-t UCL	1.3362E-5
95% Hall's Bootstrap UCL	9.9192E-6	95% Percentile Bootstrap UCL	1.1896E-5
95% BCA Bootstrap UCL	1.3758E-5		
90% Chebyshev(Mean, Sd) UCL	1.5533E-5	95% Chebyshev(Mean, Sd) UCL	1.9606E-5
97.5% Chebyshev(Mean, Sd) UCL	2.5259E-5	99% Chebyshev(Mean, Sd) UCL	3.6364E-5

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 2.5259E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	6.8800E-8	Mean	2.2904E-6
Maximum	5.6400E-6	Median	1.3482E-6
SD	1.9914E-6	Std. Error of Mean	4.1524E-7
Coefficient of Variation	N/A	Skewness	0.59

Normal GOF Test

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.0034E-6	95% Adjusted-CLT UCL (Chen-1995)	3.0279E-6
		95% Modified-t UCL (Johnson-1978)	3.0119E-6

Gamma GOF Test

A-D Test Statistic	0.73	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.172	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.187	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.045	k star (bias corrected MLE)	0.937
Theta hat (MLE)	2.1927E-6	Theta star (bias corrected MLE)	2.4436E-6
nu hat (MLE)	48.05	nu star (bias corrected)	43.11
MLE Mean (bias corrected)	2.2904E-6	MLE Sd (bias corrected)	2.3658E-6
		Approximate Chi Square Value (0.05)	29.06
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	28.22

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.3982E-6	95% Adjusted Gamma UCL (use when n<50)	3.4989E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.49	Mean of logged Data	-13.54
Maximum of Logged Data	-12.09	SD of logged Data	1.267

Assuming Lognormal Distribution

95% H-UCL	6.4554E-6	90% Chebyshev (MVUE) UCL	5.3922E-6
95% Chebyshev (MVUE) UCL	6.5733E-6	97.5% Chebyshev (MVUE) UCL	8.2126E-6
99% Chebyshev (MVUE) UCL	1.1433E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.9734E-6	95% Jackknife UCL	3.0034E-6
95% Standard Bootstrap UCL	2.9576E-6	95% Bootstrap-t UCL	3.1183E-6
95% Hall's Bootstrap UCL	2.9801E-6	95% Percentile Bootstrap UCL	2.9833E-6
95% BCA Bootstrap UCL	2.9418E-6		
90% Chebyshev(Mean, Sd) UCL	3.5361E-6	95% Chebyshev(Mean, Sd) UCL	4.1003E-6
97.5% Chebyshev(Mean, Sd) UCL	4.8835E-6	99% Chebyshev(Mean, Sd) UCL	6.4219E-6

Suggested UCL to Use

95% Adjusted Gamma UCL 3.4989E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	4.1000E-9	Mean	1.3916E-6
Maximum	4.7124E-6	Median	4.8200E-8
SD	1.7265E-6	Std. Error of Mean	3.6000E-7
Coefficient of Variation	N/A	Skewness	0.869

Normal GOF Test

Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.0098E-6	95% Adjusted-CLT UCL (Chen-1995)	2.0534E-6
		95% Modified-t UCL (Johnson-1978)	2.0206E-6

Gamma GOF Test

A-D Test Statistic	1.664	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.836	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.291	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.195	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.36	k star (bias corrected MLE)	0.342
Theta hat (MLE)	3.8689E-6	Theta star (bias corrected MLE)	4.0719E-6
nu hat (MLE)	16.55	nu star (bias corrected)	15.72
MLE Mean (bias corrected)	1.3916E-6	MLE Sd (bias corrected)	2.3804E-6
		Approximate Chi Square Value (0.05)	7.766
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	7.362

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.8172E-6	95% Adjusted Gamma UCL (use when n<50)	2.9717E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-19.31	Mean of logged Data	-15.35
Maximum of Logged Data	-12.27	SD of logged Data	2.49

Assuming Lognormal Distribution

95% H-UCL	6.3992E-5	90% Chebyshev (MVUE) UCL	9.4287E-6
95% Chebyshev (MVUE) UCL	1.2272E-5	97.5% Chebyshev (MVUE) UCL	1.6219E-5
99% Chebyshev (MVUE) UCL	2.3971E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.9838E-6	95% Jackknife UCL	2.0098E-6
95% Standard Bootstrap UCL	1.9664E-6	95% Bootstrap-t UCL	2.1063E-6
95% Hall's Bootstrap UCL	1.9987E-6	95% Percentile Bootstrap UCL	1.9801E-6
95% BCA Bootstrap UCL	2.0255E-6		
90% Chebyshev(Mean, Sd) UCL	2.4716E-6	95% Chebyshev(Mean, Sd) UCL	2.9608E-6
97.5% Chebyshev(Mean, Sd) UCL	3.6398E-6	99% Chebyshev(Mean, Sd) UCL	4.9736E-6

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 3.6398E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chrysene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	1.3800E-8	Mean	1.3538E-6
Maximum	4.7124E-6	Median	1.7500E-7
SD	1.6234E-6	Std. Error of Mean	3.3851E-7
Coefficient of Variation	N/A	Skewness	1.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.785	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.9351E-6	95% Adjusted-CLT UCL (Chen-1995)	1.9890E-6
		95% Modified-t UCL (Johnson-1978)	1.9473E-6

Gamma GOF Test

A-D Test Statistic	1.187	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.807	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.235	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.192	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.489	k star (bias corrected MLE)	0.454
Theta hat (MLE)	2.7670E-6	Theta star (bias corrected MLE)	2.9791E-6
nu hat (MLE)	22.51	nu star (bias corrected)	20.9
MLE Mean (bias corrected)	1.3538E-6	MLE Sd (bias corrected)	2.0083E-6
		Approximate Chi Square Value (0.05)	11.52
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	11.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.4566E-6	95% Adjusted Gamma UCL (use when n<50)	2.5690E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.1	Mean of logged Data	-14.82
Maximum of Logged Data	-12.27	SD of logged Data	1.973

Assuming Lognormal Distribution

95% H-UCL	1.3883E-5	90% Chebyshev (MVUE) UCL	5.3786E-6
95% Chebyshev (MVUE) UCL	6.8665E-6	97.5% Chebyshev (MVUE) UCL	8.9316E-6
99% Chebyshev (MVUE) UCL	1.2988E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.9106E-6	95% Jackknife UCL	1.9351E-6
95% Standard Bootstrap UCL	1.9036E-6	95% Bootstrap-t UCL	2.0788E-6
95% Hall's Bootstrap UCL	1.9597E-6	95% Percentile Bootstrap UCL	1.8862E-6
95% BCA Bootstrap UCL	2.0017E-6		
90% Chebyshev(Mean, Sd) UCL	2.3694E-6	95% Chebyshev(Mean, Sd) UCL	2.8294E-6
97.5% Chebyshev(Mean, Sd) UCL	3.4678E-6	99% Chebyshev(Mean, Sd) UCL	4.7220E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.8294E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	2.2900E-8	Mean	1.5488E-6
Maximum	5.0778E-6	Median	5.1700E-8
SD	2.0488E-6	Std. Error of Mean	4.2720E-7
Coefficient of Variation	N/A	Skewness	0.94

Normal GOF Test

Shapiro Wilk Test Statistic	0.71	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.2824E-6	95% Adjusted-CLT UCL (Chen-1995)	2.3410E-6
		95% Modified-t UCL (Johnson-1978)	2.2964E-6

Gamma GOF Test

A-D Test Statistic	2.543	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.83	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.356	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.195	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.388	k star (bias corrected MLE)	0.366
Theta hat (MLE)	3.9969E-6	Theta star (bias corrected MLE)	4.2324E-6
nu hat (MLE)	17.83	nu star (bias corrected)	16.83
MLE Mean (bias corrected)	1.5488E-6	MLE Sd (bias corrected)	2.5603E-6
		Approximate Chi Square Value (0.05)	8.554
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	8.127

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.0482E-6	95% Adjusted Gamma UCL (use when n<50)	3.2081E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.59	Mean of logged Data	-15.08
Maximum of Logged Data	-12.19	SD of logged Data	2.182

Assuming Lognormal Distribution

95% H-UCL	2.3084E-5	90% Chebyshev (MVUE) UCL	6.3105E-6
95% Chebyshev (MVUE) UCL	8.1289E-6	97.5% Chebyshev (MVUE) UCL	1.0653E-5
99% Chebyshev (MVUE) UCL	1.5610E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.2515E-6	95% Jackknife UCL	2.2824E-6
95% Standard Bootstrap UCL	2.2251E-6	95% Bootstrap-t UCL	2.3863E-6
95% Hall's Bootstrap UCL	2.2392E-6	95% Percentile Bootstrap UCL	2.2677E-6
95% BCA Bootstrap UCL	2.3110E-6		
90% Chebyshev(Mean, Sd) UCL	2.8304E-6	95% Chebyshev(Mean, Sd) UCL	3.4110E-6
97.5% Chebyshev(Mean, Sd) UCL	4.2167E-6	99% Chebyshev(Mean, Sd) UCL	5.7994E-6

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL 4.2167E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluoranthene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	1.5400E-7	Mean	1.6944E-6
Maximum	4.8006E-6	Median	9.9000E-7
SD	1.4616E-6	Std. Error of Mean	3.0476E-7
Coefficient of Variation	N/A	Skewness	1.165

Normal GOF Test

Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.2177E-6	95% Adjusted-CLT UCL (Chen-1995)	2.2748E-6
		95% Modified-t UCL (Johnson-1978)	2.2300E-6

Gamma GOF Test

A-D Test Statistic	0.395	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.146	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.185	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.496	k star (bias corrected MLE)	1.329
Theta hat (MLE)	1.1329E-6	Theta star (bias corrected MLE)	1.2745E-6
nu hat (MLE)	68.8	nu star (bias corrected)	61.16
MLE Mean (bias corrected)	1.6944E-6	MLE Sd (bias corrected)	1.4695E-6
		Approximate Chi Square Value (0.05)	44.17
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	43.12

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.3459E-6	95% Adjusted Gamma UCL (use when n<50)	2.4028E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0938	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.69	Mean of logged Data	-13.66
Maximum of Logged Data	-12.25	SD of logged Data	0.92

Assuming Lognormal Distribution

95% H-UCL	2.8742E-6	90% Chebyshev (MVUE) UCL	2.8602E-6
95% Chebyshev (MVUE) UCL	3.3665E-6	97.5% Chebyshev (MVUE) UCL	4.0691E-6
99% Chebyshev (MVUE) UCL	5.4494E-6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.1957E-6	95% Jackknife UCL	2.2177E-6
95% Standard Bootstrap UCL	2.1821E-6	95% Bootstrap-t UCL	2.3422E-6
95% Hall's Bootstrap UCL	2.2134E-6	95% Percentile Bootstrap UCL	2.1776E-6
95% BCA Bootstrap UCL	2.2940E-6		
90% Chebyshev(Mean, Sd) UCL	2.6087E-6	95% Chebyshev(Mean, Sd) UCL	3.0228E-6
97.5% Chebyshev(Mean, Sd) UCL	3.5976E-6	99% Chebyshev(Mean, Sd) UCL	4.7267E-6

Suggested UCL to Use

95% Adjusted Gamma UCL 2.4028E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluorene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	1.3600E-7	Mean	2.5542E-6
Maximum	8.1900E-6	Median	6.7500E-7
SD	2.9080E-6	Std. Error of Mean	6.0637E-7
Coefficient of Variation	N/A	Skewness	0.981

Normal GOF Test

Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.5955E-6	95% Adjusted-CLT UCL (Chen-1995)	3.6842E-6
		95% Modified-t UCL (Johnson-1978)	3.6161E-6

Gamma GOF Test

A-D Test Statistic	1.114	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.783	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.221	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.189	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.74	k star (bias corrected MLE)	0.672
Theta hat (MLE)	3.4531E-6	Theta star (bias corrected MLE)	3.7998E-6
nu hat (MLE)	34.03	nu star (bias corrected)	30.92
MLE Mean (bias corrected)	2.5542E-6	MLE Sd (bias corrected)	3.1154E-6
		Approximate Chi Square Value (0.05)	19.22
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	18.55

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.1096E-6	95% Adjusted Gamma UCL (use when n<50)	4.2577E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.81	Mean of logged Data	-13.69
Maximum of Logged Data	-11.71	SD of logged Data	1.391

Assuming Lognormal Distribution

95% H-UCL	7.4497E-6	90% Chebyshev (MVUE) UCL	5.6734E-6
95% Chebyshev (MVUE) UCL	6.9875E-6	97.5% Chebyshev (MVUE) UCL	8.8115E-6
99% Chebyshev (MVUE) UCL	1.2394E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.5516E-6	95% Jackknife UCL	3.5955E-6
95% Standard Bootstrap UCL	3.5374E-6	95% Bootstrap-t UCL	3.7457E-6
95% Hall's Bootstrap UCL	3.5606E-6	95% Percentile Bootstrap UCL	3.5287E-6
95% BCA Bootstrap UCL	3.6475E-6		
90% Chebyshev(Mean, Sd) UCL	4.3734E-6	95% Chebyshev(Mean, Sd) UCL	5.1973E-6
97.5% Chebyshev(Mean, Sd) UCL	6.3410E-6	99% Chebyshev(Mean, Sd) UCL	8.5875E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 5.1973E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	2.1200E-8	Mean	1.5904E-6
Maximum	4.9770E-6	Median	3.0700E-7
SD	1.9002E-6	Std. Error of Mean	3.9622E-7
Coefficient of Variation	N/A	Skewness	0.866

Normal GOF Test

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.2707E-6	95% Adjusted-CLT UCL (Chen-1995)	2.3185E-6
		95% Modified-t UCL (Johnson-1978)	2.2826E-6

Gamma GOF Test

A-D Test Statistic	0.996	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.802	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.191	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.537	k star (bias corrected MLE)	0.496
Theta hat (MLE)	2.9596E-6	Theta star (bias corrected MLE)	3.2047E-6
nu hat (MLE)	24.72	nu star (bias corrected)	22.83
MLE Mean (bias corrected)	1.5904E-6	MLE Sd (bias corrected)	2.2576E-6
		Approximate Chi Square Value (0.05)	12.96
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	12.42

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.8011E-6	95% Adjusted Gamma UCL (use when n<50)	2.9225E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.67	Mean of logged Data	-14.52
Maximum of Logged Data	-12.21	SD of logged Data	1.825

Assuming Lognormal Distribution

95% H-UCL	1.1302E-5	90% Chebyshev (MVUE) UCL	5.4068E-6
95% Chebyshev (MVUE) UCL	6.8514E-6	97.5% Chebyshev (MVUE) UCL	8.8565E-6
99% Chebyshev (MVUE) UCL	1.2795E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.2421E-6	95% Jackknife UCL	2.2707E-6
95% Standard Bootstrap UCL	2.2455E-6	95% Bootstrap-t UCL	2.3293E-6
95% Hall's Bootstrap UCL	2.2371E-6	95% Percentile Bootstrap UCL	2.2554E-6
95% BCA Bootstrap UCL	2.2972E-6		
90% Chebyshev(Mean, Sd) UCL	2.7790E-6	95% Chebyshev(Mean, Sd) UCL	3.3175E-6
97.5% Chebyshev(Mean, Sd) UCL	4.0648E-6	99% Chebyshev(Mean, Sd) UCL	5.5327E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.3175E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2-Methylnaphthalene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	4.9500E-7	Mean	3.5483E-6
Maximum	9.1728E-6	Median	1.9300E-6
SD	3.0840E-6	Std. Error of Mean	6.4305E-7
Coefficient of Variation	N/A	Skewness	0.805

Normal GOF Test

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.6525E-6	95% Adjusted-CLT UCL (Chen-1995)	4.7213E-6
		95% Modified-t UCL (Johnson-1978)	4.6705E-6

Gamma GOF Test

A-D Test Statistic	0.74	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.186	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.34	k star (bias corrected MLE)	1.194
Theta hat (MLE)	2.6489E-6	Theta star (bias corrected MLE)	2.9723E-6
nu hat (MLE)	61.62	nu star (bias corrected)	54.91
MLE Mean (bias corrected)	3.5483E-6	MLE Sd (bias corrected)	3.2475E-6
		Approximate Chi Square Value (0.05)	38.89
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	37.91

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.0108E-6	95% Adjusted Gamma UCL (use when n<50)	5.1401E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.52	Mean of logged Data	-12.97
Maximum of Logged Data	-11.6	SD of logged Data	0.979

Assuming Lognormal Distribution

95% H-UCL	6.3563E-6	90% Chebyshev (MVUE) UCL	6.1918E-6
95% Chebyshev (MVUE) UCL	7.3364E-6	97.5% Chebyshev (MVUE) UCL	8.9250E-6
99% Chebyshev (MVUE) UCL	1.2046E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.6060E-6	95% Jackknife UCL	4.6525E-6
95% Standard Bootstrap UCL	4.5816E-6	95% Bootstrap-t UCL	4.7577E-6
95% Hall's Bootstrap UCL	4.5938E-6	95% Percentile Bootstrap UCL	4.5680E-6
95% BCA Bootstrap UCL	4.7569E-6		
90% Chebyshev(Mean, Sd) UCL	5.4774E-6	95% Chebyshev(Mean, Sd) UCL	6.3513E-6
97.5% Chebyshev(Mean, Sd) UCL	7.5641E-6	99% Chebyshev(Mean, Sd) UCL	9.9465E-6

Suggested UCL to Use

95% Adjusted Gamma UCL 5.1401E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Naphthathalene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	2.9000E-6	Mean	2.1470E-5
Maximum	8.5932E-5	Median	1.4300E-5
SD	2.4183E-5	Std. Error of Mean	5.0425E-6
Coefficient of Variation	N/A	Skewness	1.889

Normal GOF Test

Shapiro Wilk Test Statistic	0.705	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.0129E-5	95% Adjusted-CLT UCL (Chen-1995)	3.1887E-5
		95% Modified-t UCL (Johnson-1978)	3.0460E-5

Gamma GOF Test

A-D Test Statistic	0.823	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.766	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.139	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.186	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.162	k star (bias corrected MLE)	1.04
Theta hat (MLE)	1.8469E-5	Theta star (bias corrected MLE)	2.0647E-5
nu hat (MLE)	53.47	nu star (bias corrected)	47.83
MLE Mean (bias corrected)	2.1470E-5	MLE Sd (bias corrected)	2.1055E-5
		Approximate Chi Square Value (0.05)	32.96
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	32.06

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.1159E-5	95% Adjusted Gamma UCL (use when n<50)	3.2029E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0982	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.75	Mean of logged Data	-11.24
Maximum of Logged Data	-9.362	SD of logged Data	0.989

Assuming Lognormal Distribution

95% H-UCL	3.6460E-5	90% Chebyshev (MVUE) UCL	3.5382E-5
95% Chebyshev (MVUE) UCL	4.1967E-5	97.5% Chebyshev (MVUE) UCL	5.1107E-5
99% Chebyshev (MVUE) UCL	6.9060E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.9764E-5	95% Jackknife UCL	3.0129E-5
95% Standard Bootstrap UCL	2.9511E-5	95% Bootstrap-t UCL	3.3636E-5
95% Hall's Bootstrap UCL	2.9848E-5	95% Percentile Bootstrap UCL	2.9933E-5
95% BCA Bootstrap UCL	3.1814E-5		
90% Chebyshev(Mean, Sd) UCL	3.6597E-5	95% Chebyshev(Mean, Sd) UCL	4.3450E-5
97.5% Chebyshev(Mean, Sd) UCL	5.2960E-5	99% Chebyshev(Mean, Sd) UCL	7.1642E-5

Suggested UCL to Use

95% Adjusted Gamma UCL	3.2029E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Phenanthrene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	23
Minimum	5.8500E-7	Mean	3.0019E-6
Maximum	5.9976E-6	Median	3.1100E-6
SD	1.7948E-6	Std. Error of Mean	3.7423E-7
Coefficient of Variation	N/A	Skewness	0.152

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.6445E-6	95% Adjusted-CLT UCL (Chen-1995)	3.6302E-6
		95% Modified-t UCL (Johnson-1978)	3.6465E-6

Gamma GOF Test

A-D Test Statistic	0.643	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.183	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.338	k star (bias corrected MLE)	2.062
Theta hat (MLE)	1.2840E-6	Theta star (bias corrected MLE)	1.4558E-6
nu hat (MLE)	107.5	nu star (bias corrected)	94.85
MLE Mean (bias corrected)	3.0019E-6	MLE Sd (bias corrected)	2.0905E-6
		Approximate Chi Square Value (0.05)	73.39
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	72.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.8798E-6	95% Adjusted Gamma UCL (use when n<50)	3.9535E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.35	Mean of logged Data	-12.95
Maximum of Logged Data	-12.02	SD of logged Data	0.752

Assuming Lognormal Distribution

95% H-UCL	4.5248E-6	90% Chebyshev (MVUE) UCL	4.7078E-6
95% Chebyshev (MVUE) UCL	5.4271E-6	97.5% Chebyshev (MVUE) UCL	6.4254E-6
99% Chebyshev (MVUE) UCL	8.3864E-6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.6175E-6	95% Jackknife UCL	3.6445E-6
95% Standard Bootstrap UCL	3.6149E-6	95% Bootstrap-t UCL	3.6536E-6
95% Hall's Bootstrap UCL	3.6266E-6	95% Percentile Bootstrap UCL	3.6262E-6
95% BCA Bootstrap UCL	3.5936E-6		
90% Chebyshev(Mean, Sd) UCL	4.1246E-6	95% Chebyshev(Mean, Sd) UCL	4.6332E-6
97.5% Chebyshev(Mean, Sd) UCL	5.3390E-6	99% Chebyshev(Mean, Sd) UCL	6.7255E-6

Suggested UCL to Use

95% Student's-t UCL 3.6445E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-1. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:10:50 PM
From File	Unit 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pyrene

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
Minimum	1.0100E-7	Mean	2.1371E-6
Maximum	4.3800E-6	Median	1.7010E-6
SD	1.4860E-6	Std. Error of Mean	3.0986E-7
Coefficient of Variation	N/A	Skewness	0.348

Normal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.6692E-6	95% Adjusted-CLT UCL (Chen-1995)	2.6708E-6
		95% Modified-t UCL (Johnson-1978)	2.6730E-6

Gamma GOF Test

A-D Test Statistic	0.478	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.185	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.539	k star (bias corrected MLE)	1.367
Theta hat (MLE)	1.3887E-6	Theta star (bias corrected MLE)	1.5631E-6
nu hat (MLE)	70.79	nu star (bias corrected)	62.89
MLE Mean (bias corrected)	2.1371E-6	MLE Sd (bias corrected)	1.8277E-6
		Approximate Chi Square Value (0.05)	45.65
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	44.59

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.9444E-6	95% Adjusted Gamma UCL (use when n<50)	3.0147E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.185	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.11	Mean of logged Data	-13.41
Maximum of Logged Data	-12.34	SD of logged Data	1.019

Assuming Lognormal Distribution

95% H-UCL	4.3706E-6	90% Chebyshev (MVUE) UCL	4.1874E-6
95% Chebyshev (MVUE) UCL	4.9834E-6	97.5% Chebyshev (MVUE) UCL	6.0882E-6
99% Chebyshev (MVUE) UCL	8.2585E-6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.6468E-6	95% Jackknife UCL	2.6692E-6
95% Standard Bootstrap UCL	2.6498E-6	95% Bootstrap-t UCL	2.7173E-6
95% Hall's Bootstrap UCL	2.6355E-6	95% Percentile Bootstrap UCL	2.6327E-6
95% BCA Bootstrap UCL	2.6127E-6		
90% Chebyshev(Mean, Sd) UCL	3.0667E-6	95% Chebyshev(Mean, Sd) UCL	3.4878E-6
97.5% Chebyshev(Mean, Sd) UCL	4.0722E-6	99% Chebyshev(Mean, Sd) UCL	5.2202E-6

Suggested UCL to Use

95% Student's-t UCL 2.6692E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
Minimum	1.7136E-6	Mean	3.5428E-5
Maximum	7.1820E-5	Median	3.5716E-5
SD	1.8658E-5	Std. Error of Mean	4.8174E-6
Coefficient of Variation	N/A	Skewness	-0.295

Normal GOF Test

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.3913E-5	95% Adjusted-CLT UCL (Chen-1995)	4.2960E-5
		95% Modified-t UCL (Johnson-1978)	4.3852E-5

Gamma GOF Test

A-D Test Statistic	1.21	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.268	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.225	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.902	k star (bias corrected MLE)	1.566
Theta hat (MLE)	1.8628E-5	Theta star (bias corrected MLE)	2.2624E-5
nu hat (MLE)	57.06	nu star (bias corrected)	46.98
MLE Mean (bias corrected)	3.5428E-5	MLE Sd (bias corrected)	2.8311E-5
		Approximate Chi Square Value (0.05)	32.25
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	30.75

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.1608E-5	95% Adjusted Gamma UCL (use when n<50)	5.4123E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.28	Mean of logged Data	-10.53
Maximum of Logged Data	-9.541	SD of logged Data	1.009

Assuming Lognormal Distribution

95% H-UCL	9.3161E-5	90% Chebyshev (MVUE) UCL	7.8368E-5
95% Chebyshev (MVUE) UCL	9.4725E-5	97.5% Chebyshev (MVUE) UCL	1.1743E-4
99% Chebyshev (MVUE) UCL	1.6202E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.3352E-5	95% Jackknife UCL	4.3913E-5
95% Standard Bootstrap UCL	4.3010E-5	95% Bootstrap-t UCL	4.3388E-5
95% Hall's Bootstrap UCL	4.3424E-5	95% Percentile Bootstrap UCL	4.2878E-5
95% BCA Bootstrap UCL	4.3002E-5		
90% Chebyshev(Mean, Sd) UCL	4.9880E-5	95% Chebyshev(Mean, Sd) UCL	5.6426E-5
97.5% Chebyshev(Mean, Sd) UCL	6.5512E-5	99% Chebyshev(Mean, Sd) UCL	8.3360E-5

Suggested UCL to Use

95% Student's-t UCL 4.3913E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	41	Number of Distinct Observations	33
Minimum	6.5520E-6	Mean	2.4978E-5
Maximum	4.7593E-5	Median	2.2970E-5
SD	1.2713E-5	Std. Error of Mean	1.9854E-6
Coefficient of Variation	N/A	Skewness	0.274

Normal GOF Test

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.8321E-5	95% Adjusted-CLT UCL (Chen-1995)	2.8334E-5
		95% Modified-t UCL (Johnson-1978)	2.8335E-5

Gamma GOF Test

A-D Test Statistic	1.408	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.139	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.557	k star (bias corrected MLE)	3.313
Theta hat (MLE)	7.0218E-6	Theta star (bias corrected MLE)	7.5390E-6
nu hat (MLE)	291.7	nu star (bias corrected)	271.7
MLE Mean (bias corrected)	2.4978E-5	MLE Sd (bias corrected)	1.3722E-5
		Approximate Chi Square Value (0.05)	234.5
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	233.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.8937E-5	95% Adjusted Gamma UCL (use when n<50)	2.9093E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.94	Mean of logged Data	-10.74
Maximum of Logged Data	-9.953	SD of logged Data	0.575

Assuming Lognormal Distribution

95% H-UCL	3.0372E-5	90% Chebyshev (MVUE) UCL	3.2564E-5
95% Chebyshev (MVUE) UCL	3.5847E-5	97.5% Chebyshev (MVUE) UCL	4.0403E-5
99% Chebyshev (MVUE) UCL	4.9352E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.8243E-5	95% Jackknife UCL	2.8321E-5
95% Standard Bootstrap UCL	2.8204E-5	95% Bootstrap-t UCL	2.8545E-5
95% Hall's Bootstrap UCL	2.8368E-5	95% Percentile Bootstrap UCL	2.8142E-5
95% BCA Bootstrap UCL	2.8322E-5		
90% Chebyshev(Mean, Sd) UCL	3.0934E-5	95% Chebyshev(Mean, Sd) UCL	3.3632E-5
97.5% Chebyshev(Mean, Sd) UCL	3.7376E-5	99% Chebyshev(Mean, Sd) UCL	4.4732E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.3632E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Beryllium

General Statistics

Total Number of Observations	68	Number of Distinct Observations	47
Minimum	1.2398E-6	Mean	5.7280E-6
Maximum	1.2483E-5	Median	3.4537E-6
SD	3.4124E-6	Std. Error of Mean	4.1381E-7
Coefficient of Variation	N/A	Skewness	0.859

Normal GOF Test

Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	4.271E-12	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.4182E-6	95% Adjusted-CLT UCL (Chen-1995)	6.4548E-6
		95% Modified-t UCL (Johnson-1978)	6.4254E-6

Gamma GOF Test

A-D Test Statistic	3.694	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.071	k star (bias corrected MLE)	2.945
Theta hat (MLE)	1.8653E-6	Theta star (bias corrected MLE)	1.9449E-6
nu hat (MLE)	417.6	nu star (bias corrected)	400.5
MLE Mean (bias corrected)	5.7280E-6	MLE Sd (bias corrected)	3.3378E-6
		Approximate Chi Square Value (0.05)	355.1
Adjusted Level of Significance	0.0465	Adjusted Chi Square Value	354.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.4601E-6	95% Adjusted Gamma UCL (use when n<50)	6.4769E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	1.0767E-7	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.224	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.6	Mean of logged Data	-12.24
Maximum of Logged Data	-11.29	SD of logged Data	0.598

Assuming Lognormal Distribution

95% H-UCL	6.6440E-6	90% Chebyshev (MVUE) UCL	7.0935E-6
95% Chebyshev (MVUE) UCL	7.7018E-6	97.5% Chebyshev (MVUE) UCL	8.5462E-6
99% Chebyshev (MVUE) UCL	1.0205E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.4087E-6	95% Jackknife UCL	6.4182E-6
95% Standard Bootstrap UCL	6.4177E-6	95% Bootstrap-t UCL	6.4952E-6
95% Hall's Bootstrap UCL	6.4464E-6	95% Percentile Bootstrap UCL	6.4304E-6
95% BCA Bootstrap UCL	6.5037E-6		
90% Chebyshev(Mean, Sd) UCL	6.9695E-6	95% Chebyshev(Mean, Sd) UCL	7.5318E-6
97.5% Chebyshev(Mean, Sd) UCL	8.3123E-6	99% Chebyshev(Mean, Sd) UCL	9.8454E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.5318E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	41	Number of Distinct Observations	39
Minimum	5.4684E-6	Mean	3.0949E-5
Maximum	4.5108E-4	Median	1.4490E-5
SD	6.8794E-5	Std. Error of Mean	1.0744E-5
Coefficient of Variation	N/A	Skewness	5.976

Normal GOF Test

Shapiro Wilk Test Statistic	0.308	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.356	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.9040E-5	95% Adjusted-CLT UCL (Chen-1995)	5.9334E-5
		95% Modified-t UCL (Johnson-1978)	5.0711E-5

Gamma GOF Test

A-D Test Statistic	4.028	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.142	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.072	k star (bias corrected MLE)	1.01
Theta hat (MLE)	2.8874E-5	Theta star (bias corrected MLE)	3.0652E-5
nu hat (MLE)	87.89	nu star (bias corrected)	82.79
MLE Mean (bias corrected)	3.0949E-5	MLE Sd (bias corrected)	3.0800E-5
		Approximate Chi Square Value (0.05)	62.82
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	62.19

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.0786E-5	95% Adjusted Gamma UCL (use when n<50)	4.1203E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.168	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.12	Mean of logged Data	-10.92
Maximum of Logged Data	-7.704	SD of logged Data	0.794

Assuming Lognormal Distribution

95% H-UCL	3.2522E-5	90% Chebyshev (MVUE) UCL	3.4802E-5
95% Chebyshev (MVUE) UCL	3.9417E-5	97.5% Chebyshev (MVUE) UCL	4.5822E-5
99% Chebyshev (MVUE) UCL	5.8402E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.8621E-5	95% Jackknife UCL	4.9040E-5
95% Standard Bootstrap UCL	4.8716E-5	95% Bootstrap-t UCL	1.0238E-4
95% Hall's Bootstrap UCL	1.1094E-4	95% Percentile Bootstrap UCL	5.0885E-5
95% BCA Bootstrap UCL	6.3744E-5		
90% Chebyshev(Mean, Sd) UCL	6.3180E-5	95% Chebyshev(Mean, Sd) UCL	7.7780E-5
97.5% Chebyshev(Mean, Sd) UCL	9.8043E-5	99% Chebyshev(Mean, Sd) UCL	1.3785E-4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.7780E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium (total)

General Statistics

Total Number of Observations	56	Number of Distinct Observations	56
Minimum	2.3940E-6	Mean	4.6864E-5
Maximum	1.7748E-4	Median	3.7393E-5
SD	3.7324E-5	Std. Error of Mean	4.9876E-6
Coefficient of Variation	N/A	Skewness	1.746

Normal GOF Test

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.2061E-8	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.118	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.5209E-5	95% Adjusted-CLT UCL (Chen-1995)	5.6311E-5
		95% Modified-t UCL (Johnson-1978)	5.5402E-5

Gamma GOF Test

A-D Test Statistic	0.593	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.121	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.788	k star (bias corrected MLE)	1.704
Theta hat (MLE)	2.6215E-5	Theta star (bias corrected MLE)	2.7505E-5
nu hat (MLE)	200.2	nu star (bias corrected)	190.8
MLE Mean (bias corrected)	4.6864E-5	MLE Sd (bias corrected)	3.5903E-5
		Approximate Chi Square Value (0.05)	159.9
Adjusted Level of Significance	0.0457	Adjusted Chi Square Value	159.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.5939E-5	95% Adjusted Gamma UCL (use when n<50)	5.6201E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0774	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.134	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.118	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.94	Mean of logged Data	-10.27
Maximum of Logged Data	-8.637	SD of logged Data	0.853

Assuming Lognormal Distribution

95% H-UCL	6.3857E-5	90% Chebyshev (MVUE) UCL	6.8475E-5
95% Chebyshev (MVUE) UCL	7.7166E-5	97.5% Chebyshev (MVUE) UCL	8.9229E-5
99% Chebyshev (MVUE) UCL	1.1292E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.5068E-5	95% Jackknife UCL	5.5209E-5
95% Standard Bootstrap UCL	5.5102E-5	95% Bootstrap-t UCL	5.6521E-5
95% Hall's Bootstrap UCL	5.6539E-5	95% Percentile Bootstrap UCL	5.5146E-5
95% BCA Bootstrap UCL	5.6055E-5		
90% Chebyshev(Mean, Sd) UCL	6.1827E-5	95% Chebyshev(Mean, Sd) UCL	6.8605E-5
97.5% Chebyshev(Mean, Sd) UCL	7.8012E-5	99% Chebyshev(Mean, Sd) UCL	9.6490E-5

Suggested UCL to Use

95% Approximate Gamma UCL 5.5939E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hexavalent Chromium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	3.4020E-6	Mean	4.2000E-6
Maximum	5.54E-06	Median	3.6540E-6
SD	1.1707E-6	Std. Error of Mean	6.7593E-7
Coefficient of Variation	N/A	Skewness	1.642

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.346	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.1737E-6	95% Adjusted-CLT UCL (Chen-1995)	5.9966E-6
		95% Modified-t UCL (Johnson-1978)	6.2805E-6

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	20.9	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.0098E-7	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	125.4	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.335	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.59	Mean of logged Data	-12.4
Maximum of Logged Data	-12.1	SD of logged Data	0.264

Assuming Lognormal Distribution

95% H-UCL	8.5957E-6	90% Chebyshev (MVUE) UCL	6.0957E-6
95% Chebyshev (MVUE) UCL	6.9565E-6	97.5% Chebyshev (MVUE) UCL	8.1511E-6
99% Chebyshev (MVUE) UCL	1.0498E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.3118E-6	95% Jackknife UCL	6.1737E-6
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	6.2278E-6	95% Chebyshev(Mean, Sd) UCL	7.1463E-6
97.5% Chebyshev(Mean, Sd) UCL	8.4212E-6	99% Chebyshev(Mean, Sd) UCL	1.0925E-5

Suggested UCL to Use

95% Student's-t UCL	6.1737E-6	
Maximum	5.54E-06	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cobalt

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Minimum	1.1616E-5	Mean	1.1790E-5
Maximum	1.1876E-5	Median	1.1876E-5
SD	1.5015E-7	Std. Error of Mean	8.6690E-8
Coefficient of Variation	N/A	Skewness	-1.732

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2043E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1840E-5
		95% Modified-t UCL (Johnson-1978)	1.2028E-5

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	9202	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.2812E-9	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	55214	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.36	Mean of logged Data	-11.35
Maximum of Logged Data	-11.34	SD of logged Data	0.0128

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1.2051E-5
95% Chebyshev (MVUE) UCL	1.2169E-5	97.5% Chebyshev (MVUE) UCL	1.2333E-5
99% Chebyshev (MVUE) UCL	1.2656E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1932E-5	95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1.2050E-5	95% Chebyshev(Mean, Sd) UCL	1.2168E-5
97.5% Chebyshev(Mean, Sd) UCL	1.2331E-5	99% Chebyshev(Mean, Sd) UCL	1.2652E-5

Suggested UCL to Use

95% Student's-t UCL	1.2043E-5	
Maximum	1.1876E-5	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	1.1000E-5	Mean	1.6239E-5
Maximum	2.1798E-5	Median	1.6317E-5
SD	3.5135E-6	Std. Error of Mean	1.4344E-6
Coefficient of Variation	N/A	Skewness	0.177

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.9130E-5	95% Adjusted-CLT UCL (Chen-1995)	1.8710E-5
		95% Modified-t UCL (Johnson-1978)	1.9147E-5

Gamma GOF Test

A-D Test Statistic	0.296	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.697	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	24.87	k star (bias corrected MLE)	12.55
Theta hat (MLE)	6.5289E-7	Theta star (bias corrected MLE)	1.2942E-6
nu hat (MLE)	298.5	nu star (bias corrected)	150.6
MLE Mean (bias corrected)	1.6239E-5	MLE Sd (bias corrected)	4.5845E-6
		Approximate Chi Square Value (0.05)	123.2
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	114.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.9846E-5	95% Adjusted Gamma UCL (use when n<50)	2.1401E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.362	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.42	Mean of logged Data	-11.05
Maximum of Logged Data	-10.73	SD of logged Data	0.223

Assuming Lognormal Distribution

95% H-UCL	2.0129E-5	90% Chebyshev (MVUE) UCL	2.0691E-5
95% Chebyshev (MVUE) UCL	2.2703E-5	97.5% Chebyshev (MVUE) UCL	2.5497E-5
99% Chebyshev (MVUE) UCL	3.0985E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.8599E-5	95% Jackknife UCL	1.9130E-5
95% Standard Bootstrap UCL	1.8374E-5	95% Bootstrap-t UCL	1.9054E-5
95% Hall's Bootstrap UCL	1.9609E-5	95% Percentile Bootstrap UCL	1.8360E-5
95% BCA Bootstrap UCL	1.8297E-5		
90% Chebyshev(Mean, Sd) UCL	2.0542E-5	95% Chebyshev(Mean, Sd) UCL	2.2492E-5
97.5% Chebyshev(Mean, Sd) UCL	2.5197E-5	99% Chebyshev(Mean, Sd) UCL	3.0511E-5

Suggested UCL to Use

95% Student's-t UCL 1.9130E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	41	Number of Distinct Observations	40
Minimum	1.5750E-5	Mean	2.4931E-4
Maximum	7.9380E-4	Median	1.8838E-4
SD	2.3203E-4	Std. Error of Mean	3.6237E-5
Coefficient of Variation	0.931	Skewness	1.17

Normal GOF Test

Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.1033E-4	95% Adjusted-CLT UCL (Chen-1995)	3.1599E-4
		95% Modified-t UCL (Johnson-1978)	3.1143E-4

Gamma GOF Test

A-D Test Statistic	0.567	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.103	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.142	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.132	k star (bias corrected MLE)	1.065
Theta hat (MLE)	2.2024E-4	Theta star (bias corrected MLE)	2.3400E-4
nu hat (MLE)	92.83	nu star (bias corrected)	87.37
MLE Mean (bias corrected)	2.4931E-4	MLE Sd (bias corrected)	2.4153E-4
		Approximate Chi Square Value (0.05)	66.82
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	66.16

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.2598E-4	95% Adjusted Gamma UCL (use when n<50)	3.2921E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.138	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.06	Mean of logged Data	-8.8
Maximum of Logged Data	-7.139	SD of logged Data	1.106

Assuming Lognormal Distribution

95% H-UCL	4.2846E-4	90% Chebyshev (MVUE) UCL	4.4024E-4
95% Chebyshev (MVUE) UCL	5.1657E-4	97.5% Chebyshev (MVUE) UCL	6.2251E-4
99% Chebyshev (MVUE) UCL	8.3060E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.0892E-4	95% Jackknife UCL	3.1033E-4
95% Standard Bootstrap UCL	3.0798E-4	95% Bootstrap-t UCL	3.2228E-4
95% Hall's Bootstrap UCL	3.1408E-4	95% Percentile Bootstrap UCL	3.0990E-4
95% BCA Bootstrap UCL	3.1007E-4		
90% Chebyshev(Mean, Sd) UCL	3.5802E-4	95% Chebyshev(Mean, Sd) UCL	4.0727E-4
97.5% Chebyshev(Mean, Sd) UCL	4.7561E-4	99% Chebyshev(Mean, Sd) UCL	6.0987E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 3.2921E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Manganese

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	1.0899E-4	Mean	1.1588E-4
Maximum	1.2726E-4	Median	1.1138E-4
SD	9.9295E-6	Std. Error of Mean	5.7328E-6
Coefficient of Variation	0.0857	Skewness	1.619

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.3262E-4	95% Adjusted-CLT UCL (Chen-1995)	1.3104E-4
		95% Modified-t UCL (Johnson-1978)	1.3351E-4

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	210.2	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.5127E-7	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1261	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.853	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.338	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.124	Mean of logged Data	-9.065
Maximum of Logged Data	-8.969	SD of logged Data	0.0839

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1.3270E-4
95% Chebyshev (MVUE) UCL	1.4032E-4	97.5% Chebyshev (MVUE) UCL	1.5090E-4
99% Chebyshev (MVUE) UCL	1.7168E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.2531E-4	95% Jackknife UCL	1.3262E-4
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1.3308E-4	95% Chebyshev(Mean, Sd) UCL	1.4087E-4
97.5% Chebyshev(Mean, Sd) UCL	1.5168E-4	99% Chebyshev(Mean, Sd) UCL	1.7292E-4

Suggested UCL to Use

95% Student's-t UCL	1.3262E-4	
Maximum	1.2726E-4	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Mercury

General Statistics

Total Number of Observations	71	Number of Distinct Observations	68
Minimum	8.7444E-5	Mean	5.8218E-4
Maximum	0.00277	Median	4.3218E-4
SD	4.8931E-4	Std. Error of Mean	5.8070E-5
Coefficient of Variation	0.84	Skewness	2.587

Normal GOF Test

Shapiro Wilk Test Statistic	0.72	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.105	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.7898E-4	95% Adjusted-CLT UCL (Chen-1995)	6.9675E-4
		95% Modified-t UCL (Johnson-1978)	6.8195E-4

Gamma GOF Test

A-D Test Statistic	1.596	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.262	k star (bias corrected MLE)	2.176
Theta hat (MLE)	2.5739E-4	Theta star (bias corrected MLE)	2.6759E-4
nu hat (MLE)	321.2	nu star (bias corrected)	308.9
MLE Mean (bias corrected)	5.8218E-4	MLE Sd (bias corrected)	3.9469E-4
		Approximate Chi Square Value (0.05)	269.2
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	268.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.6807E-4	95% Adjusted Gamma UCL (use when n<50)	6.6997E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.487	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0799	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.105	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.345	Mean of logged Data	-7.686
Maximum of Logged Data	-5.888	SD of logged Data	0.665

Assuming Lognormal Distribution

95% H-UCL	6.6971E-4	90% Chebyshev (MVUE) UCL	7.1832E-4
95% Chebyshev (MVUE) UCL	7.8512E-4	97.5% Chebyshev (MVUE) UCL	8.7785E-4
99% Chebyshev (MVUE) UCL	0.00106		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.7770E-4	95% Jackknife UCL	6.7898E-4
95% Standard Bootstrap UCL	6.7795E-4	95% Bootstrap-t UCL	7.0898E-4
95% Hall's Bootstrap UCL	6.9887E-4	95% Percentile Bootstrap UCL	6.7951E-4
95% BCA Bootstrap UCL	7.0421E-4		
90% Chebyshev(Mean, Sd) UCL	7.5639E-4	95% Chebyshev(Mean, Sd) UCL	8.3530E-4
97.5% Chebyshev(Mean, Sd) UCL	9.4483E-4	99% Chebyshev(Mean, Sd) UCL	0.00116

Suggested UCL to Use

95% H-UCL 6.6971E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel

General Statistics

Total Number of Observations	41	Number of Distinct Observations	40
Minimum	1.3022E-5	Mean	7.2202E-5
Maximum	3.3711E-4	Median	5.2290E-5
SD	5.7258E-5	Std. Error of Mean	8.9422E-6
Coefficient of Variation	N/A	Skewness	2.742

Normal GOF Test

Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.168	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.138	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.7259E-5	95% Adjusted-CLT UCL (Chen-1995)	9.1003E-5
		95% Modified-t UCL (Johnson-1978)	8.7897E-5

Gamma GOF Test

A-D Test Statistic	0.458	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.109	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.139	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.358	k star (bias corrected MLE)	2.202
Theta hat (MLE)	3.0619E-5	Theta star (bias corrected MLE)	3.2793E-5
nu hat (MLE)	193.4	nu star (bias corrected)	180.5
MLE Mean (bias corrected)	7.2202E-5	MLE Sd (bias corrected)	4.8659E-5
		Approximate Chi Square Value (0.05)	150.5
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	149.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	8.6635E-5	95% Adjusted Gamma UCL (use when n<50)	8.7215E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0699	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.138	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.25	Mean of logged Data	-9.763
Maximum of Logged Data	-7.995	SD of logged Data	0.671

Assuming Lognormal Distribution

95% H-UCL	8.9405E-5	90% Chebyshev (MVUE) UCL	9.5997E-5
95% Chebyshev (MVUE) UCL	1.0704E-4	97.5% Chebyshev (MVUE) UCL	1.2238E-4
99% Chebyshev (MVUE) UCL	1.5250E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.6910E-5	95% Jackknife UCL	8.7259E-5
95% Standard Bootstrap UCL	8.6690E-5	95% Bootstrap-t UCL	9.3569E-5
95% Hall's Bootstrap UCL	1.0825E-4	95% Percentile Bootstrap UCL	8.6817E-5
95% BCA Bootstrap UCL	9.1906E-5		
90% Chebyshev(Mean, Sd) UCL	9.9028E-5	95% Chebyshev(Mean, Sd) UCL	1.1118E-4
97.5% Chebyshev(Mean, Sd) UCL	1.2805E-4	99% Chebyshev(Mean, Sd) UCL	1.6118E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 8.7215E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	5.2361E-5	Mean	6.6029E-5
Maximum	1.0316E-4	Median	6.1203E-5
SD	1.8598E-5	Std. Error of Mean	7.5925E-6
Coefficient of Variation	N/A	Skewness	2.207

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.692	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.412	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.1328E-5	95% Adjusted-CLT UCL (Chen-1995)	8.5826E-5
		95% Modified-t UCL (Johnson-1978)	8.2468E-5

Gamma GOF Test

A-D Test Statistic	0.875	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.697	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.401	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.332	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	18.73	k star (bias corrected MLE)	9.476
Theta hat (MLE)	3.5252E-6	Theta star (bias corrected MLE)	6.9677E-6
nu hat (MLE)	224.8	nu star (bias corrected)	113.7
MLE Mean (bias corrected)	6.6029E-5	MLE Sd (bias corrected)	2.1449E-5
		Approximate Chi Square Value (0.05)	90.1
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	82.52

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.3337E-5	95% Adjusted Gamma UCL (use when n<50)	9.0992E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.754	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.384	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.362	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.857	Mean of logged Data	-9.652
Maximum of Logged Data	-9.179	SD of logged Data	0.241

Assuming Lognormal Distribution

95% H-UCL	8.3286E-5	90% Chebyshev (MVUE) UCL	8.5315E-5
95% Chebyshev (MVUE) UCL	9.4133E-5	97.5% Chebyshev (MVUE) UCL	1.0637E-4
99% Chebyshev (MVUE) UCL	1.3041E-4		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	7.8517E-5	95% Jackknife UCL	8.1328E-5
95% Standard Bootstrap UCL	7.7113E-5	95% Bootstrap-t UCL	1.1297E-4
95% Hall's Bootstrap UCL	1.5016E-4	95% Percentile Bootstrap UCL	7.9697E-5
95% BCA Bootstrap UCL	8.2312E-5		
90% Chebyshev(Mean, Sd) UCL	8.8806E-5	95% Chebyshev(Mean, Sd) UCL	9.9123E-5
97.5% Chebyshev(Mean, Sd) UCL	1.1344E-4	99% Chebyshev(Mean, Sd) UCL	1.4157E-4

Suggested UCL to Use

95% Student's-t UCL	8.1328E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	3.5532E-4	Mean	4.5486E-4
Maximum	5.2794E-4	Median	4.8132E-4
SD	8.9300E-5	Std. Error of Mean	5.1557E-5
Coefficient of Variation	0.196	Skewness	-1.216

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.0541E-4	95% Adjusted-CLT UCL (Chen-1995)	5.0098E-4
		95% Modified-t UCL (Johnson-1978)	5.9937E-4

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	36.37	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.2508E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	218.2	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.942	Mean of logged Data	-7.709
Maximum of Logged Data	-7.547	SD of logged Data	0.207

Assuming Lognormal Distribution

95% H-UCL	7.4805E-4	90% Chebyshev (MVUE) UCL	6.1746E-4
95% Chebyshev (MVUE) UCL	6.9102E-4	97.5% Chebyshev (MVUE) UCL	7.9312E-4
99% Chebyshev (MVUE) UCL	9.9368E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.3966E-4	95% Jackknife UCL	6.0541E-4
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	6.0953E-4	95% Chebyshev(Mean, Sd) UCL	6.7959E-4
97.5% Chebyshev(Mean, Sd) UCL	7.7684E-4	99% Chebyshev(Mean, Sd) UCL	9.6785E-4

Suggested UCL to Use

95% Student's-t UCL	6.0541E-4	
Maximum	5.2794E-4	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Chloride

General Statistics

Total Number of Observations	43	Number of Distinct Observations	41
Minimum	0.252	Mean	0.896
Maximum	5.13	Median	0.774
SD	0.726	Std. Error of Mean	0.111
Coefficient of Variation	0.81	Skewness	4.924

Normal GOF Test

Shapiro Wilk Test Statistic	0.523	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.943	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.135	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.082	95% Adjusted-CLT UCL (Chen-1995)	1.167
		95% Modified-t UCL (Johnson-1978)	1.096

Gamma GOF Test

A-D Test Statistic	1.902	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.136	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.423	k star (bias corrected MLE)	3.2
Theta hat (MLE)	0.262	Theta star (bias corrected MLE)	0.28
nu hat (MLE)	294.4	nu star (bias corrected)	275.2
MLE Mean (bias corrected)	0.896	MLE Sd (bias corrected)	0.501
		Approximate Chi Square Value (0.05)	237.7
Adjusted Level of Significance	0.0444	Adjusted Chi Square Value	236.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.037	95% Adjusted Gamma UCL (use when n<50)	1.042

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.943	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.135	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.378	Mean of logged Data	-0.263
Maximum of Logged Data	1.635	SD of logged Data	0.513

Assuming Lognormal Distribution

95% H-UCL	1.02	90% Chebyshev (MVUE) UCL	1.089
95% Chebyshev (MVUE) UCL	1.187	97.5% Chebyshev (MVUE) UCL	1.322
99% Chebyshev (MVUE) UCL	1.588		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.078	95% Jackknife UCL	1.082
95% Standard Bootstrap UCL	1.077	95% Bootstrap-t UCL	1.304
95% Hall's Bootstrap UCL	1.858	95% Percentile Bootstrap UCL	1.1
95% BCA Bootstrap UCL	1.197		
90% Chebyshev(Mean, Sd) UCL	1.228	95% Chebyshev(Mean, Sd) UCL	1.378
97.5% Chebyshev(Mean, Sd) UCL	1.587	99% Chebyshev(Mean, Sd) UCL	1.997

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	1.378

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Fluoride (as Total Fluoride)

General Statistics

Total Number of Observations	36	Number of Distinct Observations	26
Minimum	0.00493	Mean	0.00843
Maximum	0.0208	Median	0.00517
SD	0.00592	Std. Error of Mean	9.8606E-4
Coefficient of Variation	0.702	Skewness	1.433

Normal GOF Test

Shapiro Wilk Test Statistic	0.592	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.417	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0101	95% Adjusted-CLT UCL (Chen-1995)	0.0103
		95% Modified-t UCL (Johnson-1978)	0.0101

Gamma GOF Test

A-D Test Statistic	6.806	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.418	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.148	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.987	k star (bias corrected MLE)	2.757
Theta hat (MLE)	0.00282	Theta star (bias corrected MLE)	0.00306
nu hat (MLE)	215.1	nu star (bias corrected)	198.5
MLE Mean (bias corrected)	0.00843	MLE Sd (bias corrected)	0.00508
		Approximate Chi Square Value (0.05)	166.9
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	165.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.01	95% Adjusted Gamma UCL (use when n<50)	0.0101

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.616	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.407	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.313	Mean of logged Data	-4.953
Maximum of Logged Data	-3.873	SD of logged Data	0.552

Assuming Lognormal Distribution

95% H-UCL	0.00987	90% Chebyshev (MVUE) UCL	0.0106
95% Chebyshev (MVUE) UCL	0.0117	97.5% Chebyshev (MVUE) UCL	0.0132
99% Chebyshev (MVUE) UCL	0.0161		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0101	95% Jackknife UCL	0.0101
95% Standard Bootstrap UCL	0.01	95% Bootstrap-t UCL	0.0105
95% Hall's Bootstrap UCL	0.0102	95% Percentile Bootstrap UCL	0.00997
95% BCA Bootstrap UCL	0.0103		
90% Chebyshev(Mean, Sd) UCL	0.0114	95% Chebyshev(Mean, Sd) UCL	0.0127
97.5% Chebyshev(Mean, Sd) UCL	0.0146	99% Chebyshev(Mean, Sd) UCL	0.0182

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0127

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sulfuric Acid

General Statistics

Total Number of Observations	36	Number of Distinct Observations	34
Minimum	0.00164	Mean	0.0177
Maximum	0.121	Median	0.00542
SD	0.0291	Std. Error of Mean	0.00484
Coefficient of Variation	1.643	Skewness	2.236

Normal GOF Test

Shapiro Wilk Test Statistic	0.572	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0259	95% Adjusted-CLT UCL (Chen-1995)	0.0276
		95% Modified-t UCL (Johnson-1978)	0.0262

Gamma GOF Test

A-D Test Statistic	4.189	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.301	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.153	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.701	k star (bias corrected MLE)	0.661
Theta hat (MLE)	0.0252	Theta star (bias corrected MLE)	0.0267
nu hat (MLE)	50.49	nu star (bias corrected)	47.62
MLE Mean (bias corrected)	0.0177	MLE Sd (bias corrected)	0.0217
		Approximate Chi Square Value (0.05)	32.78
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	32.22

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0257	95% Adjusted Gamma UCL (use when n<50)	0.0261

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.414	Mean of logged Data	-4.897
Maximum of Logged Data	-2.112	SD of logged Data	1.177

Assuming Lognormal Distribution

95% H-UCL	0.025	90% Chebyshev (MVUE) UCL	0.0247
95% Chebyshev (MVUE) UCL	0.0294	97.5% Chebyshev (MVUE) UCL	0.0358
99% Chebyshev (MVUE) UCL	0.0485		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0256	95% Jackknife UCL	0.0259
95% Standard Bootstrap UCL	0.0253	95% Bootstrap-t UCL	0.0293
95% Hall's Bootstrap UCL	0.0266	95% Percentile Bootstrap UCL	0.0255
95% BCA Bootstrap UCL	0.0282		
90% Chebyshev(Mean, Sd) UCL	0.0322	95% Chebyshev(Mean, Sd) UCL	0.0388
97.5% Chebyshev(Mean, Sd) UCL	0.0479	99% Chebyshev(Mean, Sd) UCL	0.0659

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0388

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	9.193E-12	Mean	1.473E-10
Maximum	1.9400E-9	Median	5.734E-11
SD	3.245E-10	Std. Error of Mean	4.088E-11
Coefficient of Variation	N/A	Skewness	4.638

Normal GOF Test

Shapiro Wilk Test Statistic	0.402	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.156E-10	95% Adjusted-CLT UCL (Chen-1995)	2.401E-10
		95% Modified-t UCL (Johnson-1978)	2.195E-10

Gamma GOF Test

A-D Test Statistic	4.337	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.199	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.738	k star (bias corrected MLE)	0.713
Theta hat (MLE)	1.996E-10	Theta star (bias corrected MLE)	2.065E-10
nu hat (MLE)	92.97	nu star (bias corrected)	89.87
MLE Mean (bias corrected)	1.473E-10	MLE Sd (bias corrected)	1.744E-10
		Approximate Chi Square Value (0.05)	69.01
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	68.59

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.918E-10	95% Adjusted Gamma UCL (use when n<50)	1.930E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00983	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0844	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-25.41	Mean of logged Data	-23.45
Maximum of Logged Data	-20.06	SD of logged Data	1.095

Assuming Lognormal Distribution

95% H-UCL	1.633E-10	90% Chebyshev (MVUE) UCL	1.762E-10
95% Chebyshev (MVUE) UCL	2.029E-10	97.5% Chebyshev (MVUE) UCL	2.400E-10
99% Chebyshev (MVUE) UCL	3.129E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.145E-10	95% Jackknife UCL	2.156E-10
95% Standard Bootstrap UCL	2.150E-10	95% Bootstrap-t UCL	3.274E-10
95% Hall's Bootstrap UCL	5.078E-10	95% Percentile Bootstrap UCL	2.209E-10
95% BCA Bootstrap UCL	2.544E-10		
90% Chebyshev(Mean, Sd) UCL	2.700E-10	95% Chebyshev(Mean, Sd) UCL	3.255E-10
97.5% Chebyshev(Mean, Sd) UCL	4.026E-10	99% Chebyshev(Mean, Sd) UCL	5.541E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.255E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	2.249E-11	Mean	3.050E-10
Maximum	3.6300E-9	Median	1.162E-10
SD	5.631E-10	Std. Error of Mean	7.094E-11
Coefficient of Variation	N/A	Skewness	4.237

Normal GOF Test

Shapiro Wilk Test Statistic	0.491	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.234E-10	95% Adjusted-CLT UCL (Chen-1995)	4.621E-10
		95% Modified-t UCL (Johnson-1978)	4.297E-10

Gamma GOF Test

A-D Test Statistic	4.239	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.789	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.223	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.822	k star (bias corrected MLE)	0.794
Theta hat (MLE)	3.709E-10	Theta star (bias corrected MLE)	3.842E-10
nu hat (MLE)	103.6	nu star (bias corrected)	100
MLE Mean (bias corrected)	3.050E-10	MLE Sd (bias corrected)	3.423E-10
		Approximate Chi Square Value (0.05)	77.93
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	77.48

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.913E-10	95% Adjusted Gamma UCL (use when n<50)	3.936E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00394	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.52	Mean of logged Data	-22.63
Maximum of Logged Data	-19.43	SD of logged Data	1.064

Assuming Lognormal Distribution

95% H-UCL	3.559E-10	90% Chebyshev (MVUE) UCL	3.834E-10
95% Chebyshev (MVUE) UCL	4.402E-10	97.5% Chebyshev (MVUE) UCL	5.189E-10
99% Chebyshev (MVUE) UCL	6.736E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.217E-10	95% Jackknife UCL	4.234E-10
95% Standard Bootstrap UCL	4.221E-10	95% Bootstrap-t UCL	5.408E-10
95% Hall's Bootstrap UCL	6.057E-10	95% Percentile Bootstrap UCL	4.301E-10
95% BCA Bootstrap UCL	4.759E-10		
90% Chebyshev(Mean, Sd) UCL	5.178E-10	95% Chebyshev(Mean, Sd) UCL	6.142E-10
97.5% Chebyshev(Mean, Sd) UCL	7.480E-10	99% Chebyshev(Mean, Sd) UCL	1.0108E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 6.142E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	0	Mean	2.622E-10
Maximum	1.9400E-9	Median	1.534E-10
SD	3.682E-10	Std. Error of Mean	4.639E-11
Coefficient of Variation	N/A	Skewness	3.004

Normal GOF Test

Shapiro Wilk Test Statistic	0.592	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.397E-10	95% Adjusted-CLT UCL (Chen-1995)	3.573E-10
		95% Modified-t UCL (Johnson-1978)	3.426E-10

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.385E-10	95% Jackknife UCL	3.397E-10
95% Standard Bootstrap UCL	3.373E-10	95% Bootstrap-t UCL	3.683E-10
95% Hall's Bootstrap UCL	3.566E-10	95% Percentile Bootstrap UCL	3.467E-10
95% BCA Bootstrap UCL	3.663E-10		
90% Chebyshev(Mean, Sd) UCL	4.014E-10	95% Chebyshev(Mean, Sd) UCL	4.644E-10
97.5% Chebyshev(Mean, Sd) UCL	5.519E-10	99% Chebyshev(Mean, Sd) UCL	7.237E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 4.644E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	3.320E-11	Mean	5.350E-10
Maximum	2.7500E-9	Median	3.730E-10
SD	5.838E-10	Std. Error of Mean	7.356E-11
Coefficient of Variation	N/A	Skewness	2.529

Normal GOF Test

Shapiro Wilk Test Statistic	0.652	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.578E-10	95% Adjusted-CLT UCL (Chen-1995)	6.810E-10
		95% Modified-t UCL (Johnson-1978)	6.617E-10

Gamma GOF Test

A-D Test Statistic	1.986	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.771	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.171	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.38	k star (bias corrected MLE)	1.325
Theta hat (MLE)	3.876E-10	Theta star (bias corrected MLE)	4.038E-10
nu hat (MLE)	173.9	nu star (bias corrected)	167
MLE Mean (bias corrected)	5.350E-10	MLE Sd (bias corrected)	4.648E-10
		Approximate Chi Square Value (0.05)	138.1
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	137.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.469E-10	95% Adjusted Gamma UCL (use when n<50)	6.498E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0381	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.119	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.13	Mean of logged Data	-21.75
Maximum of Logged Data	-19.71	SD of logged Data	0.908

Assuming Lognormal Distribution

95% H-UCL	6.943E-10	90% Chebyshev (MVUE) UCL	7.468E-10
95% Chebyshev (MVUE) UCL	8.430E-10	97.5% Chebyshev (MVUE) UCL	9.764E-10
99% Chebyshev (MVUE) UCL	1.2386E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.560E-10	95% Jackknife UCL	6.578E-10
95% Standard Bootstrap UCL	6.512E-10	95% Bootstrap-t UCL	6.903E-10
95% Hall's Bootstrap UCL	6.808E-10	95% Percentile Bootstrap UCL	6.640E-10
95% BCA Bootstrap UCL	6.813E-10		
90% Chebyshev(Mean, Sd) UCL	7.557E-10	95% Chebyshev(Mean, Sd) UCL	8.556E-10
97.5% Chebyshev(Mean, Sd) UCL	9.944E-10	99% Chebyshev(Mean, Sd) UCL	1.2669E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 8.556E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	2.283E-11	Mean	5.180E-10
Maximum	3.6200E-9	Median	2.356E-10
SD	8.093E-10	Std. Error of Mean	1.020E-10
Coefficient of Variation	N/A	Skewness	2.677

Normal GOF Test

Shapiro Wilk Test Statistic	0.554	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.346	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.883E-10	95% Adjusted-CLT UCL (Chen-1995)	7.225E-10
		95% Modified-t UCL (Johnson-1978)	6.940E-10

Gamma GOF Test

A-D Test Statistic	4.301	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.787	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.862	k star (bias corrected MLE)	0.831
Theta hat (MLE)	6.011E-10	Theta star (bias corrected MLE)	6.232E-10
nu hat (MLE)	108.6	nu star (bias corrected)	104.7
MLE Mean (bias corrected)	5.180E-10	MLE Sd (bias corrected)	5.682E-10
		Approximate Chi Square Value (0.05)	82.12
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	81.65

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.607E-10	95% Adjusted Gamma UCL (use when n<50)	6.644E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00695	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.5	Mean of logged Data	-22.06
Maximum of Logged Data	-19.44	SD of logged Data	1.079

Assuming Lognormal Distribution

95% H-UCL	6.405E-10	90% Chebyshev (MVUE) UCL	6.906E-10
95% Chebyshev (MVUE) UCL	7.940E-10	97.5% Chebyshev (MVUE) UCL	9.376E-10
99% Chebyshev (MVUE) UCL	1.2195E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.857E-10	95% Jackknife UCL	6.883E-10
95% Standard Bootstrap UCL	6.853E-10	95% Bootstrap-t UCL	7.409E-10
95% Hall's Bootstrap UCL	7.025E-10	95% Percentile Bootstrap UCL	6.920E-10
95% BCA Bootstrap UCL	7.296E-10		
90% Chebyshev(Mean, Sd) UCL	8.239E-10	95% Chebyshev(Mean, Sd) UCL	9.625E-10
97.5% Chebyshev(Mean, Sd) UCL	1.1548E-9	99% Chebyshev(Mean, Sd) UCL	1.5325E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 9.625E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	2.700E-10	Mean	4.0555E-9
Maximum	3.3200E-8	Median	2.4800E-9
SD	5.8304E-9	Std. Error of Mean	7.346E-10
Coefficient of Variation	N/A	Skewness	3.339

Normal GOF Test

Shapiro Wilk Test Statistic	0.564	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.2821E-9	95% Adjusted-CLT UCL (Chen-1995)	5.5939E-9
		95% Modified-t UCL (Johnson-1978)	5.3336E-9

Gamma GOF Test

A-D Test Statistic	2.828	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.211	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.072	k star (bias corrected MLE)	1.032
Theta hat (MLE)	3.7821E-9	Theta star (bias corrected MLE)	3.9304E-9
nu hat (MLE)	135.1	nu star (bias corrected)	130
MLE Mean (bias corrected)	4.0555E-9	MLE Sd (bias corrected)	3.9925E-9
		Approximate Chi Square Value (0.05)	104.7
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	104.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.0373E-9	95% Adjusted Gamma UCL (use when n<50)	5.0630E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.138	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-22.03	Mean of logged Data	-19.86
Maximum of Logged Data	-17.22	SD of logged Data	0.971

Assuming Lognormal Distribution

95% H-UCL	5.0177E-9	90% Chebyshev (MVUE) UCL	5.3955E-9
95% Chebyshev (MVUE) UCL	6.1324E-9	97.5% Chebyshev (MVUE) UCL	7.1553E-9
99% Chebyshev (MVUE) UCL	9.1645E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.2638E-9	95% Jackknife UCL	5.2821E-9
95% Standard Bootstrap UCL	5.2833E-9	95% Bootstrap-t UCL	5.9346E-9
95% Hall's Bootstrap UCL	5.7399E-9	95% Percentile Bootstrap UCL	5.3423E-9
95% BCA Bootstrap UCL	5.7273E-9		
90% Chebyshev(Mean, Sd) UCL	6.2592E-9	95% Chebyshev(Mean, Sd) UCL	7.2574E-9
97.5% Chebyshev(Mean, Sd) UCL	8.6429E-9	99% Chebyshev(Mean, Sd) UCL	1.1364E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.2574E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDD

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	5.820E-10	Mean	9.4403E-9
Maximum	1.1200E-7	Median	3.5300E-9
SD	1.8364E-8	Std. Error of Mean	2.3137E-9
Coefficient of Variation	N/A	Skewness	3.841

Normal GOF Test

Shapiro Wilk Test Statistic	0.481	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.366	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.3304E-8	95% Adjusted-CLT UCL (Chen-1995)	1.4442E-8
		95% Modified-t UCL (Johnson-1978)	1.3490E-8

Gamma GOF Test

A-D Test Statistic	5.227	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.256	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.742	k star (bias corrected MLE)	0.717
Theta hat (MLE)	1.2723E-8	Theta star (bias corrected MLE)	1.3163E-8
nu hat (MLE)	93.49	nu star (bias corrected)	90.37
MLE Mean (bias corrected)	9.4403E-9	MLE Sd (bias corrected)	1.1147E-8
		Approximate Chi Square Value (0.05)	69.45
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	69.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.2284E-8	95% Adjusted Gamma UCL (use when n<50)	1.2360E-8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	6.4092E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-21.26	Mean of logged Data	-19.29
Maximum of Logged Data	-16	SD of logged Data	1.107

Assuming Lognormal Distribution

95% H-UCL	1.0702E-8	90% Chebyshev (MVUE) UCL	1.1558E-8
95% Chebyshev (MVUE) UCL	1.3328E-8	97.5% Chebyshev (MVUE) UCL	1.5784E-8
99% Chebyshev (MVUE) UCL	2.0608E-8		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.3246E-8	95% Jackknife UCL	1.3304E-8
95% Standard Bootstrap UCL	1.3231E-8	95% Bootstrap-t UCL	1.6090E-8
95% Hall's Bootstrap UCL	1.5262E-8	95% Percentile Bootstrap UCL	1.3524E-8
95% BCA Bootstrap UCL	1.4600E-8		
90% Chebyshev(Mean, Sd) UCL	1.6381E-8	95% Chebyshev(Mean, Sd) UCL	1.9525E-8
97.5% Chebyshev(Mean, Sd) UCL	2.3889E-8	99% Chebyshev(Mean, Sd) UCL	3.2461E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.9525E-8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	1.874E-11	Mean	4.533E-10
Maximum	9.3000E-9	Median	1.590E-10
SD	1.2386E-9	Std. Error of Mean	1.560E-10
Coefficient of Variation	N/A	Skewness	6.355

Normal GOF Test

Shapiro Wilk Test Statistic	0.311	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.139E-10	95% Adjusted-CLT UCL (Chen-1995)	8.435E-10
		95% Modified-t UCL (Johnson-1978)	7.347E-10

Gamma GOF Test

A-D Test Statistic	6.077	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.256	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.743	k star (bias corrected MLE)	0.718
Theta hat (MLE)	6.102E-10	Theta star (bias corrected MLE)	6.312E-10
nu hat (MLE)	93.61	nu star (bias corrected)	90.48
MLE Mean (bias corrected)	4.533E-10	MLE Sd (bias corrected)	5.349E-10
		Approximate Chi Square Value (0.05)	69.55
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	69.12

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.897E-10	95% Adjusted Gamma UCL (use when n<50)	5.934E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	2.7076E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.7	Mean of logged Data	-22.32
Maximum of Logged Data	-18.49	SD of logged Data	1.003

Assuming Lognormal Distribution

95% H-UCL	4.455E-10	90% Chebyshev (MVUE) UCL	4.790E-10
95% Chebyshev (MVUE) UCL	5.463E-10	97.5% Chebyshev (MVUE) UCL	6.397E-10
99% Chebyshev (MVUE) UCL	8.232E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	7.100E-10	95% Jackknife UCL	7.139E-10
95% Standard Bootstrap UCL	7.087E-10	95% Bootstrap-t UCL	1.4594E-9
95% Hall's Bootstrap UCL	1.6742E-9	95% Percentile Bootstrap UCL	7.470E-10
95% BCA Bootstrap UCL	8.869E-10		
90% Chebyshev(Mean, Sd) UCL	9.214E-10	95% Chebyshev(Mean, Sd) UCL	1.1335E-9
97.5% Chebyshev(Mean, Sd) UCL	1.4278E-9	99% Chebyshev(Mean, Sd) UCL	2.0059E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.1335E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	3.080E-11	Mean	7.925E-10
Maximum	1.6800E-8	Median	2.460E-10
SD	2.3303E-9	Std. Error of Mean	2.936E-10
Coefficient of Variation	N/A	Skewness	5.952

Normal GOF Test

Shapiro Wilk Test Statistic	0.317	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2828E-9	95% Adjusted-CLT UCL (Chen-1995)	1.5107E-9
		95% Modified-t UCL (Johnson-1978)	1.3195E-9

Gamma GOF Test

A-D Test Statistic	6.259	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.807	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.269	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.601	k star (bias corrected MLE)	0.583
Theta hat (MLE)	1.3188E-9	Theta star (bias corrected MLE)	1.3596E-9
nu hat (MLE)	75.72	nu star (bias corrected)	73.45
MLE Mean (bias corrected)	7.925E-10	MLE Sd (bias corrected)	1.0381E-9
		Approximate Chi Square Value (0.05)	54.71
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	54.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.0640E-9	95% Adjusted Gamma UCL (use when n<50)	1.0714E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	7.6005E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.2	Mean of logged Data	-21.98
Maximum of Logged Data	-17.9	SD of logged Data	1.15

Assuming Lognormal Distribution

95% H-UCL	7.658E-10	90% Chebyshev (MVUE) UCL	8.301E-10
95% Chebyshev (MVUE) UCL	9.613E-10	97.5% Chebyshev (MVUE) UCL	1.1435E-9
99% Chebyshev (MVUE) UCL	1.5015E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.2755E-9	95% Jackknife UCL	1.2828E-9
95% Standard Bootstrap UCL	1.2636E-9	95% Bootstrap-t UCL	2.8976E-9
95% Hall's Bootstrap UCL	3.2676E-9	95% Percentile Bootstrap UCL	1.3236E-9
95% BCA Bootstrap UCL	1.5787E-9		
90% Chebyshev(Mean, Sd) UCL	1.6733E-9	95% Chebyshev(Mean, Sd) UCL	2.0723E-9
97.5% Chebyshev(Mean, Sd) UCL	2.6260E-9	99% Chebyshev(Mean, Sd) UCL	3.7138E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.0723E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,7,8-PeCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	60
Minimum	2.620E-11	Mean	8.404E-10
Maximum	1.1900E-8	Median	3.280E-10
SD	1.7461E-9	Std. Error of Mean	2.200E-10
Coefficient of Variation	N/A	Skewness	4.945

Normal GOF Test

Shapiro Wilk Test Statistic	0.42	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2077E-9	95% Adjusted-CLT UCL (Chen-1995)	1.3487E-9
		95% Modified-t UCL (Johnson-1978)	1.2306E-9

Gamma GOF Test

A-D Test Statistic	5.264	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.789	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.227	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.818	k star (bias corrected MLE)	0.79
Theta hat (MLE)	1.0269E-9	Theta star (bias corrected MLE)	1.0638E-9
nu hat (MLE)	103.1	nu star (bias corrected)	99.54
MLE Mean (bias corrected)	8.404E-10	MLE Sd (bias corrected)	9.455E-10
		Approximate Chi Square Value (0.05)	77.52
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	77.07

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.0790E-9	95% Adjusted Gamma UCL (use when n<50)	1.0854E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00159	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.37	Mean of logged Data	-21.62
Maximum of Logged Data	-18.25	SD of logged Data	1.04

Assuming Lognormal Distribution

95% H-UCL	9.449E-10	90% Chebyshev (MVUE) UCL	1.0169E-9
95% Chebyshev (MVUE) UCL	1.1644E-9	97.5% Chebyshev (MVUE) UCL	1.3691E-9
99% Chebyshev (MVUE) UCL	1.7712E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.2022E-9	95% Jackknife UCL	1.2077E-9
95% Standard Bootstrap UCL	1.2001E-9	95% Bootstrap-t UCL	1.6863E-9
95% Hall's Bootstrap UCL	2.6466E-9	95% Percentile Bootstrap UCL	1.2420E-9
95% BCA Bootstrap UCL	1.4009E-9		
90% Chebyshev(Mean, Sd) UCL	1.5004E-9	95% Chebyshev(Mean, Sd) UCL	1.7993E-9
97.5% Chebyshev(Mean, Sd) UCL	2.2142E-9	99% Chebyshev(Mean, Sd) UCL	3.0293E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.7993E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	1.822E-11	Mean	1.3001E-9
Maximum	1.4800E-8	Median	3.476E-10
SD	2.6415E-9	Std. Error of Mean	3.328E-10
Coefficient of Variation	N/A	Skewness	3.477

Normal GOF Test

Shapiro Wilk Test Statistic	0.49	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.8559E-9	95% Adjusted-CLT UCL (Chen-1995)	2.0033E-9
		95% Modified-t UCL (Johnson-1978)	1.8802E-9

Gamma GOF Test

A-D Test Statistic	5.04	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.805	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.619	k star (bias corrected MLE)	0.6
Theta hat (MLE)	2.1016E-9	Theta star (bias corrected MLE)	2.1678E-9
nu hat (MLE)	77.95	nu star (bias corrected)	75.57
MLE Mean (bias corrected)	1.3001E-9	MLE Sd (bias corrected)	1.6788E-9
		Approximate Chi Square Value (0.05)	56.55
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	56.16

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.7375E-9	95% Adjusted Gamma UCL (use when n<50)	1.7494E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00694	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.73	Mean of logged Data	-21.46
Maximum of Logged Data	-18.03	SD of logged Data	1.276

Assuming Lognormal Distribution

95% H-UCL	1.5624E-9	90% Chebyshev (MVUE) UCL	1.7154E-9
95% Chebyshev (MVUE) UCL	2.0114E-9	97.5% Chebyshev (MVUE) UCL	2.4223E-9
99% Chebyshev (MVUE) UCL	3.2293E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.8475E-9	95% Jackknife UCL	1.8559E-9
95% Standard Bootstrap UCL	1.8394E-9	95% Bootstrap-t UCL	2.2475E-9
95% Hall's Bootstrap UCL	2.0188E-9	95% Percentile Bootstrap UCL	1.8864E-9
95% BCA Bootstrap UCL	2.0325E-9		
90% Chebyshev(Mean, Sd) UCL	2.2985E-9	95% Chebyshev(Mean, Sd) UCL	2.7508E-9
97.5% Chebyshev(Mean, Sd) UCL	3.3785E-9	99% Chebyshev(Mean, Sd) UCL	4.6115E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.7508E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	61
Minimum	2.297E-11	Mean	1.6319E-9
Maximum	3.9500E-8	Median	2.860E-10
SD	5.4211E-9	Std. Error of Mean	6.830E-10
Coefficient of Variation	N/A	Skewness	6.047

Normal GOF Test

Shapiro Wilk Test Statistic	0.309	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.402	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.7723E-9	95% Adjusted-CLT UCL (Chen-1995)	3.3113E-9
		95% Modified-t UCL (Johnson-1978)	2.8591E-9

Gamma GOF Test

A-D Test Statistic	6.697	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.826	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.251	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.119	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.457	k star (bias corrected MLE)	0.446
Theta hat (MLE)	3.5671E-9	Theta star (bias corrected MLE)	3.6567E-9
nu hat (MLE)	57.64	nu star (bias corrected)	56.23
MLE Mean (bias corrected)	1.6319E-9	MLE Sd (bias corrected)	2.4428E-9
		Approximate Chi Square Value (0.05)	40
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	39.68

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.2943E-9	95% Adjusted Gamma UCL (use when n<50)	2.3128E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00273	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.5	Mean of logged Data	-21.64
Maximum of Logged Data	-17.05	SD of logged Data	1.37

Assuming Lognormal Distribution

95% H-UCL	1.5275E-9	90% Chebyshev (MVUE) UCL	1.6645E-9
95% Chebyshev (MVUE) UCL	1.9688E-9	97.5% Chebyshev (MVUE) UCL	2.3912E-9
99% Chebyshev (MVUE) UCL	3.2209E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.7553E-9	95% Jackknife UCL	2.7723E-9
95% Standard Bootstrap UCL	2.7295E-9	95% Bootstrap-t UCL	5.4810E-9
95% Hall's Bootstrap UCL	6.4793E-9	95% Percentile Bootstrap UCL	2.9290E-9
95% BCA Bootstrap UCL	3.6520E-9		
90% Chebyshev(Mean, Sd) UCL	3.6809E-9	95% Chebyshev(Mean, Sd) UCL	4.6090E-9
97.5% Chebyshev(Mean, Sd) UCL	5.8972E-9	99% Chebyshev(Mean, Sd) UCL	8.4276E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 4.6090E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,6,7,8-HxCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	2.592E-11	Mean	1.1918E-9
Maximum	1.1900E-8	Median	3.430E-10
SD	2.3160E-9	Std. Error of Mean	2.918E-10
Coefficient of Variation	N/A	Skewness	3.361

Normal GOF Test

Shapiro Wilk Test Statistic	0.491	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.6790E-9	95% Adjusted-CLT UCL (Chen-1995)	1.8037E-9
		95% Modified-t UCL (Johnson-1978)	1.6996E-9

Gamma GOF Test

A-D Test Statistic	4.407	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.8	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.665	k star (bias corrected MLE)	0.644
Theta hat (MLE)	1.7911E-9	Theta star (bias corrected MLE)	1.8498E-9
nu hat (MLE)	83.84	nu star (bias corrected)	81.18
MLE Mean (bias corrected)	1.1918E-9	MLE Sd (bias corrected)	1.4848E-9
		Approximate Chi Square Value (0.05)	61.42
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	61.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.5752E-9	95% Adjusted Gamma UCL (use when n<50)	1.5856E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0172	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.38	Mean of logged Data	-21.46
Maximum of Logged Data	-18.25	SD of logged Data	1.233

Assuming Lognormal Distribution

95% H-UCL	1.4505E-9	90% Chebyshev (MVUE) UCL	1.5890E-9
95% Chebyshev (MVUE) UCL	1.8555E-9	97.5% Chebyshev (MVUE) UCL	2.2254E-9
99% Chebyshev (MVUE) UCL	2.9520E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.6717E-9	95% Jackknife UCL	1.6790E-9
95% Standard Bootstrap UCL	1.6710E-9	95% Bootstrap-t UCL	1.9528E-9
95% Hall's Bootstrap UCL	1.7191E-9	95% Percentile Bootstrap UCL	1.6937E-9
95% BCA Bootstrap UCL	1.8680E-9		
90% Chebyshev(Mean, Sd) UCL	2.0671E-9	95% Chebyshev(Mean, Sd) UCL	2.4636E-9
97.5% Chebyshev(Mean, Sd) UCL	3.0140E-9	99% Chebyshev(Mean, Sd) UCL	4.0950E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.4636E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	3.936E-12	Mean	2.723E-10
Maximum	3.6600E-9	Median	9.740E-11
SD	5.499E-10	Std. Error of Mean	6.929E-11
Coefficient of Variation	N/A	Skewness	4.556

Normal GOF Test

Shapiro Wilk Test Statistic	0.486	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.313	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.880E-10	95% Adjusted-CLT UCL (Chen-1995)	4.288E-10
		95% Modified-t UCL (Johnson-1978)	3.946E-10

Gamma GOF Test

A-D Test Statistic	1.825	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.806	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.159	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.602	k star (bias corrected MLE)	0.584
Theta hat (MLE)	4.521E-10	Theta star (bias corrected MLE)	4.661E-10
nu hat (MLE)	75.9	nu star (bias corrected)	73.62
MLE Mean (bias corrected)	2.723E-10	MLE Sd (bias corrected)	3.563E-10
		Approximate Chi Square Value (0.05)	54.86
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	54.48

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.654E-10	95% Adjusted Gamma UCL (use when n<50)	3.680E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.727	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0809	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-26.26	Mean of logged Data	-23.05
Maximum of Logged Data	-19.43	SD of logged Data	1.456

Assuming Lognormal Distribution

95% H-UCL	4.414E-10	90% Chebyshev (MVUE) UCL	4.734E-10
95% Chebyshev (MVUE) UCL	5.643E-10	97.5% Chebyshev (MVUE) UCL	6.904E-10
99% Chebyshev (MVUE) UCL	9.381E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.863E-10	95% Jackknife UCL	3.880E-10
95% Standard Bootstrap UCL	3.861E-10	95% Bootstrap-t UCL	5.023E-10
95% Hall's Bootstrap UCL	7.805E-10	95% Percentile Bootstrap UCL	3.956E-10
95% BCA Bootstrap UCL	4.471E-10		
90% Chebyshev(Mean, Sd) UCL	4.802E-10	95% Chebyshev(Mean, Sd) UCL	5.743E-10
97.5% Chebyshev(Mean, Sd) UCL	7.050E-10	99% Chebyshev(Mean, Sd) UCL	9.617E-10

Suggested UCL to Use

95% H-UCL 4.414E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	62
Minimum	7.900E-11	Mean	3.8807E-9
Maximum	3.8400E-8	Median	9.270E-10
SD	7.9187E-9	Std. Error of Mean	9.977E-10
Coefficient of Variation	N/A	Skewness	3.242

Normal GOF Test

Shapiro Wilk Test Statistic	0.495	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.5466E-9	95% Adjusted-CLT UCL (Chen-1995)	5.9572E-9
		95% Modified-t UCL (Johnson-1978)	5.6145E-9

Gamma GOF Test

A-D Test Statistic	4.422	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.81	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.226	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.56	k star (bias corrected MLE)	0.544
Theta hat (MLE)	6.9318E-9	Theta star (bias corrected MLE)	7.1367E-9
nu hat (MLE)	70.54	nu star (bias corrected)	68.51
MLE Mean (bias corrected)	3.8807E-9	MLE Sd (bias corrected)	5.2627E-9
		Approximate Chi Square Value (0.05)	50.46
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	50.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.2690E-9	95% Adjusted Gamma UCL (use when n<50)	5.3071E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00806	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.26	Mean of logged Data	-20.48
Maximum of Logged Data	-17.08	SD of logged Data	1.381

Assuming Lognormal Distribution

95% H-UCL	4.9708E-9	90% Chebyshev (MVUE) UCL	5.4082E-9
95% Chebyshev (MVUE) UCL	6.4036E-9	97.5% Chebyshev (MVUE) UCL	7.7851E-9
99% Chebyshev (MVUE) UCL	1.0499E-8		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.5217E-9	95% Jackknife UCL	5.5466E-9
95% Standard Bootstrap UCL	5.4883E-9	95% Bootstrap-t UCL	6.1934E-9
95% Hall's Bootstrap UCL	5.6695E-9	95% Percentile Bootstrap UCL	5.6509E-9
95% BCA Bootstrap UCL	5.8522E-9		
90% Chebyshev(Mean, Sd) UCL	6.8737E-9	95% Chebyshev(Mean, Sd) UCL	8.2294E-9
97.5% Chebyshev(Mean, Sd) UCL	1.0111E-8	99% Chebyshev(Mean, Sd) UCL	1.3807E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 8.2294E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8,9-HpCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	1.441E-11	Mean	7.122E-10
Maximum	7.9500E-9	Median	1.540E-10
SD	1.5285E-9	Std. Error of Mean	1.926E-10
Coefficient of Variation	N/A	Skewness	3.58

Normal GOF Test

Shapiro Wilk Test Statistic	0.474	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.0337E-9	95% Adjusted-CLT UCL (Chen-1995)	1.1217E-9
		95% Modified-t UCL (Johnson-1978)	1.0482E-9

Gamma GOF Test

A-D Test Statistic	3.87	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.813	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.536	k star (bias corrected MLE)	0.521
Theta hat (MLE)	1.3290E-9	Theta star (bias corrected MLE)	1.3671E-9
nu hat (MLE)	67.52	nu star (bias corrected)	65.64
MLE Mean (bias corrected)	7.122E-10	MLE Sd (bias corrected)	9.867E-10
		Approximate Chi Square Value (0.05)	48
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	47.64

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.740E-10	95% Adjusted Gamma UCL (use when n<50)	9.812E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0353	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.96	Mean of logged Data	-22.24
Maximum of Logged Data	-18.65	SD of logged Data	1.439

Assuming Lognormal Distribution

95% H-UCL	9.622E-10	90% Chebyshev (MVUE) UCL	1.0361E-9
95% Chebyshev (MVUE) UCL	1.2331E-9	97.5% Chebyshev (MVUE) UCL	1.5066E-9
99% Chebyshev (MVUE) UCL	2.0437E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0289E-9	95% Jackknife UCL	1.0337E-9
95% Standard Bootstrap UCL	1.0330E-9	95% Bootstrap-t UCL	1.2285E-9
95% Hall's Bootstrap UCL	1.0677E-9	95% Percentile Bootstrap UCL	1.0469E-9
95% BCA Bootstrap UCL	1.1499E-9		
90% Chebyshev(Mean, Sd) UCL	1.2899E-9	95% Chebyshev(Mean, Sd) UCL	1.5516E-9
97.5% Chebyshev(Mean, Sd) UCL	1.9148E-9	99% Chebyshev(Mean, Sd) UCL	2.6283E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.5516E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDF

General Statistics

Total Number of Observations	63	Number of Distinct Observations	63
Minimum	3.388E-11	Mean	2.9083E-9
Maximum	4.4300E-8	Median	4.707E-10
SD	7.3095E-9	Std. Error of Mean	9.209E-10
Coefficient of Variation	N/A	Skewness	4.059

Normal GOF Test

Shapiro Wilk Test Statistic	0.43	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.4461E-9	95% Adjusted-CLT UCL (Chen-1995)	4.9263E-9
		95% Modified-t UCL (Johnson-1978)	4.5246E-9

Gamma GOF Test

A-D Test Statistic	4.812	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.831	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.206	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.12	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.44	k star (bias corrected MLE)	0.429
Theta hat (MLE)	6.6133E-9	Theta star (bias corrected MLE)	6.7729E-9
nu hat (MLE)	55.41	nu star (bias corrected)	54.11
MLE Mean (bias corrected)	2.9083E-9	MLE Sd (bias corrected)	4.4382E-9
		Approximate Chi Square Value (0.05)	38.2
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	37.89

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.1187E-9	95% Adjusted Gamma UCL (use when n<50)	4.1527E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0305	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.1	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.11	Mean of logged Data	-21.13
Maximum of Logged Data	-16.93	SD of logged Data	1.58

Assuming Lognormal Distribution

95% H-UCL	3.8941E-9	90% Chebyshev (MVUE) UCL	4.0555E-9
95% Chebyshev (MVUE) UCL	4.8844E-9	97.5% Chebyshev (MVUE) UCL	6.0349E-9
99% Chebyshev (MVUE) UCL	8.2949E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.4231E-9	95% Jackknife UCL	4.4461E-9
95% Standard Bootstrap UCL	4.4120E-9	95% Bootstrap-t UCL	5.6958E-9
95% Hall's Bootstrap UCL	4.8613E-9	95% Percentile Bootstrap UCL	4.4710E-9
95% BCA Bootstrap UCL	4.9563E-9		
90% Chebyshev(Mean, Sd) UCL	5.6711E-9	95% Chebyshev(Mean, Sd) UCL	6.9225E-9
97.5% Chebyshev(Mean, Sd) UCL	8.6594E-9	99% Chebyshev(Mean, Sd) UCL	1.2071E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 6.9225E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total PCB

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
Minimum	1.0345E-6	Mean	4.2485E-5
Maximum	1.7299E-4	Median	1.4726E-5
SD	6.0994E-5	Std. Error of Mean	1.7608E-5
Coefficient of Variation	N/A	Skewness	1.472

Normal GOF Test

Shapiro Wilk Test Statistic	0.686	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.4106E-5	95% Adjusted-CLT UCL (Chen-1995)	7.9443E-5
		95% Modified-t UCL (Johnson-1978)	7.5353E-5

Gamma GOF Test

A-D Test Statistic	0.726	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.783	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.258	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.53	k star (bias corrected MLE)	0.453
Theta hat (MLE)	8.0179E-5	Theta star (bias corrected MLE)	9.3794E-5
nu hat (MLE)	12.72	nu star (bias corrected)	10.87
MLE Mean (bias corrected)	4.2485E-5	MLE Sd (bias corrected)	6.3125E-5
		Approximate Chi Square Value (0.05)	4.493
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	3.887

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.0279E-4	95% Adjusted Gamma UCL (use when n<50)	1.1882E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.78	Mean of logged Data	-11.25
Maximum of Logged Data	-8.662	SD of logged Data	1.802

Assuming Lognormal Distribution

95% H-UCL	7.6962E-4	90% Chebyshev (MVUE) UCL	1.3527E-4
95% Chebyshev (MVUE) UCL	1.7389E-4	97.5% Chebyshev (MVUE) UCL	2.2749E-4
99% Chebyshev (MVUE) UCL	3.3278E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.1446E-5	95% Jackknife UCL	7.4106E-5
95% Standard Bootstrap UCL	6.9698E-5	95% Bootstrap-t UCL	9.4665E-5
95% Hall's Bootstrap UCL	6.4097E-5	95% Percentile Bootstrap UCL	7.0838E-5
95% BCA Bootstrap UCL	7.5790E-5		
90% Chebyshev(Mean, Sd) UCL	9.5307E-5	95% Chebyshev(Mean, Sd) UCL	1.1923E-4
97.5% Chebyshev(Mean, Sd) UCL	1.5244E-4	99% Chebyshev(Mean, Sd) UCL	2.1768E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 1.1882E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	1.6000E-7	Mean	1.1072E-5
Maximum	1.2373E-4	Median	5.9100E-7
SD	2.7811E-5	Std. Error of Mean	6.3804E-6
Coefficient of Variation	N/A	Skewness	4.09

Normal GOF Test

Shapiro Wilk Test Statistic	0.393	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.416	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.2136E-5	95% Adjusted-CLT UCL (Chen-1995)	2.7964E-5
		95% Modified-t UCL (Johnson-1978)	2.3134E-5

Gamma GOF Test

A-D Test Statistic	1.496	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.83	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.213	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.366	k star (bias corrected MLE)	0.343
Theta hat (MLE)	3.0284E-5	Theta star (bias corrected MLE)	3.2283E-5
nu hat (MLE)	13.89	nu star (bias corrected)	13.03
MLE Mean (bias corrected)	1.1072E-5	MLE Sd (bias corrected)	1.8906E-5
		Approximate Chi Square Value (0.05)	5.915
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	5.499

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.4396E-5	95% Adjusted Gamma UCL (use when n<50)	2.6238E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.65	Mean of logged Data	-13.24
Maximum of Logged Data	-8.997	SD of logged Data	2.054

Assuming Lognormal Distribution

95% H-UCL	1.2070E-4	90% Chebyshev (MVUE) UCL	3.0474E-5
95% Chebyshev (MVUE) UCL	3.9212E-5	97.5% Chebyshev (MVUE) UCL	5.1340E-5
99% Chebyshev (MVUE) UCL	7.5163E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.1567E-5	95% Jackknife UCL	2.2136E-5
95% Standard Bootstrap UCL	2.0998E-5	95% Bootstrap-t UCL	5.2541E-5
95% Hall's Bootstrap UCL	6.1036E-5	95% Percentile Bootstrap UCL	2.3493E-5
95% BCA Bootstrap UCL	3.1035E-5		
90% Chebyshev(Mean, Sd) UCL	3.0213E-5	95% Chebyshev(Mean, Sd) UCL	3.8883E-5
97.5% Chebyshev(Mean, Sd) UCL	5.0917E-5	99% Chebyshev(Mean, Sd) UCL	7.4556E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 7.4556E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	7.0900E-8	Mean	3.8001E-6
Maximum	1.5000E-5	Median	5.0400E-6
SD	4.0513E-6	Std. Error of Mean	9.2944E-7
Coefficient of Variation	N/A	Skewness	1.056

Normal GOF Test

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.4118E-6	95% Adjusted-CLT UCL (Chen-1995)	5.5695E-6
		95% Modified-t UCL (Johnson-1978)	5.4493E-6

Gamma GOF Test

A-D Test Statistic	1.714	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.801	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.21	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.517	k star (bias corrected MLE)	0.47
Theta hat (MLE)	7.3543E-6	Theta star (bias corrected MLE)	8.0816E-6
nu hat (MLE)	19.64	nu star (bias corrected)	17.87
MLE Mean (bias corrected)	3.8001E-6	MLE Sd (bias corrected)	5.5417E-6
		Approximate Chi Square Value (0.05)	9.296
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	8.758

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.3046E-6	95% Adjusted Gamma UCL (use when n<50)	7.7532E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.794	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.46	Mean of logged Data	-13.7
Maximum of Logged Data	-11.11	SD of logged Data	2.011

Assuming Lognormal Distribution

95% H-UCL	6.3951E-5	90% Chebyshev (MVUE) UCL	1.7561E-5
95% Chebyshev (MVUE) UCL	2.2556E-5	97.5% Chebyshev (MVUE) UCL	2.9489E-5
99% Chebyshev (MVUE) UCL	4.3107E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.3289E-6	95% Jackknife UCL	5.4118E-6
95% Standard Bootstrap UCL	5.2550E-6	95% Bootstrap-t UCL	5.7183E-6
95% Hall's Bootstrap UCL	5.9618E-6	95% Percentile Bootstrap UCL	5.3089E-6
95% BCA Bootstrap UCL	5.5073E-6		
90% Chebyshev(Mean, Sd) UCL	6.5884E-6	95% Chebyshev(Mean, Sd) UCL	7.8514E-6
97.5% Chebyshev(Mean, Sd) UCL	9.6045E-6	99% Chebyshev(Mean, Sd) UCL	1.3048E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 1.3048E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	9.5900E-8	Mean	3.3668E-6
Maximum	7.7742E-6	Median	5.1408E-6
SD	3.1663E-6	Std. Error of Mean	7.2639E-7
Coefficient of Variation	N/A	Skewness	0.0395

Normal GOF Test

Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.6264E-6	95% Adjusted-CLT UCL (Chen-1995)	4.5686E-6
		95% Modified-t UCL (Johnson-1978)	4.6275E-6

Gamma GOF Test

A-D Test Statistic	2.118	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.796	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.308	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.209	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.572	k star (bias corrected MLE)	0.517
Theta hat (MLE)	5.8836E-6	Theta star (bias corrected MLE)	6.5125E-6
nu hat (MLE)	21.74	nu star (bias corrected)	19.64
MLE Mean (bias corrected)	3.3668E-6	MLE Sd (bias corrected)	4.6825E-6
		Approximate Chi Square Value (0.05)	10.59
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	10.01

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.2456E-6	95% Adjusted Gamma UCL (use when n<50)	6.6067E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.765	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.317	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.16	Mean of logged Data	-13.69
Maximum of Logged Data	-11.76	SD of logged Data	1.865

Assuming Lognormal Distribution

95% H-UCL	3.7694E-5	90% Chebyshev (MVUE) UCL	1.3462E-5
95% Chebyshev (MVUE) UCL	1.7177E-5	97.5% Chebyshev (MVUE) UCL	2.2334E-5
99% Chebyshev (MVUE) UCL	3.2463E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.5616E-6	95% Jackknife UCL	4.6264E-6
95% Standard Bootstrap UCL	4.5291E-6	95% Bootstrap-t UCL	4.6057E-6
95% Hall's Bootstrap UCL	4.4725E-6	95% Percentile Bootstrap UCL	4.5098E-6
95% BCA Bootstrap UCL	4.5350E-6		
90% Chebyshev(Mean, Sd) UCL	5.5459E-6	95% Chebyshev(Mean, Sd) UCL	6.5330E-6
97.5% Chebyshev(Mean, Sd) UCL	7.9031E-6	99% Chebyshev(Mean, Sd) UCL	1.0594E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.0594E-5	
95% Chebyshev(Mean, Sd) UCL	6.5330E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	1.1100E-8	Mean	2.8013E-6
Maximum	7.4214E-6	Median	1.2400E-6
SD	2.7627E-6	Std. Error of Mean	6.3381E-7
Coefficient of Variation	N/A	Skewness	0.319

Normal GOF Test

Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.9004E-6	95% Adjusted-CLT UCL (Chen-1995)	3.8934E-6
		95% Modified-t UCL (Johnson-1978)	3.9081E-6

Gamma GOF Test

A-D Test Statistic	1.019	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.802	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.21	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.512	k star (bias corrected MLE)	0.466
Theta hat (MLE)	5.4761E-6	Theta star (bias corrected MLE)	6.0131E-6
nu hat (MLE)	19.44	nu star (bias corrected)	17.7
MLE Mean (bias corrected)	2.8013E-6	MLE Sd (bias corrected)	4.1042E-6
		Approximate Chi Square Value (0.05)	9.176
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	8.643

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.4042E-6	95% Adjusted Gamma UCL (use when n<50)	5.7380E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.32	Mean of logged Data	-14.02
Maximum of Logged Data	-11.81	SD of logged Data	2.167

Assuming Lognormal Distribution

95% H-UCL	8.6715E-5	90% Chebyshev (MVUE) UCL	1.7381E-5
95% Chebyshev (MVUE) UCL	2.2461E-5	97.5% Chebyshev (MVUE) UCL	2.9512E-5
99% Chebyshev (MVUE) UCL	4.3363E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8438E-6	95% Jackknife UCL	3.9004E-6
95% Standard Bootstrap UCL	3.8358E-6	95% Bootstrap-t UCL	3.8795E-6
95% Hall's Bootstrap UCL	3.7627E-6	95% Percentile Bootstrap UCL	3.8085E-6
95% BCA Bootstrap UCL	3.8164E-6		
90% Chebyshev(Mean, Sd) UCL	4.7027E-6	95% Chebyshev(Mean, Sd) UCL	5.5640E-6
97.5% Chebyshev(Mean, Sd) UCL	6.7594E-6	99% Chebyshev(Mean, Sd) UCL	9.1076E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	9.1076E-6	
95% Chebyshev(Mean, Sd) UCL	5.56E-06	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	6.6700E-9	Mean	3.1148E-6
Maximum	1.0609E-5	Median	3.3900E-7
SD	3.4192E-6	Std. Error of Mean	7.8441E-7
Coefficient of Variation	N/A	Skewness	0.589

Normal GOF Test

Shapiro Wilk Test Statistic	0.796	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.4750E-6	95% Adjusted-CLT UCL (Chen-1995)	4.5183E-6
		95% Modified-t UCL (Johnson-1978)	4.4927E-6

Gamma GOF Test

A-D Test Statistic	1.628	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.81	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.211	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.463	k star (bias corrected MLE)	0.425
Theta hat (MLE)	6.7225E-6	Theta star (bias corrected MLE)	7.3243E-6
nu hat (MLE)	17.61	nu star (bias corrected)	16.16
MLE Mean (bias corrected)	3.1148E-6	MLE Sd (bias corrected)	4.7764E-6
		Approximate Chi Square Value (0.05)	8.075
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	7.579

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.2333E-6	95% Adjusted Gamma UCL (use when n<50)	6.6417E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.83	Mean of logged Data	-14.07
Maximum of Logged Data	-11.45	SD of logged Data	2.169

Assuming Lognormal Distribution

95% H-UCL	8.3895E-5	90% Chebyshev (MVUE) UCL	1.6722E-5
95% Chebyshev (MVUE) UCL	2.1611E-5	97.5% Chebyshev (MVUE) UCL	2.8398E-5
99% Chebyshev (MVUE) UCL	4.1729E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.4050E-6	95% Jackknife UCL	4.4750E-6
95% Standard Bootstrap UCL	4.3590E-6	95% Bootstrap-t UCL	4.5755E-6
95% Hall's Bootstrap UCL	4.3703E-6	95% Percentile Bootstrap UCL	4.4103E-6
95% BCA Bootstrap UCL	4.4751E-6		
90% Chebyshev(Mean, Sd) UCL	5.4680E-6	95% Chebyshev(Mean, Sd) UCL	6.5339E-6
97.5% Chebyshev(Mean, Sd) UCL	8.0134E-6	99% Chebyshev(Mean, Sd) UCL	1.0920E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.0920E-5	
95% Chebyshev(Mean, Sd) UCL	6.5339E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	3.5100E-8	Mean	2.9710E-6
Maximum	9.6516E-6	Median	9.0100E-7
SD	3.0360E-6	Std. Error of Mean	6.9650E-7
Coefficient of Variation	N/A	Skewness	0.611

Normal GOF Test

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.1787E-6	95% Adjusted-CLT UCL (Chen-1995)	4.2209E-6
		95% Modified-t UCL (Johnson-1978)	4.1950E-6

Gamma GOF Test

A-D Test Statistic	0.996	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.791	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.208	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.627	k star (bias corrected MLE)	0.563
Theta hat (MLE)	4.7409E-6	Theta star (bias corrected MLE)	5.2789E-6
nu hat (MLE)	23.81	nu star (bias corrected)	21.39
MLE Mean (bias corrected)	2.9710E-6	MLE Sd (bias corrected)	3.9602E-6
		Approximate Chi Square Value (0.05)	11.88
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	11.26

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.3486E-6	95% Adjusted Gamma UCL (use when n<50)	5.6417E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.254	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.17	Mean of logged Data	-13.71
Maximum of Logged Data	-11.55	SD of logged Data	1.745

Assuming Lognormal Distribution

95% H-UCL	2.4451E-5	90% Chebyshev (MVUE) UCL	1.0583E-5
95% Chebyshev (MVUE) UCL	1.3421E-5	97.5% Chebyshev (MVUE) UCL	1.7360E-5
99% Chebyshev (MVUE) UCL	2.5098E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.1166E-6	95% Jackknife UCL	4.1787E-6
95% Standard Bootstrap UCL	4.0815E-6	95% Bootstrap-t UCL	4.2102E-6
95% Hall's Bootstrap UCL	4.1173E-6	95% Percentile Bootstrap UCL	4.0958E-6
95% BCA Bootstrap UCL	4.1772E-6		
90% Chebyshev(Mean, Sd) UCL	5.0605E-6	95% Chebyshev(Mean, Sd) UCL	6.0069E-6
97.5% Chebyshev(Mean, Sd) UCL	7.3206E-6	99% Chebyshev(Mean, Sd) UCL	9.9011E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	9.9011E-6	
95% Chebyshev(Mean, Sd) UCL	6.0069E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	1.5900E-7	Mean	4.5776E-6
Maximum	1.1731E-5	Median	2.6300E-6
SD	3.2817E-6	Std. Error of Mean	7.5288E-7
Coefficient of Variation	N/A	Skewness	0.436

Normal GOF Test

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.8832E-6	95% Adjusted-CLT UCL (Chen-1995)	5.8964E-6
		95% Modified-t UCL (Johnson-1978)	5.8957E-6

Gamma GOF Test

A-D Test Statistic	0.858	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.203	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.334	k star (bias corrected MLE)	1.158
Theta hat (MLE)	3.4323E-6	Theta star (bias corrected MLE)	3.9524E-6
nu hat (MLE)	50.68	nu star (bias corrected)	44.01
MLE Mean (bias corrected)	4.5776E-6	MLE Sd (bias corrected)	4.2535E-6
		Approximate Chi Square Value (0.05)	29.8
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	28.78

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.7614E-6	95% Adjusted Gamma UCL (use when n<50)	7.0014E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.65	Mean of logged Data	-12.71
Maximum of Logged Data	-11.35	SD of logged Data	1.173

Assuming Lognormal Distribution

95% H-UCL	1.3217E-5	90% Chebyshev (MVUE) UCL	1.0881E-5
95% Chebyshev (MVUE) UCL	1.3245E-5	97.5% Chebyshev (MVUE) UCL	1.6527E-5
99% Chebyshev (MVUE) UCL	2.2974E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.8160E-6	95% Jackknife UCL	5.8832E-6
95% Standard Bootstrap UCL	5.7772E-6	95% Bootstrap-t UCL	6.0672E-6
95% Hall's Bootstrap UCL	5.8509E-6	95% Percentile Bootstrap UCL	5.7720E-6
95% BCA Bootstrap UCL	5.8911E-6		
90% Chebyshev(Mean, Sd) UCL	6.8363E-6	95% Chebyshev(Mean, Sd) UCL	7.8593E-6
97.5% Chebyshev(Mean, Sd) UCL	9.2794E-6	99% Chebyshev(Mean, Sd) UCL	1.2069E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.8593E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	1.3800E-8	Mean	2.9074E-6
Maximum	9.6516E-6	Median	3.4900E-7
SD	3.1873E-6	Std. Error of Mean	7.3121E-7
Coefficient of Variation	N/A	Skewness	0.562

Normal GOF Test

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.1754E-6	95% Adjusted-CLT UCL (Chen-1995)	4.2109E-6
		95% Modified-t UCL (Johnson-1978)	4.1911E-6

Gamma GOF Test

A-D Test Statistic	1.371	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.817	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.258	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.212	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.429	k star (bias corrected MLE)	0.397
Theta hat (MLE)	6.7729E-6	Theta star (bias corrected MLE)	7.3312E-6
nu hat (MLE)	16.31	nu star (bias corrected)	15.07
MLE Mean (bias corrected)	2.9074E-6	MLE Sd (bias corrected)	4.6168E-6
		Approximate Chi Square Value (0.05)	7.31
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	6.841

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.9936E-6	95% Adjusted Gamma UCL (use when n<50)	6.4046E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.272	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.1	Mean of logged Data	-14.26
Maximum of Logged Data	-11.55	SD of logged Data	2.309

Assuming Lognormal Distribution

95% H-UCL	1.2542E-4	90% Chebyshev (MVUE) UCL	1.8258E-5
95% Chebyshev (MVUE) UCL	2.3709E-5	97.5% Chebyshev (MVUE) UCL	3.1275E-5
99% Chebyshev (MVUE) UCL	4.6137E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.1102E-6	95% Jackknife UCL	4.1754E-6
95% Standard Bootstrap UCL	4.0636E-6	95% Bootstrap-t UCL	4.2672E-6
95% Hall's Bootstrap UCL	4.1195E-6	95% Percentile Bootstrap UCL	4.1092E-6
95% BCA Bootstrap UCL	4.2473E-6		
90% Chebyshev(Mean, Sd) UCL	5.1011E-6	95% Chebyshev(Mean, Sd) UCL	6.0947E-6
97.5% Chebyshev(Mean, Sd) UCL	7.4738E-6	99% Chebyshev(Mean, Sd) UCL	1.0183E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.0183E-5	
95% Chebyshev(Mean, Sd) UCL	6.0947E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chrysene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	4.8200E-8	Mean	3.0995E-6
Maximum	7.5978E-6	Median	1.8900E-6
SD	2.8595E-6	Std. Error of Mean	6.5603E-7
Coefficient of Variation	N/A	Skewness	0.251

Normal GOF Test

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.2371E-6	95% Adjusted-CLT UCL (Chen-1995)	4.2190E-6
		95% Modified-t UCL (Johnson-1978)	4.2434E-6

Gamma GOF Test

A-D Test Statistic	0.999	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.788	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.208	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.655	k star (bias corrected MLE)	0.587
Theta hat (MLE)	4.7291E-6	Theta star (bias corrected MLE)	5.2801E-6
nu hat (MLE)	24.91	nu star (bias corrected)	22.31
MLE Mean (bias corrected)	3.0995E-6	MLE Sd (bias corrected)	4.0454E-6
		Approximate Chi Square Value (0.05)	12.57
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	11.93

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.5010E-6	95% Adjusted Gamma UCL (use when n<50)	5.7947E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.855	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.85	Mean of logged Data	-13.61
Maximum of Logged Data	-11.79	SD of logged Data	1.777

Assuming Lognormal Distribution

95% H-UCL	2.9789E-5	90% Chebyshev (MVUE) UCL	1.2285E-5
95% Chebyshev (MVUE) UCL	1.5606E-5	97.5% Chebyshev (MVUE) UCL	2.0215E-5
99% Chebyshev (MVUE) UCL	2.9268E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.1786E-6	95% Jackknife UCL	4.2371E-6
95% Standard Bootstrap UCL	4.1273E-6	95% Bootstrap-t UCL	4.3146E-6
95% Hall's Bootstrap UCL	4.1732E-6	95% Percentile Bootstrap UCL	4.1258E-6
95% BCA Bootstrap UCL	4.2257E-6		
90% Chebyshev(Mean, Sd) UCL	5.0676E-6	95% Chebyshev(Mean, Sd) UCL	5.9590E-6
97.5% Chebyshev(Mean, Sd) UCL	7.1964E-6	99% Chebyshev(Mean, Sd) UCL	9.6269E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	9.6269E-6	
95% Chebyshev(Mean, Sd) UCL	5.96E-06	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	2.0000E-9	Mean	4.1223E-6
Maximum	1.4742E-5	Median	5.1400E-8
SD	4.6849E-6	Std. Error of Mean	1.0748E-6
Coefficient of Variation	N/A	Skewness	0.58

Normal GOF Test

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.334	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.9861E-6	95% Adjusted-CLT UCL (Chen-1995)	6.0429E-6
		95% Modified-t UCL (Johnson-1978)	6.0099E-6

Gamma GOF Test

A-D Test Statistic	2.151	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.847	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.31	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.216	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.291	k star (bias corrected MLE)	0.28
Theta hat (MLE)	1.4153E-5	Theta star (bias corrected MLE)	1.4704E-5
nu hat (MLE)	11.07	nu star (bias corrected)	10.65
MLE Mean (bias corrected)	4.1223E-6	MLE Sd (bias corrected)	7.7854E-6
		Approximate Chi Square Value (0.05)	4.354
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	4.007

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.0086E-5	95% Adjusted Gamma UCL (use when n<50)	1.0959E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-20.03	Mean of logged Data	-14.78
Maximum of Logged Data	-11.12	SD of logged Data	3.162

Assuming Lognormal Distribution

95% H-UCL	0.00656	90% Chebyshev (MVUE) UCL	7.1849E-5
95% Chebyshev (MVUE) UCL	9.5034E-5	97.5% Chebyshev (MVUE) UCL	1.2722E-4
99% Chebyshev (MVUE) UCL	1.9043E-4		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.8902E-6	95% Jackknife UCL	5.9861E-6
95% Standard Bootstrap UCL	5.8487E-6	95% Bootstrap-t UCL	6.0876E-6
95% Hall's Bootstrap UCL	5.9676E-6	95% Percentile Bootstrap UCL	5.9192E-6
95% BCA Bootstrap UCL	5.8180E-6		
90% Chebyshev(Mean, Sd) UCL	7.3467E-6	95% Chebyshev(Mean, Sd) UCL	8.8072E-6
97.5% Chebyshev(Mean, Sd) UCL	1.0834E-5	99% Chebyshev(Mean, Sd) UCL	1.4816E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.4816E-5	
95% Chebyshev(Mean, Sd) UCL	8.8072E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	6.9400E-7	Mean	5.0624E-6
Maximum	3.9900E-5	Median	3.0000E-6
SD	8.6423E-6	Std. Error of Mean	1.9827E-6
Coefficient of Variation	N/A	Skewness	4.026

Normal GOF Test

Shapiro Wilk Test Statistic	0.434	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.386	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.5005E-6	95% Adjusted-CLT UCL (Chen-1995)	1.0280E-5
		95% Modified-t UCL (Johnson-1978)	8.8057E-6

Gamma GOF Test

A-D Test Statistic	1.32	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.062	k star (bias corrected MLE)	0.929
Theta hat (MLE)	4.7666E-6	Theta star (bias corrected MLE)	5.4466E-6
nu hat (MLE)	40.36	nu star (bias corrected)	35.32
MLE Mean (bias corrected)	5.0624E-6	MLE Sd (bias corrected)	5.2510E-6
		Approximate Chi Square Value (0.05)	22.72
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	21.84

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.8692E-6	95% Adjusted Gamma UCL (use when n<50)	8.1871E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.18	Mean of logged Data	-12.73
Maximum of Logged Data	-10.13	SD of logged Data	0.918

Assuming Lognormal Distribution

95% H-UCL	7.7153E-6	90% Chebyshev (MVUE) UCL	7.3992E-6
95% Chebyshev (MVUE) UCL	8.7738E-6	97.5% Chebyshev (MVUE) UCL	1.0682E-5
99% Chebyshev (MVUE) UCL	1.4430E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.3236E-6	95% Jackknife UCL	8.5005E-6
95% Standard Bootstrap UCL	8.2412E-6	95% Bootstrap-t UCL	1.7619E-5
95% Hall's Bootstrap UCL	2.0406E-5	95% Percentile Bootstrap UCL	8.9208E-6
95% BCA Bootstrap UCL	1.0952E-5		
90% Chebyshev(Mean, Sd) UCL	1.1010E-5	95% Chebyshev(Mean, Sd) UCL	1.3705E-5
97.5% Chebyshev(Mean, Sd) UCL	1.7444E-5	99% Chebyshev(Mean, Sd) UCL	2.4790E-5

Suggested UCL to Use

95% H-UCL 7.7153E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluorene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	3.9700E-7	Mean	4.8849E-6
Maximum	1.0886E-5	Median	4.8600E-6
SD	4.1408E-6	Std. Error of Mean	9.4996E-7
Coefficient of Variation	N/A	Skewness	0.194

Normal GOF Test

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.5322E-6	95% Adjusted-CLT UCL (Chen-1995)	6.4927E-6
		95% Modified-t UCL (Johnson-1978)	6.5393E-6

Gamma GOF Test

A-D Test Statistic	1.348	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.769	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.001	k star (bias corrected MLE)	0.878
Theta hat (MLE)	4.8822E-6	Theta star (bias corrected MLE)	5.5659E-6
nu hat (MLE)	38.02	nu star (bias corrected)	33.35
MLE Mean (bias corrected)	4.8849E-6	MLE Sd (bias corrected)	5.2143E-6
		Approximate Chi Square Value (0.05)	21.15
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	20.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.7043E-6	95% Adjusted Gamma UCL (use when n<50)	8.0263E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.74	Mean of logged Data	-12.81
Maximum of Logged Data	-11.43	SD of logged Data	1.249

Assuming Lognormal Distribution

95% H-UCL	1.4390E-5	90% Chebyshev (MVUE) UCL	1.1153E-5
95% Chebyshev (MVUE) UCL	1.3668E-5	97.5% Chebyshev (MVUE) UCL	1.7159E-5
99% Chebyshev (MVUE) UCL	2.4016E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.4475E-6	95% Jackknife UCL	6.5322E-6
95% Standard Bootstrap UCL	6.4352E-6	95% Bootstrap-t UCL	6.5689E-6
95% Hall's Bootstrap UCL	6.4052E-6	95% Percentile Bootstrap UCL	6.4351E-6
95% BCA Bootstrap UCL	6.4129E-6		
90% Chebyshev(Mean, Sd) UCL	7.7348E-6	95% Chebyshev(Mean, Sd) UCL	9.0257E-6
97.5% Chebyshev(Mean, Sd) UCL	1.0817E-5	99% Chebyshev(Mean, Sd) UCL	1.4337E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 9.0257E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	4.2500E-8	Mean	3.5767E-6
Maximum	1.0697E-5	Median	3.9500E-7
SD	3.7190E-6	Std. Error of Mean	8.5319E-7
Coefficient of Variation	N/A	Skewness	0.373

Normal GOF Test

Shapiro Wilk Test Statistic	0.781	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.0561E-6	95% Adjusted-CLT UCL (Chen-1995)	5.0581E-6
		95% Modified-t UCL (Johnson-1978)	5.0683E-6

Gamma GOF Test

A-D Test Statistic	1.815	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.798	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.29	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.209	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.548	k star (bias corrected MLE)	0.497
Theta hat (MLE)	6.5234E-6	Theta star (bias corrected MLE)	7.1995E-6
nu hat (MLE)	20.83	nu star (bias corrected)	18.88
MLE Mean (bias corrected)	3.5767E-6	MLE Sd (bias corrected)	5.0744E-6
		Approximate Chi Square Value (0.05)	10.03
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	9.467

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.7329E-6	95% Adjusted Gamma UCL (use when n<50)	7.1321E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.286	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.97	Mean of logged Data	-13.68
Maximum of Logged Data	-11.45	SD of logged Data	1.871

Assuming Lognormal Distribution

95% H-UCL	3.8707E-5	90% Chebyshev (MVUE) UCL	1.3688E-5
95% Chebyshev (MVUE) UCL	1.7471E-5	97.5% Chebyshev (MVUE) UCL	2.2721E-5
99% Chebyshev (MVUE) UCL	3.3034E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.9800E-6	95% Jackknife UCL	5.0561E-6
95% Standard Bootstrap UCL	4.9363E-6	95% Bootstrap-t UCL	5.1031E-6
95% Hall's Bootstrap UCL	4.9193E-6	95% Percentile Bootstrap UCL	4.9536E-6
95% BCA Bootstrap UCL	5.0239E-6		
90% Chebyshev(Mean, Sd) UCL	6.1362E-6	95% Chebyshev(Mean, Sd) UCL	7.2956E-6
97.5% Chebyshev(Mean, Sd) UCL	8.9048E-6	99% Chebyshev(Mean, Sd) UCL	1.2066E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.2066E-5	
95% Chebyshev(Mean, Sd) UCL	7.2956E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2-Methylnaphthalene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
Minimum	1.9100E-6	Mean	6.5812E-6
Maximum	1.2323E-5	Median	5.8000E-6
SD	4.0114E-6	Std. Error of Mean	9.2027E-7
Coefficient of Variation	N/A	Skewness	0.233

Normal GOF Test

Shapiro Wilk Test Statistic	0.848	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.1770E-6	95% Adjusted-CLT UCL (Chen-1995)	8.1475E-6
		95% Modified-t UCL (Johnson-1978)	8.1852E-6

Gamma GOF Test

A-D Test Statistic	1.011	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.2	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.527	k star (bias corrected MLE)	2.163
Theta hat (MLE)	2.6041E-6	Theta star (bias corrected MLE)	3.0422E-6
nu hat (MLE)	96.03	nu star (bias corrected)	82.2
MLE Mean (bias corrected)	6.5812E-6	MLE Sd (bias corrected)	4.4745E-6
		Approximate Chi Square Value (0.05)	62.31
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	60.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.6824E-6	95% Adjusted Gamma UCL (use when n<50)	8.8985E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.17	Mean of logged Data	-12.14
Maximum of Logged Data	-11.3	SD of logged Data	0.696

Assuming Lognormal Distribution

95% H-UCL	9.7725E-6	90% Chebyshev (MVUE) UCL	1.0101E-5
95% Chebyshev (MVUE) UCL	1.1646E-5	97.5% Chebyshev (MVUE) UCL	1.3791E-5
99% Chebyshev (MVUE) UCL	1.8003E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	8.0949E-6	95% Jackknife UCL	8.1770E-6
95% Standard Bootstrap UCL	8.0308E-6	95% Bootstrap-t UCL	8.2153E-6
95% Hall's Bootstrap UCL	7.9753E-6	95% Percentile Bootstrap UCL	8.1084E-6
95% BCA Bootstrap UCL	8.0671E-6		
90% Chebyshev(Mean, Sd) UCL	9.3420E-6	95% Chebyshev(Mean, Sd) UCL	1.0593E-5
97.5% Chebyshev(Mean, Sd) UCL	1.2328E-5	99% Chebyshev(Mean, Sd) UCL	1.5738E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.0593E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Naphthathalene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	8.2700E-6	Mean	2.0075E-5
Maximum	4.7880E-5	Median	1.3608E-5
SD	1.1842E-5	Std. Error of Mean	2.7168E-6
Coefficient of Variation	N/A	Skewness	0.878

Normal GOF Test

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.4786E-5	95% Adjusted-CLT UCL (Chen-1995)	2.5128E-5
		95% Modified-t UCL (Johnson-1978)	2.4877E-5

Gamma GOF Test

A-D Test Statistic	0.933	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.209	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.2	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.31	k star (bias corrected MLE)	2.822
Theta hat (MLE)	6.0653E-6	Theta star (bias corrected MLE)	7.1130E-6
nu hat (MLE)	125.8	nu star (bias corrected)	107.2
MLE Mean (bias corrected)	2.0075E-5	MLE Sd (bias corrected)	1.1950E-5
		Approximate Chi Square Value (0.05)	84.35
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	82.57

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.5525E-5	95% Adjusted Gamma UCL (use when n<50)	2.6074E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.7	Mean of logged Data	-10.97
Maximum of Logged Data	-9.947	SD of logged Data	0.574

Assuming Lognormal Distribution

95% H-UCL	2.6762E-5	90% Chebyshev (MVUE) UCL	2.8253E-5
95% Chebyshev (MVUE) UCL	3.1993E-5	97.5% Chebyshev (MVUE) UCL	3.7184E-5
99% Chebyshev (MVUE) UCL	4.7381E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.4543E-5	95% Jackknife UCL	2.4786E-5
95% Standard Bootstrap UCL	2.4341E-5	95% Bootstrap-t UCL	2.5789E-5
95% Hall's Bootstrap UCL	2.5098E-5	95% Percentile Bootstrap UCL	2.4558E-5
95% BCA Bootstrap UCL	2.4771E-5		
90% Chebyshev(Mean, Sd) UCL	2.8225E-5	95% Chebyshev(Mean, Sd) UCL	3.1917E-5
97.5% Chebyshev(Mean, Sd) UCL	3.7041E-5	99% Chebyshev(Mean, Sd) UCL	4.7107E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.1917E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets

Montogomery County, RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Phenanthrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	1.0400E-6	Mean	8.8732E-6
Maximum	6.2800E-5	Median	5.5600E-6
SD	1.3673E-5	Std. Error of Mean	3.1368E-6
Coefficient of Variation	N/A	Skewness	3.779

Normal GOF Test

Shapiro Wilk Test Statistic	0.484	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.4313E-5	95% Adjusted-CLT UCL (Chen-1995)	1.6939E-5
		95% Modified-t UCL (Johnson-1978)	1.4766E-5

Gamma GOF Test

A-D Test Statistic	1.228	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.099	k star (bias corrected MLE)	0.961
Theta hat (MLE)	8.0723E-6	Theta star (bias corrected MLE)	9.2358E-6
nu hat (MLE)	41.77	nu star (bias corrected)	36.51
MLE Mean (bias corrected)	8.8732E-6	MLE Sd (bias corrected)	9.0527E-6
		Approximate Chi Square Value (0.05)	23.68
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	22.78

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.3681E-5	95% Adjusted Gamma UCL (use when n<50)	1.4223E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.78	Mean of logged Data	-12.15
Maximum of Logged Data	-9.676	SD of logged Data	0.96

Assuming Lognormal Distribution

95% H-UCL	1.4926E-5	90% Chebyshev (MVUE) UCL	1.4026E-5
95% Chebyshev (MVUE) UCL	1.6711E-5	97.5% Chebyshev (MVUE) UCL	2.0439E-5
99% Chebyshev (MVUE) UCL	2.7762E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4033E-5	95% Jackknife UCL	1.4313E-5
95% Standard Bootstrap UCL	1.3991E-5	95% Bootstrap-t UCL	3.0400E-5
95% Hall's Bootstrap UCL	3.6547E-5	95% Percentile Bootstrap UCL	1.4872E-5
95% BCA Bootstrap UCL	1.7830E-5		
90% Chebyshev(Mean, Sd) UCL	1.8284E-5	95% Chebyshev(Mean, Sd) UCL	2.2546E-5
97.5% Chebyshev(Mean, Sd) UCL	2.8462E-5	99% Chebyshev(Mean, Sd) UCL	4.0084E-5

Suggested UCL to Use

95% H-UCL 1.4926E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-2. UCL Statistics for Uncensored Full Data Sets
Montogomery County, RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:15:00 PM
From File	Unit 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Minimum	5.6200E-7	Mean	4.9122E-6
Maximum	3.4200E-5	Median	3.4776E-6
SD	7.2746E-6	Std. Error of Mean	1.6689E-6
Coefficient of Variation	N/A	Skewness	4.005

Normal GOF Test

Shapiro Wilk Test Statistic	0.449	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.8062E-6	95% Adjusted-CLT UCL (Chen-1995)	9.2957E-6
		95% Modified-t UCL (Johnson-1978)	8.0618E-6

Gamma GOF Test

A-D Test Statistic	1.284	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.251	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.203	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.311	k star (bias corrected MLE)	1.139
Theta hat (MLE)	3.7471E-6	Theta star (bias corrected MLE)	4.3127E-6
nu hat (MLE)	49.81	nu star (bias corrected)	43.28
MLE Mean (bias corrected)	4.9122E-6	MLE Sd (bias corrected)	4.6027E-6
		Approximate Chi Square Value (0.05)	29.2
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	28.19

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.2820E-6	95% Adjusted Gamma UCL (use when n<50)	7.5430E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.203	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.39	Mean of logged Data	-12.65
Maximum of Logged Data	-10.28	SD of logged Data	0.84

Assuming Lognormal Distribution

95% H-UCL	7.3262E-6	90% Chebyshev (MVUE) UCL	7.2534E-6
95% Chebyshev (MVUE) UCL	8.5223E-6	97.5% Chebyshev (MVUE) UCL	1.0284E-5
99% Chebyshev (MVUE) UCL	1.3743E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.6573E-6	95% Jackknife UCL	7.8062E-6
95% Standard Bootstrap UCL	7.6060E-6	95% Bootstrap-t UCL	1.4668E-5
95% Hall's Bootstrap UCL	1.8569E-5	95% Percentile Bootstrap UCL	8.1515E-6
95% BCA Bootstrap UCL	9.9504E-6		
90% Chebyshev(Mean, Sd) UCL	9.9189E-6	95% Chebyshev(Mean, Sd) UCL	1.2187E-5
97.5% Chebyshev(Mean, Sd) UCL	1.5335E-5	99% Chebyshev(Mean, Sd) UCL	2.1518E-5

Suggested UCL to Use

95% H-UCL 7.3262E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	15	Number of Distinct Observations	12
Minimum	5.1408E-6	Mean	4.5564E-5
Maximum	1.0445E-4	Median	3.4763E-5
SD	3.0391E-5	Std. Error of Mean	7.8470E-6
Coefficient of Variation	N/A	Skewness	1.026

Normal GOF Test

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.9385E-5	95% Adjusted-CLT UCL (Chen-1995)	6.0692E-5
		95% Modified-t UCL (Johnson-1978)	5.9731E-5

Gamma GOF Test

A-D Test Statistic	0.552	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.224	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.363	k star (bias corrected MLE)	1.935
Theta hat (MLE)	1.9281E-5	Theta star (bias corrected MLE)	2.3548E-5
nu hat (MLE)	70.89	nu star (bias corrected)	58.05
MLE Mean (bias corrected)	4.5564E-5	MLE Sd (bias corrected)	3.2756E-5
		Approximate Chi Square Value (0.05)	41.53
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	39.82

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	6.3682E-5	95% Adjusted Gamma UCL (use when n<50)	6.6427E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.18	Mean of logged Data	-10.22
Maximum of Logged Data	-9.167	SD of logged Data	0.754

Assuming Lognormal Distribution

95% H-UCL	7.7985E-5	90% Chebyshev (MVUE) UCL	7.6415E-5
95% Chebyshev (MVUE) UCL	8.9657E-5	97.5% Chebyshev (MVUE) UCL	1.0804E-4
99% Chebyshev (MVUE) UCL	1.4414E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.8471E-5	95% Jackknife UCL	5.9385E-5
95% Standard Bootstrap UCL	5.8018E-5	95% Bootstrap-t UCL	6.3213E-5
95% Hall's Bootstrap UCL	5.9978E-5	95% Percentile Bootstrap UCL	5.8246E-5
95% BCA Bootstrap UCL	5.9305E-5		
90% Chebyshev(Mean, Sd) UCL	6.9105E-5	95% Chebyshev(Mean, Sd) UCL	7.9768E-5
97.5% Chebyshev(Mean, Sd) UCL	9.4568E-5	99% Chebyshev(Mean, Sd) UCL	1.2364E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 6.6427E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	40	Number of Distinct Observations	37
Minimum	6.9804E-6	Mean	3.0845E-5
Maximum	8.9334E-5	Median	2.8476E-5
SD	1.8873E-5	Std. Error of Mean	2.9841E-6
Coefficient of Variation	N/A	Skewness	1.396

Normal GOF Test

Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.5873E-5	95% Adjusted-CLT UCL (Chen-1995)	3.6457E-5
		95% Modified-t UCL (Johnson-1978)	3.5983E-5

Gamma GOF Test

A-D Test Statistic	0.322	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0917	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.14	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.991	k star (bias corrected MLE)	2.783
Theta hat (MLE)	1.0314E-5	Theta star (bias corrected MLE)	1.1084E-5
nu hat (MLE)	239.2	nu star (bias corrected)	222.6
MLE Mean (bias corrected)	3.0845E-5	MLE Sd (bias corrected)	1.8490E-5
		Approximate Chi Square Value (0.05)	189.1
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	187.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.6315E-5	95% Adjusted Gamma UCL (use when n<50)	3.6538E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0925	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.87	Mean of logged Data	-10.56
Maximum of Logged Data	-9.323	SD of logged Data	0.618

Assuming Lognormal Distribution

95% H-UCL	3.8227E-5	90% Chebyshev (MVUE) UCL	4.0912E-5
95% Chebyshev (MVUE) UCL	4.5343E-5	97.5% Chebyshev (MVUE) UCL	5.1493E-5
99% Chebyshev (MVUE) UCL	6.3574E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.5753E-5	95% Jackknife UCL	3.5873E-5
95% Standard Bootstrap UCL	3.5755E-5	95% Bootstrap-t UCL	3.6831E-5
95% Hall's Bootstrap UCL	3.6944E-5	95% Percentile Bootstrap UCL	3.6327E-5
95% BCA Bootstrap UCL	3.6557E-5		
90% Chebyshev(Mean, Sd) UCL	3.9797E-5	95% Chebyshev(Mean, Sd) UCL	4.3852E-5
97.5% Chebyshev(Mean, Sd) UCL	4.9481E-5	99% Chebyshev(Mean, Sd) UCL	6.0537E-5

Suggested UCL to Use

95% Student's-t UCL 3.5873E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Beryllium

General Statistics

Total Number of Observations	64	Number of Distinct Observations	35
Minimum	1.3104E-6	Mean	5.3457E-6
Maximum	1.2397E-5	Median	3.4372E-6
SD	3.0967E-6	Std. Error of Mean	3.8709E-7
Coefficient of Variation	N/A	Skewness	1.255

Normal GOF Test

Shapiro Wilk Test Statistic	0.745	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	9.881E-15	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.9919E-6	95% Adjusted-CLT UCL (Chen-1995)	6.0473E-6
		95% Modified-t UCL (Johnson-1978)	6.0020E-6

Gamma GOF Test

A-D Test Statistic	5.429	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.274	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.757	k star (bias corrected MLE)	3.591
Theta hat (MLE)	1.4228E-6	Theta star (bias corrected MLE)	1.4885E-6
nu hat (MLE)	480.9	nu star (bias corrected)	459.7
MLE Mean (bias corrected)	5.3457E-6	MLE Sd (bias corrected)	2.8208E-6
		Approximate Chi Square Value (0.05)	411
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	409.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.9793E-6	95% Adjusted Gamma UCL (use when n<50)	5.9947E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	1.7924E-9	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.55	Mean of logged Data	-12.28
Maximum of Logged Data	-11.3	SD of logged Data	0.514

Assuming Lognormal Distribution

95% H-UCL	5.9927E-6	90% Chebyshev (MVUE) UCL	6.3730E-6
95% Chebyshev (MVUE) UCL	6.8608E-6	97.5% Chebyshev (MVUE) UCL	7.5377E-6
99% Chebyshev (MVUE) UCL	8.8675E-6		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.9824E-6	95% Jackknife UCL	5.9919E-6
95% Standard Bootstrap UCL	5.9584E-6	95% Bootstrap-t UCL	6.0880E-6
95% Hall's Bootstrap UCL	6.0299E-6	95% Percentile Bootstrap UCL	5.9684E-6
95% BCA Bootstrap UCL	5.9978E-6		
90% Chebyshev(Mean, Sd) UCL	6.5070E-6	95% Chebyshev(Mean, Sd) UCL	7.0330E-6
97.5% Chebyshev(Mean, Sd) UCL	7.7631E-6	99% Chebyshev(Mean, Sd) UCL	9.1972E-6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 7.0330E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	40	Number of Distinct Observations	39
Minimum	4.9014E-6	Mean	2.7927E-5
Maximum	6.8166E-5	Median	2.5074E-5
SD	1.9175E-5	Std. Error of Mean	3.0318E-6
Coefficient of Variation	N/A	Skewness	0.73

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.3036E-5	95% Adjusted-CLT UCL (Chen-1995)	3.3288E-5
		95% Modified-t UCL (Johnson-1978)	3.3094E-5

Gamma GOF Test

A-D Test Statistic	0.508	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.141	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.042	k star (bias corrected MLE)	1.905
Theta hat (MLE)	1.3678E-5	Theta star (bias corrected MLE)	1.4658E-5
nu hat (MLE)	163.3	nu star (bias corrected)	152.4
MLE Mean (bias corrected)	2.7927E-5	MLE Sd (bias corrected)	2.0233E-5
		Approximate Chi Square Value (0.05)	124.9
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	124

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.4086E-5	95% Adjusted Gamma UCL (use when n<50)	3.4342E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.117	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.23	Mean of logged Data	-10.75
Maximum of Logged Data	-9.594	SD of logged Data	0.779

Assuming Lognormal Distribution

95% H-UCL	3.8056E-5	90% Chebyshev (MVUE) UCL	4.0530E-5
95% Chebyshev (MVUE) UCL	4.5863E-5	97.5% Chebyshev (MVUE) UCL	5.3266E-5
99% Chebyshev (MVUE) UCL	6.7806E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.2914E-5	95% Jackknife UCL	3.3036E-5
95% Standard Bootstrap UCL	3.2853E-5	95% Bootstrap-t UCL	3.3657E-5
95% Hall's Bootstrap UCL	3.3654E-5	95% Percentile Bootstrap UCL	3.2979E-5
95% BCA Bootstrap UCL	3.3319E-5		
90% Chebyshev(Mean, Sd) UCL	3.7023E-5	95% Chebyshev(Mean, Sd) UCL	4.1143E-5
97.5% Chebyshev(Mean, Sd) UCL	4.6861E-5	99% Chebyshev(Mean, Sd) UCL	5.8093E-5

Suggested UCL to Use

95% Student's-t UCL 3.3036E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium (total)

General Statistics

Total Number of Observations	58	Number of Distinct Observations	58
Minimum	5.7960E-6	Mean	7.0727E-5
Maximum	2.1546E-4	Median	5.4558E-5
SD	5.4728E-5	Std. Error of Mean	7.1861E-6
Coefficient of Variation	N/A	Skewness	0.948

Normal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	2.0340E-5	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.2743E-5	95% Adjusted-CLT UCL (Chen-1995)	8.3503E-5
		95% Modified-t UCL (Johnson-1978)	8.2892E-5

Gamma GOF Test

A-D Test Statistic	0.357	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0776	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.119	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.533	k star (bias corrected MLE)	1.465
Theta hat (MLE)	4.6133E-5	Theta star (bias corrected MLE)	4.8268E-5
nu hat (MLE)	177.8	nu star (bias corrected)	170
MLE Mean (bias corrected)	7.0727E-5	MLE Sd (bias corrected)	5.8428E-5
		Approximate Chi Square Value (0.05)	140.8
Adjusted Level of Significance	0.0459	Adjusted Chi Square Value	140.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	8.5366E-5	95% Adjusted Gamma UCL (use when n<50)	8.5777E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0122	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.09	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.116	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.06	Mean of logged Data	-9.917
Maximum of Logged Data	-8.443	SD of logged Data	0.941

Assuming Lognormal Distribution

95% H-UCL	1.0198E-4	90% Chebyshev (MVUE) UCL	1.0881E-4
95% Chebyshev (MVUE) UCL	1.2368E-4	97.5% Chebyshev (MVUE) UCL	1.4431E-4
99% Chebyshev (MVUE) UCL	1.8483E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.2547E-5	95% Jackknife UCL	8.2743E-5
95% Standard Bootstrap UCL	8.2098E-5	95% Bootstrap-t UCL	8.3680E-5
95% Hall's Bootstrap UCL	8.3365E-5	95% Percentile Bootstrap UCL	8.2936E-5
95% BCA Bootstrap UCL	8.3350E-5		
90% Chebyshev(Mean, Sd) UCL	9.2285E-5	95% Chebyshev(Mean, Sd) UCL	1.0205E-4
97.5% Chebyshev(Mean, Sd) UCL	1.1560E-4	99% Chebyshev(Mean, Sd) UCL	1.4223E-4

Suggested UCL to Use

95% Approximate Gamma UCL 8.5366E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hexavalent Chromium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	4.1580E-6	Mean	4.7880E-6
Maximum	5.2920E-6	Median	4.9140E-6
SD	5.7740E-7	Std. Error of Mean	3.3336E-7
Coefficient of Variation	N/A	Skewness	-0.935

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.7614E-6	95% Adjusted-CLT UCL (Chen-1995)	5.1440E-6
		95% Modified-t UCL (Johnson-1978)	5.7314E-6

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	100	k star (bias corrected MLE)	N/A
Theta hat (MLE)	4.7863E-8	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	600.2	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.39	Mean of logged Data	-12.25
Maximum of Logged Data	-12.15	SD of logged Data	0.124

Assuming Lognormal Distribution

95% H-UCL	6.1597E-6	90% Chebyshev (MVUE) UCL	5.8109E-6
95% Chebyshev (MVUE) UCL	6.2741E-6	97.5% Chebyshev (MVUE) UCL	6.9170E-6
99% Chebyshev (MVUE) UCL	8.1798E-6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.3363E-6	95% Jackknife UCL	5.7614E-6
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	5.7881E-6	95% Chebyshev(Mean, Sd) UCL	6.2411E-6
97.5% Chebyshev(Mean, Sd) UCL	6.8699E-6	99% Chebyshev(Mean, Sd) UCL	8.1049E-6

Suggested UCL to Use

95% Student's-t UCL	5.7614E-6	
Maximum	5.2920E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cobalt

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Minimum	1.1443E-5	Mean	1.1559E-5
Maximum	1.1616E-5	Median	1.1616E-5
SD	1.0010E-7	Std. Error of Mean	5.7793E-8
Coefficient of Variation	N/A	Skewness	-1.732

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1727E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1592E-5
		95% Modified-t UCL (Johnson-1978)	1.1718E-5

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	19933	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.799E-10	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	119598	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.38	Mean of logged Data	-11.37
Maximum of Logged Data	-11.36	SD of logged Data	0.00868

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1.1732E-5
95% Chebyshev (MVUE) UCL	1.1811E-5	97.5% Chebyshev (MVUE) UCL	1.1920E-5
99% Chebyshev (MVUE) UCL	1.2135E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1654E-5	95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1.1732E-5	95% Chebyshev(Mean, Sd) UCL	1.1811E-5
97.5% Chebyshev(Mean, Sd) UCL	1.1920E-5	99% Chebyshev(Mean, Sd) UCL	1.2134E-5

Suggested UCL to Use

95% Student's-t UCL	1.1727E-5	
Maximum	1.1616E-5	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
Minimum	2.3814E-5	Mean	9.1613E-5
Maximum	4.4730E-4	Median	5.1282E-5
SD	1.1821E-4	Std. Error of Mean	3.4124E-5
Coefficient of Variation	N/A	Skewness	2.875

Normal GOF Test

Shapiro Wilk Test Statistic	0.594	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.5290E-4	95% Adjusted-CLT UCL (Chen-1995)	1.7800E-4
		95% Modified-t UCL (Johnson-1978)	1.5762E-4

Gamma GOF Test

A-D Test Statistic	0.88	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.196	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.251	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.256	k star (bias corrected MLE)	0.997
Theta hat (MLE)	7.2959E-5	Theta star (bias corrected MLE)	9.1859E-5
nu hat (MLE)	30.14	nu star (bias corrected)	23.94
MLE Mean (bias corrected)	9.1613E-5	MLE Sd (bias corrected)	9.1736E-5
		Approximate Chi Square Value (0.05)	13.8
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	12.64

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.5890E-4	95% Adjusted Gamma UCL (use when n<50)	1.7351E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-10.65	Mean of logged Data	-9.746
Maximum of Logged Data	-7.712	SD of logged Data	0.893

Assuming Lognormal Distribution

95% H-UCL	1.8179E-4	90% Chebyshev (MVUE) UCL	1.5208E-4
95% Chebyshev (MVUE) UCL	1.8312E-4	97.5% Chebyshev (MVUE) UCL	2.2621E-4
99% Chebyshev (MVUE) UCL	3.1084E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4774E-4	95% Jackknife UCL	1.5290E-4
95% Standard Bootstrap UCL	1.4544E-4	95% Bootstrap-t UCL	2.6885E-4
95% Hall's Bootstrap UCL	3.3910E-4	95% Percentile Bootstrap UCL	1.5597E-4
95% BCA Bootstrap UCL	1.8087E-4		
90% Chebyshev(Mean, Sd) UCL	1.9399E-4	95% Chebyshev(Mean, Sd) UCL	2.4036E-4
97.5% Chebyshev(Mean, Sd) UCL	3.0472E-4	99% Chebyshev(Mean, Sd) UCL	4.3115E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 1.7351E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	40	Number of Distinct Observations	36
Minimum	2.3233E-5	Mean	4.2427E-4
Maximum	0.00135	Median	3.9060E-4
SD	3.2796E-4	Std. Error of Mean	5.1856E-5
Coefficient of Variation	0.773	Skewness	0.811

Normal GOF Test

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.1164E-4	95% Adjusted-CLT UCL (Chen-1995)	5.1667E-4
		95% Modified-t UCL (Johnson-1978)	5.1275E-4

Gamma GOF Test

A-D Test Statistic	0.755	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.151	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.143	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.278	k star (bias corrected MLE)	1.199
Theta hat (MLE)	3.3206E-4	Theta star (bias corrected MLE)	3.5399E-4
nu hat (MLE)	102.2	nu star (bias corrected)	95.88
MLE Mean (bias corrected)	4.2427E-4	MLE Sd (bias corrected)	3.8754E-4
		Approximate Chi Square Value (0.05)	74.3
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	73.59

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.4753E-4	95% Adjusted Gamma UCL (use when n<50)	5.5283E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.14	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-10.67	Mean of logged Data	-8.205
Maximum of Logged Data	-6.609	SD of logged Data	1.119

Assuming Lognormal Distribution

95% H-UCL	8.0675E-4	90% Chebyshev (MVUE) UCL	8.1568E-4
95% Chebyshev (MVUE) UCL	9.5929E-4	97.5% Chebyshev (MVUE) UCL	0.00116
99% Chebyshev (MVUE) UCL	0.00155		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.0957E-4	95% Jackknife UCL	5.1164E-4
95% Standard Bootstrap UCL	5.0800E-4	95% Bootstrap-t UCL	5.1867E-4
95% Hall's Bootstrap UCL	5.1836E-4	95% Percentile Bootstrap UCL	5.0990E-4
95% BCA Bootstrap UCL	5.2074E-4		
90% Chebyshev(Mean, Sd) UCL	5.7984E-4	95% Chebyshev(Mean, Sd) UCL	6.5030E-4
97.5% Chebyshev(Mean, Sd) UCL	7.4811E-4	99% Chebyshev(Mean, Sd) UCL	9.4023E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 5.5283E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Manganese

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	1.2978E-5	Mean	3.9816E-5
Maximum	9.2862E-5	Median	1.3608E-5
SD	4.5940E-5	Std. Error of Mean	2.6524E-5
Coefficient of Variation	N/A	Skewness	1.732

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1726E-4	95% Adjusted-CLT UCL (Chen-1995)	1.1178E-4
		95% Modified-t UCL (Johnson-1978)	1.2168E-4

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	1.253	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.1767E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	7.52	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.768	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.378	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.25	Mean of logged Data	-10.58
Maximum of Logged Data	-9.284	SD of logged Data	1.123

Assuming Lognormal Distribution

95% H-UCL	5.404	90% Chebyshev (MVUE) UCL	1.0029E-4
95% Chebyshev (MVUE) UCL	1.2884E-4	97.5% Chebyshev (MVUE) UCL	1.6847E-4
99% Chebyshev (MVUE) UCL	2.4632E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.3443E-5	95% Jackknife UCL	1.1726E-4
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1.1939E-4	95% Chebyshev(Mean, Sd) UCL	1.5543E-4
97.5% Chebyshev(Mean, Sd) UCL	2.0546E-4	99% Chebyshev(Mean, Sd) UCL	3.0372E-4

Suggested UCL to Use

95% Student's-t UCL	1.1726E-4	
Maximum	9.2862E-5	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Mercury

General Statistics

Total Number of Observations	67	Number of Distinct Observations	65
Minimum	3.9990E-5	Mean	4.2348E-4
Maximum	0.00166	Median	2.5200E-4
SD	3.8944E-4	Std. Error of Mean	4.7578E-5
Coefficient of Variation	0.92	Skewness	1.607

Normal GOF Test

Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.995E-12	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.0285E-4	95% Adjusted-CLT UCL (Chen-1995)	5.1172E-4
		95% Modified-t UCL (Johnson-1978)	5.0441E-4

Gamma GOF Test

A-D Test Statistic	0.968	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.468	k star (bias corrected MLE)	1.412
Theta hat (MLE)	2.8844E-4	Theta star (bias corrected MLE)	2.9984E-4
nu hat (MLE)	196.7	nu star (bias corrected)	189.3
MLE Mean (bias corrected)	4.2348E-4	MLE Sd (bias corrected)	3.5633E-4
		Approximate Chi Square Value (0.05)	158.4
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	157.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.0587E-4	95% Adjusted Gamma UCL (use when n<50)	5.0785E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.325	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0871	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-10.13	Mean of logged Data	-8.145
Maximum of Logged Data	-6.399	SD of logged Data	0.893

Assuming Lognormal Distribution

95% H-UCL	5.4960E-4	90% Chebyshev (MVUE) UCL	5.9077E-4
95% Chebyshev (MVUE) UCL	6.6412E-4	97.5% Chebyshev (MVUE) UCL	7.6593E-4
99% Chebyshev (MVUE) UCL	9.6592E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.0173E-4	95% Jackknife UCL	5.0285E-4
95% Standard Bootstrap UCL	5.0323E-4	95% Bootstrap-t UCL	5.1438E-4
95% Hall's Bootstrap UCL	5.0819E-4	95% Percentile Bootstrap UCL	5.0175E-4
95% BCA Bootstrap UCL	5.0903E-4		
90% Chebyshev(Mean, Sd) UCL	5.6621E-4	95% Chebyshev(Mean, Sd) UCL	6.3086E-4
97.5% Chebyshev(Mean, Sd) UCL	7.2060E-4	99% Chebyshev(Mean, Sd) UCL	8.9687E-4

Suggested UCL to Use

95% H-UCL 5.4960E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel

General Statistics

Total Number of Observations	40	Number of Distinct Observations	40
Minimum	6.5016E-6	Mean	7.6740E-5
Maximum	3.2587E-4	Median	5.4054E-5
SD	6.8951E-5	Std. Error of Mean	1.0902E-5
Coefficient of Variation	N/A	Skewness	2.113

Normal GOF Test

Shapiro Wilk Test Statistic	0.773	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.5109E-5	95% Adjusted-CLT UCL (Chen-1995)	9.8564E-5
		95% Modified-t UCL (Johnson-1978)	9.5716E-5

Gamma GOF Test

A-D Test Statistic	0.513	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.142	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.695	k star (bias corrected MLE)	1.585
Theta hat (MLE)	4.5275E-5	Theta star (bias corrected MLE)	4.8431E-5
nu hat (MLE)	135.6	nu star (bias corrected)	126.8
MLE Mean (bias corrected)	7.6740E-5	MLE Sd (bias corrected)	6.0964E-5
		Approximate Chi Square Value (0.05)	101.8
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	100.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	9.5597E-5	95% Adjusted Gamma UCL (use when n<50)	9.6392E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0815	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.94	Mean of logged Data	-9.798
Maximum of Logged Data	-8.029	SD of logged Data	0.83

Assuming Lognormal Distribution

95% H-UCL	1.0535E-4	90% Chebyshev (MVUE) UCL	1.1175E-4
95% Chebyshev (MVUE) UCL	1.2725E-4	97.5% Chebyshev (MVUE) UCL	1.4877E-4
99% Chebyshev (MVUE) UCL	1.9104E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.4673E-5	95% Jackknife UCL	9.5109E-5
95% Standard Bootstrap UCL	9.4674E-5	95% Bootstrap-t UCL	1.0237E-4
95% Hall's Bootstrap UCL	1.0464E-4	95% Percentile Bootstrap UCL	9.6539E-5
95% BCA Bootstrap UCL	9.8187E-5		
90% Chebyshev(Mean, Sd) UCL	1.0945E-4	95% Chebyshev(Mean, Sd) UCL	1.2426E-4
97.5% Chebyshev(Mean, Sd) UCL	1.4482E-4	99% Chebyshev(Mean, Sd) UCL	1.8522E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 9.6392E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
Minimum	9.2862E-6	Mean	5.3262E-5
Maximum	1.1000E-4	Median	4.0817E-5
SD	3.3007E-5	Std. Error of Mean	9.5284E-6
Coefficient of Variation	N/A	Skewness	0.803

Normal GOF Test

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.0374E-5	95% Adjusted-CLT UCL (Chen-1995)	7.1294E-5
		95% Modified-t UCL (Johnson-1978)	7.0742E-5

Gamma GOF Test

A-D Test Statistic	0.451	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.69	k star (bias corrected MLE)	2.073
Theta hat (MLE)	1.9798E-5	Theta star (bias corrected MLE)	2.5690E-5
nu hat (MLE)	64.57	nu star (bias corrected)	49.76
MLE Mean (bias corrected)	5.3262E-5	MLE Sd (bias corrected)	3.6990E-5
		Approximate Chi Square Value (0.05)	34.56
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	32.64

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.6679E-5	95% Adjusted Gamma UCL (use when n<50)	8.1199E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.59	Mean of logged Data	-10.04
Maximum of Logged Data	-9.115	SD of logged Data	0.7

Assuming Lognormal Distribution

95% H-UCL	9.2974E-5	90% Chebyshev (MVUE) UCL	8.8972E-5
95% Chebyshev (MVUE) UCL	1.0457E-4	97.5% Chebyshev (MVUE) UCL	1.2622E-4
99% Chebyshev (MVUE) UCL	1.6875E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.8935E-5	95% Jackknife UCL	7.0374E-5
95% Standard Bootstrap UCL	6.8364E-5	95% Bootstrap-t UCL	7.3461E-5
95% Hall's Bootstrap UCL	6.8624E-5	95% Percentile Bootstrap UCL	6.8893E-5
95% BCA Bootstrap UCL	7.0612E-5		
90% Chebyshev(Mean, Sd) UCL	8.1847E-5	95% Chebyshev(Mean, Sd) UCL	9.4796E-5
97.5% Chebyshev(Mean, Sd) UCL	1.1277E-4	99% Chebyshev(Mean, Sd) UCL	1.4807E-4

Suggested UCL to Use

95% Student's-t UCL	7.0374E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Minimum	2.4696E-4	Mean	3.7926E-4
Maximum	5.7960E-4	Median	3.1122E-4
SD	1.7645E-4	Std. Error of Mean	1.0187E-4
Coefficient of Variation	0.465	Skewness	1.477

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.317	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.7673E-4	95% Adjusted-CLT UCL (Chen-1995)	6.3966E-4
		95% Modified-t UCL (Johnson-1978)	6.9121E-4

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	7.567	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.0124E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	45.4	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.283	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.512	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-8.306	Mean of logged Data	-7.945
Maximum of Logged Data	-7.453	SD of logged Data	0.441

Assuming Lognormal Distribution

95% H-UCL	0.00233	90% Chebyshev (MVUE) UCL	6.5984E-4
95% Chebyshev (MVUE) UCL	7.8756E-4	97.5% Chebyshev (MVUE) UCL	9.6483E-4
99% Chebyshev (MVUE) UCL	0.00131		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.4683E-4	95% Jackknife UCL	6.7673E-4
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	6.8488E-4	95% Chebyshev(Mean, Sd) UCL	8.2331E-4
97.5% Chebyshev(Mean, Sd) UCL	0.00102	99% Chebyshev(Mean, Sd) UCL	0.00139

Suggested UCL to Use

95% Student's-t UCL	6.7673E-4	
Maximum	5.7960E-4	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Chloride

General Statistics

Total Number of Observations	38	Number of Distinct Observations	35
Minimum	0.266	Mean	0.578
Maximum	1.153	Median	0.518
SD	0.226	Std. Error of Mean	0.0366
Coefficient of Variation	0.391	Skewness	0.812

Normal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.938	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.64	95% Adjusted-CLT UCL (Chen-1995)	0.644
		95% Modified-t UCL (Johnson-1978)	0.641

Gamma GOF Test

A-D Test Statistic	0.422	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.143	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.135	k star (bias corrected MLE)	6.589
Theta hat (MLE)	0.081	Theta star (bias corrected MLE)	0.0878
nu hat (MLE)	542.2	nu star (bias corrected)	500.8
MLE Mean (bias corrected)	0.578	MLE Sd (bias corrected)	0.225
		Approximate Chi Square Value (0.05)	449.9
Adjusted Level of Significance	0.0434	Adjusted Chi Square Value	447.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.644	95% Adjusted Gamma UCL (use when n<50)	0.646

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.938	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0916	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.325	Mean of logged Data	-0.62
Maximum of Logged Data	0.142	SD of logged Data	0.384

Assuming Lognormal Distribution

95% H-UCL	0.651	90% Chebyshev (MVUE) UCL	0.689
95% Chebyshev (MVUE) UCL	0.74	97.5% Chebyshev (MVUE) UCL	0.809
99% Chebyshev (MVUE) UCL	0.947		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.638	95% Jackknife UCL	0.64
95% Standard Bootstrap UCL	0.638	95% Bootstrap-t UCL	0.645
95% Hall's Bootstrap UCL	0.641	95% Percentile Bootstrap UCL	0.638
95% BCA Bootstrap UCL	0.644		
90% Chebyshev(Mean, Sd) UCL	0.688	95% Chebyshev(Mean, Sd) UCL	0.738
97.5% Chebyshev(Mean, Sd) UCL	0.807	99% Chebyshev(Mean, Sd) UCL	0.943

Suggested UCL to Use

95% Adjusted Gamma UCL	0.646

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Hydrogen Fluoride (as Total Fluoride)

General Statistics

Total Number of Observations	36	Number of Distinct Observations	29
Minimum	0.00488	Mean	0.0103
Maximum	0.0718	Median	0.00517
SD	0.012	Std. Error of Mean	0.00201
Coefficient of Variation	1.172	Skewness	4.085

Normal GOF Test

Shapiro Wilk Test Statistic	0.484	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0137	95% Adjusted-CLT UCL (Chen-1995)	0.015
		95% Modified-t UCL (Johnson-1978)	0.0139

Gamma GOF Test

A-D Test Statistic	5.353	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.373	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.149	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.821	k star (bias corrected MLE)	1.688
Theta hat (MLE)	0.00564	Theta star (bias corrected MLE)	0.00609
nu hat (MLE)	131.1	nu star (bias corrected)	121.5
MLE Mean (bias corrected)	0.0103	MLE Sd (bias corrected)	0.00791
		Approximate Chi Square Value (0.05)	97.06
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	96.07

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0129	95% Adjusted Gamma UCL (use when n<50)	0.013

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.677	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.373	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.323	Mean of logged Data	-4.877
Maximum of Logged Data	-2.634	SD of logged Data	0.668

Assuming Lognormal Distribution

95% H-UCL	0.012	90% Chebyshev (MVUE) UCL	0.0129
95% Chebyshev (MVUE) UCL	0.0144	97.5% Chebyshev (MVUE) UCL	0.0166
99% Chebyshev (MVUE) UCL	0.0208		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0136	95% Jackknife UCL	0.0137
95% Standard Bootstrap UCL	0.0135	95% Bootstrap-t UCL	0.017
95% Hall's Bootstrap UCL	0.0264	95% Percentile Bootstrap UCL	0.0138
95% BCA Bootstrap UCL	0.0153		
90% Chebyshev(Mean, Sd) UCL	0.0163	95% Chebyshev(Mean, Sd) UCL	0.019
97.5% Chebyshev(Mean, Sd) UCL	0.0228	99% Chebyshev(Mean, Sd) UCL	0.0302

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 0.019

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sulfuric Acid

General Statistics

Total Number of Observations	36	Number of Distinct Observations	36
Minimum	0.00161	Mean	0.0329
Maximum	0.164	Median	0.00622
SD	0.0476	Std. Error of Mean	0.00794
Coefficient of Variation	1.449	Skewness	1.557

Normal GOF Test

Shapiro Wilk Test Statistic	0.669	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.35	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0463	95% Adjusted-CLT UCL (Chen-1995)	0.0481
		95% Modified-t UCL (Johnson-1978)	0.0466

Gamma GOF Test

A-D Test Statistic	3.349	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.804	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.279	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.589	k star (bias corrected MLE)	0.558
Theta hat (MLE)	0.0558	Theta star (bias corrected MLE)	0.0589
nu hat (MLE)	42.38	nu star (bias corrected)	40.19
MLE Mean (bias corrected)	0.0329	MLE Sd (bias corrected)	0.044
		Approximate Chi Square Value (0.05)	26.66
Adjusted Level of Significance	0.0428	Adjusted Chi Square Value	26.16

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0496	95% Adjusted Gamma UCL (use when n<50)	0.0505

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.43	Mean of logged Data	-4.468
Maximum of Logged Data	-1.805	SD of logged Data	1.447

Assuming Lognormal Distribution

95% H-UCL	0.067	90% Chebyshev (MVUE) UCL	0.0594
95% Chebyshev (MVUE) UCL	0.0724	97.5% Chebyshev (MVUE) UCL	0.0903
99% Chebyshev (MVUE) UCL	0.126		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0459	95% Jackknife UCL	0.0463
95% Standard Bootstrap UCL	0.0458	95% Bootstrap-t UCL	0.0503
95% Hall's Bootstrap UCL	0.0476	95% Percentile Bootstrap UCL	0.0468
95% BCA Bootstrap UCL	0.0485		
90% Chebyshev(Mean, Sd) UCL	0.0567	95% Chebyshev(Mean, Sd) UCL	0.0675
97.5% Chebyshev(Mean, Sd) UCL	0.0824	99% Chebyshev(Mean, Sd) UCL	0.112

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0675

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
Minimum	1.116E-11	Mean	7.642E-11
Maximum	6.260E-10	Median	4.040E-11
SD	1.083E-10	Std. Error of Mean	1.354E-11
Coefficient of Variation	N/A	Skewness	3.614

Normal GOF Test

Shapiro Wilk Test Statistic	0.539	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.902E-11	95% Adjusted-CLT UCL (Chen-1995)	1.052E-10
		95% Modified-t UCL (Johnson-1978)	1.000E-10

Gamma GOF Test

A-D Test Statistic	3.884	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.232	k star (bias corrected MLE)	1.185
Theta hat (MLE)	6.203E-11	Theta star (bias corrected MLE)	6.451E-11
nu hat (MLE)	157.7	nu star (bias corrected)	151.6
MLE Mean (bias corrected)	7.642E-11	MLE Sd (bias corrected)	7.021E-11
		Approximate Chi Square Value (0.05)	124.2
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	123.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.332E-11	95% Adjusted Gamma UCL (use when n<50)	9.375E-11

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	8.2349E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-25.22	Mean of logged Data	-23.75
Maximum of Logged Data	-21.19	SD of logged Data	0.844

Assuming Lognormal Distribution

95% H-UCL	8.662E-11	90% Chebyshev (MVUE) UCL	9.323E-11
95% Chebyshev (MVUE) UCL	1.044E-10	97.5% Chebyshev (MVUE) UCL	1.199E-10
99% Chebyshev (MVUE) UCL	1.505E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	9.869E-11	95% Jackknife UCL	9.902E-11
95% Standard Bootstrap UCL	9.830E-11	95% Bootstrap-t UCL	1.158E-10
95% Hall's Bootstrap UCL	1.204E-10	95% Percentile Bootstrap UCL	1.001E-10
95% BCA Bootstrap UCL	1.064E-10		
90% Chebyshev(Mean, Sd) UCL	1.170E-10	95% Chebyshev(Mean, Sd) UCL	1.354E-10
97.5% Chebyshev(Mean, Sd) UCL	1.610E-10	99% Chebyshev(Mean, Sd) UCL	2.111E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.354E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
Minimum	2.275E-11	Mean	2.047E-10
Maximum	1.9800E-9	Median	1.026E-10
SD	3.402E-10	Std. Error of Mean	4.252E-11
Coefficient of Variation	N/A	Skewness	4.136

Normal GOF Test

Shapiro Wilk Test Statistic	0.462	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.313	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.757E-10	95% Adjusted-CLT UCL (Chen-1995)	2.982E-10
		95% Modified-t UCL (Johnson-1978)	2.794E-10

Gamma GOF Test

A-D Test Statistic	4.671	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.205	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.104	k star (bias corrected MLE)	1.062
Theta hat (MLE)	1.855E-10	Theta star (bias corrected MLE)	1.927E-10
nu hat (MLE)	141.2	nu star (bias corrected)	136
MLE Mean (bias corrected)	2.047E-10	MLE Sd (bias corrected)	1.986E-10
		Approximate Chi Square Value (0.05)	110
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	109.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.530E-10	95% Adjusted Gamma UCL (use when n<50)	2.542E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	2.9316E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.51	Mean of logged Data	-22.83
Maximum of Logged Data	-20.04	SD of logged Data	0.867

Assuming Lognormal Distribution

95% H-UCL	2.248E-10	90% Chebyshev (MVUE) UCL	2.419E-10
95% Chebyshev (MVUE) UCL	2.716E-10	97.5% Chebyshev (MVUE) UCL	3.128E-10
99% Chebyshev (MVUE) UCL	3.938E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.747E-10	95% Jackknife UCL	2.757E-10
95% Standard Bootstrap UCL	2.733E-10	95% Bootstrap-t UCL	3.581E-10
95% Hall's Bootstrap UCL	3.556E-10	95% Percentile Bootstrap UCL	2.788E-10
95% BCA Bootstrap UCL	3.037E-10		
90% Chebyshev(Mean, Sd) UCL	3.323E-10	95% Chebyshev(Mean, Sd) UCL	3.901E-10
97.5% Chebyshev(Mean, Sd) UCL	4.703E-10	99% Chebyshev(Mean, Sd) UCL	6.278E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 3.901E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	1.775E-11	Mean	2.555E-10
Maximum	4.3660E-9	Median	1.185E-10
SD	5.701E-10	Std. Error of Mean	7.127E-11
Coefficient of Variation	N/A	Skewness	6.271

Normal GOF Test

Shapiro Wilk Test Statistic	0.362	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.744E-10	95% Adjusted-CLT UCL (Chen-1995)	4.324E-10
		95% Modified-t UCL (Johnson-1978)	3.838E-10

Gamma GOF Test

A-D Test Statistic	4.883	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.892	k star (bias corrected MLE)	0.861
Theta hat (MLE)	2.864E-10	Theta star (bias corrected MLE)	2.968E-10
nu hat (MLE)	114.2	nu star (bias corrected)	110.2
MLE Mean (bias corrected)	2.555E-10	MLE Sd (bias corrected)	2.754E-10
		Approximate Chi Square Value (0.05)	86.93
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	86.46

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.237E-10	95% Adjusted Gamma UCL (use when n<50)	3.255E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00555	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.75	Mean of logged Data	-22.74
Maximum of Logged Data	-19.25	SD of logged Data	0.957

Assuming Lognormal Distribution

95% H-UCL	2.741E-10	90% Chebyshev (MVUE) UCL	2.948E-10
95% Chebyshev (MVUE) UCL	3.343E-10	97.5% Chebyshev (MVUE) UCL	3.892E-10
99% Chebyshev (MVUE) UCL	4.971E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.727E-10	95% Jackknife UCL	3.744E-10
95% Standard Bootstrap UCL	3.721E-10	95% Bootstrap-t UCL	5.706E-10
95% Hall's Bootstrap UCL	7.811E-10	95% Percentile Bootstrap UCL	3.924E-10
95% BCA Bootstrap UCL	4.535E-10		
90% Chebyshev(Mean, Sd) UCL	4.693E-10	95% Chebyshev(Mean, Sd) UCL	5.661E-10
97.5% Chebyshev(Mean, Sd) UCL	7.005E-10	99% Chebyshev(Mean, Sd) UCL	9.646E-10

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 5.661E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
Minimum	5.166E-11	Mean	4.415E-10
Maximum	3.4972E-9	Median	2.591E-10
SD	5.584E-10	Std. Error of Mean	6.980E-11
Coefficient of Variation	N/A	Skewness	3.439

Normal GOF Test

Shapiro Wilk Test Statistic	0.633	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.580E-10	95% Adjusted-CLT UCL (Chen-1995)	5.884E-10
		95% Modified-t UCL (Johnson-1978)	5.630E-10

Gamma GOF Test

A-D Test Statistic	1.553	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.776	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.137	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.186	k star (bias corrected MLE)	1.141
Theta hat (MLE)	3.721E-10	Theta star (bias corrected MLE)	3.868E-10
nu hat (MLE)	151.9	nu star (bias corrected)	146.1
MLE Mean (bias corrected)	4.415E-10	MLE Sd (bias corrected)	4.133E-10
		Approximate Chi Square Value (0.05)	119.2
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	118.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.413E-10	95% Adjusted Gamma UCL (use when n<50)	5.438E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.136	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0893	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.69	Mean of logged Data	-22.02
Maximum of Logged Data	-19.47	SD of logged Data	0.948

Assuming Lognormal Distribution

95% H-UCL	5.599E-10	90% Chebyshev (MVUE) UCL	6.021E-10
95% Chebyshev (MVUE) UCL	6.822E-10	97.5% Chebyshev (MVUE) UCL	7.935E-10
99% Chebyshev (MVUE) UCL	1.0119E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.563E-10	95% Jackknife UCL	5.580E-10
95% Standard Bootstrap UCL	5.588E-10	95% Bootstrap-t UCL	6.205E-10
95% Hall's Bootstrap UCL	6.719E-10	95% Percentile Bootstrap UCL	5.610E-10
95% BCA Bootstrap UCL	6.008E-10		
90% Chebyshev(Mean, Sd) UCL	6.509E-10	95% Chebyshev(Mean, Sd) UCL	7.457E-10
97.5% Chebyshev(Mean, Sd) UCL	8.774E-10	99% Chebyshev(Mean, Sd) UCL	1.1359E-9

Suggested UCL to Use

95% H-UCL	5.599E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	1.432E-11	Mean	3.157E-10
Maximum	3.4972E-9	Median	1.790E-10
SD	5.057E-10	Std. Error of Mean	6.321E-11
Coefficient of Variation	N/A	Skewness	4.616

Normal GOF Test

Shapiro Wilk Test Statistic	0.503	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.212E-10	95% Adjusted-CLT UCL (Chen-1995)	4.586E-10
		95% Modified-t UCL (Johnson-1978)	4.273E-10

Gamma GOF Test

A-D Test Statistic	2.857	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.068	k star (bias corrected MLE)	1.028
Theta hat (MLE)	2.956E-10	Theta star (bias corrected MLE)	3.070E-10
nu hat (MLE)	136.7	nu star (bias corrected)	131.6
MLE Mean (bias corrected)	3.157E-10	MLE Sd (bias corrected)	3.113E-10
		Approximate Chi Square Value (0.05)	106.1
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	105.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.915E-10	95% Adjusted Gamma UCL (use when n<50)	3.935E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.546	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0913	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.97	Mean of logged Data	-22.41
Maximum of Logged Data	-19.47	SD of logged Data	0.953

Assuming Lognormal Distribution

95% H-UCL	3.797E-10	90% Chebyshev (MVUE) UCL	4.083E-10
95% Chebyshev (MVUE) UCL	4.628E-10	97.5% Chebyshev (MVUE) UCL	5.386E-10
99% Chebyshev (MVUE) UCL	6.873E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.196E-10	95% Jackknife UCL	4.212E-10
95% Standard Bootstrap UCL	4.202E-10	95% Bootstrap-t UCL	5.261E-10
95% Hall's Bootstrap UCL	8.011E-10	95% Percentile Bootstrap UCL	4.261E-10
95% BCA Bootstrap UCL	4.716E-10		
90% Chebyshev(Mean, Sd) UCL	5.053E-10	95% Chebyshev(Mean, Sd) UCL	5.912E-10
97.5% Chebyshev(Mean, Sd) UCL	7.104E-10	99% Chebyshev(Mean, Sd) UCL	9.446E-10

Suggested UCL to Use

95% H-UCL	3.797E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	63
Minimum	3.010E-10	Mean	3.0148E-9
Maximum	2.3020E-8	Median	1.7018E-9
SD	4.1008E-9	Std. Error of Mean	5.126E-10
Coefficient of Variation	N/A	Skewness	3.107

Normal GOF Test

Shapiro Wilk Test Statistic	0.604	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.302	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.8705E-9	95% Adjusted-CLT UCL (Chen-1995)	4.0706E-9
		95% Modified-t UCL (Johnson-1978)	3.9037E-9

Gamma GOF Test

A-D Test Statistic	2.341	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.092	k star (bias corrected MLE)	1.051
Theta hat (MLE)	2.7613E-9	Theta star (bias corrected MLE)	2.8684E-9
nu hat (MLE)	139.8	nu star (bias corrected)	134.5
MLE Mean (bias corrected)	3.0148E-9	MLE Sd (bias corrected)	2.9407E-9
		Approximate Chi Square Value (0.05)	108.7
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	108.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.7300E-9	95% Adjusted Gamma UCL (use when n<50)	3.7484E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0908	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0976	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-21.92	Mean of logged Data	-20.14
Maximum of Logged Data	-17.59	SD of logged Data	0.967

Assuming Lognormal Distribution

95% H-UCL	3.7413E-9	90% Chebyshev (MVUE) UCL	4.0231E-9
95% Chebyshev (MVUE) UCL	4.5677E-9	97.5% Chebyshev (MVUE) UCL	5.3236E-9
99% Chebyshev (MVUE) UCL	6.8083E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8580E-9	95% Jackknife UCL	3.8705E-9
95% Standard Bootstrap UCL	3.8493E-9	95% Bootstrap-t UCL	4.1892E-9
95% Hall's Bootstrap UCL	4.1130E-9	95% Percentile Bootstrap UCL	3.9632E-9
95% BCA Bootstrap UCL	4.0735E-9		
90% Chebyshev(Mean, Sd) UCL	4.5526E-9	95% Chebyshev(Mean, Sd) UCL	5.2492E-9
97.5% Chebyshev(Mean, Sd) UCL	6.2160E-9	99% Chebyshev(Mean, Sd) UCL	8.1151E-9

Suggested UCL to Use

95% H-UCL	3.7413E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDD

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
Minimum	4.670E-10	Mean	8.5166E-9
Maximum	1.4002E-7	Median	2.4600E-9
SD	1.9823E-8	Std. Error of Mean	2.4778E-9
Coefficient of Variation	N/A	Skewness	5.163

Normal GOF Test

Shapiro Wilk Test Statistic	0.42	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.346	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2653E-8	95% Adjusted-CLT UCL (Chen-1995)	1.4301E-8
		95% Modified-t UCL (Johnson-1978)	1.2920E-8

Gamma GOF Test

A-D Test Statistic	4.776	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.804	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.627	k star (bias corrected MLE)	0.608
Theta hat (MLE)	1.3586E-8	Theta star (bias corrected MLE)	1.4010E-8
nu hat (MLE)	80.24	nu star (bias corrected)	77.81
MLE Mean (bias corrected)	8.5166E-9	MLE Sd (bias corrected)	1.0923E-8
		Approximate Chi Square Value (0.05)	58.49
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	58.11

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.1330E-8	95% Adjusted Gamma UCL (use when n<50)	1.1405E-8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00207	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.109	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-21.48	Mean of logged Data	-19.56
Maximum of Logged Data	-15.78	SD of logged Data	1.221

Assuming Lognormal Distribution

95% H-UCL	9.4901E-9	90% Chebyshev (MVUE) UCL	1.0411E-8
95% Chebyshev (MVUE) UCL	1.2135E-8	97.5% Chebyshev (MVUE) UCL	1.4527E-8
99% Chebyshev (MVUE) UCL	1.9226E-8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.2592E-8	95% Jackknife UCL	1.2653E-8
95% Standard Bootstrap UCL	1.2553E-8	95% Bootstrap-t UCL	1.7754E-8
95% Hall's Bootstrap UCL	2.7091E-8	95% Percentile Bootstrap UCL	1.2694E-8
95% BCA Bootstrap UCL	1.5072E-8		
90% Chebyshev(Mean, Sd) UCL	1.5950E-8	95% Chebyshev(Mean, Sd) UCL	1.9317E-8
97.5% Chebyshev(Mean, Sd) UCL	2.3991E-8	99% Chebyshev(Mean, Sd) UCL	3.3171E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.9317E-8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,7,8-TCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	3.254E-11	Mean	3.094E-10
Maximum	4.3800E-9	Median	1.795E-10
SD	5.807E-10	Std. Error of Mean	7.258E-11
Coefficient of Variation	N/A	Skewness	5.854

Normal GOF Test

Shapiro Wilk Test Statistic	0.411	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.306E-10	95% Adjusted-CLT UCL (Chen-1995)	4.856E-10
		95% Modified-t UCL (Johnson-1978)	4.395E-10

Gamma GOF Test

A-D Test Statistic	3.404	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.051	k star (bias corrected MLE)	1.012
Theta hat (MLE)	2.944E-10	Theta star (bias corrected MLE)	3.057E-10
nu hat (MLE)	134.6	nu star (bias corrected)	129.6
MLE Mean (bias corrected)	3.094E-10	MLE Sd (bias corrected)	3.075E-10
		Approximate Chi Square Value (0.05)	104.3
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	103.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.845E-10	95% Adjusted Gamma UCL (use when n<50)	3.864E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0534	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.109	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.15	Mean of logged Data	-22.44
Maximum of Logged Data	-19.25	SD of logged Data	0.908

Assuming Lognormal Distribution

95% H-UCL	3.477E-10	90% Chebyshev (MVUE) UCL	3.739E-10
95% Chebyshev (MVUE) UCL	4.217E-10	97.5% Chebyshev (MVUE) UCL	4.882E-10
99% Chebyshev (MVUE) UCL	6.187E-10		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.288E-10	95% Jackknife UCL	4.306E-10
95% Standard Bootstrap UCL	4.285E-10	95% Bootstrap-t UCL	6.054E-10
95% Hall's Bootstrap UCL	8.621E-10	95% Percentile Bootstrap UCL	4.354E-10
95% BCA Bootstrap UCL	5.217E-10		
90% Chebyshev(Mean, Sd) UCL	5.272E-10	95% Chebyshev(Mean, Sd) UCL	6.258E-10
97.5% Chebyshev(Mean, Sd) UCL	7.627E-10	99% Chebyshev(Mean, Sd) UCL	1.0316E-9

Suggested UCL to Use

95% H-UCL	3.477E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8-PeCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	61
Minimum	3.456E-11	Mean	5.622E-10
Maximum	8.8200E-9	Median	2.540E-10
SD	1.2491E-9	Std. Error of Mean	1.561E-10
Coefficient of Variation	N/A	Skewness	5.253

Normal GOF Test

Shapiro Wilk Test Statistic	0.403	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.229E-10	95% Adjusted-CLT UCL (Chen-1995)	9.286E-10
		95% Modified-t UCL (Johnson-1978)	8.400E-10

Gamma GOF Test

A-D Test Statistic	4.441	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.792	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.755	k star (bias corrected MLE)	0.73
Theta hat (MLE)	7.443E-10	Theta star (bias corrected MLE)	7.698E-10
nu hat (MLE)	96.69	nu star (bias corrected)	93.49
MLE Mean (bias corrected)	5.622E-10	MLE Sd (bias corrected)	6.579E-10
		Approximate Chi Square Value (0.05)	72.19
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	71.76

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.281E-10	95% Adjusted Gamma UCL (use when n<50)	7.325E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0161	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.09	Mean of logged Data	-22.09
Maximum of Logged Data	-18.55	SD of logged Data	1.088

Assuming Lognormal Distribution

95% H-UCL	6.287E-10	90% Chebyshev (MVUE) UCL	6.788E-10
95% Chebyshev (MVUE) UCL	7.807E-10	97.5% Chebyshev (MVUE) UCL	9.221E-10
99% Chebyshev (MVUE) UCL	1.1998E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	8.191E-10	95% Jackknife UCL	8.229E-10
95% Standard Bootstrap UCL	8.212E-10	95% Bootstrap-t UCL	1.1382E-9
95% Hall's Bootstrap UCL	1.6109E-9	95% Percentile Bootstrap UCL	8.449E-10
95% BCA Bootstrap UCL	9.646E-10		
90% Chebyshev(Mean, Sd) UCL	1.0307E-9	95% Chebyshev(Mean, Sd) UCL	1.2428E-9
97.5% Chebyshev(Mean, Sd) UCL	1.5373E-9	99% Chebyshev(Mean, Sd) UCL	2.1158E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.2428E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,7,8-PeCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	6.240E-11	Mean	6.116E-10
Maximum	8.3700E-9	Median	3.595E-10
SD	1.1329E-9	Std. Error of Mean	1.416E-10
Coefficient of Variation	N/A	Skewness	5.643

Normal GOF Test

Shapiro Wilk Test Statistic	0.428	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.314	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.480E-10	95% Adjusted-CLT UCL (Chen-1995)	9.513E-10
		95% Modified-t UCL (Johnson-1978)	8.647E-10

Gamma GOF Test

A-D Test Statistic	2.195	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.781	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.984	k star (bias corrected MLE)	0.948
Theta hat (MLE)	6.219E-10	Theta star (bias corrected MLE)	6.453E-10
nu hat (MLE)	125.9	nu star (bias corrected)	121.3
MLE Mean (bias corrected)	6.116E-10	MLE Sd (bias corrected)	6.282E-10
		Approximate Chi Square Value (0.05)	96.89
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	96.38

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.659E-10	95% Adjusted Gamma UCL (use when n<50)	7.699E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.145	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0718	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.5	Mean of logged Data	-21.8
Maximum of Logged Data	-18.6	SD of logged Data	0.986

Assuming Lognormal Distribution

95% H-UCL	7.295E-10	90% Chebyshev (MVUE) UCL	7.845E-10
95% Chebyshev (MVUE) UCL	8.924E-10	97.5% Chebyshev (MVUE) UCL	1.0423E-9
99% Chebyshev (MVUE) UCL	1.3368E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.446E-10	95% Jackknife UCL	8.480E-10
95% Standard Bootstrap UCL	8.359E-10	95% Bootstrap-t UCL	1.2417E-9
95% Hall's Bootstrap UCL	1.8719E-9	95% Percentile Bootstrap UCL	8.713E-10
95% BCA Bootstrap UCL	9.615E-10		
90% Chebyshev(Mean, Sd) UCL	1.0365E-9	95% Chebyshev(Mean, Sd) UCL	1.2289E-9
97.5% Chebyshev(Mean, Sd) UCL	1.4960E-9	99% Chebyshev(Mean, Sd) UCL	2.0206E-9

Suggested UCL to Use

95% H-UCL 7.295E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8-HxCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	63
Minimum	5.426E-11	Mean	1.0295E-9
Maximum	2.0700E-8	Median	3.460E-10
SD	2.7733E-9	Std. Error of Mean	3.467E-10
Coefficient of Variation	N/A	Skewness	6.14

Normal GOF Test

Shapiro Wilk Test Statistic	0.342	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.363	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.6082E-9	95% Adjusted-CLT UCL (Chen-1995)	1.8840E-9
		95% Modified-t UCL (Johnson-1978)	1.6526E-9

Gamma GOF Test

A-D Test Statistic	4.8	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.802	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.644	k star (bias corrected MLE)	0.624
Theta hat (MLE)	1.5985E-9	Theta star (bias corrected MLE)	1.6492E-9
nu hat (MLE)	82.44	nu star (bias corrected)	79.9
MLE Mean (bias corrected)	1.0295E-9	MLE Sd (bias corrected)	1.3030E-9
		Approximate Chi Square Value (0.05)	60.31
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	59.92

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.3640E-9	95% Adjusted Gamma UCL (use when n<50)	1.3729E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0142	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.64	Mean of logged Data	-21.64
Maximum of Logged Data	-17.69	SD of logged Data	1.163

Assuming Lognormal Distribution

95% H-UCL	1.0897E-9	90% Chebyshev (MVUE) UCL	1.1853E-9
95% Chebyshev (MVUE) UCL	1.3735E-9	97.5% Chebyshev (MVUE) UCL	1.6349E-9
99% Chebyshev (MVUE) UCL	2.1481E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.5997E-9	95% Jackknife UCL	1.6082E-9
95% Standard Bootstrap UCL	1.5987E-9	95% Bootstrap-t UCL	2.8507E-9
95% Hall's Bootstrap UCL	3.6617E-9	95% Percentile Bootstrap UCL	1.6693E-9
95% BCA Bootstrap UCL	2.0232E-9		
90% Chebyshev(Mean, Sd) UCL	2.0695E-9	95% Chebyshev(Mean, Sd) UCL	2.5406E-9
97.5% Chebyshev(Mean, Sd) UCL	3.1944E-9	99% Chebyshev(Mean, Sd) UCL	4.4788E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.5406E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,6,7,8-HxCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	63
Minimum	4.038E-11	Mean	7.510E-10
Maximum	9.2200E-9	Median	3.225E-10
SD	1.4701E-9	Std. Error of Mean	1.838E-10
Coefficient of Variation	N/A	Skewness	4.213

Normal GOF Test

Shapiro Wilk Test Statistic	0.474	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.0578E-9	95% Adjusted-CLT UCL (Chen-1995)	1.1567E-9
		95% Modified-t UCL (Johnson-1978)	1.0739E-9

Gamma GOF Test

A-D Test Statistic	3.527	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.794	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.209	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.736	k star (bias corrected MLE)	0.712
Theta hat (MLE)	1.0204E-9	Theta star (bias corrected MLE)	1.0549E-9
nu hat (MLE)	94.2	nu star (bias corrected)	91.12
MLE Mean (bias corrected)	7.510E-10	MLE Sd (bias corrected)	8.901E-10
		Approximate Chi Square Value (0.05)	70.11
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	69.69

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.761E-10	95% Adjusted Gamma UCL (use when n<50)	9.820E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0203	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0986	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.93	Mean of logged Data	-21.83
Maximum of Logged Data	-18.5	SD of logged Data	1.158

Assuming Lognormal Distribution

95% H-UCL	9.034E-10	90% Chebyshev (MVUE) UCL	9.820E-10
95% Chebyshev (MVUE) UCL	1.1375E-9	97.5% Chebyshev (MVUE) UCL	1.3533E-9
99% Chebyshev (MVUE) UCL	1.7772E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0533E-9	95% Jackknife UCL	1.0578E-9
95% Standard Bootstrap UCL	1.0525E-9	95% Bootstrap-t UCL	1.3557E-9
95% Hall's Bootstrap UCL	2.5222E-9	95% Percentile Bootstrap UCL	1.0620E-9
95% BCA Bootstrap UCL	1.1887E-9		
90% Chebyshev(Mean, Sd) UCL	1.3023E-9	95% Chebyshev(Mean, Sd) UCL	1.5520E-9
97.5% Chebyshev(Mean, Sd) UCL	1.8986E-9	99% Chebyshev(Mean, Sd) UCL	2.5794E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.5520E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,3,4,6,7,8-HxCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	63
Minimum	4.810E-11	Mean	7.515E-10
Maximum	5.4500E-9	Median	3.460E-10
SD	1.1431E-9	Std. Error of Mean	1.429E-10
Coefficient of Variation	N/A	Skewness	2.795

Normal GOF Test

Shapiro Wilk Test Statistic	0.583	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.900E-10	95% Adjusted-CLT UCL (Chen-1995)	1.0399E-9
		95% Modified-t UCL (Johnson-1978)	9.984E-10

Gamma GOF Test

A-D Test Statistic	3.157	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.786	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.87	k star (bias corrected MLE)	0.84
Theta hat (MLE)	8.634E-10	Theta star (bias corrected MLE)	8.946E-10
nu hat (MLE)	111.4	nu star (bias corrected)	107.5
MLE Mean (bias corrected)	7.515E-10	MLE Sd (bias corrected)	8.199E-10
		Approximate Chi Square Value (0.05)	84.59
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	84.12

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.552E-10	95% Adjusted Gamma UCL (use when n<50)	9.605E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0399	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0912	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.76	Mean of logged Data	-21.68
Maximum of Logged Data	-19.03	SD of logged Data	1.089

Assuming Lognormal Distribution

95% H-UCL	9.464E-10	90% Chebyshev (MVUE) UCL	1.0220E-9
95% Chebyshev (MVUE) UCL	1.1755E-9	97.5% Chebyshev (MVUE) UCL	1.3886E-9
99% Chebyshev (MVUE) UCL	1.8072E-9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.865E-10	95% Jackknife UCL	9.900E-10
95% Standard Bootstrap UCL	9.845E-10	95% Bootstrap-t UCL	1.1070E-9
95% Hall's Bootstrap UCL	1.0333E-9	95% Percentile Bootstrap UCL	1.0053E-9
95% BCA Bootstrap UCL	1.0322E-9		
90% Chebyshev(Mean, Sd) UCL	1.1802E-9	95% Chebyshev(Mean, Sd) UCL	1.3744E-9
97.5% Chebyshev(Mean, Sd) UCL	1.6439E-9	99% Chebyshev(Mean, Sd) UCL	2.1733E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1.3744E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,7,8,9-HxCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	4.576E-12	Mean	2.809E-10
Maximum	3.1800E-9	Median	7.747E-11
SD	6.140E-10	Std. Error of Mean	7.676E-11
Coefficient of Variation	N/A	Skewness	3.29

Normal GOF Test

Shapiro Wilk Test Statistic	0.474	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.392	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.090E-10	95% Adjusted-CLT UCL (Chen-1995)	4.409E-10
		95% Modified-t UCL (Johnson-1978)	4.143E-10

Gamma GOF Test

A-D Test Statistic	4.939	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.816	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.247	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.506	k star (bias corrected MLE)	0.493
Theta hat (MLE)	5.552E-10	Theta star (bias corrected MLE)	5.702E-10
nu hat (MLE)	64.76	nu star (bias corrected)	63.06
MLE Mean (bias corrected)	2.809E-10	MLE Sd (bias corrected)	4.002E-10
		Approximate Chi Square Value (0.05)	45.79
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	45.45

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.868E-10	95% Adjusted Gamma UCL (use when n<50)	3.897E-10

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0131	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-26.11	Mean of logged Data	-23.25
Maximum of Logged Data	-19.57	SD of logged Data	1.474

Assuming Lognormal Distribution

95% H-UCL	3.725E-10	90% Chebyshev (MVUE) UCL	4.002E-10
95% Chebyshev (MVUE) UCL	4.774E-10	97.5% Chebyshev (MVUE) UCL	5.846E-10
99% Chebyshev (MVUE) UCL	7.951E-10		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.072E-10	95% Jackknife UCL	4.090E-10
95% Standard Bootstrap UCL	4.078E-10	95% Bootstrap-t UCL	4.798E-10
95% Hall's Bootstrap UCL	4.412E-10	95% Percentile Bootstrap UCL	4.097E-10
95% BCA Bootstrap UCL	4.428E-10		
90% Chebyshev(Mean, Sd) UCL	5.112E-10	95% Chebyshev(Mean, Sd) UCL	6.155E-10
97.5% Chebyshev(Mean, Sd) UCL	7.602E-10	99% Chebyshev(Mean, Sd) UCL	1.0446E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 6.155E-10

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,6,7,8-HpCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	1.100E-10	Mean	2.7213E-9
Maximum	3.3300E-8	Median	9.105E-10
SD	5.5953E-9	Std. Error of Mean	6.994E-10
Coefficient of Variation	N/A	Skewness	3.77

Normal GOF Test

Shapiro Wilk Test Statistic	0.488	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.35	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.8889E-9	95% Adjusted-CLT UCL (Chen-1995)	4.2240E-9
		95% Modified-t UCL (Johnson-1978)	3.9439E-9

Gamma GOF Test

A-D Test Statistic	4.311	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.805	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.616	k star (bias corrected MLE)	0.597
Theta hat (MLE)	4.4210E-9	Theta star (bias corrected MLE)	4.5575E-9
nu hat (MLE)	78.79	nu star (bias corrected)	76.43
MLE Mean (bias corrected)	2.7213E-9	MLE Sd (bias corrected)	3.5217E-9
		Approximate Chi Square Value (0.05)	57.29
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	56.91

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.6303E-9	95% Adjusted Gamma UCL (use when n<50)	3.6546E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.00817	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-22.93	Mean of logged Data	-20.72
Maximum of Logged Data	-17.22	SD of logged Data	1.284

Assuming Lognormal Distribution

95% H-UCL	3.2684E-9	90% Chebyshev (MVUE) UCL	3.6039E-9
95% Chebyshev (MVUE) UCL	4.2260E-9	97.5% Chebyshev (MVUE) UCL	5.0894E-9
99% Chebyshev (MVUE) UCL	6.7855E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8717E-9	95% Jackknife UCL	3.8889E-9
95% Standard Bootstrap UCL	3.8672E-9	95% Bootstrap-t UCL	4.7671E-9
95% Hall's Bootstrap UCL	4.6076E-9	95% Percentile Bootstrap UCL	3.9481E-9
95% BCA Bootstrap UCL	4.3335E-9		
90% Chebyshev(Mean, Sd) UCL	4.8195E-9	95% Chebyshev(Mean, Sd) UCL	5.7700E-9
97.5% Chebyshev(Mean, Sd) UCL	7.0891E-9	99% Chebyshev(Mean, Sd) UCL	9.6804E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 5.7700E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,3,4,7,8,9-HpCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
Minimum	1.459E-11	Mean	8.336E-10
Maximum	2.2900E-8	Median	1.365E-10
SD	2.9762E-9	Std. Error of Mean	3.720E-10
Coefficient of Variation	N/A	Skewness	6.763

Normal GOF Test

Shapiro Wilk Test Statistic	0.287	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.392	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.4546E-9	95% Adjusted-CLT UCL (Chen-1995)	1.7815E-9
		95% Modified-t UCL (Johnson-1978)	1.5070E-9

Gamma GOF Test

A-D Test Statistic	6.832	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.836	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.119	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.419	k star (bias corrected MLE)	0.41
Theta hat (MLE)	1.9882E-9	Theta star (bias corrected MLE)	2.0330E-9
nu hat (MLE)	53.66	nu star (bias corrected)	52.48
MLE Mean (bias corrected)	8.336E-10	MLE Sd (bias corrected)	1.3018E-9
		Approximate Chi Square Value (0.05)	36.84
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	36.54

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.1874E-9	95% Adjusted Gamma UCL (use when n<50)	1.1972E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0016	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-24.95	Mean of logged Data	-22.46
Maximum of Logged Data	-17.59	SD of logged Data	1.471

Assuming Lognormal Distribution

95% H-UCL	8.109E-10	90% Chebyshev (MVUE) UCL	8.718E-10
95% Chebyshev (MVUE) UCL	1.0398E-9	97.5% Chebyshev (MVUE) UCL	1.2730E-9
99% Chebyshev (MVUE) UCL	1.7310E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4455E-9	95% Jackknife UCL	1.4546E-9
95% Standard Bootstrap UCL	1.4361E-9	95% Bootstrap-t UCL	2.7768E-9
95% Hall's Bootstrap UCL	3.4057E-9	95% Percentile Bootstrap UCL	1.4957E-9
95% BCA Bootstrap UCL	2.0733E-9		
90% Chebyshev(Mean, Sd) UCL	1.9496E-9	95% Chebyshev(Mean, Sd) UCL	2.4552E-9
97.5% Chebyshev(Mean, Sd) UCL	3.1568E-9	99% Chebyshev(Mean, Sd) UCL	4.5351E-9

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.4552E-9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

OCDF

General Statistics

Total Number of Observations	64	Number of Distinct Observations	63
Minimum	4.860E-11	Mean	5.8724E-9
Maximum	2.3600E-7	Median	4.655E-10
SD	2.9757E-8	Std. Error of Mean	3.7196E-9
Coefficient of Variation	N/A	Skewness	7.59

Normal GOF Test

Shapiro Wilk Test Statistic	0.205	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2082E-8	95% Adjusted-CLT UCL (Chen-1995)	1.5761E-8
		95% Modified-t UCL (Johnson-1978)	1.2670E-8

Gamma GOF Test

A-D Test Statistic	8.95	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.866	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.29	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.121	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.297	k star (bias corrected MLE)	0.294
Theta hat (MLE)	1.9765E-8	Theta star (bias corrected MLE)	2.0001E-8
nu hat (MLE)	38.03	nu star (bias corrected)	37.58
MLE Mean (bias corrected)	5.8724E-9	MLE Sd (bias corrected)	1.0838E-8
		Approximate Chi Square Value (0.05)	24.54
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	24.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.9913E-9	95% Adjusted Gamma UCL (use when n<50)	9.0812E-9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	5.0432E-5	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.111	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-23.75	Mean of logged Data	-21.28
Maximum of Logged Data	-15.26	SD of logged Data	1.679

Assuming Lognormal Distribution

95% H-UCL	4.1288E-9	90% Chebyshev (MVUE) UCL	4.2198E-9
95% Chebyshev (MVUE) UCL	5.1187E-9	97.5% Chebyshev (MVUE) UCL	6.3663E-9
99% Chebyshev (MVUE) UCL	8.8170E-9		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1991E-8	95% Jackknife UCL	1.2082E-8
95% Standard Bootstrap UCL	1.1981E-8	95% Bootstrap-t UCL	3.8480E-8
95% Hall's Bootstrap UCL	3.1825E-8	95% Percentile Bootstrap UCL	1.3486E-8
95% BCA Bootstrap UCL	1.9279E-8		
90% Chebyshev(Mean, Sd) UCL	1.7031E-8	95% Chebyshev(Mean, Sd) UCL	2.2086E-8
97.5% Chebyshev(Mean, Sd) UCL	2.9101E-8	99% Chebyshev(Mean, Sd) UCL	4.2882E-8

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.2086E-8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total PCBs

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	9.2106E-7	Mean	8.5999E-5
Maximum	3.8430E-4	Median	1.5876E-5
SD	1.3440E-4	Std. Error of Mean	3.4703E-5
Coefficient of Variation	N/A	Skewness	1.57

Normal GOF Test

Shapiro Wilk Test Statistic	0.671	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.4712E-4	95% Adjusted-CLT UCL (Chen-1995)	1.5811E-4
		95% Modified-t UCL (Johnson-1978)	1.4947E-4

Gamma GOF Test

A-D Test Statistic	0.82	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.821	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.225	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.366	k star (bias corrected MLE)	0.337
Theta hat (MLE)	2.3491E-4	Theta star (bias corrected MLE)	2.5495E-4
nu hat (MLE)	10.98	nu star (bias corrected)	10.12
MLE Mean (bias corrected)	8.5999E-5	MLE Sd (bias corrected)	1.4807E-4
		Approximate Chi Square Value (0.05)	4.017
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	3.555

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.1667E-4	95% Adjusted Gamma UCL (use when n<50)	2.4477E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.9	Mean of logged Data	-11.18
Maximum of Logged Data	-7.864	SD of logged Data	2.339

Assuming Lognormal Distribution

95% H-UCL	0.00564	90% Chebyshev (MVUE) UCL	4.0236E-4
95% Chebyshev (MVUE) UCL	5.2490E-4	97.5% Chebyshev (MVUE) UCL	6.9498E-4
99% Chebyshev (MVUE) UCL	0.00103		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4308E-4	95% Jackknife UCL	1.4712E-4
95% Standard Bootstrap UCL	1.4006E-4	95% Bootstrap-t UCL	1.7246E-4
95% Hall's Bootstrap UCL	1.3364E-4	95% Percentile Bootstrap UCL	1.4699E-4
95% BCA Bootstrap UCL	1.5739E-4		
90% Chebyshev(Mean, Sd) UCL	1.9011E-4	95% Chebyshev(Mean, Sd) UCL	2.3727E-4
97.5% Chebyshev(Mean, Sd) UCL	3.0272E-4	99% Chebyshev(Mean, Sd) UCL	4.3129E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 2.4477E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	3.2000E-8	Mean	1.1976E-5
Maximum	1.2083E-4	Median	3.4200E-7
SD	3.0680E-5	Std. Error of Mean	7.9216E-6
Coefficient of Variation	N/A	Skewness	3.639

Normal GOF Test

Shapiro Wilk Test Statistic	0.426	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.389	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.5928E-5	95% Adjusted-CLT UCL (Chen-1995)	3.2958E-5
		95% Modified-t UCL (Johnson-1978)	2.7169E-5

Gamma GOF Test

A-D Test Statistic	0.988	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.846	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.244	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.241	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.278	k star (bias corrected MLE)	0.266
Theta hat (MLE)	4.3149E-5	Theta star (bias corrected MLE)	4.4941E-5
nu hat (MLE)	8.326	nu star (bias corrected)	7.994
MLE Mean (bias corrected)	1.1976E-5	MLE Sd (bias corrected)	2.3199E-5
		Approximate Chi Square Value (0.05)	2.732
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	2.367

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.5047E-5	95% Adjusted Gamma UCL (use when n<50)	4.0442E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.26	Mean of logged Data	-13.85
Maximum of Logged Data	-9.021	SD of logged Data	2.565

Assuming Lognormal Distribution

95% H-UCL	0.00128	90% Chebyshev (MVUE) UCL	4.4062E-5
95% Chebyshev (MVUE) UCL	5.7803E-5	97.5% Chebyshev (MVUE) UCL	7.6875E-5
99% Chebyshev (MVUE) UCL	1.1434E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.5006E-5	95% Jackknife UCL	2.5928E-5
95% Standard Bootstrap UCL	2.4856E-5	95% Bootstrap-t UCL	7.2661E-5
95% Hall's Bootstrap UCL	7.0183E-5	95% Percentile Bootstrap UCL	2.7182E-5
95% BCA Bootstrap UCL	3.4875E-5		
90% Chebyshev(Mean, Sd) UCL	3.5741E-5	95% Chebyshev(Mean, Sd) UCL	4.6505E-5
97.5% Chebyshev(Mean, Sd) UCL	6.1446E-5	99% Chebyshev(Mean, Sd) UCL	9.0795E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 9.0795E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	2.6700E-8	Mean	2.9213E-6
Maximum	8.2656E-6	Median	1.8600E-7
SD	3.3876E-6	Std. Error of Mean	8.7467E-7
Coefficient of Variation	N/A	Skewness	0.504

Normal GOF Test

Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.4619E-6	95% Adjusted-CLT UCL (Chen-1995)	4.4817E-6
		95% Modified-t UCL (Johnson-1978)	4.4809E-6

Gamma GOF Test

A-D Test Statistic	1.324	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.812	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.284	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.237	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.412	k star (bias corrected MLE)	0.374
Theta hat (MLE)	7.0862E-6	Theta star (bias corrected MLE)	7.8058E-6
nu hat (MLE)	12.37	nu star (bias corrected)	11.23
MLE Mean (bias corrected)	2.9213E-6	MLE Sd (bias corrected)	4.7753E-6
		Approximate Chi Square Value (0.05)	4.723
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	4.215

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.9450E-6	95% Adjusted Gamma UCL (use when n<50)	7.7821E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.44	Mean of logged Data	-14.33
Maximum of Logged Data	-11.7	SD of logged Data	2.265

Assuming Lognormal Distribution

95% H-UCL	1.6875E-4	90% Chebyshev (MVUE) UCL	1.4962E-5
95% Chebyshev (MVUE) UCL	1.9477E-5	97.5% Chebyshev (MVUE) UCL	2.5744E-5
99% Chebyshev (MVUE) UCL	3.8055E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.3600E-6	95% Jackknife UCL	4.4619E-6
95% Standard Bootstrap UCL	4.3234E-6	95% Bootstrap-t UCL	4.5582E-6
95% Hall's Bootstrap UCL	4.2016E-6	95% Percentile Bootstrap UCL	4.3270E-6
95% BCA Bootstrap UCL	4.4373E-6		
90% Chebyshev(Mean, Sd) UCL	5.5453E-6	95% Chebyshev(Mean, Sd) UCL	6.7339E-6
97.5% Chebyshev(Mean, Sd) UCL	8.3836E-6	99% Chebyshev(Mean, Sd) UCL	1.1624E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.1624E-5	
95% Chebyshev(Mean, Sd) UCL	6.7339E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Anthracene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	4.1300E-8	Mean	3.0330E-6
Maximum	1.1126E-5	Median	2.0500E-7
SD	4.0990E-6	Std. Error of Mean	1.0584E-6
Coefficient of Variation	N/A	Skewness	1.037

Normal GOF Test

Shapiro Wilk Test Statistic	0.74	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.8971E-6	95% Adjusted-CLT UCL (Chen-1995)	5.0766E-6
		95% Modified-t UCL (Johnson-1978)	4.9444E-6

Gamma GOF Test

A-D Test Statistic	1.385	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.816	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.326	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.237	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.394	k star (bias corrected MLE)	0.36
Theta hat (MLE)	7.6962E-6	Theta star (bias corrected MLE)	8.4316E-6
nu hat (MLE)	11.82	nu star (bias corrected)	10.79
MLE Mean (bias corrected)	3.0330E-6	MLE Sd (bias corrected)	5.0570E-6
		Approximate Chi Square Value (0.05)	4.442
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	3.953

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.3680E-6	95% Adjusted Gamma UCL (use when n<50)	8.2811E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.272	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17	Mean of logged Data	-14.38
Maximum of Logged Data	-11.41	SD of logged Data	2.163

Assuming Lognormal Distribution

95% H-UCL	9.9430E-5	90% Chebyshev (MVUE) UCL	1.1713E-5
95% Chebyshev (MVUE) UCL	1.5200E-5	97.5% Chebyshev (MVUE) UCL	2.0039E-5
99% Chebyshev (MVUE) UCL	2.9545E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.7739E-6	95% Jackknife UCL	4.8971E-6
95% Standard Bootstrap UCL	4.7268E-6	95% Bootstrap-t UCL	5.2678E-6
95% Hall's Bootstrap UCL	4.8690E-6	95% Percentile Bootstrap UCL	4.6926E-6
95% BCA Bootstrap UCL	5.0401E-6		
90% Chebyshev(Mean, Sd) UCL	6.2081E-6	95% Chebyshev(Mean, Sd) UCL	7.6463E-6
97.5% Chebyshev(Mean, Sd) UCL	9.6425E-6	99% Chebyshev(Mean, Sd) UCL	1.3564E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.3564E-5	
95% Chebyshev(Mean, Sd) UCL	7.6463E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)anthracene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
Minimum	2.7200E-8	Mean	1.7081E-6
Maximum	6.0228E-6	Median	7.9660E-8
SD	2.4263E-6	Std. Error of Mean	5.7189E-7
Coefficient of Variation	N/A	Skewness	0.842

Normal GOF Test

Shapiro Wilk Test Statistic	0.661	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.412	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.7030E-6	95% Adjusted-CLT UCL (Chen-1995)	2.7702E-6
		95% Modified-t UCL (Johnson-1978)	2.7219E-6

Gamma GOF Test

A-D Test Statistic	2.509	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.834	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.367	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.22	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.34	k star (bias corrected MLE)	0.321
Theta hat (MLE)	5.0191E-6	Theta star (bias corrected MLE)	5.3272E-6
nu hat (MLE)	12.25	nu star (bias corrected)	11.54
MLE Mean (bias corrected)	1.7081E-6	MLE Sd (bias corrected)	3.0166E-6
		Approximate Chi Square Value (0.05)	4.928
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	4.519

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.0014E-6	95% Adjusted Gamma UCL (use when n<50)	4.3636E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.743	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.42	Mean of logged Data	-15.26
Maximum of Logged Data	-12.02	SD of logged Data	2.259

Assuming Lognormal Distribution

95% H-UCL	4.1386E-5	90% Chebyshev (MVUE) UCL	6.0010E-6
95% Chebyshev (MVUE) UCL	7.7873E-6	97.5% Chebyshev (MVUE) UCL	1.0267E-5
99% Chebyshev (MVUE) UCL	1.5137E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.6488E-6	95% Jackknife UCL	2.7030E-6
95% Standard Bootstrap UCL	2.6383E-6	95% Bootstrap-t UCL	2.9052E-6
95% Hall's Bootstrap UCL	2.5449E-6	95% Percentile Bootstrap UCL	2.6003E-6
95% BCA Bootstrap UCL	2.6381E-6		
90% Chebyshev(Mean, Sd) UCL	3.4238E-6	95% Chebyshev(Mean, Sd) UCL	4.2010E-6
97.5% Chebyshev(Mean, Sd) UCL	5.2796E-6	99% Chebyshev(Mean, Sd) UCL	7.3984E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	7.3984E-6	
95% Chebyshev(Mean, Sd) UCL	4.2010E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
Minimum	3.6900E-8	Mean	1.7031E-6
Maximum	6.6276E-6	Median	8.3286E-8
SD	2.4726E-6	Std. Error of Mean	5.8279E-7
Coefficient of Variation	N/A	Skewness	1.076

Normal GOF Test

Shapiro Wilk Test Statistic	0.69	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.387	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.7169E-6	95% Adjusted-CLT UCL (Chen-1995)	2.8197E-6
		95% Modified-t UCL (Johnson-1978)	2.7416E-6

Gamma GOF Test

A-D Test Statistic	2.175	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.826	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.378	k star (bias corrected MLE)	0.352
Theta hat (MLE)	4.5039E-6	Theta star (bias corrected MLE)	4.8363E-6
nu hat (MLE)	13.61	nu star (bias corrected)	12.68
MLE Mean (bias corrected)	1.7031E-6	MLE Sd (bias corrected)	2.8699E-6
		Approximate Chi Square Value (0.05)	5.676
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	5.232

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.8036E-6	95% Adjusted Gamma UCL (use when n<50)	4.1266E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.12	Mean of logged Data	-15.04
Maximum of Logged Data	-11.92	SD of logged Data	2.08

Assuming Lognormal Distribution

95% H-UCL	2.4307E-5	90% Chebyshev (MVUE) UCL	5.2724E-6
95% Chebyshev (MVUE) UCL	6.7987E-6	97.5% Chebyshev (MVUE) UCL	8.9171E-6
99% Chebyshev (MVUE) UCL	1.3078E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.6617E-6	95% Jackknife UCL	2.7169E-6
95% Standard Bootstrap UCL	2.6362E-6	95% Bootstrap-t UCL	2.9195E-6
95% Hall's Bootstrap UCL	2.5834E-6	95% Percentile Bootstrap UCL	2.6212E-6
95% BCA Bootstrap UCL	2.7614E-6		
90% Chebyshev(Mean, Sd) UCL	3.4514E-6	95% Chebyshev(Mean, Sd) UCL	4.2434E-6
97.5% Chebyshev(Mean, Sd) UCL	5.3426E-6	99% Chebyshev(Mean, Sd) UCL	7.5018E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 7.5018E-6

95% Chebyshev(Mean, Sd) UCL 4.2434E-6 Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
Minimum	5.9700E-8	Mean	1.7193E-6
Maximum	6.2748E-6	Median	3.1259E-7
SD	2.1856E-6	Std. Error of Mean	5.1515E-7
Coefficient of Variation	N/A	Skewness	1.115

Normal GOF Test

Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.6155E-6	95% Adjusted-CLT UCL (Chen-1995)	2.7113E-6
		95% Modified-t UCL (Johnson-1978)	2.6380E-6

Gamma GOF Test

A-D Test Statistic	1.15	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.798	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.247	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.215	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.519	k star (bias corrected MLE)	0.47
Theta hat (MLE)	3.3097E-6	Theta star (bias corrected MLE)	3.6586E-6
nu hat (MLE)	18.7	nu star (bias corrected)	16.92
MLE Mean (bias corrected)	1.7193E-6	MLE Sd (bias corrected)	2.5080E-6
		Approximate Chi Square Value (0.05)	8.613
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	8.049

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.3769E-6	95% Adjusted Gamma UCL (use when n<50)	3.6139E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.63	Mean of logged Data	-14.49
Maximum of Logged Data	-11.98	SD of logged Data	1.791

Assuming Lognormal Distribution

95% H-UCL	1.4027E-5	90% Chebyshev (MVUE) UCL	5.2689E-6
95% Chebyshev (MVUE) UCL	6.7072E-6	97.5% Chebyshev (MVUE) UCL	8.7035E-6
99% Chebyshev (MVUE) UCL	1.2625E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.5667E-6	95% Jackknife UCL	2.6155E-6
95% Standard Bootstrap UCL	2.5560E-6	95% Bootstrap-t UCL	2.8671E-6
95% Hall's Bootstrap UCL	2.5550E-6	95% Percentile Bootstrap UCL	2.5920E-6
95% BCA Bootstrap UCL	2.6725E-6		
90% Chebyshev(Mean, Sd) UCL	3.2648E-6	95% Chebyshev(Mean, Sd) UCL	3.9648E-6
97.5% Chebyshev(Mean, Sd) UCL	4.9364E-6	99% Chebyshev(Mean, Sd) UCL	6.8450E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	6.8450E-6	
95% Chebyshev(Mean, Sd) UCL	3.9648E-6	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	4.9700E-7	Mean	2.7661E-6
Maximum	7.8498E-6	Median	1.3500E-6
SD	2.6165E-6	Std. Error of Mean	6.7557E-7
Coefficient of Variation	N/A	Skewness	1.018

Normal GOF Test

Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.9560E-6	95% Adjusted-CLT UCL (Chen-1995)	4.0671E-6
		95% Modified-t UCL (Johnson-1978)	3.9856E-6

Gamma GOF Test

A-D Test Statistic	0.645	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.237	k star (bias corrected MLE)	1.034
Theta hat (MLE)	2.2357E-6	Theta star (bias corrected MLE)	2.6746E-6
nu hat (MLE)	37.12	nu star (bias corrected)	31.03
MLE Mean (bias corrected)	2.7661E-6	MLE Sd (bias corrected)	2.7199E-6
		Approximate Chi Square Value (0.05)	19.3
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	18.17

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	4.4464E-6	95% Adjusted Gamma UCL (use when n<50)	4.7236E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.51	Mean of logged Data	-13.25
Maximum of Logged Data	-11.76	SD of logged Data	1.012

Assuming Lognormal Distribution

95% H-UCL	6.1818E-6	90% Chebyshev (MVUE) UCL	5.1859E-6
95% Chebyshev (MVUE) UCL	6.2706E-6	97.5% Chebyshev (MVUE) UCL	7.7761E-6
99% Chebyshev (MVUE) UCL	1.0733E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8773E-6	95% Jackknife UCL	3.9560E-6
95% Standard Bootstrap UCL	3.8366E-6	95% Bootstrap-t UCL	4.2348E-6
95% Hall's Bootstrap UCL	3.8708E-6	95% Percentile Bootstrap UCL	3.8729E-6
95% BCA Bootstrap UCL	4.0049E-6		
90% Chebyshev(Mean, Sd) UCL	4.7928E-6	95% Chebyshev(Mean, Sd) UCL	5.7108E-6
97.5% Chebyshev(Mean, Sd) UCL	6.9850E-6	99% Chebyshev(Mean, Sd) UCL	9.4879E-6

Suggested UCL to Use

95% Adjusted Gamma UCL	4.7236E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
Minimum	1.2800E-8	Mean	3.1575E-6
Maximum	1.3104E-5	Median	1.6814E-6
SD	3.8336E-6	Std. Error of Mean	9.0359E-7
Coefficient of Variation	N/A	Skewness	1.122

Normal GOF Test

Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.7294E-6	95% Adjusted-CLT UCL (Chen-1995)	4.8990E-6
		95% Modified-t UCL (Johnson-1978)	4.7692E-6

Gamma GOF Test

A-D Test Statistic	1.661	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.837	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.285	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.22	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.325	k star (bias corrected MLE)	0.308
Theta hat (MLE)	9.7113E-6	Theta star (bias corrected MLE)	1.0252E-5
nu hat (MLE)	11.7	nu star (bias corrected)	11.09
MLE Mean (bias corrected)	3.1575E-6	MLE Sd (bias corrected)	5.6895E-6
		Approximate Chi Square Value (0.05)	4.632
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	4.238

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7.5575E-6	95% Adjusted Gamma UCL (use when n<50)	8.2608E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.783	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.277	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.17	Mean of logged Data	-14.76
Maximum of Logged Data	-11.24	SD of logged Data	2.811

Assuming Lognormal Distribution

95% H-UCL	0.00107	90% Chebyshev (MVUE) UCL	3.2066E-5
95% Chebyshev (MVUE) UCL	4.2192E-5	97.5% Chebyshev (MVUE) UCL	5.6248E-5
99% Chebyshev (MVUE) UCL	8.3857E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.6438E-6	95% Jackknife UCL	4.7294E-6
95% Standard Bootstrap UCL	4.6094E-6	95% Bootstrap-t UCL	5.1393E-6
95% Hall's Bootstrap UCL	5.1170E-6	95% Percentile Bootstrap UCL	4.5733E-6
95% BCA Bootstrap UCL	4.9073E-6		
90% Chebyshev(Mean, Sd) UCL	5.8683E-6	95% Chebyshev(Mean, Sd) UCL	7.0961E-6
97.5% Chebyshev(Mean, Sd) UCL	8.8004E-6	99% Chebyshev(Mean, Sd) UCL	1.2148E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 1.2148E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chrysene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
Minimum	5.1000E-8	Mean	2.8421E-5
Maximum	2.2554E-4	Median	1.1670E-6
SD	6.5012E-5	Std. Error of Mean	1.5324E-5
Coefficient of Variation	N/A	Skewness	2.447

Normal GOF Test

Shapiro Wilk Test Statistic	0.505	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.465	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.5078E-5	95% Adjusted-CLT UCL (Chen-1995)	6.3072E-5
		95% Modified-t UCL (Johnson-1978)	5.6552E-5

Gamma GOF Test

A-D Test Statistic	1.663	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.878	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.272	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.225	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.224	k star (bias corrected MLE)	0.223
Theta hat (MLE)	1.2711E-4	Theta star (bias corrected MLE)	1.2724E-4
nu hat (MLE)	8.049	nu star (bias corrected)	8.041
MLE Mean (bias corrected)	2.8421E-5	MLE Sd (bias corrected)	6.0137E-5
		Approximate Chi Square Value (0.05)	2.759
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	2.47

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.2839E-5	95% Adjusted Gamma UCL (use when n<50)	9.2521E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.79	Mean of logged Data	-13.7
Maximum of Logged Data	-8.397	SD of logged Data	2.946

Assuming Lognormal Distribution

95% H-UCL	0.00659	90% Chebyshev (MVUE) UCL	1.2463E-4
95% Chebyshev (MVUE) UCL	1.6438E-4	97.5% Chebyshev (MVUE) UCL	2.1956E-4
99% Chebyshev (MVUE) UCL	3.2795E-4		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.3626E-5	95% Jackknife UCL	5.5078E-5
95% Standard Bootstrap UCL	5.2462E-5	95% Bootstrap-t UCL	9.6294E-5
95% Hall's Bootstrap UCL	6.1743E-5	95% Percentile Bootstrap UCL	5.4039E-5
95% BCA Bootstrap UCL	6.5489E-5		
90% Chebyshev(Mean, Sd) UCL	7.4392E-5	95% Chebyshev(Mean, Sd) UCL	9.5215E-5
97.5% Chebyshev(Mean, Sd) UCL	1.2412E-4	99% Chebyshev(Mean, Sd) UCL	1.8089E-4

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 1.8089E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
Minimum	1.3900E-8	Mean	1.9158E-6
Maximum	7.9380E-6	Median	5.2499E-8
SD	2.8934E-6	Std. Error of Mean	6.8197E-7
Coefficient of Variation	N/A	Skewness	1.165

Normal GOF Test

Shapiro Wilk Test Statistic	0.678	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.1021E-6	95% Adjusted-CLT UCL (Chen-1995)	3.2376E-6
		95% Modified-t UCL (Johnson-1978)	3.1333E-6

Gamma GOF Test

A-D Test Statistic	2.8	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.838	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.418	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.22	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.319	k star (bias corrected MLE)	0.303
Theta hat (MLE)	6.0097E-6	Theta star (bias corrected MLE)	6.3292E-6
nu hat (MLE)	11.48	nu star (bias corrected)	10.9
MLE Mean (bias corrected)	1.9158E-6	MLE Sd (bias corrected)	3.4821E-6
		Approximate Chi Square Value (0.05)	4.51
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	4.121

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.6291E-6	95% Adjusted Gamma UCL (use when n<50)	5.0651E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.705	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.396	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-18.09	Mean of logged Data	-15.31
Maximum of Logged Data	-11.74	SD of logged Data	2.34

Assuming Lognormal Distribution

95% H-UCL	5.7193E-5	90% Chebyshev (MVUE) UCL	6.7883E-6
95% Chebyshev (MVUE) UCL	8.8313E-6	97.5% Chebyshev (MVUE) UCL	1.1667E-5
99% Chebyshev (MVUE) UCL	1.7237E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3.0375E-6	95% Jackknife UCL	3.1021E-6
95% Standard Bootstrap UCL	3.0099E-6	95% Bootstrap-t UCL	3.3728E-6
95% Hall's Bootstrap UCL	2.9635E-6	95% Percentile Bootstrap UCL	3.0935E-6
95% BCA Bootstrap UCL	3.1694E-6		
90% Chebyshev(Mean, Sd) UCL	3.9617E-6	95% Chebyshev(Mean, Sd) UCL	4.8884E-6
97.5% Chebyshev(Mean, Sd) UCL	6.1747E-6	99% Chebyshev(Mean, Sd) UCL	8.7013E-6

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 8.7013E-6

95% Chebyshev(Mean, Sd) UCL 4.8884E-6 Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets
Montgomery County RRF
Dickerson, MD

User Selected Options

Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluoranthene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	5.4400E-7	Mean	3.1490E-6
Maximum	8.7822E-6	Median	1.5600E-6
SD	2.9204E-6	Std. Error of Mean	7.5405E-7
Coefficient of Variation	N/A	Skewness	0.93

Normal GOF Test

Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.4771E-6	95% Adjusted-CLT UCL (Chen-1995)	4.5827E-6
		95% Modified-t UCL (Johnson-1978)	4.5073E-6

Gamma GOF Test

A-D Test Statistic	0.79	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.274	k star (bias corrected MLE)	1.063
Theta hat (MLE)	2.4726E-6	Theta star (bias corrected MLE)	2.9616E-6
nu hat (MLE)	38.21	nu star (bias corrected)	31.9
MLE Mean (bias corrected)	3.1490E-6	MLE Sd (bias corrected)	3.0539E-6
		Approximate Chi Square Value (0.05)	19.99
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	18.84

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.0245E-6	95% Adjusted Gamma UCL (use when n<50)	5.3326E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.42	Mean of logged Data	-13.11
Maximum of Logged Data	-11.64	SD of logged Data	0.991

Assuming Lognormal Distribution

95% H-UCL	6.8243E-6	90% Chebyshev (MVUE) UCL	5.8171E-6
95% Chebyshev (MVUE) UCL	7.0186E-6	97.5% Chebyshev (MVUE) UCL	8.6863E-6
99% Chebyshev (MVUE) UCL	1.1962E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.3893E-6	95% Jackknife UCL	4.4771E-6
95% Standard Bootstrap UCL	4.3443E-6	95% Bootstrap-t UCL	4.9210E-6
95% Hall's Bootstrap UCL	4.3798E-6	95% Percentile Bootstrap UCL	4.3767E-6
95% BCA Bootstrap UCL	4.4908E-6		
90% Chebyshev(Mean, Sd) UCL	5.4111E-6	95% Chebyshev(Mean, Sd) UCL	6.4358E-6
97.5% Chebyshev(Mean, Sd) UCL	7.8580E-6	99% Chebyshev(Mean, Sd) UCL	1.0652E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 5.3326E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluorene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	2.7600E-7	Mean	4.6609E-6
Maximum	1.3356E-5	Median	7.9700E-7
SD	5.2071E-6	Std. Error of Mean	1.3445E-6
Coefficient of Variation	N/A	Skewness	0.602

Normal GOF Test

Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.0290E-6	95% Adjusted-CLT UCL (Chen-1995)	7.0956E-6
		95% Modified-t UCL (Johnson-1978)	7.0638E-6

Gamma GOF Test

A-D Test Statistic	1.392	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.782	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.278	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.232	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.649	k star (bias corrected MLE)	0.563
Theta hat (MLE)	7.1841E-6	Theta star (bias corrected MLE)	8.2718E-6
nu hat (MLE)	19.46	nu star (bias corrected)	16.9
MLE Mean (bias corrected)	4.6609E-6	MLE Sd (bias corrected)	6.2092E-6
		Approximate Chi Square Value (0.05)	8.604
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	7.883

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.1575E-6	95% Adjusted Gamma UCL (use when n<50)	9.9944E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.242	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.1	Mean of logged Data	-13.22
Maximum of Logged Data	-11.22	SD of logged Data	1.547

Assuming Lognormal Distribution

95% H-UCL	2.7718E-5	90% Chebyshev (MVUE) UCL	1.2300E-5
95% Chebyshev (MVUE) UCL	1.5521E-5	97.5% Chebyshev (MVUE) UCL	1.9991E-5
99% Chebyshev (MVUE) UCL	2.8773E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6.8724E-6	95% Jackknife UCL	7.0290E-6
95% Standard Bootstrap UCL	6.8282E-6	95% Bootstrap-t UCL	7.3532E-6
95% Hall's Bootstrap UCL	6.6641E-6	95% Percentile Bootstrap UCL	6.8497E-6
95% BCA Bootstrap UCL	6.8512E-6		
90% Chebyshev(Mean, Sd) UCL	8.6944E-6	95% Chebyshev(Mean, Sd) UCL	1.0521E-5
97.5% Chebyshev(Mean, Sd) UCL	1.3057E-5	99% Chebyshev(Mean, Sd) UCL	1.8038E-5

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	1.8038E-5	
95% Chebyshev(Mean, Sd) UCL	1.0521E-5	Used as alternate value

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
Minimum	8.2600E-8	Mean	1.8972E-6
Maximum	7.4970E-6	Median	4.6886E-7
SD	2.5423E-6	Std. Error of Mean	5.9923E-7
Coefficient of Variation	N/A	Skewness	1.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.733	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.9396E-6	95% Adjusted-CLT UCL (Chen-1995)	3.0899E-6
		95% Modified-t UCL (Johnson-1978)	2.9719E-6

Gamma GOF Test

A-D Test Statistic	0.985	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.563	k star (bias corrected MLE)	0.506
Theta hat (MLE)	3.3721E-6	Theta star (bias corrected MLE)	3.7502E-6
nu hat (MLE)	20.25	nu star (bias corrected)	18.21
MLE Mean (bias corrected)	1.8972E-6	MLE Sd (bias corrected)	2.6674E-6
		Approximate Chi Square Value (0.05)	9.544
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	8.945

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.6201E-6	95% Adjusted Gamma UCL (use when n<50)	3.8624E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.209	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.31	Mean of logged Data	-14.28
Maximum of Logged Data	-11.8	SD of logged Data	1.645

Assuming Lognormal Distribution

95% H-UCL	1.0531E-5	90% Chebyshev (MVUE) UCL	4.9707E-6
95% Chebyshev (MVUE) UCL	6.2774E-6	97.5% Chebyshev (MVUE) UCL	8.0910E-6
99% Chebyshev (MVUE) UCL	1.1654E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.8828E-6	95% Jackknife UCL	2.9396E-6
95% Standard Bootstrap UCL	2.8667E-6	95% Bootstrap-t UCL	3.3893E-6
95% Hall's Bootstrap UCL	2.8783E-6	95% Percentile Bootstrap UCL	2.9601E-6
95% BCA Bootstrap UCL	3.0383E-6		
90% Chebyshev(Mean, Sd) UCL	3.6948E-6	95% Chebyshev(Mean, Sd) UCL	4.5091E-6
97.5% Chebyshev(Mean, Sd) UCL	5.6393E-6	99% Chebyshev(Mean, Sd) UCL	7.8594E-6

Suggested UCL to Use

95% Adjusted Gamma UCL	3.8624E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2-Methylnaphthalene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	4.4100E-7	Mean	9.1818E-6
Maximum	5.3000E-5	Median	7.0800E-6
SD	1.2869E-5	Std. Error of Mean	3.3228E-6
Coefficient of Variation	N/A	Skewness	3.14

Normal GOF Test

Shapiro Wilk Test Statistic	0.59	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.5034E-5	95% Adjusted-CLT UCL (Chen-1995)	1.7526E-5
		95% Modified-t UCL (Johnson-1978)	1.5483E-5

Gamma GOF Test

A-D Test Statistic	0.578	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.817	k star (bias corrected MLE)	0.698
Theta hat (MLE)	1.1235E-5	Theta star (bias corrected MLE)	1.3149E-5
nu hat (MLE)	24.52	nu star (bias corrected)	20.95
MLE Mean (bias corrected)	9.1818E-6	MLE Sd (bias corrected)	1.0988E-5
		Approximate Chi Square Value (0.05)	11.55
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	10.7

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.6649E-5	95% Adjusted Gamma UCL (use when n<50)	1.7973E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.63	Mean of logged Data	-12.32
Maximum of Logged Data	-9.845	SD of logged Data	1.359

Assuming Lognormal Distribution

95% H-UCL	3.7861E-5	90% Chebyshev (MVUE) UCL	2.2133E-5
95% Chebyshev (MVUE) UCL	2.7581E-5	97.5% Chebyshev (MVUE) UCL	3.5142E-5
99% Chebyshev (MVUE) UCL	4.9995E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.4647E-5	95% Jackknife UCL	1.5034E-5
95% Standard Bootstrap UCL	1.4469E-5	95% Bootstrap-t UCL	2.2837E-5
95% Hall's Bootstrap UCL	3.6307E-5	95% Percentile Bootstrap UCL	1.5288E-5
95% BCA Bootstrap UCL	1.8710E-5		
90% Chebyshev(Mean, Sd) UCL	1.9150E-5	95% Chebyshev(Mean, Sd) UCL	2.3666E-5
97.5% Chebyshev(Mean, Sd) UCL	2.9933E-5	99% Chebyshev(Mean, Sd) UCL	4.2243E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 1.7973E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Naphthathalene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	5.0200E-6	Mean	2.7686E-5
Maximum	8.1018E-5	Median	1.7200E-5
SD	2.6237E-5	Std. Error of Mean	6.7743E-6
Coefficient of Variation	N/A	Skewness	1.116

Normal GOF Test

Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.9618E-5	95% Adjusted-CLT UCL (Chen-1995)	4.0916E-5
		95% Modified-t UCL (Johnson-1978)	3.9944E-5

Gamma GOF Test

A-D Test Statistic	0.674	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.223	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.268	k star (bias corrected MLE)	1.059
Theta hat (MLE)	2.1834E-5	Theta star (bias corrected MLE)	2.6146E-5
nu hat (MLE)	38.04	nu star (bias corrected)	31.77
MLE Mean (bias corrected)	2.7686E-5	MLE Sd (bias corrected)	2.6905E-5
		Approximate Chi Square Value (0.05)	19.89
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	18.74

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.4225E-5	95% Adjusted Gamma UCL (use when n<50)	4.6943E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.2	Mean of logged Data	-10.94
Maximum of Logged Data	-9.421	SD of logged Data	0.995

Assuming Lognormal Distribution

95% H-UCL	6.0348E-5	90% Chebyshev (MVUE) UCL	5.1298E-5
95% Chebyshev (MVUE) UCL	6.1918E-5	97.5% Chebyshev (MVUE) UCL	7.6658E-5
99% Chebyshev (MVUE) UCL	1.0561E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.8829E-5	95% Jackknife UCL	3.9618E-5
95% Standard Bootstrap UCL	3.8302E-5	95% Bootstrap-t UCL	4.3582E-5
95% Hall's Bootstrap UCL	3.8888E-5	95% Percentile Bootstrap UCL	3.8609E-5
95% BCA Bootstrap UCL	4.0606E-5		
90% Chebyshev(Mean, Sd) UCL	4.8009E-5	95% Chebyshev(Mean, Sd) UCL	5.7215E-5
97.5% Chebyshev(Mean, Sd) UCL	6.9992E-5	99% Chebyshev(Mean, Sd) UCL	9.5090E-5

Suggested UCL to Use

95% Student's-t UCL	3.9618E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Phenanthrene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	6.1500E-7	Mean	4.8292E-6
Maximum	1.5120E-5	Median	2.3600E-6
SD	4.2366E-6	Std. Error of Mean	1.0939E-6
Coefficient of Variation	N/A	Skewness	1.267

Normal GOF Test

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.7559E-6	95% Adjusted-CLT UCL (Chen-1995)	7.0110E-6
		95% Modified-t UCL (Johnson-1978)	6.8156E-6

Gamma GOF Test

A-D Test Statistic	0.449	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.222	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.226	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.491	k star (bias corrected MLE)	1.237
Theta hat (MLE)	3.2385E-6	Theta star (bias corrected MLE)	3.9027E-6
nu hat (MLE)	44.74	nu star (bias corrected)	37.12
MLE Mean (bias corrected)	4.8292E-6	MLE Sd (bias corrected)	4.3413E-6
		Approximate Chi Square Value (0.05)	24.17
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	22.89

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	7.4159E-6	95% Adjusted Gamma UCL (use when n<50)	7.8311E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.3	Mean of logged Data	-12.61
Maximum of Logged Data	-11.1	SD of logged Data	0.924

Assuming Lognormal Distribution

95% H-UCL	9.7555E-6	90% Chebyshev (MVUE) UCL	8.7214E-6
95% Chebyshev (MVUE) UCL	1.0446E-5	97.5% Chebyshev (MVUE) UCL	1.2840E-5
99% Chebyshev (MVUE) UCL	1.7542E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.6285E-6	95% Jackknife UCL	6.7559E-6
95% Standard Bootstrap UCL	6.5919E-6	95% Bootstrap-t UCL	7.6698E-6
95% Hall's Bootstrap UCL	7.1539E-6	95% Percentile Bootstrap UCL	6.5841E-6
95% BCA Bootstrap UCL	6.9044E-6		
90% Chebyshev(Mean, Sd) UCL	8.1109E-6	95% Chebyshev(Mean, Sd) UCL	9.5974E-6
97.5% Chebyshev(Mean, Sd) UCL	1.1661E-5	99% Chebyshev(Mean, Sd) UCL	1.5713E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 7.8311E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix B-3. UCL Statistics for Uncensored Full Data Sets

Montgomery County RRF

Dickerson, MD

User Selected Options	
Date/Time of Computation	9/25/2013 5:22:51 PM
From File	Unit 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pyrene

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Minimum	8.7100E-7	Mean	3.2728E-6
Maximum	6.3504E-6	Median	3.4100E-6
SD	2.1744E-6	Std. Error of Mean	5.6143E-7
Coefficient of Variation	N/A	Skewness	0.164

Normal GOF Test

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.2616E-6	95% Adjusted-CLT UCL (Chen-1995)	4.2216E-6
		95% Modified-t UCL (Johnson-1978)	4.2656E-6

Gamma GOF Test

A-D Test Statistic	0.933	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.224	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.004	k star (bias corrected MLE)	1.648
Theta hat (MLE)	1.6329E-6	Theta star (bias corrected MLE)	1.9861E-6
nu hat (MLE)	60.13	nu star (bias corrected)	49.43
MLE Mean (bias corrected)	3.2728E-6	MLE Sd (bias corrected)	2.5495E-6
		Approximate Chi Square Value (0.05)	34.29
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	32.74

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.7179E-6	95% Adjusted Gamma UCL (use when n<50)	4.9410E-6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.95	Mean of logged Data	-12.9
Maximum of Logged Data	-11.97	SD of logged Data	0.809

Assuming Lognormal Distribution

95% H-UCL	5.8977E-6	90% Chebyshev (MVUE) UCL	5.6320E-6
95% Chebyshev (MVUE) UCL	6.6550E-6	97.5% Chebyshev (MVUE) UCL	8.0750E-6
99% Chebyshev (MVUE) UCL	1.0864E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.1962E-6	95% Jackknife UCL	4.2616E-6
95% Standard Bootstrap UCL	4.1732E-6	95% Bootstrap-t UCL	4.3219E-6
95% Hall's Bootstrap UCL	4.1074E-6	95% Percentile Bootstrap UCL	4.1911E-6
95% BCA Bootstrap UCL	4.2043E-6		
90% Chebyshev(Mean, Sd) UCL	4.9571E-6	95% Chebyshev(Mean, Sd) UCL	5.7200E-6
97.5% Chebyshev(Mean, Sd) UCL	6.7789E-6	99% Chebyshev(Mean, Sd) UCL	8.8589E-6

Suggested UCL to Use

95% Student's-t UCL 4.2616E-6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

APPENDIX C

FUGITIVE EMISSION IMPACTS

Appendix C
Fugitive Emission Impacts
Montgomery County RRF
Dickerson, MD

		Maximum			1-hr Maximum	Potomac River (avg)			Potomac River Watershed(avg)			Farm 02		
		Cyp	Dyp	Dywp	Chp	Cyp	Dyp	Dywp	Cyp	Dyp	Dywp	Cyp	Dyp	Dywp
	Q (g/s)	0.007742385	0.4750104	0.1968979	9.347094801	0.341717	0.012471	0.000658	2.42370713	0.1280221	0.004604	2.655749	0.135905	0.008129
Metals														
Arsenic	1.60E-08	1.24E-10	7.60E-09	3.15E-09	1.50E-07	5.47E-09	2.00E-10	1.05E-11	3.88E-08	2.05E-09	7.37E-11	4.25E-08	2.18E-09	1.30E-10
Beryllium	2.51E-09	1.95E-11	1.19E-09	4.95E-10	2.35E-08	8.59E-10	3.14E-11	1.66E-12	6.09E-09	3.22E-10	1.16E-11	6.68E-09	3.42E-10	2.04E-11
Cadmium	2.14E-08	1.66E-10	1.02E-08	4.21E-09	2.00E-07	7.31E-09	2.67E-10	1.41E-11	5.19E-08	2.74E-09	9.85E-11	5.68E-08	2.91E-09	1.74E-10
Chromium +3	1.71E-08	1.33E-10	8.13E-09	3.37E-09	1.60E-07	5.85E-09	2.13E-10	1.13E-11	4.15E-08	2.19E-09	7.88E-11	4.55E-08	2.33E-09	1.39E-10
Chromium +6	8.77E-09	6.79E-11	4.16E-09	1.73E-09	8.19E-08	3.00E-09	1.09E-10	5.77E-12	2.12E-08	1.12E-09	4.04E-11	2.33E-08	1.19E-09	7.13E-11
Total Chromium (b)	2.59E-08	2.00E-10	1.23E-08	5.10E-09	2.42E-07	8.84E-09	3.23E-10	1.70E-11	6.27E-08	3.31E-09	1.19E-10	6.87E-08	3.52E-09	2.10E-10
Cobalt	4.41E-09	3.42E-11	2.10E-09	8.68E-10	4.12E-08	1.51E-09	5.50E-11	2.90E-12	1.07E-08	5.65E-10	2.03E-11	1.17E-08	5.99E-10	3.59E-11
Copper	2.71E-08	2.10E-10	1.29E-08	5.34E-09	2.54E-07	9.27E-09	3.38E-10	1.79E-11	6.58E-08	3.47E-09	1.25E-10	7.21E-08	3.69E-09	2.21E-10
Lead	2.40E-07	1.86E-09	1.14E-07	4.72E-08	2.24E-06	8.20E-08	2.99E-09	1.58E-10	5.81E-07	3.07E-08	1.10E-09	6.37E-07	3.26E-08	1.95E-09
Manganese	3.77E-08	2.92E-10	1.79E-08	7.41E-09	3.52E-07	1.29E-08	4.70E-10	2.48E-11	9.13E-08	4.82E-09	1.73E-10	1.00E-07	5.12E-09	3.06E-10
Nickel	3.29E-08	2.55E-10	1.56E-08	6.48E-09	3.08E-07	1.12E-08	4.10E-10	2.17E-11	7.98E-08	4.21E-09	1.52E-10	8.74E-08	4.47E-09	2.68E-10
Selenium	2.37E-08	1.83E-10	1.12E-08	4.66E-09	2.21E-07	8.09E-09	2.95E-10	1.56E-11	5.74E-08	3.03E-09	1.09E-10	6.29E-08	3.22E-09	1.92E-10
Zinc	3.92E-07	3.03E-09	1.86E-07	7.72E-08	3.66E-06	1.34E-07	4.89E-09	2.58E-10	9.50E-07	5.02E-08	1.80E-09	1.04E-06	5.33E-08	3.19E-09
PAHs														
Dibenzo(a,h)anthracene	2.40E-09	1.86E-11	1.14E-09	4.72E-10	2.24E-08	8.20E-10	2.99E-11	1.58E-12	5.82E-09	3.07E-10	1.10E-11	6.37E-09	3.26E-10	1.95E-11
Indeno(1,2,3-cd)pyrene	1.82E-09	1.41E-11	8.64E-10	3.58E-10	1.70E-08	6.21E-10	2.27E-11	1.20E-12	4.41E-09	2.33E-10	8.37E-12	4.83E-09	2.47E-10	1.48E-11

* Note: These locations selected based on
the STACK1 (main RRF stack) impacts.

Appendix C
Fugitive Emission Impacts
Montgomery County RRF
Dickerson, MD

		MEI A			MEI B			Secondary Max	Monocacy River (avg)			Monocacy River Watershed(avg)		
		Cyp	Dyp	Dywp	Cyp	Dyp	Dywp	Cyp	Cyp	Dyp	Dywp	Cyp	Dyp	Dywp
	Q (g/s)	9.477248	0.47501	0.035568	61.56269	4.141737	0.196898	6.248012232	0.251717	0.010146	0.000441	0.137258	0.004327	0.000212
Metals														
Arsenic	1.60E-08	1.52E-07	7.60E-09	5.69E-10	9.85E-07	6.63E-08	3.15E-09	1.00E-07	4.03E-09	1.62E-10	7.06E-12	2.20E-09	6.93E-11	3.40E-12
Beryllium	2.51E-09	2.38E-08	1.19E-09	8.94E-11	1.55E-07	1.04E-08	4.95E-10	1.57E-08	6.33E-10	2.55E-11	1.11E-12	3.45E-10	1.09E-11	5.34E-13
Cadmium	2.14E-08	2.03E-07	1.02E-08	7.61E-10	1.32E-06	8.86E-08	4.21E-09	1.34E-07	5.39E-09	2.17E-10	9.44E-12	2.94E-09	9.26E-11	4.55E-12
Chromium +3	1.71E-08	1.62E-07	8.13E-09	6.09E-10	1.05E-06	7.09E-08	3.37E-09	1.07E-07	4.31E-09	1.74E-10	7.55E-12	2.35E-09	7.41E-11	3.64E-12
Chromium +6	8.77E-09	8.31E-08	4.16E-09	3.12E-10	5.40E-07	3.63E-08	1.73E-09	5.48E-08	2.21E-09	8.89E-11	3.87E-12	1.20E-09	3.79E-11	1.86E-12
Total Chromium (b)	2.59E-08	2.45E-07	1.23E-08	9.21E-10	1.59E-06	1.07E-07	5.10E-09	1.62E-07	6.51E-09	2.63E-10	1.14E-11	3.55E-09	1.12E-10	5.50E-12
Cobalt	4.41E-09	4.18E-08	2.10E-09	1.57E-10	2.72E-07	1.83E-08	8.68E-10	2.76E-08	1.11E-09	4.48E-11	1.95E-12	6.05E-10	1.91E-11	9.37E-13
Copper	2.71E-08	2.57E-07	1.29E-08	9.65E-10	1.67E-06	1.12E-07	5.34E-09	1.70E-07	6.83E-09	2.75E-10	1.20E-11	3.73E-09	1.17E-10	5.77E-12
Lead	2.40E-07	2.27E-06	1.14E-07	8.53E-09	1.48E-05	9.93E-07	4.72E-08	1.50E-06	6.04E-08	2.43E-09	1.06E-10	3.29E-08	1.04E-09	5.10E-11
Manganese	3.77E-08	3.57E-07	1.79E-08	1.34E-09	2.32E-06	1.56E-07	7.41E-09	2.35E-07	9.48E-09	3.82E-10	1.66E-11	5.17E-09	1.63E-10	8.00E-12
Nickel	3.29E-08	3.12E-07	1.56E-08	1.17E-09	2.03E-06	1.36E-07	6.48E-09	2.06E-07	8.28E-09	3.34E-10	1.45E-11	4.52E-09	1.42E-10	6.99E-12
Selenium	2.37E-08	2.24E-07	1.12E-08	8.42E-10	1.46E-06	9.80E-08	4.66E-09	1.48E-07	5.96E-09	2.40E-10	1.04E-11	3.25E-09	1.02E-10	5.03E-12
Zinc	3.92E-07	3.71E-06	1.86E-07	1.39E-08	2.41E-05	1.62E-06	7.72E-08	2.45E-06	9.87E-08	3.98E-09	1.73E-10	5.38E-08	1.70E-09	8.33E-11
PAHs														
Dibenzo(a,h)anthracene	2.40E-09	2.27E-08	1.14E-09	8.53E-11	1.48E-07	9.94E-09	4.72E-10	1.50E-08	6.04E-10	2.43E-11	1.06E-12	3.29E-10	1.04E-11	5.10E-13
Indeno(1,2,3-cd)pyrene	1.82E-09	1.72E-08	8.64E-10	6.47E-11	1.12E-07	7.53E-09	3.58E-10	1.14E-08	4.58E-10	1.84E-11	8.02E-13	2.50E-10	7.87E-12	3.86E-13

* Note: These locations selected based on
the STACK1 (main RRF stack) impacts.

Appendix C
Fugitive Emission Impacts
Montgomery County RRF
Dickerson, MD

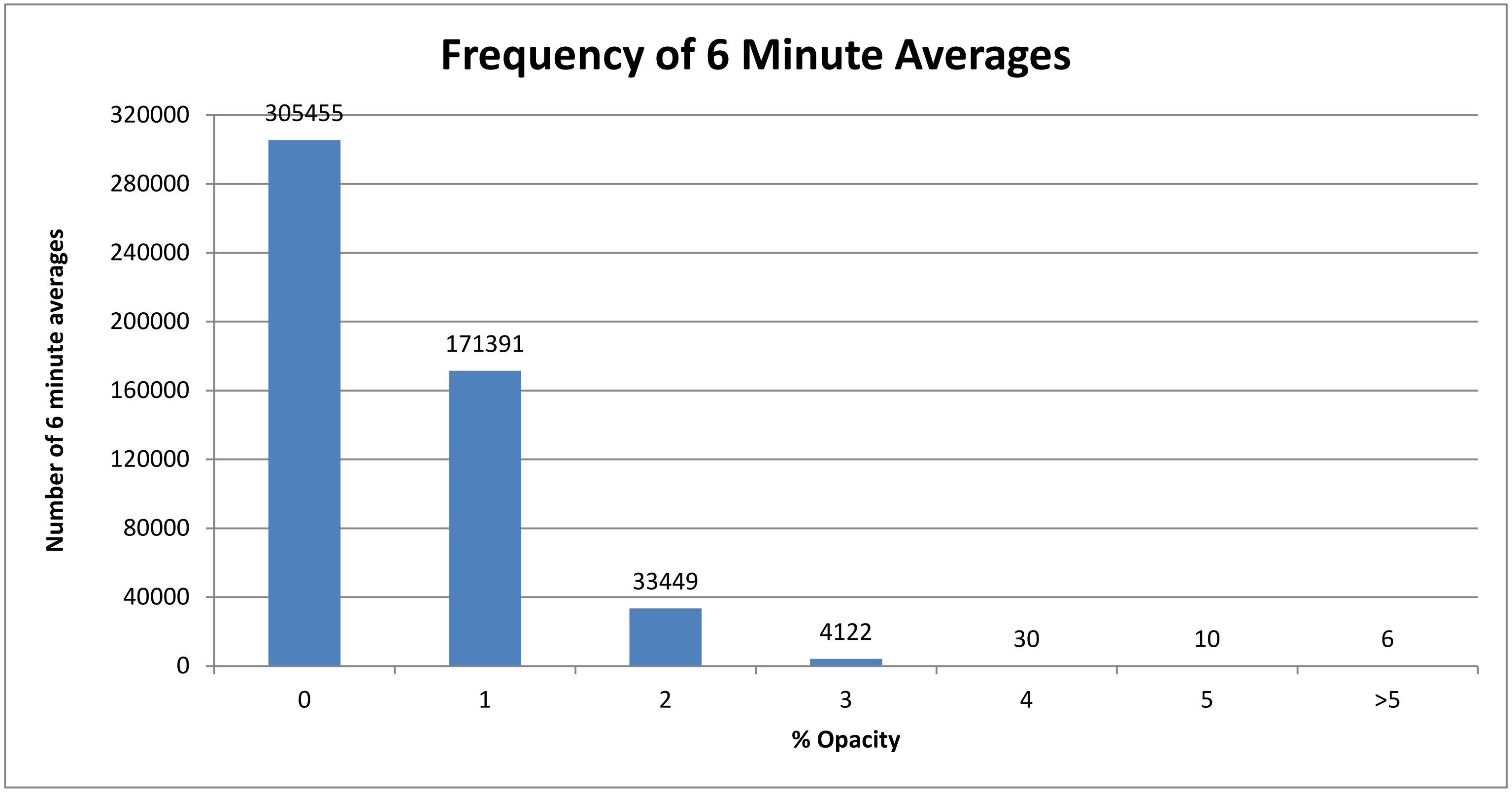
		Pond 02			Farm 01			Pond 03			Farm 06		
		Cyp	Dyp	Dywp	Cyp	Dyp	Dywp	Cyp	Dyp	Dywp	Cyp	Dyp	Dywp
	Q (g/s)	3.311456	0.117096	0.004506	3.240232	0.122958	0.004193	0.75543119	0.02758263	0.00154618	0.324623	0.015296	0.000937
Metals													
Arsenic	1.60E-08	5.30E-08	1.87E-09	7.21E-11	5.19E-08	1.97E-09	6.71E-11	1.21E-08	4.42E-10	2.47E-11	5.20E-09	2.45E-10	1.50E-11
Beryllium	2.51E-09	8.33E-09	2.94E-10	1.13E-11	8.15E-09	3.09E-10	1.05E-11	1.90E-09	6.94E-11	3.89E-12	8.16E-10	3.85E-11	2.36E-12
Cadmium	2.14E-08	7.09E-08	2.51E-09	9.64E-11	6.93E-08	2.63E-09	8.97E-11	1.62E-08	5.90E-10	3.31E-11	6.95E-09	3.27E-10	2.00E-11
Chromium +3	1.71E-08	5.67E-08	2.00E-09	7.71E-11	5.55E-08	2.10E-09	7.18E-11	1.29E-08	4.72E-10	2.65E-11	5.56E-09	2.62E-10	1.60E-11
Chromium +6	8.77E-09	2.90E-08	1.03E-09	3.95E-11	2.84E-08	1.08E-09	3.68E-11	6.62E-09	2.42E-10	1.36E-11	2.85E-09	1.34E-10	8.21E-12
Total Chromium (b)	2.59E-08	8.57E-08	3.03E-09	1.17E-10	8.39E-08	3.18E-09	1.09E-10	1.96E-08	7.14E-10	4.00E-11	8.40E-09	3.96E-10	2.42E-11
Cobalt	4.41E-09	1.46E-08	5.16E-10	1.99E-11	1.43E-08	5.42E-10	1.85E-11	3.33E-09	1.22E-10	6.82E-12	1.43E-09	6.75E-11	4.13E-12
Copper	2.71E-08	8.99E-08	3.18E-09	1.22E-10	8.79E-08	3.34E-09	1.14E-10	2.05E-08	7.49E-10	4.20E-11	8.81E-09	4.15E-10	2.54E-11
Lead	2.40E-07	7.94E-07	2.81E-08	1.08E-09	7.77E-07	2.95E-08	1.01E-09	1.81E-07	6.62E-09	3.71E-10	7.79E-08	3.67E-09	2.25E-10
Manganese	3.77E-08	1.25E-07	4.41E-09	1.70E-10	1.22E-07	4.63E-09	1.58E-10	2.84E-08	1.04E-09	5.82E-11	1.22E-08	5.76E-10	3.53E-11
Nickel	3.29E-08	1.09E-07	3.85E-09	1.48E-10	1.07E-07	4.05E-09	1.38E-10	2.49E-08	9.08E-10	5.09E-11	1.07E-08	5.03E-10	3.08E-11
Selenium	2.37E-08	7.84E-08	2.77E-09	1.07E-10	7.67E-08	2.91E-09	9.93E-11	1.79E-08	6.53E-10	3.66E-11	7.68E-09	3.62E-10	2.22E-11
Zinc	3.92E-07	1.30E-06	4.59E-08	1.77E-09	1.27E-06	4.82E-08	1.64E-09	2.96E-07	1.08E-08	6.06E-10	1.27E-07	6.00E-09	3.67E-10
PAHs													
Dibenzo(a,h)anthracene	2.40E-09	7.95E-09	2.81E-10	1.08E-11	7.77E-09	2.95E-10	1.01E-11	1.81E-09	6.62E-11	3.71E-12	7.79E-10	3.67E-11	2.25E-12
Indeno(1,2,3-cd)pyrene	1.82E-09	6.02E-09	2.13E-10	8.19E-12	5.89E-09	2.24E-10	7.62E-12	1.37E-09	5.02E-11	2.81E-12	5.90E-10	2.78E-11	1.70E-12

* Note: These locations selected based on
the STACK1 (main RRF stack) impacts.

APPENDIX D

PROCESS UPSET EMISSIONS EVALUATION

Appendix D - 1
Calculation of Metals Process Upset Factor
Montgomery County RRF
Dickerson, MD

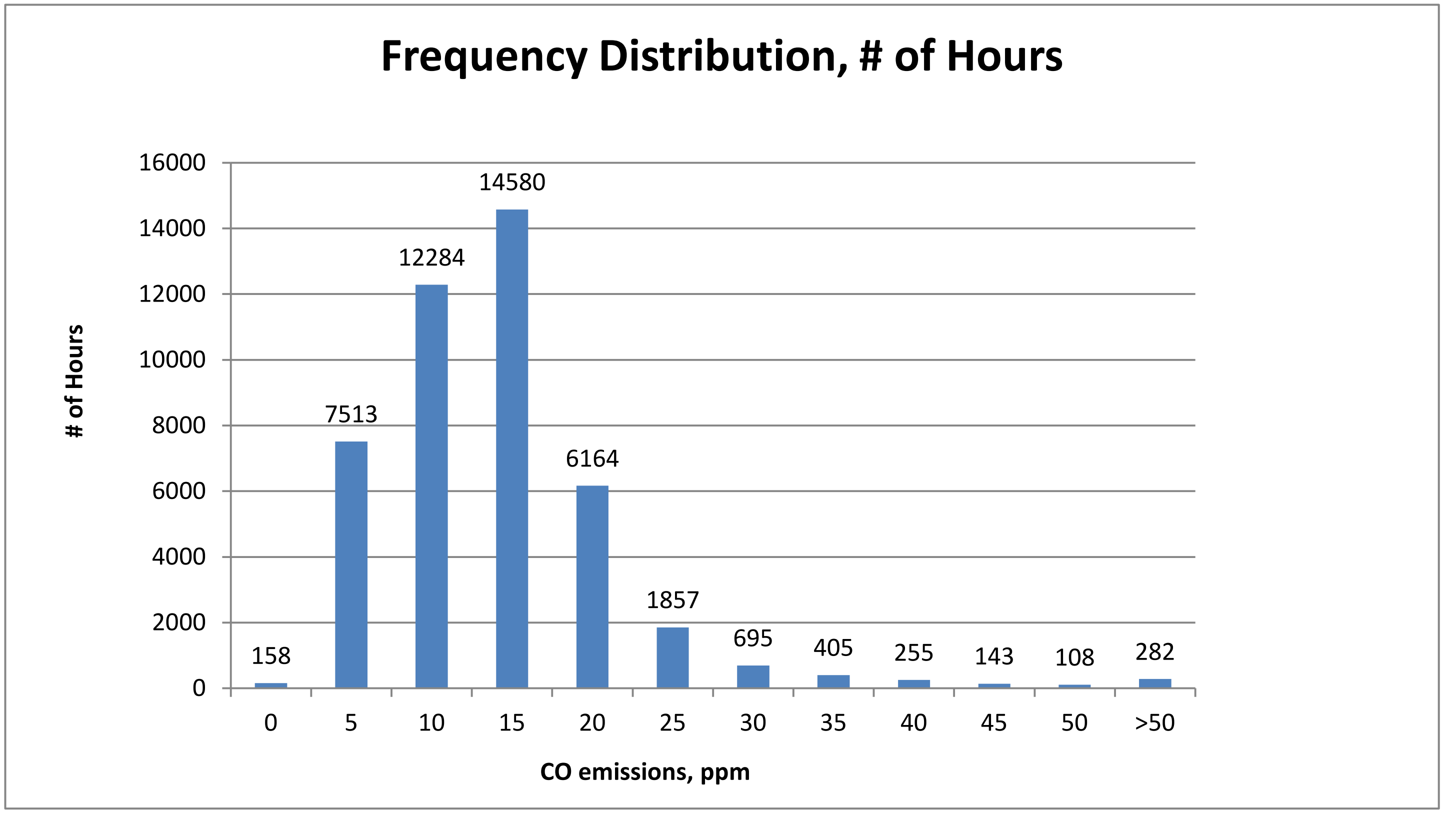


Total # of 6 minute averages (10/2011 - 09/2013)	514463
# of 6 minute averages >3% opacity	46

0.0089% % time >3% opacity

Metals Process upset factor = (1-0.0089%) * 1 + (0.0089% * 10) = 1.000805

Appendix D - 2
Calculation of Organics Process Upset Factor
Montgomery County RRF
Dickerson, MD



Total hours (12/1/2011 - 11/30/2013)	44444
# hours < 50 ppm	44162
# hours > 50 ppm	282

0.63% % time > 50 ppm

Organic Process upset factor = (1-0.63%) * 1 + (0.63% * 10) = 1.057106

APPENDIX E

ENVIRONMENTAL CONCENTRATION AND EXPOSURE INTAKE/DOSE EQUATIONS

APPENDIX E

ENVIRONMENTAL CONCENTRATION AND EXPOSURE INTAKE/DOSE EQUATIONS

E.1 INHALATION OF AIRBORNE CONSTITUENTS

Air concentrations are calculated for the evaluation of long-term or chronic exposure and for acute exposure and are based on the fraction of the constituent in vapor, particle (inorganics) or particle bound (organics) phases. The ambient air concentration for chronic exposure is calculated using receptor specific unitized yearly air parameter values. Air concentrations for acute exposure are calculated using receptor specific unitized hourly air parameter values.

Chronic Exposure:

$$C_{chronic} = Q \; x \; [Fv \; x \; Cyv + (1.0 - Fv) \; x \; Cyp]$$

For Mercury:

$$For \; Hg^{0} : C_{chronic} = 0.002Q \; x \; [Fv \; x \; Cyv + (1.0 - Fv) \; x \; Cyp]$$
$$For \; Hg^{2+} : C_{chronic} = 0.48Q \; x \; [Fv \; x \; Cyv + (1.0 - Fv) \; x \; Cyp]$$

Where:

$C_{chronic}$	=	Chronic air concentration (µg/m^3)
Q	=	constituent specific emission rate (g/s)
Fv	=	fraction of constituent air concentration in vapor phase (unitless)
Cyv	=	unitized yearly air concentration from vapor phase (µg-s/g-m^3)
Cyp	=	unitized yearly air concentration from particle or particle bound phase (µg-s/g-m^3)

Acute Exposure:

$$C_{acute} = Q \; x \; [Fv \; x \; Chv + (1.0 - Fv) \; x \; Chp]$$

For Elemental Mercury:

$$C_{acute} = 0.002Q \; x \; [Fv \; x \; Chv + (1.0 - Fv) \; x \; Chp]$$

Where:

C_{acute}	=	Acute air concentration (µg/m^3)
Q	=	constituent specific emission rate (g/s)
Fv	=	fraction of constituent air concentration in vapor phase (unitless)
Chv	=	unitized hourly air concentration from vapor phase (µg-s/g-m^3)
Chp	=	unitized hourly air concentration from particle or particle bound phase (µg-s/g-m^3)

E.1.1 Inhalation Exposure Concentration

The inhalation exposure of facility emissions is estimated based on annual ambient impact, the exposure duration and frequency:

Non-Cancer:

$$ECnc = \frac{Ca \ x \ IR \ x \ EF \ x \ ED \ x \ ET \ x UC1}{BW \ x \ ATnc \ x \ UC2}$$

Cancer:

$$ECc = \frac{Ca \ x \ IR \ x \ EF \ x \ ED \ x \ ET \ x UC1}{BW \ x \ ATc \ x \ UC2}$$

Where:

ECnc	=	non-cancer based inhalation exposure dose (mg/kg-d)
ECc	=	cancer based inhalation exposure dose (mg/kg-d)
Ca	=	total air concentration (μg/m^3)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
ET	=	exposure time (hrs)
UC1	=	units conversion (mg/μg), 0.001
AT	=	averaging time (yr) (c – 70 yrs, nc - ED)
UC2	=	units conversion (d/yr), 365

E.1.2 Cancer Risks and Hazard Quotients for Individual Chemicals by Inhalation

Cancer Risk:

$$CRi = ECc \ x \ SFi$$

Where:

CR_i	=	individual excess lifetime cancer risk, inhalation (unitless)
ECc	=	cancer based exposure dose (mg/kg-d)
SFi	=	inhalation slope factor (mg/kg-d)$^{-1}$

Hazard Quotient:

$$HQ_i = \frac{ECnc}{RfDi}$$

Where:

HQ_i	=	hazard quotient, inhalation (unitless)
ECnc	=	non-cancer based exposure dose (mg/kg-d)
RfC	=	inhalation reference dose (mg/kg-d)

Acute Exposure:

$$AHQ_{inh} = \frac{C_{acute} \ x \ UC}{AIEC}$$

Where:

AHQ_{inh} = acute hazard quotient (unitless)
C_{acute} = acute air concentration (µg/m^3)
AIEC = acute inhalation exposure criteria (mg/m^3)
UC = units conversion factor (mg/µg), 0.001

E.2 RESIDENTIAL SCENARIOS

The residential scenarios assume that the resident inadvertently ingests soil, consumes produce grown at the point of residence, and inhales the constituents in air at the residential impact point. Exposure doses for the inadvertent ingestion of soil and produce consumption are calculated both for the adult resident and child resident. An exposure pathway for infants via the ingestion of breastmilk is also included.

E.2.1 Incidental Ingestion of Soil

Soil Concentration

Constituent levels in soil are estimated as a function of wet and dry deposition of particles and vapors onto soil; the time period over which the deposition occurs and the loss of constituents via processes such as leaching, erosion runoff, degradation and volatilization. The average concentration of constituents in soil is estimated as follows:

Carcinogenic Constituents:

For carcinogenic constituents, the HHRAP recommends either of two algorithms depending on whether the exposure period is less than, or equal to, the time period of incinerator operation.

For ED $\leq$ tD:

$$Sc = \frac{Ds}{ks\ x\ (tD - T1)}\ x\ [(tD + \frac{\exp^{(-ks\,x\,tD)}}{ks} - (T1 + \frac{\exp^{(-ks\,x\,T1)}}{ks})]$$

For tD < ED:

$$Sc = \frac{(\frac{Ds\ x\ tD - C_stD}{ks}) + (\frac{C_stD}{ks})\ x\ (1 - \exp^{[-ks\ x\ (T2 - tD)]})}{(T2 - T1)}$$

Non-carcinogenic Constituents:

$$C_stD = \frac{Ds\ x\ [1 - \exp^{(-ks\ x\ tD)}]}{ks}$$

Where:

Sc	=	average soil concentration over exposure duration (mg/kg)
$C_s tD$	=	soil concentration at time tD (mg/kg)
Ds	=	deposition term (mg constituent/kg soil-yr)
tD	=	time period over which deposition occurs (yr)
t1	=	time period at beginning of combustion (yr)
t2	=	exposure duration or ED (yr)
ks	=	soil loss constant (yr^{-1})

And:

$$Ds = [\frac{100\ x\ Q}{Zs\ x\ BD}]\ x\ [(Fv\ x\ (Dydv + Dywv) + (Dydp + Dywp)\ x\ (1 - Fv)]$$

For mercury modeling, the HHRAP recommends:

$$Ds = [\frac{100\ x\ Q\ x\ 0.48}{Zs\ x\ BD}]\ x\ [(Fv\ x\ (Dydv + Dywv) + (Dydp + Dywp)\ x\ (1 - Fv)]$$

For Ds ($HgCl_2$) = Ds x 0.98
For Ds (MeHg) = Ds x 0.02

Where:

Ds	=	deposition term (mg/kg soil-yr)
Q	=	constituent specific emission rate (g/s)
Zs	=	soil mixing zone depth (cm)
BD	=	soil bulk density (g/cm^3)
FV	=	fraction of constituent air concentration in vapor phase (unitless)
Dydv	=	unitized yearly average dry deposition from vapor phase (s/m^2-yr)
Dywv	=	unitized yearly average wet deposition from vapor phase (s/m^2-yr)
Dydp	=	unitized yearly average dry deposition from particle or particle bound phase (s/m^2-yr)
Dywp	=	unitized yearly average wet deposition from particle or particle bound phase (s/m^2-yr)

And:

$$ks = ksl + ksg + ksr + ksv + kse$$

Where:

k_s	=	soil loss constant (yr^{-1})
ksl	=	loss constant due to leaching (yr^{-1})
ksg	=	loss constant due to degradation (yr^{-1})
ksr	=	loss constant due to runoff (yr^{-1})
ksv	=	loss constant due to volatilization (yr^{-1})
kse	=	loss constant due to soil erosion (yr^{-1})

And:

$$ksl = \frac{P + I + RO + E_V}{\theta_{SW}\ x\ Z_S\ x\left[1.0 + \left(\left(BD\ x\ \ Kd_S\right)/\theta_{SW}\right)\right]}$$

$$ksr = \frac{RO}{\left[\theta_{SW}\ x\ Z_S\right] x \left[1.0 + \right]\left(\left(BD\ x\ Kd_S\right)/\theta_{SW}\right)}$$

ksg = chemical-specific

$$ksv = \left[\frac{UC\ x\ H}{Z_S\ x\ Kd_S\ x\ R\ x\ T_a\ x\ BD}\right] x \left(\frac{D_a}{Z_S}\right) x \left[1 - \left(\frac{BD}{\rho_{soil}}\right) - \theta_{SW}\right]$$

kse = default (0)

Where:

P	=	average annual precipitation (cm/yr)
I	=	average annual irrigation (cm/yr)
RO	=	average annual surface runoff from pervious areas (cm/yr)
EV	=	average annual evapotranspiration (cm/yr)
Zs	=	soil mixing zone depth (cm)
θ_{sw}	=	soil volumetric water content (ml/cm^3)
Kd_s	=	soil-water partition coefficient (cm^3/g)
BD	=	soil bulk density (g/cm^3)
UC	=	units conversion (s/yr), 3.1536E+07
H	=	Henry's Law constant (atm-m^3/mole)
R	=	ideal gas constant (atm-m^3/mole-K)
Ta	=	ambient temperature in Kelvin (K)
Da	=	diffusion coefficient of constituent in air (cm^2/s)
ρsoil	=	solids particle density (g/cm^3)

Default soil properties such as bulk density, etc., are taken from the companion database to the final HHRAP Guidance (USEPA 2005b).

Soil Intake

Daily constituent intake from surface soil is calculated based on the estimated concentrations in untilled soil (i.e., in the top 2 cm of soil (USEPA 2005a)), the rate of soil ingestion, and the fraction of contaminated soil that is ingested:

$$I_{soil} = \frac{Sc\ x\ CR_{soil}\ x\ F_{soil}}{BW}$$

Where:

I_{soil}	=	daily intake of constituent from soil (mg/kg-d)
Sc	=	concentration of constituent in soil (untilled) (mg/kg)
CR_{soil}	=	soil consumption rate (kg/d)
F_{soil}	=	fraction of consumed soil that is impacted (unitless)
BW	=	body weight (kg)

E.2.2 Ingestion of Produce

Concentration in Aboveground Vegetation

$$CAGV = PD + PV + PRa$$

Where:

CAGV	=	total concentration of constituent in above ground vegetables (mg/kg),
PD	=	concentration of constituent due to direct deposition (mg/kg)
PV	=	concentration of constituent due to air-to-plant transfer (mg/kg)
PRa	=	concentration of constituent in aboveground produce due to root uptake (mg/kg)

Direct Deposition

Potential concentrations in plant tissue due to the direct deposition on plant surfaces are calculated using the following equation:

$$PD = \frac{UC\ x\ Q\ x\ (1 - Fv)\ x\ [Dydp + (Fw\ x\ Dywp)]\ x\ Rpi\ x\ (1 - \exp^{(-kp\,x\,Tp)})}{Y_p\ x\ k_p}$$

For mercury modeling:

$$PD = \frac{UC\ x\ Q\ x\ 0.48\ x\ (1 - Fv_{Hg^{2+}})\ x\ [Dydp + (Fw\ x\ Dywp)]\ x\ Rpi\ x\ (1 - \exp^{(-kp\,x\,Tp)})}{Y_p\ x\ k_p}$$

And:

Pd ($HgCl_2$) = 0.78Pd

Pd (MeHg) = 0.22Pd

Where:

PD	=	concentration of constituent due to direct deposition (mg/kg)
Q	=	constituent specific emission rate (g/s)
UC	=	units conversion factor (mg/g), 1000
Fv	=	fraction of constituent air concentration in vapor phase (unitless)
Dydp	=	unitized yearly average dry deposition from particle phase (s/m^2-yr)
Dywp	=	unitized yearly average wet deposition from particle phase (s/m^2-yr)
Fw	=	fraction of wet deposition that adheres to plant surfaces (unitless)
Rp_i	=	interception fraction of the edible portion of plant tissue (unitless)
k_p	=	rate constant for constituent degradation (yr^{-1})
T_p	=	length of growing season (yr)
Y_p	=	yield or standing crop dry weight (DW) biomass of the edible portion of the plant group (kg DW/m^2)

Air-to-plant Transfer

Air-to-plant transfers of constituents to aboveground vegetation are estimated by:

$$PV = (Q \; x \; F_v \; x \; \frac{Cyv \; x \; Bv_{ag} \; x \, VG_{ag}}{\rho_a})$$

For mercury modeling:

$$PV = (Q \; x \; Fv_{Hg^{2+}} \; x \; 0.48 \; x \; \frac{Cyv \; x \; Bv_{ag} \; x \, VG_{ag}}{\rho_a})$$

And:

Pv ($HgCl_2$) = 0.78Pv
Pv (MeHg) = 0.22Pv

Where:

PV	=	concentration of constituent due to air-to-plant transfer (mg/kg)
Q	=	constituent specific emission rate (g/s)
Fv	=	fraction of air concentration in vapor phase, chemical-specific (unitless)
Cyv	=	unitized yearly air concentration from vapor phase (µg-s/g-m^3)
B_v	=	air-to-plant biotransfer factor, (mg constituent/kg DW plant tissue)/(mg constituent/kg air)
Vg_{ag}	=	aboveground vegetable correction factor (unitless)
ρa	=	density of air (g/m^3)

Root Uptake

Potential concentrations in plant tissue due to root uptake in exposed and protected aboveground produce are estimated by:

$$PRa = Sc \; x \; Br$$

For mercury modeling:

$$PRa_{(Hg^{2+})} = Sc_{(Hg^{2+})} \; x \; Br$$

$$PRa_{(MeHg)} = Sc_{(MeHg)} \; x \; Br$$

Where:

PRa	=	concentration of constituent in aboveground produce due to root uptake (mg/kg) (Hg^{2+} = divalent mercury; MeHg = methyl mercury)
Sc	=	average soil concentration over exposure duration (mg/kg) (Hg^{2+} = divalent mercury; MeHg = methyl mercury)
Br	=	plant-soil bioconcentration factor for aboveground produce (unitless)

Concentration in Belowground Vegetation

Potential concentrations in belowground vegetation are estimated by

$$PRb = \frac{Sc \ x \ RCF \ x \ VG_{rv}}{Kd_s}$$

Where:

PRb	=	concentration of constituent in belowground vegetables (mg/kg)
Sc	=	average soil concentration over exposure duration (mg/kg)
VG_{rv}	=	belowground vegetable correction factor (unitless)
Kd_s	=	Soil-water partition coefficient (cm^3/g)

For root uptake of vegetables evaluated in the HHRA, emissions potentially deposited on soils are assumed to be mixed into the soil to a tilling depth of 20 cm (USEPA 2005a). For root uptake of plants evaluated in the ERA, emissions potentially deposited on soils are assumed to be mixed into the soil to a tilling depth of 2 cm (USEPA 2005a). Information on growing periods and yields is obtained from USEPA 2005a.

Produce Intake

Daily constituent intake from produce is calculated based on the amount of produce ingested per day, the estimated concentration of constituents in the produce, and the percentage of produce ingested that is homegrown as shown in the following equation:

$$I_{agv} = [(CAVG \ x \ CR_{ag}) + (PRa \ x \ Cr_{pp}) + (PRb \ x \ CR_{bg})] \ x \ F_{ag}$$

Where:

I_{agv}	=	daily intake of constituent from vegetables (mg/kg-d)
CAVG	=	concentration of constituents in aboveground vegetables (mg/kg)
CR_{ag}	=	consumption rate of aboveground vegetables (kg/kg-d)
PRa	=	concentration of constituents in aboveground vegetables due to root uptake (mg/kg)
CR_{pp}	=	consumption rate of protected aboveground vegetables (kg/kg-d)
PRbg	=	concentration of constituents in belowground vegetables due to root uptake (mg/kg)
CR_{bg}	=	consumption rate of belowground vegetables (kg/kg-d)
F_{ag}	=	fraction of vegetables that are contaminated (unitless)

Consumption rates of the two plant groups (aboveground (exposed and protected) and belowground) and fractions contaminated are based on information presented in the Final HHRAP guidance document (USEPA 2005a).

E.2.3 Total Daily Intake for Indirect Pathways: Residential Scenarios

The total daily constituent intake is estimated as:

$$I_{tot} = I_{soil} + I_{agv}$$

Where:

I_{tot}	=	total daily intake of constituent (mg/kg-d)
I_{soil}	=	daily intake of constituent from soil (mg/kg-d)
I_{agv}	=	daily intake of constituent from vegetables (mg/kg-d)

E.2.5 Cancer Risks and Hazard Quotients for Individual Chemicals in the Residential Scenario

Cancer Risk:

$$CRo = \frac{I_{tot}\ x\ EF\ x\ ED\ x\ CSFo}{AT\ x\ UC}$$

Where:

CR_O	=	individual excess lifetime cancer risk, oral (unitless)
I_{tot}	=	total daily intake of constituent (mg/kg-d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
CSF_O	=	cancer slope factor, oral $(mg/kg\text{-}d)^{-1}$
AT	=	time over which the dose is averaged (yr)
UC	=	units conversion (d/yr), 365

Hazard Quotient:

$$HQo = \frac{I_{tot}\ x\ ED\ x\ EF}{AT\ x\ RfDo\ x\ UC}$$

Where:

HQ_O	=	hazard quotient, oral
I_{tot}	=	total daily intake of constituent (mg/kg-d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
RfD_O	=	reference dose (oral, mg/kg-d)
AT	=	time over which the dose is averaged (ED)
UC	=	units conversion (d/yr), 365

E.2.6 Infant Exposure via Breastmilk Ingestion

Per the Final HHRAP Guidance (USEPA 2005a), the preliminary screening-level risk assessment includes an estimate of the exposure of breast-fed infants to potential dioxin/furans emissions for each scenarios. Dioxin/furans are the only constituents evaluated in this pathway because of their lipophilic nature and because they have been reported to be found in human breastmilk. Maternal exposures from the previously described residential scenario are used to determine infant exposure via breast-feeding. The concentrations of dioxins/furans as a 2,3,7,8-

TCDD toxicity equivalent (TEQ) is compared with an infant target intake level of 60 picograms per kilogram per day (pg/kg-d).

Maternal Milk Concentration

The concentration in maternal milk is calculated as follows:

$$C_{milkfat} = \frac{(M \ x \, UC \ x \ h \ x \ f1)}{(0.693 \ x \ f2)}$$

Where:

$C_{milkfat}$	=	concentration of dioxin in milkfat of breast milk (pg/kg)
M	=	total maternal exposure by all routes (mg/kg-d)
UC	=	units conversion (pg/mg), 1E+9
f1	=	fraction of ingested dioxin that is stored in fat (unitless)
h	=	half-life of constituent in mother's body (d)
f2	=	proportion of maternal weight that is fat (unitless)

Ingestion of Breastmilk

The infant's average daily dose is calculated as follows:

$$ADD_{infant} = \frac{C_{milkfat} \ x \ f3 \ x \ f4 \ x \ IR_{milk} \ x \ ED}{BW \ x \ AT}$$

Where:

ADD_{infant}	=	average daily dose for infant (pg/kg-d)
$C_{milkfat}$	=	concentration of dioxin in milkfat of breast milk (pg/kg)
IR_{milk}	=	infant breast milk ingestion rate (kg/d)
f3	=	fraction of breast milk that is fat (unitless)
f4	=	fraction constituent absorbed (unitless)
ED	=	exposure duration (yr)
BW	=	body weight of infant (kg)
AT	=	averaging time (yr)

E.3 FISHER SCENARIOS

The fishing scenarios assume that the fisher inadvertently ingests soil and consumes produce at the location of residence. Consumption of fish from a local waterbody caught recreationally is also included. Daily constituent intake via the incidental ingestion of soil and consumption of homegrown produce is calculated as described in Section E.2.

Facility emissions may potentially deposit directly on surface water bodies. Thus, it is theoretically possible for receptors to be exposed to facility emissions via the ingestion of fish. Constituent concentrations in fish are calculated from estimated concentrations in the water body, either dissolved or total water column concentrations or sediment concentrations. The calculations are illustrated below.

E.3.1 <u>Constituent Load to the Waterbody</u>

The first step is to calculate the load of each constituent to the waterbody. The HHRAP guidance (USEPA 2005a), suggests five pathways cause constituent loading of the waterbody: 1) direct deposition; 2) runoff from impervious surfaces within the watershed; 3) runoff from pervious surfaces within the watershed; 4) soil erosion from the watershed; and 5) vapor phase constituent diffusion to the waterbody.

$$L_T = L_{Dep} + L_{RI} + L_R + L_E + L_{Dif}$$

Where:

L_T = total constituent load to the waterbody (g/yr)
L_{Dep} = deposition of particle bound constituent to the waterbody (g/yr)
L_{RI} = runoff load from impervious surfaces (g/yr)
L_R = runoff load from pervious surfaces (g/yr)
L_E = soil erosion load (g/yr)
L_{Dif} = vapor phase constituent diffusion (dry deposition) to water body (g/yr)

And:

$$L_{Dep} = Q \ x \ [Fv \ x \ Dytwv + (1.0 - Fv) \ x \ Dytwp] \ x \ WA_w$$

$$L_{Dif} = Kv \ x \ Q \ x \ Fv \ x \ Cywv + WA_w \ x \ UC1/(H/(R \ x \ T_{wk}))$$

$$L_{RI} = Q \ x \ [Fv \ x \ Dytwv + (1.0 - Fv) \ x \ Dytwp] \ x \ WA_i$$

$$L_R = RO \ x \ (WA_L - WA_i) \ x \ \frac{Cs \ x \ BD}{\theta_{sw} + Kd_s \ x \ BD} \ x \ UC2$$

$$L_E = Xe \ x \ (WA_L - WA_i) \ x \ SD \ x \ ER \ x \ \frac{Sc \ x \ Kds \ x \ BD}{\theta_{sw} + Kds \ x \ BD} \ x \ UC3$$

For Mercury

$$L_{Dep\ Hg} = Q \ x \ 0.48 \ x \ [Fv_{Hg^{2+}} \ x \ Dytwv + (1.0 - Fv_{Hg^{2+}}) \ x \ Dytwp] \ x \ WA_w$$

$$L_{RI\ Hg} = Q \ x \ 0.48 \ x \ [Fv_{Hg^{2+}} \ x \ Dytwv + (1.0 - Fv_{Hg^{2+}}) \ x \ Dytwp] \ x \ WA_i$$

$$L_{Dif\ Hg} = Kv \ x \ Q \ x \ 0.48 \ x \ Fv_{Hg^{2+}} \ x \ Cywv + WA_w \ x \ UC1/(H/(R \ x \ T_{wk}))$$

And:

$$K_v = [K_L^{-1} + [K_G \ x \ \frac{H}{R \ x \ T_{wk}}]^{-1}]^{-1} \ x \ \theta^{Twk-293}$$

For Flowing Streams or Rivers:

$$K_L = \sqrt{\frac{UC4 \ x \ D_w \ x \ u}{d_z}} \ x \ UC5$$

For Quiescent Lakes or Ponds:

$$K_L = (C_d^{0.5}\ x\, W)\ x\ (\frac{\rho_a}{\rho_w})^{0.5}\ x\ \frac{k^{0.33}}{\lambda z}\ x\ (\frac{\mu_w}{\rho_w\, x\, Dw})^{-0.67}\ x\, UC5$$

For Flowing Streams or Rivers:

$$K_G = 36500\ m/yr$$

For Quiescent Lakes or Ponds:

$$K_G = (C_d^{0.5}\ x\, W)\ x\ \frac{k^{0.33}}{\lambda z}\ x\ (\frac{\mu a}{\rho_a\, x\, D_a})^{-0.67}\ x\, UC5$$

Universal Soil Loss Equation:

$$Xe = RF\ x\ K\ x\ LS\ x\ C\ x\ PF\ x\ \frac{UC6}{UC7}$$

Sediment Delivery Ratio:

$$SD = a\ x\left(A_L\right)^{-b}$$

Where:

Q	=	constituent specific emission rate (g/s)
Fv	=	fraction of air concentration in vapor phase (unitless)
Dywwv	=	unitized yearly average wet deposition from vapor phase for watershed (s/m^2-yr)
Dytwp	=	unitized yearly average total (wet and dry) deposition from particle phase for watershed (s/m^2-yr)
WA_w	=	total water body area (m^2)
WA_i	=	impervious watershed area receiving pollutant deposition (m^2)
UC1	=	units conversion factor (g/ug), 1E-06
WA_L	=	total watershed area receiving pollutant deposition (m^2)
RO	=	average annual surface runoff (cm/yr)
Sc	=	average soil concentration over exposure duration (mg/kg)
BD	=	soil bulk density (g/cm^3)
θ_{sw}	=	soil volumetric water content (cm^3/cm^3)
Kd_s	=	soil-water partition coefficient (cm^3/g or ml/g)
X_e	=	unit soil loss (from Universal Soil Loss Equation), (kg/m^2-yr)
SD	=	sediment delivery ratio (unitless)
ER	=	constituent enrichment ratio (unitless)
K_v	=	overall transfer rate coefficient (m/yr)
UC2	=	units conversion factor ($kg\text{-}cm^2/mg\text{-}m^2$), 0.01
UC3	=	units conversion factor (g/mg), 0.001
K_L	=	liquid phase transfer coefficient (m/yr)
K_G	=	gas phase transfer coefficient (m/yr)
H	=	Henry's law constant ($atm\text{-}m^3/mol$)

R	=	universal gas constant (atm-m^3/mol-K)
T_{wk}	=	water body temperature (K)
θ	=	temperature correction factor
D_w	=	diffusivity of constituent in water (cm^2/s)
u	=	current velocity (m/s)
dz	=	total water body depth (m)
UC4	=	units conversion factor (m^2/cm^2), 1E-4
UC5	=	units conversion factor (s/yr), 3.1536E+7
Cd	=	drag coefficient (unitless)
W	=	average annual wind speed (m/s)
ρ_a	=	density of air (g/cm^3)
ρ_w	=	density of water (g/cm^3)
k	=	von Karman's constant (unitless)
λ_z	=	dimensionless viscous sublayer thickness (unitless)
μ_w	=	viscosity of water corresponding to water temperature (g/cm-s)
μ_a	=	viscosity of air (g/cm-s)
D_a	=	diffusivity of constituent in air (cm^2/s)
RF	=	USLE rainfall (or erosivity) factor (yr^{-1})
K	=	USLE erodibility factor (yr^{-1})
LS	=	USLE length-slope factor (yr^{-1})
C	=	USLE cover management factor (yr^{-1})
PF	=	USLE supporting practice factor (unitless)
UC6	=	Units conversion factor (kg/ton), 907.18
UC7	=	Units conversion factor (m^2/acre), 4047
a	=	Empirical intercept coefficient (unitless)
A_L	=	Total watershed area receiving deposition (m^2)
b	=	Empirical slope coefficient (unitless), 0.125

E.3.2 Total Waterbody Concentration

The second step involves calculating the total waterbody concentration (in the water column and sediments) from the waterbody load and partitioning the total concentration into a water column concentration and a bed sediment concentration.

$$C_{wtot} = \frac{L_T}{[Vf_x \ x \ f_{wc} \ x \ k_{wt} \ x \ WA_w \ x \ (d_{wc} + d_{bs})]}$$

And:

$$f_{wc} = \frac{(1 + Kd_{sw} \ x \ TSS \ x \ UC1) \ x \ \frac{d_{wc}}{dz}}{(1 + KD_{sw} \ x \ TSS \ x \ UC1) \ x \ \frac{d_{wc}}{dz} + (\theta_{bs} + Kd_{bs} \ x \ C_{bs}) \ x \ \frac{d_{bs}}{dz}}$$

$$k_{wt} = f_{wc} \ x \ k_v + f_{bs} \ x \ k_b$$

$$f_{bs} = 1 - f_{wc}$$

$$k_v = \frac{K_v}{dz \ x \ (1 + Kd_{sw} \ x \ TSS \ x \ UC1)}$$

$$k_b = (\frac{Xe \ x \ WA_L \ x \ SD \ x \ UC2 - Vf_x \ x \ TSS}{WA_w \ x \ TSS}) \ x \ (\frac{TSS \ x \ UC1}{C_{bs} \ x \ d_{bs}})$$

Where:

C_{wtot}	=	total waterbody concentration (g/m^3)
L_T	=	total constituent load to the waterbody (g/yr)
f_{wc}	=	fraction of total water body concentration that occurs in the water column (unitless)
k_{wt}	=	total first order dissipation rate constant (yr^{-1})
Vf_x	=	average volumetric flow rate through the water body (m^3/yr)
d_{wc}	=	depth of water column (m)
WA_w	=	total water body area (m^2)
Kd_{sw}	=	suspended sediment/surface water partition coefficient (l/kg)
TSS	=	total suspended solids (mg/l)
UC1	=	units conversion 1 (kg/mg), 1E-06
dz	=	total water body depth (m)
C_{bs}	=	bed sediment concentration (g/cm^3)
θ_{bs}	=	bed sediment porosity (l_{water}/l)
Kd_{bs}	=	bed sediment/sediment pore water partition coefficient (l/kg)
d_{bs}	=	depth of upper benthic sediment layer (m)
k_v	=	water column volatilization rate constant (yr^{-1})
f_{bs}	=	fraction of total water body constituent concentration in benthic sediment (unitless)
k_b	=	benthic burial rate constant (yr^{-1})
Kv	=	overall constituent transfer rate coefficient (m/yr)
Xe	=	unit soil loss (kg/m^2-yr)
WA_L	=	total watershed area receiving deposition (m^2)
SD	=	watershed sediment delivery ratio (unitless)
UC2	=	units conversion 2 (g/kg), 1000

Water Column Concentration

The water column portion of the total waterbody concentration for each constituent, C_{wc}, can be calculated as follows:

$$C_{wc} = f_{wc} \ x \ C_{wtot} \ x \ \frac{d_{wc} + d_{bs}}{d_{wc}}$$

Where:

C_{wc} = total constituent concentration in water column (mg/l)
C_{wtot} = total waterbody concentration (mg/l)
f_{wc} = fraction of total water body concentration that occurs in the water column (unitless)
d_{wc} = depth of water column (m)
d_{bs} = depth of upper benthic sediment layer (m)

Dissolved Phase Water Column Concentration

The dissolved phase portion of the water column concentration for each constituent, C_{dw}, can be calculated as follows:

$$C_{dw} = \frac{C_{wc}}{1 + Kd_{sw}\ x\ TSS\ \ x\ UC}$$

For mercury modeling,

$$C_{dwMercury} = \frac{C_{wcHg2^+}}{1 + Kd_{swHg2^+}\ x\ TSS\ \ x\ UC}$$

And for apportioning total mercury into divalent mercury ($Hg2^+$) and methyl mercury (MeHg):

$$C_{dwHg2^+} = 0.85\ x\ C_{dwmercury}$$
$$C_{dwMeHg} = 0.15\ x\ C_{dwmercury}$$

Where:

C_{dw} = dissolved phase water concentration (mg/l)
C_{wc} = total constituent concentration in water column (mg/l)
Kd_{sw} = suspended sediment/surface water partition coefficient (l/kg)
TSS = total suspended solids (mg/l)
UC = units conversion (kg/mg), 1E-06

Constituent Concentration Sorbed to Bed Sediment

The portion of the total water body concentration sorbed to bed sediment for each constituent, C_{sb}, can be calculated as follows:

$$C_{sb} = f_{bs}\ x\ C_{wtot}\ x\ \frac{Kd_{bs}}{\theta_{bs} + Kd_{bs}\ x\ C_{bs}}\ x\ \frac{d_{wc} + d_{bs}}{d_{bs}}$$

Where:

C_{sb} = concentration sorbed to bed sediments (mg/kg)
C_{wtot} = total waterbody concentration (mg/l)
f_{bs} = fraction of total water body concentration that occurs in the bed sediment (unitless)
d_{wc} = depth of water column (m)
d_{bs} = depth of upper benthic sediment layer (m)
θ_{bs} = bed sediment porosity (l_{water}/l)

Kd_{bs} = bed sediment/sediment pore water partition coefficient (l/kg)
C_{bs} = bed sediment concentration (g/cm^3)

E.3.3 Fish Concentration

Estimated constituent concentrations in fish are calculated from the dissolved water concentration or the bed sediment concentration using a constituent-specific bioconcentration factor, bioaccumulation factor, or a sediment bioaccumulation factor as appropriate.

$$C_{fishdw} = C_{dw} \ x \ BCF$$

$$C_{fishdw} = C_{dw} \ x \ BAF$$

$$C_{fishsb} = \frac{C_{sb} \ x \ f_{lipid} \ x \ BSAF}{OC_{sed}}$$

For Mercury:

$$C_{fishdwHg2^+} = C_{dwHg2^+} \ x \ BAF_{Hg2^+}$$

$$C_{fishdwMeHg} = C_{dwMeHg} \ x \ BAF_{MeHg}$$

Where:

C_{fishdw} = fish concentration from dissolved water concentration (mg/kg)
C_{fishsb} = fish concentration from bed sediment (mg/kg)
C_{dw} = dissolved water concentration (mg/l)
C_{sb} = concentration of constituent sorbed to bed sediment (mg/kg)
BCF = bioconcentration factor (l/kg)
BAF = bioaccumulation factor (l/kg)
BSAF = biota- to-sediment accumulation factor (unitless)
f_{lipid} = fish lipid content (fraction)
OC_{sed} = fraction organic carbon in bottom sediment (unitless)

Intake of Fish

The daily constituent intake from fish is estimated based on the calculated constituent concentration in fish tissue, the fish consumption rate, and the fraction of ingested fish that is obtained from the impacted waterbody:

$$I_{fish} = C_{fish} \ x \ CR_{fish} \ x \ F_{fish}$$

Where:

I_{fish} = daily intake of constituent from fish (mg/kg-d)
C_{fish} = fish concentration (mg/kg)
CR_{fish} = consumption rate of fish (kg/kg-d)
F_{fish} = fraction of fish contaminated (unitless)

E.3.4 Total Daily Intake for Indirect Pathway: Fishing Scenarios

The total daily constituent intake is estimated as:

$$I_{tot} = I_{soil} + I_{agv} + I_{dw} + I_{fish}$$

Where:

I_{tot} = total daily intake of constituent (mg/kg-d)
I_{soil} = daily intake of constituent from soil (mg/kg-d)
I_{ag} = daily intake of constituent from vegetables (mg/kg-d)
I_{dw} = daily intake of constituent from drinking water (mg/kg-d)
I_{fish} = daily intake of constituent from fish (mg/kg-d)

E.3.5 Cancer Risks and Hazard Quotients for Individual Chemicals in the Fisher Scenarios

Cancer Risk:

$$CRo = \frac{I_{tot}\ x\ EF\ \ x\ ED\ x\ CSFo}{AT\ \ x\ UC}$$

Where:

CR_O = individual excess lifetime cancer risk, oral (unitless)
I_{tot} = total daily intake of constituent (mg/kg-d)
EF = exposure frequency (d/yr)
ED = exposure duration (yr)
CSF_O = cancer slope factor, oral $(mg/kg\text{-}d)^{-1}$
AT = time over which the dose is averaged (yr)
UC = units conversion (d/yr), 365

Hazard Quotient:

$$HQo = \frac{I_{tot}\ x\ ED\ x\ EF}{AT\ \ x\ RfDo\ x\ UC}$$

Where:

HQ_O = hazard quotient, oral (unitless)
I_{tot} = total daily intake of constituent (mg/kg-d)
EF = exposure frequency (d/yr)
ED = exposure duration (yr)
AT = time over which the dose is averaged (ED)
UC = units conversion (d/yr), 365
RfD_O = reference dose, oral (mg/kg-d)

E.4 FARMER SCENARIOS

The farming scenarios assume that a farmer inadvertently ingests soil, consumes produce, beef, dairy, pork, chicken and eggs specific to the farm and inhales constituents in air at the farm impact point. Daily constituent intake via incidental soil ingestion and consumption of homegrown produce are calculated as described in Section E.2.

E.4.1 Ingestion of Animal Tissue

Constituent concentrations in animal tissue (beef, dairy, pork, chicken, eggs) are estimated based on the calculated concentrations in the type of plant eaten (forage, silage, grain) and soils ingested by cattle, swine and chickens and constituent-specific biotransfer factors as shown in the following equations:

$$A_{beef} = (\sum (F_i \ x \ Qp_i \ x \ P_i) + (Qs \ x \ Sc \ x \ BS)) \ x \ Ba_{beef} \ x \ MF$$
$$A_{milk} = (\sum (F_i \ x \ Qp_i \ x \ P_i) + (Qs \ x \ Sc \ x \ BS)) \ x \ Ba_{milk} \ x \ MF$$
$$A_{pork} = (\sum (F_i \ x \ Qp_i \ x \ P_i) + (Qs \ x \ Sc \ x \ BS)) \ x \ Ba_{pork} \ x \ MF$$
$$A_{chicken} = (\sum (F_i \ x \ Qp_i \ x \ P_i) + (Qs \ x \ Sc \ x \ BS)) \ x \ Ba_{chicken} \ x \ MF$$
$$A_{egg} = (\sum (F_i \ x \ Qp_i \ x \ P_i) + (Qs \ x \ Sc \ x \ BS)) \ x \ Ba_{egg} \ x \ MF$$

Where:

A_{beef} = concentration of constituent in beef tissue (mg/kg)
A_{milk} = concentration of constituent in milk (mg/kg)
A_{pork} = concentration of constituent in pork (mg/kg)
$A_{chicken}$ = concentration of constituent in chicken (mg/kg)
A_{egg} = concentration of constituent in eggs (mg/kg)
P_i = concentration of constituent in plant type i consumed by the animal (mg/kg DW)
Qp_i = quantity of plant type i consumed by the animal each day (kg DW/d)
F_i = fraction of consumed plant type i grown on contaminated soil (unitless)
Sc = soil concentration (mg/kg)
Qs = quantity of soil eaten each day (kg soil/d)
Bs = soil bioavailability factor (unitless)
Ba_{beef} = beef biotransfer factor (d/kg-fresh weight (FW))
Ba_{milk} = milk biotransfer factor (d/kg-wet weight (WW))
Ba_{pork} = pork biotransfer factor (d/kg-FW)
$Ba_{chicken}$ = chicken biotransfer factor (d/kg-FW)
Ba_{egg} = egg biotransfer factor (d/kg-FW)
MF = metabolism factor (unitless)

Estimated concentrations in forage and silage are calculated using algorithms for estimating concentrations in exposed aboveground vegetation. Concentrations in grain are estimated using algorithms for estimating levels in protected aboveground vegetation. The algorithms are discussed in Section A.2.2. Algorithm inputs for estimating concentrations in forage, silage and grain are taken from the Final HHRAP Guidance as are feed and soil consumption rates, and constituent-specific beef, milk, pork, chicken and egg biotransfer factors.

Constituent Intake from Beef

The daily constituent intake from beef tissue is estimated based on the calculated constituent concentration in beef tissue, the beef consumption rate, and the fraction of consumed beef that is impacted:

$$I_{beef} = A_{beef}\ x\ CR_{beef}\ x\ F_{beef}$$

Where:

I_{beef} = daily intake of constituent from beef (mg/kg-d)
A_{beef} = beef concentration (mg/kg)
CR_{beef} = consumption rate of beef (kg/kg-d)
F_{beef} = fraction of beef consumed that is impacted (unitless)

Beef ingestion rates are based on default values presented in the Final HHRAP Guidance (USEPA 2005A).

Constituent Intake from Milk

Daily constituent intake form milk is estimated based on the calculated constituent concentration in milk, the milk consumption rate, and the fraction of ingested milk that is impacted:

$$I_{milk} = A_{milk}\ x\ CR_{milk}\ x\ F_{milk}$$

Where:

I_{milk} = daily intake of constituent from milk (mg/kg-d)
A_{milk} = milk concentration (mg/kg)
CR_{milk} = consumption rate of milk (kg/kg-d)
F_{milk} = fraction of milk consumed that is impacted (unitless)

Milk ingestion rates are based on default values presented in the Final HHRAP Guidance (USEPA 2005A).

Constituent Intake from Pork

Daily constituent intake from pork is estimated based on the calculated constituent concentration in pork, the pork consumption rate, and the fraction of ingested pork that is impacted:

$$I_{pork} = A_{pork}\ x\ CR_{pork}\ x\ F_{pork}$$

Where:

I_{pork} = daily intake of constituent from pork (mg/kg-d)
A_{pork} = pork concentration (mg/kg)
CR_{pork} = consumption rate of pork (kg/kg-d)
F_{pork} = fraction of pork consumed that is impacted (unitless)

Pork ingestion rates are based on default values presented in the Final HHRAP Guidance (USEPA 2005A).

Constituent Intake from Chicken

Daily constituent intake from chicken is estimated based on the calculated constituent concentration in chicken, the chicken consumption rate, and the fraction of ingested chicken that is impacted:

$$I_{chicken} = A_{chicken} \ x \ CR_{chicken} \ x \ F_{chicken}$$

Where:

$I_{chicken}$	=	daily intake of constituent from chicken (mg/kg-d)
$A_{chicken}$	=	chicken concentration (mg/kg)
$CR_{chicken}$	=	consumption rate of chicken (kg/kg-d)
$F_{chicken}$	=	fraction of chicken consumed that is impacted (unitless)

Chicken ingestion rates are based on default values presented in the Final HHRAP Guidance (USEPA 2005A).

Constituent Intake from Eggs

Daily constituent intake from eggs is estimated based on the calculated constituent concentration in eggs, the egg consumption rate, and the fraction of ingested eggs that are impacted:

$$I_{egg} = A_{egg} \ x \ CR_{egg} \ x \ F_{egg}$$

Where:

I_{egg}	=	daily intake of constituent from eggs (mg/kg-d)
A_{egg}	=	egg concentration (mg/kg)
CR_{egg}	=	consumption rate of eggs (kg/kg-d)
F_{egg}	=	fraction of eggs consumed that is impacted (unitless)

Egg ingestion rates are based on default values presented in the Final HHRAP Guidance (USEPA 2005A).

E.4.2 Total Daily Intake From Indirect Pathways: Farmer Scenarios

The total daily constituent intake is estimated as:

$$I_{tot} = I_{soil} + I_{agv} + I_{dw} + I_{beef} + I_{milk} + I_{pork} + I_{chicken} + I_{egg}$$

Where:

I_{tot}	=	total daily intake of constituent (mg/kg-d)
I_{soil}	=	daily intake of constituent from soil (mg/kg-d)
I_{agv}	=	daily intake of constituent from vegetables (mg/kg-d)
I_{dw}	=	daily intake of constituent from drinking water (mg/kg-d)
I_{beef}	=	daily intake of constituent from beef (mg/kg-d)
I_{milk}	=	daily intake of constituent from milk (mg/kg-d)
I_{pork}	=	daily intake of constituent from pork (mg/kg-d)
$I_{chicken}$	=	daily intake of constituent from chicken (mg/kg-d)
I_{egg}	=	daily intake of constituent from eggs (mg/kg-d)

E.4.3 Cancer Risks and Hazard Quotients for Individual Chemicals in the Farmer Scenarios

Cancer Risk:

$$CRo = \frac{I_{tot}\ x\ EF\ x\ ED\ x\ CSFo}{AT\ x\ UC}$$

Where:

CR_O	=	individual excess lifetime cancer risk, oral (unitless)
I_{tot}	=	total daily intake of constituent (mg/kg-d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
CSF_O	=	oral cancer slope factor, $(mg/kg\text{-}d)^{-1}$
AT	=	time over which the dose is averaged (yr)
UC	=	units conversion (d/yr), 365

Hazard Quotient:

$$HQo = \frac{Itot\ x\ EF\ x\ ED}{AT\ x\ RfDo\ x\ UC}$$

Where:

HQ_O	=	hazard quotient, oral (unitless)
I_{tot}	=	total daily intake of constituent (mg/kg-d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
RfD_O	=	reference dose, oral (mg/kg-d)
AT	=	time over which the dose is averaged (ED)
UC	=	units conversion (d/yr), 365

APPENDIX F

RECEPTOR MODELING IMPACTS

Appendix F-1
Annual Facility Impacts for Constituents of Concern
RME Residential Scenario
Montgomery County RRF, Dickerson, MD

COC	Organics, Antimony, Hg Cyv * Q ug/m3	dry dep Dydv * Q g/m2- yr	wet dep Dywv * Q g/m2- yr	Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene Cyp * Q ug/m3	dry dep Dydp * Q g/m2- yr	wet dep Dywp * Q g/m2- yr	total dep Dtot * Q g/m2- yr	Particle Bound - Mercury and Organics Cypb * Q ug/m3	dry dep Dydpb * Q g/m2- yr	wet dep Dywpb * Q g/m2- yr	total dep Dtotpb * Q g/m2- yr
Inorganics											
Antimony	4.38E-06	7.83E-10	1.86E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	3.14E-06	1.58E-06	3.94E-05	4.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	4.93E-07	2.49E-07	6.19E-06	6.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	4.20E-06	2.12E-06	5.27E-05	5.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	2.97E-06	1.50E-06	3.73E-05	3.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	1.75E-06	8.83E-07	2.19E-05	2.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	8.65E-07	4.37E-07	1.09E-05	1.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	5.32E-06	2.69E-06	6.68E-05	6.95E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	4.70E-05	2.37E-05	5.90E-04	6.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	7.38E-06	3.73E-06	9.26E-05	9.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	4.70E-05	1.90E-08	7.03E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-05	1.87E-06	2.12E-05	2.30E-05
Nickel	0.00E+00	0.00E+00	0.00E+00	6.47E-06	3.27E-06	8.12E-05	8.44E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	4.64E-06	2.34E-06	5.82E-05	6.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	7.69E-05	3.88E-05	9.64E-04	1.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	1.56E-10	1.60E-11	5.23E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-10	6.45E-12	7.29E-11	7.94E-11
PCBs											
Total PCBs	1.11E-05	3.14E-08	1.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-05	4.43E-07	5.01E-06	5.45E-06
PAHs											
Acenaphthene	4.44E-06	2.12E-08	2.96E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	6.02E-07	1.17E-08	2.32E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	4.51E-07	4.85E-09	7.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.49E-07	1.81E-08	2.04E-07	2.22E-07
Benzo(a)anthracene	3.23E-07	4.25E-08	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-07	1.33E-08	1.51E-07	1.64E-07
Benzo(a)pyrene	3.61E-07	4.70E-08	3.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.70E-07	1.49E-08	1.68E-07	1.83E-07
Benzo(b)fluoranthene	9.00E-07	2.87E-08	8.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.97E-07	3.61E-08	4.08E-07	4.44E-07
Benzo(k)fluoranthene	5.59E-07	1.78E-08	2.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-07	2.24E-08	2.54E-07	2.76E-07
Benzo(ghi)perylene	3.99E-07	5.29E-08	5.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	4.85E-06	1.47E-07	5.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-06	1.94E-07	2.20E-06	2.39E-06
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	3.97E-07	2.01E-07	4.98E-06	5.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.95E-07	9.14E-09	1.13E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-07	1.58E-08	1.79E-07	1.95E-07
Fluorene	6.33E-07	5.69E-09	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	3.21E-07	1.62E-07	4.03E-06	4.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	8.63E-07	2.57E-09	1.78E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	2.66E-06	1.45E-08	5.90E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	6.75E-07	1.22E-08	1.79E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.72E-07	2.70E-08	3.06E-07	3.33E-07
Pyrene	3.64E-07	9.41E-09	1.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.63E-07	1.46E-08	1.65E-07	1.80E-07
Aldehyde Ketones											
Formaldehyde	4.91E-05	2.06E-06	1.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 2a
Annual Facility Impacts for Constituents of Concern
RME Fisher Scenario (Potomac River)
Montgomery County RRF, Dickerson, MD

COC	Organics, Antimony, Hg			Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
	Cyv * Q ug/m3	**dry dep Dydv * Q** g/m2- yr	**wet dep Dywv * Q** g/m2- yr	**Cyp * Q** ug/m3	**dry dep Dydp * Q** g/m2- yr	**wet dep Dywp * Q** g/m2- yr	**total dep Dtot * Q** g/m2- yr	**Cypb * Q** ug/m3	**dry dep Dydpb * Q** g/m2- yr	**wet dep Dywpb * Q** g/m2- yr	**total dep Dtotpb * Q** g/m2- yr
Inorganics											
Antimony	4.38E-06	7.83E-10	1.86E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	3.14E-06	1.58E-06	3.94E-05	4.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	4.93E-07	2.49E-07	6.19E-06	6.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	4.20E-06	2.12E-06	5.27E-05	5.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	2.97E-06	1.50E-06	3.73E-05	3.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	1.75E-06	8.83E-07	2.19E-05	2.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	8.65E-07	4.37E-07	1.09E-05	1.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	5.32E-06	2.69E-06	6.68E-05	6.95E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	4.70E-05	2.37E-05	5.90E-04	6.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	7.38E-06	3.73E-06	9.26E-05	9.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	4.70E-05	1.90E-08	7.03E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-05	1.87E-06	2.12E-05	2.30E-05
Nickel	0.00E+00	0.00E+00	0.00E+00	6.47E-06	3.27E-06	8.12E-05	8.44E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	4.64E-06	2.34E-06	5.82E-05	6.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	7.69E-05	3.88E-05	9.64E-04	1.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	1.56E-10	1.60E-11	5.23E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-10	6.45E-12	7.29E-11	7.94E-11
PCBs											
Total PCBs	1.11E-05	3.14E-08	1.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-05	4.43E-07	5.01E-06	5.45E-06
PAHs											
Acenaphthene	4.44E-06	2.12E-08	2.96E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	6.02E-07	1.17E-08	2.32E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	4.51E-07	4.85E-09	7.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.49E-07	1.81E-08	2.04E-07	2.22E-07
Benzo(a)anthracene	3.23E-07	4.25E-08	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-07	1.33E-08	1.51E-07	1.64E-07
Benzo(a)pyrene	3.61E-07	4.70E-08	3.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.70E-07	1.49E-08	1.68E-07	1.83E-07
Benzo(b)fluoranthene	9.00E-07	2.87E-08	8.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.97E-07	3.61E-08	4.08E-07	4.44E-07
Benzo(k)fluoranthene	5.59E-07	1.78E-08	2.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-07	2.24E-08	2.54E-07	2.76E-07
Benzo(ghi)perylene	3.99E-07	5.29E-08	5.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	4.85E-06	1.47E-07	5.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-06	1.94E-07	2.20E-06	2.39E-06
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	3.97E-07	2.01E-07	4.98E-06	5.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.95E-07	9.14E-09	1.13E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-07	1.58E-08	1.79E-07	1.95E-07
Fluorene	6.33E-07	5.69E-09	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	3.21E-07	1.62E-07	4.03E-06	4.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	8.63E-07	2.57E-09	1.78E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	2.66E-06	1.45E-08	5.90E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	6.75E-07	1.22E-08	1.79E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.72E-07	2.70E-08	3.06E-07	3.33E-07
Pyrene	3.64E-07	9.41E-09	1.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.63E-07	1.46E-08	1.65E-07	1.80E-07
Aldehyde Ketones											
Formaldehyde	4.91E-05	2.06E-06	1.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 2b
Annual Facility Impacts for Constituents of Concern - Potomac River
RME Fisher Scenario (Potomac River)
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	5.28E-07	1.01E-10	1.72E-12	1.03E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.09E-07	1.25E-07	1.23E-07	2.48E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.56E-08	1.96E-08	1.93E-08	3.89E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.14E-07	1.67E-07	1.65E-07	3.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.77E-07	1.18E-07	1.17E-07	2.35E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-07	6.95E-08	6.86E-08	1.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-07	3.44E-08	3.39E-08	6.83E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-06	2.12E-07	2.09E-07	4.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.12E-06	1.87E-06	1.85E-06	3.72E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-06	2.93E-07	2.90E-07	5.83E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	5.67E-06	2.41E-09	6.49E-11	2.48E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.74E-06	1.57E-07	6.97E-08	2.26E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-06	2.57E-07	2.54E-07	5.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E-07	1.84E-07	1.82E-07	3.67E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-05	3.05E-06	3.02E-06	6.07E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	1.91E-11	2.12E-12	4.77E-14	2.17E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-11	5.39E-13	2.40E-13	7.79E-13
PCBs												
Total PCBs	1.34E-06	4.04E-09	1.48E-10	4.19E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-06	3.70E-08	1.65E-08	5.35E-08
PAHs												
Acenaphthene	5.36E-07	3.09E-09	2.72E-10	3.36E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	7.34E-08	1.67E-09	2.14E-11	1.69E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	5.46E-08	6.63E-10	6.53E-11	7.28E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.54E-08	1.51E-09	6.73E-10	2.18E-09
Benzo(a)anthracene	3.92E-08	5.44E-09	8.80E-10	6.32E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.08E-08	1.11E-09	4.96E-10	1.61E-09
Benzo(a)pyrene	4.38E-08	6.04E-09	2.47E-09	8.50E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.56E-08	1.25E-09	5.55E-10	1.80E-09
Benzo(b)fluoranthene	1.09E-07	3.38E-09	7.96E-11	3.46E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-07	3.02E-09	1.34E-09	4.36E-09
Benzo(k)fluoranthene	6.75E-08	2.10E-09	1.95E-10	2.30E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.87E-08	1.87E-09	8.35E-10	2.71E-09
Benzo(ghi)perylene	4.83E-08	6.81E-09	4.16E-09	1.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	5.85E-07	1.73E-08	4.96E-10	1.78E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.95E-07	1.62E-08	7.24E-09	2.35E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.71E-08	1.58E-08	1.56E-08	3.14E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	4.77E-08	1.13E-09	1.04E-10	1.23E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.85E-08	1.32E-09	5.89E-10	1.91E-09
Fluorene	7.66E-08	7.91E-10	9.29E-11	8.84E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.23E-08	1.28E-08	1.26E-08	2.53E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	1.05E-07	3.82E-10	1.64E-12	3.84E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	3.21E-07	1.94E-09	5.44E-11	1.99E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	8.16E-08	1.56E-09	1.64E-10	1.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-08	2.26E-09	1.01E-09	3.27E-09
Pyrene	4.40E-08	1.14E-09	1.03E-10	1.24E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-08	1.22E-09	5.44E-10	1.76E-09
Aldehyde Ketones												
Formaldehyde	6.03E-06	2.89E-07	9.11E-07	1.20E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 2c
Annual Facility Impacts for Constituents of Concern - Potomac River Watershed
RME Fisher Scenario (Potomac River)
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydpb** g/m2- yr	**Wet dep Dywpb** g/m2- yr	**Total Dep Dytwpb** g/m2- yr
Inorganics												
Antimony	8.08E-07	1.64E-10	3.98E-12	1.68E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.51E-07	2.28E-07	5.23E-07	7.52E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-07	3.59E-08	8.22E-08	1.18E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-06	3.05E-07	7.00E-07	1.01E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.11E-07	2.16E-07	4.96E-07	7.12E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.74E-07	1.27E-07	2.92E-07	4.19E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-07	6.29E-08	1.44E-07	2.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-06	3.87E-07	8.87E-07	1.27E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-05	3.42E-06	7.84E-06	1.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-06	5.37E-07	1.23E-06	1.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	8.67E-06	3.94E-09	1.50E-10	4.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.72E-06	2.91E-07	2.86E-07	5.78E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-06	4.71E-07	1.08E-06	1.55E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-06	3.38E-07	7.74E-07	1.11E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-05	5.59E-06	1.28E-05	1.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	2.95E-11	3.44E-12	1.11E-13	3.55E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E-11	1.00E-12	9.85E-13	1.99E-12
PCBs												
Total PCBs	2.05E-06	6.60E-09	3.42E-10	6.94E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-06	6.89E-08	6.77E-08	1.37E-07
PAHs												
Acenaphthene	8.20E-07	4.84E-09	6.31E-10	5.47E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	1.13E-07	2.65E-09	4.95E-11	2.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	8.35E-08	1.05E-09	1.51E-10	1.20E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.42E-08	2.81E-09	2.76E-09	5.57E-09
Benzo(a)anthracene	6.07E-08	8.88E-09	2.13E-09	1.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.20E-08	2.07E-09	2.04E-09	4.11E-09
Benzo(a)pyrene	6.79E-08	9.84E-09	6.17E-09	1.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.94E-08	2.32E-09	2.28E-09	4.59E-09
Benzo(b)fluoranthene	1.67E-07	5.57E-09	1.84E-10	5.75E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-07	5.62E-09	5.52E-09	1.11E-08
Benzo(k)fluoranthene	1.03E-07	3.46E-09	4.46E-10	3.91E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-07	3.49E-09	3.43E-09	6.92E-09
Benzo(ghi)perylene	7.50E-08	1.11E-08	1.04E-08	2.15E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	8.97E-07	2.85E-08	1.15E-09	2.97E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.06E-07	3.02E-08	2.97E-08	5.99E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-07	2.89E-08	6.62E-08	9.51E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	7.31E-08	1.84E-09	2.38E-10	2.07E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.38E-08	2.46E-09	2.42E-09	4.88E-09
Fluorene	1.17E-07	1.25E-09	2.15E-10	1.46E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.74E-08	2.34E-08	5.35E-08	7.69E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	1.60E-07	5.98E-10	3.79E-12	6.02E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	4.91E-07	3.13E-09	1.26E-10	3.26E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	1.25E-07	2.51E-09	3.76E-10	2.89E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-07	4.21E-09	4.13E-09	8.34E-09
Pyrene	6.74E-08	1.87E-09	2.35E-10	2.10E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.81E-08	2.27E-09	2.23E-09	4.51E-09
Aldehyde Ketones												
Formaldehyde	9.28E-06	4.62E-07	2.58E-06	3.04E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 3
Annual Facility Impacts for Constituents of Concern - Farm 2
RME Farmer Scenario
Montgomery County RRF, Dickerson, MD

COC	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
	Cyv ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	2.55E-06	5.17E-10	9.21E-12	5.26E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-06	9.61E-07	1.35E-06	2.32E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-07	1.51E-07	2.13E-07	3.64E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E-06	1.29E-06	1.81E-06	3.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-06	9.11E-07	1.28E-06	2.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-06	5.35E-07	7.54E-07	1.29E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.96E-07	2.65E-07	3.73E-07	6.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.67E-06	1.63E-06	2.30E-06	3.93E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.24E-05	1.44E-05	2.03E-05	3.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.09E-06	2.26E-06	3.19E-06	5.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	2.73E-05	1.27E-08	3.48E-10	1.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.73E-05	1.19E-06	7.39E-07	1.93E-06
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E-06	1.98E-06	2.79E-06	4.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E-06	1.42E-06	2.00E-06	3.42E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E-05	2.35E-05	3.32E-05	5.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	9.41E-11	1.17E-11	2.58E-13	1.20E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.42E-11	4.11E-12	2.54E-12	6.65E-12
PCBs												
Total PCBs	6.47E-06	2.15E-08	7.91E-10	2.23E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-06	2.82E-07	1.75E-07	4.57E-07
PAHs												
Acenaphthene	2.59E-06	1.61E-08	1.46E-09	1.75E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	3.56E-07	8.64E-09	1.15E-10	8.76E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.64E-07	3.63E-09	3.57E-10	3.98E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.64E-07	1.15E-08	7.13E-09	1.86E-08
Benzo(a)anthracene	1.94E-07	3.09E-08	5.06E-09	3.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-07	8.49E-09	5.26E-09	1.37E-08
Benzo(a)pyrene	2.17E-07	3.44E-08	1.51E-08	4.94E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-07	9.49E-09	5.88E-09	1.54E-08
Benzo(b)fluoranthene	5.27E-07	2.08E-08	4.29E-10	2.12E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.27E-07	2.30E-08	1.42E-08	3.73E-08
Benzo(k)fluoranthene	3.27E-07	1.29E-08	1.09E-09	1.40E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.27E-07	1.43E-08	8.85E-09	2.31E-08
Benzo(ghi)perylene	2.40E-07	3.87E-08	2.58E-08	6.45E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	2.84E-06	1.06E-07	2.68E-09	1.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-06	1.24E-07	7.67E-08	2.01E-07
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-07	1.22E-07	1.71E-07	2.93E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.31E-07	6.68E-09	5.74E-10	7.25E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-07	1.01E-08	6.25E-09	1.63E-08
Fluorene	3.70E-07	4.27E-09	5.08E-10	4.77E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-07	9.83E-08	1.38E-07	2.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	5.04E-07	1.91E-09	8.78E-12	1.92E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.55E-06	1.02E-08	2.91E-10	1.05E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	3.95E-07	8.96E-09	8.99E-10	9.86E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.95E-07	1.72E-08	1.07E-08	2.79E-08
Pyrene	2.13E-07	6.85E-09	5.70E-10	7.42E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-07	9.31E-09	5.77E-09	1.51E-08
Aldehyde Ketones												
Formaldehyde	2.95E-05	1.51E-06	6.55E-06	8.06E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F-4
Location of Maximum Dry Particle Deposition
MEI Scenario A
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg			Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv * Q** ug/m3	**dry dep Dydv * Q** g/m2- yr	**wet dep Dywv * Q** g/m2- yr	**Cyp * Q** ug/m3	**dry dep Dydp * Q** g/m2- yr	**wet dep Dywp * Q** g/m2- yr	**total dep Dtot * Q** g/m2- yr	**Cypb * Q** ug/m3	**dry dep Dydpb * Q** g/m2- yr	**wet dep Dywpb * Q** g/m2- yr	**total dep Dtotpb * Q** g/m2- yr
Inorganics											
Antimony	3.27E-06	7.83E-10	2.80E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	2.88E-06	1.58E-06	4.84E-06	6.43E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	4.52E-07	2.49E-07	7.61E-07	1.01E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	3.85E-06	2.12E-06	6.47E-06	8.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	2.74E-06	1.50E-06	4.59E-06	6.09E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	1.60E-06	8.83E-07	2.70E-06	3.58E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	7.93E-07	4.37E-07	1.33E-06	1.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	4.88E-06	2.69E-06	8.21E-06	1.09E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	4.31E-05	2.37E-05	7.26E-05	9.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	6.77E-06	3.73E-06	1.14E-05	1.51E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	3.50E-05	1.90E-08	1.06E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.45E-05	1.87E-06	2.92E-06	4.79E-06
Nickel	0.00E+00	0.00E+00	0.00E+00	5.93E-06	3.27E-06	9.98E-06	1.32E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	4.25E-06	2.34E-06	7.16E-06	9.50E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	7.05E-05	3.88E-05	1.19E-04	1.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	1.21E-10	1.60E-11	7.86E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-10	6.45E-12	1.01E-11	1.65E-11
PCBs											
Total PCBs	8.29E-06	3.14E-08	2.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.16E-06	4.43E-07	6.90E-07	1.13E-06
PAHs											
Acenaphthene	3.34E-06	2.12E-08	3.57E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	4.56E-07	1.17E-08	3.49E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	3.41E-07	4.85E-09	8.63E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-07	1.81E-08	2.82E-08	4.62E-08
Benzo(a)anthracene	2.49E-07	4.25E-08	1.55E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-07	1.33E-08	2.08E-08	3.41E-08
Benzo(a)pyrene	2.79E-07	4.70E-08	4.63E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.74E-07	1.49E-08	2.32E-08	3.81E-08
Benzo(b)fluoranthene	6.81E-07	2.87E-08	1.05E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.65E-07	3.61E-08	5.63E-08	9.24E-08
Benzo(k)fluoranthene	4.23E-07	1.78E-08	2.53E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.13E-07	2.24E-08	3.49E-08	5.74E-08
Benzo(ghi)perylene	3.08E-07	5.29E-08	7.69E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	3.64E-06	1.47E-07	8.17E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.58E-06	1.94E-07	3.03E-07	4.97E-07
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	3.67E-07	2.01E-07	6.12E-07	8.13E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.98E-07	9.14E-09	1.36E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.92E-07	1.58E-08	2.47E-08	4.05E-08
Fluorene	4.78E-07	5.69E-09	1.23E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	2.96E-07	1.62E-07	4.95E-07	6.57E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	6.46E-07	2.57E-09	2.67E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.99E-06	1.45E-08	8.87E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	5.10E-07	1.22E-08	2.15E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.98E-07	2.70E-08	4.22E-08	6.92E-08
Pyrene	2.73E-07	9.41E-09	1.66E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-07	1.46E-08	2.28E-08	3.74E-08
Aldehyde Ketones											
Formaldehyde	3.78E-05	2.06E-06	2.09E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F-5a
Location of Maximum Total Particle and Vapor Deposition
MEI Scenario B
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv * Q** ug/m3	**dry dep Dydv * Q** g/m2- yr	**wet dep Dywv * Q** g/m2- yr	**total dep Dtotv * Q**	**Cyp * Q** ug/m3	**dry dep Dydp * Q** g/m2- yr	**wet dep Dywp * Q** g/m2- yr	**total dep Dtotp * Q** g/m2- yr	**Cypb * Q** ug/m3	**dry dep Dydpb * Q** g/m2- yr	**wet dep Dywpb * Q** g/m2- yr	**total dep Dtotpb * Q** g/m2- yr
Inorganics												
Antimony	3.27E-06	7.83E-10	2.80E-11	8.11E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-07	7.59E-08	3.94E-05	3.95E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E-08	1.19E-08	6.19E-06	6.20E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-07	1.02E-07	5.27E-05	5.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-07	7.19E-08	3.73E-05	3.74E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-07	4.23E-08	2.19E-05	2.20E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-08	2.09E-08	1.09E-05	1.09E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-07	1.29E-07	6.68E-05	6.69E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-06	1.14E-06	5.90E-04	5.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.34E-07	1.79E-07	9.26E-05	9.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	3.50E-05	1.90E-08	1.06E-09	2.00E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E-06	1.51E-07	2.12E-05	2.13E-05
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E-07	1.56E-07	8.12E-05	8.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.73E-07	1.12E-07	5.82E-05	5.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.52E-06	1.86E-06	9.64E-04	9.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	1.21E-10	1.60E-11	7.86E-13	1.68E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.14E-12	5.21E-13	7.29E-11	7.34E-11
PCBs												
Total PCBs	8.29E-06	3.14E-08	2.41E-09	3.38E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.59E-07	3.58E-08	5.01E-06	5.04E-06
PAHs												
Acenaphthene	3.21E-07	1.98E-09	2.90E-08	3.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	4.56E-07	1.17E-08	3.49E-10	1.20E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.28E-08	2.96E-10	7.09E-09	7.39E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E-08	1.46E-09	2.04E-07	2.06E-07
Benzo(a)anthracene	1.68E-08	2.66E-09	1.04E-07	1.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-08	1.08E-09	1.51E-07	1.52E-07
Benzo(a)pyrene	1.88E-08	2.92E-09	3.11E-07	3.14E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-08	1.20E-09	1.68E-07	1.70E-07
Benzo(b)fluoranthene	6.75E-07	0.00E+00	1.31E-09	3.00E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.56E-08	2.92E-09	4.08E-07	4.11E-07
Benzo(k)fluoranthene	4.06E-08	1.35E-09	2.02E-08	2.16E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.83E-08	1.81E-09	2.54E-07	2.55E-07
Benzo(ghi)perylene	2.08E-08	3.28E-09	5.20E-07	5.24E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	3.64E-06	1.47E-07	8.17E-09	1.55E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-07	1.57E-08	2.20E-06	2.21E-06
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-08	9.60E-09	4.98E-06	4.99E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.87E-08	7.38E-10	1.11E-08	1.18E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-08	1.28E-09	1.79E-07	1.80E-07
Fluorene	3.20E-08	3.53E-10	9.89E-09	1.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.89E-08	7.76E-09	4.03E-06	4.03E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	6.46E-07	2.57E-09	2.67E-11	2.59E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.99E-06	1.45E-08	8.87E-10	1.53E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	3.42E-08	6.95E-10	1.79E-08	1.86E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.42E-08	2.19E-09	3.06E-07	3.08E-07
Pyrene	2.64E-08	7.45E-10	1.09E-08	1.17E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-08	1.18E-09	1.65E-07	1.66E-07
Aldehyde Ketones												
Formaldehyde	2.55E-06	1.50E-07	1.44E-04	1.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F-5b
Secondary Air Concentrations
MEI Scenario B
Montgomery County RRF, Dickerson, MD

COC	**Cyv * Q** ug/m3	**Cyp * Q** g/m2- yr	**Cypb * Q** g/m2- yr
Inorganics			
Antimony	3.29E-06	0.00E+00	0.00E+00
Arsenic	0.00E+00	2.85E-06	0.00E+00
Beryllium	0.00E+00	4.47E-07	0.00E+00
Cadmium	0.00E+00	3.80E-06	0.00E+00
Chromium +3	0.00E+00	2.71E-06	0.00E+00
Chromium +6	0.00E+00	1.58E-06	0.00E+00
Cobalt	0.00E+00	7.84E-07	0.00E+00
Copper	0.00E+00	4.82E-06	0.00E+00
Lead	0.00E+00	4.26E-05	0.00E+00
Manganese	0.00E+00	6.69E-06	0.00E+00
Mercury	3.53E-05	0.00E+00	3.53E-05
Nickel	0.00E+00	5.86E-06	0.00E+00
Selenium	0.00E+00	4.21E-06	0.00E+00
Zinc	0.00E+00	6.97E-05	0.00E+00
Dioxins/Furans			
2,3,7,8-TCDD-TEQ	1.22E-10	0.00E+00	1.22E-10
PCBs			
Total PCBs	8.35E-06	0.00E+00	8.35E-06
PAHs			
Acenaphthene	3.34E-06	0.00E+00	0.00E+00
Acenaphthylene	4.60E-07	0.00E+00	0.00E+00
Anthracene	3.41E-07	0.00E+00	3.41E-07
Benzo(a)anthracene	2.51E-07	0.00E+00	2.51E-07
Benzo(a)pyrene	2.81E-07	0.00E+00	2.81E-07
Benzo(b)fluoranthene	6.81E-07	0.00E+00	6.81E-07
Benzo(k)fluoranthene	4.23E-07	0.00E+00	4.23E-07
Benzo(ghi)perylene	3.10E-07	0.00E+00	0.00E+00
Chrysene	3.66E-06	0.00E+00	3.66E-06
Dibenzo(a,h)anthracene	0.00E+00	3.62E-07	0.00E+00
Fluoranthene	2.98E-07	0.00E+00	2.99E-07
Fluorene	4.78E-07	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	2.92E-07	0.00E+00
2-Methylnaphthalene	6.51E-07	0.00E+00	0.00E+00
Naphthalene	2.00E-06	0.00E+00	0.00E+00
Phenanthrene	5.10E-07	0.00E+00	5.10E-07
Pyrene	2.75E-07	0.00E+00	2.75E-07
Aldehyde Ketones			
Formaldehyde	3.81E-05	0.00E+00	0.00E+00

Appendix F - 6a
Annual Facility Impacts for Constituents of Concern
Fisher Scenario (Monocacy River)
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg			Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv * Q** ug/m3	**dry dep Dydv * Q** g/m2- yr	**wet dep Dywv * Q** g/m2- yr	**Cyp * Q** ug/m3	**dry dep Dydp * Q** g/m2- yr	**wet dep Dywp * Q** g/m2- yr	**total dep Dtot * Q** g/m2- yr	**Cypb * Q** ug/m3	**dry dep Dydpb * Q** g/m2- yr	**wet dep Dywpb * Q** g/m2- yr	**total dep Dtotpb * Q** g/m2- yr
Inorganics											
Antimony	4.38E-06	7.83E-10	1.86E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	3.14E-06	1.58E-06	3.94E-05	4.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	4.93E-07	2.49E-07	6.19E-06	6.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	4.20E-06	2.12E-06	5.27E-05	5.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	2.97E-06	1.50E-06	3.73E-05	3.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	1.75E-06	8.83E-07	2.19E-05	2.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	8.65E-07	4.37E-07	1.09E-05	1.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	5.32E-06	2.69E-06	6.68E-05	6.95E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	4.70E-05	2.37E-05	5.90E-04	6.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	7.38E-06	3.73E-06	9.26E-05	9.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	4.70E-05	1.90E-08	7.03E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-05	1.87E-06	2.12E-05	2.30E-05
Nickel	0.00E+00	0.00E+00	0.00E+00	6.47E-06	3.27E-06	8.12E-05	8.44E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	4.64E-06	2.34E-06	5.82E-05	6.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	7.69E-05	3.88E-05	9.64E-04	1.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	1.56E-10	1.60E-11	5.23E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-10	6.45E-12	7.29E-11	7.94E-11
PCBs											
Total PCBs	1.11E-05	3.14E-08	1.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-05	4.43E-07	5.01E-06	5.45E-06
PAHs											
Acenaphthene	4.44E-06	2.12E-08	2.96E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	6.02E-07	1.17E-08	2.32E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	4.51E-07	4.85E-09	7.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.49E-07	1.81E-08	2.04E-07	2.22E-07
Benzo(a)anthracene	3.23E-07	4.25E-08	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-07	1.33E-08	1.51E-07	1.64E-07
Benzo(a)pyrene	3.61E-07	4.70E-08	3.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.70E-07	1.49E-08	1.68E-07	1.83E-07
Benzo(b)fluoranthene	9.00E-07	2.87E-08	8.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.97E-07	3.61E-08	4.08E-07	4.44E-07
Benzo(k)fluoranthene	5.59E-07	1.78E-08	2.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-07	2.24E-08	2.54E-07	2.76E-07
Benzo(ghi)perylene	3.99E-07	5.29E-08	5.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	4.85E-06	1.47E-07	5.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-06	1.94E-07	2.20E-06	2.39E-06
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	3.97E-07	2.01E-07	4.98E-06	5.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.95E-07	9.14E-09	1.13E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-07	1.58E-08	1.79E-07	1.95E-07
Fluorene	6.33E-07	5.69E-09	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	3.21E-07	1.62E-07	4.03E-06	4.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	8.63E-07	2.57E-09	1.78E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	2.66E-06	1.45E-08	5.90E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	6.75E-07	1.22E-08	1.79E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.72E-07	2.70E-08	3.06E-07	3.33E-07
Pyrene	3.64E-07	9.41E-09	1.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.63E-07	1.46E-08	1.65E-07	1.80E-07
Aldehyde Ketones											
Formaldehyde	4.91E-05	2.06E-06	1.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 6b
Annual Facility Impacts for Constituents of Concern - Monocacy River
Fisher Scenario (Monocacy River)
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	9.20E-07	1.61E-10	1.72E-12	1.63E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.97E-07	2.19E-07	8.19E-08	3.01E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-07	3.44E-08	1.29E-08	4.72E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06	2.93E-07	1.09E-07	4.02E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.50E-07	2.07E-07	7.75E-08	2.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-07	1.22E-07	4.56E-08	1.68E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-07	6.03E-08	2.26E-08	8.29E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-06	3.71E-07	1.39E-07	5.10E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-05	3.28E-06	1.23E-06	4.51E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-06	5.15E-07	1.93E-07	7.08E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	9.88E-06	3.89E-09	6.49E-11	3.96E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.92E-06	2.64E-07	4.70E-08	3.11E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-06	4.51E-07	1.69E-07	6.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-06	3.24E-07	1.21E-07	4.45E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-05	5.36E-06	2.00E-06	7.37E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	3.34E-11	3.84E-12	4.67E-14	3.89E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.42E-11	9.09E-13	1.62E-13	1.07E-12
PCBs												
Total PCBs	2.33E-06	6.72E-09	1.48E-10	6.87E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-06	6.24E-08	1.11E-08	7.35E-08
PAHs												
Acenaphthene	9.35E-07	5.52E-09	2.71E-10	5.79E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	1.28E-07	2.93E-09	2.13E-11	2.95E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	9.51E-08	1.21E-09	5.82E-11	1.27E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.57E-08	2.55E-09	4.53E-10	3.00E-09
Benzo(a)anthracene	6.86E-08	9.99E-09	7.64E-10	1.08E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-08	1.88E-09	3.34E-10	2.21E-09
Benzo(a)pyrene	7.67E-08	1.11E-08	1.89E-09	1.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.89E-08	2.10E-09	3.74E-10	2.47E-09
Benzo(b)fluoranthene	1.89E-07	6.60E-09	7.63E-11	6.68E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-07	5.09E-09	9.05E-10	5.99E-09
Benzo(k)fluoranthene	1.18E-07	4.11E-09	1.57E-10	4.26E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-07	3.16E-09	5.62E-10	3.72E-09
Benzo(ghi)perylene	8.48E-08	1.25E-08	3.13E-09	1.57E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.02E-06	3.36E-08	4.66E-10	3.41E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-06	2.74E-08	4.87E-09	3.23E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-07	2.77E-08	1.04E-08	3.81E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	8.32E-08	2.14E-09	8.30E-11	2.23E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.39E-08	2.23E-09	3.97E-10	2.63E-09
Fluorene	1.33E-07	1.44E-09	8.26E-11	1.52E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.18E-08	2.24E-08	8.37E-09	3.08E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	1.82E-07	6.56E-10	1.64E-12	6.57E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	5.59E-07	3.28E-09	5.43E-11	3.33E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	1.42E-07	2.91E-09	1.32E-10	3.05E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-07	3.81E-09	6.79E-10	4.49E-09
Pyrene	7.67E-08	2.19E-09	8.20E-11	2.27E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.74E-08	2.06E-09	3.66E-10	2.43E-09
Aldehyde Ketones												
Formaldehyde	1.06E-05	5.05E-07	6.33E-07	1.14E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 6c
Annual Facility Impacts for Constituents of Concern - Monocacy River Watershed
Fisher Scenario (Monocacy River)
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydpb** g/m2- yr	**Wet dep Dywpb** g/m2- yr	**Total Dep Dytwpb** g/m2- yr
Inorganics												
Antimony	6.27E-07	1.19E-10	1.04E-12	1.20E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.22E-07	1.49E-07	4.62E-08	1.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-07	2.34E-08	7.25E-09	3.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.65E-07	1.99E-07	6.17E-08	2.61E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.84E-07	1.41E-07	4.37E-08	1.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.02E-07	8.29E-08	2.57E-08	1.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-07	4.10E-08	1.27E-08	5.37E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-06	2.52E-07	7.83E-08	3.31E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-05	2.23E-06	6.92E-07	2.92E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-06	3.50E-07	1.09E-07	4.59E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	6.73E-06	2.83E-09	3.91E-11	2.87E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.81E-06	1.82E-07	2.69E-08	2.09E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-06	3.07E-07	9.51E-08	4.02E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-06	2.20E-07	6.83E-08	2.88E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-05	3.64E-06	1.13E-06	4.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	2.26E-11	2.52E-12	2.82E-14	2.55E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-11	6.27E-13	9.27E-14	7.20E-13
PCBs												
Total PCBs	1.59E-06	4.80E-09	8.90E-11	4.89E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-06	4.31E-08	6.37E-09	4.94E-08
PAHs												
Acenaphthene	6.37E-07	3.66E-09	1.64E-10	3.83E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	8.71E-08	2.00E-09	1.29E-11	2.01E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	6.48E-08	7.84E-10	3.69E-11	8.21E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.57E-08	1.76E-09	2.60E-10	2.02E-09
Benzo(a)anthracene	4.65E-08	6.43E-09	4.72E-10	6.90E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.84E-08	1.29E-09	1.92E-10	1.49E-09
Benzo(a)pyrene	5.20E-08	7.13E-09	1.20E-09	8.33E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-08	1.45E-09	2.14E-10	1.66E-09
Benzo(b)fluoranthene	1.29E-07	4.03E-09	4.68E-11	4.07E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-07	3.51E-09	5.19E-10	4.03E-09
Benzo(k)fluoranthene	8.01E-08	2.50E-09	1.07E-10	2.61E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.15E-08	2.18E-09	3.22E-10	2.50E-09
Benzo(ghi)perylene	5.74E-08	8.03E-09	2.04E-09	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	6.95E-07	2.06E-08	2.89E-10	2.09E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.07E-07	1.89E-08	2.80E-09	2.17E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.14E-08	1.88E-08	5.84E-09	2.47E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	5.66E-08	1.34E-09	5.53E-11	1.39E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.76E-08	1.54E-09	2.28E-10	1.77E-09
Fluorene	9.09E-08	9.35E-10	5.24E-11	9.88E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.38E-08	1.52E-08	4.72E-09	1.99E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	1.24E-07	4.55E-10	9.88E-13	4.56E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	3.81E-07	2.31E-09	3.27E-11	2.35E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	9.68E-08	1.85E-09	8.71E-11	1.93E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.84E-08	2.63E-09	3.89E-10	3.02E-09
Pyrene	5.22E-08	1.36E-09	5.48E-11	1.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.31E-08	1.42E-09	2.10E-10	1.63E-09
Aldehyde Ketones												
Formaldehyde	7.16E-06	3.45E-07	3.96E-07	7.41E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 7a
Annual Facility Impacts for Constituents of Concern
Resident Fisher Near Farm 1/Fishes Pond 2 Scenario - Farm Pond 2
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	1.72E-06	3.13E-10	4.34E-12	3.18E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-06	6.31E-07	5.34E-07	1.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-07	9.91E-08	8.38E-08	1.83E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-06	8.44E-07	7.14E-07	1.56E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-06	5.98E-07	5.05E-07	1.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.26E-07	3.52E-07	2.97E-07	6.49E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.09E-07	1.74E-07	1.47E-07	3.21E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.52E-06	1.07E-06	9.05E-07	1.98E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-05	9.46E-06	8.00E-06	1.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.49E-06	1.48E-06	1.26E-06	2.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	1.84E-05	7.59E-09	1.64E-10	7.75E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-05	7.79E-07	2.93E-07	1.07E-06
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-06	1.30E-06	1.10E-06	2.40E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-06	9.33E-07	7.89E-07	1.72E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.63E-05	1.55E-05	1.31E-05	2.85E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	6.34E-11	7.85E-12	1.22E-13	7.97E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.35E-11	2.68E-12	1.01E-12	3.69E-12
PCBs												
Total PCBs	4.36E-06	1.30E-08	3.73E-10	1.34E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.36E-06	1.84E-07	6.94E-08	2.54E-07
PAHs												
Acenaphthene	1.75E-06	1.09E-08	6.89E-10	1.16E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	2.40E-07	5.72E-09	5.40E-11	5.78E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.78E-07	2.45E-09	1.69E-10	2.62E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-07	7.52E-09	2.83E-09	1.04E-08
Benzo(a)anthracene	1.31E-07	2.07E-08	2.36E-09	2.31E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-07	5.54E-09	2.09E-09	7.63E-09
Benzo(a)pyrene	1.46E-07	2.30E-08	7.01E-09	3.00E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-07	6.20E-09	2.33E-09	8.53E-09
Benzo(b)fluoranthene	3.55E-07	1.39E-08	2.02E-10	1.41E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.55E-07	1.50E-08	5.66E-09	2.07E-08
Benzo(k)fluoranthene	2.21E-07	8.63E-09	5.00E-10	9.13E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-07	9.33E-09	3.51E-09	1.28E-08
Benzo(ghi)perylene	1.62E-07	2.59E-08	1.17E-08	3.76E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.91E-06	7.10E-08	1.26E-09	7.23E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-06	8.09E-08	3.05E-08	1.11E-07
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-07	7.17E-08	6.06E-08	1.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	1.56E-07	4.48E-09	2.68E-10	4.75E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-07	6.59E-09	2.48E-09	9.07E-09
Fluorene	2.50E-07	2.89E-09	2.40E-10	3.13E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-07	6.45E-08	5.46E-08	1.19E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	3.40E-07	1.27E-09	4.14E-12	1.28E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.05E-06	6.37E-09	1.37E-10	6.51E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.66E-07	6.03E-09	4.23E-10	6.46E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.66E-07	1.13E-08	4.24E-09	1.55E-08
Pyrene	1.44E-07	4.59E-09	2.63E-10	4.86E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-07	6.08E-09	2.29E-09	8.37E-09
Aldehyde Ketones												
Formaldehyde	1.99E-05	9.62E-07	2.90E-06	3.86E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 7b
Annual Facility Impacts for Constituents of Concern
Resident Fisher Near Farm 1/Fishes Pond 2 Scenario - Farm Pond 2 Watershed
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydpb** g/m2- yr	**Wet dep Dywpb** g/m2- yr	**Total Dep Dytwpb** g/m2- yr
Inorganics												
Antimony	1.51E-06	2.93E-10	3.96E-12	2.97E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-06	2.67E-06	2.39E-06	5.07E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-07	4.20E-07	3.76E-07	7.96E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-06	3.58E-06	3.20E-06	6.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-06	2.53E-06	2.26E-06	4.80E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.27E-07	1.49E-06	1.33E-06	2.82E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.60E-07	7.37E-07	6.59E-07	1.40E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-06	4.54E-06	4.05E-06	8.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-05	4.01E-05	3.58E-05	7.59E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.07E-06	6.29E-06	5.62E-06	1.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	1.62E-05	7.11E-09	1.50E-10	7.26E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-05	6.79E-07	2.63E-07	9.42E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-06	5.51E-06	4.93E-06	1.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-06	3.96E-06	3.54E-06	7.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E-05	6.55E-05	5.86E-05	1.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	5.56E-11	6.95E-12	1.11E-13	7.06E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-11	2.34E-12	9.07E-13	3.25E-12
PCBs												
Total PCBs	3.82E-06	1.21E-08	3.40E-10	1.24E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-06	1.61E-07	6.23E-08	2.23E-07
PAHs												
Acenaphthene	1.53E-06	6.45E-09	6.28E-10	7.08E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	2.10E-07	1.13E-10	4.93E-11	1.63E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.56E-07	6.93E-11	1.54E-10	2.23E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-07	6.55E-09	2.54E-09	9.10E-09
Benzo(a)anthracene	1.15E-07	3.97E-11	2.15E-09	2.19E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-07	4.83E-09	1.87E-09	6.70E-09
Benzo(a)pyrene	1.28E-07	4.98E-11	6.36E-09	6.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-07	5.40E-09	2.09E-09	7.50E-09
Benzo(b)fluoranthene	3.12E-07	2.64E-10	1.84E-10	4.49E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.12E-07	1.31E-08	5.08E-09	1.82E-08
Benzo(k)fluoranthene	1.94E-07	1.02E-10	4.63E-10	5.65E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-07	8.13E-09	3.15E-09	1.13E-08
Benzo(ghi)perylene	1.42E-07	5.17E-11	1.07E-08	1.08E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.68E-06	7.24E-09	1.15E-09	8.39E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-06	7.05E-08	2.73E-08	9.78E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-07	6.79E-08	6.05E-08	1.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	1.37E-07	6.63E-11	2.46E-10	3.12E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-07	5.74E-09	2.23E-09	7.97E-09
Fluorene	2.19E-07	1.35E-10	2.19E-10	3.54E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-07	5.49E-08	4.89E-08	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	2.98E-07	2.27E-10	3.78E-12	2.31E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	9.16E-07	2.15E-09	1.25E-10	2.27E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.34E-07	1.80E-10	3.87E-10	5.66E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-07	9.81E-09	3.80E-09	1.36E-08
Pyrene	1.26E-07	5.45E-11	2.42E-10	2.97E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-07	5.30E-09	2.05E-09	7.35E-09
Aldehyde Ketones												
Formaldehyde	1.74E-05	8.71E-07	2.61E-06	3.48E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 8a
Annual Facility Impacts for Constituents of Concern
Resident Fisher Near Farm 2/Fishes Pond 3 Scenario - Farm Pond 3
Montgomery County RRF, Dickerson, MD

COC	Organics, Antimony, Hg Cyv ug/m3	Dry dep Dydv g/m2- yr	Wet dep Dywv g/m2- yr	Total Dep Dytwv g/m2- yr	Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene Cyp ug/m3	Dry dep Dydp g/m2- yr	Wet dep Dywp g/m2- yr	Total Dep Dytwp g/m2- yr	Particle Bound - Mercury and Organics Cypb ug/m3	Dry dep Dydp g/m2- yr	Wet dep Dywp g/m2- yr	Total Dep Dytwp g/m2- yr
Inorganics												
Antimony	1.38E-06	2.54E-10	3.04E-12	2.57E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-06	3.68E-07	3.11E-07	6.79E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-07	5.78E-08	4.89E-08	1.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-06	4.92E-07	4.16E-07	9.08E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-06	3.48E-07	2.95E-07	6.43E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.42E-07	2.05E-07	1.73E-07	3.78E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-07	1.01E-07	8.57E-08	1.87E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-06	6.23E-07	5.27E-07	1.15E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-05	5.51E-06	4.66E-06	1.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-06	8.65E-07	7.32E-07	1.60E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	1.48E-05	6.21E-09	1.15E-10	6.33E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-05	5.00E-07	1.73E-07	6.73E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.38E-06	7.58E-07	6.41E-07	1.40E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-06	5.44E-07	4.60E-07	1.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E-05	9.00E-06	7.62E-06	1.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	5.08E-11	5.93E-12	8.50E-14	6.02E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-11	1.72E-12	5.96E-13	2.32E-12
PCBs												
Total PCBs	3.50E-06	1.07E-08	2.61E-10	1.09E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.50E-06	1.18E-07	4.09E-08	1.59E-07
PAHs												
Acenaphthene	1.40E-06	8.48E-09	4.82E-10	8.96E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	1.93E-07	4.51E-09	3.78E-11	4.55E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.43E-07	1.86E-09	1.18E-10	1.98E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-07	4.82E-09	1.67E-09	6.49E-09
Benzo(a)anthracene	1.05E-07	1.54E-08	1.63E-09	1.70E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-07	3.55E-09	1.23E-09	4.78E-09
Benzo(a)pyrene	1.17E-07	1.71E-08	4.79E-09	2.19E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-07	3.98E-09	1.38E-09	5.35E-09
Benzo(b)fluoranthene	2.85E-07	9.96E-09	1.42E-10	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.85E-07	9.63E-09	3.33E-09	1.30E-08
Benzo(k)fluoranthene	1.77E-07	6.19E-09	3.68E-10	6.56E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-07	5.98E-09	2.07E-09	8.05E-09
Benzo(ghi)perylene	1.30E-07	1.93E-08	8.34E-09	2.76E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.54E-06	5.10E-08	8.86E-10	5.19E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-06	5.19E-08	1.80E-08	6.98E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-07	4.18E-08	3.53E-08	7.71E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	1.25E-07	3.27E-09	1.93E-10	3.47E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-07	4.22E-09	1.46E-09	5.69E-09
Fluorene	2.01E-07	2.20E-09	1.68E-10	2.37E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-07	3.76E-08	3.18E-08	6.94E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	2.73E-07	1.01E-09	2.90E-12	1.02E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	8.39E-07	5.16E-09	9.63E-11	5.26E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.14E-07	4.47E-09	3.03E-10	4.77E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-07	7.22E-09	2.50E-09	9.72E-09
Pyrene	1.15E-07	3.33E-09	1.92E-10	3.52E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-07	3.90E-09	1.35E-09	5.25E-09
Aldehyde Ketones												
Formaldehyde	1.60E-05	7.72E-07	1.88E-06	2.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 8b
Annual Facility Impacts for Constituents of Concern
Resident Fisher Near Farm 2/Fishes Pond 3 Scenario - Farm Pond 3 Watershed
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydpb** g/m2- yr	**Wet dep Dywpb** g/m2- yr	**Total Dep Dytwpb** g/m2- yr
Inorganics												
Antimony	2.55E-06	5.17E-10	9.21E-12	5.26E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-06	9.61E-07	1.35E-06	2.32E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-07	1.51E-07	2.13E-07	3.64E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E-06	1.29E-06	1.81E-06	3.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-06	9.11E-07	1.28E-06	2.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-06	5.35E-07	7.54E-07	1.29E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.96E-07	2.65E-07	3.73E-07	6.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.67E-06	1.63E-06	2.30E-06	3.93E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.24E-05	1.44E-05	2.03E-05	3.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.09E-06	2.26E-06	3.19E-06	5.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	2.73E-05	1.27E-08	3.48E-10	1.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.73E-05	1.19E-06	7.39E-07	1.93E-06
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E-06	1.98E-06	2.79E-06	4.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E-06	1.42E-06	2.00E-06	3.42E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E-05	2.35E-05	3.32E-05	5.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	9.41E-11	1.17E-11	2.58E-13	1.20E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.42E-11	4.11E-12	2.54E-12	6.65E-12
PCBs												
Total PCBs	6.47E-06	2.15E-08	7.91E-10	2.23E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-06	2.82E-07	1.75E-07	4.57E-07
PAHs												
Acenaphthene	2.59E-06	1.61E-08	1.46E-09	1.75E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	3.56E-07	8.64E-09	1.15E-10	8.76E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.64E-07	3.63E-09	3.57E-10	3.98E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.64E-07	1.15E-08	7.13E-09	1.86E-08
Benzo(a)anthracene	1.94E-07	3.09E-08	5.06E-09	3.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-07	8.49E-09	5.26E-09	1.37E-08
Benzo(a)pyrene	2.17E-07	3.44E-08	1.51E-08	4.94E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-07	9.49E-09	5.88E-09	1.54E-08
Benzo(b)fluoranthene	5.27E-07	2.08E-08	4.29E-10	2.12E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.27E-07	2.30E-08	1.42E-08	3.73E-08
Benzo(k)fluoranthene	3.27E-07	1.29E-08	1.09E-09	1.40E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.27E-07	1.43E-08	8.85E-09	2.31E-08
Benzo(ghi)perylene	2.40E-07	3.87E-08	2.58E-08	6.45E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	2.84E-06	1.06E-07	2.68E-09	1.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-06	1.24E-07	7.67E-08	2.01E-07
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-07	1.22E-07	1.71E-07	2.93E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.31E-07	6.68E-09	5.74E-10	7.25E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-07	1.01E-08	6.25E-09	1.63E-08
Fluorene	3.70E-07	4.27E-09	5.08E-10	4.77E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-07	9.83E-08	1.38E-07	2.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	5.04E-07	1.91E-09	8.78E-12	1.92E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.55E-06	1.02E-08	2.91E-10	1.05E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	3.95E-07	8.96E-09	8.99E-10	9.86E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.95E-07	1.72E-08	1.07E-08	2.79E-08
Pyrene	2.13E-07	6.85E-09	5.70E-10	7.42E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-07	9.31E-09	5.77E-09	1.51E-08
Aldehyde Ketones												
Formaldehyde	2.95E-05	1.51E-06	6.55E-06	8.06E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 9
Annual Facility Impacts for Constituents of Concern - Farm 1
Farmer Scenario
Montgomery County RRF, Dickerson, MD

COC	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
	Cyv ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	1.51E-06	2.93E-10	3.96E-12	2.97E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-06	2.67E-06	2.39E-06	5.07E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-07	4.20E-07	3.76E-07	7.96E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-06	3.58E-06	3.20E-06	6.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-06	2.53E-06	2.26E-06	4.80E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.27E-07	1.49E-06	1.33E-06	2.82E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.60E-07	7.37E-07	6.59E-07	1.40E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-06	4.54E-06	4.05E-06	8.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-05	4.01E-05	3.58E-05	7.59E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.07E-06	6.29E-06	5.62E-06	1.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	1.62E-05	7.11E-09	1.50E-10	7.26E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-05	6.79E-07	2.63E-07	9.42E-07
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-06	5.51E-06	4.93E-06	1.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-06	3.96E-06	3.54E-06	7.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E-05	6.55E-05	5.86E-05	1.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	5.56E-11	6.95E-12	1.11E-13	7.06E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-11	2.34E-12	9.07E-13	3.25E-12
PCBs												
Total PCBs	3.82E-06	1.21E-08	3.40E-10	1.24E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-06	1.61E-07	6.23E-08	2.23E-07
PAHs												
Acenaphthene	1.53E-06	6.45E-09	6.28E-10	7.08E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	2.10E-07	1.13E-10	4.93E-11	1.63E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.56E-07	6.93E-11	1.54E-10	2.23E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-07	6.55E-09	2.54E-09	9.10E-09
Benzo(a)anthracene	1.15E-07	3.97E-11	2.15E-09	2.19E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-07	4.83E-09	1.87E-09	6.70E-09
Benzo(a)pyrene	1.28E-07	4.98E-11	6.36E-09	6.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-07	5.40E-09	2.09E-09	7.50E-09
Benzo(b)fluoranthene	3.12E-07	2.64E-10	1.84E-10	4.49E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.12E-07	1.31E-08	5.08E-09	1.82E-08
Benzo(k)fluoranthene	1.94E-07	1.02E-10	4.63E-10	5.65E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-07	8.13E-09	3.15E-09	1.13E-08
Benzo(ghi)perylene	1.42E-07	5.17E-11	1.07E-08	1.08E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.68E-06	7.24E-09	1.15E-09	8.39E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-06	7.05E-08	2.73E-08	9.78E-08
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-07	6.79E-08	6.05E-08	1.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	1.37E-07	6.63E-11	2.46E-10	3.12E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-07	5.74E-09	2.23E-09	7.97E-09
Fluorene	2.19E-07	1.35E-10	2.19E-10	3.54E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-07	5.49E-08	4.89E-08	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	2.98E-07	2.27E-10	3.78E-12	2.31E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	9.16E-07	2.15E-09	1.25E-10	2.27E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.34E-07	1.80E-10	3.87E-10	5.66E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-07	9.81E-09	3.80E-09	1.36E-08
Pyrene	1.26E-07	5.45E-11	2.42E-10	2.97E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-07	5.30E-09	2.05E-09	7.35E-09
Aldehyde Ketones												
Formaldehyde	1.74E-05	8.71E-07	2.61E-06	3.48E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 10
Annual Facility Impacts for Constituents of Concern - Farm 6
Farmer Scenario - Maximum Actual Farm
Montgomery County RRF, Dickerson, MD

	Organics, Antimony, Hg				Particulates - Inorganics (except Mercury), Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene				Particle Bound - Mercury and Organics			
COC	**Cyv** ug/m3	**Dry dep Dydv** g/m2- yr	**Wet dep Dywv** g/m2- yr	**Total Dep Dytwv** g/m2- yr	**Cyp** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr	**Cypb** ug/m3	**Dry dep Dydp** g/m2- yr	**Wet dep Dywp** g/m2- yr	**Total Dep Dytwp** g/m2- yr
Inorganics												
Antimony	1.18E-06	2.40E-12	1.60E-12	4.00E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.81E-07	1.06E-06	1.29E-07	1.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-07	1.67E-07	2.02E-08	1.87E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-06	1.42E-06	1.72E-07	1.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.29E-07	1.01E-06	1.22E-07	1.13E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium +6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.46E-07	5.92E-07	7.17E-08	6.64E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.70E-07	2.93E-07	3.55E-08	3.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-06	1.80E-06	2.18E-07	2.02E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-05	1.59E-05	1.93E-06	1.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-06	2.50E-06	3.03E-07	2.80E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	1.27E-05	9.06E-11	6.06E-11	1.51E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-05	2.74E-06	7.28E-08	2.81E-06
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-06	2.19E-06	2.65E-07	2.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-06	1.57E-06	1.90E-07	1.76E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.40E-05	2.60E-05	3.15E-06	2.92E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	4.34E-11	6.70E-14	4.47E-14	1.12E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.36E-11	9.44E-12	2.51E-13	9.69E-12
PCBs												
Total PCBs	3.00E-06	2.06E-10	1.38E-10	3.44E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E-06	6.49E-07	1.72E-08	6.66E-07
PAHs												
Acenaphthene	1.20E-06	3.80E-10	2.54E-10	6.35E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	1.65E-07	2.98E-11	2.00E-11	4.98E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.22E-07	9.29E-11	6.21E-11	1.55E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-07	2.65E-08	7.02E-10	2.72E-08
Benzo(a)anthracene	8.96E-08	1.27E-09	8.40E-10	2.11E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E-08	1.95E-08	5.18E-10	2.00E-08
Benzo(a)pyrene	1.00E-07	3.70E-09	2.40E-09	6.09E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	2.18E-08	5.79E-10	2.24E-08
Benzo(b)fluoranthene	2.44E-07	1.12E-10	7.46E-11	1.86E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.44E-07	5.29E-08	1.40E-09	5.43E-08
Benzo(k)fluoranthene	1.52E-07	2.89E-10	1.98E-10	4.87E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-07	3.28E-08	8.71E-10	3.37E-08
Benzo(ghi)perylene	1.11E-07	6.44E-09	4.15E-09	1.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	1.31E-06	6.98E-10	4.66E-10	1.16E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-06	2.85E-07	7.55E-09	2.92E-07
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-07	2.69E-08	1.63E-08	4.32E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	1.07E-07	1.52E-10	9.98E-11	2.52E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-07	2.32E-08	6.15E-10	2.38E-08
Fluorene	1.72E-07	1.32E-10	8.83E-11	2.20E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-07	2.17E-08	1.32E-08	3.49E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene	2.34E-07	2.29E-12	1.53E-12	3.82E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	7.18E-07	7.59E-11	5.08E-11	1.27E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	1.83E-07	2.38E-10	1.56E-10	3.95E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-07	3.96E-08	1.05E-09	4.07E-08
Pyrene	9.88E-08	1.51E-10	9.93E-11	2.50E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.88E-08	2.14E-08	5.68E-10	2.20E-08
Aldehyde Ketones												
Formaldehyde	1.36E-05	1.41E-06	8.80E-07	2.29E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix F - 11
Maximum Hourly Impacts
Montgomery County RRF, Dickerson, MD

COC	**Chv * Q** ug/m3	**Chp * Q** ug/m3	**Chpb * Q** ug/m3
Inorganics			
Antimony	9.60E-04	0.00E+00	0.00E+00
Arsenic	0.00E+00	5.41E-04	0.00E+00
Beryllium	0.00E+00	8.50E-05	0.00E+00
Cadmium	0.00E+00	7.24E-04	0.00E+00
Chromium +3	0.00E+00	5.13E-04	0.00E+00
Chromium +6	0.00E+00	3.02E-04	0.00E+00
Cobalt	0.00E+00	1.49E-04	0.00E+00
Copper	0.00E+00	9.18E-04	0.00E+00
Lead	0.00E+00	8.11E-03	0.00E+00
Manganese	0.00E+00	1.27E-03	0.00E+00
Mercury	1.03E-02	0.00E+00	1.01E-02
Nickel	0.00E+00	1.12E-03	0.00E+00
Selenium	0.00E+00	8.01E-04	0.00E+00
Zinc	0.00E+00	1.33E-02	0.00E+00
Acid Gasses			
Hydrogen Chloride	5.58E+00	0.00E+00	0.00E+00
Hydrogen Flouride	5.62E+00	0.00E+00	0.00E+00
Sulfuric Acid	5.32E+00	0.00E+00	0.00E+00
Dioxins/Furans			
2,3,7,8-TCDD-TEQ	3.41E-08	0.00E+00	3.46E-08
PCBs			
Total PCBs	2.44E-03	0.00E+00	2.38E-03
PAHs			
Acenaphthene	9.73E-04	0.00E+00	0.00E+00
Acenaphthylene	1.33E-04	0.00E+00	0.00E+00
Anthracene	9.88E-05	0.00E+00	9.71E-05
Benzo(a)anthracene	7.01E-05	0.00E+00	7.15E-05
Benzo(a)pyrene	7.83E-05	0.00E+00	8.00E-05
Benzo(b)fluoranthene	1.96E-04	0.00E+00	1.94E-04
Benzo(k)fluoranthene	1.22E-04	0.00E+00	1.20E-04
Benzo(ghi)perylene	8.66E-05	0.00E+00	0.00E+00
Chrysene	1.06E-03	0.00E+00	1.04E-03
Dibenzo(a,h)anthracene	0.00E+00	6.85E-05	0.00E+00
Fluoranthene	8.63E-05	0.00E+00	8.50E-05
Fluorene	1.39E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.00E+00	5.53E-05	0.00E+00
2-Methylnaphthalene	1.90E-04	0.00E+00	0.00E+00
Naphthalene	5.83E-04	0.00E+00	0.00E+00
Phenanthrene	1.48E-04	0.00E+00	1.45E-04
Pyrene	7.96E-05	0.00E+00	7.85E-05
Aldehyde Ketones			
Formaldehyde	1.08E-02	0.00E+00	0.00E+00

APPENDIX G

EXPOSURE AND MODELING SPREADSHEETS

Appendix G-1a
Contaminant Concentration in Soil
RME Residential Scenario - Adult and Child

Parameters

Carcinogens ($T2 \leq tD$)

$$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$$

NonCarcinogens

$$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$$

Where:

$$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-1a
Contaminant Concentration in Soil
RME Residential Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	1.4E-10	1.4E-10	1.38E-11	1.4E-11	3.2E-09	3.2E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.2E-07	1.2E-07	1.21E-08	1.2E-08	1.4E-04	1.4E-03	6.0E-03	1.12E+03	1.12E+05
Beryllium	2.6E-05	2.5E-05	2.65E-06	2.6E-06	2.1E-05	2.1E-04	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.0E-05	1.0E-05	1.04E-06	1.0E-06	1.8E-04	1.8E-03	9.0E-03	1.75E+01	1.75E+03
Chromium +3	7.9E-04	6.4E-04	8.01E-04	7.8E-04	1.3E-04	1.3E-03	9.0E-03	1.60E-01	1.60E+00
Chromium +6	4.7E-04	3.8E-04	4.76E-04	4.7E-04	7.6E-05	7.6E-04	0.0E+00	1.60E-01	1.60E+00
Cobalt	4.8E-04	3.2E-04	5.55E-04	5.3E-04	3.8E-05	3.8E-04	0.0E+00	6.78E-02	6.78E-01
Copper	6.9E-03	3.5E-03	6.64E-02	3.4E-02	2.3E-04	2.3E-03	0.0E+00	3.06E-04	3.06E-03
Lead	1.7E-03	1.7E-03	1.73E-04	1.7E-04	2.0E-03	2.0E-02	7.0E-03	1.18E+00	1.17E+02
Manganese	5.2E-03	3.2E-03	6.84E-03	6.4E-03	3.2E-04	3.2E-03	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.6E-04	8.2E-05	1.62E-03	8.1E-04	5.5E-06	5.5E-05	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	3.3E-06	1.7E-06	3.12E-05	1.6E-05	1.1E-07	1.1E-06	8.5E-01	4.39E-04	4.57E-03
Nickel	1.7E-05	1.7E-05	1.72E-06	1.7E-06	2.8E-04	2.8E-03	9.0E-03	1.63E+01	1.63E+03
Selenium	2.4E-06	2.4E-06	2.46E-07	2.5E-07	2.0E-04	2.0E-03	0.0E+00	8.26E+01	8.21E+03
Zinc	1.9E-04	1.9E-04	1.95E-05	1.9E-05	3.3E-03	3.3E-02	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.7E-09	1.5E-09	2.50E-08	1.5E-08	1.4E-10	1.4E-09	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	5.6E-08	5.6E-08	4.22E-07	4.2E-07	2.8E-07	2.8E-06	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	6.8E-08	6.7E-08	6.72E-07	6.6E-07	1.7E-07	1.7E-06	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.6E-10	1.6E-10	1.67E-11	1.7E-11	4.7E-08	4.7E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	7.5E-08	7.0E-08	7.39E-07	7.0E-07	4.1E-08	4.1E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.4E-06	1.3E-06	1.40E-05	1.3E-05	5.2E-07	5.2E-06	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.6E-06	1.5E-06	1.63E-05	1.5E-05	7.8E-07	7.8E-06	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	4.2E-07	3.8E-07	4.13E-06	3.8E-06	1.7E-07	1.7E-06	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	5.7E-06	4.3E-06	5.70E-05	4.3E-05	7.0E-07	7.0E-06	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	8.6E-08	8.6E-08	6.66E-08	6.7E-08	1.9E-06	1.9E-05	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.0E-05	8.8E-06	1.01E-04	8.8E-05	2.5E-06	2.5E-05	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	6.0E-05	5.3E-05	6.04E-04	5.3E-04	1.6E-05	1.6E-04	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	1.3E-07	1.2E-07	1.27E-06	1.2E-06	7.3E-08	7.3E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	1.2E-08	1.2E-08	1.24E-07	1.2E-07	5.3E-08	5.3E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	4.0E-05	3.6E-05	3.97E-04	3.6E-04	1.4E-05	1.4E-04	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.8E-13	3.8E-13	3.77E-14	3.8E-14	9.2E-09	9.2E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	1.3E-08	1.3E-08	6.43E-08	6.4E-08	6.8E-08	6.8E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	8.0E-08	7.8E-08	7.97E-07	7.8E-07	1.0E-07	1.0E-06	1.0E+00	1.26E+00	1.27E+00
Pyrene	5.4E-07	4.1E-07	5.28E-06	4.1E-06	7.2E-08	7.2E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	8.4E-06	8.4E-06	1.22E-05	1.2E-05	4.9E-04	4.9E-03	1.0E+00	5.77E+01	4.00E+02

Appendix G-1a
Calculation of Soil Loss Constant
RME Residential Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-1a
Calculation of Soil Loss Constant
RME Residential Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-1b
Contaminant Concentration in Above Ground Vegetation
RME Residential Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1-Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$
$Pv(Hg^{2+}) = 0.78Pv$
$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-1b
Contaminant Concentration in Above Ground Vegetation
RME Residential Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	4.4E-12	4.4E-12	4.4E-12	4.4E-12	1.4E-10	1.4E-10	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	8.6E-05	0.0E+00	7.7E-10	7.7E-10	7.7E-10	7.7E-10	1.2E-07	1.2E-07	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	3.6E-05	0.0E+00	6.8E-08	6.5E-08	6.8E-08	6.5E-08	2.6E-05	2.5E-05	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	3.1E-04	0.0E+00	1.3E-06	1.3E-06	1.3E-06	1.3E-06	1.0E-05	1.0E-05	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	2.2E-04	0.0E+00	3.9E-06	3.1E-06	3.9E-06	3.1E-06	7.9E-04	6.4E-04	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	1.3E-04	0.0E+00	2.3E-06	1.8E-06	2.3E-06	1.8E-06	4.7E-04	3.8E-04	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	6.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04	3.2E-04	0.00E+00	6.00E-01	ND	ND	ND
Copper	3.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.9E-03	3.5E-03	0.00E+00	6.00E-01	ND	ND	ND
Lead	3.4E-03	0.0E+00	2.3E-05	2.3E-05	2.3E-05	2.3E-05	1.7E-03	1.7E-03	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	5.4E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.2E-03	3.2E-03	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	7.5E-06	0.0E+00	2.2E-06	1.1E-06	2.2E-06	1.1E-06	1.6E-04	8.2E-05	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	2.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E-06	1.7E-06	8.50E-01	6.00E-01	ND	ND	ND
Nickel	4.7E-04	0.0E+00	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.7E-05	1.7E-05	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.3E-04	0.0E+00	4.8E-08	4.8E-08	4.8E-08	4.8E-08	2.4E-06	2.4E-06	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	5.6E-03	0.0E+00	1.9E-05	1.9E-05	1.9E-05	1.9E-05	1.9E-04	1.9E-04	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.5E-10	5.7E-11	1.2E-11	7.0E-12	1.2E-11	7.0E-12	2.7E-09	1.5E-09	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.2E-07	2.9E-08	5.6E-10	5.6E-10	5.6E-10	5.6E-10	5.6E-08	5.6E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.9E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	6.8E-08	6.7E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	2.2E-11	2.7E-11	2.7E-11	2.7E-11	2.7E-11	1.6E-10	1.6E-10	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.6E-09	2.0E-10	7.3E-09	6.8E-09	7.3E-09	6.8E-09	7.5E-08	7.0E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	4.9E-07	2.5E-08	2.8E-08	2.5E-08	2.8E-08	2.5E-08	1.4E-06	1.3E-06	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	7.5E-07	1.1E-07	2.2E-08	2.0E-08	2.2E-08	2.0E-08	1.6E-06	1.5E-06	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	8.8E-08	1.2E-08	4.7E-09	4.3E-09	4.7E-09	4.3E-09	4.2E-07	3.8E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.2E-06	2.7E-07	6.6E-08	4.9E-08	6.6E-08	4.9E-08	5.7E-06	4.3E-06	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	8.1E-06	4.9E-10	4.9E-10	4.9E-10	4.9E-10	8.6E-08	8.6E-08	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	3.6E-06	2.1E-08	2.0E-07	1.7E-07	2.0E-07	1.7E-07	1.0E-05	8.8E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	2.8E-05	0.0E+00	4.1E-07	3.6E-07	4.1E-07	3.6E-07	6.0E-05	5.3E-05	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	9.0E-09	2.4E-09	6.4E-09	6.0E-09	6.4E-09	6.0E-09	1.3E-07	1.2E-07	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	1.4E-10	1.8E-09	1.8E-09	1.8E-09	1.8E-09	1.2E-08	1.2E-08	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.4E-05	0.0E+00	2.4E-07	2.1E-07	2.4E-07	2.1E-07	4.0E-05	3.6E-05	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	1.0E-10	8.6E-14	8.6E-14	8.6E-14	8.6E-14	3.8E-13	3.8E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	8.5E-10	6.1E-09	6.1E-09	6.1E-09	6.1E-09	1.3E-08	1.3E-08	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.9E-09	8.6E-10	7.8E-09	7.6E-09	7.8E-09	7.6E-09	8.0E-08	7.8E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	6.3E-09	2.6E-09	3.1E-08	2.3E-08	3.1E-08	2.3E-08	5.4E-07	4.1E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	1.6E-08	7.1E-05	7.1E-05	7.1E-05	7.1E-05	8.4E-06	8.4E-06	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-1b
Contaminant Concentration in Below Ground Vegetation
RME Residential Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-1b
Contaminant Concentration in Below Ground Vegetation
RME Residential Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	4.1E-12	4.1E-12	1.4E-10	1.4E-10	3.00E-02	1.0E+00
Arsenic	9.7E-10	9.7E-10	1.2E-07	1.2E-07	8.00E-03	1.0E+00
Beryllium	4.0E-08	3.8E-08	2.6E-05	2.5E-05	1.50E-03	1.0E+00
Cadmium	6.6E-07	6.6E-07	1.0E-05	1.0E-05	6.40E-02	1.0E+00
Chromium +3	3.6E-06	2.9E-06	7.9E-04	6.4E-04	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	4.7E-04	3.8E-04	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	4.8E-04	3.2E-04	7.00E-03	ND
Copper	0.0E+00	0.0E+00	6.9E-03	3.5E-03	2.50E-01	ND
Lead	1.6E-05	1.5E-05	1.7E-03	1.7E-03	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	5.2E-03	3.2E-03	5.00E-02	ND
Mercury as HgCl2	5.9E-06	2.9E-06	1.6E-04	8.2E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	3.3E-06	1.7E-06	9.90E-02	ND
Nickel	1.4E-07	1.4E-07	1.7E-05	1.7E-05	8.00E-03	1.0E+00
Selenium	5.4E-08	5.4E-08	2.4E-06	2.4E-06	2.20E-02	1.0E+00
Zinc	1.7E-04	1.7E-04	1.9E-04	1.9E-04	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.8E-11	1.6E-11	2.7E-09	1.5E-09	1.03E+00	1.0E-02
PCBs						
Total PCBs	7.9E-09	7.9E-09	5.6E-08	5.6E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	1.5E-08	1.4E-08	6.8E-08	6.7E-08	2.13E-01	1.0E+00
Acenaphthylene	1.0E-08	1.0E-08	1.6E-10	1.6E-10	6.42E+03	1.0E-02
Anthracene	1.1E-10	1.1E-10	7.5E-08	7.0E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	1.3E-09	1.2E-09	1.4E-06	1.3E-06	9.48E-02	1.0E-02
Benzo(a)pyrene	9.9E-10	9.2E-10	1.6E-06	1.5E-06	6.05E-02	1.0E-02
Benzo(b)fluoranthene	4.8E-09	4.4E-09	4.2E-07	3.8E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.5E-09	2.6E-09	5.7E-06	4.3E-06	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.1E-03	2.1E-03	8.6E-08	8.6E-08	2.44E+06	1.0E-02
Chrysene	9.6E-09	8.3E-09	1.0E-05	8.8E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.4E-08	2.1E-08	6.0E-05	5.3E-05	4.05E-02	1.0E-02
Fluoranthene	1.9E-10	1.8E-10	1.3E-07	1.2E-07	1.50E-01	1.0E-02
Fluorene	2.4E-11	2.3E-11	1.2E-08	1.2E-08	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	2.1E-08	1.9E-08	4.0E-05	3.6E-05	5.29E-02	1.0E-02
2-Methylnaphthalene	7.5E-09	7.5E-09	3.8E-13	3.8E-13	2.00E+04	1.0E+00
Naphthalene	3.4E-09	3.4E-09	1.3E-08	1.3E-08	2.69E-01	1.0E+00
Phenanthrene	1.5E-10	1.4E-10	8.0E-08	7.8E-08	1.83E-01	1.0E-02
Pyrene	7.8E-10	6.0E-10	5.4E-07	4.1E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	2.6E-03	2.6E-03	8.4E-06	8.4E-06	3.05E+02	1.0E+00

Appendix G-1c
Calculation of Chemical Intakes
RME Residential Scenario: Adult

Parameter

Itot = Isoil + Iag

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics						
Antimony	1.1E-15	1.1E-15	2.0E-17	2.0E-17	1.1E-15	1.1E-15
Arsenic	6.5E-09	6.5E-09	1.7E-14	1.7E-14	6.5E-09	6.5E-09
Beryllium	2.7E-09	2.7E-09	3.8E-12	3.8E-12	2.7E-09	2.7E-09
Cadmium	2.3E-08	2.3E-08	1.5E-12	1.5E-12	2.3E-08	2.3E-08
Chromium +3	1.8E-08	1.8E-08	1.1E-09	1.1E-09	1.7E-08	1.7E-08
Chromium +6	1.1E-08	1.1E-08	6.8E-10	6.7E-10	1.0E-08	1.0E-08
Cobalt	5.6E-09	5.5E-09	7.9E-10	7.5E-10	4.8E-09	4.8E-09
Copper	1.2E-07	7.8E-08	9.5E-08	4.8E-08	2.9E-08	2.9E-08
Lead	2.6E-07	2.6E-07	2.5E-10	2.5E-10	2.6E-07	2.6E-07
Manganese	5.1E-08	5.0E-08	9.8E-09	9.1E-09	4.1E-08	4.1E-08
Mercury as HgCl2	3.6E-09	2.1E-09	2.3E-09	1.2E-09	1.3E-09	9.1E-10
Mercury as Methyl Hg	2.0E-10	1.8E-10	4.5E-11	2.3E-11	1.6E-10	1.6E-10
Nickel	3.5E-08	3.5E-08	2.5E-12	2.5E-12	3.5E-08	3.5E-08
Selenium	9.6E-09	9.6E-09	3.5E-13	3.5E-13	9.6E-09	9.6E-09
Zinc	4.3E-07	4.3E-07	2.8E-11	2.8E-11	4.3E-07	4.3E-07
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	5.5E-14	3.9E-14	3.6E-14	2.1E-14	1.9E-14	1.8E-14
PCBs						
Total PCBs	2.0E-11	2.0E-11	6.0E-13	6.0E-13	1.9E-11	1.9E-11
PAHs						
Acenaphthene	6.1E-12	6.0E-12	9.6E-13	9.5E-13	5.1E-12	5.0E-12
Acenaphthylene	3.6E-13	3.6E-13	2.4E-17	2.4E-17	3.6E-13	3.6E-13
Anthracene	2.8E-12	2.7E-12	1.1E-12	9.9E-13	1.8E-12	1.7E-12
Benzo(a)anthracene	6.5E-11	6.2E-11	2.0E-11	1.8E-11	4.5E-11	4.4E-11
Benzo(a)pyrene	9.3E-11	9.1E-11	2.3E-11	2.2E-11	6.9E-11	6.9E-11
Benzo(b)fluoranthene	1.5E-11	1.4E-11	5.9E-12	5.4E-12	8.7E-12	8.6E-12
Benzo(k)fluoranthene	2.0E-10	1.8E-10	8.1E-11	6.1E-11	1.2E-10	1.2E-10
Benzo(ghi)perylene	7.4E-08	7.4E-08	9.5E-14	9.5E-14	7.4E-08	7.4E-08
Chrysene	4.6E-10	4.3E-10	1.4E-10	1.3E-10	3.1E-10	3.1E-10
Dibenzo(a,h)anthracene	3.0E-09	2.9E-09	8.6E-10	7.6E-10	2.2E-09	2.2E-09
Fluoranthene	4.1E-12	3.9E-12	1.8E-12	1.7E-12	2.3E-12	2.2E-12
Fluorene	5.8E-13	5.8E-13	1.8E-13	1.8E-13	4.0E-13	4.0E-13
Indeno(1,2,3-cd)pyrene	2.4E-09	2.3E-09	5.7E-10	5.1E-10	1.8E-09	1.8E-09
2-Methylnaphthalene	2.7E-13	2.7E-13	5.4E-20	5.4E-20	2.7E-13	2.7E-13
Naphthalene	1.6E-12	1.6E-12	9.2E-14	9.2E-14	1.5E-12	1.5E-12
Phenanthrene	3.0E-12	3.0E-12	1.1E-12	1.1E-12	1.9E-12	1.9E-12
Pyrene	1.5E-11	1.2E-11	7.5E-12	5.8E-12	7.4E-12	5.8E-12
Aldehyde Ketones						
Formaldehyde	1.1E-07	1.1E-07	1.7E-11	1.7E-11	1.1E-07	1.1E-07

Appendix G-1c
Calculation of Chemical Intakes
RME Residential Scenario: Child

Itot = Isoil + Iag

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	0.25
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics						
Antimony	1.7E-15	1.7E-15	1.8E-16	1.8E-16	1.5E-15	1.5E-15
Arsenic	9.1E-09	9.1E-09	1.6E-13	1.6E-13	9.1E-09	9.1E-09
Beryllium	3.8E-09	3.8E-09	3.5E-11	3.5E-11	3.8E-09	3.8E-09
Cadmium	3.3E-08	3.3E-08	1.4E-11	1.4E-11	3.3E-08	3.3E-08
Chromium +3	3.5E-08	3.4E-08	1.1E-08	1.0E-08	2.4E-08	2.4E-08
Chromium +6	2.1E-08	2.0E-08	6.3E-09	6.2E-09	1.4E-08	1.4E-08
Cobalt	1.4E-08	1.4E-08	7.4E-09	7.0E-09	6.7E-09	6.7E-09
Copper	9.3E-07	4.9E-07	8.9E-07	4.5E-07	4.1E-08	4.1E-08
Lead	3.7E-07	3.7E-07	2.3E-09	2.3E-09	3.7E-07	3.7E-07
Manganese	1.5E-07	1.4E-07	9.1E-08	8.5E-08	5.7E-08	5.7E-08
Mercury (Total) as HgCl2	2.3E-08	1.2E-08	2.2E-08	1.1E-08	1.8E-09	1.3E-09
Mercury (Total) as Methyl Hg	6.4E-10	4.4E-10	4.2E-10	2.1E-10	2.2E-10	2.2E-10
Nickel	5.0E-08	5.0E-08	2.3E-11	2.3E-11	5.0E-08	5.0E-08
Selenium	1.3E-08	1.3E-08	3.3E-12	3.3E-12	1.3E-08	1.3E-08
Zinc	6.1E-07	6.1E-07	2.6E-10	2.6E-10	6.0E-07	6.0E-07
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	3.6E-13	2.2E-13	3.3E-13	2.0E-13	2.7E-14	2.5E-14
PCBs						
Total PCBs	3.2E-11	3.2E-11	5.6E-12	5.6E-12	2.7E-11	2.7E-11
PAHs						
Acenaphthene	1.6E-11	1.6E-11	9.0E-12	8.8E-12	7.1E-12	7.1E-12
Acenaphthylene	5.7E-13	5.7E-13	2.2E-16	2.2E-16	5.7E-13	5.7E-13
Anthracene	1.2E-11	1.2E-11	9.9E-12	9.3E-12	2.5E-12	2.3E-12
Benzo(a)anthracene	2.5E-10	2.3E-10	1.9E-10	1.7E-10	6.3E-11	6.2E-11
Benzo(a)pyrene	3.1E-10	3.0E-10	2.2E-10	2.0E-10	9.7E-11	9.6E-11
Benzo(b)fluoranthene	6.7E-11	6.3E-11	5.5E-11	5.1E-11	1.2E-11	1.2E-11
Benzo(k)fluoranthene	9.3E-10	7.4E-10	7.6E-10	5.7E-10	1.7E-10	1.7E-10
Benzo(ghi)perylene	1.2E-07	1.2E-07	8.9E-13	8.9E-13	1.2E-07	1.2E-07
Chrysene	1.8E-09	1.6E-09	1.4E-09	1.2E-09	4.4E-10	4.3E-10
Dibenzo(a,h)anthracene	1.1E-08	1.0E-08	8.1E-09	7.1E-09	3.0E-09	3.0E-09
Fluoranthene	2.0E-11	1.9E-11	1.7E-11	1.6E-11	3.1E-12	3.0E-12
Fluorene	2.2E-12	2.2E-12	1.7E-12	1.6E-12	5.5E-13	5.5E-13
Indeno(1,2,3-cd)pyrene	7.8E-09	7.3E-09	5.3E-09	4.8E-09	2.5E-09	2.5E-09
2-Methylnaphthalene	4.2E-13	4.2E-13	5.0E-19	5.0E-19	4.2E-13	4.2E-13
Naphthalene	2.9E-12	2.9E-12	8.6E-13	8.6E-13	2.1E-12	2.1E-12
Phenanthrene	1.3E-11	1.3E-11	1.1E-11	1.0E-11	2.6E-12	2.6E-12
Pyrene	8.0E-11	6.2E-11	7.0E-11	5.4E-11	1.0E-11	7.9E-12
Aldehyde Ketones						
Formaldehyde	1.6E-07	1.6E-07	1.6E-10	1.6E-10	1.6E-07	1.6E-07

Appendix G-1d
Summary of Cancer Risks and Hazard Indices (a)
RME Residential Scenario - Adult and Child

Parameter	Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC	**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC								
	Antimony	4.0E-04	NA	2.7E-12	NA	4.1E-12	NA	Longevity, blood glucose, cholesterol
Where:	Arsenic	3.0E-04	1.5E+00	2.1E-05	4E-09	2.9E-05	1E-09	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:	Beryllium	2.0E-03	NA	1.3E-06	NA	1.8E-06	NA	Intestinal lesions
CRo = Cancer Risk oral (--): CS*	Cadmium	1.0E-03	NA	2.2E-05	NA	3.1E-05	NA	Proteinuria
HQo = Ingestion Hazard Index (--): CS*	Chromium +3	1.5E+00	NA	1.2E-08	NA	2.2E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d): CS*	Chromium +6	3.0E-03	5.0E-01	3.5E-06	2E-09	6.6E-06	8E-10	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1): CS*	Cobalt	3.0E-04	NA	1.8E-05	NA	4.5E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d): CS*	Copper	4.0E-02	NA	3.0E-06	NA	2.2E-05	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):	Lead	NA	NA	NA	NA	NA	NA	
adult: 30	Manganese	1.4E-01	NA	3.5E-07	NA	1.0E-06	NA	CNS
child: 6	Mercury as HgCl2	3.0E-04	NA	1.1E-05	NA	7.5E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr): 350	Mercury as Methyl Hg	1.0E-04	NA	1.9E-06	NA	6.1E-06	NA	Developmental Effects
AT = Averaging Time (yr): See Below	Nickel	2.0E-02	NA	1.7E-06	NA	2.4E-06	NA	Reduced body and organ weight
Cancer: 70	Selenium	5.0E-03	NA	1.8E-06	NA	2.6E-06	NA	Selenosis
Noncancer: See Below	Zinc	3.0E-01	NA	1.4E-06	NA	1.9E-06	NA	Anemia
adult: 30								
child: 6	**Dioxins/Furans**							
UC = Units Conversion (day/yr): 365								
	2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	7.6E-05	2E-09	4.9E-04	2E-09	Developmental
	PCBs							
	Total PCBs	2.0E-05	2.0E+00	9.5E-07	2E-11	1.6E-06	5E-12	Developmental
	PAHs							
	Acenaphthene	6.0E-02	NA	9.7E-11	NA	2.6E-10	NA	Liver
	Acenaphthylene	NA	NA	NA	NA	NA	NA	
	Anthracene	3.0E-01	NA	9.1E-12	NA	3.9E-11	NA	No Observed Effects
	Benzo(a)anthracene	NA	7.3E-01	NA	2E-11	NA	1E-11	
	Benzo(a)pyrene	NA	7.3E+00	NA	3E-10	NA	2E-10	
	Benzo(b)fluoranthene	NA	7.3E-01	NA	4E-12	NA	4E-12	
	Benzo(k)fluoranthene	NA	7.3E-02	NA	5E-12	NA	4E-12	
	Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
	Chrysene	NA	7.3E-03	NA	1E-12	NA	1E-12	
	Dibenzo(a,h)anthracene	NA	7.3E+00	NA	9E-09	NA	6E-09	
	Fluoranthene	4.0E-02	NA	9.8E-11	NA	4.8E-10	NA	CNS, liver, blood
	Fluorene	4.0E-02	NA	1.4E-11	NA	5.3E-11	NA	Blood
	Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	7E-10	NA	4E-10	
	2-Methylnaphthalene	4.0E-03	NA	6.5E-11	NA	1.0E-10	NA	Lung
	Naphthalene	2.0E-02	NA	7.7E-11	NA	1.4E-10	NA	Decreased body weight gain
	Phenanthrene	NA	NA	NA	NA	NA	NA	
	Pyrene	3.0E-02	NA	4.8E-10	NA	2.6E-09	NA	Kidney
	Aldehyde Ketones							
	Formaldehyde	2.0E-01	NA	5.1E-07	NA	7.8E-07	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion and produce consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.7E-04	2E-08	7.5E-04	1E-08

Appendix G-1e
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
RME Residential Scenario - Adult and Child

Parameter

CRi = Ca * ED * EF * URF/AT * UC2
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2

And:
Ca = Q * Fv * Cyv + (1- Fv) * Cyp

For Hg:
Ca (Hg_{2+}) = 0.48Q(total) * Fv (Hg_{2+}) * Cyv + 1 - Fv (Hg_{2+}) * Cypb
Ca (Hg_0) = 0.002Q(total) * Fv (Hg_0) * Cyv + 1 - Fv (Hg_0) * Cypb

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
URF = Unit Risk Factor ((ug/m3)-1):	CS*
RfC = Reference Concentration (mg/m3):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
ED = Exposure Duration (see below) (yr):	
adult:	30
child:	6
EF = Exposure Frequency (day/yr):	350
UC1 = Units Conversion (mg/ug):	0.001
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	30
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m^3	Fv (unitless)	RfC mg/m3	URF (ug/m3)-1	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	4.38E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	3.12E-06	6.0E-03	1.5E-05	4.3E-03	2.0E-04	6E-09	2.0E-04	1E-09	Cardiovascular, CNS, Developmental
Beryllium	4.89E-07	9.0E-03	2.0E-05	2.4E-03	2.3E-05	5E-10	2.3E-05	1E-10	Sensitization
Cadmium	4.16E-06	9.0E-03	1.0E-05	1.8E-03	4.0E-04	3E-09	4.0E-04	6E-10	
Chromium +3	2.95E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	1.75E-06	0.0E+00	1.0E-04	8.4E-02	1.7E-05	6E-08	1.7E-05	1E-08	Increased LDH in bronchoalveolar lavage fluid
Cobalt	8.65E-07	0.0E+00	6.0E-06	9.0E-03	1.4E-04	3E-09	1.4E-04	6E-10	
Copper	5.32E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	4.67E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	7.38E-06	0.0E+00	5.0E-05	NA	1.4E-04	NA	1.4E-04	NA	CNS
Mercury (Total) as HgCl2	2.25E-05	8.5E-01	3.0E-04	NA	7.2E-05	NA	7.2E-05	NA	Autoimmune effects
Mercury (Total) as Elemental Hg	9.40E-08	1.0E+00	3.0E-04	NA	3.0E-07	NA	3.0E-07	NA	PNS, Autonomic Dysfunction
Nickel	6.41E-06	9.0E-03	9.0E-05	2.4E-04	6.8E-05	6E-10	6.8E-05	1E-10	
Selenium	4.64E-06	0.0E+00	2.0E-02	NA	2.2E-07	NA	2.2E-07	NA	
Zinc	7.62E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	1.58E-10	6.6E-01	4.0E-08	3.8E+01	3.8E-06	2E-09	3.8E-06	5E-10	
PCBs									
Total PCBs	1.11E-05	9.9E-01	NA	5.7E-04	NA	3E-09	NA	5E-10	
PAHs									
Acenaphthene	4.44E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	6.02E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	4.51E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	3.27E-07	4.8E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
Benzo(a)pyrene	3.67E-07	2.9E-01	NA	1.1E-03	NA	2E-10	NA	3E-11	
Benzo(b)fluoranthene	9.00E-07	9.7E-01	NA	1.1E-04	NA	4E-11	NA	8E-12	
Benzo(k)fluoranthene	5.58E-07	2.7E-01	NA	1.1E-04	NA	3E-11	NA	5E-12	
Benzo(ghi)perylene	3.99E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	4.84E-06	7.4E-01	NA	1.1E-05	NA	2E-11	NA	4E-12	
Dibenzo(a,h)anthracene	3.75E-07	5.5E-02	NA	1.2E-03	NA	2E-10	NA	4E-11	
Fluoranthene	3.95E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	6.33E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	3.19E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	3E-12	
2-Methylnaphthalene	8.63E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	2.66E-06	1.0E+00	3.0E-03	3.4E-05	8.5E-07	4E-11	8.5E-07	7E-12	Nasal effects
Phenanthrene	6.75E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	3.64E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	4.91E-05	1.0E+00	9.8E-03	1.3E-05	4.8E-06	3E-10	4.8E-06	5E-11	Respiratory tract

Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	1.1E-03	8E-08	1.1E-03	2E-08

Appendix G-1f
Ingestion of Mother's Milk
RME Residential Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.8E-14	3.9E-14	6.1E-14	6.71E-01	1.93E-03
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-1d						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-1f
Ingestion of Mother's Milk
RME Residential Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
		2,3,7,8-TCDD TEQ	1.93E-03	6.0E+01	3.2E-05
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Aaverage infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-2a
Contaminant Concentration in Soil
RME Potomac River Fisher Scenario - Adult and Child

Parameters

Carcinogens ($T2 \leq tD$)

$$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$$

NonCarcinogens

$$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$$

Where:

$$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: Ds(MeHg) = Ds * 0.02

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-2a
Contaminant Concentration in Soil
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm) Non - Cancer	Cs Tilled (20 cm) Cancer	Cs Untilled (2 cm) Non - Cancer	Cs Untilled (2 cm) Cancer	Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
Inorganics									
Antimony	1.4E-10	1.4E-10	1.43E-11	1.4E-11	3.2E-09	3.2E-08	1.0E+00	2.26E+01	2.25E+03
Arsenic	1.3E-07	1.3E-07	1.26E-08	1.3E-08	1.4E-04	1.4E-03	6.0E-03	1.08E+03	1.08E+05
Beryllium	2.7E-05	2.6E-05	2.76E-06	2.8E-06	2.1E-05	2.1E-04	9.0E-03	7.74E-01	7.71E+01
Cadmium	1.1E-05	1.1E-05	1.08E-06	1.1E-06	1.8E-04	1.8E-03	9.0E-03	1.68E+01	1.68E+03
Chromium +3	7.9E-04	6.4E-04	8.01E-04	7.8E-04	1.3E-04	1.3E-03	9.0E-03	1.60E-01	1.60E+00
Chromium +6	4.7E-04	3.8E-04	4.76E-04	4.7E-04	7.6E-05	7.6E-04	0.0E+00	1.60E-01	1.60E+00
Cobalt	4.8E-04	3.2E-04	5.55E-04	5.3E-04	3.8E-05	3.8E-04	0.0E+00	6.78E-02	6.78E-01
Copper	6.9E-03	3.5E-03	6.64E-02	3.4E-02	2.3E-04	2.3E-03	0.0E+00	3.06E-04	3.06E-03
Lead	1.8E-03	1.7E-03	1.80E-04	1.8E-04	2.0E-03	2.0E-02	7.0E-03	1.13E+00	1.13E+02
Manganese	5.2E-03	3.2E-03	6.84E-03	6.4E-03	3.2E-04	3.2E-03	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.6E-04	8.2E-05	1.62E-03	8.1E-04	5.5E-06	5.5E-05	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	3.3E-06	1.7E-06	3.12E-05	1.6E-05	1.1E-07	1.1E-06	8.5E-01	4.39E-04	4.56E-03
Nickel	1.8E-05	1.8E-05	1.79E-06	1.8E-06	2.8E-04	2.8E-03	9.0E-03	1.56E+01	1.56E+03
Selenium	2.5E-06	2.5E-06	2.56E-07	2.6E-07	2.0E-04	2.0E-03	0.0E+00	7.93E+01	7.88E+03
Zinc	2.0E-04	2.0E-04	2.03E-05	2.0E-05	3.3E-03	3.3E-02	8.0E-03	1.64E+01	1.64E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.7E-09	1.5E-09	2.51E-08	1.5E-08	1.4E-10	1.4E-09	6.6E-01	3.01E-02	3.54E-02
PCBs									
Total PCBs	5.6E-08	5.6E-08	4.26E-07	4.2E-07	2.8E-07	2.8E-06	9.9E-01	5.08E+00	6.67E+00
PAHs									
Acenaphthene	6.8E-08	6.7E-08	6.72E-07	6.6E-07	1.7E-07	1.7E-06	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.6E-10	1.6E-10	1.74E-11	1.7E-11	4.7E-08	4.7E-07	1.0E+00	2.84E+02	2.68E+04
Anthracene	7.5E-08	7.0E-08	7.39E-07	7.0E-07	4.1E-08	4.1E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.4E-06	1.3E-06	1.40E-05	1.3E-05	5.2E-07	5.2E-06	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.6E-06	1.5E-06	1.63E-05	1.5E-05	7.8E-07	7.8E-06	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	4.2E-07	3.8E-07	4.13E-06	3.8E-06	1.7E-07	1.7E-06	9.7E-01	4.10E-01	4.13E-01
Benzo(k)fluoranthene	5.7E-06	4.3E-06	5.70E-05	4.3E-05	7.0E-07	7.0E-06	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	8.6E-08	8.6E-08	6.73E-08	6.7E-08	1.9E-06	1.9E-05	1.0E+00	2.22E+01	2.84E+02
Chrysene	1.0E-05	8.8E-06	1.01E-04	8.8E-05	2.5E-06	2.5E-05	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	6.0E-05	5.3E-05	6.04E-04	5.3E-04	1.6E-05	1.6E-04	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	1.3E-07	1.2E-07	1.27E-06	1.2E-06	7.3E-08	7.3E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	1.2E-08	1.2E-08	1.24E-07	1.2E-07	5.3E-08	5.3E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	4.0E-05	3.6E-05	3.97E-04	3.6E-04	1.4E-05	1.4E-04	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.9E-13	3.9E-13	3.93E-14	3.9E-14	9.2E-09	9.2E-08	1.0E+00	2.33E+04	2.33E+06
Naphthalene	1.3E-08	1.3E-08	6.56E-08	6.5E-08	6.8E-08	6.8E-07	1.0E+00	5.33E+00	1.03E+01
Phenanthrene	8.0E-08	7.8E-08	7.97E-07	7.8E-07	1.0E-07	1.0E-06	1.0E+00	1.26E+00	1.27E+00
Pyrene	5.4E-07	4.1E-07	5.28E-06	4.1E-06	7.2E-08	7.2E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	8.4E-06	8.4E-06	1.24E-05	1.2E-05	4.9E-04	4.9E-03	1.0E+00	5.77E+01	3.93E+02

Appendix G-2a

Calculation of Soil Loss Constant

RME Potomac River Fisher Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:

ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]

ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))

ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:

theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-2a
Calculation of Soil Loss Constant
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.3E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	7.7E-01	7.7E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	7.7E-01	7.7E+01	7.9E+02
Cadmium	1.7E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.1E+00	1.1E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.1E+00	1.1E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	2.9E-10	2.9E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	7.9E+01	7.9E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	7.9E+01	7.9E+03	5.0E+00
Zinc	1.6E+01	1.6E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.6E+01	1.6E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.5E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.6E-05	4.6E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	7.6E-05	7.6E-03	1.1E+03
Acenaphthylene	2.8E+02	2.7E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.7E+02	2.7E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.6E-06	7.6E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.5E-06	1.5E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.6E-06	5.6E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.3E-09	2.3E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.8E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	6.9E-01	6.9E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.3E-07	8.3E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	7.6E-07	7.6E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.6E-05	1.6E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.6E-09	1.6E-07	5.3E+05
2-Methylnaphthalene	2.3E+04	2.3E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.3E+04	2.3E+06	8.1E-03
Naphthalene	5.3E+00	1.0E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.0E-02	5.0E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.3E-06	3.3E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.1E-07	6.1E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	3.9E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-2b

Contaminant Concentration in Above Ground Vegetation

RME Potomac River Fisher Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:

$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$

$Pd(Hg^{2+}) = 0.78Pd$

Pd(MeHg) = 0.22Pd

Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)

For Mercury:

$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$

$Pv(Hg^{2+}) = 0.78Pv$

Pv(MeHg) = 0.22Pv

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-2b
Contaminant Concentration in Above Ground Vegetation
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	4.6E-12	4.6E-12	4.6E-12	4.6E-12	1.4E-10	1.4E-10	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	8.6E-05	0.0E+00	8.0E-10	8.0E-10	8.0E-10	8.0E-10	1.3E-07	1.3E-07	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	3.6E-05	0.0E+00	7.1E-08	6.8E-08	7.1E-08	6.8E-08	2.7E-05	2.6E-05	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	3.1E-04	0.0E+00	1.3E-06	1.3E-06	1.3E-06	1.3E-06	1.1E-05	1.1E-05	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	2.2E-04	0.0E+00	3.9E-06	3.1E-06	3.9E-06	3.1E-06	7.9E-04	6.4E-04	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	1.3E-04	0.0E+00	2.3E-06	1.8E-06	2.3E-06	1.8E-06	4.7E-04	3.8E-04	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	6.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04	3.2E-04	0.00E+00	6.00E-01	ND	ND	ND
Copper	3.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.9E-03	3.5E-03	0.00E+00	6.00E-01	ND	ND	ND
Lead	3.4E-03	0.0E+00	2.4E-05	2.4E-05	2.4E-05	2.4E-05	1.8E-03	1.7E-03	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	5.4E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.2E-03	3.2E-03	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	7.5E-06	0.0E+00	2.2E-06	1.1E-06	2.2E-06	1.1E-06	1.6E-04	8.2E-05	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	2.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E-06	1.7E-06	8.50E-01	6.00E-01	ND	ND	ND
Nickel	4.7E-04	0.0E+00	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.8E-05	1.8E-05	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.3E-04	0.0E+00	5.0E-08	5.0E-08	5.0E-08	5.0E-08	2.5E-06	2.5E-06	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	5.6E-03	0.0E+00	2.0E-05	2.0E-05	2.0E-05	2.0E-05	2.0E-04	2.0E-04	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.5E-10	5.7E-11	1.2E-11	7.0E-12	1.2E-11	7.0E-12	2.7E-09	1.5E-09	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.2E-07	2.9E-08	5.6E-10	5.6E-10	5.6E-10	5.6E-10	5.6E-08	5.6E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.9E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	6.8E-08	6.7E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	2.2E-11	2.8E-11	2.8E-11	2.8E-11	2.8E-11	1.6E-10	1.6E-10	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.6E-09	2.0E-10	7.3E-09	6.8E-09	7.3E-09	6.8E-09	7.5E-08	7.0E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	4.9E-07	2.5E-08	2.8E-08	2.5E-08	2.8E-08	2.5E-08	1.4E-06	1.3E-06	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	7.5E-07	1.1E-07	2.2E-08	2.0E-08	2.2E-08	2.0E-08	1.6E-06	1.5E-06	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	8.7E-08	1.2E-08	4.7E-09	4.3E-09	4.7E-09	4.3E-09	4.2E-07	3.8E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.2E-06	2.7E-07	6.6E-08	4.9E-08	6.6E-08	4.9E-08	5.7E-06	4.3E-06	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	8.1E-06	4.9E-10	4.9E-10	4.9E-10	4.9E-10	8.6E-08	8.6E-08	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	3.5E-06	2.1E-08	2.0E-07	1.7E-07	2.0E-07	1.7E-07	1.0E-05	8.8E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	2.8E-05	0.0E+00	4.1E-07	3.6E-07	4.1E-07	3.6E-07	6.0E-05	5.3E-05	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	9.0E-09	2.4E-09	6.4E-09	6.0E-09	6.4E-09	6.0E-09	1.3E-07	1.2E-07	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	1.4E-10	1.8E-09	1.8E-09	1.8E-09	1.8E-09	1.2E-08	1.2E-08	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.3E-05	0.0E+00	2.4E-07	2.1E-07	2.4E-07	2.1E-07	4.0E-05	3.6E-05	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	1.0E-10	8.9E-14	8.9E-14	8.9E-14	8.9E-14	3.9E-13	3.9E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	8.5E-10	6.1E-09	6.1E-09	6.1E-09	6.1E-09	1.3E-08	1.3E-08	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.9E-09	8.6E-10	7.8E-09	7.6E-09	7.8E-09	7.6E-09	8.0E-08	7.8E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	6.2E-09	2.6E-09	3.1E-08	2.3E-08	3.1E-08	2.3E-08	5.4E-07	4.1E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	1.6E-08	7.1E-05	7.1E-05	7.1E-05	7.1E-05	8.4E-06	8.4E-06	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-2b
Contaminant Concentration in Below Ground Vegetation
RME Potomac River Fisher Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-2b

Contaminant Concentration in Below Ground Vegetation

RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	4.3E-12	4.3E-12	1.4E-10	1.4E-10	3.00E-02	1.0E+00
Arsenic	1.0E-09	1.0E-09	1.3E-07	1.3E-07	8.00E-03	1.0E+00
Beryllium	4.1E-08	3.9E-08	2.7E-05	2.6E-05	1.50E-03	1.0E+00
Cadmium	6.9E-07	6.9E-07	1.1E-05	1.1E-05	6.40E-02	1.0E+00
Chromium +3	3.6E-06	2.9E-06	7.9E-04	6.4E-04	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	4.7E-04	3.8E-04	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	4.8E-04	3.2E-04	7.00E-03	ND
Copper	0.0E+00	0.0E+00	6.9E-03	3.5E-03	2.50E-01	ND
Lead	1.6E-05	1.6E-05	1.8E-03	1.7E-03	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	5.2E-03	3.2E-03	5.00E-02	ND
Mercury as HgCl2	5.9E-06	2.9E-06	1.6E-04	8.2E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	3.3E-06	1.7E-06	9.90E-02	ND
Nickel	1.4E-07	1.4E-07	1.8E-05	1.8E-05	8.00E-03	1.0E+00
Selenium	5.6E-08	5.6E-08	2.5E-06	2.5E-06	2.20E-02	1.0E+00
Zinc	1.8E-04	1.8E-04	2.0E-04	2.0E-04	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.8E-11	1.6E-11	2.7E-09	1.5E-09	1.03E+00	1.0E-02
PCBs						
Total PCBs	7.9E-09	7.9E-09	5.6E-08	5.6E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	1.5E-08	1.4E-08	6.8E-08	6.7E-08	2.13E-01	1.0E+00
Acenaphthylene	1.1E-08	1.1E-08	1.6E-10	1.6E-10	6.42E+03	1.0E-02
Anthracene	1.1E-10	1.1E-10	7.5E-08	7.0E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	1.3E-09	1.2E-09	1.4E-06	1.3E-06	9.48E-02	1.0E-02
Benzo(a)pyrene	9.9E-10	9.2E-10	1.6E-06	1.5E-06	6.05E-02	1.0E-02
Benzo(b)fluoranthene	4.8E-09	4.4E-09	4.2E-07	3.8E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.5E-09	2.6E-09	5.7E-06	4.3E-06	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.1E-03	2.1E-03	8.6E-08	8.6E-08	2.44E+06	1.0E-02
Chrysene	9.6E-09	8.3E-09	1.0E-05	8.8E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.4E-08	2.1E-08	6.0E-05	5.3E-05	4.05E-02	1.0E-02
Fluoranthene	1.9E-10	1.8E-10	1.3E-07	1.2E-07	1.50E-01	1.0E-02
Fluorene	2.4E-11	2.3E-11	1.2E-08	1.2E-08	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	2.1E-08	1.9E-08	4.0E-05	3.6E-05	5.29E-02	1.0E-02
2-Methylnaphthalene	7.8E-09	7.8E-09	3.9E-13	3.9E-13	2.00E+04	1.0E+00
Naphthalene	3.4E-09	3.4E-09	1.3E-08	1.3E-08	2.69E-01	1.0E+00
Phenanthrene	1.5E-10	1.4E-10	8.0E-08	7.8E-08	1.83E-01	1.0E-02
Pyrene	7.8E-10	6.0E-10	5.4E-07	4.1E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	2.6E-03	2.6E-03	8.4E-06	8.4E-06	3.05E+02	1.0E+00

Appendix G-2c
Potomac River Watershed Soil Concentration Due to Deposition
RME Potomac River Fisher Scenario - Adult and Child

Parameters

Carcinogens

Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp(-ks * tD)/ks)) - (T1 + (exp(-ks * T1))/ks)]

NonCarcinogens

Cs(tD) = (Ds * [1 - exp(-ks * tD)])/ks

Where:

Ds = [UC1 * Q/Zs * BD] * [Fv * (Dytwv) + (Dytwp) * (1 - Fv)]

For Mercury:
Ds = [UC1 * 0.48Q(total)/Zs * BD] * [FvHg2+ * (Dytwv) + (Dytwpb) * (1 - FvHg2+)]
For HgCl2: Ds(HgCl2) = Ds * 0.98
For MeHg: Ds(MeHg) = Ds * 0.02

ks = ksl + ksg + ksr + kse + ksv
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = RO/theta sw * Zs * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs)* theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
ksr = COC Loss Constant Due to Runoff (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	2
T1 = Time Peroid At Beginning Of Combustion (yr):	0
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--)	CS*
Cywv = Unitized Yearly Average Air Concentration From Vapor Phase (Watershed) (ug-s/g-m3):	RS*
Dytwv = Unitized Yearly Average Total Deposition From Vapor Phase (Watershed) (s/m2-yr):	RS*
Dytwp = Unitized Yearly Average Total Deposition From Particle Phase (Watershed) (s/m2-yr):	RS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	0
RO = Average Annual Surface Water Runoff (cm/yr):	34.42
Ev = Average Annual Evapotranspiration (cm/yr):	70
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC3 = Units Conversion (sec/yr):	3.2E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.2E-05
T = Temperature (K):	298
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	2.4E-01
ps = Solids Particle Density (g/cm3):	2.7E+00

Appendix G-2c
Potomac River Watershed Soil Concentration Due to Deposition
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Cs Surface (2 cm) Non - Cancer	Cs Surface (2 cm) Cancer	Ds (2 cm)	Fv (unitless)	ks (yr-1)	ksl (yr-1)	ksr (yr-1)	ksv (yr-1)	ksg (yr-1)	Kds
Inorganics										
Antimony	2.5E-12	2.5E-12	5.6E-09	1.0E+00	2.3E+03	2.6E-01	2.5E-01	2.3E+03	0.0E+00	4.5E+01
Arsenic	2.3E-10	2.3E-10	2.5E-05	6.0E-03	1.1E+05	4.1E-01	3.9E-01	1.1E+05	0.0E+00	2.9E+01
Beryllium	5.1E-08	5.1E-08	3.9E-06	9.0E-03	7.7E+01	1.5E-02	1.5E-02	7.7E+01	0.0E+00	7.9E+02
Cadmium	2.0E-08	2.0E-08	3.3E-05	9.0E-03	1.7E+03	1.6E-01	1.5E-01	1.7E+03	0.0E+00	7.5E+01
Chromium +3	1.9E-05	1.9E-05	2.4E-05	9.0E-03	1.2E+00	6.2E-01	6.0E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.1E-05	1.1E-05	1.4E-05	0.0E+00	1.2E+00	6.2E-01	6.0E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	1.3E-05	1.3E-05	6.9E-06	0.0E+00	5.2E-01	2.6E-01	2.5E-01	0.0E+00	0.0E+00	4.5E+01
Copper	1.2E-03	6.2E-04	4.2E-05	0.0E+00	2.3E-03	1.2E-03	1.1E-03	0.0E+00	0.0E+00	1.0E+04
Lead	3.3E-06	3.3E-06	3.7E-04	7.0E-03	1.1E+02	1.3E-02	1.3E-02	1.1E+02	0.0E+00	9.0E+02
Manganese	1.6E-04	1.5E-04	5.9E-05	0.0E+00	3.6E-01	1.8E-01	1.8E-01	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	4.2E-05	2.1E-05	1.4E-06	8.5E-01	4.0E-04	2.0E-04	2.0E-04	2.9E-08	0.0E+00	5.8E+04
Mercury as Methyl Hg	8.2E-07	4.2E-07	2.9E-08	8.5E-01	3.5E-03	1.7E-03	1.6E-03	1.9E-04	0.0E+00	7.0E+03
Nickel	3.3E-08	3.3E-08	5.1E-05	9.0E-03	1.6E+03	1.8E-01	1.8E-01	1.6E+03	0.0E+00	6.5E+01
Selenium	4.7E-09	4.7E-09	3.7E-05	0.0E+00	7.9E+03	2.3E+00	2.2E+00	7.9E+03	0.0E+00	5.0E+00
Zinc	3.7E-07	3.7E-07	6.1E-04	8.0E-03	1.6E+03	1.9E-01	1.8E-01	1.6E+03	0.0E+00	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	1.9E-09	1.1E-09	1.0E-10	6.6E-01	3.5E-02	3.0E-04	2.9E-04	4.6E-03	3.0E-02	3.9E+04
PCBs										
Total PCBs	3.9E-08	3.9E-08	2.6E-07	9.9E-01	6.7E+00	1.2E-02	1.2E-02	1.6E+00	5.1E+00	9.8E+02
PAHs										
Acenaphthene	7.3E-08	7.2E-08	1.8E-07	1.0E+00	2.5E+00	1.1E-02	1.0E-02	7.6E-03	2.5E+00	1.1E+03
Acenaphthylene	3.4E-12	3.4E-12	9.0E-08	1.0E+00	2.7E+04	6.9E+01	6.7E+01	2.7E+04	0.0E+00	3.7E-02
Anthracene	7.3E-08	6.8E-08	4.0E-08	1.0E+00	5.6E-01	2.6E-03	2.5E-03	7.6E-04	5.5E-01	4.5E+03
Benzo(a)anthracene	6.7E-07	6.1E-07	2.5E-07	4.8E-01	3.7E-01	2.0E-04	1.9E-04	1.5E-04	3.7E-01	6.0E+04
Benzo(a)pyrene	5.5E-07	5.1E-07	2.7E-07	2.9E-01	4.8E-01	7.4E-05	7.2E-05	1.6E-05	4.8E-01	1.6E+05
Benzo(b)fluoranthene	4.8E-07	4.4E-07	2.0E-07	9.7E-01	4.1E-01	1.1E-03	1.1E-03	5.6E-04	4.1E-01	1.0E+04
Benzo(k)fluoranthene	1.6E-06	1.2E-06	2.0E-07	2.7E-01	1.2E-01	6.2E-05	6.0E-05	2.3E-07	1.2E-01	1.9E+05
Benzo(ghi)perylene	3.1E-09	3.1E-09	7.2E-07	1.0E+00	2.3E+02	8.3E+01	8.1E+01	6.9E+01	0.0E+00	9.1E-03
Chrysene	5.0E-06	4.3E-06	1.2E-06	7.4E-01	2.5E-01	2.0E-04	1.9E-04	8.3E-05	2.5E-01	6.0E+04
Dibenzo(a,h)anthracene	1.1E-05	9.7E-06	3.0E-06	5.5E-02	2.7E-01	2.0E-05	2.0E-05	1.4E-09	2.7E-01	5.8E+05
Fluoranthene	1.2E-07	1.2E-07	7.0E-08	9.9E-01	5.7E-01	1.1E-03	1.0E-03	7.6E-05	5.7E-01	1.1E+04
Fluorene	1.2E-08	1.1E-08	4.9E-08	1.0E+00	4.2E+00	5.6E-03	5.5E-03	1.6E-03	4.2E+00	2.1E+03
Indeno(1,2,3-cd)pyrene	7.3E-06	6.6E-06	2.5E-06	5.0E-03	3.5E-01	2.2E-05	2.2E-05	1.6E-07	3.5E-01	5.3E+05
2-Methylnaphthalene	8.6E-15	8.6E-15	2.0E-08	1.0E+00	2.3E+06	8.3E+01	8.1E+01	2.3E+06	0.0E+00	8.1E-03
Naphthalene	1.1E-08	1.1E-08	1.1E-07	1.0E+00	1.0E+01	3.9E-02	3.8E-02	5.0E+00	5.3E+00	3.0E+02
Phenanthrene	7.6E-08	7.4E-08	9.6E-08	1.0E+00	1.3E+00	3.2E-03	3.1E-03	3.3E-04	1.3E+00	3.7E+03
Pyrene	5.2E-07	4.0E-07	7.1E-08	9.9E-01	1.3E-01	1.2E-03	1.2E-03	6.1E-05	1.3E-01	9.5E+03
Aldehyde Ketones										
Formaldehyde	2.9E-07	2.9E-07	1.0E-04	1.0E+00	3.5E+02	7.7E+01	7.5E+01	1.6E+02	3.6E+01	2.0E-02

Appendix G-2c
Calculation of Potomac River Total Waterbody Load
RME Potomac River Fisher Scenario - Adult and Child

Parameters

LT = LDif + LDep + LRI + LR + LE

Where:

LDep = Q * [Fv * Dytwv(river) + (1 - Fv) * Dytwp(river)] * WAw
LDep (Hg) = 0.48Q(total) * [FvHg2+ * Dywtv(river) + (1 - FvHg2+) * Dytwp(river)] * WAw

LRI = Q * [Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed] * WAi
LRI (Hg) = 0.48Q(total) * (Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed)) * WAi

LR = UC1 * RO * (WAL - WAi) * ((Cs * BD)/(θsw + Kds * BD))

LE = Xe * (WAL - WAi) * SD * ER * (Cs * Kds * BD)/(θsw + Kds * BD) * UC2

LDif = (Kv * Q * Fv * Cywv(river) * WAw * UC5)/(H/(R * Twk))
LDif (Hg) = (Kv * 0.48Q(total) * FvHg2+ * Cywv(river) * WAw * UC5)/(H/(R * Twk))

Xe = RF * K * LS * C * PF * (UC3/UC4)
$SD = a * (WAl)^{-b}$
$Kv = ([KL^{-1} + (KG * (H/(R * T))^{-1})]^{-1}) * \theta^{Twk - 293}$
$KL = SQRT[(((1 x 10^{-4}) * Dw * \mu)/dz) * UC6$ (For flowing streams or rivers)
KG = 36500 m/yr (For flowing streams or rivers)

and:

Values Specific to Contaminant:	CS*
Values Specific to Site:	RS*
LT = Total Contaminant Load to the Water Body (g/yr):	CS*
LDep = Deposition of Particle Phase and Wet Vapor Phase Contaminant Load to the Water Body (g/yr):	CS*
LRI = Runoff Load From Impervious Surfaces (g/yr):	CS*
LR = Runoff Load From Pervious Surface (g/yr):	CS*
LE = Soil Erosion Load (g/yr):	CS*
LDif = Dry Vapor Phase Diffusion Load to Water Body (g/yr):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dytwv = Yearly Average (Wet and Dry) Deposition From Vapor Phase (g/m2-yr):	RS*
Dytwp = Yearly Average Total (Wet and Dry) Deposition From Particle Phase (g/m2-yr):	RS*
Cywv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
WAw = Water Body Area (m2):	1.3E+08
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	7.84E+07
UC1 = Units Conversion Factor (kg-cm2/mg-m2):	1.0E-02
WAL = Total Watershed Area Receiving Pollutant Deposition (m2):	1.60E+09
RO = Average Annual Surface Runoff from pervious areas (cm water/yr):	3.4E+01
Cs = Contaminant Level in Watershed Soil (mg/kg):	CS*
BD = Soil Bulk Density (g/cm3):	1.5E+00
θsw = Volumetric Water Content (cm3/cm3):	2.0E-01
Kds = Soil-water partition coefficient (cm3/g or ml/g):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	4.6E-01
SD = Sediment Delivery Ratio (--):	4.24E-02
ER = Contaminant Enrichment Ratio (--):	See Below
Inorganics:	1.0E+00
Organics:	3.0E+00
UC2 = Units Conversion Factor (g/mg):	1.0E-03
RF = "Erosivity" Factor (yr-1):	1.8E+02
K = "Erodibility" Factor (tons/acre):	1.9E-01
LS = "Topographic or Slope Length" Factor (--):	1.5E+00
C = "Cover Management" Factor (--):	4.1E-02
PF = "Supporting Practice" Factor (--):	1.0E+00
a = Empirical Intercept Coefficient:	6.0E-01
b = Empirical Slope Coefficient:	1.25E-01
UC3 = Units Conversion Factor (kg/ton):	9.1E+02
UC4 = Units Conversion Factor (m2/acre):	4.0E+03
Kv = Overall Transfer Rate Coefficient (m/yr):	CS*
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Universal Gas Constant (atm-m3/mol-K):	8.2E-05
Twk = Water Body Temperature (K):	2.9E+02
θ = Temperature Correction Factor (--):	1.03E+00
KL = Liquid Phase Transfer Coefficient (m/yr):	CS*
Dw = Diffusivity of COC in Water (cm3/s):	CS*
UC5 = Units Conversion Factor (g/ug):	1.00E-06
UC6 = Units Conversion Factor (s/yr):	3.2E+07
Kg = Gas Phase Transfer Coefficient (m/yr):	3.7E+04
μ = Current velocity (m/s):	3.4E-01
dz = Total water body depth (m):	1.0E+00

Appendix G-2c
Calculation of Potomac River Total Waterbody Load
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	LT		LDiff	LDep	LRI	LR		LE		Fv	Kv	KL
	Non - Cancer	Cancer				Non - Cancer	Cancer	Non - Cancer	Cancer	(unitless)		
Inorganics												
Antimony	6.0E-02	6.0E-02	3.3E-02	1.4E-02	1.3E-02	2.9E-05	2.9E-05	7.3E-08	7.3E-08	1.0E+00	4.9E+02	5.5E+02
Arsenic	9.2E+01	9.2E+01	0.0E+00	3.3E+01	5.9E+01	4.2E-03	4.2E-03	6.8E-06	6.8E-06	6.0E-03	5.0E+02	5.5E+02
Beryllium	1.4E+01	1.4E+01	0.0E+00	5.2E+00	9.2E+00	3.4E-02	3.4E-02	1.5E-03	1.5E-03	9.0E-03	4.9E+02	5.5E+02
Cadmium	1.2E+02	1.2E+02	0.0E+00	4.4E+01	7.8E+01	1.4E-01	1.4E-01	5.8E-04	5.8E-04	9.0E-03	4.9E+02	5.5E+02
Chromium +3	6.2E+02	6.0E+02	0.0E+00	3.1E+01	5.5E+01	5.3E+02	5.1E+02	5.7E-01	5.5E-01	9.0E-03	ND	6.7E+02
Chromium +6	3.7E+02	3.6E+02	0.0E+00	1.9E+01	3.3E+01	3.1E+02	3.1E+02	3.4E-01	3.3E-01	0.0E+00	ND	ND
Cobalt	1.8E+02	1.7E+02	0.0E+00	9.2E+00	1.6E+01	1.6E+02	1.5E+02	3.9E-01	3.7E-01	0.0E+00	ND	6.8E+02
Copper	2.6E+02	2.1E+02	0.0E+00	5.6E+01	1.0E+02	6.4E+01	3.3E+01	3.6E+01	1.8E+01	0.0E+00	ND	6.7E+02
Lead	1.4E+03	1.4E+03	0.0E+00	4.9E+02	8.8E+02	1.9E+00	1.9E+00	9.8E-02	9.8E-02	7.0E-03	4.9E+02	5.5E+02
Manganese	1.5E+03	1.4E+03	0.0E+00	7.8E+01	1.4E+02	1.3E+03	1.2E+03	4.9E+00	4.4E+00	0.0E+00	ND	7.0E+02
Mercury as HgCl2	1.7E+01	1.7E+01	1.0E+01	2.3E+00	3.4E+00	3.8E-01	1.9E-01	1.2E+00	6.2E-01	8.5E-01	9.8E-04	4.1E+02
Mercury as Methyl Hg	1.6E+01	1.6E+01	1.0E+01	2.3E+00	3.4E+00	6.1E-02	3.1E-02	2.4E-02	1.2E-02	8.5E-01	6.5E-01	4.4E+02
Nickel	1.9E+02	1.9E+02	0.0E+00	6.8E+01	1.2E+02	2.6E-01	2.6E-01	9.7E-04	9.7E-04	9.0E-03	4.9E+02	5.5E+02
Selenium	1.4E+02	1.4E+02	0.0E+00	4.9E+01	8.7E+01	4.8E-01	4.8E-01	1.4E-04	1.4E-04	0.0E+00	4.8E+02	5.5E+02
Zinc	2.2E+03	2.2E+03	0.0E+00	8.1E+02	1.4E+03	3.1E+00	3.1E+00	1.1E-02	1.1E-02	8.0E-03	4.9E+02	5.5E+02
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	7.3E-04	6.5E-04	7.5E-05	2.3E-04	2.4E-04	2.5E-05	1.5E-05	1.7E-04	9.7E-05	6.6E-01	4.1E+01	4.2E+02
PCBs												
Total PCBs	2.7E+00	2.7E+00	1.5E+00	6.1E-01	6.2E-01	2.1E-02	2.1E-02	3.5E-03	3.5E-03	9.9E-01	2.6E+02	3.9E+02
PAHs												
Acenaphthene	2.6E+00	2.6E+00	1.6E+00	4.5E-01	4.3E-01	3.5E-02	3.4E-02	6.4E-03	6.4E-03	1.0E+00	1.5E+02	5.7E+02
Acenaphthylene	5.7E-01	5.7E-01	1.2E-01	2.3E-01	2.1E-01	1.0E-02	1.0E-02	6.4E-08	6.4E-08	1.0E+00	1.5E+02	2.6E+02
Anthracene	4.1E-01	4.1E-01	2.0E-01	9.8E-02	9.5E-02	8.5E-03	8.0E-03	6.5E-03	6.1E-03	1.0E+00	7.6E+01	5.7E+02
Benzo(a)anthracene	1.3E+00	1.3E+00	1.7E-01	5.2E-01	5.8E-01	5.8E-03	5.3E-03	5.9E-02	5.4E-02	4.8E-01	4.7E+00	5.4E+02
Benzo(a)pyrene	1.4E+00	1.4E+00	1.9E-01	5.1E-01	6.2E-01	1.8E-03	1.7E-03	4.9E-02	4.6E-02	2.9E-01	1.5E+00	5.4E+02
Benzo(b)fluoranthene	1.4E+00	1.4E+00	3.7E-01	4.7E-01	4.7E-01	2.4E-02	2.2E-02	4.3E-02	3.9E-02	9.7E-01	1.2E+02	5.7E+02
Benzo(k)fluoranthene	1.3E+00	1.2E+00	3.0E-01	3.5E-01	4.8E-01	4.5E-03	3.4E-03	1.5E-01	1.1E-01	2.7E-01	1.1E+00	5.7E+02
Benzo(ghi)perylene	1.5E+01	1.5E+01	2.1E-01	1.5E+00	1.7E+00	1.1E+01	1.1E+01	1.7E-05	1.7E-05	1.0E+00	3.7E-01	2.0E+02
Chrysene	8.0E+00	8.0E+00	2.0E+00	2.6E+00	2.9E+00	4.3E-02	3.8E-02	4.4E-01	3.8E-01	7.4E-01	1.0E+02	5.7E+02
Dibenzo(a,h)anthracene	1.2E+01	1.2E+01	0.0E+00	4.0E+00	7.0E+00	1.0E-02	8.8E-03	9.8E-01	8.6E-01	5.5E-02	2.1E-02	5.7E+02
Fluoranthene	5.5E-01	5.5E-01	2.0E-01	1.7E-01	1.6E-01	5.8E-03	5.5E-03	1.1E-02	1.0E-02	9.9E-01	2.1E+01	5.7E+02
Fluorene	5.2E-01	5.2E-01	2.9E-01	1.2E-01	1.1E-01	2.9E-03	2.9E-03	1.0E-03	1.0E-03	1.0E+00	7.5E+01	5.7E+02
Indeno(1,2,3-cd)pyrene	1.0E+01	1.0E+01	0.0E+00	3.4E+00	6.0E+00	7.2E-03	6.5E-03	6.5E-01	5.8E-01	5.0E-03	2.2E+00	5.7E+02
2-Methylnaphthalene	1.1E-01	1.1E-01	1.5E-02	5.1E-02	4.7E-02	3.2E-05	3.2E-05	4.4E-11	4.4E-11	1.0E+00	2.4E+02	2.7E+02
Naphthalene	1.1E+00	1.1E+00	5.6E-01	2.7E-01	2.6E-01	1.8E-02	1.8E-02	9.4E-04	9.3E-04	1.0E+00	2.6E+02	4.9E+02
Phenanthrene	8.1E-01	8.1E-01	3.4E-01	2.3E-01	2.3E-01	1.1E-02	1.0E-02	6.8E-03	6.6E-03	1.0E+00	3.0E+01	5.7E+02
Pyrene	6.0E-01	5.8E-01	1.9E-01	1.7E-01	1.7E-01	2.9E-02	2.2E-02	4.6E-02	3.6E-02	9.9E-01	1.5E+01	5.7E+02
Aldehyde Ketones												
Formaldehyde	1.4E+03	1.4E+03	2.6E+01	1.6E+02	2.4E+02	1.0E+03	1.0E+03	3.4E-03	3.4E-03	1.0E+00	4.6E-01	8.0E+02

Appendix G-2c

Calculation of Potomac River Water Concentration

RME Potomac River Fisher Scenario - Adult and Child

Parameters

Cwtot = LT/Vfx * fwc + kwt * WAw * (dwc + dbs)
Cwt = fwc * Cwtot * (dwc + dbs/dwc)
Cdw = Cwt/1 + Kdsw * TSS * 10-6
Cdw(Hg) = Cwt(Hg2+)/1 + Kdsw(Hg2+)* TSS * 10-6
Cdw Hg2+ = Cdw (Hg) * 0.85
Cdw MeHg = Cdw (Hg) * 0.15
Csb = fbs * Cwtot * (Kdbs / thetabs + Kdbs * Cbs) * (dwc + dbs/dbs)

Where:

fwc = (1 + Kdsw * TSS * 10-6) * (dwc/dz)/(1 + Kdsw * TSS * 10-6) * (dwc/dz) + (thetabs + Kdbs * Cbs) * (dbs/dz)
kwt = fwc * kv + fbs * kb
fbs = 1 - fwc
kv = Kv/(dz * (1 + Kdsw * TSS * 10-6)
kb = [(Xe * WAl * SD * 10+3 - Vfx * TSS)/(WAw *TSS)] * [(TSS * 10-6)/(Cbs * dbs)]
TSS = (Xe * (WAl-WAi) * SD * 103)/(Vfx + Dss * WAw)
and:

Values Specific to Contaminant:	CS*
Cwtot = Total Water Body Concentration (g/m3=mg/L):	CS*
Cwt = Total Concentration in Water Column (mg/L):	CS*
Cdw = Dissolved Phase Water Concentration (mg/L):	CS*
Csb = Concentration Sorbed to Bed Sediments (mg/L):	CS*
fwc = Fraction of Total Water Body Concentration That Occurs in the Water Column (--):	CS*
kwt = Total First Order Dissipation Rate Constant (yr-1):	CS*
fbs = Fraction of Total Water Body Concentration That Occurs in the Bed Sediment (--):	CS*
LT = Total Contaminant Load to the Water Body (mg/yr):	CS*
Vfx = Average Volumetric Flow Rate Through Water Body (m3/yr):	4.4E+09
dwc = Depth of Water Column (m):	1.0E+00
dbs = Depth of Upper Benthic Sediment Layer (m):	3.0E-02
dz = Total Waterbody Depth (m):	1.04E+00
WAw = Water Body Area (m2):	1.3E+08
UC1 = Units Conversion Factor (g/mg):	1.0E+03
Kdsw = Suspended Sediment/Surface Water Partition Coefficient (L/kg):	CS*
TSS = Total Suspended Solids (mg/L):	3.8E+01
thetabs = Bed Sediment Porosity (Lwater/L):	6.0E-01
Kdbs = Bed Sediment/Sediment Pore Water Partition Coefficient (L/kg):	CS*
Cbs = Bed Sediment Concentration (g/cm3):	1.0E+00
kv = Water Column Volatilization Rate Constant (yr-1):	CS*
kb = Benthic Burial Rate Constant (yr-1):	0.0E+00
Kv = Overall COC Transfer Rate Coefficient (m/yr):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	4.6E-01
SD = Sediment Delivery Ratio (--):	4.2E-02
WAl = Total Watershed Area Recieving Pollutant Deposition (m2):	1.6E+09
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	7.84E+07
Dss = Suspended solids depostion rate (m/yr):	1.8E+03

Appendix G-2c
Calculation of Potomac River Water Concentration
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Cwtot		Cwt		Cdw		Csb		fwc	fbs	kwt	kv	Kdsw	Kdbs
	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer						
Inorganics														
Antimony	2.02E-12	2.02E-12	8.81E-13	8.81E-13	8.80E-13	8.80E-13	4.0E-11	4.0E-11	4.2E-01	5.8E-01	2.0E+02	4.7E+02	4.5E+01	4.5E+01
Arsenic	2.43E-09	2.43E-09	1.33E-09	1.33E-09	1.33E-09	1.33E-09	3.8E-08	3.8E-08	5.3E-01	4.7E-01	2.5E+02	4.8E+02	2.9E+01	2.9E+01
Beryllium	5.08E-09	5.08E-09	2.19E-10	2.19E-10	2.12E-10	2.12E-10	1.7E-07	1.7E-07	4.2E-02	9.6E-01	1.9E+01	4.6E+02	7.9E+02	7.9E+02
Cadmium	5.66E-09	5.66E-09	1.79E-09	1.79E-09	1.79E-09	1.79E-09	1.3E-07	1.3E-07	3.1E-01	6.9E-01	1.5E+02	4.7E+02	7.5E+01	7.5E+01
Chromium +3	2.20E-07	2.14E-07	1.43E-07	1.39E-07	1.43E-07	1.39E-07	2.7E-06	2.6E-06	6.3E-01	3.7E-01	0.0E+00	0.0E+00	1.9E+01	1.9E+01
Chromium +6	1.30E-07	1.27E-07	8.47E-08	8.27E-08	8.46E-08	8.26E-08	1.6E-06	1.6E-06	6.3E-01	3.7E-01	0.0E+00	0.0E+00	1.9E+01	1.9E+01
Cobalt	9.60E-08	9.07E-08	4.19E-08	3.96E-08	4.19E-08	3.95E-08	1.9E-06	1.8E-06	4.2E-01	5.8E-01	0.0E+00	0.0E+00	4.5E+01	4.5E+01
Copper	1.26E-05	1.01E-05	5.96E-08	4.80E-08	4.32E-08	3.48E-08	4.3E-04	3.5E-04	4.6E-03	1.0E+00	0.0E+00	0.0E+00	1.0E+04	1.0E+04
Lead	5.44E-07	5.44E-07	2.08E-08	2.08E-08	2.01E-08	2.01E-08	1.8E-05	1.8E-05	3.7E-02	9.6E-01	1.7E+01	4.6E+02	9.0E+02	9.0E+02
Manganese	1.03E-06	9.45E-07	3.58E-07	3.30E-07	3.58E-07	3.29E-07	2.3E-05	2.1E-05	3.4E-01	6.6E-01	0.0E+00	0.0E+00	6.5E+01	6.5E+01
Mercury as HgCl2	1.23E-06	1.17E-06	4.05E-09	3.86E-09	7.17E-10	6.84E-10	4.2E-05	4.0E-05	3.2E-03	1.0E+00	6.3E-07	2.0E-04	1.0E+05	5.0E+04
Mercury as Methyl Hg	7.01E-08	6.99E-08	3.67E-09	3.66E-09	1.27E-10	1.21E-10	2.3E-06	2.3E-06	5.1E-02	9.5E-01	6.6E-03	1.3E-01	1.0E+05	3.0E+03
Nickel	7.94E-09	7.94E-09	2.77E-09	2.77E-09	2.76E-09	2.76E-09	1.8E-07	1.8E-07	3.4E-01	6.6E-01	1.6E+02	4.7E+02	6.5E+01	6.5E+01
Selenium	2.32E-09	2.32E-09	2.05E-09	2.05E-09	2.05E-09	2.05E-09	1.0E-08	1.0E-08	8.6E-01	1.4E-01	4.0E+02	4.6E+02	5.0E+00	5.0E+00
Zinc	9.16E-08	9.16E-08	3.30E-08	3.30E-08	3.29E-08	3.29E-08	2.0E-06	2.0E-06	3.5E-01	6.5E-01	1.7E+02	4.7E+02	6.2E+01	6.2E+01
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	5.74E-11	5.12E-11	1.54E-13	1.37E-13	1.27E-14	1.13E-14	2.0E-09	1.8E-09	2.6E-03	1.0E+00	8.4E-03	3.2E+00	2.9E+05	1.6E+05
PCBs														
Total PCBs	8.05E-09	8.05E-09	8.96E-11	8.96E-11	7.00E-11	7.00E-11	2.8E-07	2.8E-07	1.1E-02	9.9E-01	2.1E+00	1.9E+02	7.4E+03	3.9E+03
PAHs														
Acenaphthene	7.00E-10	7.00E-10	1.06E-10	1.06E-10	1.05E-10	1.05E-10	2.1E-08	2.1E-08	1.5E-01	8.5E-01	2.2E+01	1.5E+02	3.7E+02	2.0E+02
Acenaphthylene	2.42E-11	2.42E-11	2.44E-11	2.44E-11	2.44E-11	2.44E-11	3.6E-12	3.6E-12	9.8E-01	2.2E-02	1.4E+02	1.4E+02	2.8E-01	1.5E-01
Anthracene	8.00E-10	7.98E-10	3.02E-11	3.01E-11	2.83E-11	2.82E-11	2.7E-08	2.7E-08	3.7E-02	9.6E-01	2.5E+00	6.9E+01	1.8E+03	9.4E+02
Benzo(a)anthracene	5.98E-08	5.96E-08	2.90E-10	2.89E-10	1.44E-10	1.43E-10	2.1E-06	2.0E-06	4.7E-03	1.0E+00	1.0E-02	2.2E+00	2.7E+04	1.4E+04
Benzo(a)pyrene	9.39E-08	9.36E-08	3.14E-10	3.13E-10	8.34E-11	8.32E-11	3.2E-06	3.2E-06	3.2E-03	1.0E+00	1.3E-03	3.9E-01	7.3E+04	3.9E+04
Benzo(b)fluoranthene	5.11E-08	5.09E-08	1.67E-10	1.67E-10	4.20E-11	4.18E-11	1.8E-06	1.8E-06	3.2E-03	1.0E+00	9.1E-02	2.9E+01	7.9E+04	4.2E+04
Benzo(k)fluoranthene	8.79E-08	8.53E-08	2.92E-10	2.83E-10	7.62E-11	7.40E-11	3.0E-06	2.9E-06	3.2E-03	1.0E+00	9.3E-04	2.9E-01	7.4E+04	4.0E+04
Benzo(ghi)perylene	3.33E-09	3.33E-09	3.36E-09	3.36E-09	3.36E-09	3.36E-09	1.2E-10	1.2E-10	9.8E-01	1.9E-02	3.5E-01	3.5E-01	6.8E-02	3.6E-02
Chrysene	1.64E-07	1.63E-07	7.55E-10	7.49E-10	3.52E-10	3.49E-10	5.7E-06	5.6E-06	4.5E-03	1.0E+00	2.1E-01	4.7E+01	3.0E+04	1.6E+04
Dibenzo(a,h)anthracene	9.48E-07	9.38E-07	2.78E-09	2.75E-09	4.56E-10	4.51E-10	3.3E-05	3.2E-05	2.8E-03	1.0E+00	9.3E-06	3.3E-03	1.3E+05	7.2E+04
Fluoranthene	4.14E-09	4.13E-09	8.13E-11	8.11E-11	7.13E-11	7.12E-11	1.4E-07	1.4E-07	1.9E-02	9.8E-01	3.4E-01	1.8E+01	3.7E+03	2.0E+03
Fluorene	3.66E-10	3.66E-10	3.76E-11	3.76E-11	3.68E-11	3.68E-11	1.1E-08	1.1E-08	1.0E-01	9.0E-01	7.1E+00	7.1E+01	5.8E+02	3.1E+02
Indeno(1,2,3-cd)pyrene	8.44E-07	8.39E-07	2.31E-09	2.29E-09	2.36E-10	2.35E-10	2.9E-05	2.9E-05	2.7E-03	1.0E+00	5.8E-04	2.2E-01	2.3E+05	1.2E+05
2-Methylnaphthalene	3.20E-12	3.20E-12	3.24E-12	3.24E-12	3.24E-12	3.24E-12	1.1E-13	1.1E-13	9.8E-01	1.9E-02	2.2E+02	2.3E+02	6.1E-02	3.3E-02
Naphthalene	6.75E-11	6.75E-11	2.86E-11	2.86E-11	2.85E-11	2.85E-11	1.4E-09	1.4E-09	4.1E-01	5.9E-01	1.0E+02	2.5E+02	8.9E+01	4.8E+01
Phenanthrene	3.03E-09	3.02E-09	1.02E-10	1.02E-10	9.52E-11	9.51E-11	1.0E-07	1.0E-07	3.3E-02	9.7E-01	8.8E-01	2.7E+01	2.0E+03	1.1E+03
Pyrene	6.73E-09	6.53E-09	1.01E-10	9.76E-11	8.42E-11	8.17E-11	2.3E-07	2.2E-07	1.5E-02	9.9E-01	1.7E-01	1.2E+01	5.1E+03	2.7E+03
Aldehyde Ketones														
Formaldehyde	3.24E-07	3.24E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07	2.9E-08	2.9E-08	9.8E-01	2.0E-02	4.4E-01	4.5E-01	1.7E-01	9.0E-02

Appendix G-2d
Calculation of Fish Concentration
RME Potomac River Fisher Scenario - Adult and Child

Parameters	
Cfishdw = Cdw * BCFfish or	
Cfishdw = Cdw * BAFfish or	
Cfishsb = Csb * flipid * BSAF/ OCsed	
Where:	
Values Specific to Contaminant:	CS*
Cfish = Contaminant Concentration In Fish (mg/kg):	CS*
Cfishdw = Fish Concentration from Dissolved Water Concentration (mg/kg):	CS*
Cfishsb = Fish Concentration from Bed Sediments (mg/kg):	CS*
Cdw = Dissolved Water Concentration (mg/L):	CS*
Cwt = Total Water Column Concentration (mg/L):	CS*
Csb = Concentration of Contaminant Sorbed to Bed Sediment (mg/kg):	CS*
BCFfish = Fish Bioconcentration Factor (L/kg):	CS*
BAFfish = Fish Bioaccumulation Factor (L/kg):	CS*
BSAF = Biota to Sediment Accumulation Factor (--):	CS*
flipid = Fish Lipid Content:	7.0E-02
OCsed = Fraction Organic Carbon in Bottom Sediment:	4.0E-02

Appendix G-2d
Calculation of Fish Concentration
RME Potomac River Fisher Scenario - Adult and Child

Contaminant	Cfish		Cfishdw_BCF		BCF	Cfishdw_BAF		BAF	Cfishsb		BSAF
	Non - Cancer	Cancer	Non - Cancer	Cancer		Non - Cancer	Cancer		Non - Cancer	Cancer	
Inorganics											
Antimony	3.5E-11	3.5E-11	3.5E-11	3.5E-11	4.0E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Arsenic	1.5E-07	1.5E-07	1.5E-07	1.5E-07	1.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Beryllium	1.3E-08	1.3E-08	1.3E-08	1.3E-08	6.2E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cadmium	1.6E-06	1.6E-06	1.6E-06	1.6E-06	9.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +3	2.7E-06	2.6E-06	2.7E-06	2.6E-06	1.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +6	2.7E-07	2.6E-07	2.7E-07	2.6E-07	3.2E+00	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cobalt	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Copper	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Lead	1.8E-09	1.8E-09	1.8E-09	1.8E-09	9.0E-02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Manganese	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as HgCl2	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as Methyl Hg	8.6E-04	8.2E-04	0.0E+00	0.0E+00	ND	8.6E-04	8.2E-04	6.8E+06	0.0E+00	0.0E+00	ND
Nickel	2.2E-07	2.2E-07	2.2E-07	2.2E-07	7.8E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Selenium	2.6E-07	2.6E-07	2.6E-07	2.6E-07	1.3E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Zinc	6.8E-05	6.8E-05	6.8E-05	6.8E-05	2.1E+03	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	3.1E-10	2.8E-10	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	3.1E-10	2.8E-10	9.0E-02
PCBs											
Total PCBs	9.6E-07	9.6E-07	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	9.6E-07	9.6E-07	2.0E+00
PAHs											
Acenaphthene	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.0E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Acenaphthylene	6.6E-09	6.6E-09	0.0E+00	0.0E+00	ND	6.6E-09	6.6E-09	2.7E+02	0.0E+00	0.0E+00	ND
Anthracene	2.9E-08	2.9E-08	0.0E+00	0.0E+00	ND	2.9E-08	2.9E-08	1.0E+03	0.0E+00	0.0E+00	ND
Benzo(a)anthracene	7.2E-06	7.1E-06	0.0E+00	0.0E+00	ND	7.2E-06	7.1E-06	5.0E+04	0.0E+00	0.0E+00	ND
Benzo(a)pyrene	1.1E-05	1.1E-05	0.0E+00	0.0E+00	ND	1.1E-05	1.1E-05	1.3E+05	0.0E+00	0.0E+00	ND
Benzo(b)fluoranthene	8.7E-06	8.6E-06	0.0E+00	0.0E+00	ND	8.7E-06	8.6E-06	2.1E+05	0.0E+00	0.0E+00	ND
Benzo(k)fluoranthene	1.3E-05	1.3E-05	0.0E+00	0.0E+00	ND	1.3E-05	1.3E-05	1.8E+05	0.0E+00	0.0E+00	ND
Benzo(ghi)perylene	8.5E-05	8.5E-05	0.0E+00	0.0E+00	ND	8.5E-05	8.5E-05	2.5E+04	0.0E+00	0.0E+00	ND
Chrysene	1.8E-05	1.7E-05	0.0E+00	0.0E+00	ND	1.8E-05	1.7E-05	5.0E+04	0.0E+00	0.0E+00	ND
Dibenzo(a,h)anthracene	2.3E-04	2.2E-04	0.0E+00	0.0E+00	ND	2.3E-04	2.2E-04	5.0E+05	0.0E+00	0.0E+00	ND
Fluoranthene	3.2E-07	3.2E-07	0.0E+00	0.0E+00	ND	3.2E-07	3.2E-07	4.5E+03	0.0E+00	0.0E+00	ND
Fluorene	1.7E-08	1.7E-08	0.0E+00	0.0E+00	ND	1.7E-08	1.7E-08	4.7E+02	0.0E+00	0.0E+00	ND
Indeno(1,2,3-cd)pyrene	1.5E-04	1.5E-04	0.0E+00	0.0E+00	ND	1.5E-04	1.5E-04	6.2E+05	0.0E+00	0.0E+00	ND
2-Methylnaphthalene	6.1E-10	6.1E-10	6.1E-10	6.1E-10	1.9E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Naphthalene	2.0E-09	2.0E-09	2.0E-09	2.0E-09	6.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Phenanthrene	9.8E-08	9.8E-08	0.0E+00	0.0E+00	ND	9.8E-08	9.8E-08	1.0E+03	1.3E-09	1.3E-09	7.3E-03
Pyrene	2.8E-07	2.7E-07	0.0E+00	0.0E+00	ND	2.8E-07	2.7E-07	3.3E+03	9.6E-10	9.3E-10	2.4E-03
Aldehyde Ketones											
Formaldehyde	1.1E-04	1.1E-04	1.1E-04	1.1E-04	3.4E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND

Appendix G-2e
Calculation of Chemical Intakes
RME Potomac River Fisher Scenario: Adult

Parameter

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep)* CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	4.5E-14	4.5E-14	2.0E-17	2.0E-17	1.1E-15	1.1E-15	4.4E-14	4.4E-14
Arsenic	6.6E-09	6.6E-09	1.8E-14	1.8E-14	6.4E-09	6.4E-09	1.9E-10	1.9E-10
Beryllium	2.7E-09	2.7E-09	3.9E-12	3.9E-12	2.7E-09	2.7E-09	1.6E-11	1.6E-11
Cadmium	2.5E-08	2.5E-08	1.5E-12	1.5E-12	2.3E-08	2.3E-08	2.0E-09	2.0E-09
Chromium +3	2.2E-08	2.1E-08	1.1E-09	1.1E-09	1.7E-08	1.7E-08	3.4E-09	3.3E-09
Chromium +6	1.1E-08	1.1E-08	6.8E-10	6.7E-10	1.0E-08	1.0E-08	3.3E-10	3.3E-10
Cobalt	5.6E-09	5.5E-09	7.9E-10	7.5E-10	4.8E-09	4.8E-09	0.0E+00	0.0E+00
Copper	1.2E-07	7.7E-08	9.5E-08	4.8E-08	2.9E-08	2.9E-08	0.0E+00	0.0E+00
Lead	2.6E-07	2.6E-07	2.6E-10	2.6E-10	2.6E-07	2.6E-07	2.3E-12	2.3E-12
Manganese	5.0E-08	5.0E-08	9.8E-09	9.1E-09	4.1E-08	4.1E-08	0.0E+00	0.0E+00
Mercury as HgCl2	3.6E-09	2.1E-09	2.3E-09	1.2E-09	1.3E-09	9.1E-10	0.0E+00	0.0E+00
Mercury as Methyl Hg	1.1E-06	1.0E-06	4.5E-11	2.3E-11	1.6E-10	1.6E-10	1.1E-06	1.0E-06
Nickel	3.6E-08	3.6E-08	2.6E-12	2.6E-12	3.5E-08	3.5E-08	2.7E-10	2.7E-10
Selenium	9.9E-09	9.9E-09	3.7E-13	3.7E-13	9.6E-09	9.6E-09	3.3E-10	3.3E-10
Zinc	5.1E-07	5.1E-07	2.9E-11	2.9E-11	4.3E-07	4.3E-07	8.5E-08	8.5E-08
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	4.4E-13	3.9E-13	3.6E-14	2.1E-14	1.9E-14	1.8E-14	3.9E-13	3.5E-13
PCBs								
Total PCBs	1.2E-09	1.2E-09	6.1E-13	6.1E-13	1.9E-11	1.9E-11	1.2E-09	1.2E-09
PAHs								
Acenaphthene	3.2E-11	3.2E-11	9.6E-13	9.5E-13	5.1E-12	5.0E-12	2.6E-11	2.6E-11
Acenaphthylene	8.6E-12	8.6E-12	2.5E-17	2.5E-17	3.8E-13	3.8E-13	8.3E-12	8.3E-12
Anthracene	3.9E-11	3.9E-11	1.1E-12	9.9E-13	1.8E-12	1.7E-12	3.6E-11	3.6E-11
Benzo(a)anthracene	9.0E-09	9.0E-09	2.0E-11	1.8E-11	4.5E-11	4.4E-11	9.0E-09	8.9E-09
Benzo(a)pyrene	1.4E-08	1.4E-08	2.3E-11	2.2E-11	6.9E-11	6.9E-11	1.4E-08	1.4E-08
Benzo(b)fluoranthene	1.1E-08	1.1E-08	5.9E-12	5.4E-12	8.6E-12	8.5E-12	1.1E-08	1.1E-08
Benzo(k)fluoranthene	1.7E-08	1.7E-08	8.1E-11	6.1E-11	1.2E-10	1.2E-10	1.7E-08	1.6E-08
Benzo(ghi)perylene	1.8E-07	1.8E-07	9.6E-14	9.6E-14	7.4E-08	7.4E-08	1.1E-07	1.1E-07
Chrysene	2.2E-08	2.2E-08	1.4E-10	1.3E-10	3.1E-10	3.0E-10	2.2E-08	2.2E-08
Dibenzo(a,h)anthracene	2.9E-07	2.8E-07	8.6E-10	7.6E-10	2.2E-09	2.1E-09	2.8E-07	2.8E-07
Fluoranthene	4.0E-10	4.0E-10	1.8E-12	1.7E-12	2.2E-12	2.2E-12	4.0E-10	4.0E-10
Fluorene	2.2E-11	2.2E-11	1.8E-13	1.8E-13	4.0E-13	4.0E-13	2.2E-11	2.2E-11
Indeno(1,2,3-cd)pyrene	1.8E-07	1.8E-07	5.7E-10	5.1E-10	1.8E-09	1.8E-09	1.8E-07	1.8E-07
2-Methylnaphthalene	1.0E-12	1.0E-12	5.6E-20	5.6E-20	2.8E-13	2.8E-13	7.6E-13	7.6E-13
Naphthalene	4.1E-12	4.1E-12	9.4E-14	9.3E-14	1.5E-12	1.5E-12	2.5E-12	2.5E-12
Phenanthrene	1.3E-10	1.3E-10	1.1E-12	1.1E-12	1.9E-12	1.9E-12	1.2E-10	1.2E-10
Pyrene	3.6E-10	3.5E-10	7.5E-12	5.8E-12	7.4E-12	5.8E-12	3.5E-10	3.4E-10
Aldehyde Ketones								
Formaldehyde	2.5E-07	2.5E-07	1.8E-11	1.8E-11	1.1E-07	1.1E-07	1.4E-07	1.4E-07

Appendix G-2e
Calculation of Chemical Intakes
RME Potomac River Fisher Scenario: Child

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	8.80E-04
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	3.3E-14	3.3E-14	1.9E-16	1.9E-16	1.6E-15	1.6E-15	3.1E-14	3.1E-14
Arsenic	9.1E-09	9.1E-09	1.7E-13	1.7E-13	9.0E-09	9.0E-09	1.3E-10	1.3E-10
Beryllium	3.8E-09	3.8E-09	3.7E-11	3.7E-11	3.8E-09	3.8E-09	1.2E-11	1.2E-11
Cadmium	3.4E-08	3.4E-08	1.4E-11	1.4E-11	3.2E-08	3.2E-08	1.4E-09	1.4E-09
Chromium +3	3.7E-08	3.7E-08	1.1E-08	1.0E-08	2.4E-08	2.4E-08	2.4E-09	2.3E-09
Chromium +6	2.1E-08	2.0E-08	6.3E-09	6.2E-09	1.4E-08	1.4E-08	2.4E-10	2.3E-10
Cobalt	1.4E-08	1.4E-08	7.4E-09	7.0E-09	6.7E-09	6.7E-09	0.0E+00	0.0E+00
Copper	9.3E-07	4.9E-07	8.9E-07	4.5E-07	4.1E-08	4.1E-08	0.0E+00	0.0E+00
Lead	3.7E-07	3.7E-07	2.4E-09	2.4E-09	3.7E-07	3.7E-07	1.6E-12	1.6E-12
Manganese	1.5E-07	1.4E-07	9.1E-08	8.5E-08	5.7E-08	5.7E-08	0.0E+00	0.0E+00
Mercury as HgCl2	2.3E-08	1.2E-08	2.2E-08	1.1E-08	1.8E-09	1.3E-09	0.0E+00	0.0E+00
Mercury as Methyl Hg	7.6E-07	7.2E-07	4.2E-10	2.1E-10	2.2E-10	2.2E-10	7.6E-07	7.2E-07
Nickel	5.0E-08	5.0E-08	2.4E-11	2.4E-11	4.9E-08	4.9E-08	1.9E-10	1.9E-10
Selenium	1.4E-08	1.4E-08	3.4E-12	3.4E-12	1.3E-08	1.3E-08	2.3E-10	2.3E-10
Zinc	6.6E-07	6.6E-07	2.7E-10	2.7E-10	6.0E-07	6.0E-07	6.0E-08	6.0E-08
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	6.4E-13	4.7E-13	3.3E-13	2.0E-13	2.7E-14	2.5E-14	2.7E-13	2.4E-13
PCBs								
Total PCBs	8.8E-10	8.8E-10	5.7E-12	5.7E-12	2.7E-11	2.7E-11	8.5E-10	8.5E-10
PAHs								
Acenaphthene	3.5E-11	3.4E-11	9.0E-12	8.8E-12	7.1E-12	7.1E-12	1.9E-11	1.9E-11
Acenaphthylene	6.4E-12	6.4E-12	2.3E-16	2.3E-16	5.9E-13	5.9E-13	5.8E-12	5.8E-12
Anthracene	3.8E-11	3.7E-11	9.9E-12	9.3E-12	2.5E-12	2.3E-12	2.6E-11	2.6E-11
Benzo(a)anthracene	6.6E-09	6.5E-09	1.9E-10	1.7E-10	6.2E-11	6.2E-11	6.3E-09	6.3E-09
Benzo(a)pyrene	1.0E-08	1.0E-08	2.2E-10	2.0E-10	9.7E-11	9.6E-11	9.8E-09	9.7E-09
Benzo(b)fluoranthene	7.7E-09	7.6E-09	5.5E-11	5.1E-11	1.2E-11	1.2E-11	7.6E-09	7.6E-09
Benzo(k)fluoranthene	1.3E-08	1.2E-08	7.6E-10	5.7E-10	1.7E-10	1.6E-10	1.2E-08	1.1E-08
Benzo(ghi)perylene	1.9E-07	1.9E-07	9.0E-13	9.0E-13	1.2E-07	1.2E-07	7.5E-08	7.5E-08
Chrysene	1.7E-08	1.7E-08	1.4E-09	1.2E-09	4.3E-10	4.3E-10	1.5E-08	1.5E-08
Dibenzo(a,h)anthracene	2.1E-07	2.1E-07	8.1E-09	7.1E-09	3.0E-09	3.0E-09	2.0E-07	2.0E-07
Fluoranthene	3.0E-10	3.0E-10	1.7E-11	1.6E-11	3.1E-12	3.0E-12	2.8E-10	2.8E-10
Fluorene	1.8E-11	1.7E-11	1.7E-12	1.6E-12	5.5E-13	5.5E-13	1.5E-11	1.5E-11
Indeno(1,2,3-cd)pyrene	1.4E-07	1.3E-07	5.3E-09	4.8E-09	2.5E-09	2.5E-09	1.3E-07	1.3E-07
2-Methylnaphthalene	9.8E-13	9.8E-13	5.2E-19	5.2E-19	4.4E-13	4.4E-13	5.3E-13	5.3E-13
Naphthalene	4.7E-12	4.7E-12	8.8E-13	8.7E-13	2.1E-12	2.1E-12	1.7E-12	1.7E-12
Phenanthrene	9.9E-11	9.9E-11	1.1E-11	1.0E-11	2.6E-12	2.6E-12	8.6E-11	8.6E-11
Pyrene	3.2E-10	3.0E-10	7.0E-11	5.4E-11	1.0E-11	7.9E-12	2.4E-10	2.4E-10
Aldehyde Ketones								
Formaldehyde	2.6E-07	2.6E-07	1.7E-10	1.7E-10	1.6E-07	1.6E-07	9.8E-08	9.8E-08

Appendix G-2e
Summary of Cancer Risks and Hazard Indices (a)
RME Potomac River Fisher Scenario - Adult and Child

Parameter

CRo = Itot * ED * EF * SFo/AT * UC
HQo = Itot * ED * EF/ RfDo * AT * UC

Where:

CS* = Values Specific to Contaminant:	
CRo = Cancer Risk oral (--):	CS*
HQo = Ingestion Hazard Index (--):	CS*
Itot = Total Daily Intake of Contaminant (mg/d):	CS*
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*
ED = Exposure Duration (see below) (yr):	
adult:	30
child:	6
EF = Exposure Frequency (day/yr):	350
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	30
child:	6
UC = Units Conversion (day/yr):	365

Contaminant	RfDo mg/kg-d	SFo mg/kg-D-2	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
Inorganics							
Antimony	4.0E-04	NA	1.1E-10	NA	7.9E-11	NA	Longevity, blood glucose, cholesterol
Arsenic	3.0E-04	1.5E+00	2.1E-05	4E-09	2.9E-05	1E-09	Hyperpigmentation, keratosis, possible vascular effects
Beryllium	2.0E-03	NA	1.3E-06	NA	1.8E-06	NA	Intestinal lesions
Cadmium	1.0E-03	NA	2.4E-05	NA	3.3E-05	NA	Proteinuria
Chromium +3	1.5E+00	NA	1.4E-08	NA	2.4E-08	NA	None observed
Chromium +6	3.0E-03	5.0E-01	3.6E-06	2E-09	6.6E-06	8E-10	None observed
Cobalt	3.0E-04	NA	1.8E-05	NA	4.5E-05	NA	Endocrine Effects
Copper	4.0E-02	NA	3.0E-06	NA	2.2E-05	NA	Gastrointestinal Effects
Lead	NA	NA	NA	NA	NA	NA	
Manganese	1.4E-01	NA	3.5E-07	NA	1.0E-06	NA	CNS
Mercury as HgCl2	3.0E-04	NA	1.1E-05	NA	7.5E-05	NA	Autoimmune Effects
Mercury as Methyl Hg	1.0E-04	NA	1.0E-02	NA	7.3E-03	NA	Developmental Effects
Nickel	2.0E-02	NA	1.7E-06	NA	2.4E-06	NA	Reduced body and organ weight
Selenium	5.0E-03	NA	1.9E-06	NA	2.6E-06	NA	Selenosis
Zinc	3.0E-01	NA	1.6E-06	NA	2.1E-06	NA	Anemia
Dioxins/Furans							
2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	6.1E-04	2E-08	8.7E-04	5E-09	Developmental
PCBs							
Total PCBs	2.0E-05	2.0E+00	5.9E-05	1E-09	4.2E-05	1E-10	Developmental
							0.00E+00
PAHs							
Acenaphthene	6.0E-02	NA	5.2E-10	NA	5.5E-10	NA	Liver
Acenaphthylene	NA	NA	NA	NA	NA	NA	
Anthracene	3.0E-01	NA	1.3E-10	NA	1.2E-10	NA	No Observed Effects
Benzo(a)anthracene	NA	7.3E-01	NA	3E-09	NA	4E-10	
Benzo(a)pyrene	NA	7.3E+00	NA	4E-08	NA	6E-09	
Benzo(b)fluoranthene	NA	7.3E-01	NA	3E-09	NA	5E-10	
Benzo(k)fluoranthene	NA	7.3E-02	NA	5E-10	NA	7E-11	
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
Chrysene	NA	7.3E-03	NA	7E-11	NA	1E-11	
Dibenzo(a,h)anthracene	NA	7.3E+00	NA	8E-07	NA	1E-07	
Fluoranthene	4.0E-02	NA	9.7E-09	NA	7.2E-09	NA	CNS, liver, blood
Fluorene	4.0E-02	NA	5.3E-10	NA	4.2E-10	NA	Blood
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6E-08	NA	8E-09	
2-Methylnaphthalene	4.0E-03	NA	2.5E-10	NA	2.3E-10	NA	Lung
Naphthalene	2.0E-02	NA	2.0E-10	NA	2.3E-10	NA	Decreased body weight gain
Phenanthrene	NA	NA	NA	NA	NA	NA	
Pyrene	3.0E-02	NA	1.2E-08	NA	1.0E-08	NA	Kidney
Aldehyde Ketones							
Formaldehyde	2.0E-01	NA	1.2E-06	NA	1.3E-06	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and fish consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.1E-02	1E-06	8.5E-03	2E-07

Appendix G-2f
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
RME Potomac River Fisher Scenario - Adult and Child

Parameter

CRi = Ca * ED * EF * URF/AT * UC2
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2

And:
Ca = Q * Fv * Cyv + (1- Fv) * Cyp

For Hg:
Ca (Hg_{2+}) = 0.48Q(total) * Fv (Hg_{2+}) * Cyv + 1 - Fv (Hg_{2+}) * Cypb
Ca (Hg_0) = 0.002Q(total) * Fv (Hg_0) * Cyv + 1 - Fv (Hg_0) * Cypb

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
URF = Unit Risk Factor ((ug/m3)-1):	CS*
RfC = Reference Concentration (mg/m3):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
ED = Exposure Duration (see below) (yr):	
adult:	30
child:	6
EF = Exposure Frequency (day/yr):	350
UC1 = Units Conversion (mg/ug):	0.001
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	30
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	4.38E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	3.12E-06	6.0E-03	1.5E-05	4.3E-03	2.0E-04	6E-09	2.0E-04	1E-09	Cardiovascular, CNS, Developmental
Beryllium	4.89E-07	9.0E-03	2.0E-05	2.4E-03	2.3E-05	5E-10	2.3E-05	1E-10	Sensitization
Cadmium	4.16E-06	9.0E-03	1.0E-05	1.8E-03	4.0E-04	3E-09	4.0E-04	6E-10	
Chromium +3	2.95E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	1.75E-06	0.0E+00	1.0E-04	8.4E-02	1.7E-05	6E-08	1.7E-05	1E-08	Increased LDH in bronchoalveolar lavage fluid
Cobalt	8.65E-07	0.0E+00	6.0E-06	9.0E-03	1.4E-04	3E-09	1.4E-04	6E-10	
Copper	5.32E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	4.67E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	7.38E-06	0.0E+00	5.0E-05	NA	1.4E-04	NA	1.4E-04	NA	CNS
Mercury as HgCl2	2.25E-05	8.5E-01	3.0E-04	NA	7.2E-05	NA	7.2E-05	NA	PNS, Autonomic Dysfunction
Mercury as Methyl Hg	9.40E-08	1.0E+00	3.0E-04	NA	3.0E-07	NA	3.0E-07	NA	PNS, Autonomic Dysfunction
Nickel	6.41E-06	9.0E-03	9.0E-05	2.4E-04	6.8E-05	6E-10	6.8E-05	1E-10	
Selenium	4.64E-06	0.0E+00	2.0E-02	NA	2.2E-07	NA	2.2E-07	NA	
Zinc	7.62E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	1.58E-10	6.6E-01	4.0E-08	3.8E+01	3.8E-06	2E-09	3.8E-06	5E-10	
PCBs									
Total PCBs	1.11E-05	9.9E-01	NA	5.7E-04	NA	3E-09	NA	5E-10	
PAHs									
Acenaphthene	4.44E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	6.02E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	4.51E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	3.27E-07	4.8E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
Benzo(a)pyrene	3.67E-07	2.9E-01	NA	1.1E-03	NA	2E-10	NA	3E-11	
Benzo(b)fluoranthene	9.00E-07	9.7E-01	NA	1.1E-04	NA	4E-11	NA	8E-12	
Benzo(k)fluoranthene	5.58E-07	2.7E-01	NA	1.1E-04	NA	3E-11	NA	5E-12	
Benzo(ghi)perylene	3.99E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	4.84E-06	7.4E-01	NA	1.1E-05	NA	2E-11	NA	4E-12	
Dibenzo(a,h)anthracene	3.75E-07	5.5E-02	NA	1.2E-03	NA	2E-10	NA	4E-11	
Fluoranthene	3.95E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	6.33E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	3.19E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	3E-12	
2-Methylnaphthalene	8.63E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	2.66E-06	1.0E+00	3.0E-03	3.4E-05	8.5E-07	4E-11	8.5E-07	7E-12	Nasal effects
Phenanthrene	6.75E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	3.64E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	4.91E-05	1.0E+00	9.8E-03	1.3E-05	4.8E-06	3E-10	4.8E-06	5E-11	Respiratory tract

Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	1.1E-03	8E-08	1.1E-03	2E-08

Appendix G-2g
Ingestion of Mother's Milk
RME Potomac River Fisher Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.8E-14	3.9E-13	4.3E-13	4.73E+00	1.36E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-2e						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

(a) Organic process upset factor of 1.057 applied

Appendix G-2g
Ingestion of Mother's Milk
RME Potomac River Fisher Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
		2,3,7,8-TCDD TEQ	1.36E-02	6.0E+01	2.3E-04
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-3a
Contaminant Concentration in Soil
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

Carcinogens (T1 < tD < T2)

$$Cs = [((Ds * tD - Cs(tD)/ks) + ((Cs(tD)/ks) * (1 - \exp(-ks*(T2 - tD)))]/(T2 - T1)$$

Carcinogens (T2 $\leq$ tD)

$$Cs = [Ds/(ks * (tD - T1))] * [(tD + (\exp^{(-ks * tD)}/ks)) - (T1 + (\exp^{(-ks * T1)})/ks)]$$

NonCarcinogens

$$Cs(tD) = (Ds * [1 - \exp^{(-ks * tD)}])/ks$$

Where:

$$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
CstD = Soil concentration at time tD (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T1 = Time Peroid At Beginning Of Combustion (yr):	0
T2 = Exposure duration or ED (yr):	see below
Adult:	40
Child	6
ks = COC Soil Loss Constant (yr-1):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (mg-mg2/kg-cm2):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-3a
Contaminant Concentration in Soil
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled	Ds Untilled	Fv	ks Tilled	ks Untilled
	Non - Cancer	Cancer	Non - Cancer	Cancer	(20 cm)	(2 cm)	(unitless)	(yr-1)	(yr-1)
Inorganics									
Antimony	7.5E-11	5.6E-11	7.47E-12	5.6E-12	1.8E-09	1.8E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	6.8E-09	5.1E-09	6.84E-10	5.1E-10	7.7E-06	7.7E-05	6.0E-03	1.12E+03	1.12E+05
Beryllium	1.5E-06	1.1E-06	1.50E-07	1.1E-07	1.2E-06	1.2E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	5.8E-07	4.4E-07	5.85E-08	4.4E-08	1.0E-05	1.0E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	4.5E-05	3.3E-05	4.53E-05	3.4E-05	7.2E-06	7.2E-05	9.0E-03	1.60E-01	1.60E+00
Chromium +6	2.7E-05	1.9E-05	2.69E-05	2.0E-05	4.3E-06	4.3E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	2.7E-05	1.8E-05	3.14E-05	2.4E-05	2.1E-06	2.1E-05	0.0E+00	6.78E-02	6.78E-01
Copper	3.9E-04	2.4E-04	3.75E-03	2.4E-03	1.3E-05	1.3E-04	0.0E+00	3.06E-04	3.06E-03
Lead	9.8E-05	7.3E-05	9.78E-06	7.3E-06	1.1E-04	1.1E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	2.9E-04	1.9E-04	3.86E-04	2.9E-04	1.8E-05	1.8E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.4E-05	8.8E-06	1.40E-04	8.8E-05	4.7E-07	4.7E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	2.9E-07	1.8E-07	2.70E-06	1.7E-06	9.6E-09	9.6E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	9.7E-07	7.3E-07	9.69E-08	7.3E-08	1.6E-05	1.6E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	1.4E-07	1.0E-07	1.39E-08	1.0E-08	1.1E-05	1.1E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	1.1E-05	8.2E-06	1.10E-06	8.2E-07	1.9E-04	1.9E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	6.7E-10	4.3E-10	6.25E-09	4.1E-09	3.4E-11	3.4E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	1.7E-08	1.2E-08	1.26E-07	9.4E-08	8.5E-08	8.5E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	2.4E-08	1.8E-08	2.32E-07	1.7E-07	5.8E-08	5.8E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	9.9E-11	7.4E-11	1.04E-11	7.8E-12	2.9E-08	2.9E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	2.4E-08	1.8E-08	2.40E-07	1.8E-07	1.3E-08	1.3E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	2.2E-07	1.7E-07	2.20E-06	1.6E-06	8.2E-08	8.2E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.8E-07	1.3E-07	1.76E-06	1.3E-06	8.5E-08	8.5E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	1.8E-07	1.3E-07	1.75E-06	1.3E-06	7.3E-08	7.3E-07	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	5.6E-07	4.0E-07	5.57E-06	3.9E-06	6.9E-08	6.9E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	9.7E-09	7.3E-09	7.49E-09	5.6E-09	2.2E-07	2.2E-06	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.8E-06	1.3E-06	1.76E-05	1.3E-05	4.4E-07	4.4E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	3.4E-06	2.5E-06	3.42E-05	2.5E-05	9.2E-07	9.2E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	4.3E-08	3.2E-08	4.26E-07	3.2E-07	2.4E-08	2.4E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	3.8E-09	2.8E-09	3.76E-08	2.8E-08	1.6E-08	1.6E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	2.2E-06	1.7E-06	2.24E-05	1.7E-05	7.9E-07	7.9E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	2.6E-13	2.0E-13	2.64E-14	2.0E-14	6.4E-09	6.4E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	6.6E-09	4.9E-09	3.32E-08	2.5E-08	3.5E-08	3.5E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	2.6E-08	2.0E-08	2.60E-07	1.9E-07	3.3E-08	3.3E-07	1.0E+00	1.26E+00	1.27E+00
Pyrene	1.9E-07	1.3E-07	1.83E-06	1.3E-06	2.5E-08	2.5E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	4.7E-07	3.5E-07	6.72E-07	5.0E-07	2.7E-05	2.7E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-3a
Contaminant Concentration in Soil
RME Farmer - Farm 2 Scenario - Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled	Ds Untilled	Fv	ks Tilled	ks Untilled
	Non - Cancer	Cancer	Non - Cancer	Cancer	(20 cm)	(2 cm)	(unitless)	(yr-1)	(yr-1)
Inorganics									
Antimony	7.5E-11	7.4E-11	7.47E-12	7.5E-12	1.8E-09	1.8E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	6.8E-09	6.8E-09	6.84E-10	6.8E-10	7.7E-06	7.7E-05	6.0E-03	1.12E+03	1.12E+05
Beryllium	1.5E-06	1.4E-06	1.50E-07	1.5E-07	1.2E-06	1.2E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	5.8E-07	5.8E-07	5.85E-08	5.9E-08	1.0E-05	1.0E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	4.5E-05	3.6E-05	4.53E-05	4.4E-05	7.2E-06	7.2E-05	9.0E-03	1.60E-01	1.60E+00
Chromium +6	2.7E-05	2.1E-05	2.69E-05	2.6E-05	4.3E-06	4.3E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	2.7E-05	1.8E-05	3.14E-05	3.0E-05	2.1E-06	2.1E-05	0.0E+00	6.78E-02	6.78E-01
Copper	3.9E-04	2.0E-04	3.75E-03	1.9E-03	1.3E-05	1.3E-04	0.0E+00	3.06E-04	3.06E-03
Lead	9.8E-05	9.5E-05	9.78E-06	9.8E-06	1.1E-04	1.1E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	2.9E-04	1.8E-04	3.86E-04	3.6E-04	1.8E-05	1.8E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.4E-05	7.1E-06	1.40E-04	7.0E-05	4.7E-07	4.7E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	2.9E-07	1.4E-07	2.70E-06	1.4E-06	9.6E-09	9.6E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	9.7E-07	9.6E-07	9.69E-08	9.7E-08	1.6E-05	1.6E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	1.4E-07	1.4E-07	1.39E-08	1.4E-08	1.1E-05	1.1E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	1.1E-05	1.1E-05	1.10E-06	1.1E-06	1.9E-04	1.9E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	6.7E-10	3.8E-10	6.25E-09	3.7E-09	3.4E-11	3.4E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	1.7E-08	1.7E-08	1.26E-07	1.2E-07	8.5E-08	8.5E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	2.4E-08	2.3E-08	2.32E-07	2.3E-07	5.8E-08	5.8E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	9.9E-11	9.9E-11	1.04E-11	1.0E-11	2.9E-08	2.9E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	2.4E-08	2.3E-08	2.40E-07	2.3E-07	1.3E-08	1.3E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	2.2E-07	2.0E-07	2.20E-06	2.0E-06	8.2E-08	8.2E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.8E-07	1.6E-07	1.76E-06	1.6E-06	8.5E-08	8.5E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	1.8E-07	1.6E-07	1.75E-06	1.6E-06	7.3E-08	7.3E-07	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	5.6E-07	4.2E-07	5.57E-06	4.2E-06	6.9E-08	6.9E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	9.7E-09	9.7E-09	7.49E-09	7.5E-09	2.2E-07	2.2E-06	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.8E-06	1.5E-06	1.76E-05	1.5E-05	4.4E-07	4.4E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	3.4E-06	3.0E-06	3.42E-05	3.0E-05	9.2E-07	9.2E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	4.3E-08	4.0E-08	4.26E-07	4.0E-07	2.4E-08	2.4E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	3.8E-09	3.7E-09	3.76E-08	3.7E-08	1.6E-08	1.6E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	2.2E-06	2.0E-06	2.24E-05	2.0E-05	7.9E-07	7.9E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	2.6E-13	2.6E-13	2.64E-14	2.6E-14	6.4E-09	6.4E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	6.6E-09	6.5E-09	3.32E-08	3.3E-08	3.5E-08	3.5E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	2.6E-08	2.5E-08	2.60E-07	2.5E-07	3.3E-08	3.3E-07	1.0E+00	1.26E+00	1.27E+00
Pyrene	1.9E-07	1.4E-07	1.83E-06	1.4E-06	2.5E-08	2.5E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	4.7E-07	4.6E-07	6.72E-07	6.7E-07	2.7E-05	2.7E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-3a
Calculation of Soil Loss Constant
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-3a
Calculation of Soil Loss Constant
RME Farmer - Farm 2 Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-3b
Contaminant Concentration in Above Ground Vegetation
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
Pd(MeHg) = 0.22Pd

Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)

For Mercury:
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$
$Pv(Hg^{2+}) = 0.78Pv$
Pv(MeHg) = 0.22Pv

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-3b
Contaminant Concentration in Above Ground Vegetation
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	2.4E-12	1.8E-12	2.4E-12	1.8E-12	7.5E-11	5.6E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	1.1E-05	0.0E+00	4.3E-11	3.2E-11	4.3E-11	3.2E-11	6.8E-09	5.1E-09	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	2.5E-06	0.0E+00	3.8E-09	2.9E-09	3.8E-09	2.9E-09	1.5E-06	1.1E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	2.2E-05	0.0E+00	7.3E-08	5.5E-08	7.3E-08	5.5E-08	5.8E-07	4.4E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	1.5E-05	0.0E+00	2.2E-07	1.6E-07	2.2E-07	1.6E-07	4.5E-05	3.3E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	9.1E-06	0.0E+00	1.3E-07	9.4E-08	1.3E-07	9.4E-08	2.7E-05	1.9E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	4.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.7E-05	1.8E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	2.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E-04	2.4E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	2.4E-04	0.0E+00	1.3E-06	9.9E-07	1.3E-06	9.9E-07	9.8E-05	7.3E-05	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	3.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E-04	1.9E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	8.4E-07	3.5E-05	2.1E-07	1.3E-07	2.1E-07	1.3E-07	1.4E-05	8.8E-06	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	1.6E-06	0.0E+00	8.4E-09	5.3E-09	8.4E-09	5.3E-09	2.9E-07	1.8E-07	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	3.3E-05	0.0E+00	9.0E-09	6.8E-09	9.0E-09	6.8E-09	9.7E-07	7.3E-07	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.7E-05	0.0E+00	2.7E-09	2.0E-09	2.7E-09	2.0E-09	1.4E-07	1.0E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	3.9E-04	0.0E+00	1.1E-06	8.0E-07	1.1E-06	8.0E-07	1.1E-05	8.2E-06	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.7E-11	3.4E-11	3.0E-12	2.0E-12	3.0E-12	2.0E-12	6.7E-10	4.3E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.5E-08	1.7E-08	1.7E-10	1.2E-10	1.7E-10	1.2E-10	1.7E-08	1.2E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.1E-08	5.1E-09	3.8E-09	5.1E-09	3.8E-09	2.4E-08	1.8E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	1.3E-11	1.7E-11	1.3E-11	1.7E-11	1.3E-11	9.9E-11	7.4E-11	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.9E-10	1.2E-10	2.4E-09	1.8E-09	2.4E-09	1.8E-09	2.4E-08	1.8E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	5.5E-08	1.5E-08	4.3E-09	3.3E-09	4.3E-09	3.3E-09	2.2E-07	1.7E-07	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	8.4E-08	6.7E-08	2.3E-09	1.7E-09	2.3E-09	1.7E-09	1.8E-07	1.3E-07	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	9.8E-09	7.2E-09	2.0E-09	1.5E-09	2.0E-09	1.5E-09	1.8E-07	1.3E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.3E-07	1.6E-07	6.4E-09	4.5E-09	6.4E-09	4.5E-09	5.6E-07	4.0E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	4.9E-06	5.5E-11	4.1E-11	5.5E-11	4.1E-11	9.7E-09	7.3E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	4.0E-07	1.2E-08	3.5E-08	2.6E-08	3.5E-08	2.6E-08	1.8E-06	1.3E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	1.9E-06	0.0E+00	2.3E-08	1.7E-08	2.3E-08	1.7E-08	3.4E-06	2.5E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	1.0E-09	1.4E-09	2.1E-09	1.6E-09	2.1E-09	1.6E-09	4.3E-08	3.2E-08	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	8.1E-11	5.5E-10	4.1E-10	5.5E-10	4.1E-10	3.8E-09	2.8E-09	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	1.7E-06	0.0E+00	1.3E-08	9.9E-09	1.3E-08	9.9E-09	2.2E-06	1.7E-06	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	5.9E-11	6.0E-14	4.5E-14	6.0E-14	4.5E-14	2.6E-13	2.0E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	5.0E-10	3.1E-09	2.4E-09	3.1E-09	2.4E-09	6.6E-09	4.9E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	2.2E-10	5.0E-10	2.5E-09	1.9E-09	2.5E-09	1.9E-09	2.6E-08	2.0E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	7.0E-10	1.5E-09	1.1E-08	7.6E-09	1.1E-08	7.6E-09	1.9E-07	1.3E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	9.7E-09	3.9E-06	2.9E-06	3.9E-06	2.9E-06	4.7E-07	3.5E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-3b
Contaminant Concentration in Above Ground Vegetation
RME Farmer - Farm 2 Scenario - Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	2.4E-12	5.5E-21	2.4E-12	5.5E-21	7.5E-11	7.4E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	1.1E-05	0.0E+00	4.3E-11	4.3E-11	4.3E-11	4.3E-11	6.8E-09	6.8E-09	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	2.5E-06	0.0E+00	3.8E-09	3.7E-09	3.8E-09	3.7E-09	1.5E-06	1.4E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	2.2E-05	0.0E+00	7.3E-08	7.3E-08	7.3E-08	7.3E-08	5.8E-07	5.8E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	1.5E-05	0.0E+00	2.2E-07	1.8E-07	2.2E-07	1.8E-07	4.5E-05	3.6E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	9.1E-06	0.0E+00	1.3E-07	1.0E-07	1.3E-07	1.0E-07	2.7E-05	2.1E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	4.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.7E-05	1.8E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	2.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E-04	2.0E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	2.4E-04	0.0E+00	1.3E-06	1.3E-06	1.3E-06	1.3E-06	9.8E-05	9.5E-05	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	3.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E-04	1.8E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	8.4E-07	3.5E-05	2.1E-07	1.0E-07	2.1E-07	1.0E-07	1.4E-05	7.1E-06	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	1.6E-06	0.0E+00	8.4E-09	4.2E-09	8.4E-09	4.2E-09	2.9E-07	1.4E-07	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	3.3E-05	0.0E+00	9.0E-09	9.0E-09	9.0E-09	9.0E-09	9.7E-07	9.6E-07	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.7E-05	0.0E+00	2.7E-09	2.7E-09	2.7E-09	2.7E-09	1.4E-07	1.4E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	3.9E-04	0.0E+00	1.1E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-05	1.1E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.7E-11	3.4E-11	3.0E-12	1.7E-12	3.0E-12	1.7E-12	6.7E-10	3.8E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.5E-08	1.7E-08	1.7E-10	1.7E-10	1.7E-10	1.7E-10	1.7E-08	1.7E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.1E-08	5.1E-09	5.0E-09	5.1E-09	5.0E-09	2.4E-08	2.3E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	1.3E-11	1.7E-11	1.7E-11	1.7E-11	1.7E-11	9.9E-11	9.9E-11	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.9E-10	1.2E-10	2.4E-09	2.2E-09	2.4E-09	2.2E-09	2.4E-08	2.3E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	5.5E-08	1.5E-08	4.3E-09	4.0E-09	4.3E-09	4.0E-09	2.2E-07	2.0E-07	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	8.4E-08	6.7E-08	2.3E-09	2.2E-09	2.3E-09	2.2E-09	1.8E-07	1.6E-07	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	9.8E-09	7.2E-09	2.0E-09	1.8E-09	2.0E-09	1.8E-09	1.8E-07	1.6E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.3E-07	1.6E-07	6.4E-09	4.8E-09	6.4E-09	4.8E-09	5.6E-07	4.2E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	4.9E-06	5.5E-11	5.5E-11	5.5E-11	5.5E-11	9.7E-09	9.7E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	4.0E-07	1.2E-08	3.5E-08	3.0E-08	3.5E-08	3.0E-08	1.8E-06	1.5E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	1.9E-06	0.0E+00	2.3E-08	2.0E-08	2.3E-08	2.0E-08	3.4E-06	3.0E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	1.0E-09	1.4E-09	2.1E-09	2.0E-09	2.1E-09	2.0E-09	4.3E-08	4.0E-08	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	8.1E-11	5.5E-10	5.4E-10	5.5E-10	5.4E-10	3.8E-09	3.7E-09	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	1.7E-06	0.0E+00	1.3E-08	1.2E-08	1.3E-08	1.2E-08	2.2E-06	2.0E-06	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	5.9E-11	6.0E-14	6.0E-14	6.0E-14	6.0E-14	2.6E-13	2.6E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	5.0E-10	3.1E-09	3.1E-09	3.1E-09	3.1E-09	6.6E-09	6.5E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	2.2E-10	5.0E-10	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.6E-08	2.5E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	7.0E-10	1.5E-09	1.1E-08	8.2E-09	1.1E-08	8.2E-09	1.9E-07	1.4E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	9.7E-09	3.9E-06	3.9E-06	3.9E-06	3.9E-06	4.7E-07	4.6E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-3b
Contaminant Concentration in Below Ground Vegetation
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-3b
Contaminant Concentration in Below Ground Vegetation
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	2.2E-12	1.7E-12	7.5E-11	5.6E-11	3.00E-02	1.0E+00
Arsenic	5.5E-11	4.1E-11	6.8E-09	5.1E-09	8.00E-03	1.0E+00
Beryllium	2.2E-09	1.7E-09	1.5E-06	1.1E-06	1.50E-03	1.0E+00
Cadmium	3.7E-08	2.8E-08	5.8E-07	4.4E-07	6.40E-02	1.0E+00
Chromium +3	2.0E-07	1.5E-07	4.5E-05	3.3E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	2.7E-05	1.9E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	2.7E-05	1.8E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	3.9E-04	2.4E-04	2.50E-01	ND
Lead	8.8E-07	6.6E-07	9.8E-05	7.3E-05	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	2.9E-04	1.9E-04	5.00E-02	ND
Mercury as HgCl2	5.1E-07	3.2E-07	1.4E-05	8.8E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	2.9E-07	1.8E-07	9.90E-02	ND
Nickel	7.7E-09	5.8E-09	9.7E-07	7.3E-07	8.00E-03	1.0E+00
Selenium	3.0E-09	2.3E-09	1.4E-07	1.0E-07	2.20E-02	1.0E+00
Zinc	9.9E-06	7.4E-06	1.1E-05	8.2E-06	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	6.9E-12	4.5E-12	6.7E-10	4.3E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	2.4E-09	1.8E-09	1.7E-08	1.2E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	5.0E-09	3.8E-09	2.4E-08	1.8E-08	2.13E-01	1.0E+00
Acenaphthylene	6.3E-09	4.8E-09	9.9E-11	7.4E-11	6.42E+03	1.0E-02
Anthracene	3.7E-11	2.8E-11	2.4E-08	1.8E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	2.1E-10	1.6E-10	2.2E-07	1.7E-07	9.48E-02	1.0E-02
Benzo(a)pyrene	1.1E-10	8.0E-11	1.8E-07	1.3E-07	6.05E-02	1.0E-02
Benzo(b)fluoranthene	2.0E-09	1.5E-09	1.8E-07	1.3E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.4E-10	2.4E-10	5.6E-07	4.0E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.4E-04	1.8E-04	9.7E-09	7.3E-09	2.44E+06	1.0E-02
Chrysene	1.7E-09	1.2E-09	1.8E-06	1.3E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	1.4E-09	1.0E-09	3.4E-06	2.5E-06	4.05E-02	1.0E-02
Fluoranthene	6.4E-11	4.8E-11	4.3E-08	3.2E-08	1.50E-01	1.0E-02
Fluorene	7.2E-12	5.4E-12	3.8E-09	2.8E-09	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	1.2E-09	8.9E-10	2.2E-06	1.7E-06	5.29E-02	1.0E-02
2-Methylnaphthalene	5.3E-09	3.9E-09	2.6E-13	2.0E-13	2.00E+04	1.0E+00
Naphthalene	1.8E-09	1.3E-09	6.6E-09	4.9E-09	2.69E-01	1.0E+00
Phenanthrene	4.8E-11	3.6E-11	2.6E-08	2.0E-08	1.83E-01	1.0E-02
Pyrene	2.7E-10	1.9E-10	1.9E-07	1.3E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	1.4E-04	1.1E-04	4.7E-07	3.5E-07	3.05E+02	1.0E+00

Appendix G-3b
Contaminant Concentration in Below Ground Vegetation
RME Farmer - Farm 2 Scenario - Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	2.2E-12	2.2E-12	7.5E-11	7.4E-11	3.00E-02	1.0E+00
Arsenic	5.5E-11	5.5E-11	6.8E-09	6.8E-09	8.00E-03	1.0E+00
Beryllium	2.2E-09	2.1E-09	1.5E-06	1.4E-06	1.50E-03	1.0E+00
Cadmium	3.7E-08	3.7E-08	5.8E-07	5.8E-07	6.40E-02	1.0E+00
Chromium +3	2.0E-07	1.6E-07	4.5E-05	3.6E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	2.7E-05	2.1E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	2.7E-05	1.8E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	3.9E-04	2.0E-04	2.50E-01	ND
Lead	8.8E-07	8.5E-07	9.8E-05	9.5E-05	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	2.9E-04	1.8E-04	5.00E-02	ND
Mercury as HgCl2	5.1E-07	2.5E-07	1.4E-05	7.1E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	2.9E-07	1.4E-07	9.90E-02	ND
Nickel	7.7E-09	7.7E-09	9.7E-07	9.6E-07	8.00E-03	1.0E+00
Selenium	3.0E-09	3.0E-09	1.4E-07	1.4E-07	2.20E-02	1.0E+00
Zinc	9.9E-06	9.9E-06	1.1E-05	1.1E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	6.9E-12	4.0E-12	6.7E-10	3.8E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	2.4E-09	2.3E-09	1.7E-08	1.7E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	5.0E-09	4.9E-09	2.4E-08	2.3E-08	2.13E-01	1.0E+00
Acenaphthylene	6.3E-09	6.3E-09	9.9E-11	9.9E-11	6.42E+03	1.0E-02
Anthracene	3.7E-11	3.4E-11	2.4E-08	2.3E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	2.1E-10	1.9E-10	2.2E-07	2.0E-07	9.48E-02	1.0E-02
Benzo(a)pyrene	1.1E-10	9.9E-11	1.8E-07	1.6E-07	6.05E-02	1.0E-02
Benzo(b)fluoranthene	2.0E-09	1.9E-09	1.8E-07	1.6E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.4E-10	2.5E-10	5.6E-07	4.2E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.4E-04	2.4E-04	9.7E-09	9.7E-09	2.44E+06	1.0E-02
Chrysene	1.7E-09	1.4E-09	1.8E-06	1.5E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	1.4E-09	1.2E-09	3.4E-06	3.0E-06	4.05E-02	1.0E-02
Fluoranthene	6.4E-11	6.0E-11	4.3E-08	4.0E-08	1.50E-01	1.0E-02
Fluorene	7.2E-12	7.1E-12	3.8E-09	3.7E-09	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	1.2E-09	1.1E-09	2.2E-06	2.0E-06	5.29E-02	1.0E-02
2-Methylnaphthalene	5.3E-09	5.3E-09	2.6E-13	2.6E-13	2.00E+04	1.0E+00
Naphthalene	1.8E-09	1.8E-09	6.6E-09	6.5E-09	2.69E-01	1.0E+00
Phenanthrene	4.8E-11	4.7E-11	2.6E-08	2.5E-08	1.83E-01	1.0E-02
Pyrene	2.7E-10	2.1E-10	1.9E-07	1.4E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	1.4E-04	1.4E-04	4.7E-07	4.6E-07	3.05E+02	1.0E+00

Appendix G-3c

Contaminant Concentration in Forage

RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - \exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:

$Pd = (UC1 * 0.48Q(total) * (1 - Fv_{Hg2+}) * [(Dydpb + (FW * Dywpb))] * Rp * [1 - \exp^{(-kp * Tp)}])/Yp * kp$

$Pd(Hg^{2+}) = 0.78Pd$

$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag)/pa)$

For Mercury:

$Pv =0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag)/pa)$

$Pv(Hg^{2+}) = 0.78Pv$

$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr = Forage Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor - Forage (--):	1.0E+00
Rp = Interception Factor For Forage (--):	0.5
kp = Plant Surface Loss Coefficient (yr-1):	18
Tp = Length of Growing Season For Forage (yr):	0.12
Yp = Vegetation Yield For Forage (kg DW/m2):	0.24
pa = Air Density (g/m3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br = Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-3c
Contaminant Concentration in Forage
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Pd	Pv	Pr forage		Cs Tilled (20 cm)		Fv	Fw	Bv forage	Br forage
			Non - Cancer	Cancer	Non - Cancer	Cancer				
Inorganics										
Antimony	0.0E+00	0.0E+00	1.5E-11	1.1E-11	7.5E-11	5.6E-11	1.0E+00	2.0E-01	ND	2.00E-01
Arsenic	1.3E-04	0.0E+00	2.5E-10	1.8E-10	6.8E-09	5.1E-09	6.0E-03	2.0E-01	ND	3.60E-02
Beryllium	2.8E-05	0.0E+00	1.5E-08	1.1E-08	1.5E-06	1.1E-06	9.0E-03	6.0E-01	ND	1.00E-02
Cadmium	2.4E-04	0.0E+00	2.1E-07	1.6E-07	5.8E-07	4.4E-07	9.0E-03	6.0E-01	ND	3.64E-01
Chromium +3	1.7E-04	0.0E+00	3.4E-07	2.4E-07	4.5E-05	3.3E-05	9.0E-03	6.0E-01	ND	7.50E-03
Chromium +6	1.0E-04	0.0E+00	2.0E-07	1.4E-07	2.7E-05	1.9E-05	0.0E+00	6.0E-01	ND	7.50E-03
Cobalt	5.0E-05	0.0E+00	5.5E-07	3.7E-07	2.7E-05	1.8E-05	0.0E+00	6.0E-01	ND	2.00E-02
Copper	3.1E-04	0.0E+00	1.6E-04	9.8E-05	3.9E-04	2.4E-04	0.0E+00	6.0E-01	ND	4.00E-01
Lead	2.7E-03	0.0E+00	4.4E-06	3.3E-06	9.8E-05	7.3E-05	7.0E-03	6.0E-01	ND	4.50E-02
Manganese	4.3E-04	0.0E+00	7.3E-05	4.8E-05	2.9E-04	1.9E-04	0.0E+00	6.0E-01	ND	2.50E-01
Mercury as HgCl2	9.4E-09	1.3E-05	0.0E+00	0.0E+00	1.4E-05	8.8E-06	8.5E-01	6.0E-01	1.80E+03	ND
Mercury as Methyl Hg	2.7E-09	0.0E+00	0.0E+00	0.0E+00	2.9E-07	1.8E-07	8.5E-01	6.0E-01	ND	ND
Nickel	3.7E-04	0.0E+00	3.1E-08	2.3E-08	9.7E-07	7.3E-07	9.0E-03	6.0E-01	ND	3.20E-02
Selenium	1.9E-04	0.0E+00	2.2E-09	1.7E-09	1.4E-07	1.0E-07	0.0E+00	2.0E-01	ND	1.60E-02
Zinc	4.4E-03	0.0E+00	2.7E-06	2.1E-06	1.1E-05	8.2E-06	8.0E-03	6.0E-01	ND	2.50E-01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	1.9E-10	3.4E-09	3.0E-12	2.0E-12	6.7E-10	4.3E-10	6.6E-01	6.0E-01	6.55E+04	4.55E-03
PCBs										
Total PCBs	2.8E-07	1.7E-06	1.7E-10	1.2E-10	1.7E-08	1.2E-08	9.9E-01	6.0E-01	3.09E+02	1.00E-02
PAHs										
Acenaphthene	0.0E+00	1.1E-08	5.1E-09	3.8E-09	2.4E-08	1.8E-08	1.0E+00	6.0E-01	4.97E+00	2.16E-01
Acenaphthylene	0.0E+00	1.3E-09	1.7E-11	1.3E-11	9.9E-11	7.4E-11	1.0E+00	6.0E-01	4.31E+00	1.72E-01
Anthracene	3.2E-09	1.2E-08	2.4E-09	1.8E-09	2.4E-08	1.8E-08	1.0E+00	6.0E-01	5.33E+01	9.71E-02
Benzo(a)anthracene	6.2E-07	1.5E-06	4.3E-09	3.3E-09	2.2E-07	1.7E-07	4.8E-01	6.0E-01	1.93E+04	1.97E-02
Benzo(a)pyrene	9.4E-07	6.7E-06	2.3E-09	1.7E-09	1.8E-07	1.3E-07	2.9E-01	6.0E-01	1.25E+05	1.32E-02
Benzo(b)fluoranthene	1.1E-07	7.2E-07	2.0E-09	1.5E-09	1.8E-07	1.3E-07	9.7E-01	6.0E-01	1.68E+03	1.12E-02
Benzo(k)fluoranthene	1.5E-06	1.6E-05	6.4E-09	4.5E-09	5.6E-07	4.0E-07	2.7E-01	6.0E-01	2.11E+05	1.15E-02
Benzo(ghi)perylene	0.0E+00	4.9E-04	5.5E-11	4.1E-11	9.7E-09	7.3E-09	1.0E+00	6.0E-01	2.42E+06	5.70E-03
Chrysene	4.5E-06	1.2E-06	3.5E-08	2.6E-08	1.8E-06	1.3E-06	7.4E-01	6.0E-01	6.92E+02	1.97E-02
Dibenzo(a,h)anthracene	2.2E-05	0.0E+00	2.3E-08	1.7E-08	3.4E-06	2.5E-06	5.5E-02	6.0E-01	3.12E+07	6.78E-03
Fluoranthene	1.1E-08	1.4E-07	2.1E-09	1.6E-09	4.3E-08	3.2E-08	9.9E-01	6.0E-01	7.38E+02	4.99E-02
Fluorene	0.0E+00	8.1E-09	5.5E-10	4.1E-10	3.8E-09	2.8E-09	1.0E+00	6.0E-01	2.60E+01	1.45E-01
Indeno(1,2,3-cd)pyrene	1.8E-05	0.0E+00	1.3E-08	9.9E-09	2.2E-06	1.7E-06	5.0E-03	6.0E-01	3.73E+05	5.93E-03
2-Methylnaphthalene	0.0E+00	5.9E-11	6.0E-14	4.5E-14	2.6E-13	2.0E-13	1.0E+00	6.0E-01	1.39E-01	2.27E-01
Naphthalene	0.0E+00	5.0E-10	3.1E-09	2.4E-09	6.6E-09	4.9E-09	1.0E+00	6.0E-01	3.81E-01	4.79E-01
Phenanthrene	2.4E-09	5.0E-08	2.5E-09	1.9E-09	2.6E-08	2.0E-08	1.0E+00	6.0E-01	1.51E+02	9.71E-02
Pyrene	7.8E-09	1.5E-07	1.1E-08	7.6E-09	1.9E-07	1.3E-07	9.9E-01	6.0E-01	8.40E+02	5.70E-02
Aldehyde Ketones										
Formaldehyde	0.0E+00	9.7E-09	3.9E-06	2.9E-06	4.7E-07	3.5E-07	1.0E+00	6.0E-01	3.92E-01	8.38E+00

Appendix G-3c
Contaminant Concentration in Silage
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp(-kp*Tp)]) / Yp * kp

For Mercury:
Pd = (UC1 * 0.48Q(total) * (1 - FvHg2+) * [(Dydpb + (FW * Dywpb))] * Rp * [1 - exp(-kp * Tp)])/Yp * kp
Pd(Hg2+) = 0.78Pd
Pd(MeHg) = 0.22Pd

Pv = Q * Fv *((Cyv * Bvag * VGag)/pa)

For Mercury:
Pv =0.48Q(total) * FvHg2+ *((Cyv * Bvag * VGag)/pa)
Pv(Hg2+) = 0.78Pv
Pv(MeHg) = 0.22Pv

Pr abvgrd = Cs * Br ag
Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr silage = Silage Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bv forage = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor - Silage (--):	5.0E-01
Rp = Interception Factor For Silage (--):	0.46
kp = Plant Surface Loss Coefficient (yr-1):	18
Tp = Length of Growing Season For Silage (yr):	0.16
Yp = Vegetation Yield For Silage (kg DW/m2):	0.8
pa = Air Density (g/m3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br = Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-3c
Contaminant Concentration in Silage
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Pd	Pv	Pr silage		Cs Tilled (20 cm)		Fv	Fw	Bv silage	Br silage
			Non - Cancer	Cancer	Non - Cancer	Cancer				
Inorganics										
Antimony	0.0E+00	0.0E+00	1.5E-11	1.1E-11	7.5E-11	5.6E-11	1.0E+00	2.0E-01	ND	2.00E-01
Arsenic	3.7E-05	0.0E+00	2.5E-10	1.8E-10	6.8E-09	5.1E-09	6.0E-03	2.0E-01	ND	3.60E-02
Beryllium	8.3E-06	0.0E+00	1.5E-08	1.1E-08	1.5E-06	1.1E-06	9.0E-03	6.0E-01	ND	1.00E-02
Cadmium	7.1E-05	0.0E+00	2.1E-07	1.6E-07	5.8E-07	4.4E-07	9.0E-03	6.0E-01	ND	3.64E-01
Chromium +3	5.0E-05	0.0E+00	3.4E-07	2.4E-07	4.5E-05	3.3E-05	9.0E-03	6.0E-01	ND	7.50E-03
Chromium +6	3.0E-05	0.0E+00	2.0E-07	1.4E-07	2.7E-05	1.9E-05	0.0E+00	6.0E-01	ND	7.50E-03
Cobalt	1.5E-05	0.0E+00	5.5E-07	3.7E-07	2.7E-05	1.8E-05	0.0E+00	6.0E-01	ND	2.00E-02
Copper	9.1E-05	0.0E+00	1.6E-04	9.8E-05	3.9E-04	2.4E-04	0.0E+00	6.0E-01	ND	4.00E-01
Lead	8.0E-04	0.0E+00	4.4E-06	3.3E-06	9.8E-05	7.3E-05	7.0E-03	6.0E-01	ND	4.50E-02
Manganese	1.3E-04	0.0E+00	7.3E-05	4.8E-05	2.9E-04	1.9E-04	0.0E+00	6.0E-01	ND	2.50E-01
Mercury as HgCl2	2.8E-09	6.6E-06	0.0E+00	0.0E+00	1.4E-05	8.8E-06	8.5E-01	6.0E-01	1.80E+03	ND
Mercury as Methyl Hg	7.8E-10	0.0E+00	0.0E+00	0.0E+00	2.9E-07	1.8E-07	8.5E-01	6.0E-01	ND	ND
Nickel	1.1E-04	0.0E+00	3.1E-08	2.3E-08	9.7E-07	7.3E-07	9.0E-03	6.0E-01	ND	3.20E-02
Selenium	5.5E-05	0.0E+00	2.2E-09	1.7E-09	1.4E-07	1.0E-07	0.0E+00	2.0E-01	ND	1.60E-02
Zinc	1.3E-03	0.0E+00	2.7E-06	2.1E-06	1.1E-05	8.2E-06	8.0E-03	6.0E-01	ND	2.50E-01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	5.7E-11	1.7E-09	3.0E-12	2.0E-12	6.7E-10	4.3E-10	6.6E-01	6.0E-01	6.55E+04	4.55E-03
PCBs										
Total PCBs	8.2E-08	8.3E-07	1.7E-10	1.2E-10	1.7E-08	1.2E-08	9.9E-01	6.0E-01	3.09E+02	1.00E-02
PAHs										
Acenaphthene	0.0E+00	5.4E-09	5.1E-09	3.8E-09	2.4E-08	1.8E-08	1.0E+00	6.0E-01	4.97E+00	2.16E-01
Acenaphthylene	0.0E+00	6.5E-10	1.7E-11	1.3E-11	9.9E-11	7.4E-11	1.0E+00	6.0E-01	4.31E+00	1.72E-01
Anthracene	9.5E-10	5.9E-09	2.4E-09	1.8E-09	2.4E-08	1.8E-08	1.0E+00	6.0E-01	5.33E+01	9.71E-02
Benzo(a)anthracene	1.8E-07	7.6E-07	4.3E-09	3.3E-09	2.2E-07	1.7E-07	4.8E-01	6.0E-01	1.93E+04	1.97E-02
Benzo(a)pyrene	2.8E-07	3.3E-06	2.3E-09	1.7E-09	1.8E-07	1.3E-07	2.9E-01	6.0E-01	1.25E+05	1.32E-02
Benzo(b)fluoranthene	3.2E-08	3.6E-07	2.0E-09	1.5E-09	1.8E-07	1.3E-07	9.7E-01	6.0E-01	1.68E+03	1.12E-02
Benzo(k)fluoranthene	4.3E-07	7.9E-06	6.4E-09	4.5E-09	5.6E-07	4.0E-07	2.7E-01	6.0E-01	2.11E+05	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.4E-04	5.5E-11	4.1E-11	9.7E-09	7.3E-09	1.0E+00	6.0E-01	2.42E+06	5.70E-03
Chrysene	1.3E-06	6.1E-07	3.5E-08	2.6E-08	1.8E-06	1.3E-06	7.4E-01	6.0E-01	6.92E+02	1.97E-02
Dibenzo(a,h)anthracene	6.4E-06	0.0E+00	2.3E-08	1.7E-08	3.4E-06	2.5E-06	5.5E-02	6.0E-01	3.12E+07	6.78E-03
Fluoranthene	3.3E-09	7.1E-08	2.1E-09	1.6E-09	4.3E-08	3.2E-08	9.9E-01	6.0E-01	7.38E+02	4.99E-02
Fluorene	0.0E+00	4.0E-09	5.5E-10	4.1E-10	3.8E-09	2.8E-09	1.0E+00	6.0E-01	2.60E+01	1.45E-01
Indeno(1,2,3-cd)pyrene	5.4E-06	0.0E+00	1.3E-08	9.9E-09	2.2E-06	1.7E-06	5.0E-03	6.0E-01	3.73E+05	5.93E-03
2-Methylnaphthalene	0.0E+00	3.0E-11	6.0E-14	4.5E-14	2.6E-13	2.0E-13	1.0E+00	6.0E-01	1.39E-01	2.27E-01
Naphthalene	0.0E+00	2.5E-10	3.1E-09	2.4E-09	6.6E-09	4.9E-09	1.0E+00	6.0E-01	3.81E-01	4.79E-01
Phenanthrene	7.1E-10	2.5E-08	2.5E-09	1.9E-09	2.6E-08	2.0E-08	1.0E+00	6.0E-01	1.51E+02	9.71E-02
Pyrene	2.3E-09	7.5E-08	1.1E-08	7.6E-09	1.9E-07	1.3E-07	9.9E-01	6.0E-01	8.40E+02	5.70E-02
Aldehyde Ketones										
Formaldehyde	0.0E+00	4.9E-09	3.9E-06	2.9E-06	4.7E-07	3.5E-07	1.0E+00	6.0E-01	3.92E-01	8.38E+00

Appendix G-3c

Contaminant Concentration in Grain

RME Farmer - Farm 2 Scenario - Adult and Child

Parameters	
Pr grain = Cs * Br grain	
Where:	
Values Specific to Contaminant:	CS*
Pr grain = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br grain = Plant Soil Bioconcentration Factor For Grain (--):	CS*

Appendix G-3c
Contaminant Concentration in Grain
RME Farmer - Farm 2 Scenario - Adult

Contaminant	Pr grain		Cs Tilled (20 cm)		Br grain
	Non - Cancer	Cancer	Non - Cancer	Cancer	
Inorganics					
Antimony	2.2E-12	1.7E-12	7.5E-11	5.6E-11	3.00E-02
Arsenic	2.7E-11	2.1E-11	6.8E-09	5.1E-09	4.00E-03
Beryllium	2.2E-09	1.7E-09	1.5E-06	1.1E-06	1.50E-03
Cadmium	3.6E-08	2.7E-08	5.8E-07	4.4E-07	6.20E-02
Chromium +3	2.0E-07	1.5E-07	4.5E-05	3.3E-05	4.50E-03
Chromium +6	1.2E-07	8.7E-08	2.7E-05	1.9E-05	4.50E-03
Cobalt	1.9E-07	1.3E-07	2.7E-05	1.8E-05	7.00E-03
Copper	9.8E-05	6.1E-05	3.9E-04	2.4E-04	2.50E-01
Lead	8.8E-07	6.6E-07	9.8E-05	7.3E-05	9.00E-03
Manganese	1.5E-05	9.6E-06	2.9E-04	1.9E-04	5.00E-02
Mercury as HgCl2	1.3E-07	8.2E-08	1.4E-05	8.8E-06	9.30E-03
Mercury as Methyl Hg	5.5E-09	3.4E-09	2.9E-07	1.8E-07	1.90E-02
Nickel	5.8E-09	4.4E-09	9.7E-07	7.3E-07	6.00E-03
Selenium	2.8E-10	2.1E-10	1.4E-07	1.0E-07	2.00E-03
Zinc	5.9E-07	4.4E-07	1.1E-05	8.2E-06	5.40E-02
Dioxins/Furans					
2,3,7,8-TCDD-TEQ	3.0E-12	2.0E-12	6.7E-10	4.3E-10	4.55E-03
PCBs					
Total PCBs	1.7E-10	1.2E-10	1.7E-08	1.2E-08	1.00E-02
PAHs					
Acenaphthene	5.1E-09	3.8E-09	2.4E-08	1.8E-08	2.16E-01
Acenaphthylene	6.3E-07	4.8E-07	9.9E-11	7.4E-11	6.42E+03
Anthracene	2.4E-09	1.8E-09	2.4E-08	1.8E-08	9.71E-02
Benzo(a)anthracene	4.3E-09	3.3E-09	2.2E-07	1.7E-07	1.97E-02
Benzo(a)pyrene	2.3E-09	1.7E-09	1.8E-07	1.3E-07	1.32E-02
Benzo(b)fluoranthene	2.0E-09	1.5E-09	1.8E-07	1.3E-07	1.12E-02
Benzo(k)fluoranthene	6.4E-09	4.5E-09	5.6E-07	4.0E-07	1.15E-02
Benzo(ghi)perylene	2.4E-02	1.8E-02	9.7E-09	7.3E-09	2.44E+06
Chrysene	3.5E-08	2.6E-08	1.8E-06	1.3E-06	1.97E-02
Dibenzo(a,h)anthracene	2.3E-08	1.7E-08	3.4E-06	2.5E-06	6.78E-03
Fluoranthene	2.1E-09	1.6E-09	4.3E-08	3.2E-08	4.99E-02
Fluorene	5.5E-10	4.1E-10	3.8E-09	2.8E-09	1.45E-01
Indeno(1,2,3-cd)pyrene	1.3E-08	9.9E-09	2.2E-06	1.7E-06	5.93E-03
2-Methylnaphthalene	5.3E-09	3.9E-09	2.6E-13	2.0E-13	2.00E+04
Naphthalene	3.1E-09	2.4E-09	6.6E-09	4.9E-09	4.79E-01
Phenanthrene	2.5E-09	1.9E-09	2.6E-08	2.0E-08	9.71E-02
Pyrene	1.1E-08	7.6E-09	1.9E-07	1.3E-07	5.70E-02
Aldehyde Ketones					
Formaldehyde	3.9E-06	2.9E-06	4.7E-07	3.5E-07	8.38E+00

Appendix G-3d
Contaminant Concentration in Beef and Milk
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters

Abeef = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba beef * MF
Amilk = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba milk * MF

and:

Pi = Pdi + Pvi + Pri

Where:

Abeef = Concentration of COC in Beef (mg/kg):	CS*
Amilk = Concentration of COC in Milk (mg/kg):	CS*
Fi = Fraction of Plant type i Grown on Contaminated Soil (--):	1.0E+00
Qpi = Quantity of Plant Type i Eaten By Beef Cattle per day (kg/d):	See Below
Forage:	8.8E+00
Silage:	2.5E+00
Grain:	4.7E-01
Qpi = Quantity of Plant Type i Eaten By Dairy Cattle per day (kg/d):	See Below
Forage:	1.3E+01
Silage:	4.1E+00
Grain:	3.0E+00
Pi = Concentration of COC in Each Plant Type i (mg/kg):	CS*
Pd = Aboveground Produce Concentration of Plant Type i Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration of Plant Type i Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day (kg/d):	See Below:
Beef Cattle:	5.0E-01
Dairy Cattle:	4.0E-01
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba beef = COC Biotransfer Factor for Beef (d/kg):	CS*
Ba milk = COC Biotransfer Factor for Milk (d/kg):	CS*
MF = Metabolism Factor (--):	1.0E+00

Appendix G-3d
Contaminant Concentration in Beef and Milk
RME Farmer - Farm 2 Scenario - Adult and Child

Contaminant	A beef		A milk		P for		P sil		P gr		Cs Untilled (2 cm)		Babeef	Bamilk
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer		
Inorganics														
Antimony	1.7E-13	1.3E-13	2.7E-14	2.0E-14	1.5E-11	1.1E-11	1.5E-11	1.1E-11	2.2E-12	1.7E-12	7.5E-12	5.6E-12	1.0E-03	1.0E-04
Arsenic	2.4E-06	2.4E-06	1.1E-07	1.1E-07	1.3E-04	1.3E-04	3.7E-05	3.7E-05	2.7E-11	2.1E-11	6.8E-10	5.1E-10	2.0E-03	6.0E-05
Beryllium	2.7E-07	2.7E-07	3.7E-10	3.7E-10	2.8E-05	2.8E-05	8.3E-06	8.3E-06	2.2E-09	1.7E-09	1.5E-07	1.1E-07	1.0E-03	9.0E-07
Cadmium	2.8E-07	2.8E-07	2.3E-08	2.3E-08	2.4E-04	2.4E-04	7.1E-05	7.1E-05	3.6E-08	2.7E-08	5.9E-08	4.4E-08	1.2E-04	6.5E-06
Chromium +3	9.1E-06	9.0E-06	3.7E-06	3.7E-06	1.7E-04	1.7E-04	5.1E-05	5.0E-05	2.0E-07	1.5E-07	4.5E-05	3.4E-05	5.5E-03	1.5E-03
Chromium +6	5.4E-06	5.4E-06	2.2E-06	2.2E-06	1.0E-04	1.0E-04	3.0E-05	3.0E-05	1.2E-07	8.7E-08	2.7E-05	2.0E-05	5.5E-03	1.5E-03
Cobalt	1.0E-05	9.9E-06	1.5E-06	1.5E-06	5.1E-05	5.0E-05	1.5E-05	1.5E-05	1.9E-07	1.3E-07	3.1E-05	2.4E-05	2.0E-02	2.0E-03
Copper	6.6E-05	5.2E-05	1.3E-05	1.1E-05	4.6E-04	4.1E-04	2.5E-04	1.9E-04	9.8E-05	6.1E-05	3.8E-03	2.4E-03	1.0E-02	1.5E-03
Lead	7.7E-06	7.7E-06	9.8E-06	9.8E-06	2.7E-03	2.7E-03	8.0E-04	8.0E-04	8.8E-07	6.6E-07	9.8E-06	7.3E-06	3.0E-04	2.5E-04
Manganese	2.0E-06	1.9E-06	2.7E-06	2.5E-06	5.0E-04	4.8E-04	2.0E-04	1.7E-04	1.5E-05	9.6E-06	3.9E-04	2.9E-04	4.0E-04	3.5E-04
Mercury as HgCl2	1.1E-06	9.2E-07	5.8E-07	5.3E-07	1.3E-05	1.3E-05	6.6E-06	6.6E-06	1.3E-07	8.2E-08	1.4E-04	8.8E-05	5.2E-03	2.3E-03
Mercury as Methyl Hg	1.1E-09	6.8E-10	3.8E-10	2.5E-10	2.7E-09	2.7E-09	7.8E-10	7.8E-10	5.5E-09	3.4E-09	2.7E-06	1.7E-06	7.8E-04	3.4E-04
Nickel	2.1E-05	2.1E-05	5.3E-06	5.3E-06	3.7E-04	3.7E-04	1.1E-04	1.1E-04	5.8E-09	4.4E-09	9.7E-08	7.3E-08	6.0E-03	1.0E-03
Selenium	4.0E-06	4.0E-06	1.6E-05	1.6E-05	1.9E-04	1.9E-04	5.5E-05	5.5E-05	2.8E-10	2.1E-10	1.4E-08	1.0E-08	2.3E-03	5.9E-03
Zinc	3.8E-06	3.8E-06	2.1E-06	2.1E-06	4.4E-03	4.4E-03	1.3E-03	1.3E-03	5.9E-07	4.4E-07	1.1E-06	8.2E-07	9.0E-05	3.3E-05
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	1.0E-09	1.0E-09	3.2E-10	3.1E-10	3.6E-09	3.6E-09	1.8E-09	1.8E-09	3.0E-12	2.0E-12	6.3E-09	4.1E-09	2.6E-02	5.5E-03
PCBs														
Total PCBs	7.9E-07	7.9E-07	3.8E-07	3.8E-07	1.9E-06	1.9E-06	9.2E-07	9.2E-07	1.7E-10	1.2E-10	1.3E-07	9.4E-08	4.1E-02	1.3E-02
PAHs														
Acenaphthene	6.9E-09	5.9E-09	1.8E-09	1.6E-09	1.6E-08	1.5E-08	1.0E-08	9.2E-09	5.1E-09	3.8E-09	2.3E-07	1.7E-07	2.4E-02	5.1E-03
Acenaphthylene	8.4E-09	6.4E-09	1.1E-08	8.3E-09	1.3E-09	1.3E-09	6.6E-10	6.6E-10	6.3E-07	4.8E-07	1.0E-11	7.8E-12	2.7E-02	5.7E-03
Anthracene	1.0E-08	8.8E-09	2.6E-09	2.4E-09	1.7E-08	1.7E-08	9.2E-09	8.6E-09	2.4E-09	1.8E-09	2.4E-07	1.8E-07	3.4E-02	7.1E-03
Benzo(a)anthracene	8.9E-07	8.8E-07	2.8E-07	2.8E-07	2.1E-06	2.1E-06	9.5E-07	9.5E-07	4.3E-09	3.3E-09	2.2E-06	1.6E-06	4.0E-02	8.4E-03
Benzo(a)pyrene	2.9E-06	2.9E-06	9.2E-07	9.2E-07	7.6E-06	7.6E-06	3.6E-06	3.6E-06	2.3E-09	1.7E-09	1.8E-06	1.3E-06	3.8E-02	7.9E-03
Benzo(b)fluoranthene	3.3E-07	3.2E-07	1.0E-07	1.0E-07	8.3E-07	8.3E-07	3.9E-07	3.9E-07	2.0E-09	1.5E-09	1.8E-06	1.3E-06	3.6E-02	7.6E-03
Benzo(k)fluoranthene	6.4E-06	6.4E-06	2.0E-06	2.0E-06	1.7E-05	1.7E-05	8.4E-06	8.4E-06	6.4E-09	4.5E-09	5.6E-06	3.9E-06	3.6E-02	7.7E-03
Benzo(ghi)perylene	4.6E-04	3.8E-04	4.8E-04	3.7E-04	4.9E-04	4.9E-04	2.4E-04	2.4E-04	2.4E-02	1.8E-02	7.5E-09	5.6E-09	2.9E-02	6.1E-03
Chrysene	2.6E-06	2.5E-06	7.6E-07	7.4E-07	5.7E-06	5.7E-06	2.0E-06	2.0E-06	3.5E-08	2.6E-08	1.8E-05	1.3E-05	4.0E-02	8.4E-03
Dibenzo(a,h)anthracene	7.0E-06	6.8E-06	2.1E-06	2.1E-06	2.2E-05	2.2E-05	6.4E-06	6.4E-06	2.3E-08	1.7E-08	3.4E-05	2.5E-05	3.1E-02	6.5E-03
Fluoranthene	7.0E-08	6.7E-08	2.1E-08	2.1E-08	1.6E-07	1.6E-07	7.7E-08	7.6E-08	2.1E-09	1.6E-09	4.3E-07	3.2E-07	3.9E-02	8.3E-03
Fluorene	3.1E-09	2.9E-09	9.2E-10	8.8E-10	8.6E-09	8.5E-09	4.6E-09	4.5E-09	5.5E-10	4.1E-10	3.8E-08	2.8E-08	2.9E-02	6.2E-03
Indeno(1,2,3-cd)pyrene	5.5E-06	5.4E-06	1.7E-06	1.7E-06	1.8E-05	1.8E-05	5.5E-06	5.5E-06	1.3E-08	9.9E-09	2.2E-05	1.7E-05	2.9E-02	6.2E-03
2-Methylnaphthalene	7.3E-11	5.8E-11	8.3E-11	6.3E-11	5.9E-11	5.9E-11	3.0E-11	3.0E-11	5.3E-09	3.9E-09	2.6E-14	2.0E-14	2.4E-02	5.0E-03
Naphthalene	8.7E-10	6.7E-10	2.6E-10	2.0E-10	3.6E-09	2.9E-09	3.4E-09	2.6E-09	3.1E-09	2.4E-09	3.3E-08	2.5E-08	1.5E-02	3.1E-03
Phenanthrene	2.3E-08	2.2E-08	6.8E-09	6.5E-09	5.5E-08	5.4E-08	2.8E-08	2.8E-08	2.5E-09	1.9E-09	2.6E-07	1.9E-07	3.4E-02	7.1E-03
Pyrene	1.0E-07	8.9E-08	2.7E-08	2.5E-08	1.7E-07	1.7E-07	8.8E-08	8.5E-08	1.1E-08	7.6E-09	1.8E-06	1.3E-06	3.8E-02	8.1E-03
Aldehyde Ketones														
Formaldehyde	5.6E-09	4.2E-09	2.0E-09	1.5E-09	3.9E-06	2.9E-06	3.9E-06	2.9E-06	3.9E-06	2.9E-06	6.7E-07	5.0E-07	1.2E-04	2.5E-05

Appendix G-3e
Contaminant Concentration in Pork
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters	
Apork = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba pork * MF	
and:	
Pi = Pdi + Pvi + Pri	
Where:	
Apork = Concentration of COC in Pork (mg/kg):	CS*
Fi = Fraction of Plant type i Grown on Contaminated Soil (--):	1.0E+00
Qpi = Quantity of Plant Type i Eaten By Swine per day (kg/d):	See Below
Silage:	1.4E+00
Grain:	3.3E+00
Pi = Concentration of COC in Each Plant Type i (mg/kg):	CS*
Pd = Aboveground Produce Concentration of Plant Type i Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration of Plant Type i Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day (kg/d):	3.7E-01
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba pork = COC Biotransfer Factor for Pork (d/kg):	CS*
MF = Metabolism Factor (--):	1.0E+00

Appendix G-3e
Contaminant Concentration in Pork
RME Farmer - Farm 2 Scenario - Adult and Child

Contaminant	A pork		P sil		P gr		Cs Untilled (2 cm)		Ba pork
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	
Inorganics									
Antimony	3.5E-15	2.6E-15	1.5E-11	1.1E-11	2.2E-12	1.7E-12	7.5E-12	5.6E-12	1.1E-04
Arsenic	6.1E-09	6.1E-09	3.7E-05	3.7E-05	2.7E-11	2.1E-11	6.8E-10	5.1E-10	1.2E-04
Beryllium	8.7E-11	8.7E-11	8.3E-06	8.3E-06	2.2E-09	1.7E-09	1.5E-07	1.1E-07	7.4E-06
Cadmium	1.9E-08	1.9E-08	7.1E-05	7.1E-05	3.6E-08	2.7E-08	5.9E-08	4.4E-08	1.9E-04
Chromium +3	8.7E-09	8.3E-09	5.1E-05	5.0E-05	2.0E-07	1.5E-07	4.5E-05	3.4E-05	9.9E-05
Chromium +6	ND	ND	3.0E-05	3.0E-05	1.2E-07	8.7E-08	2.7E-05	2.0E-05	ND
Cobalt	8.1E-07	7.3E-07	1.5E-05	1.5E-05	1.9E-07	1.3E-07	3.1E-05	2.4E-05	2.4E-02
Copper	2.5E-05	1.6E-05	2.5E-04	1.9E-04	9.8E-05	6.1E-05	3.8E-03	2.4E-03	1.2E-02
Lead	1.3E-07	1.3E-07	8.0E-04	8.0E-04	8.8E-07	6.6E-07	9.8E-06	7.3E-06	1.1E-04
Manganese	2.3E-07	1.8E-07	2.0E-04	1.7E-04	1.5E-05	9.6E-06	3.9E-04	2.9E-04	4.8E-04
Mercury as HgCl2	2.1E-09	1.4E-09	6.6E-06	6.6E-06	1.3E-07	8.2E-08	1.4E-04	8.8E-05	3.4E-05
Mercury as Methyl Hg	5.2E-12	3.2E-12	7.8E-10	7.8E-10	5.5E-09	3.4E-09	2.7E-06	1.7E-06	5.1E-06
Nickel	1.1E-09	1.1E-09	1.1E-04	1.1E-04	5.8E-09	4.4E-09	9.7E-08	7.3E-08	7.4E-06
Selenium	1.4E-05	1.4E-05	5.5E-05	5.5E-05	2.8E-10	2.1E-10	1.4E-08	1.0E-08	1.9E-01
Zinc	2.3E-07	2.3E-07	1.3E-03	1.3E-03	5.9E-07	4.4E-07	1.1E-06	8.2E-07	1.3E-04
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	1.5E-10	1.3E-10	1.8E-09	1.8E-09	3.0E-12	2.0E-12	6.3E-09	4.1E-09	3.2E-02
PCBs									
Total PCBs	6.5E-08	6.5E-08	9.2E-07	9.2E-07	1.7E-10	1.2E-10	1.3E-07	9.4E-08	4.9E-02
PAHs									
Acenaphthene	3.5E-09	2.6E-09	1.0E-08	9.2E-09	5.1E-09	3.8E-09	2.3E-07	1.7E-07	2.9E-02
Acenaphthylene	6.9E-08	5.2E-08	6.6E-10	6.6E-10	6.3E-07	4.8E-07	1.0E-11	7.8E-12	3.3E-02
Anthracene	4.5E-09	3.5E-09	9.2E-09	8.6E-09	2.4E-09	1.8E-09	2.4E-07	1.8E-07	4.1E-02
Benzo(a)anthracene	1.0E-07	9.4E-08	9.5E-07	9.5E-07	4.3E-09	3.3E-09	2.2E-06	1.6E-06	4.8E-02
Benzo(a)pyrene	2.6E-07	2.5E-07	3.6E-06	3.6E-06	2.3E-09	1.7E-09	1.8E-06	1.3E-06	4.5E-02
Benzo(b)fluoranthene	5.3E-08	4.6E-08	3.9E-07	3.9E-07	2.0E-09	1.5E-09	1.8E-06	1.3E-06	4.4E-02
Benzo(k)fluoranthene	6.1E-07	5.8E-07	8.4E-06	8.4E-06	6.4E-09	4.5E-09	5.6E-06	3.9E-06	4.4E-02
Benzo(ghi)perylene	2.7E-03	2.1E-03	2.4E-04	2.4E-04	2.4E-02	1.8E-02	7.5E-09	5.6E-09	3.5E-02
Chrysene	4.5E-07	3.7E-07	2.0E-06	2.0E-06	3.5E-08	2.6E-08	1.8E-05	1.3E-05	4.8E-02
Dibenzo(a,h)anthracene	8.1E-07	6.9E-07	6.4E-06	6.4E-06	2.3E-08	1.7E-08	3.4E-05	2.5E-05	3.7E-02
Fluoranthene	1.3E-08	1.1E-08	7.7E-08	7.6E-08	2.1E-09	1.6E-09	4.3E-07	3.2E-07	4.8E-02
Fluorene	7.8E-10	6.4E-10	4.6E-09	4.5E-09	5.5E-10	4.1E-10	3.8E-08	2.8E-08	3.5E-02
Indeno(1,2,3-cd)pyrene	5.7E-07	4.9E-07	5.5E-06	5.5E-06	1.3E-08	9.9E-09	2.2E-05	1.7E-05	3.6E-02
2-Methylnaphthalene	5.0E-10	3.7E-10	3.0E-11	3.0E-11	5.3E-09	3.9E-09	2.6E-14	2.0E-14	2.9E-02
Naphthalene	4.9E-10	3.7E-10	3.4E-09	2.6E-09	3.1E-09	2.4E-09	3.3E-08	2.5E-08	1.8E-02
Phenanthrene	5.9E-09	4.8E-09	2.8E-08	2.8E-08	2.5E-09	1.9E-09	2.6E-07	1.9E-07	4.1E-02
Pyrene	3.9E-08	2.9E-08	8.8E-08	8.5E-08	1.1E-08	7.6E-09	1.8E-06	1.3E-06	4.7E-02
Aldehyde Ketones									
Formaldehyde	2.7E-09	2.0E-09	3.9E-06	2.9E-06	3.9E-06	2.9E-06	6.7E-07	5.0E-07	1.5E-04

Appendix G-3f
Contaminant Concentration in Chicken and Eggs
RME Farmer - Farm 2 Scenario - Adult and Child

Parameters	
Achicken = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba chicken Aegg = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba egg and: Pgr = Prgr Where:	
Achicken = Concentration of COC in Chicken (mg/kg):	CS*
Aegg = Concentration of COC in Eggs (mg/kg):	CS*
Fgr = Fraction of Grain Grown on Contaminated Soil (--):	1.0E+00
Qgr = Quantity of Grain Eaten By Chickens per day (kg/d):	2.0E-01
Pgr = Concentration of COC in Grain (mg/kg):	CS*
Prgr = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day by Chickens (kg/d):	2.2E-02
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba chicken = COC Biotransfer Factor for Chickens (d/kg):	CS*
Ba egg = COC Biotransfer Factor for Eggs (d/kg):	CS*

Appendix G-3f
Contaminant Concentration in Chicken and Eggs
RME Farmer - Farm 2 Scenario - Adult and Child

Contaminant	A chicken		A egg		P gr		Cs Untilled (2 cm)		Ba chicken	Ba egg
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer		
Inorganics										
Antimony	4.2E-17	3.2E-17	2.4E-17	1.8E-17	2.2E-12	1.7E-12	7.5E-12	5.6E-12	6.9E-05	4.0E-05
Arsenic	1.5E-15	1.1E-15	8.4E-16	6.3E-16	2.7E-11	2.1E-11	6.8E-10	5.1E-10	7.2E-05	4.1E-05
Beryllium	1.7E-14	1.3E-14	9.6E-15	7.2E-15	2.2E-09	1.7E-09	1.5E-07	1.1E-07	4.5E-06	2.6E-06
Cadmium	9.1E-10	6.8E-10	2.1E-11	1.6E-11	3.6E-08	2.7E-08	5.9E-08	4.4E-08	1.1E-01	2.5E-03
Chromium +3	6.2E-11	4.7E-11	3.6E-11	2.7E-11	2.0E-07	1.5E-07	4.5E-05	3.4E-05	6.0E-05	3.4E-05
Chromium +6	ND	ND	ND	ND	1.2E-07	8.7E-08	2.7E-05	2.0E-05	ND	ND
Cobalt	1.2E-08	8.7E-09	ND	ND	1.9E-07	1.3E-07	3.1E-05	2.4E-05	1.6E-02	ND
Copper	8.2E-07	5.1E-07	ND	ND	9.8E-05	6.1E-05	3.8E-03	2.4E-03	8.0E-03	ND
Lead	2.7E-11	2.0E-11	1.5E-11	1.2E-11	8.8E-07	6.6E-07	9.8E-06	7.3E-06	6.9E-05	4.0E-05
Manganese	3.7E-09	2.7E-09	ND	ND	1.5E-05	9.6E-06	3.9E-04	2.9E-04	3.2E-04	ND
Mercury as HgCl2	7.5E-08	4.7E-08	7.5E-08	4.7E-08	1.3E-07	8.2E-08	1.4E-04	8.8E-05	2.4E-02	2.4E-02
Mercury as Methyl Hg	2.2E-10	1.4E-10	2.2E-10	1.4E-10	5.5E-09	3.4E-09	2.7E-06	1.7E-06	3.6E-03	3.6E-03
Nickel	1.5E-14	1.1E-14	8.5E-15	6.4E-15	5.8E-09	4.4E-09	9.7E-08	7.3E-08	4.5E-06	2.6E-06
Selenium	4.1E-10	3.1E-10	4.1E-10	3.1E-10	2.8E-10	2.1E-10	1.4E-08	1.0E-08	1.1E+00	1.1E+00
Zinc	1.2E-09	9.4E-10	1.2E-09	9.4E-10	5.9E-07	4.4E-07	1.1E-06	8.2E-07	8.8E-03	8.8E-03
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	2.7E-12	1.7E-12	1.5E-12	9.9E-13	3.0E-12	2.0E-12	6.3E-09	4.1E-09	1.9E-02	1.1E-02
PCBs										
Total PCBs	8.9E-11	6.7E-11	3.6E-08	2.7E-08	1.7E-10	1.2E-10	1.3E-07	9.4E-08	3.2E-02	1.3E+01
PAHs										
Acenaphthene	1.1E-10	8.2E-11	6.3E-11	4.7E-11	5.1E-09	3.8E-09	2.3E-07	1.7E-07	1.8E-02	1.0E-02
Acenaphthylene	2.5E-09	1.9E-09	1.4E-09	1.1E-09	6.3E-07	4.8E-07	1.0E-11	7.8E-12	2.0E-02	1.1E-02
Anthracene	1.4E-10	1.1E-10	8.2E-11	6.1E-11	2.4E-09	1.8E-09	2.4E-07	1.8E-07	2.5E-02	1.4E-02
Benzo(a)anthracene	1.5E-09	1.1E-09	8.3E-10	6.2E-10	4.3E-09	3.3E-09	2.2E-06	1.6E-06	2.9E-02	1.7E-02
Benzo(a)pyrene	1.1E-09	8.1E-10	6.2E-10	4.7E-10	2.3E-09	1.7E-09	1.8E-06	1.3E-06	2.8E-02	1.6E-02
Benzo(b)fluoranthene	1.0E-09	7.8E-10	5.9E-10	4.4E-10	2.0E-09	1.5E-09	1.8E-06	1.3E-06	2.7E-02	1.5E-02
Benzo(k)fluoranthene	3.3E-09	2.4E-09	1.9E-09	1.3E-09	6.4E-09	4.5E-09	5.6E-06	3.9E-06	2.7E-02	1.5E-02
Benzo(ghi)perylene	1.0E-04	7.6E-05	5.8E-05	4.3E-05	2.4E-02	1.8E-02	7.5E-09	5.6E-09	2.1E-02	1.2E-02
Chrysene	1.2E-08	8.6E-09	6.6E-09	4.9E-09	3.5E-08	2.6E-08	1.8E-05	1.3E-05	2.9E-02	1.7E-02
Dibenzo(a,h)anthracene	1.7E-08	1.3E-08	9.9E-09	7.3E-09	2.3E-08	1.7E-08	3.4E-05	2.5E-05	2.3E-02	1.3E-02
Fluoranthene	2.8E-10	2.1E-10	1.6E-10	1.2E-10	2.1E-09	1.6E-09	4.3E-07	3.2E-07	2.9E-02	1.7E-02
Fluorene	2.0E-11	1.5E-11	1.2E-11	8.6E-12	5.5E-10	4.1E-10	3.8E-08	2.8E-08	2.2E-02	1.2E-02
Indeno(1,2,3-cd)pyrene	1.1E-08	8.0E-09	6.1E-09	4.6E-09	1.3E-08	9.9E-09	2.2E-05	1.7E-05	2.2E-02	1.2E-02
2-Methylnaphthalene	1.8E-11	1.4E-11	1.0E-11	7.9E-12	5.3E-09	3.9E-09	2.6E-14	2.0E-14	1.7E-02	1.0E-02
Naphthalene	1.5E-11	1.1E-11	8.5E-12	6.4E-12	3.1E-09	2.4E-09	3.3E-08	2.5E-08	1.1E-02	6.3E-03
Phenanthrene	1.5E-10	1.2E-10	8.9E-11	6.6E-11	2.5E-09	1.9E-09	2.6E-07	1.9E-07	2.5E-02	1.4E-02
Pyrene	1.2E-09	8.6E-10	6.9E-10	4.9E-10	1.1E-08	7.6E-09	1.8E-06	1.3E-06	2.8E-02	1.6E-02
Aldehyde Ketones										
Formaldehyde	7.1E-11	5.3E-11	4.0E-11	3.0E-11	3.9E-06	2.9E-06	6.7E-07	5.0E-07	8.9E-05	5.1E-05

Appendix G-3g
Calculation of Chemical Intakes
RME Farmer - Farm 2 Scenario: Adult

Parameter

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp=Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg=Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00114
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.00842
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.00053
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.00061
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.00062
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics																
Antimony	2.8E-15	2.1E-15	1.1E-17	8.0E-18	2.4E-15	1.8E-15	2.0E-16	1.5E-16	2.3E-16	1.7E-16	1.9E-18	1.4E-18	2.6E-20	1.9E-20	1.5E-20	1.1E-20
Arsenic	7.0E-09	7.0E-09	9.8E-16	7.3E-16	3.4E-09	3.4E-09	2.7E-09	2.7E-09	9.1E-10	9.1E-10	3.2E-12	3.2E-12	9.0E-19	6.7E-19	5.2E-19	3.9E-19
Beryllium	1.1E-09	1.1E-09	2.1E-13	1.6E-13	7.6E-10	7.6E-10	3.1E-10	3.1E-10	3.1E-12	3.1E-12	4.6E-14	4.6E-14	1.0E-17	7.7E-18	6.0E-18	4.5E-18
Cadmium	7.0E-09	7.0E-09	8.4E-14	6.3E-14	6.5E-09	6.5E-09	3.1E-10	3.1E-10	1.9E-10	1.9E-10	1.0E-11	1.0E-11	5.5E-13	4.1E-13	1.3E-14	9.9E-15
Chromium +3	4.7E-08	4.6E-08	6.5E-11	4.9E-11	4.8E-09	4.7E-09	1.0E-08	1.0E-08	3.1E-08	3.1E-08	4.6E-12	4.4E-12	3.8E-14	2.9E-14	2.2E-14	1.7E-14
Chromium +6	2.8E-08	2.7E-08	3.8E-11	2.9E-11	2.8E-09	2.8E-09	6.1E-09	6.1E-09	1.9E-08	1.9E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cobalt	2.6E-08	2.5E-08	4.5E-11	3.4E-11	1.3E-09	1.3E-09	1.1E-08	1.1E-08	1.3E-08	1.2E-08	4.3E-10	3.9E-10	7.1E-12	5.3E-12	0.0E+00	0.0E+00
Copper	2.2E-07	1.7E-07	5.4E-09	3.4E-09	8.3E-09	8.3E-09	7.6E-08	6.0E-08	1.1E-07	9.2E-08	1.3E-08	8.5E-09	5.0E-10	3.1E-10	0.0E+00	0.0E+00
Lead	1.6E-07	1.6E-07	1.4E-11	1.0E-11	7.4E-08	7.4E-08	8.8E-09	8.8E-09	8.2E-08	8.2E-08	6.8E-11	6.8E-11	1.6E-14	1.2E-14	9.6E-15	7.2E-15
Manganese	3.7E-08	3.5E-08	5.5E-10	4.1E-10	1.1E-08	1.1E-08	2.3E-09	2.2E-09	2.2E-08	2.1E-08	1.2E-10	9.7E-11	2.2E-12	1.6E-12	0.0E+00	0.0E+00
Mercury as HgCl2	1.7E-08	1.7E-08	2.0E-10	1.3E-10	1.1E-08	1.1E-08	1.2E-09	1.0E-09	4.9E-09	4.5E-09	1.1E-12	7.5E-13	4.5E-11	2.8E-11	4.6E-11	2.9E-11
Mercury as Methyl Hg	4.9E-10	4.9E-10	3.9E-12	2.4E-12	4.8E-10	4.8E-10	1.2E-12	7.8E-13	3.2E-12	2.1E-12	2.7E-15	1.7E-15	1.3E-13	8.3E-14	1.3E-13	8.4E-14
Nickel	7.9E-08	7.9E-08	1.4E-13	1.0E-13	1.0E-08	1.0E-08	2.4E-08	2.4E-08	4.5E-08	4.5E-08	6.0E-13	6.0E-13	9.1E-18	6.8E-18	5.3E-18	3.9E-18
Selenium	1.5E-07	1.5E-07	2.0E-14	1.5E-14	5.0E-09	5.0E-09	4.6E-09	4.6E-09	1.3E-07	1.3E-07	7.7E-09	7.7E-09	2.5E-13	1.9E-13	2.5E-13	1.9E-13
Zinc	1.4E-07	1.4E-07	1.6E-12	1.2E-12	1.2E-07	1.2E-07	4.3E-09	4.3E-09	1.7E-08	1.7E-08	1.2E-10	1.2E-10	7.6E-13	5.7E-13	7.7E-13	5.8E-13
Dioxins/Furans																
2,3,7,8-TCDD-TEQ	4.0E-12	3.9E-12	8.9E-15	5.8E-15	1.9E-14	1.8E-14	1.2E-12	1.1E-12	2.7E-12	2.6E-12	8.1E-14	6.7E-14	1.6E-15	1.1E-15	9.4E-16	6.1E-16
PCBs																
Total PCBs	4.1E-09	4.1E-09	1.8E-13	1.3E-13	1.3E-11	1.3E-11	9.0E-10	9.0E-10	3.2E-09	3.2E-09	3.5E-11	3.4E-11	5.4E-14	4.1E-14	2.2E-11	1.7E-11
PAHs																
Acenaphthene	3.4E-11	2.9E-11	3.3E-13	2.5E-13	8.4E-12	7.1E-12	7.9E-12	6.7E-12	1.6E-11	1.3E-11	1.8E-12	1.4E-12	6.7E-14	5.0E-14	3.9E-14	2.9E-14
Acenaphthylene	1.4E-10	1.1E-10	1.5E-17	1.1E-17	9.1E-13	6.8E-13	9.6E-12	7.3E-12	9.2E-11	7.0E-11	3.6E-11	2.7E-11	1.5E-12	1.2E-12	9.0E-13	6.7E-13
Anthracene	3.9E-11	3.4E-11	3.4E-13	2.6E-13	2.2E-12	1.7E-12	1.1E-11	1.0E-11	2.2E-11	2.0E-11	2.4E-12	1.8E-12	8.7E-14	6.6E-14	5.1E-14	3.8E-14
Benzo(a)anthracene	3.4E-09	3.4E-09	3.1E-12	2.4E-12	2.5E-11	2.4E-11	1.0E-09	1.0E-09	2.3E-09	2.3E-09	5.5E-11	5.0E-11	8.9E-13	6.6E-13	5.1E-13	3.8E-13
Benzo(a)pyrene	1.1E-08	1.1E-08	2.5E-12	1.9E-12	4.7E-11	4.7E-11	3.3E-09	3.3E-09	7.8E-09	7.7E-09	1.4E-10	1.3E-10	6.6E-13	5.0E-13	3.8E-13	2.9E-13
Benzo(b)fluoranthene	1.3E-09	1.2E-09	2.5E-12	1.9E-12	7.1E-12	6.6E-12	3.8E-10	3.7E-10	8.5E-10	8.4E-10	2.8E-11	2.4E-11	6.3E-13	4.7E-13	3.7E-13	2.8E-13
Benzo(k)fluoranthene	2.5E-08	2.5E-08	8.0E-12	5.6E-12	9.2E-11	9.1E-11	7.3E-09	7.3E-09	1.7E-08	1.7E-08	3.2E-10	3.1E-10	2.0E-12	1.4E-12	1.2E-12	8.4E-13
Benzo(ghi)perylene	6.1E-06	4.7E-06	1.1E-14	8.0E-15	3.5E-08	2.6E-08	5.3E-07	4.4E-07	4.0E-06	3.1E-06	1.5E-06	1.1E-06	6.1E-08	4.6E-08	3.6E-08	2.7E-08
Chrysene	9.8E-09	9.4E-09	2.5E-11	1.9E-11	1.5E-10	1.5E-10	2.9E-09	2.8E-09	6.4E-09	6.3E-09	2.4E-10	2.0E-10	7.1E-12	5.2E-12	4.1E-12	3.0E-12
Dibenzo(a,h)anthracene	2.7E-08	2.7E-08	4.9E-11	3.6E-11	6.0E-10	6.0E-10	7.9E-09	7.8E-09	1.8E-08	1.8E-08	4.3E-10	3.7E-10	1.1E-11	7.8E-12	6.1E-12	4.5E-12
Fluoranthene	2.7E-10	2.6E-10	6.1E-13	4.6E-13	2.6E-12	2.1E-12	7.9E-11	7.7E-11	1.8E-10	1.7E-10	6.8E-12	5.8E-12	1.7E-13	1.3E-13	1.0E-13	7.5E-14
Fluorene	1.2E-11	1.2E-11	5.4E-14	4.0E-14	5.0E-13	3.8E-13	3.6E-12	3.3E-12	7.8E-12	7.4E-12	4.2E-13	3.4E-13	1.2E-14	9.2E-15	7.1E-15	5.4E-15
Indeno(1,2,3-cd)pyrene	2.1E-08	2.1E-08	3.2E-11	2.4E-11	5.1E-10	5.1E-10	6.3E-09	6.2E-09	1.4E-08	1.4E-08	3.0E-10	2.6E-10	6.6E-12	4.9E-12	3.8E-12	2.8E-12
2-Methylnaphthalene	1.8E-12	1.4E-12	3.8E-20	2.8E-20	7.5E-13	5.7E-13	8.3E-14	6.6E-14	7.0E-13	5.3E-13	2.6E-13	2.0E-13	1.1E-14	8.4E-15	6.5E-15	4.9E-15
Naphthalene	6.7E-12	5.1E-12	4.7E-14	3.6E-14	3.1E-12	2.4E-12	9.9E-13	7.6E-13	2.2E-12	1.7E-12	2.6E-13	2.0E-13	9.1E-15	6.8E-15	5.3E-15	3.9E-15
Phenanthrene	9.0E-11	8.5E-11	3.7E-13	2.8E-13	2.4E-12	1.9E-12	2.6E-11	2.5E-11	5.7E-11	5.5E-11	3.1E-12	2.5E-12	9.4E-14	7.1E-14	5.5E-14	4.1E-14
Pyrene	3.8E-10	3.4E-10	2.6E-12	1.9E-12	1.0E-11	7.3E-12	1.1E-10	1.0E-10	2.3E-10	2.1E-10	2.1E-11	1.5E-11	7.3E-13	5.2E-13	4.3E-13	3.0E-13
Aldehyde Ketones																
Formaldehyde	2.3E-08	1.7E-08	9.6E-13	7.2E-13	2.3E-08	1.7E-08	6.4E-12	4.8E-12	1.7E-11	1.3E-11	1.4E-12	1.1E-12	4.3E-14	3.2E-14	2.5E-14	1.9E-14

Appendix G-3g
Calculation of Chemical Intakes
RME Farmer - Farm 2 Scenario: Child

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp=Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg=Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00051
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.01857
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.000398
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.000425
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.000438
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics																
Antimony	4.0E-15	1.2E-15	1.0E-16	1.0E-16	3.3E-15	4.9E-16	8.8E-17	6.6E-17	5.0E-16	5.0E-16	1.4E-18	1.1E-18	1.8E-20	1.3E-20	1.1E-20	7.9E-21
Arsenic	8.0E-09	8.0E-09	9.1E-15	9.1E-15	4.7E-09	4.7E-09	1.2E-09	1.2E-09	2.0E-09	2.0E-09	2.4E-12	2.4E-12	6.3E-19	4.7E-19	3.7E-19	2.8E-19
Beryllium	1.2E-09	1.2E-09	2.0E-12	2.0E-12	1.1E-09	1.1E-09	1.4E-10	1.4E-10	6.8E-12	6.8E-12	3.5E-14	3.5E-14	7.2E-18	5.4E-18	4.2E-18	3.2E-18
Cadmium	9.7E-09	9.7E-09	7.8E-13	7.8E-13	9.1E-09	9.1E-09	1.4E-10	1.4E-10	4.2E-10	4.2E-10	7.6E-12	7.6E-12	3.9E-13	2.9E-13	9.3E-15	7.0E-15
Chromium +3	8.1E-08	8.1E-08	6.0E-10	5.9E-10	6.7E-09	6.7E-09	4.6E-09	4.6E-09	6.9E-08	6.9E-08	3.5E-12	3.3E-12	2.7E-14	2.0E-14	1.6E-14	1.2E-14
Chromium +6	4.8E-08	4.8E-08	3.6E-10	3.5E-10	4.0E-09	3.9E-09	2.8E-09	2.7E-09	4.1E-08	4.1E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cobalt	3.5E-08	3.5E-08	4.2E-10	4.0E-10	1.9E-09	1.9E-09	5.1E-09	5.0E-09	2.8E-08	2.8E-08	3.2E-10	2.9E-10	5.0E-12	3.7E-12	0.0E+00	0.0E+00
Copper	3.5E-07	3.2E-07	5.0E-08	2.5E-08	1.2E-08	1.2E-08	3.4E-08	2.7E-08	2.5E-07	2.5E-07	9.8E-09	6.4E-09	3.5E-10	2.2E-10	0.0E+00	0.0E+00
Lead	2.9E-07	2.9E-07	1.3E-10	1.3E-10	1.0E-07	1.0E-07	4.0E-09	3.9E-09	1.8E-07	1.8E-07	5.1E-11	5.1E-11	1.1E-14	8.6E-15	6.8E-15	5.1E-15
Manganese	7.2E-08	7.1E-08	5.2E-09	4.8E-09	1.6E-08	1.6E-08	1.0E-09	9.7E-10	5.0E-08	5.0E-08	9.0E-11	7.3E-11	1.6E-12	1.1E-12	0.0E+00	0.0E+00
Mercury (Total) as HgCl2	2.9E-08	2.8E-08	1.9E-09	9.4E-10	1.5E-08	1.5E-08	5.4E-10	4.7E-10	1.1E-08	1.1E-08	8.3E-13	5.7E-13	3.2E-11	2.0E-11	3.3E-11	2.0E-11
Mercury (Total) as Methyl Hg	7.2E-10	7.0E-10	3.6E-11	1.8E-11	6.8E-10	6.7E-10	5.5E-13	3.5E-13	7.1E-12	7.1E-12	2.1E-15	1.3E-15	9.2E-14	5.8E-14	9.5E-14	5.9E-14
Nickel	1.2E-07	1.2E-07	1.3E-12	1.3E-12	1.4E-08	1.4E-08	1.1E-08	1.1E-08	9.9E-08	9.9E-08	4.5E-13	4.5E-13	6.3E-18	4.7E-18	3.7E-18	2.8E-18
Selenium	3.1E-07	3.1E-07	1.9E-13	1.9E-13	7.0E-09	7.0E-09	2.1E-09	2.1E-09	2.9E-07	2.9E-07	5.7E-09	5.7E-09	1.7E-13	1.3E-13	1.8E-13	1.3E-13
Zinc	2.1E-07	2.1E-07	1.5E-11	1.5E-11	1.7E-07	1.7E-07	1.9E-09	1.9E-09	3.8E-08	3.8E-08	9.3E-11	9.3E-11	5.3E-13	4.0E-13	5.5E-13	4.1E-13
Dioxins/Furans																
2,3,7,8-TCDD-TEQ	6.6E-12	6.5E-12	8.3E-14	4.9E-14	2.7E-14	2.5E-14	5.3E-13	5.1E-13	5.9E-12	5.9E-12	6.1E-14	5.0E-14	1.1E-15	7.4E-16	6.7E-16	4.3E-16
PCBs																
Total PCBs	7.5E-09	7.5E-09	1.7E-12	1.7E-12	1.8E-11	1.8E-11	4.0E-10	4.0E-10	7.0E-09	7.0E-09	2.6E-11	2.6E-11	3.8E-14	2.8E-14	1.6E-11	1.2E-11
PAHs																
Acenaphthene	5.4E-11	5.3E-11	3.1E-12	3.1E-12	1.2E-11	1.2E-11	3.5E-12	3.0E-12	3.4E-11	3.4E-11	1.4E-12	1.1E-12	4.7E-14	3.5E-14	2.7E-14	2.1E-14
Acenaphthylene	2.4E-10	2.3E-10	1.4E-16	1.4E-16	1.4E-12	1.4E-12	4.3E-12	3.3E-12	2.0E-10	2.0E-10	2.7E-11	2.1E-11	1.1E-12	8.1E-13	6.3E-13	4.8E-13
Anthracene	6.2E-11	6.1E-11	3.2E-12	3.0E-12	3.0E-12	2.8E-12	5.1E-12	4.5E-12	4.9E-11	4.9E-11	1.8E-12	1.4E-12	6.1E-14	4.6E-14	3.6E-14	2.7E-14
Benzo(a)anthracene	5.7E-09	5.7E-09	2.9E-11	2.7E-11	3.5E-11	3.4E-11	4.6E-10	4.5E-10	5.2E-09	5.2E-09	4.1E-11	3.7E-11	6.2E-13	4.6E-13	3.6E-13	2.7E-13
Benzo(a)pyrene	1.9E-08	1.9E-08	2.3E-11	2.2E-11	6.6E-11	6.6E-11	1.5E-09	1.5E-09	1.7E-08	1.7E-08	1.0E-10	1.0E-10	4.6E-13	3.5E-13	2.7E-13	2.0E-13
Benzo(b)fluoranthene	2.1E-09	2.1E-09	2.3E-11	2.1E-11	9.9E-12	9.7E-12	1.7E-10	1.6E-10	1.9E-09	1.9E-09	2.1E-11	1.8E-11	4.4E-13	3.3E-13	2.6E-13	1.9E-13
Benzo(k)fluoranthene	4.2E-08	4.2E-08	7.4E-11	5.6E-11	1.3E-10	1.3E-10	3.3E-09	3.3E-09	3.8E-08	3.8E-08	2.4E-10	2.3E-10	1.4E-12	1.0E-12	8.3E-13	5.9E-13
Benzo(ghi)perylene	1.0E-05	1.0E-05	1.0E-13	1.0E-13	5.4E-08	5.4E-08	2.4E-07	2.0E-07	8.9E-06	8.9E-06	1.1E-06	8.2E-07	4.3E-08	3.2E-08	2.5E-08	1.9E-08
Chrysene	1.6E-08	1.6E-08	2.3E-10	2.0E-10	2.1E-10	2.1E-10	1.3E-09	1.3E-09	1.4E-08	1.4E-08	1.8E-10	1.5E-10	4.9E-12	3.7E-12	2.9E-12	2.2E-12
Dibenzo(a,h)anthracene	4.5E-08	4.5E-08	4.6E-10	4.0E-10	8.4E-10	8.4E-10	3.5E-09	3.5E-09	4.0E-08	4.0E-08	3.2E-10	2.8E-10	7.3E-12	5.5E-12	4.3E-12	3.2E-12
Fluoranthene	4.4E-10	4.4E-10	5.7E-12	5.4E-12	3.6E-12	3.4E-12	3.6E-11	3.4E-11	3.9E-10	3.9E-10	5.1E-12	4.3E-12	1.2E-13	9.0E-14	7.1E-14	5.3E-14
Fluorene	2.0E-11	2.0E-11	5.0E-13	5.0E-13	6.9E-13	6.8E-13	1.6E-12	1.5E-12	1.7E-11	1.7E-11	3.1E-13	2.5E-13	8.6E-15	6.4E-15	5.1E-15	3.8E-15
Indeno(1,2,3-cd)pyrene	3.6E-08	3.6E-08	3.0E-10	2.7E-10	7.1E-10	7.1E-10	2.8E-09	2.8E-09	3.2E-08	3.2E-08	2.3E-10	2.0E-10	4.6E-12	3.4E-12	2.7E-12	2.0E-12
2-Methylnaphthalene	3.0E-12	2.9E-12	3.5E-19	3.5E-19	1.2E-12	1.2E-12	3.7E-14	3.0E-14	1.5E-12	1.5E-12	2.0E-13	1.5E-13	7.8E-15	5.8E-15	4.6E-15	3.4E-15
Naphthalene	1.0E-11	1.0E-11	4.4E-13	4.4E-13	4.3E-12	4.3E-12	4.4E-13	3.4E-13	4.9E-12	4.9E-12	2.0E-13	1.5E-13	6.3E-15	4.7E-15	3.7E-15	2.8E-15
Phenanthrene	1.5E-10	1.5E-10	3.5E-12	3.4E-12	3.3E-12	3.2E-12	1.2E-11	1.1E-11	1.3E-10	1.3E-10	2.3E-12	1.9E-12	6.6E-14	4.9E-14	3.9E-14	2.9E-14
Pyrene	6.1E-10	5.9E-10	2.4E-11	1.9E-11	1.4E-11	1.1E-11	5.1E-11	4.6E-11	5.0E-10	5.0E-10	1.5E-11	1.2E-11	5.1E-13	3.7E-13	3.0E-13	2.2E-13
Aldehyde Ketones																
Formaldehyde	3.6E-08	3.6E-08	9.0E-12	9.0E-12	3.6E-08	3.6E-08	2.8E-12	2.1E-12	3.7E-11	3.7E-11	1.1E-12	8.1E-13	3.0E-14	2.2E-14	1.8E-14	1.3E-14

Appendix G-3h
Summary of Cancer Risks and Hazard Indices (a)
RME Farmer - Farm 2 Scenario - Adult and Child

Parameter

CRo = Itot * ED * EF * SFo/AT * UC
HQo = Itot * ED * EF/ RfDo * AT * UC

Where:

CS* = Values Specific to Contaminant:	
CRo = Cancer Risk oral (--):	CS*
HQo = Ingestion Hazard Index (--):	CS*
Itot = Total Daily Intake of Contaminant (mg/d):	CS*
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*
ED = Exposure Duration (see below) (yr):	
adult:	40
child:	6
EF = Exposure Frequency (day/yr):	350
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	40
child:	6
UC = Units Conversion (day/yr):	365

Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
Inorganics							
Antimony	4.0E-04	NA	6.8E-12	NA	9.6E-12	NA	Longevity, blood glucose, cholesterol
Arsenic	3.0E-04	1.5E+00	2.2E-05	6E-09	2.5E-05	1E-09	Hyperpigmentation, keratosis, possible vascular effects
Beryllium	2.0E-03	NA	5.1E-07	NA	5.8E-07	NA	Intestinal lesions
Cadmium	1.0E-03	NA	6.8E-06	NA	9.3E-06	NA	Proteinuria
Chromium +3	1.5E+00	NA	3.0E-08	NA	5.2E-08	NA	None observed
Chromium +6	3.0E-03	5.0E-01	8.8E-06	8E-09	1.5E-05	2E-09	None observed
Cobalt	3.0E-04	NA	8.2E-05	NA	1.1E-04	NA	Endocrine Effects
Copper	4.0E-02	NA	5.2E-06	NA	8.5E-06	NA	Gastrointestinal Effects
Lead	NA	NA	NA	NA	NA	NA	
Manganese	1.4E-01	NA	2.5E-07	NA	4.9E-07	NA	CNS
Mercury as HgCl2	3.0E-04	NA	5.6E-05	NA	9.2E-05	NA	Autoimmune Effects
Mercury as Methyl Hg	1.0E-04	NA	4.7E-06	NA	6.9E-06	NA	Developmental Effects
Nickel	2.0E-02	NA	3.8E-06	NA	5.9E-06	NA	Reduced body and organ weight
Selenium	5.0E-03	NA	2.9E-05	NA	5.9E-05	NA	Selenosis
Zinc	3.0E-01	NA	4.6E-07	NA	6.7E-07	NA	Anemia
Dioxins/Furans							
2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	5.4E-03	3E-07	9.0E-03	7E-08	Developmental
PCBs							
Total PCBs	2.0E-05	2.0E+00	2.0E-04	5E-09	3.6E-04	1E-09	Developmental
PAHs							
Acenaphthene	6.0E-02	NA	5.4E-10	NA	8.6E-10	NA	Liver
Acenaphthylene	NA	NA	NA	NA	NA	NA	
Anthracene	3.0E-01	NA	1.2E-10	NA	2.0E-10	NA	No Observed Effects
Benzo(a)anthracene	NA	7.3E-01	NA	1E-09	NA	3E-10	
Benzo(a)pyrene	NA	7.3E+00	NA	4E-08	NA	1E-08	
Benzo(b)fluoranthene	NA	7.3E-01	NA	5E-10	NA	1E-10	
Benzo(k)fluoranthene	NA	7.3E-02	NA	1E-09	NA	2E-10	
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
Chrysene	NA	7.3E-03	NA	4E-11	NA	1E-11	
Dibenzo(a,h)anthracene	NA	7.3E+00	NA	1E-07	NA	3E-08	
Fluoranthene	4.0E-02	NA	6.4E-09	NA	1.1E-08	NA	CNS, liver, blood
Fluorene	4.0E-02	NA	2.9E-10	NA	4.8E-10	NA	Blood
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	8E-09	NA	2E-09	
2-Methylnaphthalene	4.0E-03	NA	4.4E-10	NA	7.1E-10	NA	Lung
Naphthalene	2.0E-02	NA	3.2E-10	NA	5.0E-10	NA	Decreased body weight gain
Phenanthrene	NA	NA	NA	NA	NA	NA	
Pyrene	3.0E-02	NA	1.2E-08	NA	1.9E-08	NA	Kidney
Aldehyde Ketones							
Formaldehyde	2.0E-01	NA	1.1E-07	NA	1.7E-07	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and home-raised livestock consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	6.2E-03	5E-07	1.0E-02	1E-07

Appendix G-3i
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
RME Farmer - Farm 2 Scenario - Adult and Child

Parameter

CRi = Ca * ED * EF * URF / AT * UC2
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2

And:
Ca = Q * Fv * Cyv + (1- Fv) * Cyp

For Hg:
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
URF = Unit Risk Factor ((ug/m3)-1):	CS*
RfC = Reference Concentration (mg/m3):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
ED = Exposure Duration (see below) (yr):	
adult:	40
child:	6
EF = Exposure Frequency (day/yr):	350
UC1 = Units Conversion (mg/ug):	0.001
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	40
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m^3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	2.55E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	2.15E-06	6.0E-03	1.5E-05	4.3E-03	1.4E-04	5E-09	1.4E-04	8E-10	Cardiovascular, CNS, Developmental
Beryllium	3.37E-07	9.0E-03	2.0E-05	2.4E-03	1.6E-05	4E-10	1.6E-05	7E-11	Sensitization
Cadmium	2.87E-06	9.0E-03	1.0E-05	1.8E-03	2.7E-04	3E-09	2.7E-04	4E-10	
Chromium +3	2.04E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	1.21E-06	0.0E+00	1.0E-04	8.4E-02	1.2E-05	6E-08	1.2E-05	8E-09	Increased LDH in bronchoalveolar lavage fluid
Cobalt	5.96E-07	0.0E+00	6.0E-06	9.0E-03	9.5E-05	3E-09	9.5E-05	4E-10	
Copper	3.67E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	3.22E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	5.09E-06	0.0E+00	5.0E-05	NA	9.8E-05	NA	9.8E-05	NA	CNS
Mercury (Total) as HgCl2	1.31E-05	8.5E-01	3.0E-04	NA	4.2E-05	NA	4.2E-05	NA	PNS, Autonomic Dysfunction
Mercury (Total) as Elemental Hg	5.47E-08	1.0E+00	3.0E-04	NA	1.7E-07	NA	1.7E-07	NA	PNS, Autonomic Dysfunction
Nickel	4.42E-06	9.0E-03	9.0E-05	2.4E-04	4.7E-05	6E-10	4.7E-05	9E-11	
Selenium	3.20E-06	0.0E+00	2.0E-02	NA	1.5E-07	NA	1.5E-07	NA	
Zinc	5.26E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	9.41E-11	6.6E-01	4.0E-08	3.8E+01	2.3E-06	2E-09	2.3E-06	3E-10	
PCBs									
Total PCBs	6.47E-06	9.9E-01	NA	5.7E-04	NA	2E-09	NA	3E-10	
PAHs									
Acenaphthene	2.59E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	3.56E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	2.64E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	1.94E-07	4.8E-01	NA	1.1E-04	NA	1E-11	NA	2E-12	
Benzo(a)pyrene	2.17E-07	2.9E-01	NA	1.1E-03	NA	1E-10	NA	2E-11	
Benzo(b)fluoranthene	5.27E-07	9.7E-01	NA	1.1E-04	NA	3E-11	NA	5E-12	
Benzo(k)fluoranthene	3.27E-07	2.7E-01	NA	1.1E-04	NA	2E-11	NA	3E-12	
Benzo(ghi)perylene	2.40E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	2.84E-06	7.4E-01	NA	1.1E-05	NA	2E-11	NA	3E-12	
Dibenzo(a,h)anthracene	2.60E-07	5.5E-02	NA	1.2E-03	NA	2E-10	NA	3E-11	
Fluoranthene	2.31E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	3.70E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	2.21E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	2E-12	
2-Methylnaphthalene	5.04E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	1.55E-06	1.0E+00	3.0E-03	3.4E-05	5.0E-07	3E-11	5.0E-07	4E-12	Nasal effects
Phenanthrene	3.95E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	2.13E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	2.95E-05	1.0E+00	9.8E-03	1.3E-05	2.9E-06	2E-10	2.9E-06	3E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	7.3E-04	7E-08	7.3E-04	1E-08

Appendix G-3j
Ingestion of Mother's Milk
RME Farmer - Farm 2 Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.5E-14	3.9E-12	4.1E-12	4.55E+01	1.31E-01
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-3h						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-3j
Ingestion of Mother's Milk
RME Farmer - Farm 2 Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
		2,3,7,8-TCDD TEQ	1.31E-01	6.0E+01	2.2E-03
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-4a
Contaminant Concentration in Soil
MEI A Scenario - Adult and Child

Parameters

Carcinogens (T2 ≤ tD)

$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$

NonCarcinogens

$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$

Where:

$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: Ds(MeHg) = Ds * 0.02

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-4a
Contaminant Concentration in Soil
MEI A Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm) Non - Cancer	Cs Tilled (20 cm) Cancer	Cs Untilled (2 cm) Non - Cancer	Cs Untilled (2 cm) Cancer	Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
Inorganics									
Antimony	1.1E-10	1.1E-10	1.15E-11	1.2E-11	2.7E-09	2.7E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.9E-08	1.9E-08	1.90E-09	1.9E-09	2.1E-05	2.1E-04	6.0E-03	1.12E+03	1.12E+05
Beryllium	4.1E-06	4.0E-06	4.15E-07	4.2E-07	3.3E-06	3.3E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.6E-06	1.6E-06	1.62E-07	1.6E-07	2.8E-05	2.8E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	1.2E-04	1.0E-04	1.26E-04	1.2E-04	2.0E-05	2.0E-04	9.0E-03	1.60E-01	1.60E+00
Chromium +6	7.4E-05	5.9E-05	7.46E-05	7.3E-05	1.2E-05	1.2E-04	0.0E+00	1.60E-01	1.60E+00
Cobalt	7.6E-05	5.0E-05	8.70E-05	8.3E-05	5.9E-06	5.9E-05	0.0E+00	6.78E-02	6.78E-01
Copper	1.1E-03	5.4E-04	1.04E-02	5.3E-03	3.6E-05	3.6E-04	0.0E+00	3.06E-04	3.06E-03
Lead	2.7E-04	2.6E-04	2.71E-05	2.7E-05	3.2E-04	3.2E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	8.1E-04	5.0E-04	1.07E-03	1.0E-03	5.0E-05	5.0E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	3.5E-05	1.7E-05	3.43E-04	1.7E-04	1.2E-06	1.2E-05	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	7.0E-07	3.5E-07	6.60E-06	3.4E-06	2.4E-08	2.4E-07	8.5E-01	4.39E-04	4.57E-03
Nickel	2.7E-06	2.7E-06	2.69E-07	2.7E-07	4.4E-05	4.4E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	3.8E-07	3.8E-07	3.86E-08	3.9E-08	3.2E-05	3.2E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	3.0E-05	3.0E-05	3.05E-06	3.1E-06	5.2E-04	5.2E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	1.1E-09	6.3E-10	1.02E-08	6.0E-09	5.6E-11	5.6E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	2.7E-08	2.7E-08	2.05E-07	2.0E-07	1.4E-07	1.4E-06	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	3.3E-08	3.3E-08	3.28E-07	3.2E-07	8.3E-08	8.3E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.4E-10	1.4E-10	1.43E-11	1.4E-11	4.0E-08	4.0E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	3.5E-08	3.3E-08	3.47E-07	3.3E-07	1.9E-08	1.9E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	4.1E-07	3.7E-07	4.11E-06	3.7E-06	1.5E-07	1.5E-06	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	3.8E-07	3.5E-07	3.77E-06	3.5E-06	1.8E-07	1.8E-06	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	2.6E-07	2.4E-07	2.57E-06	2.4E-06	1.1E-07	1.1E-06	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	1.3E-06	9.6E-07	1.28E-05	9.6E-06	1.6E-07	1.6E-06	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.9E-08	1.9E-08	1.51E-08	1.5E-08	4.3E-07	4.3E-06	1.0E+00	2.22E+01	2.87E+02
Chrysene	3.2E-06	2.8E-06	3.23E-05	2.8E-05	8.1E-07	8.1E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	9.5E-06	8.3E-06	9.48E-05	8.3E-05	2.6E-06	2.6E-05	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	6.3E-08	5.9E-08	6.25E-07	5.9E-07	3.6E-08	3.6E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	5.5E-09	5.4E-09	5.44E-08	5.4E-08	2.3E-08	2.3E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	6.2E-06	5.6E-06	6.23E-05	5.6E-05	2.2E-06	2.2E-05	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.6E-13	3.6E-13	3.56E-14	3.6E-14	8.6E-09	8.6E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	9.6E-09	9.5E-09	4.85E-08	4.8E-08	5.1E-08	5.1E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	3.8E-08	3.7E-08	3.78E-07	3.7E-07	4.8E-08	4.8E-07	1.0E+00	1.26E+00	1.27E+00
Pyrene	2.8E-07	2.2E-07	2.76E-06	2.1E-06	3.7E-08	3.7E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	1.3E-06	1.3E-06	1.91E-06	1.9E-06	7.7E-05	7.7E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-4a
Calculation of Soil Loss Constant
MEI A Scenario - Adult and Child

Parameters	
ks = ksl + ksg + ksr + kse + ksv	
where:	
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]	
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))	
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v	
where:	
theta v = 1 - (BD/ps) - theta sw	
and:	
Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-4a
Calculation of Soil Loss Constant
MEI A Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-4b
Contaminant Concentration in Above Ground Vegetation
MEI A Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$
$Pv(Hg^{2+}) = 0.78Pv$
$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-4b
Contaminant Concentration in Above Ground Vegetation
MEI A Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	3.7E-12	3.7E-12	3.7E-12	3.7E-12	1.1E-10	1.1E-10	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	2.3E-05	0.0E+00	1.2E-10	1.2E-10	1.2E-10	1.2E-10	1.9E-08	1.9E-08	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	6.4E-06	0.0E+00	1.1E-08	1.0E-08	1.1E-08	1.0E-08	4.1E-06	4.0E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	5.5E-05	0.0E+00	2.0E-07	2.0E-07	2.0E-07	2.0E-07	1.6E-06	1.6E-06	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	3.9E-05	0.0E+00	6.1E-07	4.9E-07	6.1E-07	4.9E-07	1.2E-04	1.0E-04	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	2.3E-05	0.0E+00	3.6E-07	2.9E-07	3.6E-07	2.9E-07	7.4E-05	5.9E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	1.1E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.6E-05	5.0E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	7.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-03	5.4E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	6.1E-04	0.0E+00	3.7E-06	3.6E-06	3.7E-06	3.6E-06	2.7E-04	2.6E-04	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	9.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.1E-04	5.0E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	1.9E-06	0.0E+00	4.7E-07	2.4E-07	4.7E-07	2.4E-07	3.5E-05	1.7E-05	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	5.3E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.0E-07	3.5E-07	8.50E-01	6.00E-01	ND	ND	ND
Nickel	8.4E-05	0.0E+00	2.5E-08	2.5E-08	2.5E-08	2.5E-08	2.7E-06	2.7E-06	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	3.5E-05	0.0E+00	7.5E-09	7.5E-09	7.5E-09	7.5E-09	3.8E-07	3.8E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	1.0E-03	0.0E+00	3.0E-06	2.9E-06	3.0E-06	2.9E-06	3.0E-05	3.0E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	3.8E-11	4.4E-11	5.0E-12	2.9E-12	5.0E-12	2.9E-12	1.1E-09	6.3E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	5.5E-08	2.1E-08	2.7E-10	2.7E-10	2.7E-10	2.7E-10	2.7E-08	2.7E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.4E-08	7.2E-09	7.1E-09	7.2E-09	7.1E-09	3.3E-08	3.3E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	1.7E-11	2.3E-11	2.3E-11	2.3E-11	2.3E-11	1.4E-10	1.4E-10	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	6.4E-10	1.5E-10	3.4E-09	3.2E-09	3.4E-09	3.2E-09	3.5E-08	3.3E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	1.2E-07	2.0E-08	8.1E-09	7.4E-09	8.1E-09	7.4E-09	4.1E-07	3.7E-07	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	1.9E-07	8.6E-08	5.0E-09	4.6E-09	5.0E-09	4.6E-09	3.8E-07	3.5E-07	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	2.2E-08	9.3E-09	2.9E-09	2.7E-09	2.9E-09	2.7E-09	2.6E-07	2.4E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	2.9E-07	2.0E-07	1.5E-08	1.1E-08	1.5E-08	1.1E-08	1.3E-06	9.6E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	6.3E-06	1.1E-10	1.1E-10	1.1E-10	1.1E-10	1.9E-08	1.9E-08	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	8.8E-07	1.6E-08	6.4E-08	5.5E-08	6.4E-08	5.5E-08	3.2E-06	2.8E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	4.9E-06	0.0E+00	6.4E-08	5.6E-08	6.4E-08	5.6E-08	9.5E-06	8.3E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	2.2E-09	1.8E-09	3.1E-09	3.0E-09	3.1E-09	3.0E-09	6.3E-08	5.9E-08	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	1.0E-10	7.9E-10	7.9E-10	7.9E-10	7.9E-10	5.5E-09	5.4E-09	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	4.2E-06	0.0E+00	3.7E-08	3.3E-08	3.7E-08	3.3E-08	6.2E-06	5.6E-06	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	7.6E-11	8.1E-14	8.1E-14	8.1E-14	8.1E-14	3.6E-13	3.6E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	6.4E-10	4.6E-09	4.6E-09	4.6E-09	4.6E-09	9.6E-09	9.5E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	4.8E-10	6.5E-10	3.7E-09	3.6E-09	3.7E-09	3.6E-09	3.8E-08	3.7E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	1.6E-09	1.9E-09	1.6E-08	1.2E-08	1.6E-08	1.2E-08	2.8E-07	2.2E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	1.2E-08	1.1E-05	1.1E-05	1.1E-05	1.1E-05	1.3E-06	1.3E-06	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-4b
Contaminant Concentration in Below Ground Vegetation
MEI A Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-4b
Contaminant Concentration in Below Ground Vegetation
MEI A Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	3.4E-12	3.4E-12	1.1E-10	1.1E-10	3.00E-02	1.0E+00
Arsenic	1.5E-10	1.5E-10	1.9E-08	1.9E-08	8.00E-03	1.0E+00
Beryllium	6.2E-09	5.9E-09	4.1E-06	4.0E-06	1.50E-03	1.0E+00
Cadmium	1.0E-07	1.0E-07	1.6E-06	1.6E-06	6.40E-02	1.0E+00
Chromium +3	5.6E-07	4.5E-07	1.2E-04	1.0E-04	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	7.4E-05	5.9E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	7.6E-05	5.0E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	1.1E-03	5.4E-04	2.50E-01	ND
Lead	2.4E-06	2.4E-06	2.7E-04	2.6E-04	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	8.1E-04	5.0E-04	5.00E-02	ND
Mercury as HgCl2	1.2E-06	6.2E-07	3.5E-05	1.7E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	7.0E-07	3.5E-07	9.90E-02	ND
Nickel	2.1E-08	2.1E-08	2.7E-06	2.7E-06	8.00E-03	1.0E+00
Selenium	8.4E-09	8.4E-09	3.8E-07	3.8E-07	2.20E-02	1.0E+00
Zinc	2.7E-05	2.7E-05	3.0E-05	3.0E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	1.1E-11	6.5E-12	1.1E-09	6.3E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	3.9E-09	3.8E-09	2.7E-08	2.7E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	7.1E-09	7.0E-09	3.3E-08	3.3E-08	2.13E-01	1.0E+00
Acenaphthylene	8.7E-09	8.7E-09	1.4E-10	1.4E-10	6.42E+03	1.0E-02
Anthracene	5.3E-11	5.0E-11	3.5E-08	3.3E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	3.9E-10	3.5E-10	4.1E-07	3.7E-07	9.48E-02	1.0E-02
Benzo(a)pyrene	2.3E-10	2.1E-10	3.8E-07	3.5E-07	6.05E-02	1.0E-02
Benzo(b)fluoranthene	3.0E-09	2.7E-09	2.6E-07	2.4E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	7.8E-10	5.8E-10	1.3E-06	9.6E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	4.8E-04	4.7E-04	1.9E-08	1.9E-08	2.44E+06	1.0E-02
Chrysene	3.1E-09	2.7E-09	3.2E-06	2.8E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	3.8E-09	3.4E-09	9.5E-06	8.3E-06	4.05E-02	1.0E-02
Fluoranthene	9.4E-11	8.9E-11	6.3E-08	5.9E-08	1.50E-01	1.0E-02
Fluorene	1.0E-11	1.0E-11	5.5E-09	5.4E-09	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	3.3E-09	3.0E-09	6.2E-06	5.6E-06	5.29E-02	1.0E-02
2-Methylnaphthalene	7.1E-09	7.1E-09	3.6E-13	3.6E-13	2.00E+04	1.0E+00
Naphthalene	2.6E-09	2.6E-09	9.6E-09	9.5E-09	2.69E-01	1.0E+00
Phenanthrene	7.0E-11	6.8E-11	3.8E-08	3.7E-08	1.83E-01	1.0E-02
Pyrene	4.1E-10	3.1E-10	2.8E-07	2.2E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	4.0E-04	4.0E-04	1.3E-06	1.3E-06	3.05E+02	1.0E+00

Appendix G-4c
Calculation of Chemical Intakes
MEI A Scenario: Adult

Parameter

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs
Ifish = Cfish * CRfish * Ffish

Where:	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00114
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.00842
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.00053
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.00061
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.00062
Feggs = Fraction of Eggs that is Contaminated:	1
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non-Cancer	Cancer
Inorganics																		
Antimony	4.8E-14	4.8E-14	1.6E-17	1.6E-17	3.7E-15	3.7E-15	1.5E-18	1.1E-18	1.7E-18	1.3E-18	1.4E-20	1.1E-20	2.0E-22	1.5E-22	1.1E-22	8.5E-23	4.4E-14	4.4E-14
Arsenic	1.0E-08	1.0E-08	2.7E-15	2.7E-15	7.0E-09	7.0E-09	2.4E-09	2.4E-09	8.1E-10	8.1E-10	2.9E-12	2.9E-12	4.6E-19	3.5E-19	2.7E-19	2.0E-19	1.9E-10	1.9E-10
Beryllium	2.1E-09	2.1E-09	5.9E-13	5.9E-13	1.9E-09	1.9E-09	2.0E-10	2.0E-10	2.0E-12	2.0E-12	3.0E-14	3.0E-14	5.3E-18	4.0E-18	3.1E-18	2.3E-18	1.6E-11	1.6E-11
Cadmium	1.9E-08	1.9E-08	2.3E-13	2.3E-13	1.7E-08	1.7E-08	2.0E-10	2.0E-10	1.2E-10	1.2E-10	6.5E-12	6.5E-12	2.8E-13	2.1E-13	6.8E-15	5.1E-15	2.0E-09	2.0E-09
Chromium +3	4.6E-08	4.6E-08	1.8E-10	1.8E-10	1.2E-08	1.2E-08	7.5E-09	7.5E-09	2.3E-08	2.3E-08	3.2E-12	3.1E-12	2.2E-14	1.7E-14	1.3E-14	9.7E-15	3.4E-09	3.3E-09
Chromium +6	2.3E-08	2.3E-08	1.1E-10	1.0E-10	7.2E-09	7.1E-09	3.8E-09	3.8E-09	1.2E-08	1.2E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E-10	3.3E-10
Cobalt	1.9E-08	1.9E-08	1.2E-10	1.2E-10	3.4E-09	3.4E-09	7.2E-09	7.2E-09	8.0E-09	7.9E-09	2.5E-10	2.3E-10	3.6E-12	2.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Copper	1.5E-07	1.2E-07	1.5E-08	7.6E-09	2.1E-08	2.1E-08	4.3E-08	3.5E-08	6.5E-08	5.4E-08	6.8E-09	4.5E-09	2.6E-10	1.6E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Lead	2.5E-07	2.5E-07	3.9E-11	3.9E-11	1.9E-07	1.9E-07	5.7E-09	5.7E-09	5.3E-08	5.3E-08	4.3E-11	4.3E-11	8.5E-15	6.4E-15	4.9E-15	3.7E-15	2.3E-12	2.3E-12
Manganese	4.3E-08	4.2E-08	1.5E-09	1.4E-09	2.9E-08	2.9E-08	1.2E-09	1.1E-09	1.1E-08	1.1E-08	5.4E-11	4.5E-11	9.3E-13	6.7E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury as HgCl2	6.6E-09	5.1E-09	4.9E-10	2.5E-10	1.1E-09	8.5E-10	1.1E-09	8.3E-10	3.7E-09	3.1E-09	1.6E-12	1.0E-12	7.2E-11	4.5E-11	7.4E-11	4.6E-11	0.0E+00	0.0E+00
Mercury as Methyl Hg	1.1E-06	1.0E-06	9.4E-12	4.8E-12	1.6E-10	1.6E-10	2.0E-12	1.2E-12	5.2E-12	3.3E-12	4.4E-15	2.7E-15	2.1E-13	1.3E-13	2.1E-13	1.3E-13	1.1E-06	1.0E-06
Nickel	7.0E-08	7.0E-08	3.8E-13	3.8E-13	2.5E-08	2.5E-08	1.6E-08	1.6E-08	2.9E-08	2.9E-08	3.9E-13	3.9E-13	4.7E-18	3.5E-18	2.7E-18	2.0E-18	2.7E-10	2.7E-10
Selenium	1.4E-07	1.4E-07	5.5E-14	5.5E-14	1.0E-08	1.0E-08	4.1E-09	4.1E-09	1.2E-07	1.2E-07	6.8E-09	6.8E-09	1.3E-13	9.6E-14	1.3E-13	9.7E-14	3.3E-10	3.3E-10
Zinc	4.0E-07	4.0E-07	4.4E-12	4.4E-12	3.1E-07	3.1E-07	2.6E-09	2.6E-09	1.0E-08	1.0E-08	7.3E-11	7.3E-11	3.6E-13	2.7E-13	3.7E-13	2.8E-13	8.5E-08	8.5E-08
Dioxins/Furans																		
2,3,7,8-TCDD-TEQ	2.6E-12	2.5E-12	1.5E-14	8.6E-15	3.1E-14	2.8E-14	6.5E-13	6.4E-13	1.5E-12	1.5E-12	3.6E-14	3.2E-14	5.7E-16	3.7E-16	3.3E-16	2.2E-16	3.9E-13	3.5E-13
PCBs																		
Total PCBs	3.8E-09	3.8E-09	2.9E-13	2.9E-13	2.4E-11	2.4E-11	5.7E-10	5.7E-10	2.0E-09	2.0E-09	1.9E-11	1.9E-11	1.1E-14	8.0E-15	4.4E-12	3.3E-12	1.2E-09	1.2E-09
PAHs																		
Acenaphthene	4.4E-11	4.4E-11	4.7E-13	4.6E-13	1.1E-11	1.1E-11	1.7E-12	1.6E-12	3.9E-12	3.8E-12	1.3E-13	1.1E-13	2.6E-15	2.0E-15	1.5E-15	1.1E-15	2.6E-11	2.6E-11
Acenaphthylene	1.1E-11	1.1E-11	2.0E-17	2.0E-17	1.2E-12	1.2E-12	2.4E-13	2.3E-13	9.6E-13	8.3E-13	2.1E-13	1.6E-13	8.8E-15	6.6E-15	5.1E-15	3.8E-15	8.3E-12	8.3E-12
Anthracene	5.7E-11	5.6E-11	5.0E-13	4.7E-13	3.2E-12	3.0E-12	4.9E-12	4.9E-12	1.1E-11	1.1E-11	2.7E-13	2.4E-13	5.1E-15	3.8E-15	2.9E-15	2.2E-15	3.6E-11	3.6E-11
Benzo(a)anthracene	1.2E-08	1.2E-08	5.9E-12	5.3E-12	5.0E-11	4.9E-11	9.4E-10	9.3E-10	2.2E-09	2.2E-09	3.9E-11	3.7E-11	4.8E-13	3.6E-13	2.8E-13	2.1E-13	9.0E-09	8.9E-09
Benzo(a)pyrene	2.2E-08	2.2E-08	5.4E-12	5.0E-12	8.6E-11	8.6E-11	2.4E-09	2.4E-09	5.5E-09	5.5E-09	9.3E-11	9.0E-11	5.4E-13	4.1E-13	3.1E-13	2.4E-13	1.4E-08	1.4E-08
Benzo(b)fluoranthene	1.2E-08	1.2E-08	3.7E-12	3.4E-12	1.2E-11	1.2E-11	2.3E-10	2.3E-10	5.3E-10	5.3E-10	9.2E-12	8.8E-12	6.3E-14	4.7E-14	3.7E-14	2.7E-14	1.1E-08	1.1E-08
Benzo(k)fluoranthene	3.2E-08	3.1E-08	1.8E-11	1.4E-11	1.6E-10	1.6E-10	4.5E-09	4.4E-09	1.0E-08	1.0E-08	2.2E-10	2.0E-10	2.6E-12	1.8E-12	1.5E-12	1.1E-12	1.7E-08	1.6E-08
Benzo(ghi)perylene	1.3E-06	1.1E-06	2.2E-14	2.2E-14	6.8E-08	6.8E-08	1.3E-07	1.2E-07	7.7E-07	6.2E-07	2.4E-07	1.8E-07	1.0E-08	7.6E-09	5.9E-09	4.4E-09	1.1E-07	1.1E-07
Chrysene	3.5E-08	3.5E-08	4.6E-11	4.0E-11	3.3E-10	3.2E-10	3.8E-09	3.8E-09	8.7E-09	8.6E-09	1.9E-10	1.6E-10	4.1E-12	3.0E-12	2.4E-12	1.8E-12	2.2E-08	2.2E-08
Dibenzo(a,h)anthracene	2.9E-07	2.9E-07	1.4E-10	1.2E-10	1.5E-09	1.5E-09	1.5E-09	1.5E-09	3.5E-09	3.4E-09	7.9E-11	6.7E-11	1.8E-12	1.4E-12	1.1E-12	7.9E-13	2.8E-07	2.8E-07
Fluoranthene	5.9E-10	5.8E-10	8.9E-13	8.4E-13	4.0E-12	3.8E-12	5.3E-11	5.3E-11	1.3E-10	1.2E-10	2.2E-12	2.2E-12	1.4E-14	1.1E-14	8.4E-15	6.3E-15	4.0E-10	4.0E-10
Fluorene	2.7E-11	2.7E-11	7.8E-14	7.7E-14	7.2E-13	7.2E-13	1.4E-12	1.4E-12	3.3E-12	3.3E-12	7.0E-14	6.6E-14	6.3E-16	4.7E-16	3.6E-16	2.7E-16	2.2E-11	2.2E-11
Indeno(1,2,3-cd)pyrene	1.9E-07	1.9E-07	8.9E-11	8.0E-11	1.3E-09	1.3E-09	1.1E-09	1.1E-09	2.6E-09	2.6E-09	5.2E-11	4.5E-11	1.1E-12	8.0E-13	6.2E-13	4.7E-13	1.8E-07	1.8E-07
2-Methylnaphthalene	1.8E-12	1.8E-12	5.1E-20	5.1E-20	1.0E-12	1.0E-12	7.6E-15	7.5E-15	1.9E-14	1.8E-14	8.2E-16	6.8E-16	2.2E-17	1.7E-17	1.3E-17	9.7E-18	7.6E-13	7.6E-13
Naphthalene	7.3E-12	7.2E-12	6.9E-14	6.9E-14	4.5E-12	4.5E-12	5.0E-14	4.7E-14	1.2E-13	1.1E-13	4.6E-15	3.9E-15	1.1E-16	8.2E-17	6.4E-17	4.8E-17	2.5E-12	2.5E-12
Phenanthrene	1.7E-10	1.7E-10	5.4E-13	5.3E-13	3.6E-12	3.5E-12	1.4E-11	1.4E-11	3.2E-11	3.2E-11	6.3E-13	6.0E-13	5.4E-15	4.0E-15	3.1E-15	2.3E-15	1.2E-10	1.2E-10
Pyrene	5.4E-10	5.2E-10	3.9E-12	3.0E-12	1.5E-11	1.2E-11	5.2E-11	5.1E-11	1.2E-10	1.2E-10	3.0E-12	2.7E-12	5.0E-14	3.6E-14	2.9E-14	2.1E-14	3.5E-10	3.4E-10
Aldehyde Ketones																		
Formaldehyde	2.1E-07	2.1E-07	2.7E-12	2.7E-12	6.6E-08	6.6E-08	1.8E-12	1.4E-12	4.8E-12	3.6E-12	4.1E-13	3.1E-13	1.2E-14	9.2E-15	7.1E-15	5.3E-15	1.4E-07	1.4E-07

Where:
Incidental soil ingestion and produce grown at the location of maximum dry particle depositon
Meat and dairy products from Farm 6
Fish locally caught from the Potomac River

Appendix G-4c
Calculation of Chemical Intakes
MEI A Scenario: Child

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs
Ifish = Cfish * CRfish * Ffish

Where:	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00051
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.01857
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.000398
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.000425
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.000438
Feggs = Fraction of Eggs that is Contaminated:	1
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	0.00088
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non-Cancer	Cancer
Inorganics																		
Antimony	3.6E-14	######	1.5E-16	1.5E-16	5.1E-15	5.1E-15	6.7E-19	5.0E-19	3.8E-18	3.8E-18	1.1E-20	8.0E-21	1.4E-22	1.0E-22	8.0E-23	6.0E-23	3.1E-14	3.1E-14
Arsenic	1.3E-08	######	2.5E-14	2.5E-14	9.8E-09	9.8E-09	1.1E-09	1.1E-09	1.8E-09	1.8E-09	2.1E-12	2.1E-12	3.2E-19	2.4E-19	1.9E-19	1.4E-19	1.3E-10	1.3E-10
Beryllium	2.8E-09	######	5.5E-12	5.5E-12	2.7E-09	2.7E-09	8.8E-11	8.8E-11	4.4E-12	4.4E-12	2.2E-14	2.2E-14	3.7E-18	2.8E-18	2.2E-18	1.6E-18	1.2E-11	1.2E-11
Cadmium	2.5E-08	######	2.2E-12	2.2E-12	2.3E-08	2.3E-08	9.0E-11	9.0E-11	2.7E-10	2.7E-10	4.9E-12	4.9E-12	2.0E-13	1.5E-13	4.8E-15	3.6E-15	1.4E-09	1.4E-09
Chromium +3	7.5E-08	######	1.7E-09	1.6E-09	1.7E-08	1.7E-08	3.4E-09	3.4E-09	5.0E-08	5.0E-08	2.4E-12	2.3E-12	1.5E-14	1.2E-14	9.1E-15	6.8E-15	2.4E-09	2.3E-09
Chromium +6	3.9E-08	######	9.9E-10	9.7E-10	1.0E-08	1.0E-08	1.7E-09	1.7E-09	2.6E-08	2.6E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.4E-10	2.3E-10
Cobalt	2.7E-08	######	1.2E-09	1.1E-09	4.8E-09	4.8E-09	3.2E-09	3.2E-09	1.8E-08	1.8E-08	1.9E-10	1.7E-10	2.5E-12	1.9E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Copper	3.4E-07	######	1.4E-07	7.0E-08	2.9E-08	2.9E-08	1.9E-08	1.6E-08	1.4E-07	1.4E-07	5.1E-09	3.4E-09	1.8E-10	1.1E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Lead	3.8E-07	######	3.6E-10	3.6E-10	2.6E-07	2.6E-07	2.5E-09	2.5E-09	1.2E-07	1.2E-07	3.3E-11	3.3E-11	5.9E-15	4.4E-15	3.5E-15	2.6E-15	1.6E-12	1.6E-12
Manganese	8.0E-08	######	1.4E-08	1.3E-08	4.1E-08	4.1E-08	5.2E-10	4.9E-10	2.5E-08	2.5E-08	4.1E-11	3.4E-11	6.4E-13	4.7E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury (Total) as HgCl2	1.5E-08	######	4.6E-09	2.3E-09	1.6E-09	1.2E-09	4.8E-10	3.7E-10	8.2E-09	8.2E-09	1.2E-12	7.7E-13	5.0E-11	3.2E-11	5.2E-11	3.3E-11	0.0E+00	0.0E+00
Mercury (Total) as Methyl Hg	7.6E-07	######	8.8E-11	4.5E-11	2.2E-10	2.2E-10	8.8E-13	5.6E-13	1.1E-11	1.1E-11	3.3E-15	2.1E-15	1.5E-13	9.2E-14	1.5E-13	9.5E-14	7.6E-07	7.2E-07
Nickel	1.1E-07	######	3.6E-12	3.6E-12	3.5E-08	3.5E-08	7.0E-09	7.0E-09	6.4E-08	6.4E-08	2.9E-13	2.9E-13	3.2E-18	2.4E-18	1.9E-18	1.4E-18	1.9E-10	1.9E-10
Selenium	2.8E-07	######	5.1E-13	5.1E-13	1.5E-08	1.5E-08	1.8E-09	1.8E-09	2.6E-07	2.6E-07	5.1E-09	5.1E-09	8.9E-14	6.7E-14	9.2E-14	6.9E-14	2.3E-10	2.3E-10
Zinc	5.1E-07	######	4.1E-11	4.1E-11	4.3E-07	4.3E-07	1.1E-09	1.1E-09	2.3E-08	2.3E-08	5.5E-11	5.5E-11	2.5E-13	1.9E-13	2.6E-13	1.9E-13	6.0E-08	6.0E-08
Dioxins/Furans																		
2,3,7,8-TCDD-TEQ	4.1E-12	######	1.4E-13	8.0E-14	4.3E-14	3.9E-14	2.9E-13	2.8E-13	3.3E-12	3.3E-12	2.7E-14	2.4E-14	4.0E-16	2.6E-16	2.4E-16	1.5E-16	2.7E-13	2.4E-13
PCBs																		
Total PCBs	5.6E-09	######	2.7E-12	2.7E-12	3.3E-11	3.3E-11	2.5E-10	2.5E-10	4.4E-09	4.4E-09	1.5E-11	1.4E-11	7.5E-15	5.6E-15	3.1E-12	2.3E-12	8.5E-10	8.5E-10
PAHs																		
Acenaphthene	4.8E-11	######	4.4E-12	4.3E-12	1.6E-11	1.6E-11	7.6E-13	7.4E-13	8.5E-12	8.5E-12	9.4E-14	8.2E-14	1.8E-15	1.4E-15	1.1E-15	8.0E-16	1.9E-11	1.9E-11
Acenaphthylene	1.0E-11	######	1.9E-16	1.9E-16	1.9E-12	1.9E-12	1.1E-13	1.0E-13	2.1E-12	2.1E-12	1.6E-13	1.2E-13	6.1E-15	4.6E-15	3.6E-15	2.7E-15	5.8E-12	5.8E-12
Anthracene	6.2E-11	######	4.6E-12	4.3E-12	4.4E-12	4.2E-12	2.2E-12	2.2E-12	2.5E-11	2.5E-11	2.0E-13	1.8E-13	3.5E-15	2.6E-15	2.1E-15	1.6E-15	2.6E-11	2.6E-11
Benzo(a)anthracene	1.2E-08	######	5.5E-11	5.0E-11	6.9E-11	6.8E-11	4.2E-10	4.2E-10	4.8E-09	4.8E-09	3.0E-11	2.7E-11	3.4E-13	2.5E-13	2.0E-13	1.5E-13	6.3E-09	6.3E-09
Benzo(a)pyrene	2.3E-08	######	5.0E-11	4.7E-11	1.2E-10	1.2E-10	1.1E-09	1.1E-09	1.2E-08	1.2E-08	7.0E-11	6.7E-11	3.8E-13	2.8E-13	2.2E-13	1.7E-13	9.8E-09	9.7E-09
Benzo(b)fluoranthene	9.0E-09	######	3.4E-11	3.1E-11	1.7E-11	1.7E-11	1.0E-10	1.0E-10	1.2E-09	1.2E-09	6.9E-12	6.6E-12	4.4E-14	3.3E-14	2.6E-14	1.9E-14	7.6E-09	7.6E-09
Benzo(k)fluoranthene	3.7E-08	######	1.7E-10	1.3E-10	2.3E-10	2.2E-10	2.0E-09	2.0E-09	2.3E-08	2.3E-08	1.6E-10	1.5E-10	1.8E-12	1.3E-12	1.1E-12	7.5E-13	1.2E-08	1.1E-08
Benzo(ghi)perylene	2.1E-06	######	2.0E-13	2.0E-13	1.1E-07	1.1E-07	6.0E-08	5.4E-08	1.7E-06	1.7E-06	1.8E-07	1.4E-07	7.0E-09	5.3E-09	4.1E-09	3.1E-09	7.5E-08	7.5E-08
Chrysene	3.7E-08	######	4.3E-10	3.7E-10	4.5E-10	4.4E-10	1.7E-09	1.7E-09	1.9E-08	1.9E-08	1.4E-10	1.2E-10	2.8E-12	2.1E-12	1.7E-12	1.2E-12	1.5E-08	1.5E-08
Dibenzo(a,h)anthracene	2.1E-07	######	1.3E-09	1.1E-09	2.1E-09	2.1E-09	6.8E-10	6.7E-10	7.6E-09	7.6E-09	5.9E-11	5.1E-11	1.3E-12	9.5E-13	7.5E-13	5.6E-13	2.0E-07	2.0E-07
Fluoranthene	6.0E-10	######	8.3E-12	7.8E-12	5.5E-12	5.2E-12	2.4E-11	2.4E-11	2.8E-10	2.8E-10	1.7E-12	1.6E-12	1.0E-14	7.5E-15	5.9E-15	4.4E-15	2.8E-10	2.8E-10
Fluorene	2.5E-11	######	7.3E-13	7.2E-13	9.9E-13	9.8E-13	6.4E-13	6.3E-13	7.4E-12	7.4E-12	5.3E-14	5.0E-14	4.4E-16	3.3E-16	2.6E-16	1.9E-16	1.5E-11	1.5E-11
Indeno(1,2,3-cd)pyrene	1.4E-07	######	8.3E-10	7.5E-10	1.8E-09	1.8E-09	5.1E-10	5.0E-10	5.7E-09	5.7E-09	3.9E-11	3.4E-11	7.5E-13	5.6E-13	4.4E-13	3.3E-13	1.3E-07	1.3E-07
2-Methylnaphthalene	2.2E-12	######	4.7E-19	4.7E-19	1.6E-12	1.6E-12	3.4E-15	3.4E-15	4.2E-14	4.2E-14	6.1E-16	5.1E-16	1.6E-17	1.2E-17	9.1E-18	6.8E-18	5.3E-13	5.3E-13
Naphthalene	9.0E-12	######	6.5E-13	6.4E-13	6.3E-12	6.3E-12	2.2E-14	2.1E-14	2.6E-13	2.6E-13	3.5E-15	2.9E-15	7.6E-17	5.7E-17	4.5E-17	3.4E-17	1.7E-12	1.7E-12
Phenanthrene	1.7E-10	######	5.0E-12	4.9E-12	4.9E-12	4.8E-12	6.2E-12	6.2E-12	7.2E-11	7.2E-11	4.8E-13	4.5E-13	3.7E-15	2.8E-15	2.2E-15	1.6E-15	8.6E-11	8.6E-11
Pyrene	5.9E-10	######	3.7E-11	2.8E-11	2.1E-11	1.6E-11	2.3E-11	2.3E-11	2.6E-10	2.6E-10	2.3E-12	2.0E-12	3.5E-14	2.5E-14	2.1E-14	1.5E-14	2.4E-10	2.4E-10
Aldehyde Ketones																		
Formaldehyde	2.0E-07	######	2.6E-11	2.6E-11	1.0E-07	1.0E-07	8.1E-13	6.1E-13	1.1E-11	1.1E-11	3.1E-13	2.3E-13	8.5E-15	6.4E-15	5.0E-15	3.8E-15	9.8E-08	9.8E-08

Where:
Incidental soil ingestion and produce grown at the location of maximum dry particle depositon
Meat and dairy products from Farm 6
Fish locally caught from the Potomac River

Appendix G-4d
Summary of Cancer Risks and Hazard Indices (a)
MEI A Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	1.1E-10	NA	8.7E-11	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	3.3E-05	6E-09	4.1E-05	2E-09	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	1.0E-06	NA	1.3E-06	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	1.8E-05	NA	2.4E-05	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	2.9E-08	NA	4.8E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	7.4E-06	5E-09	1.2E-05	2E-09	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	6.1E-05	NA	8.6E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	3.6E-06	NA	8.1E-06	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	30	Manganese	1.4E-01	NA	2.9E-07	NA	5.5E-07	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	2.1E-05	NA	4.8E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	1.0E-02	NA	7.3E-03	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	3.4E-06	NA	5.1E-06	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	2.7E-05	NA	5.4E-05	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	1.3E-06	NA	1.6E-06	NA	Anemia
adult:	30								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	3.6E-03	1E-07	5.6E-03	4E-08	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	1.8E-04	3E-09	2.7E-04	9E-10	Developmental
		PAHs							
		Acenaphthene	6.0E-02	NA	7.0E-10	NA	7.7E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	1.8E-10	NA	2.0E-10	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	4E-09	NA	7E-10	
		Benzo(a)pyrene	NA	7.3E+00	NA	7E-08	NA	1E-08	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	3E-09	NA	5E-10	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	9E-10	NA	2E-10	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	1E-10	NA	2E-11	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	9E-07	NA	1E-07	
		Fluoranthene	4.0E-02	NA	1.4E-08	NA	1.4E-08	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	6.6E-10	NA	6.0E-10	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6E-08	NA	8E-09	
		2-Methylnaphthalene	4.0E-03	NA	4.3E-10	NA	5.2E-10	NA	Lung
		Naphthalene	2.0E-02	NA	3.5E-10	NA	4.3E-10	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	1.7E-08	NA	1.9E-08	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	9.9E-07	NA	9.6E-07	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion and produce consumption, meat and dairy products from Farm 6, and locally caught fish from the Potomac River
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.4E-02	1E-06	1.4E-02	2E-07

Appendix G-4e
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
MEI A Scenario - Adult and Child

Parameter		Contaminant	Ca ug/m^3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
CRi = Ca *ED * EF * URF / AT * UC2		**Inorganics**									
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2											
		Antimony	4.38E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
And:		Arsenic	3.12E-06	6.0E-03	1.5E-05	4.3E-03	2.0E-04	6E-09	2.0E-04	1E-09	Cardiovascular, CNS, Developmental
Ca = Q * Fv * Cyv + (1- Fv) * Cyp		Beryllium	4.89E-07	9.0E-03	2.0E-05	2.4E-03	2.3E-05	5E-10	2.3E-05	1E-10	Sensitization
		Cadmium	4.16E-06	9.0E-03	1.0E-05	1.8E-03	4.0E-04	3E-09	4.0E-04	6E-10	
For Hg:		Chromium +3	2.95E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb		Chromium +6	1.75E-06	0.0E+00	1.0E-04	8.4E-02	1.7E-05	6E-08	1.7E-05	1E-08	Increased LDH in bronchoalveolar lavage fluid
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb		Cobalt	8.65E-07	0.0E+00	6.0E-06	9.0E-03	1.4E-04	3E-09	1.4E-04	6E-10	
		Copper	5.32E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Where:		Lead	4.67E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
CS* = Values specific to Contaminant:		Manganese	7.38E-06	0.0E+00	5.0E-05	NA	1.4E-04	NA	1.4E-04	NA	CNS
Values specific to Site:	RS*	Mercury (Total) as HgCl2	2.25E-05	8.5E-01	3.0E-04	NA	7.2E-05	NA	7.2E-05	NA	PNS, Autonomic Dysfunction
CRi = Cancer Risk inhalation (--):	CS*	Mercury (Total) as Elemental Hg	9.40E-08	1.0E+00	3.0E-04	NA	3.0E-07	NA	3.0E-07	NA	PNS, Autonomic Dysfunction
HQi = Inhalation Hazard Index (--):	CS*	Nickel	6.41E-06	9.0E-03	9.0E-05	2.4E-04	6.8E-05	6E-10	6.8E-05	1E-10	
Ca = Air Concentration (ug/m3)	CS*	Selenium	4.64E-06	0.0E+00	2.0E-02	NA	2.2E-07	NA	2.2E-07	NA	
URF = Unit Risk Factor ((ug/m3)-1):	CS*	Zinc	7.62E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
RfC = Reference Concentration (mg/m3):	CS*										
Q = COPC specific emission rate (g/s):	CS*	**Dioxins/Furans**									
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*										
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*	2,3,7,8-TCDD-TEQ	1.58E-10	6.6E-01	4.0E-08	3.8E+01	3.8E-06	2E-09	3.8E-06	5E-10	
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*										
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*	**PCBs**									
ED = Exposure Duration (see below) (yr):											
adult:	30	Total PCBs	1.11E-05	9.9E-01	NA	5.7E-04	NA	3E-09	NA	5E-10	
child:	6										
EF = Exposure Frequency (day/yr):	350	**PAHs**									
UC1 = Units Conversion (mg/ug):	0.001										
AT = Averaging Time (yr):	See Below	Acenaphthene	4.44E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Cancer:	70	Acenaphthylene	6.02E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Noncancer:	See Below	Anthracene	4.51E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
adult:	30	Benzo(a)anthracene	3.27E-07	4.8E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
child:	6	Benzo(a)pyrene	3.67E-07	2.9E-01	NA	1.1E-03	NA	2E-10	NA	3E-11	
UC2 = Units Conversion (day/yr):	365	Benzo(b)fluoranthene	9.00E-07	9.7E-01	NA	1.1E-04	NA	4E-11	NA	8E-12	
		Benzo(k)fluoranthene	5.58E-07	2.7E-01	NA	1.1E-04	NA	3E-11	NA	5E-12	
		Benzo(ghi)perylene	3.99E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Chrysene	4.84E-06	7.4E-01	NA	1.1E-05	NA	2E-11	NA	4E-12	
		Dibenzo(a,h)anthracene	3.75E-07	5.5E-02	NA	1.2E-03	NA	2E-10	NA	4E-11	
		Fluoranthene	3.95E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Fluorene	6.33E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Indeno(1,2,3-cd)pyrene	3.19E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	3E-12	
		2-Methylnaphthalene	8.63E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Naphthalene	2.66E-06	1.0E+00	3.0E-03	3.4E-05	8.5E-07	4E-11	8.5E-07	7E-12	Nasal effects
		Phenanthrene	6.75E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Pyrene	3.64E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Aldehyde Ketones									
		Formaldehyde	4.91E-05	1.0E+00	9.8E-03	1.3E-05	4.8E-06	3E-10	4.8E-06	5E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	1.1E-03	8E-08	1.1E-03	2E-08

Appendix G-4f
Ingestion of Mother's Milk
MEI A Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.8E-14	2.5E-12	2.7E-12	2.98E+01	8.58E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-4d						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-4f
Ingestion of Mother's Milk
MEI A Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m And: ADD (TCDD) = (Sum of ADDi) Where:		**Dioxins/Furans** 2,3,7,8-TCDD TEQ	8.58E-02	6.0E+01	1.4E-03
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-5a
Contaminant Concentration in Soil
MEI B Scenario - Adult and Child

Parameters

Carcinogens ($T2 \leq tD$)

$$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$$

NonCarcinogens

$$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$$

Where:

$$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$$

For Mercury:
$$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-5a
Contaminant Concentration in Soil
MEI B Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm) Non - Cancer	Cs Tilled (20 cm) Cancer	Cs Untilled (2 cm) Non - Cancer	Cs Untilled (2 cm) Cancer	Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
Inorganics									
Antimony	1.1E-10	1.1E-10	1.15E-11	1.2E-11	2.7E-09	2.7E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.2E-07	1.2E-07	1.16E-08	1.2E-08	1.3E-04	1.3E-03	6.0E-03	1.12E+03	1.12E+05
Beryllium	2.5E-05	2.4E-05	2.55E-06	2.5E-06	2.0E-05	2.0E-04	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.0E-05	9.9E-06	9.97E-07	1.0E-06	1.7E-04	1.7E-03	9.0E-03	1.75E+01	1.75E+03
Chromium +3	7.7E-04	6.1E-04	7.72E-04	7.6E-04	1.2E-04	1.2E-03	9.0E-03	1.60E-01	1.60E+00
Chromium +6	4.5E-04	3.6E-04	4.58E-04	4.5E-04	7.3E-05	7.3E-04	0.0E+00	1.60E-01	1.60E+00
Cobalt	4.6E-04	3.1E-04	5.34E-04	5.1E-04	3.6E-05	3.6E-04	0.0E+00	6.78E-02	6.78E-01
Copper	6.7E-03	3.3E-03	6.39E-02	3.2E-02	2.2E-04	2.2E-03	0.0E+00	3.06E-04	3.06E-03
Lead	1.7E-03	1.6E-03	1.67E-04	1.7E-04	2.0E-03	2.0E-02	7.0E-03	1.18E+00	1.17E+02
Manganese	5.0E-03	3.1E-03	6.58E-03	6.1E-03	3.1E-04	3.1E-03	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.5E-04	7.6E-05	1.10E-05	5.5E-06	5.0E-06	3.7E-07	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	3.1E-06	1.5E-06	2.12E-07	1.1E-07	1.0E-07	7.6E-09	8.5E-01	4.39E-04	4.57E-03
Nickel	1.6E-05	1.6E-05	1.65E-06	1.7E-06	2.7E-04	2.7E-03	9.0E-03	1.63E+01	1.63E+03
Selenium	2.4E-06	2.4E-06	2.37E-07	2.4E-07	1.9E-04	1.9E-03	0.0E+00	8.26E+01	8.21E+03
Zinc	1.9E-04	1.9E-04	1.87E-05	1.9E-05	3.2E-03	3.2E-02	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.4E-09	1.4E-09	2.20E-08	1.3E-08	1.2E-10	1.2E-09	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	4.5E-08	4.5E-08	3.41E-07	3.4E-07	2.3E-07	2.3E-06	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	4.2E-08	4.1E-08	4.11E-07	4.1E-07	1.0E-07	1.0E-06	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.4E-10	1.4E-10	1.43E-11	1.4E-11	4.0E-08	4.0E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	4.7E-08	4.4E-08	4.65E-07	4.4E-07	2.6E-08	2.6E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.2E-06	1.1E-06	1.17E-05	1.1E-05	4.3E-07	4.3E-06	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.5E-06	1.4E-06	1.47E-05	1.4E-05	7.1E-07	7.1E-06	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	3.5E-07	3.2E-07	3.46E-06	3.2E-06	1.4E-07	1.4E-06	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	5.2E-06	3.9E-06	5.17E-05	3.9E-05	6.4E-07	6.4E-06	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	7.9E-08	7.8E-08	6.08E-08	6.1E-08	1.7E-06	1.7E-05	1.0E+00	2.22E+01	2.87E+02
Chrysene	9.1E-06	7.9E-06	9.07E-05	7.9E-05	2.3E-06	2.3E-05	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	5.8E-05	5.1E-05	5.82E-04	5.1E-04	1.6E-05	1.6E-04	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	7.7E-08	7.3E-08	7.67E-07	7.2E-07	4.4E-08	4.4E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	8.2E-09	8.2E-09	8.21E-08	8.1E-08	3.5E-08	3.5E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	3.8E-05	3.5E-05	3.82E-04	3.5E-04	1.3E-05	1.3E-04	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.6E-13	3.6E-13	3.56E-14	3.6E-14	8.6E-09	8.6E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	9.6E-09	9.5E-09	4.85E-08	4.8E-08	5.1E-08	5.1E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	5.0E-08	4.9E-08	4.96E-07	4.8E-07	6.3E-08	6.3E-07	1.0E+00	1.26E+00	1.27E+00
Pyrene	3.2E-07	2.4E-07	3.09E-06	2.4E-06	4.2E-08	4.2E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	8.3E-06	8.3E-06	1.20E-05	1.2E-05	4.8E-04	4.8E-03	1.0E+00	5.77E+01	4.00E+02

Appendix G-5a
Calculation of Soil Loss Constant
MEI B Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-5a
Calculation of Soil Loss Constant
MEI B Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-5b
Contaminant Concentration in Above Ground Vegetation
MEI B Scenario - Adult and Child

Parameters

$$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$$

For Mercury:

$$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$$

$Pd(Hg^{2+}) = 0.78Pd$

$Pd(MeHg) = 0.22Pd$

$$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$$

For Mercury:

$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$

$Pv(Hg^{2+}) = 0.78Pv$

$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-5b
Contaminant Concentration in Above Ground Vegetation
MEI B Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	3.7E-12	3.7E-12	3.7E-12	3.7E-12	1.1E-10	1.1E-10	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	1.8E-06	0.0E+00	7.4E-10	7.4E-10	7.4E-10	7.4E-10	1.2E-07	1.2E-07	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	3.3E-07	0.0E+00	6.5E-08	6.3E-08	6.5E-08	6.3E-08	2.5E-05	2.4E-05	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	2.8E-06	0.0E+00	1.2E-06	1.2E-06	1.2E-06	1.2E-06	1.0E-05	9.9E-06	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	2.0E-06	0.0E+00	3.7E-06	3.0E-06	3.7E-06	3.0E-06	7.7E-04	6.1E-04	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	1.2E-06	0.0E+00	2.2E-06	1.8E-06	2.2E-06	1.8E-06	4.5E-04	3.6E-04	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	5.8E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.6E-04	3.1E-04	0.00E+00	6.00E-01	ND	ND	ND
Copper	3.6E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.7E-03	3.3E-03	0.00E+00	6.00E-01	ND	ND	ND
Lead	3.1E-05	0.0E+00	2.3E-05	2.2E-05	2.3E-05	2.2E-05	1.7E-03	1.6E-03	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	5.0E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.0E-03	3.1E-03	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	1.3E-06	0.0E+00	2.1E-06	1.0E-06	2.1E-06	1.0E-06	1.5E-04	7.6E-05	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	3.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-06	1.5E-06	8.50E-01	6.00E-01	ND	ND	ND
Nickel	4.3E-06	0.0E+00	1.5E-07	1.5E-07	1.5E-07	1.5E-07	1.6E-05	1.6E-05	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	2.7E-06	0.0E+00	4.6E-08	4.6E-08	4.6E-08	4.6E-08	2.4E-06	2.4E-06	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	5.1E-05	0.0E+00	1.8E-05	1.8E-05	1.8E-05	1.8E-05	1.9E-04	1.9E-04	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	2.6E-11	4.4E-11	1.1E-11	6.2E-12	1.1E-11	6.2E-12	2.4E-09	1.4E-09	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	3.7E-08	2.1E-08	4.5E-10	4.5E-10	4.5E-10	4.5E-10	4.5E-08	4.5E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.3E-09	9.0E-09	8.9E-09	9.0E-09	8.9E-09	4.2E-08	4.1E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	1.7E-11	2.3E-11	2.3E-11	2.3E-11	2.3E-11	1.4E-10	1.4E-10	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	4.3E-10	1.0E-11	4.6E-09	4.3E-09	4.6E-09	4.3E-09	4.7E-08	4.4E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	8.3E-08	1.3E-09	2.3E-08	2.1E-08	2.3E-08	2.1E-08	1.2E-06	1.1E-06	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	1.3E-07	5.8E-09	1.9E-08	1.8E-08	1.9E-08	1.8E-08	1.5E-06	1.4E-06	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	1.5E-08	9.2E-09	3.9E-09	3.6E-09	3.9E-09	3.6E-09	3.5E-07	3.2E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	2.0E-07	2.0E-08	6.0E-08	4.5E-08	6.0E-08	4.5E-08	5.2E-06	3.9E-06	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	4.2E-07	4.5E-10	4.5E-10	4.5E-10	4.5E-10	7.9E-08	7.8E-08	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	6.0E-07	1.6E-08	1.8E-07	1.6E-07	1.8E-07	1.6E-07	9.1E-06	7.9E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	2.5E-07	0.0E+00	3.9E-07	3.5E-07	3.9E-07	3.5E-07	5.8E-05	5.1E-05	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	1.5E-09	1.8E-10	3.8E-09	3.6E-09	3.8E-09	3.6E-09	7.7E-08	7.3E-08	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	7.0E-12	1.2E-09	1.2E-09	1.2E-09	1.2E-09	8.2E-09	8.2E-09	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.1E-07	0.0E+00	2.3E-07	2.1E-07	2.3E-07	2.1E-07	3.8E-05	3.5E-05	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	7.6E-11	8.1E-14	8.1E-14	8.1E-14	8.1E-14	3.6E-13	3.6E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	6.4E-10	4.6E-09	4.6E-09	4.6E-09	4.6E-09	9.6E-09	9.5E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	3.3E-10	4.3E-11	4.8E-09	4.7E-09	4.8E-09	4.7E-09	5.0E-08	4.9E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	1.1E-09	1.9E-10	1.8E-08	1.4E-08	1.8E-08	1.4E-08	3.2E-07	2.4E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	8.4E-10	7.0E-05	7.0E-05	7.0E-05	7.0E-05	8.3E-06	8.3E-06	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-5b

Contaminant Concentration in Below Ground Vegetation

MEI B Scenario - Adult and Child

Parameters	
$Pr\ bg = Cs * Br\ rv * VG\ rv$	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-5b
Contaminant Concentration in Below Ground Vegetation
MEI B Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	3.4E-12	3.4E-12	1.1E-10	1.1E-10	3.00E-02	1.0E+00
Arsenic	9.3E-10	9.3E-10	1.2E-07	1.2E-07	8.00E-03	1.0E+00
Beryllium	3.8E-08	3.7E-08	2.5E-05	2.4E-05	1.50E-03	1.0E+00
Cadmium	6.4E-07	6.4E-07	1.0E-05	9.9E-06	6.40E-02	1.0E+00
Chromium +3	3.4E-06	2.8E-06	7.7E-04	6.1E-04	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	4.5E-04	3.6E-04	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	4.6E-04	3.1E-04	7.00E-03	ND
Copper	0.0E+00	0.0E+00	6.7E-03	3.3E-03	2.50E-01	ND
Lead	1.5E-05	1.5E-05	1.7E-03	1.6E-03	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	5.0E-03	3.1E-03	5.00E-02	ND
Mercury as HgCl2	5.4E-06	2.7E-06	1.5E-04	7.6E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	3.1E-06	1.5E-06	9.90E-02	ND
Nickel	1.3E-07	1.3E-07	1.6E-05	1.6E-05	8.00E-03	1.0E+00
Selenium	5.2E-08	5.2E-08	2.4E-06	2.4E-06	2.20E-02	1.0E+00
Zinc	1.7E-04	1.7E-04	1.9E-04	1.9E-04	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.4E-11	1.4E-11	2.4E-09	1.4E-09	1.03E+00	1.0E-02
PCBs						
Total PCBs	6.4E-09	6.4E-09	4.5E-08	4.5E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	8.9E-09	8.8E-09	4.2E-08	4.1E-08	2.13E-01	1.0E+00
Acenaphthylene	8.7E-09	8.7E-09	1.4E-10	1.4E-10	6.42E+03	1.0E-02
Anthracene	7.1E-11	6.7E-11	4.7E-08	4.4E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	1.1E-09	1.0E-09	1.2E-06	1.1E-06	9.48E-02	1.0E-02
Benzo(a)pyrene	8.9E-10	8.3E-10	1.5E-06	1.4E-06	6.05E-02	1.0E-02
Benzo(b)fluoranthene	4.0E-09	3.7E-09	3.5E-07	3.2E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.2E-09	2.4E-09	5.2E-06	3.9E-06	6.09E-02	1.0E-02
Benzo(ghi)perylene	1.9E-03	1.9E-03	7.9E-08	7.8E-08	2.44E+06	1.0E-02
Chrysene	8.6E-09	7.5E-09	9.1E-06	7.9E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.4E-08	2.1E-08	5.8E-05	5.1E-05	4.05E-02	1.0E-02
Fluoranthene	1.2E-10	1.1E-10	7.7E-08	7.3E-08	1.50E-01	1.0E-02
Fluorene	1.6E-11	1.6E-11	8.2E-09	8.2E-09	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	2.0E-08	1.8E-08	3.8E-05	3.5E-05	5.29E-02	1.0E-02
2-Methylnaphthalene	7.1E-09	7.1E-09	3.6E-13	3.6E-13	2.00E+04	1.0E+00
Naphthalene	2.6E-09	2.6E-09	9.6E-09	9.5E-09	2.69E-01	1.0E+00
Phenanthrene	9.1E-11	8.9E-11	5.0E-08	4.9E-08	1.83E-01	1.0E-02
Pyrene	4.6E-10	3.5E-10	3.2E-07	2.4E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	2.5E-03	2.5E-03	8.3E-06	8.3E-06	3.05E+02	1.0E+00

Appendix G-5c
Calculation of Chemical Intakes
MEI B Scenario: Adult

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs
Ifish = Cfish * CRfish * Ffish

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00114
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.00842
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.00053
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.00061
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.00062
Feggs = Fraction of Eggs that is Contaminated:	1
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non-Cancer	Cancer
Inorganics																		
Antimony	4.8E-14	4.8E-14	1.6E-17	1.6E-17	3.7E-15	3.7E-15	1.5E-18	1.1E-18	1.7E-18	1.3E-18	1.4E-20	1.1E-20	2.0E-22	1.5E-22	1.1E-22	8.5E-23	4.4E-14	4.4E-14
Arsenic	4.0E-09	4.0E-09	1.7E-14	1.7E-14	5.5E-10	5.5E-10	2.4E-09	2.4E-09	8.1E-10	8.1E-10	2.9E-12	2.9E-12	4.6E-19	3.5E-19	2.7E-19	2.0E-19	1.9E-10	1.9E-10
Beryllium	3.8E-10	3.8E-10	3.6E-12	3.6E-12	1.6E-10	1.6E-10	2.0E-10	2.0E-10	2.0E-12	2.0E-12	3.0E-14	3.0E-14	5.3E-18	4.0E-18	3.1E-18	2.3E-18	1.6E-11	1.6E-11
Cadmium	4.4E-09	4.4E-09	1.4E-12	1.4E-12	2.0E-09	2.0E-09	2.0E-10	2.0E-10	1.2E-10	1.2E-10	6.5E-12	6.5E-12	2.8E-13	2.1E-13	6.8E-15	5.1E-15	2.0E-09	2.0E-09
Chromium +3	3.9E-08	3.8E-08	1.1E-09	1.1E-09	4.3E-09	3.6E-09	7.5E-09	7.5E-09	2.3E-08	2.3E-08	3.2E-12	3.1E-12	2.2E-14	1.7E-14	1.3E-14	9.7E-15	3.4E-09	3.3E-09
Chromium +6	1.9E-08	1.8E-08	6.5E-10	6.4E-10	2.3E-09	1.9E-09	3.8E-09	3.8E-09	1.2E-08	1.2E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E-10	3.3E-10
Cobalt	1.6E-08	1.6E-08	7.6E-10	7.3E-10	1.7E-10	1.7E-10	7.2E-09	7.2E-09	8.0E-09	7.9E-09	2.5E-10	2.3E-10	3.6E-12	2.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Copper	2.1E-07	1.4E-07	9.1E-08	4.6E-08	1.1E-09	1.1E-09	4.3E-08	3.5E-08	6.5E-08	5.4E-08	6.8E-09	4.5E-09	2.6E-10	1.6E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Lead	9.0E-08	8.9E-08	2.4E-10	2.4E-10	3.1E-08	3.1E-08	5.7E-09	5.7E-09	5.3E-08	5.3E-08	4.3E-11	4.3E-11	8.5E-15	6.4E-15	4.9E-15	3.7E-15	2.3E-12	2.3E-12
Manganese	2.3E-08	2.2E-08	9.4E-09	8.7E-09	1.5E-09	1.5E-09	1.2E-09	1.1E-09	1.1E-08	1.1E-08	5.4E-11	4.5E-11	9.3E-13	6.7E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury as HgCl2	7.9E-09	5.7E-09	1.6E-11	7.9E-12	2.9E-09	1.7E-09	1.1E-09	8.3E-10	3.7E-09	3.1E-09	1.6E-12	1.0E-12	7.2E-11	4.5E-11	7.4E-11	4.6E-11	0.0E+00	0.0E+00
Mercury as Methyl Hg	1.1E-06	1.0E-06	3.0E-13	1.5E-13	1.1E-10	1.1E-10	2.0E-12	1.2E-12	5.2E-12	3.3E-12	4.4E-15	2.7E-15	2.1E-13	1.3E-13	2.1E-13	1.3E-13	1.1E-06	1.0E-06
Nickel	4.6E-08	4.6E-08	2.4E-12	2.4E-12	1.4E-09	1.4E-09	1.6E-08	1.6E-08	2.9E-08	2.9E-08	3.9E-13	3.9E-13	4.7E-18	3.5E-18	2.7E-18	2.0E-18	2.7E-10	2.7E-10
Selenium	1.3E-07	1.3E-07	3.4E-13	3.4E-13	8.6E-10	8.6E-10	4.1E-09	4.1E-09	1.2E-07	1.2E-07	6.8E-09	6.8E-09	1.3E-13	9.6E-14	1.3E-13	9.7E-14	3.3E-10	3.3E-10
Zinc	1.5E-07	1.5E-07	2.7E-11	2.7E-11	5.5E-08	5.5E-08	2.6E-09	2.6E-09	1.0E-08	1.0E-08	7.3E-11	7.3E-11	3.6E-13	2.7E-13	3.7E-13	2.8E-13	8.5E-08	8.5E-08
Dioxins/Furans																		
2,3,7,8-TCDD-TEQ	2.6E-12	2.5E-12	3.1E-14	1.8E-14	3.4E-14	2.8E-14	6.5E-13	6.4E-13	1.5E-12	1.5E-12	3.6E-14	3.2E-14	5.7E-16	3.7E-16	3.3E-16	2.2E-16	3.9E-13	3.5E-13
PCBs																		
Total PCBs	3.8E-09	3.8E-09	4.9E-13	4.8E-13	1.9E-11	1.9E-11	5.7E-10	5.7E-10	2.0E-09	2.0E-09	1.9E-11	1.9E-11	1.1E-14	8.0E-15	4.4E-12	3.3E-12	1.2E-09	1.2E-09
PAHs																		
Acenaphthene	4.2E-11	4.2E-11	5.9E-13	5.8E-13	9.5E-12	9.4E-12	1.7E-12	1.6E-12	3.9E-12	3.8E-12	1.3E-13	1.1E-13	2.6E-15	2.0E-15	1.5E-15	1.1E-15	2.6E-11	2.6E-11
Acenaphthylene	1.1E-11	1.1E-11	2.0E-17	2.0E-17	1.2E-12	1.2E-12	2.4E-13	2.3E-13	9.6E-13	8.3E-13	2.1E-13	1.6E-13	8.8E-15	6.6E-15	5.1E-15	3.8E-15	8.3E-12	8.3E-12
Anthracene	5.8E-11	5.7E-11	6.6E-13	6.2E-13	4.1E-12	3.9E-12	4.9E-12	4.9E-12	1.1E-11	1.1E-11	2.7E-13	2.4E-13	5.1E-15	3.8E-15	2.9E-15	2.2E-15	3.6E-11	3.6E-11
Benzo(a)anthracene	1.2E-08	1.2E-08	1.7E-11	1.5E-11	4.5E-11	4.4E-11	9.4E-10	9.3E-10	2.2E-09	2.2E-09	3.9E-11	3.7E-11	4.8E-13	3.6E-13	2.8E-13	2.1E-13	9.0E-09	8.9E-09
Benzo(a)pyrene	2.2E-08	2.2E-08	2.1E-11	2.0E-11	5.7E-11	5.6E-11	2.4E-09	2.4E-09	5.5E-09	5.5E-09	9.3E-11	9.0E-11	5.4E-13	4.1E-13	3.1E-13	2.4E-13	1.4E-08	1.4E-08
Benzo(b)fluoranthene	1.2E-08	1.2E-08	4.9E-12	4.5E-12	1.1E-11	1.1E-11	2.3E-10	2.3E-10	5.3E-10	5.3E-10	9.2E-12	8.8E-12	6.3E-14	4.7E-14	3.7E-14	2.7E-14	1.1E-08	1.1E-08
Benzo(k)fluoranthene	3.2E-08	3.1E-08	7.4E-11	5.5E-11	1.2E-10	1.0E-10	4.5E-09	4.4E-09	1.0E-08	1.0E-08	2.2E-10	2.0E-10	2.6E-12	1.8E-12	1.5E-12	1.1E-12	1.7E-08	1.6E-08
Benzo(ghi)perylene	1.5E-06	1.3E-06	8.7E-14	8.7E-14	2.7E-07	2.7E-07	1.3E-07	1.2E-07	7.7E-07	6.2E-07	2.4E-07	1.8E-07	1.0E-08	7.6E-09	5.9E-09	4.4E-09	1.1E-07	1.1E-07
Chrysene	3.5E-08	3.5E-08	1.3E-10	1.1E-10	3.4E-10	3.2E-10	3.8E-09	3.8E-09	8.7E-09	8.6E-09	1.9E-10	1.6E-10	4.1E-12	3.0E-12	2.4E-12	1.8E-12	2.2E-08	2.2E-08
Dibenzo(a,h)anthracene	2.9E-07	2.9E-07	8.3E-10	7.3E-10	4.2E-10	3.8E-10	1.5E-09	1.5E-09	3.5E-09	3.4E-09	7.9E-11	6.7E-11	1.8E-12	1.4E-12	1.1E-12	7.9E-13	2.8E-07	2.8E-07
Fluoranthene	5.9E-10	5.8E-10	1.1E-12	1.0E-12	3.9E-12	3.7E-12	5.3E-11	5.3E-11	1.3E-10	1.2E-10	2.2E-12	2.2E-12	1.4E-14	1.1E-14	8.4E-15	6.3E-15	4.0E-10	4.0E-10
Fluorene	2.8E-11	2.8E-11	1.2E-13	1.2E-13	1.0E-12	1.0E-12	1.4E-12	1.4E-12	3.3E-12	3.3E-12	7.0E-14	6.6E-14	6.3E-16	4.7E-16	3.6E-16	2.7E-16	2.2E-11	2.2E-11
Indeno(1,2,3-cd)pyrene	1.9E-07	1.9E-07	5.5E-10	4.9E-10	2.6E-10	2.5E-10	1.1E-09	1.1E-09	2.6E-09	2.6E-09	5.2E-11	4.5E-11	1.1E-12	8.0E-13	6.2E-13	4.7E-13	1.8E-07	1.8E-07
2-Methylnaphthalene	1.8E-12	1.8E-12	5.1E-20	5.1E-20	1.0E-12	1.0E-12	7.6E-15	7.5E-15	1.9E-14	1.8E-14	8.2E-16	6.8E-16	2.2E-17	1.7E-17	1.3E-17	9.7E-18	7.6E-13	7.6E-13
Naphthalene	7.3E-12	7.2E-12	6.9E-14	6.9E-14	4.5E-12	4.5E-12	5.0E-14	4.7E-14	1.2E-13	1.1E-13	4.6E-15	3.9E-15	1.1E-16	8.2E-17	6.4E-17	4.8E-17	2.5E-12	2.5E-12
Phenanthrene	1.7E-10	1.7E-10	7.1E-13	6.9E-13	4.3E-12	4.2E-12	1.4E-11	1.4E-11	3.2E-11	3.2E-11	6.3E-13	6.0E-13	5.4E-15	4.0E-15	3.1E-15	2.3E-15	1.2E-10	1.2E-10
Pyrene	5.4E-10	5.2E-10	4.4E-12	3.4E-12	1.6E-11	1.2E-11	5.2E-11	5.1E-11	1.2E-10	1.2E-10	3.0E-12	2.7E-12	5.0E-14	3.6E-14	2.9E-14	2.1E-14	3.5E-10	3.4E-10
Aldehyde Ketones																		
Formaldehyde	5.6E-07	5.6E-07	1.7E-11	1.7E-11	4.2E-07	4.2E-07	1.8E-12	1.4E-12	4.8E-12	3.6E-12	4.1E-13	3.1E-13	1.2E-14	9.2E-15	7.1E-15	5.3E-15	1.4E-07	1.4E-07

Where:
Incidental soil ingestion and produce grown at the location of maximum total particle and vapor depositon
Meat and dairy products from Farm 6
Fish locally caught from the Potomac River

Appendix G-5c
Calculation of Chemical Intakes
MEI B Scenario: Child

		Contaminant	Itot Non-Cancer	Itot Cancer	Isoil Non-Cancer	Isoil Cancer	Iag Non-Cancer	Iag Cancer	Ibeef Non - Cancer	Ibeef Cancer	Imilk Non - Cancer	Imilk Cancer	Ipork Non - Cancer	Ipork Cancer	Ichicken Non - Cancer	Ichicken Cancer	Iegg Non - Cancer	Iegg Cancer	Ifish Non-Cancer	Ifish Cancer
Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs + Ifish		**Inorganics**																		
Where:		Antimony	3.6E-14	3.6E-14	1.5E-16	1.5E-16	5.1E-15	5.1E-15	6.7E-19	5.0E-19	3.8E-18	3.8E-18	1.1E-20	8.0E-21	1.4E-22	1.0E-22	8.0E-23	6.0E-23	3.1E-14	3.1E-14
Isoil = Sc * CRsoil * Fsoil/BW		Arsenic	3.8E-09	3.8E-09	1.6E-13	1.6E-13	7.7E-10	7.7E-10	1.1E-09	1.1E-09	1.8E-09	1.8E-09	2.1E-12	2.1E-12	3.2E-19	2.4E-19	1.9E-19	1.4E-19	1.3E-10	1.3E-10
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag		Beryllium	3.6E-10	3.6E-10	3.4E-11	3.4E-11	2.2E-10	2.2E-10	8.8E-11	8.8E-11	4.4E-12	4.4E-12	2.2E-14	2.2E-14	3.7E-18	2.8E-18	2.2E-18	1.6E-18	1.2E-11	1.2E-11
Ibeef = Abeef * CRbeef * Fbeef		Cadmium	4.6E-09	4.6E-09	1.3E-11	1.3E-11	2.8E-09	2.8E-09	9.0E-11	9.0E-11	2.7E-10	2.7E-10	4.9E-12	4.9E-12	2.0E-13	1.5E-13	4.8E-15	3.6E-15	1.4E-09	1.4E-09
Imilk = Amilk * CRmilk * Fmilk		Chromium +3	7.2E-08	7.1E-08	1.0E-08	1.0E-08	6.0E-09	5.0E-09	3.4E-09	3.4E-09	5.0E-08	5.0E-08	2.4E-12	2.3E-12	1.5E-14	1.2E-14	9.1E-15	6.8E-15	2.4E-09	2.3E-09
Ipork = Apork * Crpork * Fpork		Chromium +6	3.7E-08	3.6E-08	6.1E-09	6.0E-09	3.1E-09	2.6E-09	1.7E-09	1.7E-09	2.6E-08	2.6E-08	0.0E+00	######	0.0E+00	######	0.0E+00	######	2.4E-10	2.3E-10
Ichicken = Achicken * CRchicken * Fchicken		Cobalt	2.8E-08	2.8E-08	7.1E-09	6.8E-09	2.4E-10	2.4E-10	3.2E-09	3.2E-09	1.8E-08	1.8E-08	1.9E-10	1.7E-10	2.5E-12	1.9E-12	0.0E+00	######	0.0E+00	######
Ieggs = Aeggs * CReggs * Feggs		Copper	1.0E-06	6.0E-07	8.5E-07	4.3E-07	1.5E-09	1.5E-09	1.9E-08	1.6E-08	1.4E-07	1.4E-07	5.1E-09	3.4E-09	1.8E-10	1.1E-10	0.0E+00	######	0.0E+00	######
Ifish = Cfish * CRfish * Ffish		Lead	1.6E-07	1.6E-07	2.2E-09	2.2E-09	4.3E-08	4.3E-08	2.5E-09	2.5E-09	1.2E-07	1.2E-07	3.3E-11	3.3E-11	5.9E-15	4.4E-15	3.5E-15	2.6E-15	1.6E-12	1.6E-12
		Manganese	1.2E-07	1.1E-07	8.8E-08	8.2E-08	2.1E-09	2.1E-09	5.2E-10	4.9E-10	2.5E-08	2.5E-08	4.1E-11	3.4E-11	6.4E-13	4.7E-13	0.0E+00	######	0.0E+00	######
Where:		Mercury as HgCl2	1.3E-08	1.1E-08	1.5E-10	7.4E-11	4.2E-09	2.4E-09	4.8E-10	3.7E-10	8.2E-09	8.2E-09	1.2E-12	7.7E-13	5.0E-11	3.2E-11	5.2E-11	3.3E-11	0.0E+00	######
CS* = Values Specific to Contaminant:		Mercury as Methyl Hg	7.6E-07	7.2E-07	2.8E-12	1.4E-12	1.5E-10	1.5E-10	8.8E-13	5.6E-13	1.1E-11	1.1E-11	3.3E-15	2.1E-15	1.5E-13	9.2E-14	1.5E-13	9.5E-14	7.6E-07	7.2E-07
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*	Nickel	7.3E-08	7.3E-08	2.2E-11	2.2E-11	2.0E-09	2.0E-09	7.0E-09	7.0E-09	6.4E-08	6.4E-08	2.9E-13	2.9E-13	3.2E-18	2.4E-18	1.9E-18	1.4E-18	1.9E-10	1.9E-10
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*	Selenium	2.7E-07	2.7E-07	3.2E-12	3.2E-12	1.2E-09	1.2E-09	1.8E-09	1.8E-09	2.6E-07	2.6E-07	5.1E-09	5.1E-09	8.9E-14	6.7E-14	9.2E-14	6.9E-14	2.3E-10	2.3E-10
Sc = Soil Concentration (untilled) (mg/kg):	CS*	Zinc	1.6E-07	1.6E-07	2.5E-10	2.5E-10	8.0E-08	8.0E-08	1.1E-09	1.1E-09	2.3E-08	2.3E-08	5.5E-11	5.5E-11	2.5E-13	1.9E-13	2.6E-13	1.9E-13	6.0E-08	6.0E-08
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002																			
Fsoil = Fraction of Consumed Soil that is Contaminated:	1	**Dioxins/Furans**																		
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*																			
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*	2,3,7,8-TCDD-TEQ	4.2E-12	4.1E-12	2.9E-13	1.7E-13	4.8E-14	4.0E-14	2.9E-13	2.8E-13	3.3E-12	3.3E-12	2.7E-14	2.4E-14	4.0E-16	2.6E-16	2.4E-16	1.5E-16	2.7E-13	2.4E-13
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*																			
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*	**PCBs**																		
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*																			
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*	Total PCBs	5.6E-09	5.6E-09	4.5E-12	4.5E-12	2.7E-11	2.7E-11	2.5E-10	2.5E-10	4.4E-09	4.4E-09	1.5E-11	1.4E-11	7.5E-15	5.6E-15	3.1E-12	2.3E-12	8.5E-10	8.5E-10
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042																			
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077	**PAHs**																		
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022																			
Fag = Fraction of Produce that is Contaminated:	0.25	Acenaphthene	4.7E-11	4.6E-11	5.5E-12	5.4E-12	1.3E-11	1.3E-11	7.6E-13	7.4E-13	8.5E-12	8.5E-12	9.4E-14	8.2E-14	1.8E-15	1.4E-15	1.1E-15	8.0E-16	1.9E-11	1.9E-11
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*	Acenaphthylene	1.0E-11	1.0E-11	1.9E-16	1.9E-16	1.9E-12	1.9E-12	1.1E-13	1.0E-13	2.1E-12	2.1E-12	1.6E-13	1.2E-13	6.1E-15	4.6E-15	3.6E-15	2.7E-15	5.8E-12	5.8E-12
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00051	Anthracene	6.5E-11	6.4E-11	6.2E-12	5.8E-12	5.6E-12	5.3E-12	2.2E-12	2.2E-12	2.5E-11	2.5E-11	2.0E-13	1.8E-13	3.5E-15	2.6E-15	2.1E-15	1.6E-15	2.6E-11	2.6E-11
Fbeef = Fraction of Beef that is Contaminated:	1	Benzo(a)anthracene	1.2E-08	1.2E-08	1.6E-10	1.4E-10	6.3E-11	6.0E-11	4.2E-10	4.2E-10	4.8E-09	4.8E-09	3.0E-11	2.7E-11	3.4E-13	2.5E-13	2.0E-13	1.5E-13	6.3E-09	6.3E-09
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*	Benzo(a)pyrene	2.3E-08	2.3E-08	2.0E-10	1.8E-10	7.9E-11	7.7E-11	1.1E-09	1.1E-09	1.2E-08	1.2E-08	7.0E-11	6.7E-11	3.8E-13	2.8E-13	2.2E-13	1.7E-13	9.8E-09	9.7E-09
CRmilk = Consumption Rate of Milk (kg/d):	0.01857	Benzo(b)fluoranthene	9.0E-09	8.9E-09	4.6E-11	4.2E-11	1.6E-11	1.5E-11	1.0E-10	1.0E-10	1.2E-09	1.2E-09	6.9E-12	6.6E-12	4.4E-14	3.3E-14	2.6E-14	1.9E-14	7.6E-09	7.6E-09
Fmilk = Fraction of Milk that is Contaminated:	1	Benzo(k)fluoranthene	3.8E-08	3.7E-08	6.9E-10	5.2E-10	1.6E-10	1.4E-10	2.0E-09	2.0E-09	2.3E-08	2.3E-08	1.6E-10	1.5E-10	1.8E-12	1.3E-12	1.1E-12	7.5E-13	1.2E-08	1.1E-08
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*	Benzo(ghi)perylene	2.5E-06	2.4E-06	8.1E-13	8.1E-13	4.2E-07	4.2E-07	6.0E-08	5.4E-08	1.7E-06	1.7E-06	1.8E-07	1.4E-07	7.0E-09	5.3E-09	4.1E-09	3.1E-09	7.5E-08	7.5E-08
CRpork = Consumption Rate of Pork (kg/d):	0.000398	Chrysene	3.8E-08	3.8E-08	1.2E-09	1.0E-09	4.7E-10	4.4E-10	1.7E-09	1.7E-09	1.9E-08	1.9E-08	1.4E-10	1.2E-10	2.8E-12	2.1E-12	1.7E-12	1.2E-12	1.5E-08	1.5E-08
Fpork = Fraction of Pork that is Contaminated:	1	Dibenzo(a,h)anthracene	2.2E-07	2.1E-07	7.8E-09	6.8E-09	5.8E-10	5.2E-10	6.8E-10	6.7E-10	7.6E-09	7.6E-09	5.9E-11	5.1E-11	1.3E-12	9.5E-13	7.5E-13	5.6E-13	2.0E-07	2.0E-07
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*	Fluoranthene	6.0E-10	6.0E-10	1.0E-11	9.6E-12	5.3E-12	5.0E-12	2.4E-11	2.4E-11	2.8E-10	2.8E-10	1.7E-12	1.6E-12	1.0E-14	7.5E-15	5.9E-15	4.4E-15	2.8E-10	2.8E-10
CRchicken = Consumption Rate of Chicken (kg/d):	0.000425	Fluorene	2.6E-11	2.6E-11	1.1E-12	1.1E-12	1.4E-12	1.4E-12	6.4E-13	6.3E-13	7.4E-12	7.4E-12	5.3E-14	5.0E-14	4.4E-16	3.3E-16	2.6E-16	1.9E-16	1.5E-11	1.5E-11
Fchicken = Fraction of Chicken that is Contaminated:	1	Indeno(1,2,3-cd)pyrene	1.4E-07	1.4E-07	5.1E-09	4.6E-09	3.6E-10	3.4E-10	5.1E-10	5.0E-10	5.7E-09	5.7E-09	3.9E-11	3.4E-11	7.5E-13	5.6E-13	4.4E-13	3.3E-13	1.3E-07	1.3E-07
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*	2-Methylnaphthalene	2.2E-12	2.2E-12	4.7E-19	4.7E-19	1.6E-12	1.6E-12	3.4E-15	3.4E-15	4.2E-14	4.2E-14	6.1E-16	5.1E-16	1.6E-17	1.2E-17	9.1E-18	6.8E-18	5.3E-13	5.3E-13
CReggs = Consumption Rate of Eggs (kg/d):	0.000438	Naphthalene	9.0E-12	8.9E-12	6.5E-13	6.4E-13	6.3E-12	6.3E-12	2.2E-14	2.1E-14	2.6E-13	2.6E-13	3.5E-15	2.9E-15	7.6E-17	5.7E-17	4.5E-17	3.4E-17	1.7E-12	1.7E-12
Feggs = Fraction of Eggs that is Contaminated:	1	Phenanthrene	1.8E-10	1.8E-10	6.6E-12	6.4E-12	5.9E-12	5.8E-12	6.2E-12	6.2E-12	7.2E-11	7.2E-11	4.8E-13	4.5E-13	3.7E-15	2.8E-15	2.2E-15	1.6E-15	8.6E-11	8.6E-11
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*	Pyrene	5.9E-10	5.7E-10	4.1E-11	3.2E-11	2.2E-11	1.7E-11	2.3E-11	2.3E-11	2.6E-10	2.6E-10	2.3E-12	2.0E-12	3.5E-14	2.5E-14	2.1E-14	1.5E-14	2.4E-10	2.4E-10
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	0.00088																			
Ffish = Fraction of Locally Caught Fish:	1	**Aldehyde Ketones**																		
BW = Body weight (child) (kg):	15																			
		Formaldehyde	7.4E-07	7.4E-07	1.6E-10	1.6E-10	6.4E-07	6.4E-07	8.1E-13	6.1E-13	1.1E-11	1.1E-11	3.1E-13	2.3E-13	8.5E-15	6.4E-15	5.0E-15	3.8E-15	9.8E-08	9.8E-08

Where:
Incidental soil ingestion and produce grown at the location of maximum total particle and vapor depositon
Meat and dairy products from Farm 6
Fish locally caught from the Potomac River

Appendix G-5d
Summary of Cancer Risks and Hazard Indices (a)
MEI B Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	1.1E-10	NA	8.7E-11	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	1.3E-05	2E-09	1.2E-05	5E-10	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	1.8E-07	NA	1.7E-07	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	4.2E-06	NA	4.4E-06	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	2.5E-08	NA	4.6E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	6.0E-06	4E-09	1.2E-05	1E-09	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	5.2E-05	NA	9.1E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	5.0E-06	NA	2.5E-05	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	30	Manganese	1.4E-01	NA	1.6E-07	NA	7.9E-07	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	2.5E-05	NA	4.2E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	1.0E-02	NA	7.3E-03	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	2.2E-06	NA	3.5E-06	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	2.5E-05	NA	5.1E-05	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	4.9E-07	NA	5.2E-07	NA	Anemia
adult:	30								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	3.6E-03	1E-07	5.8E-03	4E-08	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	1.8E-04	3E-09	2.7E-04	9E-10	Developmental
		PAHs							
		Acenaphthene	6.0E-02	NA	6.7E-10	NA	7.5E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	1.8E-10	NA	2.1E-10	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	4E-09	NA	7E-10	
		Benzo(a)pyrene	NA	7.3E+00	NA	7E-08	NA	1E-08	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	3E-09	NA	5E-10	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	9E-10	NA	2E-10	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	1E-10	NA	2E-11	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	9E-07	NA	1E-07	
		Fluoranthene	4.0E-02	NA	1.4E-08	NA	1.4E-08	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	6.6E-10	NA	6.2E-10	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6E-08	NA	8E-09	
		2-Methylnaphthalene	4.0E-03	NA	4.3E-10	NA	5.2E-10	NA	Lung
		Naphthalene	2.0E-02	NA	3.5E-10	NA	4.3E-10	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	1.7E-08	NA	1.9E-08	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	2.7E-06	NA	3.5E-06	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion and produce consumption, meat and dairy products from Farm 6,
and locally caught fish from the Potomac River
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.4E-02	1E-06	1.4E-02	2E-07

Appendix G-5e
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
MEI B Scenario - Adult and Child

Parameter

CRi = Ca *ED * EF * URF / AT * UC2
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2

And:
Ca = Q * Fv * Cyv + (1- Fv) * Cyp

For Hg:
Ca (Hg_{2+}) = 0.48Q(total) * Fv (Hg_{2+}) * Cyv + 1 - Fv (Hg_{2+}) * Cypb
Ca (Hg_0) = 0.002Q(total) * Fv (Hg_0) * Cyv + 1 - Fv (Hg_0) * Cypb

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
SFi = Inhalation Slope Factor ((mg/kg-d)-1):	CS*
RfDi = Inhalation Reference Dose (mg/kg-d):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
IR = Inhalation Rate (see below) (m3/hr):	
adult:	0.63
child:	0.3
ED = Exposure Duration (see below) (yr):	
adult:	40
child:	6
EF = Exposure Frequency (day/yr):	350
ET = Exposure Time (hrs/day):	24
UC1 = Units Conversion (mg/ug):	0.001
BW = Body Weight (see below) (kg):	
adult:	70
child:	15
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	40
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m^3	Fv (unitless)	RfC mg/m3	URF (ug/m3)-1	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	3.29E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	2.83E-06	6.0E-03	4.3E-06	1.5E+01	1.4E-04	4E-09	3.0E-04	2E-09	Cardiovascular, CNS, Developmental
Beryllium	4.43E-07	9.0E-03	5.7E-06	8.4E+00	1.6E-05	3E-10	3.6E-05	1E-10	Sensitization
Cadmium	3.77E-06	9.0E-03	2.9E-06	6.3E+00	2.7E-04	2E-09	6.1E-04	9E-10	
Chromium +3	2.68E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	1.58E-06	0.0E+00	2.9E-05	2.9E+02	1.1E-05	4E-08	2.6E-05	2E-08	Increased LDH in bronchoalveolar lavage fluid
Cobalt	7.84E-07	0.0E+00	1.7E-06	3.2E+01	9.5E-05	2E-09	2.1E-04	1E-09	
Copper	4.82E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	4.23E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	6.69E-06	0.0E+00	1.4E-05	NA	9.7E-05	NA	2.2E-04	NA	CNS
Mercury as HgCl2	1.69E-05	8.5E-01	8.6E-05	NA	4.1E-05	NA	9.1E-05	NA	Autoimmune effects
Mercury as Methyl Hg	7.06E-08	1.0E+00	8.6E-05	NA	1.7E-07	NA	3.8E-07	NA	PNS, Autonomic Dysfunction
Nickel	5.81E-06	9.0E-03	2.6E-05	9.1E-01	4.7E-05	5E-10	1.0E-04	2E-10	
Selenium	4.21E-06	0.0E+00	5.7E-03	NA	1.5E-07	NA	3.4E-07	NA	
Zinc	6.91E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	1.22E-10	6.6E-01	1.1E-08	1.3E+05	2.2E-06	1E-09	4.9E-06	6E-10	
PCBs									
Total PCBs	8.35E-06	9.9E-01	NA	2.0E+00	NA	1E-09	NA	7E-10	
PAHs									
Acenaphthene	3.34E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	4.60E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	3.41E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	2.51E-07	4.8E-01	NA	3.9E-01	NA	9E-12	NA	4E-12	
Benzo(a)pyrene	2.81E-07	2.9E-01	NA	3.9E+00	NA	1E-10	NA	4E-11	
Benzo(b)fluoranthene	6.81E-07	9.7E-01	NA	3.9E-01	NA	2E-11	NA	1E-11	
Benzo(k)fluoranthene	4.23E-07	2.7E-01	NA	3.9E-01	NA	1E-11	NA	6E-12	
Benzo(ghi)perylene	3.10E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	3.66E-06	7.4E-01	NA	3.9E-02	NA	1E-11	NA	6E-12	
Dibenzo(a,h)anthracene	3.42E-07	5.5E-02	NA	4.2E+00	NA	1E-10	NA	6E-11	
Fluoranthene	2.98E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	4.78E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	2.91E-07	5.0E-03	NA	3.9E-01	NA	1E-11	NA	4E-12	
2-Methylnaphthalene	6.51E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	2.00E-06	1.0E+00	8.6E-04	1.2E-01	4.8E-07	2E-11	1.1E-06	9E-12	Nasal effects
Phenanthrene	5.10E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	2.75E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	3.81E-05	1.0E+00	2.8E-03	4.6E-02	2.8E-06	2E-10	6.3E-06	7E-11	Respiratory tract

Secondary maximum air concentration
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	7.2E-04	5E-08	1.6E-03	2E-08

Appendix G-5f
Ingestion of Mother's Milk
MEI B Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.4E-14	2.5E-12	2.7E-12	2.99E+01	8.60E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-5d						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-5f
Ingestion of Mother's Milk
MEI B Scenario: Infant

Parameters		ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m	**Dioxins/Furans**			
	2,3,7,8-TCDD TEQ	8.60E-02	6.0E+01	1.4E-03
And:				
ADD (TCDD) = (Sum of ADDi)				
Where:				
Values specific to Contaminant: CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level: CS*				
ADD i/m = Average infant intake level (pg/kg-day): 60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d): CS*				

Appendix G-6a
Contaminant Concentration in Soil
Monocacy River Fisher Scenario - Adult and Child

Parameters

Carcinogens ($T2 \leq tD$)

$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$

NonCarcinogens

$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$

Where:

$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-6a
Contaminant Concentration in Soil
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	1.4E-10	1.4E-10	1.43E-11	1.4E-11	3.2E-09	3.2E-08	1.0E+00	2.26E+01	2.25E+03
Arsenic	1.3E-07	1.3E-07	1.26E-08	1.3E-08	1.4E-04	1.4E-03	6.0E-03	1.08E+03	1.08E+05
Beryllium	2.7E-05	2.6E-05	2.76E-06	2.8E-06	2.1E-05	2.1E-04	9.0E-03	7.74E-01	7.71E+01
Cadmium	1.1E-05	1.1E-05	1.08E-06	1.1E-06	1.8E-04	1.8E-03	9.0E-03	1.68E+01	1.68E+03
Chromium +3	7.9E-04	6.4E-04	8.01E-04	7.8E-04	1.3E-04	1.3E-03	9.0E-03	1.60E-01	1.60E+00
Chromium +6	4.7E-04	3.8E-04	4.76E-04	4.7E-04	7.6E-05	7.6E-04	0.0E+00	1.60E-01	1.60E+00
Cobalt	4.8E-04	3.2E-04	5.55E-04	5.3E-04	3.8E-05	3.8E-04	0.0E+00	6.78E-02	6.78E-01
Copper	6.9E-03	3.5E-03	6.64E-02	3.4E-02	2.3E-04	2.3E-03	0.0E+00	3.06E-04	3.06E-03
Lead	1.8E-03	1.7E-03	1.80E-04	1.8E-04	2.0E-03	2.0E-02	7.0E-03	1.13E+00	1.13E+02
Manganese	5.2E-03	3.2E-03	6.84E-03	6.4E-03	3.2E-04	3.2E-03	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.6E-04	8.2E-05	1.62E-03	8.1E-04	5.5E-06	5.5E-05	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	3.3E-06	1.7E-06	3.12E-05	1.6E-05	1.1E-07	1.1E-06	8.5E-01	4.39E-04	4.56E-03
Nickel	1.8E-05	1.8E-05	1.79E-06	1.8E-06	2.8E-04	2.8E-03	9.0E-03	1.56E+01	1.56E+03
Selenium	2.5E-06	2.5E-06	2.56E-07	2.6E-07	2.0E-04	2.0E-03	0.0E+00	7.93E+01	7.88E+03
Zinc	2.0E-04	2.0E-04	2.03E-05	2.0E-05	3.3E-03	3.3E-02	8.0E-03	1.64E+01	1.64E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.7E-09	1.5E-09	2.51E-08	1.5E-08	1.4E-10	1.4E-09	6.6E-01	3.01E-02	3.54E-02
PCBs									
Total PCBs	5.6E-08	5.6E-08	4.26E-07	4.2E-07	2.8E-07	2.8E-06	9.9E-01	5.08E+00	6.67E+00
PAHs									
Acenaphthene	6.8E-08	6.7E-08	6.72E-07	6.6E-07	1.7E-07	1.7E-06	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.6E-10	1.6E-10	1.74E-11	1.7E-11	4.7E-08	4.7E-07	1.0E+00	2.84E+02	2.68E+04
Anthracene	7.5E-08	7.0E-08	7.39E-07	7.0E-07	4.1E-08	4.1E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.4E-06	1.3E-06	1.40E-05	1.3E-05	5.2E-07	5.2E-06	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.6E-06	1.5E-06	1.63E-05	1.5E-05	7.8E-07	7.8E-06	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	4.2E-07	3.8E-07	4.13E-06	3.8E-06	1.7E-07	1.7E-06	9.7E-01	4.10E-01	4.13E-01
Benzo(k)fluoranthene	5.7E-06	4.3E-06	5.70E-05	4.3E-05	7.0E-07	7.0E-06	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	8.6E-08	8.6E-08	6.73E-08	6.7E-08	1.9E-06	1.9E-05	1.0E+00	2.22E+01	2.84E+02
Chrysene	1.0E-05	8.8E-06	1.01E-04	8.8E-05	2.5E-06	2.5E-05	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	6.0E-05	5.3E-05	6.04E-04	5.3E-04	1.6E-05	1.6E-04	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	1.3E-07	1.2E-07	1.27E-06	1.2E-06	7.3E-08	7.3E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	1.2E-08	1.2E-08	1.24E-07	1.2E-07	5.3E-08	5.3E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	4.0E-05	3.6E-05	3.97E-04	3.6E-04	1.4E-05	1.4E-04	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.9E-13	3.9E-13	3.93E-14	3.9E-14	9.2E-09	9.2E-08	1.0E+00	2.33E+04	2.33E+06
Naphthalene	1.3E-08	1.3E-08	6.56E-08	6.5E-08	6.8E-08	6.8E-07	1.0E+00	5.33E+00	1.03E+01
Phenanthrene	8.0E-08	7.8E-08	7.97E-07	7.8E-07	1.0E-07	1.0E-06	1.0E+00	1.26E+00	1.27E+00
Pyrene	5.4E-07	4.1E-07	5.28E-06	4.1E-06	7.2E-08	7.2E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	8.4E-06	8.4E-06	1.24E-05	1.2E-05	4.9E-04	4.9E-03	1.0E+00	5.77E+01	3.93E+02

Appendix G-6a
Calculation of Soil Loss Constant
Monocacy River Fisher Scenario - Adult and Child

Parameters	
ks = ksl + ksg + ksr + kse + ksv	
where:	
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]	
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))	
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v	
where:	
theta v = 1 - (BD/ps) - theta sw	
and:	
Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-6a
Calculation of Soil Loss Constant
Monocacy River Fisher Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.3E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	7.7E-01	7.7E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	7.7E-01	7.7E+01	7.9E+02
Cadmium	1.7E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.1E+00	1.1E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.1E+00	1.1E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	2.9E-10	2.9E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	7.9E+01	7.9E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	7.9E+01	7.9E+03	5.0E+00
Zinc	1.6E+01	1.6E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.6E+01	1.6E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.5E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.6E-05	4.6E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	7.6E-05	7.6E-03	1.1E+03
Acenaphthylene	2.8E+02	2.7E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.7E+02	2.7E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.6E-06	7.6E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.5E-06	1.5E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.6E-06	5.6E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.3E-09	2.3E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.8E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	6.9E-01	6.9E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.3E-07	8.3E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	7.6E-07	7.6E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.6E-05	1.6E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.6E-09	1.6E-07	5.3E+05
2-Methylnaphthalene	2.3E+04	2.3E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.3E+04	2.3E+06	8.1E-03
Naphthalene	5.3E+00	1.0E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.0E-02	5.0E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.3E-06	3.3E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.1E-07	6.1E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	3.9E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-6b
Contaminant Concentration in Above Ground Vegetation
Monocacy River Fisher Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:
$Pv =0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$
$Pv(Hg^{2+}) = 0.78Pv$
$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-6b
Contaminant Concentration in Above Ground Vegetation
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	4.6E-12	4.6E-12	4.6E-12	4.6E-12	1.4E-10	1.4E-10	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	8.6E-05	0.0E+00	8.0E-10	8.0E-10	8.0E-10	8.0E-10	1.3E-07	1.3E-07	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	3.6E-05	0.0E+00	7.1E-08	6.8E-08	7.1E-08	6.8E-08	2.7E-05	2.6E-05	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	3.1E-04	0.0E+00	1.3E-06	1.3E-06	1.3E-06	1.3E-06	1.1E-05	1.1E-05	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	2.2E-04	0.0E+00	3.9E-06	3.1E-06	3.9E-06	3.1E-06	7.9E-04	6.4E-04	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	1.3E-04	0.0E+00	2.3E-06	1.8E-06	2.3E-06	1.8E-06	4.7E-04	3.8E-04	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	6.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04	3.2E-04	0.00E+00	6.00E-01	ND	ND	ND
Copper	3.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.9E-03	3.5E-03	0.00E+00	6.00E-01	ND	ND	ND
Lead	3.4E-03	0.0E+00	2.4E-05	2.4E-05	2.4E-05	2.4E-05	1.8E-03	1.7E-03	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	5.4E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.2E-03	3.2E-03	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	7.5E-06	0.0E+00	2.2E-06	1.1E-06	2.2E-06	1.1E-06	1.6E-04	8.2E-05	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	2.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E-06	1.7E-06	8.50E-01	6.00E-01	ND	ND	ND
Nickel	4.7E-04	0.0E+00	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.8E-05	1.8E-05	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.3E-04	0.0E+00	5.0E-08	5.0E-08	5.0E-08	5.0E-08	2.5E-06	2.5E-06	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	5.6E-03	0.0E+00	2.0E-05	2.0E-05	2.0E-05	2.0E-05	2.0E-04	2.0E-04	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.5E-10	5.7E-11	1.2E-11	7.0E-12	1.2E-11	7.0E-12	2.7E-09	1.5E-09	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.2E-07	2.9E-08	5.6E-10	5.6E-10	5.6E-10	5.6E-10	5.6E-08	5.6E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.9E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	6.8E-08	6.7E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	2.2E-11	2.8E-11	2.8E-11	2.8E-11	2.8E-11	1.6E-10	1.6E-10	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.6E-09	2.0E-10	7.3E-09	6.8E-09	7.3E-09	6.8E-09	7.5E-08	7.0E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	4.9E-07	2.5E-08	2.8E-08	2.5E-08	2.8E-08	2.5E-08	1.4E-06	1.3E-06	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	7.5E-07	1.1E-07	2.2E-08	2.0E-08	2.2E-08	2.0E-08	1.6E-06	1.5E-06	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	8.7E-08	1.2E-08	4.7E-09	4.3E-09	4.7E-09	4.3E-09	4.2E-07	3.8E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.2E-06	2.7E-07	6.6E-08	4.9E-08	6.6E-08	4.9E-08	5.7E-06	4.3E-06	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	8.1E-06	4.9E-10	4.9E-10	4.9E-10	4.9E-10	8.6E-08	8.6E-08	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	3.5E-06	2.1E-08	2.0E-07	1.7E-07	2.0E-07	1.7E-07	1.0E-05	8.8E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	2.8E-05	0.0E+00	4.1E-07	3.6E-07	4.1E-07	3.6E-07	6.0E-05	5.3E-05	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	9.0E-09	2.4E-09	6.4E-09	6.0E-09	6.4E-09	6.0E-09	1.3E-07	1.2E-07	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	1.4E-10	1.8E-09	1.8E-09	1.8E-09	1.8E-09	1.2E-08	1.2E-08	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.3E-05	0.0E+00	2.4E-07	2.1E-07	2.4E-07	2.1E-07	4.0E-05	3.6E-05	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	1.0E-10	8.9E-14	8.9E-14	8.9E-14	8.9E-14	3.9E-13	3.9E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	8.5E-10	6.1E-09	6.1E-09	6.1E-09	6.1E-09	1.3E-08	1.3E-08	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.9E-09	8.6E-10	7.8E-09	7.6E-09	7.8E-09	7.6E-09	8.0E-08	7.8E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	6.2E-09	2.6E-09	3.1E-08	2.3E-08	3.1E-08	2.3E-08	5.4E-07	4.1E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	1.6E-08	7.1E-05	7.1E-05	7.1E-05	7.1E-05	8.4E-06	8.4E-06	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-6b

Contaminant Concentration in Below Ground Vegetation

Monocacy River Fisher Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-6b
Contaminant Concentration in Below Ground Vegetation
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	4.3E-12	4.3E-12	1.4E-10	1.4E-10	3.00E-02	1.0E+00
Arsenic	1.0E-09	1.0E-09	1.3E-07	1.3E-07	8.00E-03	1.0E+00
Beryllium	4.1E-08	3.9E-08	2.7E-05	2.6E-05	1.50E-03	1.0E+00
Cadmium	6.9E-07	6.9E-07	1.1E-05	1.1E-05	6.40E-02	1.0E+00
Chromium +3	3.6E-06	2.9E-06	7.9E-04	6.4E-04	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	4.7E-04	3.8E-04	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	4.8E-04	3.2E-04	7.00E-03	ND
Copper	0.0E+00	0.0E+00	6.9E-03	3.5E-03	2.50E-01	ND
Lead	1.6E-05	1.6E-05	1.8E-03	1.7E-03	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	5.2E-03	3.2E-03	5.00E-02	ND
Mercury as HgCl2	5.9E-06	2.9E-06	1.6E-04	8.2E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	3.3E-06	1.7E-06	9.90E-02	ND
Nickel	1.4E-07	1.4E-07	1.8E-05	1.8E-05	8.00E-03	1.0E+00
Selenium	5.6E-08	5.6E-08	2.5E-06	2.5E-06	2.20E-02	1.0E+00
Zinc	1.8E-04	1.8E-04	2.0E-04	2.0E-04	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.8E-11	1.6E-11	2.7E-09	1.5E-09	1.03E+00	1.0E-02
PCBs						
Total PCBs	7.9E-09	7.9E-09	5.6E-08	5.6E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	1.5E-08	1.4E-08	6.8E-08	6.7E-08	2.13E-01	1.0E+00
Acenaphthylene	1.1E-08	1.1E-08	1.6E-10	1.6E-10	6.42E+03	1.0E-02
Anthracene	1.1E-10	1.1E-10	7.5E-08	7.0E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	1.3E-09	1.2E-09	1.4E-06	1.3E-06	9.48E-02	1.0E-02
Benzo(a)pyrene	9.9E-10	9.2E-10	1.6E-06	1.5E-06	6.05E-02	1.0E-02
Benzo(b)fluoranthene	4.8E-09	4.4E-09	4.2E-07	3.8E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.5E-09	2.6E-09	5.7E-06	4.3E-06	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.1E-03	2.1E-03	8.6E-08	8.6E-08	2.44E+06	1.0E-02
Chrysene	9.6E-09	8.3E-09	1.0E-05	8.8E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.4E-08	2.1E-08	6.0E-05	5.3E-05	4.05E-02	1.0E-02
Fluoranthene	1.9E-10	1.8E-10	1.3E-07	1.2E-07	1.50E-01	1.0E-02
Fluorene	2.4E-11	2.3E-11	1.2E-08	1.2E-08	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	2.1E-08	1.9E-08	4.0E-05	3.6E-05	5.29E-02	1.0E-02
2-Methylnaphthalene	7.8E-09	7.8E-09	3.9E-13	3.9E-13	2.00E+04	1.0E+00
Naphthalene	3.4E-09	3.4E-09	1.3E-08	1.3E-08	2.69E-01	1.0E+00
Phenanthrene	1.5E-10	1.4E-10	8.0E-08	7.8E-08	1.83E-01	1.0E-02
Pyrene	7.8E-10	6.0E-10	5.4E-07	4.1E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	2.6E-03	2.6E-03	8.4E-06	8.4E-06	3.05E+02	1.0E+00

Appendix G-6c
Potomac River Watershed Soil Concentration Due to Deposition
Monocacy River Fisher Scenario - Adult and Child

Parameters

Carcinogens

Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp(-ks * tD)/ks)) - (T1 + (exp(-ks * T1))/ks)]

NonCarcinogens

Cs(tD) = (Ds * [1 - exp(-ks * tD)])/ks

Where:

Ds = [UC1 * Q/Zs * BD] * [Fv * (Dytwv) + (Dytwp) * (1 - Fv)]

For Mercury:
Ds = [UC1 * 0.48Q(total)/Zs * BD] * [FvHg2+ * (Dytwv) + (Dytwpb) * (1 - FvHg2+)]
For HgCl2: Ds(HgCl2) = Ds * 0.98
For MeHg: Ds(MeHg) = Ds * 0.02

ks = ksl + ksg + ksr + kse + ksv
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = RO/theta sw * Zs * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs)* theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
ksr = COC Loss Constant Due to Runoff (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	2
T1 = Time Peroid At Beginning Of Combustion (yr):	0
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--)	CS*
Cywv = Unitized Yearly Average Air Concentration From Vapor Phase (Watershed) (ug-s/g-m3):	RS*
Dytwv = Unitized Yearly Average Total Deposition From Vapor Phase (Watershed) (s/m2-yr):	RS*
Dytwp = Unitized Yearly Average Total Deposition From Particle Phase (Watershed) (s/m2-yr):	RS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	40.4368
Ev = Average Annual Evapotranspiration (cm/yr):	70
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC3 = Units Conversion (sec/yr):	3.2E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.2E-05
T = Temperature (K):	285.96
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	2.4E-01
ps = Solids Particle Density (g/cm3):	2.7E+00

Appendix G-2c
Potomac River Watershed Soil Concentration Due to Deposition
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Cs Surface (2 cm) Non - Cancer	Cancer	Ds (2 cm)	Fv (unitless)	ks (yr-1)	ksl (yr-1)	ksr (yr-1)	ksv (yr-1)	ksg (yr-1)	Kds
Inorganics										
Antimony	1.7E-12	1.7E-12	4.0E-09	1.0E+00	2.3E+03	2.2E-01	3.0E-01	2.3E+03	0.0E+00	4.5E+01
Arsenic	5.8E-11	5.8E-11	6.5E-06	6.0E-03	1.1E+05	3.4E-01	4.6E-01	1.1E+05	0.0E+00	2.9E+01
Beryllium	1.3E-08	1.3E-08	1.0E-06	9.0E-03	8.0E+01	1.2E-02	1.7E-02	8.0E+01	0.0E+00	7.9E+02
Cadmium	4.9E-09	4.9E-09	8.6E-06	9.0E-03	1.7E+03	1.3E-01	1.8E-01	1.7E+03	0.0E+00	7.5E+01
Chromium +3	5.0E-06	4.9E-06	6.1E-06	9.0E-03	1.2E+00	5.1E-01	7.0E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	3.0E-06	2.9E-06	3.6E-06	0.0E+00	1.2E+00	5.1E-01	7.0E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	3.5E-06	3.2E-06	1.8E-06	0.0E+00	5.2E-01	2.2E-01	3.0E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.2E-04	1.6E-04	1.1E-05	0.0E+00	2.3E-03	9.8E-04	1.3E-03	0.0E+00	0.0E+00	1.0E+04
Lead	8.2E-07	8.2E-07	9.7E-05	7.0E-03	1.2E+02	1.1E-02	1.5E-02	1.2E+02	0.0E+00	9.0E+02
Manganese	4.3E-05	3.9E-05	1.5E-05	0.0E+00	3.6E-01	1.5E-01	2.1E-01	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	1.6E-05	7.9E-06	5.3E-07	8.5E-01	4.0E-04	1.7E-04	2.3E-04	3.0E-08	0.0E+00	5.8E+04
Mercury as Methyl Hg	3.1E-07	1.6E-07	1.1E-08	8.5E-01	3.5E-03	1.4E-03	1.9E-03	1.9E-04	0.0E+00	7.0E+03
Nickel	8.2E-09	8.2E-09	1.3E-05	9.0E-03	1.6E+03	1.5E-01	2.1E-01	1.6E+03	0.0E+00	6.5E+01
Selenium	1.2E-09	1.2E-09	9.6E-06	0.0E+00	8.2E+03	1.9E+00	2.6E+00	8.2E+03	0.0E+00	5.0E+00
Zinc	9.3E-08	9.3E-08	1.6E-04	8.0E-03	1.7E+03	1.6E-01	2.2E-01	1.7E+03	0.0E+00	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	1.2E-09	7.0E-10	6.5E-11	6.6E-01	3.5E-02	2.5E-04	3.5E-04	4.8E-03	3.0E-02	3.9E+04
PCBs										
Total PCBs	2.6E-08	2.6E-08	1.7E-07	9.9E-01	6.7E+00	1.0E-02	1.4E-02	1.6E+00	5.1E+00	9.8E+02
PAHs										
Acenaphthene	5.1E-08	5.0E-08	1.3E-07	1.0E+00	2.5E+00	8.9E-03	1.2E-02	8.0E-03	2.5E+00	1.1E+03
Acenaphthylene	2.4E-12	2.4E-12	6.7E-08	1.0E+00	2.8E+04	5.8E+01	7.9E+01	2.8E+04	0.0E+00	3.7E-02
Anthracene	4.9E-08	4.6E-08	2.7E-08	1.0E+00	5.6E-01	2.2E-03	3.0E-03	7.9E-04	5.5E-01	4.5E+03
Benzo(a)anthracene	3.7E-07	3.4E-07	1.4E-07	4.8E-01	3.7E-01	1.6E-04	2.2E-04	1.6E-04	3.7E-01	6.0E+04
Benzo(a)pyrene	2.5E-07	2.3E-07	1.2E-07	2.9E-01	4.8E-01	6.1E-05	8.4E-05	1.6E-05	4.8E-01	1.6E+05
Benzo(b)fluoranthene	3.3E-07	3.0E-07	1.4E-07	9.7E-01	4.1E-01	9.4E-04	1.3E-03	5.8E-04	4.1E-01	1.0E+04
Benzo(k)fluoranthene	6.8E-07	5.1E-07	8.4E-08	2.7E-01	1.2E-01	5.2E-05	7.1E-05	2.4E-07	1.2E-01	1.9E+05
Benzo(ghi)perylene	1.4E-09	1.4E-09	3.4E-07	1.0E+00	2.4E+02	6.9E+01	9.5E+01	7.2E+01	0.0E+00	9.1E-03
Chrysene	2.8E-06	2.4E-06	7.0E-07	7.4E-01	2.5E-01	1.6E-04	2.2E-04	8.7E-05	2.5E-01	6.0E+04
Dibenzo(a,h)anthracene	2.9E-06	2.5E-06	7.8E-07	5.5E-02	2.7E-01	1.7E-05	2.3E-05	1.4E-09	2.7E-01	5.8E+05
Fluoranthene	8.1E-08	7.7E-08	4.7E-08	9.9E-01	5.7E-01	8.9E-04	1.2E-03	8.0E-05	5.7E-01	1.1E+04
Fluorene	7.8E-09	7.7E-09	3.3E-08	1.0E+00	4.2E+00	4.7E-03	6.4E-03	1.7E-03	4.2E+00	2.1E+03
Indeno(1,2,3-cd)pyrene	1.9E-06	1.7E-06	6.6E-07	5.0E-03	3.5E-01	1.8E-05	2.5E-05	1.7E-07	3.5E-01	5.3E+05
2-Methylnaphthalene	6.3E-15	6.3E-15	1.5E-08	1.0E+00	2.4E+06	6.9E+01	9.5E+01	2.4E+06	0.0E+00	8.1E-03
Naphthalene	7.4E-09	7.4E-09	7.8E-08	1.0E+00	1.1E+01	3.3E-02	4.5E-02	5.2E+00	5.3E+00	3.0E+02
Phenanthrene	5.1E-08	5.0E-08	6.4E-08	1.0E+00	1.3E+00	2.6E-03	3.6E-03	3.4E-04	1.3E+00	3.7E+03
Pyrene	3.5E-07	2.7E-07	4.7E-08	9.9E-01	1.3E-01	1.0E-03	1.4E-03	6.3E-05	1.3E-01	9.5E+03
Aldehyde Ketones										
Formaldehyde	7.0E-08	7.0E-08	2.5E-05	1.0E+00	3.5E+02	6.4E+01	8.8E+01	1.6E+02	3.6E+01	2.0E-02

Appendix G-6c
Calculation of Potomac River Total Waterbody Load
Monocacy River Fisher Scenario - Adult and Child

Parameters

LT = LDif + LDep + LRI + LR + LE

Where:

LDep = Q * [Fv * Dytwv(river) + (1 - Fv) * Dytwp(river)] * WAw
LDep (Hg) = 0.48Q(total) * [FvHg2+ * Dywtv(river) + (1 - FvHg2+) * Dytwp(river)] * WAw

LRI = Q * [Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed] * WAi
LRI (Hg) = 0.48Q(total) * (Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed)) * WAi

LR = UC1 * RO * (WAL - WAi) * ((Cs * BD)/(θsw + Kds * BD))

LE = Xe * (WAL - WAi) * SD * ER * (Cs * Kds * BD)/(θsw + Kds * BD) * UC2

LDif = (Kv * Q * Fv * Cywv(river) * WAw * UC5)/(H/(R * Twk))
LDif (Hg) = (Kv * 0.48Q(total) * FvHg2+ * Cywv(river) * WAw * UC5)/(H/(R * Twk))

Xe = RF * K * LS * C * PF * (UC3/UC4)
SD = a * $(WAl)^{-b}$
Kv = $([KL^{-1} + (KG * (H/(R * T))^{-1})]^{-1}) * \theta^{Twk - 293}$
KL = SQRT[$(((1 \times 10^{-4})$ * Dw * μ)/dz) * UC6 (For flowing streams or rivers)
KG = 36500 m/yr (For flowing streams or rivers)

and:

Values Specific to Contaminant:	CS*
Values Specific to Site:	RS*
LT = Total Contaminant Load to the Water Body (g/yr):	CS*
LDep = Deposition of Particle Phase and Wet Vapor Phase Contaminant Load to the Water Body (g/yr):	CS*
LRI = Runoff Load From Impervious Surfaces (g/yr):	CS*
LR = Runoff Load From Pervious Surface (g/yr):	CS*
LE = Soil Erosion Load (g/yr):	CS*
LDif = Dry Vapor Phase Diffusion Load to Water Body (g/yr):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dytwv = Yearly Average (Wet and Dry) Deposition From Vapor Phase (g/m2-yr):	RS*
Dytwp = Yearly Average Total (Wet and Dry) Deposition From Particle Phase (g/m2-yr):	RS*
Cywv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
WAw = Water Body Area (m2):	1.1E+06
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	1.22E+07
UC1 = Units Conversion Factor (kg-cm2/mg-m2):	1.0E-02
WAL = Total Watershed Area Receiving Pollutant Deposition (m2):	3.21E+08
RO = Average Annual Surface Runoff from pervious areas (cm water/yr):	4.0E+01
Cs = Contaminant Level in Watershed Soil (mg/kg):	CS*
BD = Soil Bulk Density (g/cm3):	1.5E+00
θsw = Volumetric Water Content (cm3/cm3):	2.0E-01
Kds = Soil-water partition coefficient (cm3/g or ml/g):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	6.8E-01
SD = Sediment Delivery Ratio (--):	5.19E-02
ER = Contaminant Enrichment Ratio (--):	See Below
Inorganics:	1.0E+00
Organics:	3.0E+00
UC2 = Units Conversion Factor (g/mg):	1.0E-03
RF = "Erosivity" Factor (yr-1):	1.8E+02
K = "Erodibility" Factor (tons/acre):	2.8E-01
LS = "Topographic or Slope Length" Factor (--):	1.5E+00
C = "Cover Management" Factor (--):	4.1E-02
PF = "Supporting Practice" Factor (--):	1.0E+00
a = Empirical Intercept Coefficient:	6.0E-01
b = Empirical Slope Coefficient:	1.25E-01
UC3 = Units Conversion Factor (kg/ton):	9.1E+02
UC4 = Units Conversion Factor (m2/acre):	4.0E+03
Kv = Overall Transfer Rate Coefficient (m/yr):	CS*
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Universal Gas Constant (atm-m3/mol-K):	8.2E-05
Twk = Water Body Temperature (K):	2.9E+02
θ = Temperature Correction Factor (--):	1.03E+00
KL = Liquid Phase Transfer Coefficient (m/yr):	CS*
Dw = Diffusivity of COC in Water (cm3/s):	CS*
UC5 = Units Conversion Factor (g/ug):	1.00E-06
UC6 = Units Conversion Factor (s/yr):	3.2E+07
Kg = Gas Phase Transfer Coefficient (m/yr):	3.7E+04
μ = Current velocity (m/s):	8.2E-01
dz = Total water body depth (m):	9.6E-01

Appendix G-6c
Calculation of Potomac River Total Waterbody Load
Monocacy River Fisher Scenario - Adult and Child

Contaminant	LT		LDiff	LDep	LRI	LR		LE		Fv	Kv	KL
	Non - Cancer	Cancer				Non - Cancer	Cancer	Non - Cancer	Cancer	(unitless)		
Inorganics												
Antimony	2.4E-03	2.4E-03	7.5E-04	1.9E-04	1.5E-03	4.7E-06	4.7E-06	1.8E-08	1.8E-08	1.0E+00	7.6E+02	9.0E+02
Arsenic	2.7E+00	2.7E+00	0.0E+00	3.4E-01	2.4E+00	2.5E-04	2.5E-04	6.2E-07	6.2E-07	6.0E-03	7.7E+02	9.0E+02
Beryllium	4.3E-01	4.3E-01	0.0E+00	5.3E-02	3.7E-01	2.0E-03	2.0E-03	1.4E-04	1.4E-04	9.0E-03	7.4E+02	9.0E+02
Cadmium	3.6E+00	3.6E+00	0.0E+00	4.5E-01	3.2E+00	8.2E-03	8.2E-03	5.3E-05	5.3E-05	9.0E-03	7.6E+02	9.0E+02
Chromium +3	3.5E+01	3.4E+01	0.0E+00	3.2E-01	2.2E+00	3.3E+01	3.2E+01	5.4E-02	5.2E-02	9.0E-03	ND	1.1E+03
Chromium +6	2.1E+01	2.0E+01	0.0E+00	1.9E-01	1.3E+00	1.9E+01	1.9E+01	3.2E-02	3.1E-02	0.0E+00	ND	ND
Cobalt	1.0E+01	9.8E+00	0.0E+00	9.5E-02	6.6E-01	9.6E+00	9.0E+00	3.7E-02	3.5E-02	0.0E+00	ND	1.1E+03
Copper	1.2E+01	8.4E+00	0.0E+00	5.8E-01	4.0E+00	4.0E+00	2.0E+00	3.5E+00	1.7E+00	0.0E+00	ND	1.1E+03
Lead	4.1E+01	4.1E+01	0.0E+00	5.1E+00	3.5E+01	1.1E-01	1.1E-01	8.9E-03	8.9E-03	7.0E-03	7.6E+02	9.0E+02
Manganese	8.9E+01	8.1E+01	0.0E+00	8.1E-01	5.6E+00	8.2E+01	7.4E+01	4.6E-01	4.2E-01	0.0E+00	ND	1.1E+03
Mercury as HgCl2	5.7E-01	4.7E-01	1.4E-01	2.7E-02	2.0E-01	3.4E-02	1.7E-02	1.7E-01	8.6E-02	8.5E-01	9.4E-04	6.7E+02
Mercury as Methyl Hg	3.8E-01	3.7E-01	1.4E-01	2.7E-02	2.0E-01	5.5E-03	2.8E-03	3.3E-03	1.7E-03	8.5E-01	6.2E-01	7.2E+02
Nickel	5.6E+00	5.6E+00	0.0E+00	7.0E-01	4.9E+00	1.6E-02	1.6E-02	8.8E-05	8.8E-05	9.0E-03	7.6E+02	9.0E+02
Selenium	4.1E+00	4.1E+00	0.0E+00	5.1E-01	3.5E+00	2.9E-02	2.9E-02	1.2E-05	1.2E-05	0.0E+00	7.3E+02	9.0E+02
Zinc	6.6E+01	6.6E+01	0.0E+00	8.3E+00	5.8E+01	1.9E-01	1.9E-01	1.0E-03	1.0E-03	8.0E-03	7.6E+02	9.0E+02
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	7.1E-05	5.3E-05	1.1E-06	3.4E-06	2.4E-05	3.8E-06	2.2E-06	3.9E-05	2.3E-05	6.6E-01	4.1E+01	6.9E+02
PCBs												
Total PCBs	1.1E-01	1.1E-01	3.0E-02	8.4E-03	6.4E-02	3.3E-03	3.3E-03	8.4E-04	8.3E-04	9.9E-01	3.5E+02	6.3E+02
PAHs												
Acenaphthene	8.7E-02	8.7E-02	2.6E-02	6.6E-03	4.7E-02	5.8E-03	5.7E-03	1.7E-03	1.6E-03	1.0E+00	1.7E+02	9.2E+02
Acenaphthylene	3.2E-02	3.2E-02	2.3E-03	3.4E-03	2.5E-02	1.8E-03	1.8E-03	1.7E-08	1.7E-08	1.0E+00	1.8E+02	4.3E+02
Anthracene	1.8E-02	1.7E-02	3.1E-03	1.5E-03	1.0E-02	1.4E-03	1.3E-03	1.6E-03	1.5E-03	1.0E+00	7.8E+01	9.2E+02
Benzo(a)anthracene	7.3E-02	7.1E-02	2.4E-03	7.2E-03	5.0E-02	7.7E-04	7.0E-04	1.2E-02	1.1E-02	4.8E-01	4.5E+00	8.7E+02
Benzo(a)pyrene	6.2E-02	6.1E-02	2.7E-03	6.4E-03	4.4E-02	2.0E-04	1.8E-04	8.2E-03	7.6E-03	2.9E-01	1.5E+00	8.7E+02
Benzo(b)fluoranthene	7.8E-02	7.6E-02	5.7E-03	7.6E-03	5.0E-02	3.9E-03	3.6E-03	1.1E-02	9.8E-03	9.7E-01	1.2E+02	9.2E+02
Benzo(k)fluoranthene	6.2E-02	5.7E-02	4.2E-03	4.4E-03	3.1E-02	4.5E-04	3.4E-04	2.2E-02	1.7E-02	2.7E-01	1.1E+00	9.2E+02
Benzo(ghi)perylene	1.4E+00	1.4E+00	3.0E-03	1.8E-02	1.2E-01	1.3E+00	1.3E+00	2.9E-06	2.9E-06	1.0E+00	3.5E-01	3.2E+02
Chrysene	4.3E-01	4.1E-01	3.1E-02	3.8E-02	2.6E-01	5.9E-03	5.1E-03	9.1E-02	7.9E-02	7.4E-01	1.1E+02	9.2E+02
Dibenzo(a,h)anthracene	4.2E-01	4.1E-01	0.0E+00	4.1E-02	2.8E-01	6.2E-04	5.4E-04	9.3E-02	8.2E-02	5.5E-02	2.0E-02	9.2E+02
Fluoranthene	2.6E-02	2.6E-02	2.9E-03	2.5E-03	1.7E-02	9.3E-04	8.7E-04	2.6E-03	2.5E-03	9.9E-01	2.1E+01	9.2E+02
Fluorene	1.9E-02	1.9E-02	4.3E-03	1.7E-03	1.2E-02	4.6E-04	4.6E-04	2.5E-04	2.5E-04	1.0E+00	7.7E+01	9.2E+02
Indeno(1,2,3-cd)pyrene	3.4E-01	3.3E-01	0.0E+00	3.5E-02	2.4E-01	4.5E-04	4.0E-04	6.1E-02	5.6E-02	5.0E-03	2.1E+00	9.2E+02
2-Methylnaphthalene	6.7E-03	6.7E-03	3.4E-04	7.5E-04	5.6E-03	5.5E-06	5.5E-06	1.2E-11	1.2E-11	1.0E+00	3.6E+02	4.4E+02
Naphthalene	4.6E-02	4.6E-02	1.0E-02	3.8E-03	2.9E-02	3.1E-03	3.1E-03	2.4E-04	2.4E-04	1.0E+00	3.3E+02	8.0E+02
Phenanthrene	3.5E-02	3.5E-02	4.9E-03	3.5E-03	2.4E-02	1.7E-03	1.7E-03	1.7E-03	1.6E-03	1.0E+00	2.9E+01	9.2E+02
Pyrene	3.8E-02	3.5E-02	2.7E-03	2.6E-03	1.7E-02	4.6E-03	3.5E-03	1.1E-02	8.7E-03	9.9E-01	1.4E+01	9.2E+02
Aldehyde Ketones												
Formaldehyde	6.8E+01	6.8E+01	3.8E-01	1.3E+00	9.0E+00	5.7E+01	5.7E+01	3.0E-04	3.0E-04	1.0E+00	4.5E-01	1.3E+03

Appendix G-6c

Calculation of Potomac River Water Concentration

Monocacy River Fisher Scenario - Adult and Child

Parameters

Cwtot = LT/Vfx * fwc + kwt * WAw * (dwc + dbs)
Cwt = fwc * Cwtot * (dwc + dbs/dwc)
Cdw = Cwt/1 + Kdsw * TSS * 10-6
Cdw(Hg) = Cwt(Hg2+)/1 + Kdsw(Hg2+)* TSS * 10-6
Cdw Hg2+ = Cdw (Hg) * 0.85
Cdw MeHg = Cdw (Hg) * 0.15
Csb = fbs * Cwtot * (Kdbs / thetabs + Kdbs * Cbs) * (dwc + dbs/dbs)

Where:

fwc = (1 + Kdsw * TSS * 10-6) * (dwc/dz)/(1 + Kdsw * TSS * 10-6) * (dwc/dz) + (thetabs + Kdbs * Cbs) * (dbs/dz)
kwt = fwc * kv + fbs * kb
fbs = 1 - fwc
kv = Kv/(dz * (1 + Kdsw * TSS * 10-6)
kb = [(Xe * WAl * SD * 10+3 - Vfx * TSS)/(WAw *TSS)] * [(TSS * 10-6)/(Cbs * dbs)]
TSS = (Xe * (WAl-WAi) * SD * 103)/(Vfx + Dss * WAw)
and:

Values Specific to Contaminant:	CS*
Cwtot = Total Water Body Concentration (g/m3=mg/L):	CS*
Cwt = Total Concentration in Water Column (mg/L):	CS*
Cdw = Dissolved Phase Water Concentration (mg/L):	CS*
Csb = Concentration Sorbed to Bed Sediments (mg/L):	CS*
fwc = Fraction of Total Water Body Concentration That Occurs in the Water Column (--):	CS*
kwt = Total First Order Dissipation Rate Constant (yr-1):	CS*
fbs = Fraction of Total Water Body Concentration That Occurs in the Bed Sediment (--):	CS*
LT = Total Contaminant Load to the Water Body (mg/yr):	CS*
Vfx = Average Volumetric Flow Rate Through Water Body (m3/yr):	3.47E+08
dwc = Depth of Water Column (m):	9.3E-01
dbs = Depth of Upper Benthic Sediment Layer (m):	3.0E-02
dz = Total Waterbody Depth (m):	9.6E-01
WAw = Water Body Area (m2):	1.1E+06
UC1 = Units Conversion Factor (g/mg):	1.0E+03
Kdsw = Suspended Sediment/Surface Water Partition Coefficient (L/kg):	CS*
TSS = Total Suspended Solids (mg/L):	4.5E+00
thetabs = Bed Sediment Porosity (Lwater/L):	6.0E-01
Kdbs = Bed Sediment/Sediment Pore Water Partition Coefficient (L/kg):	CS*
Cbs = Bed Sediment Concentration (g/cm3):	1.0E+00
kv = Water Column Volatilization Rate Constant (yr-1):	CS*
kb = Benthic Burial Rate Constant (yr-1):	2.8E-01
Kv = Overall COC Transfer Rate Coefficient (m/yr):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	6.76E-01
SD = Sediment Delivery Ratio (--):	5.2E-02
WAl = Total Watershed Area Recieving Pollutant Deposition (m2):	3.2E+08
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	1.2E+07
Dss = Suspended solids depostion rate (m/yr):	1.8E+03

Appendix G-6c
Calculation of Potomac River Water Concentration
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Cwtot		Cwt		Cdw		Csb		fwc	fbs	kwt	kv	Kdsw	Kdbs
	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer						
Inorganics														
Antimony	4.91E-12	4.91E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	9.2E-11	9.2E-11	4.0E-01	6.0E-01	3.2E+02	7.9E+02	4.5E+01	4.5E+01
Arsenic	4.31E-09	4.31E-09	2.27E-09	2.27E-09	2.27E-09	2.27E-09	6.6E-08	6.6E-08	5.1E-01	4.9E-01	4.1E+02	8.0E+02	2.9E+01	2.9E+01
Beryllium	9.37E-09	9.37E-09	3.66E-10	3.66E-10	3.65E-10	3.65E-10	2.9E-07	2.9E-07	3.8E-02	9.6E-01	3.0E+01	7.7E+02	7.9E+02	7.9E+02
Cadmium	1.02E-08	1.02E-08	3.08E-09	3.08E-09	3.08E-09	3.08E-09	2.3E-07	2.3E-07	2.9E-01	7.1E-01	2.3E+02	7.9E+02	7.5E+01	7.5E+01
Chromium +3	1.66E-07	1.62E-07	1.05E-07	1.02E-07	1.05E-07	1.02E-07	2.0E-06	1.9E-06	6.1E-01	3.9E-01	1.1E-01	0.0E+00	1.9E+01	1.9E+01
Chromium +6	9.86E-08	9.61E-08	6.24E-08	6.08E-08	6.24E-08	6.08E-08	1.2E-06	1.2E-06	6.1E-01	3.9E-01	1.1E-01	0.0E+00	1.9E+01	1.9E+01
Cobalt	7.39E-08	6.95E-08	3.09E-08	2.90E-08	3.09E-08	2.90E-08	1.4E-06	1.3E-06	4.0E-01	6.0E-01	1.7E-01	0.0E+00	4.5E+01	4.5E+01
Copper	8.44E-06	5.86E-06	2.81E-08	1.95E-08	2.69E-08	1.87E-08	2.7E-04	1.9E-04	3.2E-03	1.0E+00	2.8E-01	0.0E+00	1.0E+04	1.0E+04
Lead	1.00E-06	1.00E-06	3.46E-08	3.46E-08	3.44E-08	3.44E-08	3.1E-05	3.1E-05	3.3E-02	9.7E-01	2.6E+01	7.8E+02	9.0E+02	9.0E+02
Manganese	7.97E-07	7.28E-07	2.64E-07	2.41E-07	2.64E-07	2.41E-07	1.7E-05	1.6E-05	3.2E-01	6.8E-01	1.9E-01	0.0E+00	6.5E+01	6.5E+01
Mercury as HgCl2	9.24E-07	7.60E-07	8.55E-10	7.02E-10	5.02E-10	4.13E-10	3.0E-05	2.4E-05	9.0E-04	1.0E+00	2.8E-01	6.8E-04	1.0E+05	5.0E+04
Mercury as Methyl Hg	6.97E-08	6.89E-08	1.06E-09	1.05E-09	8.87E-11	7.29E-11	2.2E-06	2.2E-06	1.5E-02	9.9E-01	2.9E-01	4.5E-01	1.0E+05	3.0E+03
Nickel	1.44E-08	1.44E-08	4.76E-09	4.76E-09	4.76E-09	4.76E-09	3.1E-07	3.1E-07	3.2E-01	6.8E-01	2.5E+02	7.9E+02	6.5E+01	6.5E+01
Selenium	4.06E-09	4.06E-09	3.55E-09	3.55E-09	3.55E-09	3.55E-09	1.8E-08	1.8E-08	8.5E-01	1.5E-01	6.4E+02	7.6E+02	5.0E+00	5.0E+00
Zinc	1.66E-07	1.66E-07	5.66E-08	5.66E-08	5.66E-08	5.66E-08	3.5E-06	3.5E-06	3.3E-01	6.7E-01	2.6E+02	7.9E+02	6.2E+01	6.2E+01
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	1.48E-10	1.11E-10	6.98E-14	5.24E-14	3.03E-14	2.28E-14	4.7E-09	3.5E-09	4.6E-04	1.0E+00	2.9E-01	1.8E+01	2.9E+05	1.6E+05
PCBs														
Total PCBs	1.70E-08	1.70E-08	1.42E-10	1.42E-10	1.37E-10	1.37E-10	5.4E-07	5.4E-07	8.1E-03	9.9E-01	3.1E+00	3.5E+02	7.4E+03	3.9E+03
PAHs														
Acenaphthene	1.18E-09	1.18E-09	1.66E-10	1.66E-10	1.66E-10	1.66E-10	3.3E-08	3.3E-08	1.4E-01	8.6E-01	2.4E+01	1.7E+02	3.7E+02	2.0E+02
Acenaphthylene	5.86E-11	5.86E-11	5.90E-11	5.90E-11	5.90E-11	5.90E-11	8.7E-12	8.7E-12	9.8E-01	2.4E-02	1.9E+02	1.9E+02	2.8E-01	1.5E-01
Anthracene	1.23E-09	1.21E-09	4.07E-11	4.03E-11	4.04E-11	4.00E-11	3.8E-08	3.8E-08	3.2E-02	9.7E-01	2.9E+00	8.0E+01	1.8E+03	9.4E+02
Benzo(a)anthracene	6.25E-08	6.15E-08	1.56E-10	1.53E-10	1.39E-10	1.37E-10	2.0E-06	2.0E-06	2.4E-03	1.0E+00	2.9E-01	4.2E+00	2.7E+04	1.4E+04
Benzo(a)pyrene	9.09E-08	9.00E-08	9.92E-11	9.83E-11	7.49E-11	7.42E-11	2.9E-06	2.9E-06	1.1E-03	1.0E+00	2.8E-01	1.1E+00	7.3E+04	3.9E+04
Benzo(b)fluoranthene	1.02E-07	1.00E-07	1.05E-10	1.03E-10	7.78E-11	7.66E-11	3.3E-06	3.2E-06	1.0E-03	1.0E+00	3.8E-01	9.6E+01	7.9E+04	4.2E+04
Benzo(k)fluoranthene	9.25E-08	8.41E-08	9.92E-11	9.02E-11	7.45E-11	6.78E-11	3.0E-06	2.7E-06	1.0E-03	1.0E+00	2.8E-01	8.6E-01	7.4E+04	4.0E+04
Benzo(ghi)perylene	4.10E-09	4.09E-09	4.14E-09	4.14E-09	4.14E-09	4.14E-09	1.5E-10	1.5E-10	9.8E-01	2.0E-02	3.7E-01	3.7E-01	6.8E-02	3.6E-02
Chrysene	3.25E-07	3.15E-07	7.33E-10	7.11E-10	6.46E-10	6.27E-10	1.0E-05	1.0E-05	2.2E-03	1.0E+00	5.0E-01	1.0E+02	3.0E+04	1.6E+04
Dibenzo(a,h)anthracene	7.62E-07	7.41E-07	5.44E-10	5.29E-10	3.40E-10	3.31E-10	2.4E-05	2.4E-05	6.9E-04	1.0E+00	2.8E-01	1.3E-02	1.3E+05	7.2E+04
Fluoranthene	4.24E-09	4.20E-09	6.90E-11	6.85E-11	6.79E-11	6.74E-11	1.3E-07	1.3E-07	1.6E-02	9.8E-01	6.1E-01	2.1E+01	3.7E+03	2.0E+03
Fluorene	4.70E-10	4.70E-10	4.44E-11	4.43E-11	4.42E-11	4.42E-11	1.4E-08	1.4E-08	9.1E-02	9.1E-01	7.5E+00	8.0E+01	5.8E+02	3.1E+02
Indeno(1,2,3-cd)pyrene	6.94E-07	6.82E-07	3.66E-10	3.59E-10	1.80E-10	1.77E-10	2.2E-05	2.2E-05	5.1E-04	1.0E+00	2.8E-01	1.1E+00	2.3E+05	1.2E+05
2-Methylnaphthalene	8.97E-12	8.97E-12	9.07E-12	9.07E-12	9.07E-12	9.07E-12	3.0E-13	3.0E-13	9.8E-01	2.0E-02	3.7E+02	3.8E+02	6.1E-02	3.3E-02
Naphthalene	1.63E-10	1.63E-10	6.58E-11	6.58E-11	6.57E-11	6.57E-11	3.1E-09	3.1E-09	3.9E-01	6.1E-01	1.3E+02	3.4E+02	8.9E+01	4.8E+01
Phenanthrene	3.16E-09	3.15E-09	9.33E-11	9.31E-11	9.25E-11	9.23E-11	9.8E-08	9.8E-08	2.9E-02	9.7E-01	1.1E+00	3.0E+01	2.0E+03	1.1E+03
Pyrene	8.56E-09	7.74E-09	1.02E-10	9.20E-11	9.95E-11	8.99E-11	2.7E-07	2.4E-07	1.2E-02	9.9E-01	4.5E-01	1.5E+01	5.1E+03	2.7E+03
Aldehyde Ketones														
Formaldehyde	2.00E-07	2.00E-07	2.02E-07	2.02E-07	2.02E-07	2.02E-07	1.8E-08	1.8E-08	9.8E-01	2.2E-02	4.6E-01	4.6E-01	1.7E-01	9.0E-02

Appendix G-6d

Calculation of Fish Concentration

Monocacy River Fisher Scenario - Adult and Child

Parameters	
Cfishdw = Cdw * BCFfish or	
Cfishdw = Cdw * BAFfish or	
Cfishsb = Csb * flipid * BSAF/ OCsed	
Where:	
Values Specific to Contaminant:	CS*
Cfish = Contaminant Concentration In Fish (mg/kg):	CS*
Cfishdw = Fish Concentration from Dissolved Water Concentration (mg/kg):	CS*
Cfishsb = Fish Concentration from Bed Sediments (mg/kg):	CS*
Cdw = Dissolved Water Concentration (mg/L):	CS*
Cwt = Total Water Column Concentration (mg/L):	CS*
Csb = Concentration of Contaminant Sorbed to Bed Sediment (mg/kg):	CS*
BCFfish = Fish Bioconcentration Factor (L/kg):	CS*
BAFfish = Fish Bioaccumulation Factor (L/kg):	CS*
BSAF = Biota to Sediment Accumulation Factor (--):	CS*
flipid = Fish Lipid Content:	7.0E-02
OCsed = Fraction Organic Carbon in Bottom Sediment:	4.0E-02

Appendix G-6d
Calculation of Fish Concentration
Monocacy River Fisher Scenario - Adult and Child

Contaminant	Cfish		Cfishdw_BCF		BCF	Cfishdw_BAF		BAF	Cfishsb		BSAF
	Non - Cancer	Cancer	Non - Cancer	Cancer		Non - Cancer	Cancer		Non - Cancer	Cancer	
Inorganics											
Antimony	8.2E-11	8.2E-11	8.2E-11	8.2E-11	4.0E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Arsenic	2.6E-07	2.6E-07	2.6E-07	2.6E-07	1.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Beryllium	2.3E-08	2.3E-08	2.3E-08	2.3E-08	6.2E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cadmium	2.8E-06	2.8E-06	2.8E-06	2.8E-06	9.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +3	2.0E-06	1.9E-06	2.0E-06	1.9E-06	1.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +6	2.0E-07	1.9E-07	2.0E-07	1.9E-07	3.2E+00	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cobalt	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Copper	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Lead	3.1E-09	3.1E-09	3.1E-09	3.1E-09	9.0E-02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Manganese	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as HgCl2	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as Methyl Hg	6.0E-04	5.0E-04	0.0E+00	0.0E+00	ND	6.0E-04	5.0E-04	6.8E+06	0.0E+00	0.0E+00	ND
Nickel	3.7E-07	3.7E-07	3.7E-07	3.7E-07	7.8E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Selenium	4.6E-07	4.6E-07	4.6E-07	4.6E-07	1.3E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Zinc	1.2E-04	1.2E-04	1.2E-04	1.2E-04	2.1E+03	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	7.4E-10	5.6E-10	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	7.4E-10	5.6E-10	9.0E-02
PCBs											
Total PCBs	1.9E-06	1.9E-06	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	1.9E-06	1.9E-06	2.0E+00
PAHs											
Acenaphthene	3.3E-08	3.3E-08	3.3E-08	3.3E-08	2.0E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Acenaphthylene	1.6E-08	1.6E-08	0.0E+00	0.0E+00	ND	1.6E-08	1.6E-08	2.7E+02	0.0E+00	0.0E+00	ND
Anthracene	4.2E-08	4.1E-08	0.0E+00	0.0E+00	ND	4.2E-08	4.1E-08	1.0E+03	0.0E+00	0.0E+00	ND
Benzo(a)anthracene	6.9E-06	6.8E-06	0.0E+00	0.0E+00	ND	6.9E-06	6.8E-06	5.0E+04	0.0E+00	0.0E+00	ND
Benzo(a)pyrene	1.0E-05	9.9E-06	0.0E+00	0.0E+00	ND	1.0E-05	9.9E-06	1.3E+05	0.0E+00	0.0E+00	ND
Benzo(b)fluoranthene	1.6E-05	1.6E-05	0.0E+00	0.0E+00	ND	1.6E-05	1.6E-05	2.1E+05	0.0E+00	0.0E+00	ND
Benzo(k)fluoranthene	1.3E-05	1.2E-05	0.0E+00	0.0E+00	ND	1.3E-05	1.2E-05	1.8E+05	0.0E+00	0.0E+00	ND
Benzo(ghi)perylene	1.1E-04	1.1E-04	0.0E+00	0.0E+00	ND	1.1E-04	1.1E-04	2.5E+04	0.0E+00	0.0E+00	ND
Chrysene	3.2E-05	3.1E-05	0.0E+00	0.0E+00	ND	3.2E-05	3.1E-05	5.0E+04	0.0E+00	0.0E+00	ND
Dibenzo(a,h)anthracene	1.7E-04	1.6E-04	0.0E+00	0.0E+00	ND	1.7E-04	1.6E-04	5.0E+05	0.0E+00	0.0E+00	ND
Fluoranthene	3.1E-07	3.0E-07	0.0E+00	0.0E+00	ND	3.1E-07	3.0E-07	4.5E+03	0.0E+00	0.0E+00	ND
Fluorene	2.1E-08	2.1E-08	0.0E+00	0.0E+00	ND	2.1E-08	2.1E-08	4.7E+02	0.0E+00	0.0E+00	ND
Indeno(1,2,3-cd)pyrene	1.1E-04	1.1E-04	0.0E+00	0.0E+00	ND	1.1E-04	1.1E-04	6.2E+05	0.0E+00	0.0E+00	ND
2-Methylnaphthalene	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.9E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Naphthalene	4.6E-09	4.6E-09	4.6E-09	4.6E-09	6.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Phenanthrene	9.5E-08	9.5E-08	0.0E+00	0.0E+00	ND	9.5E-08	9.5E-08	1.0E+03	1.3E-09	1.3E-09	7.3E-03
Pyrene	3.3E-07	3.0E-07	0.0E+00	0.0E+00	ND	3.3E-07	3.0E-07	3.3E+03	1.1E-09	1.0E-09	2.4E-03
Aldehyde Ketones											
Formaldehyde	6.9E-05	6.9E-05	6.9E-05	6.9E-05	3.4E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND

Appendix G-6e
Calculation of Chemical Intakes
Monocacy River Fisher Scenario: Adult

Parameter

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep)* CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	1.0E-13	1.0E-13	2.0E-17	2.0E-17	1.1E-15	1.1E-15	1.0E-13	1.0E-13
Arsenic	6.8E-09	6.8E-09	1.8E-14	1.8E-14	6.4E-09	6.4E-09	3.2E-10	3.2E-10
Beryllium	2.7E-09	2.7E-09	3.9E-12	3.9E-12	2.7E-09	2.7E-09	2.8E-11	2.8E-11
Cadmium	2.7E-08	2.7E-08	1.5E-12	1.5E-12	2.3E-08	2.3E-08	3.5E-09	3.5E-09
Chromium +3	2.1E-08	2.1E-08	1.1E-09	1.1E-09	1.7E-08	1.7E-08	2.5E-09	2.4E-09
Chromium +6	1.1E-08	1.1E-08	6.8E-10	6.7E-10	1.0E-08	1.0E-08	2.5E-10	2.4E-10
Cobalt	5.6E-09	5.5E-09	7.9E-10	7.5E-10	4.8E-09	4.8E-09	0.0E+00	0.0E+00
Copper	1.2E-07	7.7E-08	9.5E-08	4.8E-08	2.9E-08	2.9E-08	0.0E+00	0.0E+00
Lead	2.6E-07	2.6E-07	2.6E-10	2.6E-10	2.6E-07	2.6E-07	3.9E-12	3.9E-12
Manganese	5.0E-08	5.0E-08	9.8E-09	9.1E-09	4.1E-08	4.1E-08	0.0E+00	0.0E+00
Mercury as HgCl2	3.6E-09	2.1E-09	2.3E-09	1.2E-09	1.3E-09	9.1E-10	0.0E+00	0.0E+00
Mercury as Methyl Hg	7.5E-07	6.2E-07	4.5E-11	2.3E-11	1.6E-10	1.6E-10	7.5E-07	6.2E-07
Nickel	3.6E-08	3.6E-08	2.6E-12	2.6E-12	3.5E-08	3.5E-08	4.6E-10	4.6E-10
Selenium	1.0E-08	1.0E-08	3.7E-13	3.7E-13	9.6E-09	9.6E-09	5.7E-10	5.7E-10
Zinc	5.8E-07	5.8E-07	2.9E-11	2.9E-11	4.3E-07	4.3E-07	1.5E-07	1.5E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	9.8E-13	7.4E-13	3.6E-14	2.1E-14	1.9E-14	1.8E-14	9.3E-13	7.0E-13
PCBs								
Total PCBs	2.4E-09	2.4E-09	6.1E-13	6.1E-13	1.9E-11	1.9E-11	2.4E-09	2.4E-09
PAHs								
Acenaphthene	4.8E-11	4.8E-11	9.6E-13	9.5E-13	5.1E-12	5.0E-12	4.2E-11	4.2E-11
Acenaphthylene	2.0E-11	2.0E-11	2.5E-17	2.5E-17	3.8E-13	3.8E-13	2.0E-11	2.0E-11
Anthracene	5.5E-11	5.4E-11	1.1E-12	9.9E-13	1.8E-12	1.7E-12	5.2E-11	5.1E-11
Benzo(a)anthracene	8.8E-09	8.6E-09	2.0E-11	1.8E-11	4.5E-11	4.4E-11	8.7E-09	8.5E-09
Benzo(a)pyrene	1.3E-08	1.2E-08	2.3E-11	2.2E-11	6.9E-11	6.9E-11	1.2E-08	1.2E-08
Benzo(b)fluoranthene	2.0E-08	2.0E-08	5.9E-12	5.4E-12	8.6E-12	8.5E-12	2.0E-08	2.0E-08
Benzo(k)fluoranthene	1.7E-08	1.5E-08	8.1E-11	6.1E-11	1.2E-10	1.2E-10	1.6E-08	1.5E-08
Benzo(ghi)perylene	2.1E-07	2.1E-07	9.6E-14	9.6E-14	7.4E-08	7.4E-08	1.3E-07	1.3E-07
Chrysene	4.1E-08	4.0E-08	1.4E-10	1.3E-10	3.1E-10	3.0E-10	4.0E-08	3.9E-08
Dibenzo(a,h)anthracene	2.1E-07	2.1E-07	8.6E-10	7.6E-10	2.2E-09	2.1E-09	2.1E-07	2.1E-07
Fluoranthene	3.9E-10	3.8E-10	1.8E-12	1.7E-12	2.2E-12	2.2E-12	3.8E-10	3.8E-10
Fluorene	2.7E-11	2.7E-11	1.8E-13	1.8E-13	4.0E-13	4.0E-13	2.6E-11	2.6E-11
Indeno(1,2,3-cd)pyrene	1.4E-07	1.4E-07	5.7E-10	5.1E-10	1.8E-09	1.8E-09	1.4E-07	1.4E-07
2-Methylnaphthalene	2.4E-12	2.4E-12	5.6E-20	5.6E-20	2.8E-13	2.8E-13	2.1E-12	2.1E-12
Naphthalene	7.3E-12	7.3E-12	9.4E-14	9.3E-14	1.5E-12	1.5E-12	5.7E-12	5.7E-12
Phenanthrene	1.2E-10	1.2E-10	1.1E-12	1.1E-12	1.9E-12	1.9E-12	1.2E-10	1.2E-10
Pyrene	4.2E-10	3.8E-10	7.5E-12	5.8E-12	7.4E-12	5.8E-12	4.1E-10	3.7E-10
Aldehyde Ketones								
Formaldehyde	1.9E-07	1.9E-07	1.8E-11	1.8E-11	1.1E-07	1.1E-07	8.6E-08	8.6E-08

Appendix G-6e

Calculation of Chemical Intakes

Monocacy River Fisher Scenario: Child

Itot = Isoil + Iag + Ifish

Where:

Isoil = Sc * CRsoil * Fsoil/BW

Iag = [((Pd + Pv + Prep)* CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag

Ifish = Cfish * CRfish * Ffish

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	8.80E-04
Ffish = Fraction of Locally Caught Fish:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	7.4E-14	7.4E-14	1.9E-16	1.9E-16	1.6E-15	1.6E-15	7.2E-14	7.2E-14
Arsenic	9.2E-09	9.2E-09	1.7E-13	1.7E-13	9.0E-09	9.0E-09	2.3E-10	2.3E-10
Beryllium	3.8E-09	3.8E-09	3.7E-11	3.7E-11	3.8E-09	3.8E-09	2.0E-11	2.0E-11
Cadmium	3.5E-08	3.5E-08	1.4E-11	1.4E-11	3.2E-08	3.2E-08	2.5E-09	2.5E-09
Chromium +3	3.6E-08	3.6E-08	1.1E-08	1.0E-08	2.4E-08	2.4E-08	1.8E-09	1.7E-09
Chromium +6	2.1E-08	2.0E-08	6.3E-09	6.2E-09	1.4E-08	1.4E-08	1.7E-10	1.7E-10
Cobalt	1.4E-08	1.4E-08	7.4E-09	7.0E-09	6.7E-09	6.7E-09	0.0E+00	0.0E+00
Copper	9.3E-07	4.9E-07	8.9E-07	4.5E-07	4.1E-08	4.1E-08	0.0E+00	0.0E+00
Lead	3.7E-07	3.7E-07	2.4E-09	2.4E-09	3.7E-07	3.7E-07	2.7E-12	2.7E-12
Manganese	1.5E-07	1.4E-07	9.1E-08	8.5E-08	5.7E-08	5.7E-08	0.0E+00	0.0E+00
Mercury (Total) as HgCl2	2.3E-08	1.2E-08	2.2E-08	1.1E-08	1.8E-09	1.3E-09	0.0E+00	0.0E+00
Mercury (Total) as Methyl Hg	5.3E-07	4.4E-07	4.2E-10	2.1E-10	2.2E-10	2.2E-10	5.3E-07	4.4E-07
Nickel	5.0E-08	5.0E-08	2.4E-11	2.4E-11	4.9E-08	4.9E-08	3.3E-10	3.3E-10
Selenium	1.4E-08	1.4E-08	3.4E-12	3.4E-12	1.3E-08	1.3E-08	4.0E-10	4.0E-10
Zinc	7.1E-07	7.1E-07	2.7E-10	2.7E-10	6.0E-07	6.0E-07	1.0E-07	1.0E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	1.0E-12	7.1E-13	3.3E-13	2.0E-13	2.7E-14	2.5E-14	6.5E-13	4.9E-13
PCBs								
Total PCBs	1.7E-09	1.7E-09	5.7E-12	5.7E-12	2.7E-11	2.7E-11	1.7E-09	1.7E-09
PAHs								
Acenaphthene	4.5E-11	4.5E-11	9.0E-12	8.8E-12	7.1E-12	7.1E-12	2.9E-11	2.9E-11
Acenaphthylene	1.5E-11	1.5E-11	2.3E-16	2.3E-16	5.9E-13	5.9E-13	1.4E-11	1.4E-11
Anthracene	4.9E-11	4.8E-11	9.9E-12	9.3E-12	2.5E-12	2.3E-12	3.7E-11	3.6E-11
Benzo(a)anthracene	6.4E-09	6.2E-09	1.9E-10	1.7E-10	6.2E-11	6.2E-11	6.1E-09	6.0E-09
Benzo(a)pyrene	9.1E-09	9.0E-09	2.2E-10	2.0E-10	9.7E-11	9.6E-11	8.8E-09	8.7E-09
Benzo(b)fluoranthene	1.4E-08	1.4E-08	5.5E-11	5.1E-11	1.2E-11	1.2E-11	1.4E-08	1.4E-08
Benzo(k)fluoranthene	1.3E-08	1.1E-08	7.6E-10	5.7E-10	1.7E-10	1.6E-10	1.2E-08	1.1E-08
Benzo(ghi)perylene	2.1E-07	2.1E-07	9.0E-13	9.0E-13	1.2E-07	1.2E-07	9.3E-08	9.3E-08
Chrysene	3.0E-08	2.9E-08	1.4E-09	1.2E-09	4.3E-10	4.3E-10	2.8E-08	2.8E-08
Dibenzo(a,h)anthracene	1.6E-07	1.5E-07	8.1E-09	7.1E-09	3.0E-09	3.0E-09	1.5E-07	1.4E-07
Fluoranthene	2.9E-10	2.9E-10	1.7E-11	1.6E-11	3.1E-12	3.0E-12	2.7E-10	2.7E-10
Fluorene	2.1E-11	2.1E-11	1.7E-12	1.6E-12	5.5E-13	5.5E-13	1.8E-11	1.8E-11
Indeno(1,2,3-cd)pyrene	1.1E-07	1.0E-07	5.3E-09	4.8E-09	2.5E-09	2.5E-09	9.8E-08	9.6E-08
2-Methylnaphthalene	1.9E-12	1.9E-12	5.2E-19	5.2E-19	4.4E-13	4.4E-13	1.5E-12	1.5E-12
Naphthalene	7.0E-12	7.0E-12	8.8E-13	8.7E-13	2.1E-12	2.1E-12	4.0E-12	4.0E-12
Phenanthrene	9.7E-11	9.6E-11	1.1E-11	1.0E-11	2.6E-12	2.6E-12	8.4E-11	8.3E-11
Pyrene	3.7E-10	3.2E-10	7.0E-11	5.4E-11	1.0E-11	7.9E-12	2.9E-10	2.6E-10
Aldehyde Ketones								
Formaldehyde	2.2E-07	2.2E-07	1.7E-10	1.7E-10	1.6E-07	1.6E-07	6.1E-08	6.1E-08

Appendix G-6e
Summary of Cancer Risks and Hazard Indices (a)
Monocacy River Fisher Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-D-2	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	2.5E-10	NA	1.8E-10	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	2.2E-05	4E-09	3.0E-05	1E-09	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	1.3E-06	NA	1.8E-06	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	2.6E-05	NA	3.4E-05	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	1.3E-08	NA	2.3E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	3.5E-06	2E-09	6.6E-06	8E-10	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	1.8E-05	NA	4.5E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	3.0E-06	NA	2.2E-05	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	30	Manganese	1.4E-01	NA	3.5E-07	NA	1.0E-06	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	1.1E-05	NA	7.5E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	7.2E-03	NA	5.1E-03	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	1.7E-06	NA	2.4E-06	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	1.9E-06	NA	2.7E-06	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	1.8E-06	NA	2.3E-06	NA	Anemia
adult:	30								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	1.3E-03	4E-08	1.4E-03	8E-09	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	1.1E-04	2E-09	8.1E-05	3E-10	Developmental
		PAHs							
		Acenaphthene	6.0E-02	NA	7.6E-10	NA	7.3E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	1.8E-10	NA	1.6E-10	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	3E-09	NA	4E-10	
		Benzo(a)pyrene	NA	7.3E+00	NA	4E-08	NA	5E-09	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	6E-09	NA	8E-10	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	5E-10	NA	7E-11	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	1E-10	NA	2E-11	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	6E-07	NA	9E-08	
		Fluoranthene	4.0E-02	NA	9.2E-09	NA	6.9E-09	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	6.4E-10	NA	4.9E-10	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	4E-08	NA	6E-09	
		2-Methylnaphthalene	4.0E-03	NA	5.8E-10	NA	4.6E-10	NA	Lung
		Naphthalene	2.0E-02	NA	3.5E-10	NA	3.3E-10	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	1.4E-08	NA	1.2E-08	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	9.2E-07	NA	1.1E-06	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and fish consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	8.9E-03	8E-07	6.9E-03	1E-07

Appendix G-6f
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
Monocacy River Fisher Scenario - Adult and Child

Parameter		Contaminant	Ca ug/m3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
CRi = Ca *ED * EF * URF / AT * UC2		**Inorganics**									
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2											
		Antimony	4.38E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
And:		Arsenic	3.12E-06	6.0E-03	1.5E-05	4.3E-03	2.0E-04	6E-09	2.0E-04	1E-09	Cardiovascular, CNS, Developmental
Ca = Q * Fv * Cyv + (1- Fv) * Cyp		Beryllium	4.89E-07	9.0E-03	2.0E-05	2.4E-03	2.3E-05	5E-10	2.3E-05	1E-10	Sensitization
		Cadmium	4.16E-06	9.0E-03	1.0E-05	1.8E-03	4.0E-04	3E-09	4.0E-04	6E-10	
For Hg:		Chromium +3	2.95E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb		Chromium +6	1.75E-06	0.0E+00	1.0E-04	8.4E-02	1.7E-05	6E-08	1.7E-05	1E-08	Increased LDH in bronchoalveolar lavage fluid
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb		Cobalt	8.65E-07	0.0E+00	6.0E-06	9.0E-03	1.4E-04	3E-09	1.4E-04	6E-10	
		Copper	5.32E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Where:		Lead	4.67E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
CS* = Values specific to Contaminant:		Manganese	7.38E-06	0.0E+00	5.0E-05	NA	1.4E-04	NA	1.4E-04	NA	CNS
Values specific to Site:	RS*	Mercury (Total) as HgCl2	2.25E-05	8.5E-01	3.0E-04	NA	7.2E-05	NA	7.2E-05	NA	PNS, Autonomic Dysfunction
CRi = Cancer Risk inhalation (--):	CS*	Mercury (Total) as Elemental Hg	9.40E-08	1.0E+00	3.0E-04	NA	3.0E-07	NA	3.0E-07	NA	PNS, Autonomic Dysfunction
HQi = Inhalation Hazard Index (--):	CS*	Nickel	6.41E-06	9.0E-03	9.0E-05	2.4E-04	6.8E-05	6E-10	6.8E-05	1E-10	
Ca = Air Concentration (ug/m3)	CS*	Selenium	4.64E-06	0.0E+00	2.0E-02	NA	2.2E-07	NA	2.2E-07	NA	
URF = Unit Risk Factor ((ug/m3)-1):	CS*	Zinc	7.62E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
RfC = Reference Concentration (mg/m3):	CS*										
Q = COPC specific emission rate (g/s):	CS*	**Dioxins/Furans**									
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*										
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*	2,3,7,8-TCDD-TEQ	1.58E-10	6.6E-01	4.0E-08	3.8E+01	3.8E-06	2E-09	3.8E-06	5E-10	
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*										
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*	**PCBs**									
ED = Exposure Duration (see below) (yr):											
adult:	30	Total PCBs	1.11E-05	9.9E-01	NA	5.7E-04	NA	3E-09	NA	5E-10	
child:	6										
EF = Exposure Frequency (day/yr):	350	**PAHs**									
UC1 = Units Conversion (mg/ug):	0.001										
AT = Averaging Time (yr):	See Below	Acenaphthene	4.44E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Cancer:	70	Acenaphthylene	6.02E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Noncancer:	See Below	Anthracene	4.51E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
adult:	30	Benzo(a)anthracene	3.27E-07	4.8E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
child:	6	Benzo(a)pyrene	3.67E-07	2.9E-01	NA	1.1E-03	NA	2E-10	NA	3E-11	
UC2 = Units Conversion (day/yr):	365	Benzo(b)fluoranthene	9.00E-07	9.7E-01	NA	1.1E-04	NA	4E-11	NA	8E-12	
		Benzo(k)fluoranthene	5.58E-07	2.7E-01	NA	1.1E-04	NA	3E-11	NA	5E-12	
		Benzo(ghi)perylene	3.99E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Chrysene	4.84E-06	7.4E-01	NA	1.1E-05	NA	2E-11	NA	4E-12	
		Dibenzo(a,h)anthracene	3.75E-07	5.5E-02	NA	1.2E-03	NA	2E-10	NA	4E-11	
		Fluoranthene	3.95E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Fluorene	6.33E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Indeno(1,2,3-cd)pyrene	3.19E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	3E-12	
		2-Methylnaphthalene	8.63E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Naphthalene	2.66E-06	1.0E+00	3.0E-03	3.4E-05	8.5E-07	4E-11	8.5E-07	7E-12	Nasal effects
		Phenanthrene	6.75E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Pyrene	3.64E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Aldehyde Ketones									
		Formaldehyde	4.91E-05	1.0E+00	9.8E-03	1.3E-05	4.8E-06	3E-10	4.8E-06	5E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	1.1E-03	8E-08	1.1E-03	2E-08

Appendix G-6g
Ingestion of Mother's Milk
Monocacy River Fisher Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.8E-14	7.4E-13	8.0E-13	8.83E+00	2.54E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-6e						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-6g
Ingestion of Mother's Milk
Monocacy River Fisher Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
And:		2,3,7,8-TCDD TEQ	2.54E-02	6.0E+01	4.2E-04
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-7a
Contaminant Concentration in Soil
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters

Carcinogens ($T2 \leq tD$)

$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$

NonCarcinogens

$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$

Where:

$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr^{-1}):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm^3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-7a
Contaminant Concentration in Soil
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	4.2E-11	4.2E-11	4.22E-12	4.2E-12	9.9E-10	9.9E-09	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.5E-08	1.5E-08	1.50E-09	1.5E-09	1.7E-05	1.7E-04	6.0E-03	1.12E+03	1.12E+05
Beryllium	3.3E-06	3.1E-06	3.27E-07	3.3E-07	2.6E-06	2.6E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.3E-06	1.3E-06	1.28E-07	1.3E-07	2.2E-05	2.2E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	9.8E-05	7.9E-05	9.91E-05	9.7E-05	1.6E-05	1.6E-04	9.0E-03	1.60E-01	1.60E+00
Chromium +6	5.8E-05	4.7E-05	5.88E-05	5.8E-05	9.4E-06	9.4E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	6.0E-05	3.9E-05	6.86E-05	6.5E-05	4.7E-06	4.7E-05	0.0E+00	6.78E-02	6.78E-01
Copper	8.6E-04	4.3E-04	8.21E-03	4.2E-03	2.9E-05	2.9E-04	0.0E+00	3.06E-04	3.06E-03
Lead	2.1E-04	2.1E-04	2.14E-05	2.1E-05	2.5E-04	2.5E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	6.4E-04	3.9E-04	8.45E-04	7.9E-04	4.0E-05	4.0E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	6.9E-06	3.5E-06	6.89E-05	3.5E-05	2.3E-07	2.3E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	1.4E-07	7.1E-08	1.32E-06	6.8E-07	4.7E-09	4.7E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	2.1E-06	2.1E-06	2.12E-07	2.1E-07	3.4E-05	3.4E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	3.0E-07	3.0E-07	3.04E-08	3.0E-08	2.5E-05	2.5E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	2.4E-05	2.4E-05	2.41E-06	2.4E-06	4.1E-04	4.1E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	3.8E-10	2.2E-10	3.55E-09	2.1E-09	1.9E-11	1.9E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	9.1E-09	9.1E-09	6.89E-08	6.9E-08	4.6E-08	4.6E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	9.5E-09	9.4E-09	9.38E-08	9.3E-08	2.4E-08	2.4E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.8E-12	1.8E-12	1.94E-13	1.9E-13	5.4E-10	5.4E-09	1.0E+00	2.96E+02	2.79E+04
Anthracene	1.5E-09	1.4E-09	1.44E-08	1.4E-08	8.0E-10	8.0E-09	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	4.1E-08	3.7E-08	4.07E-07	3.7E-07	1.5E-08	1.5E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	5.0E-08	4.6E-08	4.98E-07	4.6E-07	2.4E-08	2.4E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	8.5E-09	7.8E-09	8.47E-08	7.8E-08	3.5E-09	3.5E-08	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	2.3E-07	1.7E-07	2.26E-06	1.7E-06	2.8E-08	2.8E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.6E-09	1.6E-09	1.25E-09	1.3E-09	3.6E-08	3.6E-07	1.0E+00	2.22E+01	2.87E+02
Chrysene	4.2E-07	3.6E-07	4.16E-06	3.6E-06	1.0E-07	1.0E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	1.5E-06	1.3E-06	1.50E-05	1.3E-05	4.0E-07	4.0E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	2.2E-09	2.1E-09	2.17E-08	2.0E-08	1.2E-09	1.2E-08	9.9E-01	5.70E-01	5.73E-01
Fluorene	2.8E-10	2.8E-10	2.78E-09	2.8E-09	1.2E-09	1.2E-08	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	9.8E-07	8.9E-07	9.83E-06	8.9E-06	3.4E-07	3.4E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.2E-14	3.2E-14	3.17E-15	3.2E-15	7.7E-10	7.7E-09	1.0E+00	2.43E+04	2.43E+06
Naphthalene	1.4E-09	1.4E-09	7.18E-09	7.2E-09	7.6E-09	7.6E-08	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	1.5E-09	1.5E-09	1.52E-08	1.5E-08	1.9E-09	1.9E-08	1.0E+00	1.26E+00	1.27E+00
Pyrene	8.5E-09	6.5E-09	8.32E-08	6.4E-08	1.1E-09	1.1E-08	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	2.0E-07	2.0E-07	2.90E-07	2.9E-07	1.2E-05	1.2E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-7a
Calculation of Soil Loss Constant
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters	
ks = ksl + ksg + ksr + kse + ksv	
where:	
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]	
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))	
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v	
where:	
theta v = 1 - (BD/ps) - theta sw	
and:	
Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-7a
Calculation of Soil Loss Constant
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-7b

Contaminant Concentration in Above Ground Vegetation

Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:

$Pd = (UC1 * 0.48Q(total) * (1-Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$

$Pd(Hg^{2+}) = 0.78Pd$

$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:

$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$

$Pv(Hg^{2+}) = 0.78Pv$

$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-7b
Contaminant Concentration in Above Ground Vegetation
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	1.3E-12	1.3E-12	1.3E-12	1.3E-12	4.2E-11	4.2E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	2.9E-05	0.0E+00	9.5E-11	9.5E-11	9.5E-11	9.5E-11	1.5E-08	1.5E-08	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	5.9E-06	0.0E+00	8.4E-09	8.1E-09	8.4E-09	8.1E-09	3.3E-06	3.1E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	5.0E-05	0.0E+00	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.3E-06	1.3E-06	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	3.5E-05	0.0E+00	4.8E-07	3.8E-07	4.8E-07	3.8E-07	9.8E-05	7.9E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	2.1E-05	0.0E+00	2.8E-07	2.3E-07	2.8E-07	2.3E-07	5.8E-05	4.7E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	1.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.0E-05	3.9E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	6.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-04	4.3E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	5.6E-04	0.0E+00	2.9E-06	2.8E-06	2.9E-06	2.8E-06	2.1E-04	2.1E-04	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	8.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.4E-04	3.9E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	4.3E-07	0.0E+00	9.4E-08	4.7E-08	9.4E-08	4.7E-08	6.9E-06	3.5E-06	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	1.2E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-07	7.1E-08	8.50E-01	6.00E-01	ND	ND	ND
Nickel	7.7E-05	0.0E+00	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.1E-06	2.1E-06	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	4.3E-05	0.0E+00	5.9E-09	5.9E-09	5.9E-09	5.9E-09	3.0E-07	3.0E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	9.2E-04	0.0E+00	2.3E-06	2.3E-06	2.3E-06	2.3E-06	2.4E-05	2.4E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	8.9E-12	2.0E-11	1.7E-12	9.9E-13	1.7E-12	9.9E-13	3.8E-10	2.2E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	1.3E-08	9.9E-09	9.1E-11	9.1E-11	9.1E-11	9.1E-11	9.1E-09	9.1E-09	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	6.4E-09	2.1E-09	2.0E-09	2.1E-09	2.0E-09	9.5E-09	9.4E-09	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	7.6E-12	3.2E-13	3.2E-13	3.2E-13	3.2E-13	1.8E-12	1.8E-12	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	1.5E-10	7.0E-11	1.4E-10	1.3E-10	1.4E-10	1.3E-10	1.5E-09	1.4E-09	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	2.8E-08	9.0E-09	8.0E-10	7.3E-10	8.0E-10	7.3E-10	4.1E-08	3.7E-08	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	4.3E-08	4.0E-08	6.6E-10	6.1E-10	6.6E-10	6.1E-10	5.0E-08	4.6E-08	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	5.0E-09	4.2E-09	9.6E-11	8.8E-11	9.6E-11	8.8E-11	8.5E-09	7.8E-09	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	6.7E-08	9.4E-08	2.6E-09	1.9E-09	2.6E-09	1.9E-09	2.3E-07	1.7E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.9E-06	9.2E-12	9.2E-12	9.2E-12	9.2E-12	1.6E-09	1.6E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	2.0E-07	7.3E-09	8.2E-09	7.1E-09	8.2E-09	7.1E-09	4.2E-07	3.6E-07	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	9.0E-07	0.0E+00	1.0E-08	8.9E-09	1.0E-08	8.9E-09	1.5E-06	1.3E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	5.2E-10	8.4E-10	1.1E-10	1.0E-10	1.1E-10	1.0E-10	2.2E-09	2.1E-09	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	4.8E-11	4.1E-11	4.0E-11	4.1E-11	4.0E-11	2.8E-10	2.8E-10	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	7.7E-07	0.0E+00	5.8E-09	5.3E-09	5.8E-09	5.3E-09	9.8E-07	8.9E-07	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	3.5E-11	7.2E-15	7.2E-15	7.2E-15	7.2E-15	3.2E-14	3.2E-14	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	2.9E-10	6.8E-10	6.8E-10	6.8E-10	6.8E-10	1.4E-09	1.4E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.1E-10	3.0E-10	1.5E-10	1.4E-10	1.5E-10	1.4E-10	1.5E-09	1.5E-09	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	3.6E-10	8.8E-10	4.8E-10	3.7E-10	4.8E-10	3.7E-10	8.5E-09	6.5E-09	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	5.7E-09	1.7E-06	1.7E-06	1.7E-06	1.7E-06	2.0E-07	2.0E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-7b

Contaminant Concentration in Below Ground Vegetation

Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-7b
Contaminant Concentration in Below Ground Vegetation
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	1.3E-12	1.3E-12	4.2E-11	4.2E-11	3.00E-02	1.0E+00
Arsenic	1.2E-10	1.2E-10	1.5E-08	1.5E-08	8.00E-03	1.0E+00
Beryllium	4.9E-09	4.7E-09	3.3E-06	3.1E-06	1.50E-03	1.0E+00
Cadmium	8.2E-08	8.2E-08	1.3E-06	1.3E-06	6.40E-02	1.0E+00
Chromium +3	4.4E-07	3.5E-07	9.8E-05	7.9E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	5.8E-05	4.7E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	6.0E-05	3.9E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	8.6E-04	4.3E-04	2.50E-01	ND
Lead	1.9E-06	1.9E-06	2.1E-04	2.1E-04	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	6.4E-04	3.9E-04	5.00E-02	ND
Mercury as HgCl2	2.5E-07	1.2E-07	6.9E-06	3.5E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	1.4E-07	7.1E-08	9.90E-02	ND
Nickel	1.7E-08	1.7E-08	2.1E-06	2.1E-06	8.00E-03	1.0E+00
Selenium	6.7E-09	6.6E-09	3.0E-07	3.0E-07	2.20E-02	1.0E+00
Zinc	2.2E-05	2.2E-05	2.4E-05	2.4E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	3.9E-12	2.2E-12	3.8E-10	2.2E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	1.3E-09	1.3E-09	9.1E-09	9.1E-09	1.42E+01	1.0E-02
PAHs						
Acenaphthene	2.0E-09	2.0E-09	9.5E-09	9.4E-09	2.13E-01	1.0E+00
Acenaphthylene	1.2E-10	1.2E-10	1.8E-12	1.8E-12	6.42E+03	1.0E-02
Anthracene	2.2E-12	2.1E-12	1.5E-09	1.4E-09	1.51E-01	1.0E-02
Benzo(a)anthracene	3.9E-11	3.5E-11	4.1E-08	3.7E-08	9.48E-02	1.0E-02
Benzo(a)pyrene	3.0E-11	2.8E-11	5.0E-08	4.6E-08	6.05E-02	1.0E-02
Benzo(b)fluoranthene	9.8E-11	9.0E-11	8.5E-09	7.8E-09	1.15E+00	1.0E-02
Benzo(k)fluoranthene	1.4E-10	1.0E-10	2.3E-07	1.7E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	3.9E-05	3.9E-05	1.6E-09	1.6E-09	2.44E+06	1.0E-02
Chrysene	4.0E-10	3.4E-10	4.2E-07	3.6E-07	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	6.1E-10	5.3E-10	1.5E-06	1.3E-06	4.05E-02	1.0E-02
Fluoranthene	3.3E-12	3.1E-12	2.2E-09	2.1E-09	1.50E-01	1.0E-02
Fluorene	5.3E-13	5.3E-13	2.8E-10	2.8E-10	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	5.2E-10	4.7E-10	9.8E-07	8.9E-07	5.29E-02	1.0E-02
2-Methylnaphthalene	6.3E-10	6.3E-10	3.2E-14	3.2E-14	2.00E+04	1.0E+00
Naphthalene	3.8E-10	3.8E-10	1.4E-09	1.4E-09	2.69E-01	1.0E+00
Phenanthrene	2.8E-12	2.7E-12	1.5E-09	1.5E-09	1.83E-01	1.0E-02
Pyrene	1.2E-11	9.4E-12	8.5E-09	6.5E-09	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	6.1E-05	6.1E-05	2.0E-07	2.0E-07	3.05E+02	1.0E+00

Appendix G-7c

Pond 2 Watershed Soil Concentration Due to Deposition

Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters

Carcinogens

Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp(-ks * tD)/ks)) - (T1 + (exp(-ks * T1))/ks)]

NonCarcinogens

Cs(tD) = (Ds * [1 - exp(-ks * tD)])/ks

Where:

Ds = [UC1 * Q/Zs * BD] * [Fv * (Dytwv) + (Dytwp) * (1 - Fv)]

For Mercury:
Ds = [UC1 * 0.48Q(total)/Zs * BD] * [FvHg2+ * (Dytwv) + (Dytwpb) * (1 - FvHg2+)]
For HgCl2: Ds(HgCl2) = Ds * 0.98
For MeHg: Ds(MeHg) = Ds * 0.02

ks = ksl + ksg + ksr + kse + ksv
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = RO/theta sw * Zs * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs)* theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
ksr = COC Loss Constant Due to Runoff (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	2
T1 = Time Peroid At Beginning Of Combustion (yr):	0
T2 = Exposure duration or ED (yr):	40
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--)	CS*
Cywv = Unitized Yearly Average Air Concentration From Vapor Phase (Watershed) (ug-s/g-m3):	RS*
Dytwv = Unitized Yearly Average Total Deposition From Vapor Phase (Watershed) (s/m2-yr):	RS*
Dytwp = Unitized Yearly Average Total Deposition From Particle Phase (Watershed) (s/m2-yr):	RS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	0
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC3 = Units Conversion (sec/yr):	3.2E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.205E-05
T = Temperature (K):	2.9E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	2.4E-01
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-7c

Pond 2Soil Concentration Due to Deposition

Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Cs Surface (2 cm) Non - Cancer	Cs Surface (2 cm) Cancer	Ds (2 cm)	Fv (unitless)	ks (yr-1)	ksl (yr-1)	ksr (yr-1)	ksv (yr-1)	ksg (yr-1)	Kds
Inorganics										
Antimony	4.2E-12	3.2E-12	9.9E-09	1.0E+00	2.3E+03	3.8E-01	1.3E-01	2.3E+03	0.0E+00	4.5E+01
Arsenic	1.5E-09	1.1E-09	1.7E-04	6.0E-03	1.1E+05	6.0E-01	2.0E-01	1.1E+05	0.0E+00	2.9E+01
Beryllium	3.3E-07	2.5E-07	2.6E-05	9.0E-03	8.0E+01	2.2E-02	7.5E-03	8.0E+01	0.0E+00	7.9E+02
Cadmium	1.3E-07	9.6E-08	2.2E-04	9.0E-03	1.7E+03	2.3E-01	7.9E-02	1.7E+03	0.0E+00	7.5E+01
Chromium +3	1.3E-04	9.8E-05	1.6E-04	9.0E-03	1.2E+00	9.1E-01	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	7.7E-05	5.8E-05	9.4E-05	0.0E+00	1.2E+00	9.1E-01	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	9.0E-05	6.8E-05	4.7E-05	0.0E+00	5.2E-01	3.8E-01	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	8.3E-03	5.2E-03	2.9E-04	0.0E+00	2.3E-03	1.7E-03	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	2.1E-05	1.6E-05	2.5E-03	7.0E-03	1.2E+02	1.9E-02	6.6E-03	1.2E+02	0.0E+00	9.0E+02
Manganese	1.1E-03	8.3E-04	4.0E-04	0.0E+00	3.6E-01	2.7E-01	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	6.9E-05	4.3E-05	2.3E-06	8.5E-01	4.0E-04	3.0E-04	1.0E-04	3.0E-08	0.0E+00	5.8E+04
Mercury as Methyl Hg	1.3E-06	8.4E-07	4.7E-08	8.5E-01	3.5E-03	2.5E-03	8.5E-04	1.9E-04	0.0E+00	7.0E+03
Nickel	2.1E-07	1.6E-07	3.4E-04	9.0E-03	1.6E+03	2.7E-01	9.1E-02	1.6E+03	0.0E+00	6.5E+01
Selenium	3.0E-08	2.3E-08	2.5E-04	0.0E+00	8.2E+03	3.4E+00	1.2E+00	8.2E+03	0.0E+00	5.0E+00
Zinc	2.4E-06	1.8E-06	4.1E-03	8.0E-03	1.7E+03	2.8E-01	9.5E-02	1.7E+03	0.0E+00	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.6E-09	2.3E-09	1.9E-10	6.6E-01	3.5E-02	4.5E-04	1.5E-04	4.8E-03	3.0E-02	3.9E+04
PCBs										
Total PCBs	6.9E-08	5.2E-08	4.6E-07	9.9E-01	6.7E+00	1.8E-02	6.0E-03	1.6E+00	5.1E+00	9.8E+02
PAHs										
Acenaphthene	9.4E-08	7.1E-08	2.4E-07	1.0E+00	2.5E+00	1.6E-02	5.4E-03	8.0E-03	2.5E+00	1.1E+03
Acenaphthylene	1.9E-13	1.5E-13	5.4E-09	1.0E+00	2.8E+04	1.0E+02	3.5E+01	2.8E+04	0.0E+00	3.7E-02
Anthracene	1.4E-08	1.1E-08	8.0E-09	1.0E+00	5.6E-01	3.9E-03	1.3E-03	7.9E-04	5.5E-01	4.5E+03
Benzo(a)anthracene	4.1E-07	3.0E-07	1.5E-07	4.8E-01	3.7E-01	2.9E-04	9.9E-05	1.6E-04	3.7E-01	6.0E+04
Benzo(a)pyrene	5.0E-07	3.7E-07	2.4E-07	2.9E-01	4.8E-01	1.1E-04	3.7E-05	1.6E-05	4.8E-01	1.6E+05
Benzo(b)fluoranthene	8.5E-08	6.4E-08	3.5E-08	9.7E-01	4.1E-01	1.7E-03	5.7E-04	5.8E-04	4.1E-01	1.0E+04
Benzo(k)fluoranthene	2.3E-06	1.6E-06	2.8E-07	2.7E-01	1.2E-01	9.1E-05	3.1E-05	2.4E-07	1.2E-01	1.9E+05
Benzo(ghi)perylene	1.5E-09	1.1E-09	3.6E-07	1.0E+00	2.4E+02	1.2E+02	4.2E+01	7.2E+01	0.0E+00	9.1E-03
Chrysene	4.2E-06	3.1E-06	1.0E-06	7.4E-01	2.5E-01	2.9E-04	9.9E-05	8.7E-05	2.5E-01	6.0E+04
Dibenzo(a,h)anthracene	1.5E-05	1.1E-05	4.0E-06	5.5E-02	2.7E-01	3.0E-05	1.0E-05	1.4E-09	2.7E-01	5.8E+05
Fluoranthene	2.2E-08	1.6E-08	1.2E-08	9.9E-01	5.7E-01	1.6E-03	5.4E-04	8.0E-05	5.7E-01	1.1E+04
Fluorene	2.8E-09	2.1E-09	1.2E-08	1.0E+00	4.2E+00	8.3E-03	2.8E-03	1.7E-03	4.2E+00	2.1E+03
Indeno(1,2,3-cd)pyrene	9.8E-06	7.4E-06	3.4E-06	5.0E-03	3.5E-01	3.3E-05	1.1E-05	1.7E-07	3.5E-01	5.3E+05
2-Methylnaphthalene	3.2E-15	2.4E-15	7.7E-09	1.0E+00	2.4E+06	1.2E+02	4.2E+01	2.4E+06	0.0E+00	8.1E-03
Naphthalene	7.2E-09	5.4E-09	7.6E-08	1.0E+00	1.1E+01	5.8E-02	2.0E-02	5.2E+00	5.3E+00	3.0E+02
Phenanthrene	1.5E-08	1.1E-08	1.9E-08	1.0E+00	1.3E+00	4.7E-03	1.6E-03	3.4E-04	1.3E+00	3.7E+03
Pyrene	8.4E-08	6.0E-08	1.1E-08	9.9E-01	1.3E-01	1.8E-03	6.2E-04	6.3E-05	1.3E-01	9.5E+03
Aldehyde Ketones										
Formaldehyde	3.3E-07	2.5E-07	1.2E-04	1.0E+00	3.5E+02	1.1E+02	3.9E+01	1.6E+02	3.6E+01	2.0E-02

Appendix G-7c

Calculation of Pond Total Waterbody Load

Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters

LT = LDif + LDep + LRI + LR + LE

Where:

LDep = Q * [Fv * Dytwv(pond) + (1 - Fv) * Dytwp(pond)] * WAw

LDep (Hg) = 0.48Q(total) * [FvHg2+ * Dywtv(pond) + (1 - FvHg2+) * Dytwp(pond)] * WAw

LRI = Q * [Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed] * WAi

LRI(Hg) = 0.48Q(total) * (Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed)) * WAi

LR = UC1 * RO * (WAL - WAi) * ((Cs * BD)/(theta sw + Kds * BD))

LE = Xe * (WAL - WAi) * SD * ER * (Cs * Kds * BD)/(theta sw + Kds * BD) * UC2

LDif = (Kv * Q * Fv * Cywv(pond) * WAw * UC5)/(H/(R * Twk))

LDif (Hg) = (Kv * 0.48Q(total) * FvHg2+ * Cywv(pond) * WAw * UC5)/(H/(R * Twk))

Xe = RF * K * LS * C * PF * (UC3/UC4)

$SD = a * (WAl)^{-b}$

$Kv = ([KL^{-1} + (KG * (H/(R * T))^{-1})]^{-1}) * \theta^{Twk - 293}$

$KL = (Cd^{0.5} * W) * (\rho a/\rho w)^{0.5} * (k^{0.33}/\lambda z) * (\mu w/\rho w * Dw)^{-0.67} * UC6$ (For quiescent lakes or ponds)

$KG = (Cd^{0.5} * W) * (k^{0.3}3/\lambda z) * (\mu a/\rho a * Da)^{-0.67} * UC6$ (For quiescent lakes or ponds)

and:

Values Specific to Contaminant:	CS*
Values Specific to Site:	RS*
LT = Total Contaminant Load to the Water Body (g/yr):	CS*
LDep = Deposition of Particle Phase and Wet Vapor Phase Contaminant Load to the Water Body (g/yr):	CS*
LRI = Runoff Load From Impervious Surfaces (g/yr):	CS*
LR = Runoff Load From Pervious Surface (g/yr):	CS*
LE = Soil Erosion Load (g/yr):	CS*
LDif = Dry Vapor Phase Diffusion Load to Water Body (g/yr):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dytwv = Yearly Average (Wet and Dry) Deposition From Vapor Phase (g/m2-yr):	RS*
Dytwp = Yearly Average Total (Wet and Dry) Deposition From Particle Phase (g/m2-yr):	RS*
Cywv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
WAw = Water Body Area (m2):	5.0E+03
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	0.00E+00
UC1 = Units Conversion Factor (kg-cm2/mg-m2):	0.01
WAL = Total Watershed Area Receiving Pollutant Deposition (m2):	1.89E+05
RO = Average Annual Surface Runoff (cm/yr):	17.8
Cs = Contaminant Level in Watershed Soil (mg/kg):	CS*
BD = Soil Bulk Density (g/cm3):	1.5
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-water partition coefficient (cm3/g or ml/g):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	2.3
SD = Sediment Delivery Ratio (--):	0.46
ER = Contaminant Enrichment Ratio (--):	See Below
Inorganics:	1
Organics:	3
UC2 = Units Conversion Factor (g/mg):	1.0E-03
RF = "Erosivity" Factor (yr-1):	175
K = "Erodibility" Factor (tons/acre):	0.39
LS = "Topographic or Slope Length" Factor (--):	1.5
C = "Cover Management" Factor (--):	0.1
PF = "Supporting Practice" Factor (--):	1
a = Empirical Intercept Coefficient:	2.1
b = Empirical Slope Coefficient:	0.125
UC3 = Units Conversion Factor (kg/ton):	907.18
UC4 = Units Conversion Factor (m2/acre):	4.0E+03
Kv = Overall Transfer Rate Coefficient (m/yr):	CS*
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Universal Gas Constant (atm-m3/mol-K):	8.2E-05
Twk = Water Body Temperature (K):	286.0
theta = Temperature Correction Factor (--):	1.026
KL = Liquid Phase Transfer Coefficient (m/yr):	CS*
Dw = Diffusivity of COC in Water (cm3/s):	CS*
UC5 = Units Conversion Factor (g/ug):	1.00E-06
UC6 = Units Conversion Factor (s/yr):	3.2E+07
Kg = Gas Phase Transfer Coefficient (m/yr):	CS*
Cd = Drag Coefficient (- -):	1.1E-03
W = Average Annual Wind Speed (m/s):	2.2
ρa = Density of Air (g/cm3):	1.20E-03
ρw = Density of Water (g/cm3):	1
k = von Karman's constant (- -):	0.4
λz = Dimensionless viscous sublayer thickness (- -):	4
μw = Viscosity of Water Corresponding to Water Temperature (g/cm-s):	0.0169
μa = Viscosity of Air Corresponding to Air Temperature (g/cm-s):	1.81E-04

Appendix G-7c
Calculation of Pond Total Waterbody Load
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	LT Non - Cancer	LT Cancer	LDiff	LDep	LRI	LR Non - Cancer	LR Cancer	LE Non - Cancer	LE Cancer	Fv (unitless)	Kv	KL
Inorganics												
Antimony	2.3E-06	2.3E-06	6.6E-07	1.6E-06	0.0E+00	3.2E-09	2.4E-09	8.4E-10	6.3E-10	1.0E+00	8.2E+01	9.8E+01
Arsenic	5.8E-03	5.8E-03	0.0E+00	5.8E-03	0.0E+00	1.7E-06	1.3E-06	3.0E-07	2.2E-07	6.0E-03	8.2E+01	9.8E+01
Beryllium	9.9E-04	9.7E-04	0.0E+00	9.1E-04	0.0E+00	1.4E-05	1.0E-05	6.5E-05	4.9E-05	9.0E-03	8.2E+01	9.8E+01
Cadmium	7.8E-03	7.8E-03	0.0E+00	7.7E-03	0.0E+00	5.7E-05	4.3E-05	2.6E-05	1.9E-05	9.0E-03	8.2E+01	9.8E+01
Chromium +3	2.6E-01	2.0E-01	0.0E+00	5.5E-03	0.0E+00	2.3E-01	1.7E-01	2.6E-02	1.9E-02	9.0E-03	ND	1.3E+02
Chromium +6	1.5E-01	1.2E-01	0.0E+00	3.2E-03	0.0E+00	1.4E-01	1.0E-01	1.5E-02	1.2E-02	0.0E+00	ND	ND
Cobalt	8.7E-02	6.6E-02	0.0E+00	1.6E-03	0.0E+00	6.7E-02	5.1E-02	1.8E-02	1.3E-02	0.0E+00	ND	1.3E+02
Copper	1.7E+00	1.1E+00	0.0E+00	9.9E-03	0.0E+00	2.8E-02	1.8E-02	1.7E+00	1.0E+00	0.0E+00	ND	1.3E+02
Lead	9.2E-02	9.0E-02	0.0E+00	8.7E-02	0.0E+00	8.0E-04	6.0E-04	4.3E-03	3.2E-03	7.0E-03	8.2E+01	9.8E+01
Manganese	8.1E-01	6.1E-01	0.0E+00	1.4E-02	0.0E+00	5.8E-01	4.3E-01	2.2E-01	1.7E-01	0.0E+00	ND	1.3E+02
Mercury as HgCl2	2.0E-02	1.5E-02	6.0E-03	4.0E-04	0.0E+00	4.0E-05	2.5E-05	1.4E-02	8.6E-03	8.5E-01	4.8E-03	6.6E+01
Mercury as Methyl Hg	6.9E-03	6.8E-03	6.2E-03	4.0E-04	0.0E+00	6.5E-06	4.1E-06	2.7E-04	1.7E-04	8.5E-01	3.3E+00	7.3E+01
Nickel	1.2E-02	1.2E-02	0.0E+00	1.2E-02	0.0E+00	1.1E-04	8.2E-05	4.2E-05	3.2E-05	9.0E-03	8.2E+01	9.8E+01
Selenium	8.8E-03	8.8E-03	0.0E+00	8.6E-03	0.0E+00	2.0E-04	1.5E-04	5.9E-06	4.4E-06	0.0E+00	8.2E+01	9.8E+01
Zinc	1.4E-01	1.4E-01	0.0E+00	1.4E-01	0.0E+00	1.3E-03	9.8E-04	4.8E-04	3.6E-04	8.0E-03	8.2E+01	9.8E+01
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	2.2E-06	1.4E-06	1.1E-08	3.3E-08	0.0E+00	3.1E-09	2.0E-09	2.1E-06	1.4E-06	6.6E-01	5.0E+01	6.9E+01
PCBs												
Total PCBs	1.5E-04	1.4E-04	3.5E-05	7.5E-05	0.0E+00	2.4E-06	1.8E-06	4.1E-05	3.1E-05	9.9E-01	5.0E+01	6.1E+01
PAHs												
Acenaphthene	1.7E-04	1.6E-04	5.4E-05	5.8E-05	0.0E+00	2.9E-06	2.2E-06	5.6E-05	4.2E-05	1.0E+00	4.2E+01	1.0E+02
Acenaphthylene	3.2E-05	3.2E-05	3.0E-06	2.9E-05	0.0E+00	3.8E-08	2.9E-08	2.5E-11	1.9E-11	1.0E+00	3.0E+01	3.6E+01
Anthracene	3.0E-05	2.8E-05	7.8E-06	1.3E-05	0.0E+00	1.1E-07	8.1E-08	8.7E-06	6.5E-06	1.0E+00	2.4E+01	1.0E+02
Benzo(a)anthracene	4.1E-04	3.4E-04	8.5E-05	7.5E-05	0.0E+00	2.3E-07	1.7E-07	2.4E-04	1.8E-04	4.8E-01	1.9E+01	9.4E+01
Benzo(a)pyrene	4.8E-04	4.0E-04	1.0E-04	7.4E-05	0.0E+00	1.0E-07	7.9E-08	3.0E-04	2.2E-04	2.9E-01	6.6E+00	9.4E+01
Benzo(b)fluoranthene	1.4E-04	1.2E-04	1.3E-05	7.2E-05	0.0E+00	2.7E-07	2.0E-07	5.1E-05	3.8E-05	9.7E-01	3.4E+01	1.0E+02
Benzo(k)fluoranthene	1.4E-03	1.0E-03	1.4E-05	5.9E-05	0.0E+00	4.0E-07	2.8E-07	1.4E-03	9.6E-04	2.7E-01	4.3E-01	1.0E+02
Benzo(ghi)perylene	6.7E-04	5.8E-04	1.2E-04	1.9E-04	0.0E+00	3.6E-04	2.7E-04	5.8E-08	4.4E-08	1.0E+00	1.6E+00	2.4E+01
Chrysene	3.0E-03	2.3E-03	7.4E-05	4.1E-04	0.0E+00	2.3E-06	1.7E-06	2.5E-03	1.9E-03	7.4E-01	3.1E+01	1.0E+02
Dibenzo(a,h)anthracene	9.6E-03	7.3E-03	0.0E+00	6.3E-04	0.0E+00	8.7E-07	6.5E-07	9.0E-03	6.7E-03	5.5E-02	7.9E-03	1.0E+02
Fluoranthene	4.6E-05	4.2E-05	8.7E-06	2.4E-05	0.0E+00	6.7E-08	5.0E-08	1.3E-05	9.8E-06	9.9E-01	7.6E+00	1.0E+02
Fluorene	2.8E-05	2.8E-05	1.1E-05	1.6E-05	0.0E+00	4.5E-08	3.4E-08	1.7E-06	1.3E-06	1.0E+00	2.4E+01	1.0E+02
Indeno(1,2,3-cd)pyrene	6.5E-03	5.0E-03	0.0E+00	5.9E-04	0.0E+00	6.3E-07	4.7E-07	5.9E-03	4.4E-03	5.0E-03	8.3E-01	1.0E+02
2-Methylnaphthalene	6.6E-06	6.6E-06	2.4E-07	6.4E-06	0.0E+00	7.6E-10	5.7E-10	1.1E-13	8.2E-14	1.0E+00	3.2E+01	3.8E+01
Naphthalene	5.5E-05	5.4E-05	1.7E-05	3.3E-05	0.0E+00	8.1E-07	6.1E-07	4.3E-06	3.2E-06	1.0E+00	6.8E+01	8.4E+01
Phenanthrene	5.6E-05	5.4E-05	1.4E-05	3.2E-05	0.0E+00	1.4E-07	1.0E-07	9.1E-06	6.9E-06	1.0E+00	1.1E+01	1.0E+02
Pyrene	8.3E-05	6.9E-05	8.3E-06	2.4E-05	0.0E+00	3.0E-07	2.1E-07	5.0E-05	3.6E-05	9.9E-01	5.4E+00	1.0E+02
Aldehyde Ketones												
Formaldehyde	1.3E-01	1.1E-01	3.8E-02	1.9E-02	0.0E+00	7.3E-02	5.4E-02	2.6E-05	1.9E-05	1.0E+00	5.4E+00	1.6E+02

Appendix G-7c
Calculation of Potomac River Water Concentration
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters

Cwtot = LT/Vfx * fwc + kwt * WAw * (dwc + dbs)
Cwt = fwc * Cwtot * (dwc + dbs/dwc)
Cdw = Cwt/1 + Kdsw * TSS * 10-6
Cdw(Hg) = Cwt(Hg2+)/1 + Kdsw(Hg2+)* TSS * 10-6
Cdw Hg2+ = Cdw (Hg) * 0.85
Cdw MeHg = Cdw (Hg) * 0.15
Csb = fbs * Cwtot * (Kdbs / thetabs + Kdbs * Cbs) * (dwc + dbs/dbs)

Where:

fwc = (1 + Kdsw * TSS * 10-6) * (dwc/dz)/(1 + Kdsw * TSS * 10-6) * (dwc/dz) + (thetabs + Kdbs * Cbs) * (dbs/dz)
kwt = fwc * kv + fbs * kb
fbs = 1 - fwc
kv = Kv/(dz * (1 + Kdsw * TSS * 10-6)
kb = [(Xe * WAl * SD * 10+3 - Vfx * TSS)/(WAw *TSS)] * [(TSS * 10-6)/(Cbs * dbs)]
TSS = (Xe * (WAl-WAi) * SD * 103)/(Vfx + Dss * WAw)
and:

Values Specific to Contaminant:	CS*
Cwtot = Total Water Body Concentration (g/m3=mg/L):	CS*
Cwt = Total Concentration in Water Column (mg/L):	CS*
Cdw = Dissolved Phase Water Concentration (mg/L):	CS*
Csb = Concentration Sorbed to Bed Sediments (mg/L):	CS*
fwc = Fraction of Total Water Body Concentration That Occurs in the Water Column (--):	CS*
kwt = Total First Order Dissipation Rate Constant (yr-1):	CS*
fbs = Fraction of Total Water Body Concentration That Occurs in the Bed Sediment (--):	CS*
LT = Total Contaminant Load to the Water Body (mg/yr):	CS*
Vfx = Average Volumetric Flow Rate Through Water Body (m3/yr):	6.74E+04
dwc = Depth of Water Column (m):	1.5E+00
dbs = Depth of Upper Benthic Sediment Layer (m):	3.0E-02
dz = Total Waterbody Depth (m):	1.5E+00
WAw = Water Body Area (m2):	5.0E+03
UC1 = Units Conversion Factor (g/mg):	1.0E+03
Kdsw = Suspended Sediment/Surface Water Partition Coefficient (L/kg):	CS*
TSS = Total Suspended Solids (mg/L):	2.2E+01
thetabs = Bed Sediment Porosity (Lwater/L):	6.0E-01
Kdbs = Bed Sediment/Sediment Pore Water Partition Coefficient (L/kg):	CS*
Cbs = Bed Sediment Concentration (g/cm3):	1.0E+00
kv = Water Column Volatilization Rate Constant (yr-1):	CS*
kb = Benthic Burial Rate Constant (yr-1):	1.3E+00
Kv = Overall COC Transfer Rate Coefficient (m/yr):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	2.29E+00
SD = Sediment Delivery Ratio (--):	4.6E-01
WAl = Total Watershed Area Recieving Pollutant Deposition (m2):	1.9E+05
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	0
Dss = Suspended solids depostion rate (m/yr):	1.8E+03

Appendix G-7c
Calculation of Potomac River Water Concentration
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Cwtot		Cwt		Cdw		Csb		fwc	fbs	kwt	kv	Kdsw	Kdbs
	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer						
Inorganics														
Antimony	8.85E-12	8.85E-12	4.72E-12	4.72E-12	4.72E-12	4.72E-12	2.1E-10	2.1E-10	5.2E-01	4.8E-01	2.9E+01	5.4E+01	4.5E+01	4.5E+01
Arsenic	1.91E-08	1.91E-08	1.22E-08	1.22E-08	1.22E-08	1.22E-08	3.5E-07	3.5E-07	6.3E-01	3.7E-01	3.4E+01	5.4E+01	2.9E+01	2.9E+01
Beryllium	2.60E-08	2.55E-08	1.60E-09	1.57E-09	1.57E-09	1.54E-09	1.2E-06	1.2E-06	6.0E-02	9.4E-01	4.4E+00	5.3E+01	7.9E+02	7.9E+02
Cadmium	3.98E-08	3.97E-08	1.62E-08	1.61E-08	1.61E-08	1.61E-08	1.2E-06	1.2E-06	4.0E-01	6.0E-01	2.2E+01	5.4E+01	7.5E+01	7.5E+01
Chromium +3	5.09E-06	3.84E-06	3.73E-06	2.81E-06	3.73E-06	2.81E-06	7.1E-05	5.3E-05	7.2E-01	2.8E-01	3.7E-01	0.0E+00	1.9E+01	1.9E+01
Chromium +6	3.02E-06	2.28E-06	2.21E-06	1.67E-06	2.21E-06	1.67E-06	4.2E-05	3.2E-05	7.2E-01	2.8E-01	3.7E-01	0.0E+00	1.9E+01	1.9E+01
Cobalt	2.17E-06	1.64E-06	1.16E-06	8.73E-07	1.16E-06	8.72E-07	5.2E-05	3.9E-05	5.2E-01	4.8E-01	6.3E-01	0.0E+00	4.5E+01	4.5E+01
Copper	1.62E-04	1.02E-04	1.00E-06	6.29E-07	8.21E-07	5.16E-07	8.2E-03	5.2E-03	6.0E-03	9.9E-01	1.3E+00	0.0E+00	1.0E+04	1.0E+04
Lead	2.64E-06	2.60E-06	1.44E-07	1.42E-07	1.42E-07	1.40E-07	1.3E-04	1.3E-04	5.4E-02	9.5E-01	4.1E+00	5.3E+01	9.0E+02	9.0E+02
Manganese	2.32E-05	1.75E-05	1.02E-05	7.71E-06	1.02E-05	7.70E-06	6.7E-04	5.0E-04	4.3E-01	5.7E-01	7.5E-01	0.0E+00	6.5E+01	6.5E+01
Mercury as HgCl2	1.96E-06	1.46E-06	6.33E-09	4.70E-09	1.69E-09	1.26E-09	1.0E-04	7.4E-05	3.2E-03	1.0E+00	1.3E+00	9.9E-04	1.0E+05	5.0E+04
Mercury as Methyl Hg	5.22E-07	5.14E-07	2.67E-08	2.64E-08	2.99E-10	2.22E-10	2.5E-05	2.5E-05	5.0E-02	9.5E-01	1.3E+00	6.8E-01	1.0E+05	3.0E+03
Nickel	5.68E-08	5.66E-08	2.51E-08	2.50E-08	2.50E-08	2.50E-08	1.6E-06	1.6E-06	4.3E-01	5.7E-01	2.4E+01	5.4E+01	6.5E+01	6.5E+01
Selenium	2.05E-08	2.04E-08	1.88E-08	1.87E-08	1.88E-08	1.87E-08	9.4E-08	9.3E-08	9.0E-01	1.0E-01	4.8E+01	5.4E+01	5.0E+00	5.0E+00
Zinc	6.58E-07	6.56E-07	2.98E-07	2.97E-07	2.98E-07	2.97E-07	1.8E-05	1.8E-05	4.4E-01	5.6E-01	2.5E+01	5.4E+01	6.2E+01	6.2E+01
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	2.11E-10	1.39E-10	5.07E-13	3.33E-13	6.90E-14	4.54E-14	1.1E-08	7.1E-09	2.4E-03	1.0E+00	1.3E+00	4.4E+00	2.9E+05	1.6E+05
PCBs														
Total PCBs	1.09E-08	1.02E-08	1.62E-10	1.51E-10	1.40E-10	1.30E-10	5.5E-07	5.1E-07	1.5E-02	9.9E-01	1.7E+00	2.8E+01	7.4E+03	3.9E+03
PAHs														
Acenaphthene	2.66E-09	2.43E-09	5.53E-10	5.05E-10	5.49E-10	5.01E-10	1.1E-07	9.8E-08	2.0E-01	8.0E-01	6.6E+00	2.7E+01	3.7E+02	2.0E+02
Acenaphthylene	1.49E-10	1.49E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	2.2E-11	2.2E-11	9.9E-01	1.5E-02	1.9E+01	2.0E+01	2.8E-01	1.5E-01
Anthracene	1.55E-09	1.43E-09	8.26E-11	7.65E-11	7.95E-11	7.36E-11	7.5E-08	6.9E-08	5.2E-02	9.5E-01	2.1E+00	1.5E+01	1.8E+03	9.4E+02
Benzo(a)anthracene	3.76E-08	3.19E-08	2.11E-10	1.79E-10	1.33E-10	1.13E-10	1.9E-06	1.6E-06	5.5E-03	9.9E-01	1.4E+00	7.8E+00	2.7E+04	1.4E+04
Benzo(a)pyrene	4.60E-08	3.87E-08	1.56E-10	1.31E-10	6.03E-11	5.08E-11	2.3E-06	2.0E-06	3.3E-03	1.0E+00	1.3E+00	1.7E+00	7.3E+04	3.9E+04
Benzo(b)fluoranthene	1.29E-08	1.17E-08	4.24E-11	3.84E-11	1.57E-11	1.42E-11	6.6E-07	5.9E-07	3.2E-03	1.0E+00	1.3E+00	8.3E+00	7.9E+04	4.2E+04
Benzo(k)fluoranthene	1.38E-07	1.00E-07	4.64E-10	3.35E-10	1.77E-10	1.28E-10	7.0E-06	5.1E-06	3.3E-03	1.0E+00	1.3E+00	1.1E-01	7.4E+04	4.0E+04
Benzo(ghi)perylene	8.91E-09	7.70E-09	8.97E-09	7.76E-09	8.97E-09	7.76E-09	3.3E-10	2.8E-10	9.9E-01	1.3E-02	1.1E+00	1.1E+00	6.8E-02	3.6E-02
Chrysene	2.74E-07	2.15E-07	1.43E-09	1.12E-09	8.65E-10	6.79E-10	1.4E-05	1.1E-05	5.1E-03	9.9E-01	1.4E+00	1.2E+01	3.0E+04	1.6E+04
Dibenzo(a,h)anthracene	9.35E-07	7.11E-07	2.60E-09	1.98E-09	6.64E-10	5.05E-10	4.8E-05	3.6E-05	2.7E-03	1.0E+00	1.3E+00	1.3E-03	1.3E+05	7.2E+04
Fluoranthene	3.63E-09	3.37E-09	9.91E-11	9.20E-11	9.18E-11	8.52E-11	1.8E-07	1.7E-07	2.7E-02	9.7E-01	1.4E+00	4.6E+00	3.7E+03	2.0E+03
Fluorene	8.13E-10	8.01E-10	1.17E-10	1.15E-10	1.15E-10	1.14E-10	3.6E-08	3.5E-08	1.4E-01	8.6E-01	3.3E+00	1.6E+01	5.8E+02	3.1E+02
Indeno(1,2,3-cd)pyrene	6.32E-07	4.87E-07	1.57E-09	1.21E-09	2.61E-10	2.02E-10	3.2E-05	2.5E-05	2.4E-03	1.0E+00	1.3E+00	9.0E-02	2.3E+05	1.2E+05
2-Methylnaphthalene	2.97E-11	2.97E-11	2.99E-11	2.99E-11	2.99E-11	2.99E-11	9.8E-13	9.8E-13	9.9E-01	1.2E-02	2.1E+01	2.1E+01	6.1E-02	3.3E-02
Naphthalene	2.58E-10	2.52E-10	1.34E-10	1.31E-10	1.34E-10	1.31E-10	6.4E-09	6.2E-09	5.1E-01	4.9E-01	2.3E+01	4.5E+01	8.9E+01	4.8E+01
Phenanthrene	3.69E-09	3.54E-09	1.76E-10	1.69E-10	1.69E-10	1.62E-10	1.8E-07	1.7E-07	4.7E-02	9.5E-01	1.6E+00	6.6E+00	2.0E+03	1.1E+03
Pyrene	7.08E-09	5.85E-09	1.44E-10	1.19E-10	1.30E-10	1.07E-10	3.5E-07	2.9E-07	2.0E-02	9.8E-01	1.4E+00	3.2E+00	5.1E+03	2.7E+03
Aldehyde Ketones														
Formaldehyde	1.39E-06	1.19E-06	1.40E-06	1.20E-06	1.40E-06	1.20E-06	1.3E-07	1.1E-07	9.9E-01	1.4E-02	3.5E+00	3.6E+00	1.7E-01	9.0E-02

Appendix G-7d
Calculation of Fish Concentration
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters	
Cfishdw = Cdw * BCFfish or	
Cfishdw = Cdw * BAFfish or	
Cfishsb = Csb * flipid * BSAF/ OCsed	
Where:	
Values Specific to Contaminant:	CS*
Cfish = Contaminant Concentration In Fish (mg/kg):	CS*
Cfishdw = Fish Concentration from Dissolved Water Concentration (mg/kg):	CS*
Cfishsb = Fish Concentration from Bed Sediments (mg/kg):	CS*
Cdw = Dissolved Water Concentration (mg/L):	CS*
Cwt = Total Water Column Concentration (mg/L):	CS*
Csb = Concentration of Contaminant Sorbed to Bed Sediment (mg/kg):	CS*
BCFfish = Fish Bioconcentration Factor (L/kg):	CS*
BAFfish = Fish Bioaccumulation Factor (L/kg):	CS*
BSAF = Biota to Sediment Accumulation Factor (--):	CS*
flipid = Fish Lipid Content:	7.0E-02
OCsed = Fraction Organic Carbon in Bottom Sediment:	4.0E-02

Appendix G-7d
Calculation of Fish Concentration
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Cfish		Cfishdw_BCF		BCF	Cfishdw_BAF		BAF	Cfishsb		BSAF
	Non - Cancer	Cancer	Non - Cancer	Cancer		Non - Cancer	Cancer		Non - Cancer	Cancer	
Inorganics											
Antimony	1.9E-10	1.9E-10	1.9E-10	1.9E-10	4.0E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Arsenic	1.4E-06	1.4E-06	1.4E-06	1.4E-06	1.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Beryllium	9.8E-08	9.6E-08	9.8E-08	9.6E-08	6.2E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cadmium	1.5E-05	1.5E-05	1.5E-05	1.5E-05	9.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +3	7.1E-05	5.3E-05	7.1E-05	5.3E-05	1.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +6	7.0E-06	5.3E-06	7.0E-06	5.3E-06	3.2E+00	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cobalt	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Copper	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Lead	1.3E-08	1.3E-08	1.3E-08	1.3E-08	9.0E-02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Manganese	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as HgCl2	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as Methyl Hg	2.0E-03	1.5E-03	0.0E+00	0.0E+00	ND	2.0E-03	1.5E-03	6.8E+06	0.0E+00	0.0E+00	ND
Nickel	2.0E-06	1.9E-06	2.0E-06	1.9E-06	7.8E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Selenium	2.4E-06	2.4E-06	2.4E-06	2.4E-06	1.3E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Zinc	6.1E-04	6.1E-04	6.1E-04	6.1E-04	2.1E+03	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	1.7E-09	1.1E-09	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	1.7E-09	1.1E-09	9.0E-02
PCBs											
Total PCBs	1.9E-06	1.8E-06	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	1.9E-06	1.8E-06	2.0E+00
PAHs											
Acenaphthene	1.1E-07	1.0E-07	1.1E-07	1.0E-07	2.0E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Acenaphthylene	4.1E-08	4.1E-08	0.0E+00	0.0E+00	ND	4.1E-08	4.1E-08	2.7E+02	0.0E+00	0.0E+00	ND
Anthracene	8.2E-08	7.6E-08	0.0E+00	0.0E+00	ND	8.2E-08	7.6E-08	1.0E+03	0.0E+00	0.0E+00	ND
Benzo(a)anthracene	6.7E-06	5.6E-06	0.0E+00	0.0E+00	ND	6.7E-06	5.6E-06	5.0E+04	0.0E+00	0.0E+00	ND
Benzo(a)pyrene	8.0E-06	6.8E-06	0.0E+00	0.0E+00	ND	8.0E-06	6.8E-06	1.3E+05	0.0E+00	0.0E+00	ND
Benzo(b)fluoranthene	3.2E-06	2.9E-06	0.0E+00	0.0E+00	ND	3.2E-06	2.9E-06	2.1E+05	0.0E+00	0.0E+00	ND
Benzo(k)fluoranthene	3.1E-05	2.3E-05	0.0E+00	0.0E+00	ND	3.1E-05	2.3E-05	1.8E+05	0.0E+00	0.0E+00	ND
Benzo(ghi)perylene	2.3E-04	2.0E-04	0.0E+00	0.0E+00	ND	2.3E-04	2.0E-04	2.5E+04	0.0E+00	0.0E+00	ND
Chrysene	4.3E-05	3.4E-05	0.0E+00	0.0E+00	ND	4.3E-05	3.4E-05	5.0E+04	0.0E+00	0.0E+00	ND
Dibenzo(a,h)anthracene	3.3E-04	2.5E-04	0.0E+00	0.0E+00	ND	3.3E-04	2.5E-04	5.0E+05	0.0E+00	0.0E+00	ND
Fluoranthene	4.1E-07	3.8E-07	0.0E+00	0.0E+00	ND	4.1E-07	3.8E-07	4.5E+03	0.0E+00	0.0E+00	ND
Fluorene	5.4E-08	5.4E-08	0.0E+00	0.0E+00	ND	5.4E-08	5.4E-08	4.7E+02	0.0E+00	0.0E+00	ND
Indeno(1,2,3-cd)pyrene	1.6E-04	1.2E-04	0.0E+00	0.0E+00	ND	1.6E-04	1.2E-04	6.2E+05	0.0E+00	0.0E+00	ND
2-Methylnaphthalene	5.6E-09	5.6E-09	5.6E-09	5.6E-09	1.9E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Naphthalene	9.3E-09	9.1E-09	9.3E-09	9.1E-09	6.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Phenanthrene	1.7E-07	1.7E-07	0.0E+00	0.0E+00	ND	1.7E-07	1.7E-07	1.0E+03	2.3E-09	2.2E-09	7.3E-03
Pyrene	4.3E-07	3.5E-07	0.0E+00	0.0E+00	ND	4.3E-07	3.5E-07	3.3E+03	1.5E-09	1.2E-09	2.4E-03
Aldehyde Ketones											
Formaldehyde	4.8E-04	4.1E-04	4.8E-04	4.1E-04	3.4E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND

Appendix G-7e
Calculation of Chemical Intakes
Resident Fisher Near Farm 1/Pond 2 Scenario: Adult

Parameter

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep= Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp =Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	0.5
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	1.2E-13	1.2E-13	6.0E-18	6.0E-18	3.4E-16	3.4E-16	1.2E-13	1.2E-13
Arsenic	3.0E-09	3.0E-09	2.1E-15	2.1E-15	2.2E-09	2.2E-09	8.7E-10	8.7E-10
Beryllium	5.0E-10	5.0E-10	4.7E-13	4.7E-13	4.4E-10	4.4E-10	6.1E-11	6.0E-11
Cadmium	1.3E-08	1.3E-08	1.8E-13	1.8E-13	3.8E-09	3.8E-09	9.1E-09	9.1E-09
Chromium +3	4.7E-08	3.6E-08	1.4E-10	1.4E-10	2.8E-09	2.7E-09	4.4E-08	3.3E-08
Chromium +6	6.1E-09	5.0E-09	8.4E-11	8.2E-11	1.6E-09	1.6E-09	4.4E-09	3.3E-09
Cobalt	8.8E-10	8.7E-10	9.8E-11	9.3E-11	7.8E-10	7.8E-10	0.0E+00	0.0E+00
Copper	1.7E-08	1.1E-08	1.2E-08	6.0E-09	4.8E-09	4.8E-09	0.0E+00	0.0E+00
Lead	4.3E-08	4.3E-08	3.1E-11	3.1E-11	4.3E-08	4.3E-08	8.0E-12	7.9E-12
Manganese	7.9E-09	7.8E-09	1.2E-09	1.1E-09	6.6E-09	6.6E-09	0.0E+00	0.0E+00
Mercury as HgCl2	1.6E-10	9.6E-11	9.8E-11	4.9E-11	6.2E-11	4.7E-11	0.0E+00	0.0E+00
Mercury as Methyl Hg	1.3E-06	9.4E-07	1.9E-12	9.7E-13	9.1E-12	9.1E-12	1.3E-06	9.4E-07
Nickel	7.0E-09	7.0E-09	3.0E-13	3.0E-13	5.8E-09	5.8E-09	1.2E-09	1.2E-09
Selenium	4.7E-09	4.7E-09	4.3E-14	4.3E-14	3.2E-09	3.2E-09	1.5E-09	1.5E-09
Zinc	4.5E-07	4.5E-07	3.4E-12	3.4E-12	7.0E-08	7.0E-08	3.8E-07	3.8E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	1.1E-12	7.0E-13	5.1E-15	3.0E-15	2.7E-15	2.5E-15	1.1E-12	7.0E-13
PCBs								
Total PCBs	1.2E-09	1.1E-09	9.8E-14	9.8E-14	1.8E-12	1.8E-12	1.2E-09	1.1E-09
PAHs								
Acenaphthene	7.0E-11	6.4E-11	1.3E-13	1.3E-13	1.0E-12	9.9E-13	6.9E-11	6.3E-11
Acenaphthylene	2.5E-11	2.5E-11	2.8E-19	2.8E-19	4.8E-15	4.8E-15	2.5E-11	2.5E-11
Anthracene	5.1E-11	4.7E-11	2.1E-14	1.9E-14	4.7E-14	4.5E-14	5.1E-11	4.7E-11
Benzo(a)anthracene	4.2E-09	3.5E-09	5.8E-13	5.3E-13	3.0E-12	3.0E-12	4.2E-09	3.5E-09
Benzo(a)pyrene	5.0E-09	4.2E-09	7.1E-13	6.6E-13	6.3E-12	6.3E-12	5.0E-09	4.2E-09
Benzo(b)fluoranthene	2.0E-09	1.8E-09	1.2E-13	1.1E-13	7.2E-13	7.2E-13	2.0E-09	1.8E-09
Benzo(k)fluoranthene	2.0E-08	1.4E-08	3.2E-12	2.4E-12	1.3E-11	1.2E-11	2.0E-08	1.4E-08
Benzo(ghi)perylene	1.4E-07	1.2E-07	1.8E-15	1.8E-15	1.6E-09	1.6E-09	1.4E-07	1.2E-07
Chrysene	2.7E-08	2.1E-08	5.9E-12	5.2E-12	1.8E-11	1.7E-11	2.7E-08	2.1E-08
Dibenzo(a,h)anthracene	2.1E-07	1.6E-07	2.1E-11	1.9E-11	7.0E-11	7.0E-11	2.1E-07	1.6E-07
Fluoranthene	2.6E-10	2.4E-10	3.1E-14	2.9E-14	1.3E-13	1.2E-13	2.6E-10	2.4E-10
Fluorene	3.4E-11	3.4E-11	4.0E-15	3.9E-15	1.2E-14	1.2E-14	3.4E-11	3.3E-11
Indeno(1,2,3-cd)pyrene	1.0E-07	7.8E-08	1.4E-11	1.3E-11	5.9E-11	5.9E-11	1.0E-07	7.8E-08
2-Methylnaphthalene	3.5E-12	3.5E-12	4.5E-21	4.5E-21	2.5E-14	2.5E-14	3.5E-12	3.5E-12
Naphthalene	6.0E-12	5.9E-12	1.0E-14	1.0E-14	1.8E-13	1.8E-13	5.8E-12	5.7E-12
Phenanthrene	1.1E-10	1.0E-10	2.2E-14	2.1E-14	6.3E-14	6.2E-14	1.1E-10	1.0E-10
Pyrene	2.7E-10	2.2E-10	1.2E-13	9.1E-14	2.0E-13	1.7E-13	2.7E-10	2.2E-10
Aldehyde Ketones								
Formaldehyde	3.0E-07	2.6E-07	4.1E-13	4.1E-13	2.5E-09	2.5E-09	3.0E-07	2.6E-07

Appendix G-7e
Calculation of Chemical Intakes
Resident Fisher Near Farm 1/Pond 2 Scenario: Child

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep= Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp =Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	8.80E-04
Ffish = Fraction of Locally Caught Fish:	0.5
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	8.4E-14	8.4E-14	5.6E-17	5.6E-17	4.7E-16	4.7E-16	8.3E-14	8.3E-14
Arsenic	3.6E-09	3.6E-09	2.0E-14	2.0E-14	3.0E-09	3.0E-09	6.1E-10	6.1E-10
Beryllium	6.7E-10	6.6E-10	4.4E-12	4.4E-12	6.2E-10	6.2E-10	4.3E-11	4.2E-11
Cadmium	1.2E-08	1.2E-08	1.7E-12	1.7E-12	5.3E-09	5.3E-09	6.4E-09	6.4E-09
Chromium +3	3.6E-08	2.9E-08	1.3E-09	1.3E-09	3.9E-09	3.8E-09	3.1E-08	2.4E-08
Chromium +6	6.1E-09	5.4E-09	7.8E-10	7.7E-10	2.3E-09	2.3E-09	3.1E-09	2.3E-09
Cobalt	2.0E-09	2.0E-09	9.1E-10	8.7E-10	1.1E-09	1.1E-09	0.0E+00	0.0E+00
Copper	1.2E-07	6.2E-08	1.1E-07	5.6E-08	6.7E-09	6.7E-09	0.0E+00	0.0E+00
Lead	6.0E-08	6.0E-08	2.9E-10	2.9E-10	6.0E-08	6.0E-08	5.6E-12	5.5E-12
Manganese	2.1E-08	2.0E-08	1.1E-08	1.0E-08	9.3E-09	9.3E-09	0.0E+00	0.0E+00
Mercury as HgCl2	1.0E-09	5.3E-10	9.2E-10	4.6E-10	8.7E-11	6.6E-11	0.0E+00	0.0E+00
Mercury as Methyl Hg	8.9E-07	6.7E-07	1.8E-11	9.0E-12	1.3E-11	1.3E-11	8.9E-07	6.7E-07
Nickel	8.9E-09	8.9E-09	2.8E-12	2.8E-12	8.1E-09	8.1E-09	8.6E-10	8.6E-10
Selenium	5.6E-09	5.6E-09	4.1E-13	4.1E-13	4.5E-09	4.5E-09	1.1E-09	1.1E-09
Zinc	3.7E-07	3.7E-07	3.2E-11	3.2E-11	9.8E-08	9.8E-08	2.7E-07	2.7E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	8.0E-13	5.2E-13	4.7E-14	2.8E-14	3.8E-15	3.5E-15	7.4E-13	4.9E-13
PCBs								
Total PCBs	8.5E-10	7.9E-10	9.2E-13	9.1E-13	2.5E-12	2.5E-12	8.5E-10	7.9E-10
PAHs								
Acenaphthene	5.1E-11	4.7E-11	1.3E-12	1.2E-12	1.4E-12	1.4E-12	4.9E-11	4.4E-11
Acenaphthylene	1.8E-11	1.8E-11	2.6E-18	2.6E-18	7.4E-15	7.4E-15	1.8E-11	1.8E-11
Anthracene	3.6E-11	3.4E-11	1.9E-13	1.8E-13	6.5E-14	6.3E-14	3.6E-11	3.3E-11
Benzo(a)anthracene	2.9E-09	2.5E-09	5.4E-12	4.9E-12	4.1E-12	4.1E-12	2.9E-09	2.5E-09
Benzo(a)pyrene	3.5E-09	3.0E-09	6.6E-12	6.2E-12	8.9E-12	8.9E-12	3.5E-09	3.0E-09
Benzo(b)fluoranthene	1.4E-09	1.3E-09	1.1E-12	1.0E-12	1.0E-12	1.0E-12	1.4E-09	1.3E-09
Benzo(k)fluoranthene	1.4E-08	1.0E-08	3.0E-11	2.3E-11	1.8E-11	1.7E-11	1.4E-08	1.0E-08
Benzo(ghi)perylene	1.0E-07	8.9E-08	1.7E-14	1.7E-14	2.5E-09	2.5E-09	1.0E-07	8.7E-08
Chrysene	1.9E-08	1.5E-08	5.5E-11	4.8E-11	2.5E-11	2.4E-11	1.9E-08	1.5E-08
Dibenzo(a,h)anthracene	1.5E-07	1.1E-07	2.0E-10	1.8E-10	9.8E-11	9.7E-11	1.5E-07	1.1E-07
Fluoranthene	1.8E-10	1.7E-10	2.9E-13	2.7E-13	1.8E-13	1.7E-13	1.8E-10	1.7E-10
Fluorene	2.4E-11	2.4E-11	3.7E-14	3.7E-14	1.7E-14	1.7E-14	2.4E-11	2.4E-11
Indeno(1,2,3-cd)pyrene	7.1E-08	5.5E-08	1.3E-10	1.2E-10	8.2E-11	8.2E-11	7.1E-08	5.5E-08
2-Methylnaphthalene	2.5E-12	2.5E-12	4.2E-20	4.2E-20	3.8E-14	3.8E-14	2.5E-12	2.5E-12
Naphthalene	4.4E-12	4.3E-12	9.6E-14	9.5E-14	2.5E-13	2.5E-13	4.1E-12	4.0E-12
Phenanthrene	7.7E-11	7.3E-11	2.0E-13	2.0E-13	8.7E-14	8.6E-14	7.6E-11	7.3E-11
Pyrene	1.9E-10	1.6E-10	1.1E-12	8.5E-13	2.8E-13	2.4E-13	1.9E-10	1.6E-10
Aldehyde Ketones								
Formaldehyde	2.1E-07	1.8E-07	3.9E-12	3.9E-12	3.9E-09	3.9E-09	2.1E-07	1.8E-07

Appendix G-7e
Summary of Cancer Risks and Hazard Indices (a)
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-D-2	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	2.8E-10	NA	2.0E-10	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	9.7E-06	2E-09	1.2E-05	4E-10	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	2.4E-07	NA	3.2E-07	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	1.2E-05	NA	1.1E-05	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	3.0E-08	NA	2.3E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	1.9E-06	1E-09	2.0E-06	2E-10	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	2.8E-06	NA	6.4E-06	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	4.0E-07	NA	2.8E-06	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	30	Manganese	1.4E-01	NA	5.4E-08	NA	1.4E-07	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	5.1E-07	NA	3.2E-06	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	1.2E-02	NA	8.6E-03	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	3.4E-07	NA	4.3E-07	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	9.1E-07	NA	1.1E-06	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	1.4E-06	NA	1.2E-06	NA	Anemia
adult:	30								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	1.5E-03	4E-08	1.1E-03	6E-09	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	5.8E-05	9E-10	4.1E-05	1E-10	Developmental
		PAHs							
		Acenaphthene	6.0E-02	NA	1.1E-09	NA	8.2E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	1.6E-10	NA	1.2E-10	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	1E-09	NA	1E-10	
		Benzo(a)pyrene	NA	7.3E+00	NA	1E-08	NA	2E-09	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	5E-10	NA	8E-11	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	4E-10	NA	6E-11	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	6E-11	NA	9E-12	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	5E-07	NA	7E-08	
		Fluoranthene	4.0E-02	NA	6.2E-09	NA	4.4E-09	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	8.2E-10	NA	5.8E-10	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	2E-08	NA	3E-09	
		2-Methylnaphthalene	4.0E-03	NA	8.5E-10	NA	6.0E-10	NA	Lung
		Naphthalene	2.0E-02	NA	2.9E-10	NA	2.1E-10	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	8.6E-09	NA	6.1E-09	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	1.4E-06	NA	1.0E-06	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and fish consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.4E-02	6E-07	9.8E-03	8E-08

Appendix G-7f
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameter

CRi = Ca *ED * EF * URF / AT * UC2
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2

And:
Ca = Q * Fv * Cyv + (1- Fv) * Cyp

For Hg:
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
URF = Unit Risk Factor ((ug/m3)-1):	CS*
RfC = Reference Concentration (mg/m3):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
IR = Inhalation Rate (see below) (m3/hr):	
adult:	0.63
child:	0.3
ED = Exposure Duration (see below) (yr):	
adult:	30
child:	6
EF = Exposure Frequency (day/yr):	350
ET = Exposure Time (hrs/day):	24
UC1 = Units Conversion (mg/ug):	0.001
BW = Body Weight (see below) (kg):	
adult:	70
child:	15
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	30
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	1.51E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	1.30E-06	6.0E-03	1.5E-05	4.3E-03	8.3E-05	2E-09	8.3E-05	5E-10	Cardiovascular, CNS, Developmental
Beryllium	2.03E-07	9.0E-03	2.0E-05	2.4E-03	9.7E-06	2E-10	9.7E-06	4E-11	Sensitization
Cadmium	1.73E-06	9.0E-03	1.0E-05	1.8E-03	1.7E-04	1E-09	1.7E-04	3E-10	
Chromium +3	1.23E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	7.27E-07	0.0E+00	1.0E-04	8.4E-02	7.0E-06	3E-08	7.0E-06	5E-09	Increased LDH in bronchoalveolar lavage fluid
Cobalt	3.60E-07	0.0E+00	6.0E-06	9.0E-03	5.7E-05	1E-09	5.7E-05	3E-10	
Copper	2.21E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	1.94E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	3.07E-06	0.0E+00	5.0E-05	NA	5.9E-05	NA	5.9E-05	NA	CNS
Mercury (Total) as HgCl2	7.76E-06	8.5E-01	3.0E-04	NA	2.5E-05	NA	2.5E-05	NA	PNS, Autonomic Dysfunction
Mercury (Total) as Elemental Hg	3.23E-08	1.0E+00	3.0E-04	NA	1.0E-07	NA	1.0E-07	NA	PNS, Autonomic Dysfunction
Nickel	2.67E-06	9.0E-03	9.0E-05	2.4E-04	2.8E-05	3E-10	2.8E-05	5E-11	
Selenium	1.93E-06	0.0E+00	2.0E-02	NA	9.3E-08	NA	9.3E-08	NA	
Zinc	3.17E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	5.56E-11	6.6E-01	4.0E-08	3.8E+01	1.3E-06	9E-10	1.3E-06	2E-10	
PCBs									
Total PCBs	3.82E-06	9.9E-01	NA	5.7E-04	NA	9E-10	NA	2E-10	
PAHs									
Acenaphthene	1.53E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	2.10E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	1.56E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	1.15E-07	4.8E-01	NA	1.1E-04	NA	5E-12	NA	1E-12	
Benzo(a)pyrene	1.29E-07	2.9E-01	NA	1.1E-03	NA	6E-11	NA	1E-11	
Benzo(b)fluoranthene	3.12E-07	9.7E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
Benzo(k)fluoranthene	1.94E-07	2.7E-01	NA	1.1E-04	NA	9E-12	NA	2E-12	
Benzo(ghi)perylene	1.42E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	1.68E-06	7.4E-01	NA	1.1E-05	NA	8E-12	NA	2E-12	
Dibenzo(a,h)anthracene	1.57E-07	5.5E-02	NA	1.2E-03	NA	8E-11	NA	2E-11	
Fluoranthene	1.37E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	2.19E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	1.33E-07	5.0E-03	NA	1.1E-04	NA	6E-12	NA	1E-12	
2-Methylnaphthalene	2.98E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	9.16E-07	1.0E+00	3.0E-03	3.4E-05	2.9E-07	1E-11	2.9E-07	3E-12	Nasal effects
Phenanthrene	2.34E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	1.26E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	1.74E-05	1.0E+00	9.8E-03	1.3E-05	1.7E-06	9E-11	1.7E-06	2E-11	Respiratory tract

Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	4.4E-04	3E-08	4.4E-04	7E-09

Appendix G-7g
Ingestion of Mother's Milk
Resident Fisher Near Farm 1/Pond 2 Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	6.5E-15	7.0E-13	7.5E-13	8.27E+00	2.38E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-7e						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-7g
Ingestion of Mother's Milk
Resident Fisher Near Farm 1/Pond 2 Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
		2,3,7,8-TCDD TEQ	2.38E-02	6.0E+01	4.0E-04
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-8a
Contaminant Concentration in Soil
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters	
Carcinogens (T2 $\leq$ tD)	
$Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp^{(-ks * tD)}/ks)) - (T1 + (exp^{(-ks * T1)})/ks)]$	
NonCarcinogens	
$Cs(tD) = (Ds * [1 - exp^{(-ks * tD)}])/ks$	
Where:	
$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$	
For Mercury:	
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$	
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$	
For MeHg: Ds(MeHg) = Ds * 0.02	
And:	
Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
T1 = Time Peroid At Beginning Of Combustion (yr):	0
ks = COC Soil Loss Constant (yr-1):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T2 = Length of Exposure Duration (yr):	see below
adult:	30
child	6
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m2-yr):	RS*

Appendix G-8a
Contaminant Concentration in Soil
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	7.5E-11	7.4E-11	7.47E-12	7.5E-12	1.8E-09	1.8E-08	1.0E+00	2.36E+01	2.35E+03
Arsenic	6.8E-09	6.8E-09	6.84E-10	6.8E-10	7.7E-06	7.7E-05	6.0E-03	1.12E+03	1.12E+05
Beryllium	1.5E-06	1.4E-06	1.50E-07	1.5E-07	1.2E-06	1.2E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	5.8E-07	5.8E-07	5.85E-08	5.9E-08	1.0E-05	1.0E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	4.5E-05	3.6E-05	4.53E-05	4.4E-05	7.2E-06	7.2E-05	9.0E-03	1.60E-01	1.60E+00
Chromium +6	2.7E-05	2.1E-05	2.69E-05	2.6E-05	4.3E-06	4.3E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	2.7E-05	1.8E-05	3.14E-05	3.0E-05	2.1E-06	2.1E-05	0.0E+00	6.78E-02	6.78E-01
Copper	3.9E-04	2.0E-04	3.75E-03	1.9E-03	1.3E-05	1.3E-04	0.0E+00	3.06E-04	3.06E-03
Lead	9.8E-05	9.5E-05	9.78E-06	9.8E-06	1.1E-04	1.1E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	2.9E-04	1.8E-04	3.86E-04	3.6E-04	1.8E-05	1.8E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	1.4E-05	7.1E-06	1.40E-04	7.0E-05	4.7E-07	4.7E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	2.9E-07	1.4E-07	2.70E-06	1.4E-06	9.6E-09	9.6E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	9.7E-07	9.6E-07	9.69E-08	9.7E-08	1.6E-05	1.6E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	1.4E-07	1.4E-07	1.39E-08	1.4E-08	1.1E-05	1.1E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	1.1E-05	1.1E-05	1.10E-06	1.1E-06	1.9E-04	1.9E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	6.7E-10	3.8E-10	6.25E-09	3.7E-09	3.4E-11	3.4E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	1.7E-08	1.7E-08	1.26E-07	1.2E-07	8.5E-08	8.5E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	2.4E-08	2.3E-08	2.32E-07	2.3E-07	5.8E-08	5.8E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	9.9E-11	9.9E-11	1.04E-11	1.0E-11	2.9E-08	2.9E-07	1.0E+00	2.96E+02	2.79E+04
Anthracene	2.4E-08	2.3E-08	2.40E-07	2.3E-07	1.3E-08	1.3E-07	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	2.2E-07	2.0E-07	2.20E-06	2.0E-06	8.2E-08	8.2E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.8E-07	1.6E-07	1.76E-06	1.6E-06	8.5E-08	8.5E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	1.8E-07	1.6E-07	1.75E-06	1.6E-06	7.3E-08	7.3E-07	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	5.6E-07	4.2E-07	5.57E-06	4.2E-06	6.9E-08	6.9E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	9.7E-09	9.7E-09	7.49E-09	7.5E-09	2.2E-07	2.2E-06	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.8E-06	1.5E-06	1.76E-05	1.5E-05	4.4E-07	4.4E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	3.4E-06	3.0E-06	3.42E-05	3.0E-05	9.2E-07	9.2E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	4.3E-08	4.0E-08	4.26E-07	4.0E-07	2.4E-08	2.4E-07	9.9E-01	5.70E-01	5.73E-01
Fluorene	3.8E-09	3.7E-09	3.76E-08	3.7E-08	1.6E-08	1.6E-07	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	2.2E-06	2.0E-06	2.24E-05	2.0E-05	7.9E-07	7.9E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	2.6E-13	2.6E-13	2.64E-14	2.6E-14	6.4E-09	6.4E-08	1.0E+00	2.43E+04	2.43E+06
Naphthalene	6.6E-09	6.5E-09	3.32E-08	3.3E-08	3.5E-08	3.5E-07	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	2.6E-08	2.5E-08	2.60E-07	2.5E-07	3.3E-08	3.3E-07	1.0E+00	1.26E+00	1.27E+00
Pyrene	1.9E-07	1.4E-07	1.83E-06	1.4E-06	2.5E-08	2.5E-07	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	4.7E-07	4.6E-07	6.72E-07	6.7E-07	2.7E-05	2.7E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-8a
Calculation of Soil Loss Constant
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters	
ks = ksl + ksg + ksr + kse + ksv	
where:	
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]	
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))	
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v	
where:	
theta v = 1 - (BD/ps) - theta sw	
and:	
Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-8a
Calculation of Soil Loss Constant
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-8b

Contaminant Concentration in Above Ground Vegetation

Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - \exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:

$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - \exp^{(-kp*Tp)}])/Yp * kp$

$Pd(Hg^{2+}) = 0.78Pd$

$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:

$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$

$Pv(Hg^{2+}) = 0.78Pv$

$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-8b
Contaminant Concentration in Above Ground Vegetation
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	2.4E-12	2.4E-12	2.4E-12	2.4E-12	7.5E-11	7.4E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	1.1E-05	0.0E+00	4.3E-11	4.3E-11	4.3E-11	4.3E-11	6.8E-09	6.8E-09	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	2.5E-06	0.0E+00	3.8E-09	3.7E-09	3.8E-09	3.7E-09	1.5E-06	1.4E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	2.2E-05	0.0E+00	7.3E-08	7.3E-08	7.3E-08	7.3E-08	5.8E-07	5.8E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	1.5E-05	0.0E+00	2.2E-07	1.8E-07	2.2E-07	1.8E-07	4.5E-05	3.6E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	9.1E-06	0.0E+00	1.3E-07	1.0E-07	1.3E-07	1.0E-07	2.7E-05	2.1E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	4.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.7E-05	1.8E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	2.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E-04	2.0E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	2.4E-04	0.0E+00	1.3E-06	1.3E-06	1.3E-06	1.3E-06	9.8E-05	9.5E-05	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	3.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E-04	1.8E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	8.4E-07	0.0E+00	1.9E-07	9.6E-08	1.9E-07	9.6E-08	1.4E-05	7.1E-06	8.50E-01	6.00E-01	ND	1.0E+00	1.4E-02
Mercury as Methyl Hg	2.4E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E-07	1.4E-07	8.50E-01	6.00E-01	ND	ND	ND
Nickel	3.3E-05	0.0E+00	9.0E-09	9.0E-09	9.0E-09	9.0E-09	9.7E-07	9.6E-07	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.7E-05	0.0E+00	2.7E-09	2.7E-09	2.7E-09	2.7E-09	1.4E-07	1.4E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	3.9E-04	0.0E+00	1.1E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-05	1.1E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	1.7E-11	3.4E-11	3.0E-12	1.7E-12	3.0E-12	1.7E-12	6.7E-10	3.8E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	2.5E-08	1.7E-08	1.7E-10	1.7E-10	1.7E-10	1.7E-10	1.7E-08	1.7E-08	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	1.1E-08	5.1E-09	5.0E-09	5.1E-09	5.0E-09	2.4E-08	2.3E-08	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	1.3E-11	1.7E-11	1.7E-11	1.7E-11	1.7E-11	9.9E-11	9.9E-11	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	2.9E-10	1.2E-10	2.4E-09	2.2E-09	2.4E-09	2.2E-09	2.4E-08	2.3E-08	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	5.5E-08	1.5E-08	4.3E-09	4.0E-09	4.3E-09	4.0E-09	2.2E-07	2.0E-07	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	8.4E-08	6.7E-08	2.3E-09	2.2E-09	2.3E-09	2.2E-09	1.8E-07	1.6E-07	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	9.8E-09	7.2E-09	2.0E-09	1.8E-09	2.0E-09	1.8E-09	1.8E-07	1.6E-07	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	1.3E-07	1.6E-07	6.4E-09	4.8E-09	6.4E-09	4.8E-09	5.6E-07	4.2E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	4.9E-06	5.5E-11	5.5E-11	5.5E-11	5.5E-11	9.7E-09	9.7E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	4.0E-07	1.2E-08	3.5E-08	3.0E-08	3.5E-08	3.0E-08	1.8E-06	1.5E-06	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	1.9E-06	0.0E+00	2.3E-08	2.0E-08	2.3E-08	2.0E-08	3.4E-06	3.0E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	1.0E-09	1.4E-09	2.1E-09	2.0E-09	2.1E-09	2.0E-09	4.3E-08	4.0E-08	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	8.1E-11	5.5E-10	5.4E-10	5.5E-10	5.4E-10	3.8E-09	3.7E-09	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	1.7E-06	0.0E+00	1.3E-08	1.2E-08	1.3E-08	1.2E-08	2.2E-06	2.0E-06	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	5.9E-11	6.0E-14	6.0E-14	6.0E-14	6.0E-14	2.6E-13	2.6E-13	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	5.0E-10	3.1E-09	3.1E-09	3.1E-09	3.1E-09	6.6E-09	6.5E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	2.2E-10	5.0E-10	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.6E-08	2.5E-08	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	7.0E-10	1.5E-09	1.1E-08	8.2E-09	1.1E-08	8.2E-09	1.9E-07	1.4E-07	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	9.7E-09	3.9E-06	3.9E-06	3.9E-06	3.9E-06	4.7E-07	4.6E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-8b
Contaminant Concentration in Below Ground Vegetation
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-8b
Contaminant Concentration in Below Ground Vegetation
Resident Fisher Near Farm 1/Pond 2 Scenario - Adult and Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	2.2E-12	2.2E-12	7.5E-11	7.4E-11	3.00E-02	1.0E+00
Arsenic	5.5E-11	5.5E-11	6.8E-09	6.8E-09	8.00E-03	1.0E+00
Beryllium	2.2E-09	2.1E-09	1.5E-06	1.4E-06	1.50E-03	1.0E+00
Cadmium	3.7E-08	3.7E-08	5.8E-07	5.8E-07	6.40E-02	1.0E+00
Chromium +3	2.0E-07	1.6E-07	4.5E-05	3.6E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	2.7E-05	2.1E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	2.7E-05	1.8E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	3.9E-04	2.0E-04	2.50E-01	ND
Lead	8.8E-07	8.5E-07	9.8E-05	9.5E-05	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	2.9E-04	1.8E-04	5.00E-02	ND
Mercury as HgCl2	5.1E-07	2.5E-07	1.4E-05	7.1E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	2.9E-07	1.4E-07	9.90E-02	ND
Nickel	7.7E-09	7.7E-09	9.7E-07	9.6E-07	8.00E-03	1.0E+00
Selenium	3.0E-09	3.0E-09	1.4E-07	1.4E-07	2.20E-02	1.0E+00
Zinc	9.9E-06	9.9E-06	1.1E-05	1.1E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	6.9E-12	4.0E-12	6.7E-10	3.8E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	2.4E-09	2.3E-09	1.7E-08	1.7E-08	1.42E+01	1.0E-02
PAHs						
Acenaphthene	5.0E-09	4.9E-09	2.4E-08	2.3E-08	2.13E-01	1.0E+00
Acenaphthylene	6.3E-09	6.3E-09	9.9E-11	9.9E-11	6.42E+03	1.0E-02
Anthracene	3.7E-11	3.4E-11	2.4E-08	2.3E-08	1.51E-01	1.0E-02
Benzo(a)anthracene	2.1E-10	1.9E-10	2.2E-07	2.0E-07	9.48E-02	1.0E-02
Benzo(a)pyrene	1.1E-10	9.9E-11	1.8E-07	1.6E-07	6.05E-02	1.0E-02
Benzo(b)fluoranthene	2.0E-09	1.9E-09	1.8E-07	1.6E-07	1.15E+00	1.0E-02
Benzo(k)fluoranthene	3.4E-10	2.5E-10	5.6E-07	4.2E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	2.4E-04	2.4E-04	9.7E-09	9.7E-09	2.44E+06	1.0E-02
Chrysene	1.7E-09	1.4E-09	1.8E-06	1.5E-06	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	1.4E-09	1.2E-09	3.4E-06	3.0E-06	4.05E-02	1.0E-02
Fluoranthene	6.4E-11	6.0E-11	4.3E-08	4.0E-08	1.50E-01	1.0E-02
Fluorene	7.2E-12	7.1E-12	3.8E-09	3.7E-09	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	1.2E-09	1.1E-09	2.2E-06	2.0E-06	5.29E-02	1.0E-02
2-Methylnaphthalene	5.3E-09	5.3E-09	2.6E-13	2.6E-13	2.00E+04	1.0E+00
Naphthalene	1.8E-09	1.8E-09	6.6E-09	6.5E-09	2.69E-01	1.0E+00
Phenanthrene	4.8E-11	4.7E-11	2.6E-08	2.5E-08	1.83E-01	1.0E-02
Pyrene	2.7E-10	2.1E-10	1.9E-07	1.4E-07	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	1.4E-04	1.4E-04	4.7E-07	4.6E-07	3.05E+02	1.0E+00

Appendix G-8c
Pond 2 Watershed Soil Concentration Due to Deposition
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters

Carcinogens

Cs = [Ds/(ks * (tD - T1))] * [(tD + (exp(-ks * tD)/ks)) - (T1 + (exp(-ks * T1))/ks)]

NonCarcinogens

Cs(tD) = (Ds * [1 - exp(-ks * tD)])/ks

Where:

Ds = [UC1 * Q/Zs * BD] * [Fv * (Dytwv) + (Dytwp) * (1 - Fv)]

For Mercury:
Ds = [UC1 * 0.48Q(total)/Zs * BD] * [FvHg2+ * (Dytwv) + (Dytwpb) * (1 - FvHg2+)]
For HgCl2: Ds(HgCl2) = Ds * 0.98
For MeHg: Ds(MeHg) = Ds * 0.02

ks = ksl + ksg + ksr + kse + ksv
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = RO/theta sw * Zs * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs)* theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
ksr = COC Loss Constant Due to Runoff (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
Cs(tD) = Soil Concentration At Time tD (mg/kg):	CS*
Zs = Soil Mixing Depth (cm):	2
T1 = Time Peroid At Beginning Of Combustion (yr):	0
T2 = Exposure duration or ED (yr):	40
UC1 = Units Conversion Factor (g/mg):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--)	CS*
Cywv = Unitized Yearly Average Air Concentration From Vapor Phase (Watershed) (ug-s/g-m3):	RS*
Dytwv = Unitized Yearly Average Total Deposition From Vapor Phase (Watershed) (s/m2-yr):	RS*
Dytwp = Unitized Yearly Average Total Deposition From Particle Phase (Watershed) (s/m2-yr):	RS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	0
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC3 = Units Conversion (sec/yr):	3.2E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.205E-05
T = Temperature (K):	2.9E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	2.4E-01
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-8c
Pond 2Soil Concentration Due to Deposition
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	Cs Surface (2 cm) Non - Cancer	Cancer	Ds (2 cm)	Fv (unitless)	ks (yr-1)	ksl (yr-1)	ksr (yr-1)	ksv (yr-1)	ksg (yr-1)	Kds
Inorganics										
Antimony	7.5E-12	5.6E-12	1.8E-08	1.0E+00	2.3E+03	3.8E-01	1.3E-01	2.3E+03	0.0E+00	4.5E+01
Arsenic	6.8E-10	5.1E-10	7.7E-05	6.0E-03	1.1E+05	6.0E-01	2.0E-01	1.1E+05	0.0E+00	2.9E+01
Beryllium	1.5E-07	1.1E-07	1.2E-05	9.0E-03	8.0E+01	2.2E-02	7.5E-03	8.0E+01	0.0E+00	7.9E+02
Cadmium	5.9E-08	4.4E-08	1.0E-04	9.0E-03	1.7E+03	2.3E-01	7.9E-02	1.7E+03	0.0E+00	7.5E+01
Chromium +3	6.0E-05	4.5E-05	7.2E-05	9.0E-03	1.2E+00	9.1E-01	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	3.5E-05	2.7E-05	4.3E-05	0.0E+00	1.2E+00	9.1E-01	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	4.1E-05	3.1E-05	2.1E-05	0.0E+00	5.2E-01	3.8E-01	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.8E-03	2.4E-03	1.3E-04	0.0E+00	2.3E-03	1.7E-03	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	9.8E-06	7.3E-06	1.1E-03	7.0E-03	1.2E+02	1.9E-02	6.6E-03	1.2E+02	0.0E+00	9.0E+02
Manganese	5.1E-04	3.8E-04	1.8E-04	0.0E+00	3.6E-01	2.7E-01	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	1.4E-04	8.8E-05	4.7E-06	8.5E-01	4.0E-04	3.0E-04	1.0E-04	3.0E-08	0.0E+00	5.8E+04
Mercury as Methyl Hg	2.7E-06	1.7E-06	9.6E-08	8.5E-01	3.5E-03	2.5E-03	8.5E-04	1.9E-04	0.0E+00	7.0E+03
Nickel	9.7E-08	7.3E-08	1.6E-04	9.0E-03	1.6E+03	2.7E-01	9.1E-02	1.6E+03	0.0E+00	6.5E+01
Selenium	1.4E-08	1.0E-08	1.1E-04	0.0E+00	8.2E+03	3.4E+00	1.2E+00	8.2E+03	0.0E+00	5.0E+00
Zinc	1.1E-06	8.2E-07	1.9E-03	8.0E-03	1.7E+03	2.8E-01	9.5E-02	1.7E+03	0.0E+00	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	6.3E-09	4.1E-09	3.4E-10	6.6E-01	3.5E-02	4.5E-04	1.5E-04	4.8E-03	3.0E-02	3.9E+04
PCBs										
Total PCBs	1.3E-07	9.4E-08	8.5E-07	9.9E-01	6.7E+00	1.8E-02	6.0E-03	1.6E+00	5.1E+00	9.8E+02
PAHs										
Acenaphthene	2.3E-07	1.7E-07	5.8E-07	1.0E+00	2.5E+00	1.6E-02	5.4E-03	8.0E-03	2.5E+00	1.1E+03
Acenaphthylene	1.0E-11	7.8E-12	2.9E-07	1.0E+00	2.8E+04	1.0E+02	3.5E+01	2.8E+04	0.0E+00	3.7E-02
Anthracene	2.4E-07	1.8E-07	1.3E-07	1.0E+00	5.6E-01	3.9E-03	1.3E-03	7.9E-04	5.5E-01	4.5E+03
Benzo(a)anthracene	2.2E-06	1.6E-06	8.2E-07	4.8E-01	3.7E-01	2.9E-04	9.9E-05	1.6E-04	3.7E-01	6.0E+04
Benzo(a)pyrene	1.8E-06	1.3E-06	8.5E-07	2.9E-01	4.8E-01	1.1E-04	3.7E-05	1.6E-05	4.8E-01	1.6E+05
Benzo(b)fluoranthene	1.8E-06	1.3E-06	7.3E-07	9.7E-01	4.1E-01	1.7E-03	5.7E-04	5.8E-04	4.1E-01	1.0E+04
Benzo(k)fluoranthene	5.6E-06	3.9E-06	6.9E-07	2.7E-01	1.2E-01	9.1E-05	3.1E-05	2.4E-07	1.2E-01	1.9E+05
Benzo(ghi)perylene	9.1E-09	6.9E-09	2.2E-06	1.0E+00	2.4E+02	1.2E+02	4.2E+01	7.2E+01	0.0E+00	9.1E-03
Chrysene	1.8E-05	1.3E-05	4.4E-06	7.4E-01	2.5E-01	2.9E-04	9.9E-05	8.7E-05	2.5E-01	6.0E+04
Dibenzo(a,h)anthracene	3.4E-05	2.5E-05	9.2E-06	5.5E-02	2.7E-01	3.0E-05	1.0E-05	1.4E-09	2.7E-01	5.8E+05
Fluoranthene	4.3E-07	3.2E-07	2.4E-07	9.9E-01	5.7E-01	1.6E-03	5.4E-04	8.0E-05	5.7E-01	1.1E+04
Fluorene	3.8E-08	2.8E-08	1.6E-07	1.0E+00	4.2E+00	8.3E-03	2.8E-03	1.7E-03	4.2E+00	2.1E+03
Indeno(1,2,3-cd)pyrene	2.2E-05	1.7E-05	7.9E-06	5.0E-03	3.5E-01	3.3E-05	1.1E-05	1.7E-07	3.5E-01	5.3E+05
2-Methylnaphthalene	2.6E-14	2.0E-14	6.4E-08	1.0E+00	2.4E+06	1.2E+02	4.2E+01	2.4E+06	0.0E+00	8.1E-03
Naphthalene	3.3E-08	2.5E-08	3.5E-07	1.0E+00	1.1E+01	5.8E-02	2.0E-02	5.2E+00	5.3E+00	3.0E+02
Phenanthrene	2.6E-07	1.9E-07	3.3E-07	1.0E+00	1.3E+00	4.7E-03	1.6E-03	3.4E-04	1.3E+00	3.7E+03
Pyrene	1.8E-06	1.3E-06	2.5E-07	9.9E-01	1.3E-01	1.8E-03	6.2E-04	6.3E-05	1.3E-01	9.5E+03
Aldehyde Ketones										
Formaldehyde	7.6E-07	5.7E-07	2.7E-04	1.0E+00	3.5E+02	1.1E+02	3.9E+01	1.6E+02	3.6E+01	2.0E-02

Appendix G-8c
Calculation of Pond Total Waterbody Load
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters

LT = LDif + LDep + LRI + LR + LE

Where:

LDep = Q * [Fv * Dytwv(pond) + (1 - Fv) * Dytwp(pond)] * WAw
LDep (Hg) = 0.48Q(total) * [FvHg2+ * Dywtv(pond) + (1 - FvHg2+) * Dytwp(pond)] * WAw

LRI = Q * [Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed] * WAi
LRI(Hg) = 0.48Q(total) * (Fv * Dytwv(watershed) + (1 - Fv) * Dytwp(watershed)) * WAi

LR = UC1 * RO * (WAL - WAi) * ((Cs * BD)/(theta sw + Kds * BD))

LE = Xe * (WAL - WAi) * SD * ER * (Cs * Kds * BD)/(theta sw + Kds * BD) * UC2

LDif = (Kv * Q * Fv * Cywv(pond) * WAw * UC5)/(H/(R * Twk))
LDif (Hg) = (Kv * 0.48Q(total) * FvHg2+ * Cywv(pond) * WAw * UC5)/(H/(R * Twk))

Xe = RF * K * LS * C * PF * (UC3/UC4)
SD = a * (WAl)$^{-b}$
Kv = ([KL^{-1} + (KG * (H/(R * T))$^{-1}$)]$^{-1}$) * θ$^{Twk - 293}$
KL = (Cd$^{0.5}$ * W) * (ρa/ρw)$^{0.5}$ * (k$^{0.33}$/λz) * (μw/ρw * Dw)$^{-0.67}$ * UC6 (For quiescent lakes or ponds)
KG = (Cd$^{0.5}$ * W) * (k$^{0.3}$3/λz) * (μa/ρa * Da)$^{-0.67}$ * UC6 (For quiescent lakes or ponds)

and:

Values Specific to Contaminant:	CS*
Values Specific to Site:	RS*
LT = Total Contaminant Load to the Water Body (g/yr):	CS*
LDep = Deposition of Particle Phase and Wet Vapor Phase Contaminant Load to the Water Body (g/yr):	CS*
LRI = Runoff Load From Impervious Surfaces (g/yr):	CS*
LR = Runoff Load From Pervious Surface (g/yr):	CS*
LE = Soil Erosion Load (g/yr):	CS*
LDif = Dry Vapor Phase Diffusion Load to Water Body (g/yr):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dytwv = Yearly Average (Wet and Dry) Deposition From Vapor Phase (g/m2-yr):	RS*
Dytwp = Yearly Average Total (Wet and Dry) Deposition From Particle Phase (g/m2-yr):	RS*
Cywv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
WAw = Water Body Area (m2):	3.3E+03
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	0.0E+00
UC1 = Units Conversion Factor (kg-cm2/mg-m2):	0.01
WAL = Total Watershed Area Receiving Pollutant Deposition (m2):	3.3E+05
RO = Average Annual Surface Runoff (cm/yr):	17.8
Cs = Contaminant Level in Watershed Soil (mg/kg):	CS*
BD = Soil Bulk Density (g/cm3):	1.5
theta sw = Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-water partition coefficient (cm3/g or ml/g):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	0.9
SD = Sediment Delivery Ratio (--):	0.29
ER = Contaminant Enrichment Ratio (--):	See Below
Inorganics:	1
Organics:	3
UC2 = Units Conversion Factor (g/mg):	1.0E-03
RF = "Erosivity" Factor (yr-1):	175
K = "Erodibility" Factor (tons/acre):	0.39
LS = "Topographic or Slope Length" Factor (--):	1.5
C = "Cover Management" Factor (--):	0.041
PF = "Supporting Practice" Factor (--):	1
a = Empirical Intercept Coefficient:	1.4
b = Empirical Slope Coefficient:	0.125
UC3 = Units Conversion Factor (kg/ton):	907.18
UC4 = Units Conversion Factor (m2/acre):	4.0E+03
Kv = Overall Transfer Rate Coefficient (m/yr):	CS*
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Universal Gas Constant (atm-m3/mol-K):	8.2E-05
Twk = Water Body Temperature (K):	286.0
theta = Temperature Correction Factor (--):	1.026
KL = Liquid Phase Transfer Coefficient (m/yr):	CS*
Dw = Diffusivity of COC in Water (cm3/s):	CS*
UC5 = Units Conversion Factor (g/ug):	1.00E-06
UC6 = Units Conversion Factor (s/yr):	3.2E+07
Kg = Gas Phase Transfer Coefficient (m/yr):	CS*
Cd = Drag Coefficient (- -):	1.1E-03
W = Average Annual Wind Speed (m/s):	2.2
ρa = Density of Air (g/cm3):	1.20E-03
ρw = Density of Water (g/cm3):	1
k = von Karman's constant (- -):	0.4
λz = Dimensionless viscous sublayer thickness (- -):	4
μw = Viscosity of Water Corresponding to Water Temperature (g/cm-s):	0.0169
μa = Viscosity of Air Corresponding to Air Temperature (g/cm-s):	1.81E-04
k = von Karman's constant (- -):	0.4

Appendix G-8c
Calculation of Pond Total Waterbody Load
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	LT		LDiff	LDep	LRI	LR		LE		Fv	Kv	KL
	Non - Cancer	Cancer				Non - Cancer	Cancer	Non - Cancer	Cancer	(unitless)		
Inorganics												
Antimony	1.2E-06	1.2E-06	3.5E-07	8.5E-07	0.0E+00	9.8E-09	7.3E-09	6.6E-10	5.0E-10	1.0E+00	8.2E+01	9.8E+01
Arsenic	2.2E-03	2.2E-03	0.0E+00	2.2E-03	0.0E+00	1.4E-06	1.0E-06	6.1E-08	4.5E-08	6.0E-03	8.2E+01	9.8E+01
Beryllium	3.7E-04	3.7E-04	0.0E+00	3.5E-04	0.0E+00	1.1E-05	8.4E-06	1.3E-05	1.0E-05	9.0E-03	8.2E+01	9.8E+01
Cadmium	3.0E-03	3.0E-03	0.0E+00	3.0E-03	0.0E+00	4.6E-05	3.4E-05	5.2E-06	3.9E-06	9.0E-03	8.2E+01	9.8E+01
Chromium +3	1.9E-01	1.4E-01	0.0E+00	2.1E-03	0.0E+00	1.8E-01	1.4E-01	5.3E-03	4.0E-03	9.0E-03	ND	1.3E+02
Chromium +6	1.1E-01	8.5E-02	0.0E+00	1.2E-03	0.0E+00	1.1E-01	8.2E-02	3.1E-03	2.3E-03	0.0E+00	ND	ND
Cobalt	5.8E-02	4.4E-02	0.0E+00	6.2E-04	0.0E+00	5.4E-02	4.0E-02	3.7E-03	2.7E-03	0.0E+00	ND	1.3E+02
Copper	3.6E-01	2.3E-01	0.0E+00	3.8E-03	0.0E+00	2.2E-02	1.4E-02	3.4E-01	2.1E-01	0.0E+00	ND	1.3E+02
Lead	3.5E-02	3.4E-02	0.0E+00	3.3E-02	0.0E+00	6.4E-04	4.8E-04	8.7E-04	6.5E-04	7.0E-03	8.2E+01	9.8E+01
Manganese	5.1E-01	3.8E-01	0.0E+00	5.3E-03	0.0E+00	4.6E-01	3.4E-01	4.5E-02	3.4E-02	0.0E+00	ND	1.3E+02
Mercury as HgCl2	1.6E-02	1.1E-02	3.2E-03	1.7E-04	0.0E+00	1.4E-04	9.0E-05	1.3E-02	7.8E-03	8.5E-01	4.8E-03	6.6E+01
Mercury as Methyl Hg	3.7E-03	3.6E-03	3.3E-03	1.7E-04	0.0E+00	2.3E-05	1.4E-05	2.4E-04	1.5E-04	8.5E-01	3.3E+00	7.3E+01
Nickel	4.7E-03	4.6E-03	0.0E+00	4.6E-03	0.0E+00	8.8E-05	6.6E-05	8.6E-06	6.5E-06	9.0E-03	8.2E+01	9.8E+01
Selenium	3.5E-03	3.4E-03	0.0E+00	3.3E-03	0.0E+00	1.6E-04	1.2E-04	1.2E-06	9.1E-07	0.0E+00	8.2E+01	9.8E+01
Zinc	5.6E-02	5.5E-02	0.0E+00	5.4E-02	0.0E+00	1.0E-03	7.8E-04	9.8E-05	7.3E-05	8.0E-03	8.2E+01	9.8E+01
Dioxins/Furans												
2,3,7,8-TCDD-TEQ	1.7E-06	1.1E-06	6.0E-09	1.6E-08	0.0E+00	9.5E-09	6.2E-09	1.7E-06	1.1E-06	6.6E-01	5.0E+01	6.9E+01
PCBs												
Total PCBs	9.9E-05	8.9E-05	1.8E-05	3.9E-05	0.0E+00	7.5E-06	5.7E-06	3.4E-05	2.5E-05	9.9E-01	5.0E+01	6.1E+01
PAHs												
Acenaphthene	1.3E-04	1.1E-04	2.9E-05	3.0E-05	0.0E+00	1.2E-05	9.4E-06	6.2E-05	4.7E-05	1.0E+00	4.2E+01	1.0E+02
Acenaphthylene	2.0E-05	1.9E-05	1.6E-06	1.5E-05	0.0E+00	3.6E-06	2.7E-06	6.1E-10	4.5E-10	1.0E+00	3.0E+01	3.6E+01
Anthracene	7.8E-05	6.1E-05	4.1E-06	6.6E-06	0.0E+00	3.2E-06	2.4E-06	6.4E-05	4.8E-05	1.0E+00	2.4E+01	1.0E+02
Benzo(a)anthracene	6.7E-04	5.2E-04	4.5E-05	3.5E-05	0.0E+00	2.2E-06	1.6E-06	5.9E-04	4.4E-04	4.8E-01	1.9E+01	9.4E+01
Benzo(a)pyrene	5.6E-04	4.4E-04	5.4E-05	3.4E-05	0.0E+00	6.5E-07	4.9E-07	4.7E-04	3.5E-04	2.9E-01	6.6E+00	9.4E+01
Benzo(b)fluoranthene	5.2E-04	4.0E-04	6.9E-06	3.4E-05	0.0E+00	9.9E-06	7.4E-06	4.7E-04	3.5E-04	9.7E-01	3.4E+01	1.0E+02
Benzo(k)fluoranthene	1.5E-03	1.1E-03	7.2E-06	2.5E-05	0.0E+00	1.7E-06	1.2E-06	1.5E-03	1.1E-03	2.7E-01	4.3E-01	1.0E+02
Benzo(ghi)perylene	3.9E-03	3.0E-03	6.2E-05	9.1E-05	0.0E+00	3.8E-03	2.8E-03	1.6E-07	1.2E-07	1.0E+00	1.6E+00	2.4E+01
Chrysene	5.0E-03	3.7E-03	3.9E-05	1.9E-04	0.0E+00	1.7E-05	1.3E-05	4.7E-03	3.5E-03	7.4E-01	3.1E+01	1.0E+02
Dibenzo(a,h)anthracene	9.4E-03	7.0E-03	0.0E+00	2.4E-04	0.0E+00	3.5E-06	2.6E-06	9.1E-03	6.8E-03	5.5E-02	7.9E-03	1.0E+02
Fluoranthene	1.3E-04	1.0E-04	4.6E-06	1.1E-05	0.0E+00	2.3E-06	1.7E-06	1.1E-04	8.6E-05	9.9E-01	7.6E+00	1.0E+02
Fluorene	2.5E-05	2.2E-05	5.8E-06	7.8E-06	0.0E+00	1.1E-06	7.9E-07	1.0E-05	7.5E-06	1.0E+00	2.4E+01	1.0E+02
Indeno(1,2,3-cd)pyrene	6.2E-03	4.7E-03	0.0E+00	2.3E-04	0.0E+00	2.5E-06	1.9E-06	6.0E-03	4.5E-03	5.0E-03	8.3E-01	1.0E+02
2-Methylnaphthalene	3.5E-06	3.5E-06	1.3E-07	3.4E-06	0.0E+00	1.1E-08	8.2E-09	4.1E-13	3.0E-13	1.0E+00	3.2E+01	3.8E+01
Naphthalene	4.2E-05	3.8E-05	9.3E-06	1.7E-05	0.0E+00	6.5E-06	4.9E-06	8.9E-06	6.7E-06	1.0E+00	6.8E+01	8.4E+01
Phenanthrene	9.7E-05	7.9E-05	7.6E-06	1.6E-05	0.0E+00	4.1E-06	3.1E-06	7.0E-05	5.2E-05	1.0E+00	1.1E+01	1.0E+02
Pyrene	5.2E-04	3.8E-04	4.4E-06	1.2E-05	0.0E+00	1.1E-05	8.2E-06	4.9E-04	3.5E-04	9.9E-01	5.4E+00	1.0E+02
Aldehyde Ketones												
Formaldehyde	3.2E-01	2.5E-01	2.0E-02	8.7E-03	0.0E+00	2.9E-01	2.2E-01	2.7E-05	2.0E-05	1.0E+00	5.4E+00	1.6E+02

Appendix G-8c

Calculation of Potomac River Water Concentration

Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters	
Cwtot = LT/Vfx * fwc + kwt * WAw * (dwc + dbs) Cwt = fwc * Cwtot * (dwc + dbs/dwc) Cdw = Cwt/1 + Kdsw * TSS * 10-6 Cdw(Hg) = Cwt(Hg2+)/1 + Kdsw(Hg2+)* TSS * 10-6 Cdw Hg2+ = Cdw (Hg) * 0.85 Cdw MeHg = Cdw (Hg) * 0.15 Csb = fbs * Cwtot * (Kdbs / thetabs + Kdbs * Cbs) * (dwc + dbs/dbs) Where: fwc = (1 + Kdsw * TSS * 10-6) * (dwc/dz)/(1 + Kdsw * TSS * 10-6) * (dwc/dz) + (thetabs + Kdbs * Cbs) * (dbs/dz) kwt = fwc * kv + fbs * kb fbs = 1 - fwc kv = Kv/(dz * (1 + Kdsw * TSS * 10-6) kb = [(Xe * WAl * SD * 10+3 - Vfx * TSS)/(WAw *TSS)] * [(TSS * 10-6)/(Cbs * dbs)] TSS = (Xe * (WAl-WAi) * SD * 103)/(Vfx + Dss * WAw) and:	
Values Specific to Contaminant:	CS*
Cwtot = Total Water Body Concentration (g/m3=mg/L):	CS*
Cwt = Total Concentration in Water Column (mg/L):	CS*
Cdw = Dissolved Phase Water Concentration (mg/L):	CS*
Csb = Concentration Sorbed to Bed Sediments (mg/L):	CS*
fwc = Fraction of Total Water Body Concentration That Occurs in the Water Column (--):	CS*
kwt = Total First Order Dissipation Rate Constant (yr-1):	CS*
fbs = Fraction of Total Water Body Concentration That Occurs in the Bed Sediment (--):	CS*
LT = Total Contaminant Load to the Water Body (mg/yr):	CS*
Vfx = Average Volumetric Flow Rate Through Water Body (m3/yr):	6.7E+04
dwc = Depth of Water Column (m):	2.3
dbs = Depth of Upper Benthic Sediment Layer (m):	0.03
dz = Total Waterbody Depth (m):	2.33
WAw = Water Body Area (m2):	3.3E+03
UC1 = Units Conversion Factor (g/mg):	1.0E+03
Kdsw = Suspended Sediment/Surface Water Partition Coefficient (L/kg):	CS*
TSS = Total Suspended Solids (mg/L):	14.6
thetabs = Bed Sediment Porosity (Lwater/L):	0.6
Kdbs = Bed Sediment/Sediment Pore Water Partition Coefficient (L/kg):	CS*
Cbs = Bed Sediment Concentration (g/cm3):	1
kv = Water Column Volatilization Rate Constant (yr-1):	CS*
kb = Benthic Burial Rate Constant (yr-1):	0.9
Kv = Overall COC Transfer Rate Coefficient (m/yr):	CS*
Xe = Unit Soil Loss (kg/m2/yr):	0.9
SD = Sediment Delivery Ratio (--):	0.3
WAl = Total Watershed Area Recieving Pollutant Deposition (m2):	3.3E+05
WAi = Impervious Watershed Area Receiving Pollutant Deposition (m2):	0
Dss = Suspended solids depostion rate (m/yr):	1.8E+03

Appendix G-8c

Calculation of Potomac River Water Concentration

Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	Cwtot		Cwt		Cdw		Csb		fwc	fbs	kwt	kv	Kdsw	Kdbs
	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer						
Inorganics														
Antimony	5.63E-12	5.62E-12	3.58E-12	3.57E-12	3.58E-12	3.57E-12	1.6E-10	1.6E-10	6.3E-01	3.7E-01	2.2E+01	3.5E+01	4.5E+01	4.5E+01
Arsenic	9.06E-09	9.06E-09	6.62E-09	6.62E-09	6.62E-09	6.62E-09	1.9E-07	1.9E-07	7.2E-01	2.8E-01	2.6E+01	3.5E+01	2.9E+01	2.9E+01
Beryllium	1.03E-08	1.01E-08	9.34E-10	9.19E-10	9.23E-10	9.08E-10	7.3E-07	7.2E-07	8.9E-02	9.1E-01	3.9E+00	3.5E+01	7.9E+02	7.9E+02
Cadmium	1.74E-08	1.73E-08	8.87E-09	8.84E-09	8.86E-09	8.83E-09	6.6E-07	6.6E-07	5.0E-01	5.0E-01	1.8E+01	3.5E+01	7.5E+01	7.5E+01
Chromium +3	3.47E-06	2.61E-06	2.80E-06	2.11E-06	2.80E-06	2.10E-06	5.3E-05	4.0E-05	8.0E-01	2.0E-01	1.8E-01	0.0E+00	1.9E+01	1.9E+01
Chromium +6	2.06E-06	1.55E-06	1.66E-06	1.25E-06	1.66E-06	1.25E-06	3.2E-05	2.4E-05	8.0E-01	2.0E-01	1.8E-01	0.0E+00	1.9E+01	1.9E+01
Cobalt	1.30E-06	9.76E-07	8.25E-07	6.20E-07	8.24E-07	6.20E-07	3.7E-05	2.8E-05	6.3E-01	3.7E-01	3.3E-01	0.0E+00	4.5E+01	4.5E+01
Copper	4.94E-05	3.11E-05	4.36E-07	2.75E-07	3.80E-07	2.40E-07	3.8E-03	2.4E-03	8.7E-03	9.9E-01	8.8E-01	0.0E+00	1.0E+04	1.0E+04
Lead	1.06E-06	1.05E-06	8.53E-08	8.43E-08	8.42E-08	8.32E-08	7.6E-05	7.5E-05	7.9E-02	9.2E-01	3.6E+00	3.5E+01	9.0E+02	9.0E+02
Manganese	1.29E-05	9.70E-06	7.06E-06	5.30E-06	7.05E-06	5.29E-06	4.6E-04	3.4E-04	5.4E-01	4.6E-01	4.1E-01	0.0E+00	6.5E+01	6.5E+01
Mercury as HgCl2	2.26E-06	1.59E-06	8.63E-09	6.07E-09	2.98E-09	2.09E-09	1.8E-04	1.2E-04	3.8E-03	1.0E+00	8.9E-01	8.4E-04	1.0E+05	5.0E+04
Mercury as Methyl Hg	3.50E-07	3.41E-07	2.10E-08	2.05E-08	5.25E-10	3.70E-10	2.6E-05	2.5E-05	5.9E-02	9.4E-01	8.7E-01	5.8E-01	1.0E+05	3.0E+03
Nickel	2.52E-08	2.51E-08	1.38E-08	1.37E-08	1.38E-08	1.37E-08	8.9E-07	8.9E-07	5.4E-01	4.6E-01	1.9E+01	3.5E+01	6.5E+01	6.5E+01
Selenium	1.10E-08	1.09E-08	1.04E-08	1.03E-08	1.04E-08	1.03E-08	5.2E-08	5.1E-08	9.3E-01	6.8E-02	3.3E+01	3.5E+01	5.0E+00	5.0E+00
Zinc	2.94E-07	2.92E-07	1.64E-07	1.63E-07	1.64E-07	1.63E-07	1.0E-05	1.0E-05	5.5E-01	4.5E-01	2.0E+01	3.5E+01	6.2E+01	6.2E+01
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	2.41E-10	1.58E-10	6.32E-13	4.14E-13	1.20E-13	7.86E-14	1.9E-08	1.2E-08	2.6E-03	1.0E+00	9.0E-01	4.1E+00	2.9E+05	1.6E+05
PCBs														
Total PCBs	8.78E-09	7.87E-09	1.88E-10	1.69E-10	1.70E-10	1.52E-10	6.7E-07	6.0E-07	2.1E-02	9.8E-01	1.3E+00	1.9E+01	7.4E+03	3.9E+03
PAHs														
Acenaphthene	2.12E-09	1.82E-09	6.03E-10	5.19E-10	6.00E-10	5.16E-10	1.2E-07	1.0E-07	2.8E-01	7.2E-01	5.7E+00	1.8E+01	3.7E+02	2.0E+02
Acenaphthylene	1.23E-10	1.17E-10	1.23E-10	1.18E-10	1.23E-10	1.18E-10	1.8E-11	1.7E-11	9.9E-01	9.7E-03	1.3E+01	1.3E+01	2.8E-01	1.5E-01
Anthracene	4.46E-09	3.49E-09	3.48E-10	2.73E-10	3.39E-10	2.66E-10	3.2E-07	2.5E-07	7.7E-02	9.2E-01	1.6E+00	1.0E+01	1.8E+03	9.4E+02
Benzo(a)anthracene	8.81E-08	6.86E-08	6.61E-10	5.14E-10	4.74E-10	3.69E-10	6.8E-06	5.3E-06	7.4E-03	9.9E-01	9.3E-01	5.8E+00	2.7E+04	1.4E+04
Benzo(a)pyrene	7.85E-08	6.19E-08	3.23E-10	2.55E-10	1.57E-10	1.24E-10	6.1E-06	4.8E-06	4.1E-03	1.0E+00	8.9E-01	1.4E+00	7.3E+04	3.9E+04
Benzo(b)fluoranthene	7.13E-08	5.48E-08	2.83E-10	2.18E-10	1.32E-10	1.01E-10	5.5E-06	4.2E-06	3.9E-03	1.0E+00	9.1E-01	6.9E+00	7.9E+04	4.2E+04
Benzo(k)fluoranthene	2.15E-07	1.54E-07	8.75E-10	6.25E-10	4.19E-10	2.99E-10	1.7E-05	1.2E-05	4.0E-03	1.0E+00	8.9E-01	8.9E-02	7.4E+04	4.0E+04
Benzo(ghi)perylene	5.45E-08	4.14E-08	5.47E-08	4.16E-08	5.47E-08	4.16E-08	2.0E-09	1.5E-09	9.9E-01	8.2E-03	7.1E-01	7.0E-01	6.8E-02	3.6E-02
Chrysene	6.39E-07	4.82E-07	4.42E-09	3.33E-09	3.07E-09	2.31E-09	4.9E-05	3.7E-05	6.8E-03	9.9E-01	9.5E-01	9.3E+00	3.0E+04	1.6E+04
Dibenzo(a,h)anthracene	1.33E-06	1.00E-06	4.27E-09	3.21E-09	1.44E-09	1.08E-09	1.0E-04	7.7E-05	3.2E-03	1.0E+00	8.9E-01	1.1E-03	1.3E+05	7.2E+04
Fluoranthene	1.30E-08	1.02E-08	5.21E-10	4.06E-10	4.94E-10	3.86E-10	9.7E-07	7.6E-07	4.0E-02	9.6E-01	9.8E-01	3.1E+00	3.7E+03	2.0E+03
Fluorene	7.14E-10	6.34E-10	1.45E-10	1.28E-10	1.43E-10	1.27E-10	4.4E-08	3.9E-08	2.0E-01	8.0E-01	2.8E+00	1.0E+01	5.8E+02	3.1E+02
Indeno(1,2,3-cd)pyrene	8.88E-07	6.72E-07	2.45E-09	1.85E-09	5.59E-10	4.23E-10	6.9E-05	5.2E-05	2.7E-03	1.0E+00	8.9E-01	8.2E-02	2.3E+05	1.2E+05
2-Methylnaphthalene	2.05E-11	2.04E-11	2.06E-11	2.05E-11	2.06E-11	2.05E-11	6.7E-13	6.7E-13	9.9E-01	8.2E-03	1.4E+01	1.4E+01	6.1E-02	3.3E-02
Naphthalene	2.30E-10	2.09E-10	1.43E-10	1.30E-10	1.43E-10	1.30E-10	6.8E-09	6.2E-09	6.1E-01	3.9E-01	1.8E+01	2.9E+01	8.9E+01	4.8E+01
Phenanthrene	7.25E-09	5.88E-09	5.08E-10	4.12E-10	4.94E-10	4.00E-10	5.2E-07	4.2E-07	6.9E-02	9.3E-01	1.1E+00	4.4E+00	2.0E+03	1.1E+03
Pyrene	5.71E-08	4.13E-08	1.70E-09	1.23E-09	1.58E-09	1.14E-09	4.3E-06	3.1E-06	2.9E-02	9.7E-01	9.3E-01	2.2E+00	5.1E+03	2.7E+03
Aldehyde Ketones														
Formaldehyde	3.81E-06	2.94E-06	3.82E-06	2.95E-06	3.82E-06	2.95E-06	3.4E-07	2.7E-07	9.9E-01	8.9E-03	2.3E+00	2.3E+00	1.7E-01	9.0E-02

Appendix G-8d
Calculation of Fish Concentration
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameters

Cfishdw = Cdw * BCFfish or
Cfishdw = Cdw * BAFfish or
Cfishsb = Csb * flipid * BSAF/ OCsed

Where:

Values Specific to Contaminant:	CS*
Cfish = Contaminant Concentration In Fish (mg/kg):	CS*
Cfishdw = Fish Concentration from Dissolved Water Concentration (mg/kg):	CS*
Cfishsb = Fish Concentration from Bed Sediments (mg/kg):	CS*
Cdw = Dissolved Water Concentration (mg/L):	CS*
Cwt = Total Water Column Concentration (mg/L):	CS*
Csb = Concentration of Contaminant Sorbed to Bed Sediment (mg/kg):	CS*
BCFfish = Fish Bioconcentration Factor (L/kg):	CS*
BAFfish = Fish Bioaccumulation Factor (L/kg):	CS*
BSAF = Biota to Sediment Accumulation Factor (--):	CS*
flipid = Fish Lipid Content:	7.0E-02
OCsed = Fraction Organic Carbon in Bottom Sediment:	4.0E-02

Appendix G-8d
Calculation of Fish Concentration
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Contaminant	Cfish		Cfishdw_BCF		BCF	Cfishdw_BAF		BAF	Cfishsb		BSAF
	Non - Cancer	Cancer	Non - Cancer	Cancer		Non - Cancer	Cancer		Non - Cancer	Cancer	
Inorganics											
Antimony	1.4E-10	1.4E-10	1.4E-10	1.4E-10	4.0E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Arsenic	7.5E-07	7.5E-07	7.5E-07	7.5E-07	1.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Beryllium	5.7E-08	5.6E-08	5.7E-08	5.6E-08	6.2E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cadmium	8.0E-06	8.0E-06	8.0E-06	8.0E-06	9.1E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +3	5.3E-05	4.0E-05	5.3E-05	4.0E-05	1.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Chromium +6	5.2E-06	3.9E-06	5.2E-06	3.9E-06	3.2E+00	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Cobalt	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Copper	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Lead	7.6E-09	7.5E-09	7.6E-09	7.5E-09	9.0E-02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Manganese	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as HgCl2	ND	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Mercury as Methyl Hg	3.6E-03	2.5E-03	0.0E+00	0.0E+00	ND	3.6E-03	2.5E-03	6.8E+06	0.0E+00	0.0E+00	ND
Nickel	1.1E-06	1.1E-06	1.1E-06	1.1E-06	7.8E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Selenium	1.3E-06	1.3E-06	1.3E-06	1.3E-06	1.3E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Zinc	3.4E-04	3.4E-04	3.4E-04	3.4E-04	2.1E+03	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Dioxins/Furans											
2,3,7,8-TCDD-TEQ	2.9E-09	1.9E-09	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	2.9E-09	1.9E-09	9.0E-02
PCBs											
Total PCBs	2.3E-06	2.1E-06	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	2.3E-06	2.1E-06	2.0E+00
PAHs											
Acenaphthene	1.2E-07	1.0E-07	1.2E-07	1.0E-07	2.0E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Acenaphthylene	3.3E-08	3.2E-08	0.0E+00	0.0E+00	ND	3.3E-08	3.2E-08	2.7E+02	0.0E+00	0.0E+00	ND
Anthracene	3.5E-07	2.7E-07	0.0E+00	0.0E+00	ND	3.5E-07	2.7E-07	1.0E+03	0.0E+00	0.0E+00	ND
Benzo(a)anthracene	2.4E-05	1.8E-05	0.0E+00	0.0E+00	ND	2.4E-05	1.8E-05	5.0E+04	0.0E+00	0.0E+00	ND
Benzo(a)pyrene	2.1E-05	1.6E-05	0.0E+00	0.0E+00	ND	2.1E-05	1.6E-05	1.3E+05	0.0E+00	0.0E+00	ND
Benzo(b)fluoranthene	2.7E-05	2.1E-05	0.0E+00	0.0E+00	ND	2.7E-05	2.1E-05	2.1E+05	0.0E+00	0.0E+00	ND
Benzo(k)fluoranthene	7.4E-05	5.3E-05	0.0E+00	0.0E+00	ND	7.4E-05	5.3E-05	1.8E+05	0.0E+00	0.0E+00	ND
Benzo(ghi)perylene	1.4E-03	1.1E-03	0.0E+00	0.0E+00	ND	1.4E-03	1.1E-03	2.5E+04	0.0E+00	0.0E+00	ND
Chrysene	1.5E-04	1.2E-04	0.0E+00	0.0E+00	ND	1.5E-04	1.2E-04	5.0E+04	0.0E+00	0.0E+00	ND
Dibenzo(a,h)anthracene	7.2E-04	5.4E-04	0.0E+00	0.0E+00	ND	7.2E-04	5.4E-04	5.0E+05	0.0E+00	0.0E+00	ND
Fluoranthene	2.2E-06	1.7E-06	0.0E+00	0.0E+00	ND	2.2E-06	1.7E-06	4.5E+03	0.0E+00	0.0E+00	ND
Fluorene	6.8E-08	6.0E-08	0.0E+00	0.0E+00	ND	6.8E-08	6.0E-08	4.7E+02	0.0E+00	0.0E+00	ND
Indeno(1,2,3-cd)pyrene	3.5E-04	2.6E-04	0.0E+00	0.0E+00	ND	3.5E-04	2.6E-04	6.2E+05	0.0E+00	0.0E+00	ND
2-Methylnaphthalene	3.8E-09	3.8E-09	3.8E-09	3.8E-09	1.9E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Naphthalene	9.9E-09	9.0E-09	9.9E-09	9.0E-09	6.9E+01	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND
Phenanthrene	5.1E-07	4.1E-07	0.0E+00	0.0E+00	ND	5.1E-07	4.1E-07	1.0E+03	6.7E-09	5.5E-09	7.3E-03
Pyrene	5.2E-06	3.8E-06	0.0E+00	0.0E+00	ND	5.2E-06	3.8E-06	3.3E+03	1.8E-08	1.3E-08	2.4E-03
Aldehyde Ketones											
Formaldehyde	1.3E-03	1.0E-03	1.3E-03	1.0E-03	3.4E+02	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND

Appendix G-8e
Calculation of Chemical Intakes
Resident Fisher Near Farm 2/Pond 3 Scenario: Adult

Parameter

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp = Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg = Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Consumption Rate of Fish (kg/kg-d FW):	0.00125
Ffish = Fraction of Locally Caught Fish:	0.5
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	9.0E-14	9.0E-14	1.1E-17	1.1E-17	6.0E-16	5.9E-16	8.9E-14	8.9E-14
Arsenic	1.3E-09	1.3E-09	9.8E-16	9.8E-16	8.4E-10	8.4E-10	4.7E-10	4.7E-10
Beryllium	2.3E-10	2.3E-10	2.1E-13	2.1E-13	1.9E-10	1.9E-10	3.6E-11	3.5E-11
Cadmium	6.7E-09	6.6E-09	8.4E-14	8.4E-14	1.6E-09	1.6E-09	5.0E-09	5.0E-09
Chromium +3	3.4E-08	2.6E-08	6.5E-11	6.3E-11	1.2E-09	1.2E-09	3.3E-08	2.5E-08
Chromium +6	4.0E-09	3.2E-09	3.8E-11	3.8E-11	7.1E-10	7.0E-10	3.3E-09	2.5E-09
Cobalt	3.8E-10	3.8E-10	4.5E-11	4.3E-11	3.4E-10	3.4E-10	0.0E+00	0.0E+00
Copper	7.4E-09	4.8E-09	5.4E-09	2.7E-09	2.1E-09	2.1E-09	0.0E+00	0.0E+00
Lead	1.8E-08	1.8E-08	1.4E-11	1.4E-11	1.8E-08	1.8E-08	4.7E-12	4.7E-12
Manganese	3.4E-09	3.4E-09	5.5E-10	5.1E-10	2.9E-09	2.9E-09	0.0E+00	0.0E+00
Mercury as HgCl2	3.2E-10	1.9E-10	2.0E-10	1.0E-10	1.2E-10	9.3E-11	0.0E+00	0.0E+00
Mercury as Methyl Hg	2.2E-06	1.6E-06	3.9E-12	2.0E-12	1.8E-11	1.8E-11	2.2E-06	1.6E-06
Nickel	3.2E-09	3.2E-09	1.4E-13	1.4E-13	2.5E-09	2.5E-09	6.7E-10	6.7E-10
Selenium	2.1E-09	2.1E-09	2.0E-14	2.0E-14	1.3E-09	1.3E-09	8.4E-10	8.3E-10
Zinc	2.4E-07	2.4E-07	1.6E-12	1.6E-12	3.0E-08	3.0E-08	2.1E-07	2.1E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	1.9E-12	1.2E-12	8.9E-15	5.2E-15	4.8E-15	4.4E-15	1.8E-12	1.2E-12
PCBs								
Total PCBs	1.5E-09	1.3E-09	1.8E-13	1.8E-13	3.2E-12	3.2E-12	1.5E-09	1.3E-09
PAHs								
Acenaphthene	7.8E-11	6.7E-11	3.3E-13	3.3E-13	2.1E-12	2.1E-12	7.5E-11	6.5E-11
Acenaphthylene	2.1E-11	2.0E-11	1.5E-17	1.5E-17	2.3E-13	2.3E-13	2.1E-11	2.0E-11
Anthracene	2.2E-10	1.7E-10	3.4E-13	3.2E-13	5.4E-13	5.1E-13	2.2E-10	1.7E-10
Benzo(a)anthracene	1.5E-08	1.2E-08	3.1E-12	2.9E-12	6.2E-12	6.1E-12	1.5E-08	1.2E-08
Benzo(a)pyrene	1.3E-08	1.0E-08	2.5E-12	2.3E-12	1.2E-11	1.2E-11	1.3E-08	1.0E-08
Benzo(b)fluoranthene	1.7E-08	1.3E-08	2.5E-12	2.3E-12	1.8E-12	1.7E-12	1.7E-08	1.3E-08
Benzo(k)fluoranthene	4.6E-08	3.3E-08	8.0E-12	6.0E-12	2.3E-11	2.3E-11	4.6E-08	3.3E-08
Benzo(ghi)perylene	8.8E-07	6.7E-07	1.1E-14	1.1E-14	8.6E-09	8.6E-09	8.7E-07	6.6E-07
Chrysene	9.6E-08	7.2E-08	2.5E-11	2.2E-11	3.8E-11	3.7E-11	9.6E-08	7.2E-08
Dibenzo(a,h)anthracene	4.5E-07	3.4E-07	4.9E-11	4.3E-11	1.5E-10	1.5E-10	4.5E-07	3.4E-07
Fluoranthene	1.4E-09	1.1E-09	6.1E-13	5.7E-13	6.5E-13	6.2E-13	1.4E-09	1.1E-09
Fluorene	4.2E-11	3.8E-11	5.4E-14	5.3E-14	1.3E-13	1.2E-13	4.2E-11	3.8E-11
Indeno(1,2,3-cd)pyrene	2.2E-07	1.6E-07	3.2E-11	2.9E-11	1.3E-10	1.3E-10	2.2E-07	1.6E-07
2-Methylnaphthalene	2.6E-12	2.6E-12	3.8E-20	3.8E-20	1.9E-13	1.9E-13	2.4E-12	2.4E-12
Naphthalene	7.0E-12	6.5E-12	4.7E-14	4.7E-14	7.8E-13	7.8E-13	6.2E-12	5.6E-12
Phenanthrene	3.2E-10	2.6E-10	3.7E-13	3.6E-13	6.1E-13	5.9E-13	3.2E-10	2.6E-10
Pyrene	3.3E-09	2.4E-09	2.6E-12	2.0E-12	2.5E-12	1.9E-12	3.3E-09	2.4E-09
Aldehyde Ketones								
Formaldehyde	8.2E-07	6.4E-07	9.6E-13	9.6E-13	5.8E-09	5.8E-09	8.2E-07	6.3E-07

Appendix G-8e
Calculation of Chemical Intakes
Resident Fisher Near Farm 2/Pond 3 Scenario: Child

Itot = Isoil + Iag + Ifish

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd + Pv + Prep) * CRag) + (Prpp * CRpp) + (Prbg * CRbg)] * Fag
Ifish = Cfish * CRfish * Ffish

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp = Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg = Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	0.25
Cfish = Total Contaminant Concentration in Fish (mg/kg):	CS*
CRfish = Child Consumption Rate of Fish (kg/kg-d FW):	8.80E-04
Ffish = Fraction of Locally Caught Fish:	0.5
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ifish	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer
Inorganics								
Antimony	6.4E-14	6.4E-14	1.0E-16	1.0E-16	8.3E-16	8.3E-16	6.3E-14	6.3E-14
Arsenic	1.5E-09	1.5E-09	9.1E-15	9.1E-15	1.2E-09	1.2E-09	3.3E-10	3.3E-10
Beryllium	2.9E-10	2.9E-10	2.0E-12	2.0E-12	2.7E-10	2.7E-10	2.5E-11	2.5E-11
Cadmium	5.8E-09	5.8E-09	7.8E-13	7.8E-13	2.3E-09	2.3E-09	3.5E-09	3.5E-09
Chromium +3	2.6E-08	2.0E-08	6.0E-10	5.9E-10	1.7E-09	1.7E-09	2.3E-08	1.8E-08
Chromium +6	3.7E-09	3.1E-09	3.6E-10	3.5E-10	9.9E-10	9.8E-10	2.3E-09	1.7E-09
Cobalt	8.9E-10	8.7E-10	4.2E-10	4.0E-10	4.7E-10	4.7E-10	0.0E+00	0.0E+00
Copper	5.3E-08	2.8E-08	5.0E-08	2.5E-08	2.9E-09	2.9E-09	0.0E+00	0.0E+00
Lead	2.6E-08	2.6E-08	1.3E-10	1.3E-10	2.6E-08	2.6E-08	3.3E-12	3.3E-12
Manganese	9.2E-09	8.8E-09	5.2E-09	4.8E-09	4.0E-09	4.0E-09	0.0E+00	0.0E+00
Mercury as HgCl2	2.0E-09	1.1E-09	1.9E-09	9.4E-10	1.7E-10	1.3E-10	0.0E+00	0.0E+00
Mercury as Methyl Hg	1.6E-06	1.1E-06	3.6E-11	1.8E-11	2.5E-11	2.5E-11	1.6E-06	1.1E-06
Nickel	4.0E-09	4.0E-09	1.3E-12	1.3E-12	3.5E-09	3.5E-09	4.7E-10	4.7E-10
Selenium	2.3E-09	2.3E-09	1.9E-13	1.9E-13	1.8E-09	1.8E-09	5.9E-10	5.8E-10
Zinc	1.9E-07	1.9E-07	1.5E-11	1.5E-11	4.2E-08	4.2E-08	1.5E-07	1.5E-07
Dioxins/Furans								
2,3,7,8-TCDD-TEQ	1.4E-12	9.0E-13	8.3E-14	4.9E-14	6.7E-15	6.2E-15	1.3E-12	8.5E-13
PCBs								
Total PCBs	1.0E-09	9.3E-10	1.7E-12	1.7E-12	4.5E-12	4.5E-12	1.0E-09	9.2E-10
PAHs								
Acenaphthene	5.9E-11	5.2E-11	3.1E-12	3.1E-12	2.9E-12	2.9E-12	5.3E-11	4.6E-11
Acenaphthylene	1.5E-11	1.4E-11	1.4E-16	1.4E-16	3.6E-13	3.6E-13	1.5E-11	1.4E-11
Anthracene	1.6E-10	1.2E-10	3.2E-12	3.0E-12	7.5E-13	7.0E-13	1.5E-10	1.2E-10
Benzo(a)anthracene	1.0E-08	8.1E-09	2.9E-11	2.7E-11	8.7E-12	8.6E-12	1.0E-08	8.1E-09
Benzo(a)pyrene	9.2E-09	7.3E-09	2.3E-11	2.2E-11	1.7E-11	1.7E-11	9.2E-09	7.2E-09
Benzo(b)fluoranthene	1.2E-08	9.2E-09	2.3E-11	2.1E-11	2.5E-12	2.4E-12	1.2E-08	9.2E-09
Benzo(k)fluoranthene	3.3E-08	2.3E-08	7.4E-11	5.6E-11	3.2E-11	3.2E-11	3.3E-08	2.3E-08
Benzo(ghi)perylene	6.3E-07	4.8E-07	1.0E-13	1.0E-13	1.4E-08	1.3E-08	6.1E-07	4.6E-07
Chrysene	6.8E-08	5.1E-08	2.3E-10	2.0E-10	5.4E-11	5.2E-11	6.7E-08	5.1E-08
Dibenzo(a,h)anthracene	3.2E-07	2.4E-07	4.6E-10	4.0E-10	2.1E-10	2.1E-10	3.1E-07	2.4E-07
Fluoranthene	9.8E-10	7.7E-10	5.7E-12	5.4E-12	8.9E-13	8.6E-13	9.8E-10	7.6E-10
Fluorene	3.0E-11	2.7E-11	5.0E-13	5.0E-13	1.7E-13	1.7E-13	3.0E-11	2.6E-11
Indeno(1,2,3-cd)pyrene	1.5E-07	1.2E-07	3.0E-10	2.7E-10	1.8E-10	1.8E-10	1.5E-07	1.2E-07
2-Methylnaphthalene	2.0E-12	2.0E-12	3.5E-19	3.5E-19	3.0E-13	3.0E-13	1.7E-12	1.7E-12
Naphthalene	5.9E-12	5.5E-12	4.4E-13	4.4E-13	1.1E-12	1.1E-12	4.4E-12	4.0E-12
Phenanthrene	2.3E-10	1.9E-10	3.5E-12	3.4E-12	8.3E-13	8.1E-13	2.2E-10	1.8E-10
Pyrene	2.3E-09	1.7E-09	2.4E-11	1.9E-11	3.4E-12	2.7E-12	2.3E-09	1.7E-09
Aldehyde Ketones								
Formaldehyde	5.8E-07	4.5E-07	9.0E-12	9.0E-12	9.0E-09	9.0E-09	5.8E-07	4.4E-07

Appendix G-8e
Summary of Cancer Risks and Hazard Indices (a)
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameter	Contaminant	RfDo mg/kg-d	SFo mg/kg-D-2	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC	**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC								
	Antimony	4.0E-04	NA	2.2E-10	NA	1.5E-10	NA	Longevity, blood glucose, cholesterol
Where:	Arsenic	3.0E-04	1.5E+00	4.2E-06	8E-10	4.8E-06	2E-10	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:	Beryllium	2.0E-03	NA	1.1E-07	NA	1.4E-07	NA	Intestinal lesions
CRo = Cancer Risk oral (--): CS*	Cadmium	1.0E-03	NA	6.4E-06	NA	5.6E-06	NA	Proteinuria
HQo = Ingestion Hazard Index (--): CS*	Chromium +3	1.5E+00	NA	2.2E-08	NA	1.6E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d): CS*	Chromium +6	3.0E-03	5.0E-01	1.3E-06	7E-10	1.2E-06	1E-10	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1): CS*	Cobalt	3.0E-04	NA	1.2E-06	NA	2.8E-06	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d): CS*	Copper	4.0E-02	NA	1.8E-07	NA	1.3E-06	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):	Lead	NA	NA	NA	NA	NA	NA	
adult: 30	Manganese	1.4E-01	NA	2.3E-08	NA	6.3E-08	NA	CNS
child: 6	Mercury as HgCl2	3.0E-04	NA	1.0E-06	NA	6.5E-06	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr): 350	Mercury as Methyl Hg	1.0E-04	NA	2.1E-02	NA	1.5E-02	NA	Developmental Effects
AT = Averaging Time (yr): See Below	Nickel	2.0E-02	NA	1.5E-07	NA	1.9E-07	NA	Reduced body and organ weight
Cancer: 70	Selenium	5.0E-03	NA	4.0E-07	NA	4.5E-07	NA	Selenosis
Noncancer: See Below	Zinc	3.0E-01	NA	7.7E-07	NA	6.1E-07	NA	Anemia
adult: 30								
child: 6	**Dioxins/Furans**							
UC = Units Conversion (day/yr): 365								
	2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	2.5E-03	6E-08	1.9E-03	1E-08	Developmental
	PCBs							
	Total PCBs	2.0E-05	2.0E+00	7.0E-05	1E-09	5.0E-05	2E-10	Developmental
	PAHs							
	Acenaphthene	6.0E-02	NA	1.2E-09	NA	9.4E-10	NA	Liver
	Acenaphthylene	NA	NA	NA	NA	NA	NA	
	Anthracene	3.0E-01	NA	7.0E-10	NA	5.0E-10	NA	No Observed Effects
	Benzo(a)anthracene	NA	7.3E-01	NA	3E-09	NA	5E-10	
	Benzo(a)pyrene	NA	7.3E+00	NA	3E-08	NA	4E-09	
	Benzo(b)fluoranthene	NA	7.3E-01	NA	4E-09	NA	6E-10	
	Benzo(k)fluoranthene	NA	7.3E-02	NA	1E-09	NA	1E-10	
	Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
	Chrysene	NA	7.3E-03	NA	2E-10	NA	3E-11	
	Dibenzo(a,h)anthracene	NA	7.3E+00	NA	1E-06	NA	1E-07	
	Fluoranthene	4.0E-02	NA	3.3E-08	NA	2.4E-08	NA	CNS, liver, blood
	Fluorene	4.0E-02	NA	1.0E-09	NA	7.3E-10	NA	Blood
	Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	5E-08	NA	7E-09	
	2-Methylnaphthalene	4.0E-03	NA	6.2E-10	NA	4.8E-10	NA	Lung
	Naphthalene	2.0E-02	NA	3.4E-10	NA	2.8E-10	NA	Decreased body weight gain
	Phenanthrene	NA	NA	NA	NA	NA	NA	
	Pyrene	3.0E-02	NA	1.0E-07	NA	7.4E-08	NA	Kidney
	Aldehyde Ketones							
	Formaldehyde	2.0E-01	NA	3.9E-06	NA	2.8E-06	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and fish consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	2.4E-02	1E-06	1.7E-02	2E-07

Appendix G-8f
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
Resident Fisher Near Farm 2/Pond 3 Scenario - Adult and Child

Parameter		Contaminant	Ca ug/m3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
CRi = Ca *ED * EF * URF / AT * UC2		**Inorganics**									
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2											
		Antimony	2.55E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
And:		Arsenic	2.15E-06	6.0E-03	1.5E-05	4.3E-03	1.4E-04	4E-09	1.4E-04	8E-10	Cardiovascular, CNS, Developmental
Ca = Q * Fv * Cyv + (1- Fv) * Cyp		Beryllium	3.37E-07	9.0E-03	2.0E-05	2.4E-03	1.6E-05	3E-10	1.6E-05	7E-11	Sensitization
		Cadmium	2.87E-06	9.0E-03	1.0E-05	1.8E-03	2.7E-04	2E-09	2.7E-04	4E-10	
For Hg:		Chromium +3	2.04E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb		Chromium +6	1.21E-06	0.0E+00	1.0E-04	8.4E-02	1.2E-05	4E-08	1.2E-05	8E-09	Increased LDH in bronchoalveolar lavage fluid
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb		Cobalt	5.96E-07	0.0E+00	6.0E-06	9.0E-03	9.5E-05	2E-09	9.5E-05	4E-10	
		Copper	3.67E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Where:		Lead	3.22E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
CS* = Values specific to Contaminant:		Manganese	5.09E-06	0.0E+00	5.0E-05	NA	9.8E-05	NA	9.8E-05	NA	CNS
Values specific to Site:	RS*	Mercury (Total) as HgCl2	1.31E-05	8.5E-01	3.0E-04	NA	4.2E-05	NA	4.2E-05	NA	PNS, Autonomic Dysfunction
CRi = Cancer Risk inhalation (--):	CS*	Mercury (Total) as Elemental Hg	5.47E-08	1.0E+00	3.0E-04	NA	1.7E-07	NA	1.7E-07	NA	PNS, Autonomic Dysfunction
HQi = Inhalation Hazard Index (--):	CS*	Nickel	4.42E-06	9.0E-03	9.0E-05	2.4E-04	4.7E-05	4E-10	4.7E-05	9E-11	
Ca = Air Concentration (ug/m3)	CS*	Selenium	3.20E-06	0.0E+00	2.0E-02	NA	1.5E-07	NA	1.5E-07	NA	
URF = Unit Risk Factor ((ug/m3)-1):	CS*	Zinc	5.26E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
RfC = Reference Concentration (mg/m3):	CS*										
Q = COPC specific emission rate (g/s):	CS*	**Dioxins/Furans**									
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*										
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*	2,3,7,8-TCDD-TEQ	9.41E-11	6.6E-01	4.0E-08	3.8E+01	2.3E-06	1E-09	2.3E-06	3E-10	
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*										
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*	**PCBs**									
ED = Exposure Duration (see below) (yr):											
adult:	30	Total PCBs	6.47E-06	9.9E-01	NA	5.7E-04	NA	2E-09	NA	3E-10	
child:	6										
EF = Exposure Frequency (day/yr):	350	**PAHs**									
UC1 = Units Conversion (mg/ug):	0.001										
AT = Averaging Time (yr):	See Below	Acenaphthene	2.59E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Cancer:	70	Acenaphthylene	3.56E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Noncancer:	See Below	Anthracene	2.64E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
adult:	30	Benzo(a)anthracene	1.94E-07	4.8E-01	NA	1.1E-04	NA	9E-12	NA	2E-12	
child:	6	Benzo(a)pyrene	2.17E-07	2.9E-01	NA	1.1E-03	NA	1E-10	NA	2E-11	
UC2 = Units Conversion (day/yr):	365	Benzo(b)fluoranthene	5.27E-07	9.7E-01	NA	1.1E-04	NA	2E-11	NA	5E-12	
		Benzo(k)fluoranthene	3.27E-07	2.7E-01	NA	1.1E-04	NA	1E-11	NA	3E-12	
		Benzo(ghi)perylene	2.40E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Chrysene	2.84E-06	7.4E-01	NA	1.1E-05	NA	1E-11	NA	3E-12	
		Dibenzo(a,h)anthracene	2.60E-07	5.5E-02	NA	1.2E-03	NA	1E-10	NA	3E-11	
		Fluoranthene	2.31E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Fluorene	3.70E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Indeno(1,2,3-cd)pyrene	2.21E-07	5.0E-03	NA	1.1E-04	NA	1E-11	NA	2E-12	
		2-Methylnaphthalene	5.04E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Naphthalene	1.55E-06	1.0E+00	3.0E-03	3.4E-05	5.0E-07	2E-11	5.0E-07	4E-12	Nasal effects
		Phenanthrene	3.95E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Pyrene	2.13E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Aldehyde Ketones									
		Formaldehyde	2.95E-05	1.0E+00	9.8E-03	1.3E-05	2.9E-06	2E-10	2.9E-06	3E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	7.3E-04	5E-08	7.3E-04	1E-08

Appendix G-8g
Ingestion of Mother's Milk
Resident Fisher Near Farm 2/Pond 3 Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	1.1E-14	1.2E-12	1.3E-12	1.43E+01	4.12E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-8e						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-8g
Ingestion of Mother's Milk
Resident Fisher Near Farm 2/Pond 3 Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
And:		2,3,7,8-TCDD TEQ	4.12E-02	6.0E+01	6.9E-04
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-9a
Contaminant Concentration in Soil
Farmer - Farm 1 Scenario - Adult and Child

Parameters

Carcinogens ($T1 < tD < T2$)

$$Cs = [((Ds * tD - Cs(tD)/ks) + ((Cs(tD)/ks) * (1 - \exp(-ks*(T2 - tD)))]/(T2 - T1)$$

Carcinogens ($T2 \leq tD$)

$$Cs = [Ds/(ks * (tD - T1))] * [(tD + (\exp^{(-ks * tD)}/ks)) - (T1 + (\exp^{(-ks * T1)})/ks)]$$

NonCarcinogens

$$Cs(tD) = (Ds * [1 - \exp^{(-ks * tD)}])/ks$$

Where:

$$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$$

For Mercury:
$$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
CstD = Soil concentration at time tD (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T1 = Time Peroid At Beginning Of Combustion (yr):	0
T2 = Exposure duration or ED (yr):	see below
Adult:	40
Child	6
ks = COC Soil Loss Constant (yr-1):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (mg-mg2/kg-cm2):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-9a
Contaminant Concentration in Soil
Farmer - Farm 1 Scenario - Adult

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	4.2E-11	3.2E-11	4.22E-12	3.2E-12	9.9E-10	9.9E-09	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.5E-08	1.1E-08	1.50E-09	1.1E-09	1.7E-05	1.7E-04	6.0E-03	1.12E+03	1.12E+05
Beryllium	3.3E-06	2.4E-06	3.27E-07	2.5E-07	2.6E-06	2.6E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.3E-06	9.6E-07	1.28E-07	9.6E-08	2.2E-05	2.2E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	9.8E-05	7.1E-05	9.91E-05	7.4E-05	1.6E-05	1.6E-04	9.0E-03	1.60E-01	1.60E+00
Chromium +6	5.8E-05	4.2E-05	5.88E-05	4.4E-05	9.4E-06	9.4E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	6.0E-05	4.0E-05	6.86E-05	5.1E-05	4.7E-06	4.7E-05	0.0E+00	6.78E-02	6.78E-01
Copper	8.6E-04	5.3E-04	8.21E-03	5.1E-03	2.9E-05	2.9E-04	0.0E+00	3.06E-04	3.06E-03
Lead	2.1E-04	1.6E-04	2.14E-05	1.6E-05	2.5E-04	2.5E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	6.4E-04	4.2E-04	8.45E-04	6.3E-04	4.0E-05	4.0E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	6.9E-06	4.3E-06	6.89E-05	4.3E-05	2.3E-07	2.3E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	1.4E-07	8.8E-08	1.32E-06	8.3E-07	4.7E-09	4.7E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	2.1E-06	1.6E-06	2.12E-07	1.6E-07	3.4E-05	3.4E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	3.0E-07	2.3E-07	3.04E-08	2.3E-08	2.5E-05	2.5E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	2.4E-05	1.8E-05	2.41E-06	1.8E-06	4.1E-04	4.1E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	3.8E-10	2.5E-10	3.55E-09	2.3E-09	1.9E-11	1.9E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	9.1E-09	6.8E-09	6.89E-08	5.2E-08	4.6E-08	4.6E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	9.5E-09	7.1E-09	9.38E-08	7.0E-08	2.4E-08	2.4E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.8E-12	1.4E-12	1.94E-13	1.5E-13	5.4E-10	5.4E-09	1.0E+00	2.96E+02	2.79E+04
Anthracene	1.5E-09	1.1E-09	1.44E-08	1.1E-08	8.0E-10	8.0E-09	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	4.1E-08	3.0E-08	4.07E-07	3.0E-07	1.5E-08	1.5E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	5.0E-08	3.7E-08	4.98E-07	3.7E-07	2.4E-08	2.4E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	8.5E-09	6.4E-09	8.47E-08	6.3E-08	3.5E-09	3.5E-08	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	2.3E-07	1.6E-07	2.26E-06	1.6E-06	2.8E-08	2.8E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.6E-09	1.2E-09	1.25E-09	9.4E-10	3.6E-08	3.6E-07	1.0E+00	2.22E+01	2.87E+02
Chrysene	4.2E-07	3.1E-07	4.16E-06	3.1E-06	1.0E-07	1.0E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	1.5E-06	1.1E-06	1.50E-05	1.1E-05	4.0E-07	4.0E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	2.2E-09	1.6E-09	2.17E-08	1.6E-08	1.2E-09	1.2E-08	9.9E-01	5.70E-01	5.73E-01
Fluorene	2.8E-10	2.1E-10	2.78E-09	2.1E-09	1.2E-09	1.2E-08	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	9.8E-07	7.4E-07	9.83E-06	7.4E-06	3.4E-07	3.4E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.2E-14	2.4E-14	3.17E-15	2.4E-15	7.7E-10	7.7E-09	1.0E+00	2.43E+04	2.43E+06
Naphthalene	1.4E-09	1.1E-09	7.18E-09	5.4E-09	7.6E-09	7.6E-08	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	1.5E-09	1.1E-09	1.52E-08	1.1E-08	1.9E-09	1.9E-08	1.0E+00	1.26E+00	1.27E+00
Pyrene	8.5E-09	6.1E-09	8.32E-08	5.9E-08	1.1E-09	1.1E-08	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	2.0E-07	1.5E-07	2.90E-07	2.2E-07	1.2E-05	1.2E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-9a
Contaminant Concentration in Soil
Farmer - Farm 1 Scenario - Child

Contaminant	Cs Tilled (20 cm) Non - Cancer	Cs Tilled (20 cm) Cancer	Cs Untilled (2 cm) Non - Cancer	Cs Untilled (2 cm) Cancer	Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
Inorganics									
Antimony	4.2E-11	4.2E-11	4.22E-12	4.2E-12	9.9E-10	9.9E-09	1.0E+00	2.36E+01	2.35E+03
Arsenic	1.5E-08	1.5E-08	1.50E-09	1.5E-09	1.7E-05	1.7E-04	6.0E-03	1.12E+03	1.12E+05
Beryllium	3.3E-06	3.1E-06	3.27E-07	3.3E-07	2.6E-06	2.6E-05	9.0E-03	8.07E-01	8.03E+01
Cadmium	1.3E-06	1.3E-06	1.28E-07	1.3E-07	2.2E-05	2.2E-04	9.0E-03	1.75E+01	1.75E+03
Chromium +3	9.8E-05	7.9E-05	9.91E-05	9.7E-05	1.6E-05	1.6E-04	9.0E-03	1.60E-01	1.60E+00
Chromium +6	5.8E-05	4.7E-05	5.88E-05	5.8E-05	9.4E-06	9.4E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	6.0E-05	3.9E-05	6.86E-05	6.5E-05	4.7E-06	4.7E-05	0.0E+00	6.78E-02	6.78E-01
Copper	8.6E-04	4.3E-04	8.21E-03	4.2E-03	2.9E-05	2.9E-04	0.0E+00	3.06E-04	3.06E-03
Lead	2.1E-04	2.1E-04	2.14E-05	2.1E-05	2.5E-04	2.5E-03	7.0E-03	1.18E+00	1.17E+02
Manganese	6.4E-04	3.9E-04	8.45E-04	7.9E-04	4.0E-05	4.0E-04	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	6.9E-06	3.5E-06	6.89E-05	3.5E-05	2.3E-07	2.3E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	1.4E-07	7.1E-08	1.32E-06	6.8E-07	4.7E-09	4.7E-08	8.5E-01	4.39E-04	4.57E-03
Nickel	2.1E-06	2.1E-06	2.12E-07	2.1E-07	3.4E-05	3.4E-04	9.0E-03	1.63E+01	1.63E+03
Selenium	3.0E-07	3.0E-07	3.04E-08	3.0E-08	2.5E-05	2.5E-04	0.0E+00	8.26E+01	8.21E+03
Zinc	2.4E-05	2.4E-05	2.41E-06	2.4E-06	4.1E-04	4.1E-03	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	3.8E-10	2.2E-10	3.55E-09	2.1E-09	1.9E-11	1.9E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	9.1E-09	9.1E-09	6.89E-08	6.9E-08	4.6E-08	4.6E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	9.5E-09	9.4E-09	9.38E-08	9.3E-08	2.4E-08	2.4E-07	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	1.8E-12	1.8E-12	1.94E-13	1.9E-13	5.4E-10	5.4E-09	1.0E+00	2.96E+02	2.79E+04
Anthracene	1.5E-09	1.4E-09	1.44E-08	1.4E-08	8.0E-10	8.0E-09	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	4.1E-08	3.7E-08	4.07E-07	3.7E-07	1.5E-08	1.5E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	5.0E-08	4.6E-08	4.98E-07	4.6E-07	2.4E-08	2.4E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	8.5E-09	7.8E-09	8.47E-08	7.8E-08	3.5E-09	3.5E-08	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	2.3E-07	1.7E-07	2.26E-06	1.7E-06	2.8E-08	2.8E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.6E-09	1.6E-09	1.25E-09	1.3E-09	3.6E-08	3.6E-07	1.0E+00	2.22E+01	2.87E+02
Chrysene	4.2E-07	3.6E-07	4.16E-06	3.6E-06	1.0E-07	1.0E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	1.5E-06	1.3E-06	1.50E-05	1.3E-05	4.0E-07	4.0E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	2.2E-09	2.1E-09	2.17E-08	2.0E-08	1.2E-09	1.2E-08	9.9E-01	5.70E-01	5.73E-01
Fluorene	2.8E-10	2.8E-10	2.78E-09	2.8E-09	1.2E-09	1.2E-08	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	9.8E-07	8.9E-07	9.83E-06	8.9E-06	3.4E-07	3.4E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	3.2E-14	3.2E-14	3.17E-15	3.2E-15	7.7E-10	7.7E-09	1.0E+00	2.43E+04	2.43E+06
Naphthalene	1.4E-09	1.4E-09	7.18E-09	7.2E-09	7.6E-09	7.6E-08	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	1.5E-09	1.5E-09	1.52E-08	1.5E-08	1.9E-09	1.9E-08	1.0E+00	1.26E+00	1.27E+00
Pyrene	8.5E-09	6.5E-09	8.32E-08	6.4E-08	1.1E-09	1.1E-08	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	2.0E-07	2.0E-07	2.90E-07	2.9E-07	1.2E-05	1.2E-04	1.0E+00	5.77E+01	4.00E+02

Appendix G-9a
Calculation of Soil Loss Constant
Farmer - Farm 1 Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-9a
Calculation of Soil Loss Constant
Farmer - Farm 1 Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-9b
Contaminant Concentration in Above Ground Vegetation
Farmer - Farm 1 Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1\text{-}Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - \exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1\text{-}Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - \exp^{(-kp*Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$

For Mercury:
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$
$Pv(Hg^{2+}) = 0.78Pv$
$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-9b

Contaminant Concentration in Above Ground Vegetation

Farmer - Farm 1 Scenario - Adult

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	1.3E-12	1.0E-12	1.3E-12	1.0E-12	4.2E-11	3.2E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	2.9E-05	0.0E+00	9.5E-11	7.1E-11	9.5E-11	7.1E-11	1.5E-08	1.1E-08	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	5.9E-06	0.0E+00	8.4E-09	6.3E-09	8.4E-09	6.3E-09	3.3E-06	2.4E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	5.0E-05	0.0E+00	1.6E-07	1.2E-07	1.6E-07	1.2E-07	1.3E-06	9.6E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	3.5E-05	0.0E+00	4.8E-07	3.5E-07	4.8E-07	3.5E-07	9.8E-05	7.1E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	2.1E-05	0.0E+00	2.8E-07	2.1E-07	2.8E-07	2.1E-07	5.8E-05	4.2E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	1.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.0E-05	4.0E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	6.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-04	5.3E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	5.6E-04	0.0E+00	2.9E-06	2.2E-06	2.9E-06	2.2E-06	2.1E-04	1.6E-04	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	8.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.4E-04	4.2E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	4.3E-07	2.1E-05	1.0E-07	6.3E-08	1.0E-07	6.3E-08	6.9E-06	4.3E-06	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	8.1E-07	0.0E+00	4.1E-09	2.6E-09	4.1E-09	2.6E-09	1.4E-07	8.8E-08	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	7.7E-05	0.0E+00	2.0E-08	1.5E-08	2.0E-08	1.5E-08	2.1E-06	1.6E-06	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	4.3E-05	0.0E+00	5.9E-09	4.4E-09	5.9E-09	4.4E-09	3.0E-07	2.3E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	9.2E-04	0.0E+00	2.3E-06	1.7E-06	2.3E-06	1.7E-06	2.4E-05	1.8E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	8.9E-12	2.0E-11	1.7E-12	1.1E-12	1.7E-12	1.1E-12	3.8E-10	2.5E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	1.3E-08	9.9E-09	9.1E-11	6.8E-11	9.1E-11	6.8E-11	9.1E-09	6.8E-09	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	6.4E-09	2.1E-09	1.5E-09	2.1E-09	1.5E-09	9.5E-09	7.1E-09	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	7.6E-12	3.2E-13	2.4E-13	3.2E-13	2.4E-13	1.8E-12	1.4E-12	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	1.5E-10	7.0E-11	1.4E-10	1.1E-10	1.4E-10	1.1E-10	1.5E-09	1.1E-09	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	2.8E-08	9.0E-09	8.0E-10	6.0E-10	8.0E-10	6.0E-10	4.1E-08	3.0E-08	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	4.3E-08	4.0E-08	6.6E-10	4.9E-10	6.6E-10	4.9E-10	5.0E-08	3.7E-08	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	5.0E-09	4.2E-09	9.6E-11	7.2E-11	9.6E-11	7.2E-11	8.5E-09	6.4E-09	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	6.7E-08	9.4E-08	2.6E-09	1.8E-09	2.6E-09	1.8E-09	2.3E-07	1.6E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.9E-06	9.2E-12	6.9E-12	9.2E-12	6.9E-12	1.6E-09	1.2E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	2.0E-07	7.3E-09	8.2E-09	6.1E-09	8.2E-09	6.1E-09	4.2E-07	3.1E-07	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	9.0E-07	0.0E+00	1.0E-08	7.6E-09	1.0E-08	7.6E-09	1.5E-06	1.1E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	5.2E-10	8.4E-10	1.1E-10	8.2E-11	1.1E-10	8.2E-11	2.2E-09	1.6E-09	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	4.8E-11	4.1E-11	3.0E-11	4.1E-11	3.0E-11	2.8E-10	2.1E-10	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	7.7E-07	0.0E+00	5.8E-09	4.4E-09	5.8E-09	4.4E-09	9.8E-07	7.4E-07	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	3.5E-11	7.2E-15	5.4E-15	7.2E-15	5.4E-15	3.2E-14	2.4E-14	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	2.9E-10	6.8E-10	5.1E-10	6.8E-10	5.1E-10	1.4E-09	1.1E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.1E-10	3.0E-10	1.5E-10	1.1E-10	1.5E-10	1.1E-10	1.5E-09	1.1E-09	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	3.6E-10	8.8E-10	4.8E-10	3.5E-10	4.8E-10	3.5E-10	8.5E-09	6.1E-09	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	5.7E-09	1.7E-06	1.3E-06	1.7E-06	1.3E-06	2.0E-07	1.5E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-9b

Contaminant Concentration in Above Ground Vegetation

Farmer - Farm 1 Scenario - Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	1.3E-12	1.8E-21	1.3E-12	1.8E-21	4.2E-11	4.2E-11	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	2.9E-05	0.0E+00	9.5E-11	9.5E-11	9.5E-11	9.5E-11	1.5E-08	1.5E-08	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	5.9E-06	0.0E+00	8.4E-09	8.1E-09	8.4E-09	8.1E-09	3.3E-06	3.1E-06	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	5.0E-05	0.0E+00	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.3E-06	1.3E-06	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	3.5E-05	0.0E+00	4.8E-07	3.8E-07	4.8E-07	3.8E-07	9.8E-05	7.9E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	2.1E-05	0.0E+00	2.8E-07	2.3E-07	2.8E-07	2.3E-07	5.8E-05	4.7E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	1.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.0E-05	3.9E-05	0.00E+00	6.00E-01	ND	ND	ND
Copper	6.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-04	4.3E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	5.6E-04	0.0E+00	2.9E-06	2.8E-06	2.9E-06	2.8E-06	2.1E-04	2.1E-04	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	8.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.4E-04	3.9E-04	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	4.3E-07	2.1E-05	1.0E-07	5.0E-08	1.0E-07	5.0E-08	6.9E-06	3.5E-06	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	8.1E-07	0.0E+00	4.1E-09	2.1E-09	4.1E-09	2.1E-09	1.4E-07	7.1E-08	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	7.7E-05	0.0E+00	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.1E-06	2.1E-06	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	4.3E-05	0.0E+00	5.9E-09	5.9E-09	5.9E-09	5.9E-09	3.0E-07	3.0E-07	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	9.2E-04	0.0E+00	2.3E-06	2.3E-06	2.3E-06	2.3E-06	2.4E-05	2.4E-05	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	8.9E-12	2.0E-11	1.7E-12	9.9E-13	1.7E-12	9.9E-13	3.8E-10	2.2E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	1.3E-08	9.9E-09	9.1E-11	9.1E-11	9.1E-11	9.1E-11	9.1E-09	9.1E-09	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	6.4E-09	2.1E-09	2.0E-09	2.1E-09	2.0E-09	9.5E-09	9.4E-09	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	7.6E-12	3.2E-13	3.2E-13	3.2E-13	3.2E-13	1.8E-12	1.8E-12	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	1.5E-10	7.0E-11	1.4E-10	1.3E-10	1.4E-10	1.3E-10	1.5E-09	1.4E-09	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	2.8E-08	9.0E-09	8.0E-10	7.3E-10	8.0E-10	7.3E-10	4.1E-08	3.7E-08	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	4.3E-08	4.0E-08	6.6E-10	6.1E-10	6.6E-10	6.1E-10	5.0E-08	4.6E-08	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	5.0E-09	4.2E-09	9.6E-11	8.8E-11	9.6E-11	8.8E-11	8.5E-09	7.8E-09	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	6.7E-08	9.4E-08	2.6E-09	1.9E-09	2.6E-09	1.9E-09	2.3E-07	1.7E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.9E-06	9.2E-12	9.2E-12	9.2E-12	9.2E-12	1.6E-09	1.6E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	2.0E-07	7.3E-09	8.2E-09	7.1E-09	8.2E-09	7.1E-09	4.2E-07	3.6E-07	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	9.0E-07	0.0E+00	1.0E-08	8.9E-09	1.0E-08	8.9E-09	1.5E-06	1.3E-06	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	5.2E-10	8.4E-10	1.1E-10	1.0E-10	1.1E-10	1.0E-10	2.2E-09	2.1E-09	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	4.8E-11	4.1E-11	4.0E-11	4.1E-11	4.0E-11	2.8E-10	2.8E-10	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	7.7E-07	0.0E+00	5.8E-09	5.3E-09	5.8E-09	5.3E-09	9.8E-07	8.9E-07	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	3.5E-11	7.2E-15	7.2E-15	7.2E-15	7.2E-15	3.2E-14	3.2E-14	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	2.9E-10	6.8E-10	6.8E-10	6.8E-10	6.8E-10	1.4E-09	1.4E-09	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	1.1E-10	3.0E-10	1.5E-10	1.4E-10	1.5E-10	1.4E-10	1.5E-09	1.5E-09	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	3.6E-10	8.8E-10	4.8E-10	3.7E-10	4.8E-10	3.7E-10	8.5E-09	6.5E-09	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	5.7E-09	1.7E-06	1.7E-06	1.7E-06	1.7E-06	2.0E-07	2.0E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-9b
Contaminant Concentration in Below Ground Vegetation
Farmer - Farm 1 Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-9b
Contaminant Concentration in Below Ground Vegetation
Farmer - Farm 1 Scenario - Adult

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	1.3E-12	9.5E-13	4.2E-11	3.2E-11	3.00E-02	1.0E+00
Arsenic	1.2E-10	9.0E-11	1.5E-08	1.1E-08	8.00E-03	1.0E+00
Beryllium	4.9E-09	3.7E-09	3.3E-06	2.4E-06	1.50E-03	1.0E+00
Cadmium	8.2E-08	6.1E-08	1.3E-06	9.6E-07	6.40E-02	1.0E+00
Chromium +3	4.4E-07	3.2E-07	9.8E-05	7.1E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	5.8E-05	4.2E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	6.0E-05	4.0E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	8.6E-04	5.3E-04	2.50E-01	ND
Lead	1.9E-06	1.4E-06	2.1E-04	1.6E-04	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	6.4E-04	4.2E-04	5.00E-02	ND
Mercury as HgCl2	2.5E-07	1.6E-07	6.9E-06	4.3E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	1.4E-07	8.8E-08	9.90E-02	ND
Nickel	1.7E-08	1.3E-08	2.1E-06	1.6E-06	8.00E-03	1.0E+00
Selenium	6.7E-09	5.0E-09	3.0E-07	2.3E-07	2.20E-02	1.0E+00
Zinc	2.2E-05	1.6E-05	2.4E-05	1.8E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	3.9E-12	2.5E-12	3.8E-10	2.5E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	1.3E-09	9.7E-10	9.1E-09	6.8E-09	1.42E+01	1.0E-02
PAHs						
Acenaphthene	2.0E-09	1.5E-09	9.5E-09	7.1E-09	2.13E-01	1.0E+00
Acenaphthylene	1.2E-10	8.8E-11	1.8E-12	1.4E-12	6.42E+03	1.0E-02
Anthracene	2.2E-12	1.7E-12	1.5E-09	1.1E-09	1.51E-01	1.0E-02
Benzo(a)anthracene	3.9E-11	2.9E-11	4.1E-08	3.0E-08	9.48E-02	1.0E-02
Benzo(a)pyrene	3.0E-11	2.3E-11	5.0E-08	3.7E-08	6.05E-02	1.0E-02
Benzo(b)fluoranthene	9.8E-11	7.4E-11	8.5E-09	6.4E-09	1.15E+00	1.0E-02
Benzo(k)fluoranthene	1.4E-10	9.7E-11	2.3E-07	1.6E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	3.9E-05	3.0E-05	1.6E-09	1.2E-09	2.44E+06	1.0E-02
Chrysene	4.0E-10	2.9E-10	4.2E-07	3.1E-07	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	6.1E-10	4.5E-10	1.5E-06	1.1E-06	4.05E-02	1.0E-02
Fluoranthene	3.3E-12	2.5E-12	2.2E-09	1.6E-09	1.50E-01	1.0E-02
Fluorene	5.3E-13	4.0E-13	2.8E-10	2.1E-10	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	5.2E-10	3.9E-10	9.8E-07	7.4E-07	5.29E-02	1.0E-02
2-Methylnaphthalene	6.3E-10	4.7E-10	3.2E-14	2.4E-14	2.00E+04	1.0E+00
Naphthalene	3.8E-10	2.9E-10	1.4E-09	1.1E-09	2.69E-01	1.0E+00
Phenanthrene	2.8E-12	2.1E-12	1.5E-09	1.1E-09	1.83E-01	1.0E-02
Pyrene	1.2E-11	8.8E-12	8.5E-09	6.1E-09	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	6.1E-05	4.6E-05	2.0E-07	1.5E-07	3.05E+02	1.0E+00

Appendix G-9b
Contaminant Concentration in Below Ground Vegetation
Farmer - Farm 1 Scenario - Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	1.3E-12	1.3E-12	4.2E-11	4.2E-11	3.00E-02	1.0E+00
Arsenic	1.2E-10	1.2E-10	1.5E-08	1.5E-08	8.00E-03	1.0E+00
Beryllium	4.9E-09	4.7E-09	3.3E-06	3.1E-06	1.50E-03	1.0E+00
Cadmium	8.2E-08	8.2E-08	1.3E-06	1.3E-06	6.40E-02	1.0E+00
Chromium +3	5.0E-07	4.0E-07	1.1E-04	8.9E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	5.7E-05	4.6E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	5.9E-05	3.9E-05	7.00E-03	ND
Copper	0.0E+00	0.0E+00	8.6E-04	4.3E-04	2.50E-01	ND
Lead	1.9E-06	1.9E-06	2.1E-04	2.1E-04	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	5.2E-04	3.2E-04	5.00E-02	ND
Mercury as HgCl2	2.5E-07	1.2E-07	6.9E-06	3.5E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	1.4E-07	7.1E-08	9.90E-02	ND
Nickel	1.7E-08	1.7E-08	2.1E-06	2.1E-06	8.00E-03	1.0E+00
Selenium	6.7E-09	6.6E-09	3.0E-07	3.0E-07	2.20E-02	1.0E+00
Zinc	2.0E-05	2.0E-05	2.2E-05	2.2E-05	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	3.9E-12	2.2E-12	3.7E-10	2.1E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	1.3E-09	1.3E-09	9.1E-09	9.1E-09	1.42E+01	1.0E-02
PAHs						
Acenaphthene	2.2E-09	2.1E-09	1.0E-08	1.0E-08	2.13E-01	1.0E+00
Acenaphthylene	9.9E-11	9.9E-11	1.5E-12	1.5E-12	6.42E+03	1.0E-02
Anthracene	2.5E-12	2.3E-12	1.6E-09	1.5E-09	1.51E-01	1.0E-02
Benzo(a)anthracene	2.3E-11	2.1E-11	2.4E-08	2.2E-08	9.48E-02	1.0E-02
Benzo(a)pyrene	1.8E-11	1.7E-11	2.9E-08	2.7E-08	6.05E-02	1.0E-02
Benzo(b)fluoranthene	8.3E-11	7.7E-11	7.3E-09	6.7E-09	1.15E+00	1.0E-02
Benzo(k)fluoranthene	1.0E-10	7.6E-11	1.7E-07	1.2E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	4.6E-05	4.6E-05	1.9E-09	1.9E-09	2.44E+06	1.0E-02
Chrysene	3.9E-10	3.4E-10	4.1E-07	3.6E-07	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	3.5E-10	3.1E-10	8.6E-07	7.5E-07	4.05E-02	1.0E-02
Fluoranthene	3.3E-12	3.1E-12	2.2E-09	2.1E-09	1.50E-01	1.0E-02
Fluorene	5.9E-13	5.8E-13	3.1E-10	3.1E-10	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	3.9E-10	3.5E-10	7.3E-07	6.6E-07	5.29E-02	1.0E-02
2-Methylnaphthalene	6.3E-10	6.3E-10	3.2E-14	3.2E-14	2.00E+04	1.0E+00
Naphthalene	3.8E-10	3.8E-10	1.4E-09	1.4E-09	2.69E-01	1.0E+00
Phenanthrene	2.8E-12	2.7E-12	1.5E-09	1.5E-09	1.83E-01	1.0E-02
Pyrene	1.2E-11	9.4E-12	8.5E-09	6.5E-09	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	6.1E-05	6.1E-05	2.0E-07	2.0E-07	3.05E+02	1.0E+00

Appendix G-9c
Contaminant Concentration in Grain
Farmer - Farm 1 Scenario - Adult and Child

Parameters	
Pr grain = Cs * Br grain	
Where:	
Values Specific to Contaminant:	CS*
Pr grain = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br grain = Plant Soil Bioconcentration Factor For Grain (--):	CS*

Appendix G-9c
Contaminant Concentration in Grain
Farmer - Farm 1 Scenario - Adult and Child

Contaminant	Pr grain		Cs Tilled (20 cm)		Br grain
	Non - Cancer	Cancer	Non - Cancer	Cancer	
Inorganics					
Antimony	1.3E-12	9.5E-13	4.2E-11	3.2E-11	3.00E-02
Arsenic	6.0E-11	4.5E-11	1.5E-08	1.1E-08	4.00E-03
Beryllium	4.9E-09	3.7E-09	3.3E-06	2.4E-06	1.50E-03
Cadmium	7.9E-08	5.9E-08	1.3E-06	9.6E-07	6.20E-02
Chromium +3	4.4E-07	3.2E-07	9.8E-05	7.1E-05	4.50E-03
Chromium +6	2.6E-07	1.9E-07	5.8E-05	4.2E-05	4.50E-03
Cobalt	4.2E-07	2.8E-07	6.0E-05	4.0E-05	7.00E-03
Copper	2.1E-04	1.3E-04	8.6E-04	5.3E-04	2.50E-01
Lead	1.9E-06	1.4E-06	2.1E-04	1.6E-04	9.00E-03
Manganese	3.2E-05	2.1E-05	6.4E-04	4.2E-04	5.00E-02
Mercury as HgCl2	6.4E-08	4.0E-08	6.9E-06	4.3E-06	9.30E-03
Mercury as Methyl Hg	2.7E-09	1.7E-09	1.4E-07	8.8E-08	1.90E-02
Nickel	1.3E-08	9.5E-09	2.1E-06	1.6E-06	6.00E-03
Selenium	6.0E-10	4.5E-10	3.0E-07	2.3E-07	2.00E-03
Zinc	1.3E-06	9.7E-07	2.4E-05	1.8E-05	5.40E-02
Dioxins/Furans					
2,3,7,8-TCDD-TEQ	1.7E-12	1.1E-12	3.8E-10	2.5E-10	4.55E-03
PCBs					
Total PCBs	9.1E-11	6.8E-11	9.1E-09	6.8E-09	1.00E-02
PAHs					
Acenaphthene	2.1E-09	1.5E-09	9.5E-09	7.1E-09	2.16E-01
Acenaphthylene	1.2E-08	8.8E-09	1.8E-12	1.4E-12	6.42E+03
Anthracene	1.4E-10	1.1E-10	1.5E-09	1.1E-09	9.71E-02
Benzo(a)anthracene	8.0E-10	6.0E-10	4.1E-08	3.0E-08	1.97E-02
Benzo(a)pyrene	6.6E-10	4.9E-10	5.0E-08	3.7E-08	1.32E-02
Benzo(b)fluoranthene	9.6E-11	7.2E-11	8.5E-09	6.4E-09	1.12E-02
Benzo(k)fluoranthene	2.6E-09	1.8E-09	2.3E-07	1.6E-07	1.15E-02
Benzo(ghi)perylene	3.9E-03	3.0E-03	1.6E-09	1.2E-09	2.44E+06
Chrysene	8.2E-09	6.1E-09	4.2E-07	3.1E-07	1.97E-02
Dibenzo(a,h)anthracene	1.0E-08	7.6E-09	1.5E-06	1.1E-06	6.78E-03
Fluoranthene	1.1E-10	8.2E-11	2.2E-09	1.6E-09	4.99E-02
Fluorene	4.1E-11	3.0E-11	2.8E-10	2.1E-10	1.45E-01
Indeno(1,2,3-cd)pyrene	5.8E-09	4.4E-09	9.8E-07	7.4E-07	5.93E-03
2-Methylnaphthalene	6.3E-10	4.7E-10	3.2E-14	2.4E-14	2.00E+04
Naphthalene	6.8E-10	5.1E-10	1.4E-09	1.1E-09	4.79E-01
Phenanthrene	1.5E-10	1.1E-10	1.5E-09	1.1E-09	9.71E-02
Pyrene	4.8E-10	3.5E-10	8.5E-09	6.1E-09	5.70E-02
Aldehyde Ketones					
Formaldehyde	1.7E-06	1.3E-06	2.0E-07	1.5E-07	8.38E+00

Appendix G-9d
Contaminant Concentration in Chicken and Eggs
Farmer - Farm 1 Scenario - Adult and Child

Parameters	
Achicken = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba chicken Aegg = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba egg and: Pgr = Prgr Where:	
Achicken = Concentration of COC in Chicken (mg/kg):	CS*
Aegg = Concentration of COC in Eggs (mg/kg):	CS*
Fgr = Fraction of Grain Grown on Contaminated Soil (--):	1.0E+00
Qgr = Quantity of Grain Eaten By Chickens per day (kg/d):	2.0E-01
Pgr = Concentration of COC in Grain (mg/kg):	CS*
Prgr = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day by Chickens (kg/d):	2.2E-02
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba chicken = COC Biotransfer Factor for Chickens (d/kg):	CS*
Ba egg = COC Biotransfer Factor for Eggs (d/kg):	CS*

Appendix G-9d
Contaminant Concentration in Chicken and Eggs
Farmer - Farm 1 Scenario - Adult and Child

Contaminant	A chicken		A egg		P gr		Cs Untilled (2 cm)		Ba chicken	Ba egg
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer		
Inorganics										
Antimony	2.4E-17	1.8E-17	1.4E-17	1.0E-17	1.3E-12	9.5E-13	4.2E-12	3.2E-12	6.9E-05	4.0E-05
Arsenic	3.2E-15	2.4E-15	1.8E-15	1.4E-15	6.0E-11	4.5E-11	1.5E-09	1.1E-09	7.2E-05	4.1E-05
Beryllium	3.7E-14	2.8E-14	2.1E-14	1.6E-14	4.9E-09	3.7E-09	3.3E-07	2.5E-07	4.5E-06	2.6E-06
Cadmium	2.0E-09	1.5E-09	4.7E-11	3.5E-11	7.9E-08	5.9E-08	1.3E-07	9.6E-08	1.1E-01	2.5E-03
Chromium +3	1.4E-10	1.0E-10	7.8E-11	5.8E-11	4.4E-07	3.2E-07	9.9E-05	7.4E-05	6.0E-05	3.4E-05
Chromium +6	ND	ND	ND	ND	2.6E-07	1.9E-07	5.9E-05	4.4E-05	ND	ND
Cobalt	2.5E-08	1.9E-08	ND	ND	4.2E-07	2.8E-07	6.9E-05	5.1E-05	1.6E-02	ND
Copper	1.8E-06	1.1E-06	ND	ND	2.1E-04	1.3E-04	8.2E-03	5.1E-03	8.0E-03	ND
Lead	5.9E-11	4.4E-11	3.4E-11	2.5E-11	1.9E-06	1.4E-06	2.1E-05	1.6E-05	6.9E-05	4.0E-05
Manganese	8.0E-09	5.8E-09	ND	ND	3.2E-05	2.1E-05	8.5E-04	6.3E-04	3.2E-04	ND
Mercury as HgCl2	3.7E-08	2.3E-08	3.7E-08	2.3E-08	6.4E-08	4.0E-08	6.9E-05	4.3E-05	2.4E-02	2.4E-02
Mercury as Methyl Hg	1.1E-10	6.7E-11	1.1E-10	6.7E-11	2.7E-09	1.7E-09	1.3E-06	8.3E-07	3.6E-03	3.6E-03
Nickel	3.3E-14	2.4E-14	1.9E-14	1.4E-14	1.3E-08	9.5E-09	2.1E-07	1.6E-07	4.5E-06	2.6E-06
Selenium	8.9E-10	6.7E-10	8.9E-10	6.7E-10	6.0E-10	4.5E-10	3.0E-08	2.3E-08	1.1E+00	1.1E+00
Zinc	2.7E-09	2.0E-09	2.7E-09	2.0E-09	1.3E-06	9.7E-07	2.4E-06	1.8E-06	8.8E-03	8.8E-03
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	1.5E-12	9.8E-13	8.6E-13	5.6E-13	1.7E-12	1.1E-12	3.6E-09	2.3E-09	1.9E-02	1.1E-02
PCBs										
Total PCBs	4.9E-11	3.7E-11	2.0E-08	1.5E-08	9.1E-11	6.8E-11	6.9E-08	5.2E-08	3.2E-02	1.3E+01
PAHs										
Acenaphthene	4.4E-11	3.3E-11	2.5E-11	1.9E-11	2.1E-09	1.5E-09	9.4E-08	7.0E-08	1.8E-02	1.0E-02
Acenaphthylene	4.7E-11	3.5E-11	2.7E-11	2.0E-11	1.2E-08	8.8E-09	1.9E-13	1.5E-13	2.0E-02	1.1E-02
Anthracene	8.6E-12	6.4E-12	4.9E-12	3.7E-12	1.4E-10	1.1E-10	1.4E-08	1.1E-08	2.5E-02	1.4E-02
Benzo(a)anthracene	2.7E-10	2.0E-10	1.5E-10	1.1E-10	8.0E-10	6.0E-10	4.1E-07	3.0E-07	2.9E-02	1.7E-02
Benzo(a)pyrene	3.1E-10	2.3E-10	1.8E-10	1.3E-10	6.6E-10	4.9E-10	5.0E-07	3.7E-07	2.8E-02	1.6E-02
Benzo(b)fluoranthene	5.0E-11	3.8E-11	2.9E-11	2.1E-11	9.6E-11	7.2E-11	8.5E-08	6.3E-08	2.7E-02	1.5E-02
Benzo(k)fluoranthene	1.3E-09	9.5E-10	7.7E-10	5.5E-10	2.6E-09	1.8E-09	2.3E-06	1.6E-06	2.7E-02	1.5E-02
Benzo(ghi)perylene	1.7E-05	1.3E-05	9.6E-06	7.2E-06	3.9E-03	3.0E-03	1.3E-09	9.4E-10	2.1E-02	1.2E-02
Chrysene	2.7E-09	2.0E-09	1.6E-09	1.2E-09	8.2E-09	6.1E-09	4.2E-06	3.1E-06	2.9E-02	1.7E-02
Dibenzo(a,h)anthracene	7.6E-09	5.6E-09	4.3E-09	3.2E-09	1.0E-08	7.6E-09	1.5E-05	1.1E-05	2.3E-02	1.3E-02
Fluoranthene	1.4E-11	1.1E-11	8.3E-12	6.2E-12	1.1E-10	8.2E-11	2.2E-08	1.6E-08	2.9E-02	1.7E-02
Fluorene	1.5E-12	1.1E-12	8.5E-13	6.4E-13	4.1E-11	3.0E-11	2.8E-09	2.1E-09	2.2E-02	1.2E-02
Indeno(1,2,3-cd)pyrene	4.7E-09	3.5E-09	2.7E-09	2.0E-09	5.8E-09	4.4E-09	9.8E-06	7.4E-06	2.2E-02	1.2E-02
2-Methylnaphthalene	2.2E-12	1.7E-12	1.3E-12	9.5E-13	6.3E-10	4.7E-10	3.2E-15	2.4E-15	1.7E-02	1.0E-02
Naphthalene	3.2E-12	2.4E-12	1.8E-12	1.4E-12	6.8E-10	5.1E-10	7.2E-09	5.4E-09	1.1E-02	6.3E-03
Phenanthrene	9.1E-12	6.8E-12	5.2E-12	3.9E-12	1.5E-10	1.1E-10	1.5E-08	1.1E-08	2.5E-02	1.4E-02
Pyrene	5.5E-11	3.9E-11	3.1E-11	2.2E-11	4.8E-10	3.5E-10	8.3E-08	5.9E-08	2.8E-02	1.6E-02
Aldehyde Ketones										
Formaldehyde	3.0E-11	2.3E-11	1.7E-11	1.3E-11	1.7E-06	1.3E-06	2.9E-07	2.2E-07	8.9E-05	5.1E-05

Appendix G-9e
Calculation of Chemical Intakes
Farmer - Farm 1 Scenario: Adult

Parameter

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

Parameter	
CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp=Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg=Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00114
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.00842
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.00053
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.00061
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.00062
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics										
Antimony	1.4E-15	1.0E-15	6.0E-18	4.5E-18	1.3E-15	1.0E-15	1.5E-20	1.1E-20	8.5E-21	6.3E-21
Arsenic	8.6E-09	8.6E-09	2.1E-15	1.6E-15	8.6E-09	8.6E-09	2.0E-18	1.5E-18	1.1E-18	8.6E-19
Beryllium	1.8E-09	1.8E-09	4.7E-13	3.5E-13	1.8E-09	1.8E-09	2.3E-17	1.7E-17	1.3E-17	9.8E-18
Cadmium	1.5E-08	1.5E-08	1.8E-13	1.4E-13	1.5E-08	1.5E-08	1.2E-12	9.1E-13	2.9E-14	2.2E-14
Chromium +3	1.1E-08	1.1E-08	1.4E-10	1.1E-10	1.1E-08	1.1E-08	8.3E-14	6.2E-14	4.8E-14	3.6E-14
Chromium +6	6.6E-09	6.5E-09	8.4E-11	6.3E-11	6.5E-09	6.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cobalt	3.2E-09	3.2E-09	9.8E-11	7.4E-11	3.1E-09	3.1E-09	1.6E-11	1.2E-11	0.0E+00	0.0E+00
Copper	3.2E-08	2.7E-08	1.2E-08	7.4E-09	1.9E-08	1.9E-08	1.1E-09	6.8E-10	0.0E+00	0.0E+00
Lead	1.7E-07	1.7E-07	3.1E-11	2.3E-11	1.7E-07	1.7E-07	3.6E-14	2.7E-14	2.1E-14	1.6E-14
Manganese	2.8E-08	2.7E-08	1.2E-09	9.1E-10	2.7E-08	2.7E-08	4.9E-12	3.5E-12	0.0E+00	0.0E+00
Mercury as HgCl2	6.6E-09	6.5E-09	9.8E-11	6.2E-11	6.5E-09	6.4E-09	2.2E-11	1.4E-11	2.3E-11	1.4E-11
Mercury as Methyl Hg	2.5E-10	2.5E-10	1.9E-12	1.2E-12	2.5E-10	2.5E-10	6.5E-14	4.1E-14	6.6E-14	4.1E-14
Nickel	2.3E-08	2.3E-08	3.0E-13	2.3E-13	2.3E-08	2.3E-08	2.0E-17	1.5E-17	1.2E-17	8.6E-18
Selenium	1.3E-08	1.3E-08	4.3E-14	3.3E-14	1.3E-08	1.3E-08	5.4E-13	4.1E-13	5.5E-13	4.1E-13
Zinc	2.8E-07	2.8E-07	3.4E-12	2.6E-12	2.8E-07	2.8E-07	1.7E-12	1.2E-12	1.7E-12	1.3E-12
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	1.7E-14	1.4E-14	5.1E-15	3.3E-15	1.1E-14	1.0E-14	9.2E-16	6.0E-16	5.3E-16	3.5E-16
PCBs										
Total PCBs	1.9E-11	1.6E-11	9.8E-14	7.4E-14	7.0E-12	7.0E-12	3.0E-14	2.2E-14	1.2E-11	9.1E-12
PAHs										
Acenaphthene	4.2E-12	3.6E-12	1.3E-13	1.0E-13	4.0E-12	3.5E-12	2.7E-14	2.0E-14	1.6E-14	1.2E-14
Acenaphthylene	6.4E-14	4.9E-14	2.8E-19	2.1E-19	1.9E-14	1.5E-14	2.9E-14	2.2E-14	1.7E-14	1.3E-14
Anthracene	2.2E-13	1.8E-13	2.1E-14	1.5E-14	1.9E-13	1.6E-13	5.2E-15	3.9E-15	3.0E-15	2.3E-15
Benzo(a)anthracene	1.3E-11	1.2E-11	5.8E-13	4.3E-13	1.2E-11	1.2E-11	1.6E-13	1.2E-13	9.5E-14	7.1E-14
Benzo(a)pyrene	2.6E-11	2.6E-11	7.1E-13	5.3E-13	2.5E-11	2.5E-11	1.9E-13	1.4E-13	1.1E-13	8.2E-14
Benzo(b)fluoranthene	3.0E-12	3.0E-12	1.2E-13	9.1E-14	2.9E-12	2.9E-12	3.1E-14	2.3E-14	1.8E-14	1.3E-14
Benzo(k)fluoranthene	5.5E-11	5.3E-11	3.2E-12	2.3E-12	5.0E-11	5.0E-11	8.2E-13	5.8E-13	4.8E-13	3.4E-13
Benzo(ghi)perylene	2.3E-08	1.7E-08	1.8E-15	1.3E-15	6.4E-09	5.0E-09	1.0E-08	7.7E-09	6.0E-09	4.5E-09
Chrysene	7.9E-11	7.5E-11	5.9E-12	4.4E-12	7.1E-11	6.9E-11	1.7E-12	1.2E-12	9.7E-13	7.2E-13
Dibenzo(a,h)anthracene	3.1E-10	3.0E-10	2.1E-11	1.6E-11	2.8E-10	2.8E-10	4.6E-12	3.4E-12	2.7E-12	2.0E-12
Fluoranthene	5.5E-13	5.1E-13	3.1E-14	2.3E-14	5.0E-13	4.8E-13	8.8E-15	6.6E-15	5.1E-15	3.8E-15
Fluorene	5.5E-14	4.5E-14	4.0E-15	3.0E-15	5.0E-14	4.1E-14	9.1E-16	6.8E-16	5.3E-16	4.0E-16
Indeno(1,2,3-cd)pyrene	2.5E-10	2.5E-10	1.4E-11	1.1E-11	2.4E-10	2.3E-10	2.9E-12	2.1E-12	1.7E-12	1.2E-12
2-Methylnaphthalene	1.0E-13	7.9E-14	4.5E-21	3.4E-21	9.9E-14	7.7E-14	1.3E-15	1.0E-15	7.8E-16	5.9E-16
Naphthalene	7.5E-13	5.8E-13	1.0E-14	7.7E-15	7.3E-13	5.7E-13	2.0E-15	1.5E-15	1.1E-15	8.5E-16
Phenanthrene	2.8E-13	2.4E-13	2.2E-14	1.6E-14	2.5E-13	2.2E-13	5.5E-15	4.2E-15	3.2E-15	2.4E-15
Pyrene	9.7E-13	8.0E-13	1.2E-13	8.5E-14	8.0E-13	6.8E-13	3.3E-14	2.4E-14	1.9E-14	1.4E-14
Aldehyde Ketones										
Formaldehyde	1.0E-08	7.5E-09	4.1E-13	3.1E-13	1.0E-08	7.5E-09	1.9E-14	1.4E-14	1.1E-14	8.1E-15

Appendix G-9e
Calculation of Chemical Intakes
Farmer - Farm 1 Scenario: Child

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp=Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg=Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00051
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.01857
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.000398
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.000425
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.000438
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics										
Antimony	1.9E-15	3.3E-16	5.6E-17	5.6E-17	1.9E-15	2.8E-16	1.0E-20	7.6E-21	6.0E-21	4.5E-21
Arsenic	1.2E-08	1.2E-08	2.0E-14	2.0E-14	1.2E-08	1.2E-08	1.4E-18	1.0E-18	8.1E-19	6.0E-19
Beryllium	2.5E-09	2.5E-09	4.4E-12	4.4E-12	2.5E-09	2.5E-09	1.6E-17	1.2E-17	9.2E-18	6.9E-18
Cadmium	2.1E-08	2.1E-08	1.7E-12	1.7E-12	2.1E-08	2.1E-08	8.4E-13	6.3E-13	2.0E-14	1.5E-14
Chromium +3	1.7E-08	1.7E-08	1.3E-09	1.3E-09	1.6E-08	1.5E-08	5.8E-14	4.3E-14	3.4E-14	2.6E-14
Chromium +6	9.9E-09	9.9E-09	7.8E-10	7.7E-10	9.2E-09	9.1E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cobalt	5.3E-09	5.2E-09	9.1E-10	8.7E-10	4.4E-09	4.4E-09	1.1E-11	8.1E-12	0.0E+00	0.0E+00
Copper	1.4E-07	8.3E-08	1.1E-07	5.6E-08	2.7E-08	2.7E-08	7.6E-10	4.8E-10	0.0E+00	0.0E+00
Lead	2.4E-07	2.4E-07	2.9E-10	2.9E-10	2.4E-07	2.4E-07	2.5E-14	1.9E-14	1.5E-14	1.1E-14
Manganese	4.8E-08	4.8E-08	1.1E-08	1.0E-08	3.7E-08	3.7E-08	3.4E-12	2.5E-12	0.0E+00	0.0E+00
Mercury as HgCl2	1.0E-08	9.5E-09	9.2E-10	4.6E-10	9.1E-09	9.0E-09	1.6E-11	9.7E-12	1.6E-11	1.0E-11
Mercury as Methyl Hg	3.6E-10	3.5E-10	1.8E-11	9.0E-12	3.5E-10	3.4E-10	4.5E-14	2.8E-14	4.6E-14	2.9E-14
Nickel	3.2E-08	3.2E-08	2.8E-12	2.8E-12	3.2E-08	3.2E-08	1.4E-17	1.0E-17	8.1E-18	6.1E-18
Selenium	1.8E-08	1.8E-08	4.1E-13	4.1E-13	1.8E-08	1.8E-08	3.8E-13	2.8E-13	3.9E-13	2.9E-13
Zinc	3.9E-07	3.9E-07	3.2E-11	3.2E-11	3.9E-07	3.9E-07	1.2E-12	8.7E-13	1.2E-12	9.0E-13
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	6.4E-14	4.2E-14	4.7E-14	2.8E-14	1.5E-14	1.4E-14	6.4E-16	4.2E-16	3.8E-16	2.5E-16
PCBs										
Total PCBs	1.9E-11	1.7E-11	9.2E-13	9.1E-13	9.9E-12	9.9E-12	2.1E-14	1.6E-14	8.6E-12	6.4E-12
PAHs										
Acenaphthene	6.9E-12	6.8E-12	1.3E-12	1.2E-12	5.6E-12	5.5E-12	1.9E-14	1.4E-14	1.1E-14	8.3E-15
Acenaphthylene	6.1E-14	5.3E-14	2.6E-18	2.6E-18	2.9E-14	2.9E-14	2.0E-14	1.5E-14	1.2E-14	8.8E-15
Anthracene	4.6E-13	4.4E-13	1.9E-13	1.8E-13	2.6E-13	2.5E-13	3.7E-15	2.7E-15	2.2E-15	1.6E-15
Benzo(a)anthracene	2.2E-11	2.2E-11	5.4E-12	4.9E-12	1.7E-11	1.7E-11	1.1E-13	8.5E-14	6.7E-14	5.0E-14
Benzo(a)pyrene	4.2E-11	4.2E-11	6.6E-12	6.2E-12	3.6E-11	3.5E-11	1.3E-13	9.8E-14	7.7E-14	5.8E-14
Benzo(b)fluoranthene	5.2E-12	5.1E-12	1.1E-12	1.0E-12	4.0E-12	4.0E-12	2.1E-14	1.6E-14	1.3E-14	9.4E-15
Benzo(k)fluoranthene	1.0E-10	9.3E-11	3.0E-11	2.3E-11	7.1E-11	7.0E-11	5.7E-13	4.1E-13	3.4E-13	2.4E-13
Benzo(ghi)perylene	2.1E-08	1.8E-08	1.7E-14	1.7E-14	9.9E-09	9.9E-09	7.1E-09	5.4E-09	4.2E-09	3.2E-09
Chrysene	1.6E-10	1.5E-10	5.5E-11	4.8E-11	9.9E-11	9.7E-11	1.2E-12	8.6E-13	6.9E-13	5.1E-13
Dibenzo(a,h)anthracene	6.0E-10	5.7E-10	2.0E-10	1.8E-10	3.9E-10	3.9E-10	3.2E-12	2.4E-12	1.9E-12	1.4E-12
Fluoranthene	1.0E-12	9.7E-13	2.9E-13	2.7E-13	7.0E-13	6.9E-13	6.1E-15	4.6E-15	3.6E-15	2.7E-15
Fluorene	1.1E-13	1.1E-13	3.7E-14	3.7E-14	6.8E-14	6.8E-14	6.4E-16	4.8E-16	3.7E-16	2.8E-16
Indeno(1,2,3-cd)pyrene	4.6E-10	4.5E-10	1.3E-10	1.2E-10	3.3E-10	3.3E-10	2.0E-12	1.5E-12	1.2E-12	8.8E-13
2-Methylnaphthalene	1.6E-13	1.6E-13	4.2E-20	4.2E-20	1.5E-13	1.5E-13	9.4E-16	7.0E-16	5.5E-16	4.1E-16
Naphthalene	1.1E-12	1.1E-12	9.6E-14	9.5E-14	1.0E-12	1.0E-12	1.4E-15	1.0E-15	8.0E-16	6.0E-16
Phenanthrene	5.6E-13	5.5E-13	2.0E-13	2.0E-13	3.5E-13	3.4E-13	3.9E-15	2.9E-15	2.3E-15	1.7E-15
Pyrene	2.2E-12	1.8E-12	1.1E-12	8.5E-13	1.1E-12	9.7E-13	2.3E-14	1.7E-14	1.4E-14	9.8E-15
Aldehyde Ketones										
Formaldehyde	1.5E-08	1.5E-08	3.9E-12	3.9E-12	1.5E-08	1.5E-08	1.3E-14	9.7E-15	7.6E-15	5.7E-15

Appendix G-9f
Summary of Cancer Risks and Hazard Indices (a)
Farmer - Farm 1 Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	3.2E-12	NA	4.6E-12	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	2.8E-05	7E-09	3.9E-05	1E-09	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	8.5E-07	NA	1.2E-06	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	1.5E-05	NA	2.0E-05	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	7.2E-09	NA	1.1E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	2.1E-06	2E-09	3.2E-06	4E-10	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	1.0E-05	NA	1.7E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	7.7E-07	NA	3.3E-06	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	40	Manganese	1.4E-01	NA	1.9E-07	NA	3.3E-07	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	2.1E-05	NA	3.2E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	2.4E-06	NA	3.5E-06	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	1.1E-06	NA	1.6E-06	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	2.5E-06	NA	3.4E-06	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	8.9E-07	NA	1.3E-06	NA	Anemia
adult:	40								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	2.4E-05	1E-09	8.7E-05	5E-10	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	9.3E-07	2E-11	9.3E-07	3E-12	Developmental
		PAHs							
		Acenaphthene	6.0E-02	NA	6.7E-11	NA	1.1E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	7.0E-13	NA	1.5E-12	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	5E-12	NA	1E-12	
		Benzo(a)pyrene	NA	7.3E+00	NA	1E-10	NA	3E-11	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	1E-12	NA	3E-13	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	2E-12	NA	6E-13	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	3E-13	NA	9E-14	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	1E-09	NA	3E-10	
		Fluoranthene	4.0E-02	NA	1.3E-11	NA	2.4E-11	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	1.3E-12	NA	2.6E-12	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	1E-10	NA	3E-11	
		2-Methylnaphthalene	4.0E-03	NA	2.4E-11	NA	3.7E-11	NA	Lung
		Naphthalene	2.0E-02	NA	3.6E-11	NA	5.3E-11	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	3.1E-11	NA	7.2E-11	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	4.8E-08	NA	7.4E-08	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and home-raised livestock consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	1.1E-04	1E-08	2.2E-04	3E-09

Appendix G-9g
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
Farmer - Farm 1 Scenario - Adult and Child

Parameter		Contaminant	Ca ug/m^3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
CRi = Ca *ED * EF * URF / AT * UC2		**Inorganics**									
HQi = Ca * ED * EF * UC1/ RfC * AT * UC2											
		Antimony	1.51E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
And:		Arsenic	1.30E-06	6.0E-03	1.5E-05	4.3E-03	8.3E-05	3E-09	8.3E-05	5E-10	Cardiovascular, CNS, Developmental
Ca = Q * Fv * Cyv + (1- Fv) * Cyp		Beryllium	2.03E-07	9.0E-03	2.0E-05	2.4E-03	9.7E-06	3E-10	9.7E-06	4E-11	Sensitization
		Cadmium	1.73E-06	9.0E-03	1.0E-05	1.8E-03	1.7E-04	2E-09	1.7E-04	3E-10	
For Hg:		Chromium +3	1.23E-06	9.0E-03	NA	NA	NA	NA	NA	NA	
Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb		Chromium +6	7.27E-07	0.0E+00	1.0E-04	8.4E-02	7.0E-06	3E-08	7.0E-06	5E-09	Increased LDH in bronchoalveolar lavage fluid
Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb		Cobalt	3.60E-07	0.0E+00	6.0E-06	9.0E-03	5.7E-05	2E-09	5.7E-05	3E-10	
		Copper	2.21E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Where:		Lead	1.94E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
CS* = Values specific to Contaminant:		Manganese	3.07E-06	0.0E+00	5.0E-05	NA	5.9E-05	NA	5.9E-05	NA	CNS
Values specific to Site:	RS*	Mercury (Total) as HgCl2	7.76E-06	8.5E-01	3.0E-04	NA	2.5E-05	NA	2.5E-05	NA	PNS, Autonomic Dysfunction
CRi = Cancer Risk inhalation (--):	CS*	Mercury (Total) as Elemental Hg	3.23E-08	1.0E+00	3.0E-04	NA	1.0E-07	NA	1.0E-07	NA	PNS, Autonomic Dysfunction
HQi = Inhalation Hazard Index (--):	CS*	Nickel	2.67E-06	9.0E-03	9.0E-05	2.4E-04	2.8E-05	4E-10	2.8E-05	5E-11	
Ca = Air Concentration (ug/m3)	CS*	Selenium	1.93E-06	0.0E+00	2.0E-02	NA	9.3E-08	NA	9.3E-08	NA	
URF = Unit Risk Factor ((ug/m3)-1):	CS*	Zinc	3.17E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
RfC = Reference Concentration (mg/m3):	CS*										
Q = COPC specific emission rate (g/s):	CS*	**Dioxins/Furans**									
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*										
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*	2,3,7,8-TCDD-TEQ	5.56E-11	6.6E-01	4.0E-08	3.8E+01	1.3E-06	1E-09	1.3E-06	2E-10	
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*										
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*	**PCBs**									
ED = Exposure Duration (see below) (yr):											
adult:	40	Total PCBs	3.82E-06	9.9E-01	NA	5.7E-04	NA	1E-09	NA	2E-10	
child:	6										
EF = Exposure Frequency (day/yr):	350	**PAHs**									
UC1 = Units Conversion (mg/ug):	0.001										
AT = Averaging Time (yr):	See Below	Acenaphthene	1.53E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Cancer:	70	Acenaphthylene	2.10E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Noncancer:	See Below	Anthracene	1.56E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
adult:	40	Benzo(a)anthracene	1.15E-07	4.8E-01	NA	1.1E-04	NA	7E-12	NA	1E-12	
child:	6	Benzo(a)pyrene	1.29E-07	2.9E-01	NA	1.1E-03	NA	8E-11	NA	1E-11	
UC2 = Units Conversion (day/yr):	365	Benzo(b)fluoranthene	3.12E-07	9.7E-01	NA	1.1E-04	NA	2E-11	NA	3E-12	
		Benzo(k)fluoranthene	1.94E-07	2.7E-01	NA	1.1E-04	NA	1E-11	NA	2E-12	
		Benzo(ghi)perylene	1.42E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Chrysene	1.68E-06	7.4E-01	NA	1.1E-05	NA	1E-11	NA	2E-12	
		Dibenzo(a,h)anthracene	1.57E-07	5.5E-02	NA	1.2E-03	NA	1E-10	NA	2E-11	
		Fluoranthene	1.37E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Fluorene	2.19E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Indeno(1,2,3-cd)pyrene	1.33E-07	5.0E-03	NA	1.1E-04	NA	8E-12	NA	1E-12	
		2-Methylnaphthalene	2.98E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Naphthalene	9.16E-07	1.0E+00	3.0E-03	3.4E-05	2.9E-07	2E-11	2.9E-07	3E-12	Nasal effects
		Phenanthrene	2.34E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
		Pyrene	1.26E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
		Aldehyde Ketones									
		Formaldehyde	1.74E-05	1.0E+00	9.8E-03	1.3E-05	1.7E-06	1E-10	1.7E-06	2E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	4.4E-04	4E-08	4.4E-04	7E-09

Appendix G-9h

Ingestion of Mother's Milk

Farmer - Farm 1 Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot (dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	8.7E-15	1.4E-14	2.4E-14	2.69E-01	7.75E-04
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-9f						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2.6E+03						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.90						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	3.0E-01						
Ca = Air Concentration (ug/m3):	CS*						
IR = Inhalation Rate (m3/hr):	8.3E-01						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	40						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - Adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	4.0E-02						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	9.0E-01						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	8.0E-01						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - Infant (yr):	1						

Appendix G-9h
Ingestion of Mother's Milk
Farmer - Farm 1 Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
Ratio = ADD (TCDD)/ADD i/m		**Dioxins/Furans**			
		2,3,7,8-TCDD TEQ	7.75E-04	6.0E+01	1.3E-05
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-10a
Contaminant Concentration in Soil
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters

Carcinogens ($T1 < tD < T2$)

$Cs = [((Ds * tD - Cs(tD)/ks) + ((Cs(tD)/ks) * (1 - \exp(-ks*(T2 - tD)))]/(T2 - T1)$

Carcinogens ($T2 \leq tD$)

$Cs = [Ds/(ks * (tD - T1))] * [(tD + (\exp^{(-ks * tD)}/ks)) - (T1 + (\exp^{(-ks * T1)})/ks)]$

NonCarcinogens

$Cs(tD) = (Ds * [1 - \exp^{(-ks * tD)}])/ks$

Where:

$Ds = [UC1 * Q/Zs * BD] * [Fv * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv)]$

For Mercury:
$Ds = [UC1 * 0.48Q(total)/Zs * BD] * [Fv_{Hg2+} * (Dydv + Dywv) + (Dydp + Dywp) * (1 - Fv_{Hg2+})]$
For $HgCl_2$: $Ds(HgCl_2) = Ds * 0.98$
For MeHg: $Ds(MeHg) = Ds * 0.02$

And:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg soil):	CS*
CstD = Soil concentration at time tD (mg/kg soil):	CS*
Ds = Deposition Term (mg/kg soil/yr):	CS*
tD = Time Period Over Which Depositon Occurs (yr):	30
T1 = Time Peroid At Beginning Of Combustion (yr):	0
T2 = Exposure duration or ED (yr):	see below
Adult:	40
Child	6
ks = COC Soil Loss Constant (yr-1):	CS*
Zs = Soil Mixing Depth (cm):	see below
Tilled Soil:	20
Untilled Soil:	2
UC1 = Units Conversion Factor (mg-mg2/kg-cm2):	100
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
BD = Soil Bulk Density (g soil/cm3 soil):	1.5
Fv = Fraction of COC Air Concentration in Vapor Phase (--):	CS*
Dydv = Yearly Average Dry Deposition From Vapor Phase (g/m^2-yr):	RS*
Dywv = Yearly Average Wet Deposition From Vapor Phase (g/m^2-yr):	RS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*

Appendix G-10a
Contaminant Concentration in Soil
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	5.7E-13	4.2E-13	5.68E-14	4.3E-14	1.3E-11	1.3E-10	1.0E+00	2.36E+01	2.35E+03
Arsenic	3.5E-09	2.6E-09	3.52E-10	2.6E-10	3.9E-06	3.9E-05	6.0E-03	1.12E+03	1.12E+05
Beryllium	7.7E-07	5.7E-07	7.70E-08	5.8E-08	6.2E-07	6.2E-06	9.0E-03	8.07E-01	8.03E+01
Cadmium	3.0E-07	2.3E-07	3.01E-08	2.3E-08	5.3E-06	5.3E-05	9.0E-03	1.75E+01	1.75E+03
Chromium +3	2.3E-05	1.7E-05	2.33E-05	1.7E-05	3.7E-06	3.7E-05	9.0E-03	1.60E-01	1.60E+00
Chromium +6	1.4E-05	9.9E-06	1.38E-05	1.0E-05	2.2E-06	2.2E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	1.4E-05	9.5E-06	1.61E-05	1.2E-05	1.1E-06	1.1E-05	0.0E+00	6.78E-02	6.78E-01
Copper	2.0E-04	1.3E-04	1.93E-03	1.2E-03	6.7E-06	6.7E-05	0.0E+00	3.06E-04	3.06E-03
Lead	5.0E-05	3.8E-05	5.03E-06	3.8E-06	5.9E-05	5.9E-04	7.0E-03	1.18E+00	1.17E+02
Manganese	1.5E-04	9.9E-05	1.99E-04	1.5E-04	9.3E-06	9.3E-05	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	2.0E-05	1.2E-05	1.97E-04	1.2E-04	6.6E-07	6.6E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	4.0E-07	2.5E-07	3.79E-06	2.4E-06	1.4E-08	1.4E-07	8.5E-01	4.39E-04	4.57E-03
Nickel	5.0E-07	3.7E-07	4.99E-08	3.7E-08	8.1E-06	8.1E-05	9.0E-03	1.63E+01	1.63E+03
Selenium	7.1E-08	5.3E-08	7.16E-09	5.4E-09	5.9E-06	5.9E-05	0.0E+00	8.26E+01	8.21E+03
Zinc	5.6E-06	4.2E-06	5.66E-07	4.2E-07	9.6E-05	9.6E-04	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.2E-10	1.4E-10	2.05E-09	1.3E-09	1.1E-11	1.1E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	3.3E-09	2.5E-09	2.48E-08	1.9E-08	1.7E-08	1.7E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	8.5E-10	6.4E-10	8.41E-09	6.3E-09	2.1E-09	2.1E-08	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	5.6E-13	4.2E-13	5.94E-14	4.5E-14	1.7E-10	1.7E-09	1.0E+00	2.96E+02	2.79E+04
Anthracene	1.3E-09	9.5E-10	1.25E-08	9.4E-09	7.0E-10	7.0E-09	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.0E-07	7.7E-08	1.02E-06	7.7E-07	3.8E-08	3.8E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.2E-07	9.2E-08	1.22E-06	9.2E-07	5.9E-08	5.9E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	1.6E-08	1.2E-08	1.63E-07	1.2E-07	6.7E-09	6.7E-08	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	6.7E-07	4.7E-07	6.65E-06	4.7E-06	8.2E-08	8.2E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.6E-09	1.2E-09	1.23E-09	9.2E-10	3.5E-08	3.5E-07	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.0E-06	7.5E-07	1.01E-05	7.5E-06	2.5E-07	2.5E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	5.0E-07	3.7E-07	5.04E-06	3.7E-06	1.4E-07	1.4E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	2.6E-09	1.9E-09	2.56E-08	1.9E-08	1.5E-09	1.5E-08	9.9E-01	5.70E-01	5.73E-01
Fluorene	1.7E-10	1.3E-10	1.73E-09	1.3E-09	7.3E-10	7.3E-09	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	3.3E-07	2.5E-07	3.31E-06	2.5E-06	1.2E-07	1.2E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	5.2E-16	3.9E-16	5.24E-17	3.9E-17	1.3E-11	1.3E-10	1.0E+00	2.43E+04	2.43E+06
Naphthalene	7.9E-11	5.9E-11	4.01E-10	3.0E-10	4.2E-10	4.2E-09	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	1.2E-09	8.6E-10	1.14E-08	8.6E-09	1.5E-09	1.5E-08	1.0E+00	1.26E+00	1.27E+00
Pyrene	9.5E-09	6.8E-09	9.34E-08	6.7E-08	1.3E-09	1.3E-08	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	1.3E-07	9.9E-08	1.91E-07	1.4E-07	7.6E-06	7.6E-05	1.0E+00	5.77E+01	4.00E+02

Appendix G-10a
Contaminant Concentration in Soil
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Child

Contaminant	Cs Tilled (20 cm)		Cs Untilled (2 cm)		Ds Tilled (20 cm)	Ds Untilled (2 cm)	Fv (unitless)	ks Tilled (yr-1)	ks Untilled (yr-1)
	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics									
Antimony	5.7E-13	5.7E-13	5.7E-14	5.7E-14	1.3E-11	1.3E-10	1.0E+00	2.36E+01	2.35E+03
Arsenic	3.5E-09	3.5E-09	3.5E-10	3.5E-10	3.9E-06	3.9E-05	6.0E-03	1.12E+03	1.12E+05
Beryllium	7.7E-07	7.3E-07	7.7E-08	7.7E-08	6.2E-07	6.2E-06	9.0E-03	8.07E-01	8.03E+01
Cadmium	3.0E-07	3.0E-07	3.0E-08	3.0E-08	5.3E-06	5.3E-05	9.0E-03	1.75E+01	1.75E+03
Chromium +3	2.3E-05	1.8E-05	2.3E-05	2.3E-05	3.7E-06	3.7E-05	9.0E-03	1.60E-01	1.60E+00
Chromium +6	1.4E-05	1.1E-05	1.4E-05	1.4E-05	2.2E-06	2.2E-05	0.0E+00	1.60E-01	1.60E+00
Cobalt	1.4E-05	9.2E-06	1.6E-05	1.5E-05	1.1E-06	1.1E-05	0.0E+00	6.78E-02	6.78E-01
Copper	2.0E-04	1.0E-04	1.9E-03	9.8E-04	6.7E-06	6.7E-05	0.0E+00	3.06E-04	3.06E-03
Lead	5.0E-05	4.9E-05	5.0E-06	5.0E-06	5.9E-05	5.9E-04	7.0E-03	1.18E+00	1.17E+02
Manganese	1.5E-04	9.2E-05	2.0E-04	1.8E-04	9.3E-06	9.3E-05	0.0E+00	4.70E-02	4.70E-01
Mercury as HgCl2	2.0E-05	9.9E-06	2.0E-04	9.9E-05	6.6E-07	6.6E-06	8.5E-01	5.28E-05	5.28E-04
Mercury as Methyl Hg	4.0E-07	2.0E-07	3.8E-06	1.9E-06	1.4E-08	1.4E-07	8.5E-01	4.39E-04	4.57E-03
Nickel	5.0E-07	5.0E-07	5.0E-08	5.0E-08	8.1E-06	8.1E-05	9.0E-03	1.63E+01	1.63E+03
Selenium	7.1E-08	7.1E-08	7.2E-09	7.2E-09	5.9E-06	5.9E-05	0.0E+00	8.26E+01	8.21E+03
Zinc	5.6E-06	5.6E-06	5.7E-07	5.7E-07	9.6E-05	9.6E-04	8.0E-03	1.71E+01	1.71E+03
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	2.2E-10	1.3E-10	2.0E-09	1.2E-09	1.1E-11	1.1E-10	6.6E-01	3.01E-02	3.56E-02
PCBs									
Total PCBs	3.3E-09	3.3E-09	2.5E-08	2.5E-08	1.7E-08	1.7E-07	9.9E-01	5.08E+00	6.73E+00
PAHs									
Acenaphthene	8.5E-10	8.4E-10	8.4E-09	8.3E-09	2.1E-09	2.1E-08	1.0E+00	2.48E+00	2.52E+00
Acenaphthylene	5.6E-13	5.6E-13	5.9E-14	5.9E-14	1.7E-10	1.7E-09	1.0E+00	2.96E+02	2.79E+04
Anthracene	1.3E-09	1.2E-09	1.2E-08	1.2E-08	7.0E-10	7.0E-09	1.0E+00	5.51E-01	5.58E-01
Benzo(a)anthracene	1.0E-07	9.3E-08	1.0E-06	9.3E-07	3.8E-08	3.8E-07	4.8E-01	3.70E-01	3.71E-01
Benzo(a)pyrene	1.2E-07	1.1E-07	1.2E-06	1.1E-06	5.9E-08	5.9E-07	2.9E-01	4.80E-01	4.80E-01
Benzo(b)fluoranthene	1.6E-08	1.5E-08	1.6E-07	1.5E-07	6.7E-09	6.7E-08	9.7E-01	4.10E-01	4.14E-01
Benzo(k)fluoranthene	6.7E-07	5.0E-07	6.6E-06	5.0E-06	8.2E-08	8.2E-07	2.7E-01	1.20E-01	1.20E-01
Benzo(ghi)perylene	1.6E-09	1.6E-09	1.2E-09	1.2E-09	3.5E-08	3.5E-07	1.0E+00	2.22E+01	2.87E+02
Chrysene	1.0E-06	8.7E-07	1.0E-05	8.7E-06	2.5E-07	2.5E-06	7.4E-01	2.50E-01	2.51E-01
Dibenzo(a,h)anthracene	5.0E-07	4.4E-07	5.0E-06	4.4E-06	1.4E-07	1.4E-06	5.5E-02	2.70E-01	2.70E-01
Fluoranthene	2.6E-09	2.4E-09	2.6E-08	2.4E-08	1.5E-09	1.5E-08	9.9E-01	5.70E-01	5.73E-01
Fluorene	1.7E-10	1.7E-10	1.7E-09	1.7E-09	7.3E-10	7.3E-09	1.0E+00	4.22E+00	4.24E+00
Indeno(1,2,3-cd)pyrene	3.3E-07	3.0E-07	3.3E-06	3.0E-06	1.2E-07	1.2E-06	5.0E-03	3.50E-01	3.50E-01
2-Methylnaphthalene	5.2E-16	5.2E-16	5.2E-17	5.2E-17	1.3E-11	1.3E-10	1.0E+00	2.43E+04	2.43E+06
Naphthalene	7.9E-11	7.9E-11	4.0E-10	4.0E-10	4.2E-10	4.2E-09	1.0E+00	5.33E+00	1.05E+01
Phenanthrene	1.2E-09	1.1E-09	1.1E-08	1.1E-08	1.5E-09	1.5E-08	1.0E+00	1.26E+00	1.27E+00
Pyrene	9.5E-09	7.3E-09	9.3E-08	7.2E-08	1.3E-09	1.3E-08	9.9E-01	1.30E-01	1.33E-01
Aldehyde Ketones									
Formaldehyde	1.3E-07	1.3E-07	1.9E-07	1.9E-07	7.6E-06	7.6E-05	1.0E+00	5.77E+01	4.00E+02

Appendix G-10a
Calculation of Soil Loss Constant
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters

ks = ksl + ksg + ksr + kse + ksv

where:
ksl = P + I - RO - Ev/ theta sw * Z * [1.0 + (Kds * BD)/theta sw)]
ksr = (RO/theta sw * Z) * (1/(1.0 + (Kds * BD/theta sw)))
ksv = [(UC3 * H) /(Zs * KDs * R * T * BD)] * (Da/Zs) * theta v

where:
theta v = 1 - (BD/ps) - theta sw

and:

Values Specific to Contaminant:	CS*
ks = COC Soil Loss Constant (yr-1):	CS*
ksl = COC Loss Constant Due to Leaching (yr-1):	CS*
kse = COC Loss Constant Due to Erosion (yr-1) (default):	0
ksg = COC Loss Constant Due to Biotic and Abiotic Degradation (yr-1):	CS*
ksv = COC Loss Constant Due to Volitilization (yr-1):	CS*
P = Average Annual Precipitation (cm/yr):	139.83
I = Average Annual Irrigation (cm/yr):	22
RO = Average Annual Surface Water Runoff (cm/yr):	17.8
Ev = Average Annual Evapotranspiration (cm/yr):	70
Z = Soil Depth From Which Leaching Removal Occurs (see below):	
Tilled Soil (cm):	20
Untilled Soil (cm):	2
theta sw= Volumetric Water Content (cm3/cm3):	0.2
Kds = Soil-Water Partition Coefficient (cm3/g or ml/g):	CS*
BD = Soil Bulk Density (g soil/cm3 soil)	1.5
Ke = Equilibrium Coefficient (s/yr-cm):	CS*
UC1 = Units Conversion (sec/yr):	3.15E+07
H = Henry's Law Constant (atm-m3/mol):	CS*
R = Ideal Gas Constant (atm-m3/mol-K):	8.21E-05
T = Ambient Air Temperature (K):	2.86E+02
Kt = Gas Phase Mass Transfer Coefficient (cm/s):	CS*
Da = Diffusion Coefficient of Contaminant in Air (cm2/s):	CS*
theta v = Soil Void Fraction (cm3/cm3):	0.24
ps = Solids Particle Density (g/cm3):	2.7

Appendix G-10a
Calculation of Soil Loss Constant
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Contaminant	ks Tilled (yr-1)	ks Untilled (yr-1)	ksg (yr-1)	ksl Tilled (yr-1)	ksl Untilled (yr-1)	ksr Tilled (yr-1)	ksr Untilled (yr-1)	ksv Tilled (yr-1)	ksv Untilled (yr-1)	Kds
Inorganics										
Antimony	2.4E+01	2.3E+03	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	2.3E+01	2.3E+03	4.5E+01
Arsenic	1.1E+03	1.1E+05	0.0E+00	8.5E-02	8.5E-01	2.0E-02	2.0E-01	1.1E+03	1.1E+05	2.9E+01
Beryllium	8.1E-01	8.0E+01	0.0E+00	3.1E-03	3.1E-02	7.5E-04	7.5E-03	8.0E-01	8.0E+01	7.9E+02
Cadmium	1.8E+01	1.7E+03	0.0E+00	3.3E-02	3.3E-01	7.9E-03	7.9E-02	1.7E+01	1.7E+03	7.5E+01
Chromium +3	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Chromium +6	1.6E-01	1.6E+00	0.0E+00	1.3E-01	1.3E+00	3.1E-02	3.1E-01	0.0E+00	0.0E+00	1.9E+01
Cobalt	6.8E-02	6.8E-01	0.0E+00	5.5E-02	5.5E-01	1.3E-02	1.3E-01	0.0E+00	0.0E+00	4.5E+01
Copper	3.1E-04	3.1E-03	0.0E+00	2.5E-04	2.5E-03	5.9E-05	5.9E-04	0.0E+00	0.0E+00	1.0E+04
Lead	1.2E+00	1.2E+02	0.0E+00	2.7E-03	2.7E-02	6.6E-04	6.6E-03	1.2E+00	1.2E+02	9.0E+02
Manganese	4.7E-02	4.7E-01	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	0.0E+00	0.0E+00	6.5E+01
Mercury as HgCl2	5.3E-05	5.3E-04	0.0E+00	4.3E-05	4.3E-04	1.0E-05	1.0E-04	3.0E-10	3.0E-08	5.8E+04
Mercury as Methyl Hg	4.4E-04	4.6E-03	0.0E+00	3.5E-04	3.5E-03	8.5E-05	8.5E-04	1.9E-06	1.9E-04	7.0E+03
Nickel	1.6E+01	1.6E+03	0.0E+00	3.8E-02	3.8E-01	9.1E-03	9.1E-02	1.6E+01	1.6E+03	6.5E+01
Selenium	8.3E+01	8.2E+03	0.0E+00	4.8E-01	4.8E+00	1.2E-01	1.2E+00	8.2E+01	8.2E+03	5.0E+00
Zinc	1.7E+01	1.7E+03	0.0E+00	4.0E-02	4.0E-01	9.5E-03	9.5E-02	1.7E+01	1.7E+03	6.2E+01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.0E-02	3.6E-02	3.0E-02	6.3E-05	6.3E-04	1.5E-05	1.5E-04	4.8E-05	4.8E-03	3.9E+04
PCBs										
Total PCBs	5.1E+00	6.7E+00	5.1E+00	2.5E-03	2.5E-02	6.0E-04	6.0E-03	1.6E-02	1.6E+00	9.8E+02
PAHs										
Acenaphthene	2.5E+00	2.5E+00	2.5E+00	2.2E-03	2.2E-02	5.4E-04	5.4E-03	8.0E-05	8.0E-03	1.1E+03
Acenaphthylene	3.0E+02	2.8E+04	0.0E+00	1.5E+01	1.5E+02	3.5E+00	3.5E+01	2.8E+02	2.8E+04	3.7E-02
Anthracene	5.5E-01	5.6E-01	5.5E-01	5.5E-04	5.5E-03	1.3E-04	1.3E-03	7.9E-06	7.9E-04	4.5E+03
Benzo(a)anthracene	3.7E-01	3.7E-01	3.7E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	1.6E-06	1.6E-04	6.0E+04
Benzo(a)pyrene	4.8E-01	4.8E-01	4.8E-01	1.5E-05	1.5E-04	3.7E-06	3.7E-05	1.6E-07	1.6E-05	1.6E+05
Benzo(b)fluoranthene	4.1E-01	4.1E-01	4.1E-01	2.4E-04	2.4E-03	5.7E-05	5.7E-04	5.8E-06	5.8E-04	1.0E+04
Benzo(k)fluoranthene	1.2E-01	1.2E-01	1.2E-01	1.3E-05	1.3E-04	3.1E-06	3.1E-05	2.4E-09	2.4E-07	1.9E+05
Benzo(ghi)perylene	2.2E+01	2.9E+02	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	7.2E-01	7.2E+01	9.1E-03
Chrysene	2.5E-01	2.5E-01	2.5E-01	4.1E-05	4.1E-04	9.9E-06	9.9E-05	8.7E-07	8.7E-05	6.0E+04
Dibenzo(a,h)anthracene	2.7E-01	2.7E-01	2.7E-01	4.3E-06	4.3E-05	1.0E-06	1.0E-05	1.4E-11	1.4E-09	5.8E+05
Fluoranthene	5.7E-01	5.7E-01	5.7E-01	2.2E-04	2.2E-03	5.4E-05	5.4E-04	8.0E-07	8.0E-05	1.1E+04
Fluorene	4.2E+00	4.2E+00	4.2E+00	1.2E-03	1.2E-02	2.8E-04	2.8E-03	1.7E-05	1.7E-03	2.1E+03
Indeno(1,2,3-cd)pyrene	3.5E-01	3.5E-01	3.5E-01	4.7E-06	4.7E-05	1.1E-06	1.1E-05	1.7E-09	1.7E-07	5.3E+05
2-Methylnaphthalene	2.4E+04	2.4E+06	0.0E+00	1.7E+01	1.7E+02	4.2E+00	4.2E+01	2.4E+04	2.4E+06	8.1E-03
Naphthalene	5.3E+00	1.1E+01	5.3E+00	8.2E-03	8.2E-02	2.0E-03	2.0E-02	5.2E-02	5.2E+00	3.0E+02
Phenanthrene	1.3E+00	1.3E+00	1.3E+00	6.7E-04	6.7E-03	1.6E-04	1.6E-03	3.4E-06	3.4E-04	3.7E+03
Pyrene	1.3E-01	1.3E-01	1.3E-01	2.6E-04	2.6E-03	6.2E-05	6.2E-04	6.3E-07	6.3E-05	9.5E+03
Aldehyde Ketones										
Formaldehyde	5.8E+01	4.0E+02	3.6E+01	1.6E+01	1.6E+02	3.9E+00	3.9E+01	1.6E+00	1.6E+02	2.0E-02

Appendix G-10b
Contaminant Concentration in Above Ground Vegetation
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters	
$Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$	
For Mercury:	
$Pd = (UC1 * 0.48Q(total) * (1-Fv_{Hg2+}) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}])/Yp * kp$	
$Pd(Hg^{2+}) = 0.78Pd$	
$Pd(MeHg) = 0.22Pd$	
$Pv = Q * Fv *((Cyv * Bvag * VGag) / pa)$	
For Mercury:	
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag) / pa)$	
$Pv(Hg^{2+}) = 0.78Pv$	
$Pv(MeHg) = 0.22Pv$	
Pr abvgrd = Cs * Br ag	
Where:	
Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor (--):	CS*
Rp = Interception Factor For Above Ground Vegetation (--):	0.39
kp = Plant Surface Loss Coefficient (yr^{-1}):	18
Tp = Length of Growing Season For Above Ground Vegetation (yr):	0.164
Yp = Vegetation Yield For Above Ground Vegetation (kg DW/m^2):	2.24
pa = Air Density (g/m^3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br ag= Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-10b

Contaminant Concentration in Above Ground Vegetation

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	1.8E-14	1.4E-14	1.8E-14	1.4E-14	5.7E-13	4.2E-13	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	9.9E-06	0.0E+00	2.2E-11	1.7E-11	2.2E-11	1.7E-11	3.5E-09	2.6E-09	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	1.6E-06	0.0E+00	2.0E-09	1.5E-09	2.0E-09	1.5E-09	7.7E-07	5.7E-07	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	1.4E-05	0.0E+00	3.8E-08	2.8E-08	3.8E-08	2.8E-08	3.0E-07	2.3E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	9.8E-06	0.0E+00	1.1E-07	8.2E-08	1.1E-07	8.2E-08	2.3E-05	1.7E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	5.8E-06	0.0E+00	6.7E-08	4.8E-08	6.7E-08	4.8E-08	1.4E-05	9.9E-06	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	2.9E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-05	9.5E-06	0.00E+00	6.00E-01	ND	ND	ND
Copper	1.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-04	1.3E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	1.6E-04	0.0E+00	6.8E-07	5.1E-07	6.8E-07	5.1E-07	5.0E-05	3.8E-05	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E-04	9.9E-05	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	1.4E-06	1.6E-05	2.9E-07	1.8E-07	2.9E-07	1.8E-07	2.0E-05	1.2E-05	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	2.7E-06	0.0E+00	1.2E-08	7.4E-09	1.2E-08	7.4E-09	4.0E-07	2.5E-07	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	2.1E-05	0.0E+00	4.6E-09	3.5E-09	4.6E-09	3.5E-09	5.0E-07	3.7E-07	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.5E-05	0.0E+00	1.4E-09	1.0E-09	1.4E-09	1.0E-09	7.1E-08	5.3E-08	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	2.5E-04	0.0E+00	5.5E-07	4.1E-07	5.5E-07	4.1E-07	5.6E-06	4.2E-06	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	3.0E-11	1.6E-11	1.0E-12	6.5E-13	1.0E-12	6.5E-13	2.2E-10	1.4E-10	6.64E-01	6.00E-01	6.55E+04	1.0E-02	4.55E-03
PCBs													
Total PCBs	4.2E-08	7.7E-09	3.3E-11	2.5E-11	3.3E-11	2.5E-11	3.3E-09	2.5E-09	9.93E-01	6.00E-01	3.09E+02	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	5.0E-09	1.8E-10	1.4E-10	1.8E-10	1.4E-10	8.5E-10	6.4E-10	1.00E+00	6.00E-01	4.97E+00	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	6.0E-12	9.7E-14	7.2E-14	9.7E-14	7.2E-14	5.6E-13	4.2E-13	1.00E+00	6.00E-01	4.31E+00	1.0E-02	1.72E-01
Anthracene	4.9E-10	5.5E-11	1.2E-10	9.2E-11	1.2E-10	9.2E-11	1.3E-09	9.5E-10	9.98E-01	6.00E-01	5.33E+01	1.0E-02	9.71E-02
Benzo(a)anthracene	9.4E-08	7.0E-09	2.0E-09	1.5E-09	2.0E-09	1.5E-09	1.0E-07	7.7E-08	4.83E-01	6.00E-01	1.93E+04	1.0E-02	1.97E-02
Benzo(a)pyrene	1.4E-07	3.1E-08	1.6E-09	1.2E-09	1.6E-09	1.2E-09	1.2E-07	9.2E-08	2.94E-01	6.00E-01	1.25E+05	1.0E-02	1.32E-02
Benzo(b)fluoranthene	1.7E-08	3.3E-09	1.8E-10	1.4E-10	1.8E-10	1.4E-10	1.6E-08	1.2E-08	9.66E-01	6.00E-01	1.68E+03	1.0E-02	1.12E-02
Benzo(k)fluoranthene	2.2E-07	7.3E-08	7.7E-09	5.4E-09	7.7E-09	5.4E-09	6.7E-07	4.7E-07	2.73E-01	6.00E-01	2.11E+05	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.3E-06	9.1E-12	6.8E-12	9.1E-12	6.8E-12	1.6E-09	1.2E-09	1.00E+00	6.00E-01	2.42E+06	1.0E-02	5.70E-03
Chrysene	6.8E-07	5.7E-09	2.0E-08	1.5E-08	2.0E-08	1.5E-08	1.0E-06	7.5E-07	7.44E-01	6.00E-01	6.92E+02	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	3.2E-07	0.0E+00	3.4E-09	2.5E-09	3.4E-09	2.5E-09	5.0E-07	3.7E-07	5.50E-02	6.00E-01	3.12E+07	1.0E-02	6.78E-03
Fluoranthene	1.7E-09	6.6E-10	1.3E-10	9.6E-11	1.3E-10	9.6E-11	2.6E-09	1.9E-09	9.92E-01	6.00E-01	7.38E+02	1.0E-02	4.99E-02
Fluorene	0.0E+00	3.7E-11	2.5E-11	1.9E-11	2.5E-11	1.9E-11	1.7E-10	1.3E-10	1.00E+00	6.00E-01	2.60E+01	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.7E-07	0.0E+00	2.0E-09	1.5E-09	2.0E-09	1.5E-09	3.3E-07	2.5E-07	5.00E-03	6.00E-01	3.73E+05	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	2.7E-11	1.2E-16	8.9E-17	1.2E-16	8.9E-17	5.2E-16	3.9E-16	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	2.3E-10	3.8E-11	2.8E-11	3.8E-11	2.8E-11	7.9E-11	5.9E-11	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	3.7E-10	2.3E-10	1.1E-10	8.4E-11	1.1E-10	8.4E-11	1.2E-09	8.6E-10	9.99E-01	6.00E-01	1.51E+02	1.0E-02	9.70E-02
Pyrene	1.2E-09	6.9E-10	5.4E-10	3.9E-10	5.4E-10	3.9E-10	9.5E-09	6.8E-09	9.94E-01	6.00E-01	8.40E+02	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	4.5E-09	1.1E-06	8.3E-07	1.1E-06	8.3E-07	1.3E-07	9.9E-08	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-10b
Contaminant Concentration in Above Ground Vegetation
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Child

Contaminant	Pd	Pv	Pr abvgrd - exposed		Pr abvgrd - protected		Cs Tilled (20 cm)		Fv	Fw	Bvag	VG ag	Br ag
			Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer					
Inorganics													
Antimony	0.0E+00	0.0E+00	1.8E-14	3.2E-25	1.8E-14	3.2E-25	5.7E-13	5.7E-13	1.00E+00	2.00E-01	ND	1.0E+00	3.19E-02
Arsenic	9.9E-06	0.0E+00	2.2E-11	2.2E-11	2.2E-11	2.2E-11	3.5E-09	3.5E-09	6.00E-03	2.00E-01	ND	1.0E+00	6.33E-03
Beryllium	1.6E-06	0.0E+00	2.0E-09	1.9E-09	2.0E-09	1.9E-09	7.7E-07	7.3E-07	9.00E-03	6.00E-01	ND	1.0E+00	2.58E-03
Cadmium	1.4E-05	0.0E+00	3.8E-08	3.7E-08	3.8E-08	3.7E-08	3.0E-07	3.0E-07	9.00E-03	6.00E-01	ND	1.0E+00	1.25E-01
Chromium +3	9.8E-06	0.0E+00	1.1E-07	9.0E-08	1.1E-07	9.0E-08	2.3E-05	1.8E-05	9.00E-03	6.00E-01	ND	1.0E+00	4.88E-03
Chromium +6	5.8E-06	0.0E+00	6.7E-08	5.4E-08	6.7E-08	5.4E-08	1.4E-05	1.1E-05	0.00E+00	6.00E-01	ND	ND	4.88E-03
Cobalt	2.9E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-05	9.2E-06	0.00E+00	6.00E-01	ND	ND	ND
Copper	1.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-04	1.0E-04	0.00E+00	6.00E-01	ND	ND	ND
Lead	1.6E-04	0.0E+00	6.8E-07	6.6E-07	6.8E-07	6.6E-07	5.0E-05	4.9E-05	7.00E-03	6.00E-01	ND	1.0E+00	1.36E-02
Manganese	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E-04	9.2E-05	0.00E+00	6.00E-01	ND	ND	ND
Mercury as HgCl2	1.4E-06	1.6E-05	2.9E-07	1.4E-07	2.9E-07	1.4E-07	2.0E-05	9.9E-06	8.50E-01	6.00E-01	1.8E+03	1.0E+00	1.5E-02
Mercury as Methyl Hg	2.7E-06	0.0E+00	1.2E-08	5.9E-09	1.2E-08	5.9E-09	4.0E-07	2.0E-07	0.00E+00	6.00E-01	ND	ND	2.9E-02
Nickel	2.1E-05	0.0E+00	4.6E-09	4.6E-09	4.6E-09	4.6E-09	5.0E-07	5.0E-07	9.00E-03	6.00E-01	ND	1.0E+00	9.31E-03
Selenium	1.5E-05	0.0E+00	1.4E-09	1.4E-09	1.4E-09	1.4E-09	7.1E-08	7.1E-08	0.00E+00	2.00E-01	ND	1.0E+00	1.95E-02
Zinc	2.5E-04	0.0E+00	5.5E-07	5.5E-07	5.5E-07	5.5E-07	5.6E-06	5.6E-06	8.00E-03	6.00E-01	ND	1.0E+00	9.70E-02
Dioxins/Furans													
2,3,7,8-TCDD-TEQ	3.0E-11	1.6E-11	1.0E-12	5.7E-13	1.0E-12	5.7E-13	2.2E-10	1.3E-10	6.64E-01	6.00E-01	#######	1.0E-02	4.55E-03
PCBs													
Total PCBs	4.2E-08	7.7E-09	3.3E-11	3.3E-11	3.3E-11	3.3E-11	3.3E-09	3.3E-09	9.93E-01	6.00E-01	#######	1.0E-02	1.00E-02
PAHs													
Acenaphthene	0.0E+00	5.0E-09	1.8E-10	1.8E-10	1.8E-10	1.8E-10	8.5E-10	8.4E-10	1.00E+00	6.00E-01	#######	1.0E+00	2.16E-01
Acenaphthylene	0.0E+00	6.0E-12	9.7E-14	9.7E-14	9.7E-14	9.7E-14	5.6E-13	5.6E-13	1.00E+00	6.00E-01	#######	1.0E-02	1.72E-01
Anthracene	4.9E-10	5.5E-11	1.2E-10	1.2E-10	1.2E-10	1.2E-10	1.3E-09	1.2E-09	9.98E-01	6.00E-01	#######	1.0E-02	9.71E-02
Benzo(a)anthracene	9.4E-08	7.0E-09	2.0E-09	1.8E-09	2.0E-09	1.8E-09	1.0E-07	9.3E-08	4.83E-01	6.00E-01	#######	1.0E-02	1.97E-02
Benzo(a)pyrene	1.4E-07	3.1E-08	1.6E-09	1.5E-09	1.6E-09	1.5E-09	1.2E-07	1.1E-07	2.94E-01	6.00E-01	#######	1.0E-02	1.32E-02
Benzo(b)fluoranthene	1.7E-08	3.3E-09	1.8E-10	1.7E-10	1.8E-10	1.7E-10	1.6E-08	1.5E-08	9.66E-01	6.00E-01	#######	1.0E-02	1.12E-02
Benzo(k)fluoranthene	2.2E-07	7.3E-08	7.7E-09	5.7E-09	7.7E-09	5.7E-09	6.7E-07	5.0E-07	2.73E-01	6.00E-01	#######	1.0E-02	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.3E-06	9.1E-12	9.0E-12	9.1E-12	9.0E-12	1.6E-09	1.6E-09	1.00E+00	6.00E-01	#######	1.0E-02	5.70E-03
Chrysene	6.8E-07	5.7E-09	2.0E-08	1.7E-08	2.0E-08	1.7E-08	1.0E-06	8.7E-07	7.44E-01	6.00E-01	#######	1.0E-02	1.97E-02
Dibenzo(a,h)anthracene	3.2E-07	0.0E+00	3.4E-09	3.0E-09	3.4E-09	3.0E-09	5.0E-07	4.4E-07	5.50E-02	6.00E-01	#######	1.0E-02	6.78E-03
Fluoranthene	1.7E-09	6.6E-10	1.3E-10	1.2E-10	1.3E-10	1.2E-10	2.6E-09	2.4E-09	9.92E-01	6.00E-01	#######	1.0E-02	4.99E-02
Fluorene	0.0E+00	3.7E-11	2.5E-11	2.5E-11	2.5E-11	2.5E-11	1.7E-10	1.7E-10	1.00E+00	6.00E-01	#######	1.0E-02	1.45E-01
Indeno(1,2,3-cd)pyrene	2.7E-07	0.0E+00	2.0E-09	1.8E-09	2.0E-09	1.8E-09	3.3E-07	3.0E-07	5.00E-03	6.00E-01	#######	1.0E-02	5.93E-03
2-Methylnaphthalene	0.0E+00	2.7E-11	1.2E-16	1.2E-16	1.2E-16	1.2E-16	5.2E-16	5.2E-16	1.00E+00	6.00E-01	1.39E-01	1.0E+00	2.27E-01
Naphthalene	0.0E+00	2.3E-10	3.8E-11	3.8E-11	3.8E-11	3.8E-11	7.9E-11	7.9E-11	1.00E+00	6.00E-01	3.81E-01	1.0E+00	4.79E-01
Phenanthrene	3.7E-10	2.3E-10	1.1E-10	1.1E-10	1.1E-10	1.1E-10	1.2E-09	1.1E-09	9.99E-01	6.00E-01	#######	1.0E-02	9.70E-02
Pyrene	1.2E-09	6.9E-10	5.4E-10	4.2E-10	5.4E-10	4.2E-10	9.5E-09	7.3E-09	9.94E-01	6.00E-01	#######	1.0E-02	5.70E-02
Aldehyde Ketones													
Formaldehyde	0.0E+00	4.5E-09	1.1E-06	1.1E-06	1.1E-06	1.1E-06	1.3E-07	1.3E-07	1.00E+00	6.00E-01	3.92E-01	1.0E+00	8.38E+00

Appendix G-10b

Contaminant Concentration in Below Ground Vegetation

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters	
Pr bg = Cs * Br rv * VG rv	
Where:	
Values Specific to Contaminant:	CS*
Pr bg = Total Contaminant Level In Below Ground Vegetation (mg/kg):	CS*
Cs = Soil Concentration (tilled) (mg/kg):	CS*
Br rv = Plant-Soil Bioconcentration Factor For Below Ground Vegetables:	CS*
VGrv = Below Ground Vegetable Correction Factor:	CS*

Appendix G-10b
Contaminant Concentration in Below Ground Vegetation
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	1.7E-14	1.3E-14	5.7E-13	4.2E-13	3.00E-02	1.0E+00
Arsenic	2.8E-11	2.1E-11	3.5E-09	2.6E-09	8.00E-03	1.0E+00
Beryllium	1.1E-09	8.6E-10	7.7E-07	5.7E-07	1.50E-03	1.0E+00
Cadmium	1.9E-08	1.4E-08	3.0E-07	2.3E-07	6.40E-02	1.0E+00
Chromium +3	1.0E-07	7.5E-08	2.3E-05	1.7E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	1.4E-05	9.9E-06	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	1.4E-05	9.5E-06	7.00E-03	ND
Copper	0.0E+00	0.0E+00	2.0E-04	1.3E-04	2.50E-01	ND
Lead	4.5E-07	3.4E-07	5.0E-05	3.8E-05	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	1.5E-04	9.9E-05	5.00E-02	ND
Mercury as HgCl2	7.1E-07	4.5E-07	2.0E-05	1.2E-05	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	4.0E-07	2.5E-07	9.90E-02	ND
Nickel	4.0E-09	3.0E-09	5.0E-07	3.7E-07	8.00E-03	1.0E+00
Selenium	1.6E-09	1.2E-09	7.1E-08	5.3E-08	2.20E-02	1.0E+00
Zinc	5.1E-06	3.8E-06	5.6E-06	4.2E-06	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.3E-12	1.5E-12	2.2E-10	1.4E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	4.7E-10	3.5E-10	3.3E-09	2.5E-09	1.42E+01	1.0E-02
PAHs						
Acenaphthene	1.8E-10	1.4E-10	8.5E-10	6.4E-10	2.13E-01	1.0E+00
Acenaphthylene	3.6E-11	2.7E-11	5.6E-13	4.2E-13	6.42E+03	1.0E-02
Anthracene	1.9E-12	1.4E-12	1.3E-09	9.5E-10	1.51E-01	1.0E-02
Benzo(a)anthracene	9.7E-11	7.3E-11	1.0E-07	7.7E-08	9.48E-02	1.0E-02
Benzo(a)pyrene	7.4E-11	5.5E-11	1.2E-07	9.2E-08	6.05E-02	1.0E-02
Benzo(b)fluoranthene	1.9E-10	1.4E-10	1.6E-08	1.2E-08	1.15E+00	1.0E-02
Benzo(k)fluoranthene	4.1E-10	2.9E-10	6.7E-07	4.7E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	3.9E-05	2.9E-05	1.6E-09	1.2E-09	2.44E+06	1.0E-02
Chrysene	9.6E-10	7.1E-10	1.0E-06	7.5E-07	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.0E-10	1.5E-10	5.0E-07	3.7E-07	4.05E-02	1.0E-02
Fluoranthene	3.9E-12	2.9E-12	2.6E-09	1.9E-09	1.50E-01	1.0E-02
Fluorene	3.3E-13	2.5E-13	1.7E-10	1.3E-10	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	1.7E-10	1.3E-10	3.3E-07	2.5E-07	5.29E-02	1.0E-02
2-Methylnaphthalene	1.0E-11	7.9E-12	5.2E-16	3.9E-16	2.00E+04	1.0E+00
Naphthalene	2.1E-11	1.6E-11	7.9E-11	5.9E-11	2.69E-01	1.0E+00
Phenanthrene	2.1E-12	1.6E-12	1.2E-09	8.6E-10	1.83E-01	1.0E-02
Pyrene	1.4E-11	9.9E-12	9.5E-09	6.8E-09	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	4.0E-05	3.0E-05	1.3E-07	9.9E-08	3.05E+02	1.0E+00

Appendix G-10b
Contaminant Concentration in Below Ground Vegetation
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Child

Contaminant	Pr bg		Cs Tilled (20 cm)		Br rv	VGrv
	Non - Cancer	Cancer	Non - Cancer	Cancer		
Inorganics						
Antimony	1.7E-14	1.7E-14	5.7E-13	5.7E-13	3.00E-02	1.0E+00
Arsenic	2.8E-11	2.8E-11	3.5E-09	3.5E-09	8.00E-03	1.0E+00
Beryllium	1.1E-09	1.1E-09	7.7E-07	7.3E-07	1.50E-03	1.0E+00
Cadmium	1.9E-08	1.9E-08	3.0E-07	3.0E-07	6.40E-02	1.0E+00
Chromium +3	1.0E-07	8.3E-08	2.3E-05	1.8E-05	4.50E-03	1.0E+00
Chromium +6	0.0E+00	0.0E+00	1.4E-05	1.1E-05	4.50E-03	ND
Cobalt	0.0E+00	0.0E+00	1.4E-05	9.2E-06	7.00E-03	ND
Copper	0.0E+00	0.0E+00	2.0E-04	1.0E-04	2.50E-01	ND
Lead	4.5E-07	4.4E-07	5.0E-05	4.9E-05	9.00E-03	1.0E+00
Manganese	0.0E+00	0.0E+00	1.5E-04	9.2E-05	5.00E-02	ND
Mercury as HgCl2	7.1E-07	3.6E-07	2.0E-05	9.9E-06	3.60E-02	1.0E+00
Mercury as Methyl Hg	0.0E+00	0.0E+00	4.0E-07	2.0E-07	9.90E-02	ND
Nickel	4.0E-09	4.0E-09	5.0E-07	5.0E-07	8.00E-03	1.0E+00
Selenium	1.6E-09	1.6E-09	7.1E-08	7.1E-08	2.20E-02	1.0E+00
Zinc	5.1E-06	5.1E-06	5.6E-06	5.6E-06	9.00E-01	1.0E+00
Dioxins/Furans						
2,3,7,8-TCDD-TEQ	2.3E-12	1.3E-12	2.2E-10	1.3E-10	1.03E+00	1.0E-02
PCBs						
Total PCBs	4.7E-10	4.6E-10	3.3E-09	3.3E-09	1.42E+01	1.0E-02
PAHs						
Acenaphthene	1.8E-10	1.8E-10	8.5E-10	8.4E-10	2.13E-01	1.0E+00
Acenaphthylene	3.6E-11	3.6E-11	5.6E-13	5.6E-13	6.42E+03	1.0E-02
Anthracene	1.9E-12	1.8E-12	1.3E-09	1.2E-09	1.51E-01	1.0E-02
Benzo(a)anthracene	9.7E-11	8.8E-11	1.0E-07	9.3E-08	9.48E-02	1.0E-02
Benzo(a)pyrene	7.4E-11	6.9E-11	1.2E-07	1.1E-07	6.05E-02	1.0E-02
Benzo(b)fluoranthene	1.9E-10	1.7E-10	1.6E-08	1.5E-08	1.15E+00	1.0E-02
Benzo(k)fluoranthene	4.1E-10	3.0E-10	6.7E-07	5.0E-07	6.09E-02	1.0E-02
Benzo(ghi)perylene	3.9E-05	3.9E-05	1.6E-09	1.6E-09	2.44E+06	1.0E-02
Chrysene	9.6E-10	8.3E-10	1.0E-06	8.7E-07	9.48E-02	1.0E-02
Dibenzo(a,h)anthracene	2.0E-10	1.8E-10	5.0E-07	4.4E-07	4.05E-02	1.0E-02
Fluoranthene	3.9E-12	3.6E-12	2.6E-09	2.4E-09	1.50E-01	1.0E-02
Fluorene	3.3E-13	3.3E-13	1.7E-10	1.7E-10	1.90E-01	1.0E-02
Indeno(1,2,3-cd)pyrene	1.7E-10	1.6E-10	3.3E-07	3.0E-07	5.29E-02	1.0E-02
2-Methylnaphthalene	1.0E-11	1.0E-11	5.2E-16	5.2E-16	2.00E+04	1.0E+00
Naphthalene	2.1E-11	2.1E-11	7.9E-11	7.9E-11	2.69E-01	1.0E+00
Phenanthrene	2.1E-12	2.0E-12	1.2E-09	1.1E-09	1.83E-01	1.0E-02
Pyrene	1.4E-11	1.1E-11	9.5E-09	7.3E-09	1.45E-01	1.0E-02
Aldehyde Ketones						
Formaldehyde	4.0E-05	4.0E-05	1.3E-07	1.3E-07	3.05E+02	1.0E+00

Appendix G-10c
Contaminant Concentration in Forage
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters

$Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp^{(-kp*Tp)}]) / Yp * kp$

For Mercury:
$Pd = (UC1 * 0.48Q(total) * (1 - Fv_{Hg2+}) * [(Dydpb + (FW * Dywpb))] * Rp * [1 - exp^{(-kp * Tp)}])/Yp * kp$
$Pd(Hg^{2+}) = 0.78Pd$
$Pd(MeHg) = 0.22Pd$

$Pv = Q * Fv *((Cyv * Bvag * VGag)/pa)$

For Mercury:
$Pv = 0.48Q(total) * Fv_{Hg2+} *((Cyv * Bvag * VGag)/pa)$
$Pv(Hg^{2+}) = 0.78Pv$
$Pv(MeHg) = 0.22Pv$

Pr abvgrd = Cs * Br ag
Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr = Forage Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m^3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m^2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m^2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bvag = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor - Forage (--):	1.0E+00
Rp = Interception Factor For Forage (--):	0.5
kp = Plant Surface Loss Coefficient (yr-1):	18
Tp = Length of Growing Season For Forage (yr):	0.12
Yp = Vegetation Yield For Forage (kg DW/m2):	0.24
pa = Air Density (g/m3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br = Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-10c
Contaminant Concentration in Forage
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Pd	Pv	Pr forage		Cs Tilled (20 cm)		Fv	Fw	Bv forage	Br forage
			Non - Cancer	Cancer	Non - Cancer	Cancer				
Inorganics										
Antimony	0.0E+00	0.0E+00	1.1E-13	8.5E-14	5.7E-13	4.2E-13	1.0E+00	2.0E-01	ND	2.00E-01
Arsenic	1.1E-04	0.0E+00	1.3E-10	9.5E-11	3.5E-09	2.6E-09	6.0E-03	2.0E-01	ND	3.60E-02
Beryllium	1.8E-05	0.0E+00	7.7E-09	5.7E-09	7.7E-07	5.7E-07	9.0E-03	6.0E-01	ND	1.00E-02
Cadmium	1.5E-04	0.0E+00	1.1E-07	8.2E-08	3.0E-07	2.3E-07	9.0E-03	6.0E-01	ND	3.64E-01
Chromium +3	1.1E-04	0.0E+00	1.7E-07	1.3E-07	2.3E-05	1.7E-05	9.0E-03	6.0E-01	ND	7.50E-03
Chromium +6	6.5E-05	0.0E+00	1.0E-07	7.5E-08	1.4E-05	9.9E-06	0.0E+00	6.0E-01	ND	7.50E-03
Cobalt	3.2E-05	0.0E+00	2.8E-07	1.9E-07	1.4E-05	9.5E-06	0.0E+00	6.0E-01	ND	2.00E-02
Copper	2.0E-04	0.0E+00	8.0E-05	5.0E-05	2.0E-04	1.3E-04	0.0E+00	6.0E-01	ND	4.00E-01
Lead	1.7E-03	0.0E+00	2.3E-06	1.7E-06	5.0E-05	3.8E-05	7.0E-03	6.0E-01	ND	4.50E-02
Manganese	2.7E-04	0.0E+00	3.8E-05	2.5E-05	1.5E-04	9.9E-05	0.0E+00	6.0E-01	ND	2.50E-01
Mercury as HgCl2	1.6E-08	6.1E-06	0.0E+00	0.0E+00	2.0E-05	1.2E-05	8.5E-01	6.0E-01	1.80E+03	ND
Mercury as Methyl Hg	4.5E-09	0.0E+00	0.0E+00	0.0E+00	4.0E-07	2.5E-07	8.5E-01	6.0E-01	ND	ND
Nickel	2.4E-04	0.0E+00	1.6E-08	1.2E-08	5.0E-07	3.7E-07	9.0E-03	6.0E-01	ND	3.20E-02
Selenium	1.6E-04	0.0E+00	1.1E-09	8.5E-10	7.1E-08	5.3E-08	0.0E+00	2.0E-01	ND	1.60E-02
Zinc	2.8E-03	0.0E+00	1.4E-06	1.1E-06	5.6E-06	4.2E-06	8.0E-03	6.0E-01	ND	2.50E-01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	3.3E-10	1.6E-09	1.0E-12	6.5E-13	2.2E-10	1.4E-10	6.6E-01	6.0E-01	6.55E+04	4.55E-03
PCBs										
Total PCBs	4.7E-07	7.7E-07	3.3E-11	2.5E-11	3.3E-09	2.5E-09	9.9E-01	6.0E-01	3.09E+02	1.00E-02
PAHs										
Acenaphthene	0.0E+00	5.0E-09	1.8E-10	1.4E-10	8.5E-10	6.4E-10	1.0E+00	6.0E-01	4.97E+00	2.16E-01
Acenaphthylene	0.0E+00	6.0E-10	9.7E-14	7.2E-14	5.6E-13	4.2E-13	1.0E+00	6.0E-01	4.31E+00	1.72E-01
Anthracene	5.5E-09	5.5E-09	1.2E-10	9.2E-11	1.3E-09	9.5E-10	1.0E+00	6.0E-01	5.33E+01	9.71E-02
Benzo(a)anthracene	1.0E-06	7.0E-07	2.0E-09	1.5E-09	1.0E-07	7.7E-08	4.8E-01	6.0E-01	1.93E+04	1.97E-02
Benzo(a)pyrene	1.6E-06	3.1E-06	1.6E-09	1.2E-09	1.2E-07	9.2E-08	2.9E-01	6.0E-01	1.25E+05	1.32E-02
Benzo(b)fluoranthene	1.9E-07	3.3E-07	1.8E-10	1.4E-10	1.6E-08	1.2E-08	9.7E-01	6.0E-01	1.68E+03	1.12E-02
Benzo(k)fluoranthene	2.5E-06	7.3E-06	7.7E-09	5.4E-09	6.7E-07	4.7E-07	2.7E-01	6.0E-01	2.11E+05	1.15E-02
Benzo(ghi)perylene	0.0E+00	2.3E-04	9.1E-12	6.8E-12	1.6E-09	1.2E-09	1.0E+00	6.0E-01	2.42E+06	5.70E-03
Chrysene	7.6E-06	5.7E-07	2.0E-08	1.5E-08	1.0E-06	7.5E-07	7.4E-01	6.0E-01	6.92E+02	1.97E-02
Dibenzo(a,h)anthracene	3.5E-06	0.0E+00	3.4E-09	2.5E-09	5.0E-07	3.7E-07	5.5E-02	6.0E-01	3.12E+07	6.78E-03
Fluoranthene	1.9E-08	6.6E-08	1.3E-10	9.6E-11	2.6E-09	1.9E-09	9.9E-01	6.0E-01	7.38E+02	4.99E-02
Fluorene	0.0E+00	3.7E-09	2.5E-11	1.9E-11	1.7E-10	1.3E-10	1.0E+00	6.0E-01	2.60E+01	1.45E-01
Indeno(1,2,3-cd)pyrene	3.0E-06	0.0E+00	2.0E-09	1.5E-09	3.3E-07	2.5E-07	5.0E-03	6.0E-01	3.73E+05	5.93E-03
2-Methylnaphthalene	0.0E+00	2.7E-11	1.2E-16	8.9E-17	5.2E-16	3.9E-16	1.0E+00	6.0E-01	1.39E-01	2.27E-01
Naphthalene	0.0E+00	2.3E-10	3.8E-11	2.8E-11	7.9E-11	5.9E-11	1.0E+00	6.0E-01	3.81E-01	4.79E-01
Phenanthrene	4.1E-09	2.3E-08	1.1E-10	8.4E-11	1.2E-09	8.6E-10	1.0E+00	6.0E-01	1.51E+02	9.71E-02
Pyrene	1.3E-08	6.9E-08	5.4E-10	3.9E-10	9.5E-09	6.8E-09	9.9E-01	6.0E-01	8.40E+02	5.70E-02
Aldehyde Ketones										
Formaldehyde	0.0E+00	4.5E-09	1.1E-06	8.3E-07	1.3E-07	9.9E-08	1.0E+00	6.0E-01	3.92E-01	8.38E+00

Appendix G-10c

Contaminant Concentration in Silage

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters

Pd = (UC1 * Q * (1-Fv) * [(Dydp + (FW * Dywp))] * Rp * [1 - exp(-kp*Tp)]) / Yp * kp

For Mercury:

Pd = (UC1 * 0.48Q(total) * (1 - FvHg2+) * [(Dydpb + (FW * Dywpb))] * Rp * [1 - exp(-kp * Tp)])/Yp * kp

Pd(Hg2+) = 0.78Pd

Pd(MeHg) = 0.22Pd

Pv = Q * Fv *((Cyv * Bvag * VGag)/pa)

For Mercury:

Pv =0.48Q(total) * FvHg2+ *((Cyv * Bvag * VGag)/pa)

Pv(Hg2+) = 0.78Pv

Pv(MeHg) = 0.22Pv

Pr abvgrd = Cs * Br ag

Where:

Values Specific to Contaminant:	CS*
Values Specific to Receptor:	RS*
Pd = Aboveground Produce Concentration Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration Due to Air-to-Plant Transfer(ug/g) :	CS*
Pr silage = Silage Concentration Due to Root Uptake (mg/kg) :	CS*
Cyv = Yearly Average Air Concentration From Vapor Phase (ug/m3):	RS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Air Concentration in Vapor Phase (--):	CS*
1-Fv = Fraction of Air Concentration in Particulate Phase (--):	CS*
UC1 = Units Conversion Factor (mg/g):	1000
Dydp = Yearly Average Dry Deposition From Particle Phase (g/m2-yr):	RS*
Dywp = Yearly Average Wet Deposition From Particle Phase (g/m2-yr):	RS*
FW = Fraction of COC Wet Deposition That Adheres to Plant Surfaces (--):	CS*
Bv forage = Air-to-Plant Biotransfer Factor (--):	CS*
VGag = Above Ground Vegetable Correction Factor - Silage (--):	5.0E-01
Rp = Interception Factor For Silage (--):	0.46
kp = Plant Surface Loss Coefficient (yr-1):	18
Tp = Length of Growing Season For Silage (yr):	0.16
Yp = Vegetation Yield For Silage (kg DW/m2):	0.8
pa = Air Density (g/m3):	1.2E+03
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br = Plant Soil Bioconcentration Factor For Produce (--):	CS*

Appendix G-10c
Contaminant Concentration in Silage
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Pd	Pv	Pr silage Non - Cancer	Pr silage Cancer	Cs Tilled (20 cm) Non - Cancer	Cs Tilled (20 cm) Cancer	Fv	Fw	Bv silage	Br silage
Inorganics										
Antimony	0.0E+00	0.0E+00	1.1E-13	8.5E-14	5.7E-13	4.2E-13	1.0E+00	2.0E-01	ND	2.00E-01
Arsenic	3.3E-05	0.0E+00	1.3E-10	9.5E-11	3.5E-09	2.6E-09	6.0E-03	2.0E-01	ND	3.60E-02
Beryllium	5.3E-06	0.0E+00	7.7E-09	5.7E-09	7.7E-07	5.7E-07	9.0E-03	6.0E-01	ND	1.00E-02
Cadmium	4.6E-05	0.0E+00	1.1E-07	8.2E-08	3.0E-07	2.3E-07	9.0E-03	6.0E-01	ND	3.64E-01
Chromium +3	3.2E-05	0.0E+00	1.7E-07	1.3E-07	2.3E-05	1.7E-05	9.0E-03	6.0E-01	ND	7.50E-03
Chromium +6	1.9E-05	0.0E+00	1.0E-07	7.5E-08	1.4E-05	9.9E-06	0.0E+00	6.0E-01	ND	7.50E-03
Cobalt	9.5E-06	0.0E+00	2.8E-07	1.9E-07	1.4E-05	9.5E-06	0.0E+00	6.0E-01	ND	2.00E-02
Copper	5.8E-05	0.0E+00	8.0E-05	5.0E-05	2.0E-04	1.3E-04	0.0E+00	6.0E-01	ND	4.00E-01
Lead	5.1E-04	0.0E+00	2.3E-06	1.7E-06	5.0E-05	3.8E-05	7.0E-03	6.0E-01	ND	4.50E-02
Manganese	8.1E-05	0.0E+00	3.8E-05	2.5E-05	1.5E-04	9.9E-05	0.0E+00	6.0E-01	ND	2.50E-01
Mercury as HgCl2	4.7E-09	3.1E-06	0.0E+00	0.0E+00	2.0E-05	1.2E-05	8.5E-01	6.0E-01	1.80E+03	ND
Mercury as Methyl Hg	1.3E-09	0.0E+00	0.0E+00	0.0E+00	4.0E-07	2.5E-07	8.5E-01	6.0E-01	ND	ND
Nickel	7.0E-05	0.0E+00	1.6E-08	1.2E-08	5.0E-07	3.7E-07	9.0E-03	6.0E-01	ND	3.20E-02
Selenium	4.9E-05	0.0E+00	1.1E-09	8.5E-10	7.1E-08	5.3E-08	0.0E+00	2.0E-01	ND	1.60E-02
Zinc	8.3E-04	0.0E+00	1.4E-06	1.1E-06	5.6E-06	4.2E-06	8.0E-03	6.0E-01	ND	2.50E-01
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	9.7E-11	7.9E-10	1.0E-12	6.5E-13	2.2E-10	1.4E-10	6.6E-01	6.0E-01	6.55E+04	4.55E-03
PCBs										
Total PCBs	1.4E-07	3.9E-07	3.3E-11	2.5E-11	3.3E-09	2.5E-09	9.9E-01	6.0E-01	3.09E+02	1.00E-02
PAHs										
Acenaphthene	0.0E+00	2.5E-09	1.8E-10	1.4E-10	8.5E-10	6.4E-10	1.0E+00	6.0E-01	4.97E+00	2.16E-01
Acenaphthylene	0.0E+00	3.0E-10	9.7E-14	7.2E-14	5.6E-13	4.2E-13	1.0E+00	6.0E-01	4.31E+00	1.72E-01
Anthracene	1.6E-09	2.7E-09	1.2E-10	9.2E-11	1.3E-09	9.5E-10	1.0E+00	6.0E-01	5.33E+01	9.71E-02
Benzo(a)anthracene	3.1E-07	3.5E-07	2.0E-09	1.5E-09	1.0E-07	7.7E-08	4.8E-01	6.0E-01	1.93E+04	1.97E-02
Benzo(a)pyrene	4.7E-07	1.5E-06	1.6E-09	1.2E-09	1.2E-07	9.2E-08	2.9E-01	6.0E-01	1.25E+05	1.32E-02
Benzo(b)fluoranthene	5.5E-08	1.7E-07	1.8E-10	1.4E-10	1.6E-08	1.2E-08	9.7E-01	6.0E-01	1.68E+03	1.12E-02
Benzo(k)fluoranthene	7.3E-07	3.7E-06	7.7E-09	5.4E-09	6.7E-07	4.7E-07	2.7E-01	6.0E-01	2.11E+05	1.15E-02
Benzo(ghi)perylene	0.0E+00	1.1E-04	9.1E-12	6.8E-12	1.6E-09	1.2E-09	1.0E+00	6.0E-01	2.42E+06	5.70E-03
Chrysene	2.2E-06	2.8E-07	2.0E-08	1.5E-08	1.0E-06	7.5E-07	7.4E-01	6.0E-01	6.92E+02	1.97E-02
Dibenzo(a,h)anthracene	1.0E-06	0.0E+00	3.4E-09	2.5E-09	5.0E-07	3.7E-07	5.5E-02	6.0E-01	3.12E+07	6.78E-03
Fluoranthene	5.7E-09	3.3E-08	1.3E-10	9.6E-11	2.6E-09	1.9E-09	9.9E-01	6.0E-01	7.38E+02	4.99E-02
Fluorene	0.0E+00	1.9E-09	2.5E-11	1.9E-11	1.7E-10	1.3E-10	1.0E+00	6.0E-01	2.60E+01	1.45E-01
Indeno(1,2,3-cd)pyrene	8.9E-07	0.0E+00	2.0E-09	1.5E-09	3.3E-07	2.5E-07	5.0E-03	6.0E-01	3.73E+05	5.93E-03
2-Methylnaphthalene	0.0E+00	1.4E-11	1.2E-16	8.9E-17	5.2E-16	3.9E-16	1.0E+00	6.0E-01	1.39E-01	2.27E-01
Naphthalene	0.0E+00	1.1E-10	3.8E-11	2.8E-11	7.9E-11	5.9E-11	1.0E+00	6.0E-01	3.81E-01	4.79E-01
Phenanthrene	1.2E-09	1.2E-08	1.1E-10	8.4E-11	1.2E-09	8.6E-10	1.0E+00	6.0E-01	1.51E+02	9.71E-02
Pyrene	3.9E-09	3.5E-08	5.4E-10	3.9E-10	9.5E-09	6.8E-09	9.9E-01	6.0E-01	8.40E+02	5.70E-02
Aldehyde Ketones										
Formaldehyde	0.0E+00	2.2E-09	1.1E-06	8.3E-07	1.3E-07	9.9E-08	1.0E+00	6.0E-01	3.92E-01	8.38E+00

Appendix G-10c
Contaminant Concentration in Grain
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters	
Pr grain = Cs * Br grain	
Where:	
Values Specific to Contaminant:	CS*
Pr grain = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Br grain = Plant Soil Bioconcentration Factor For Grain (--):	CS*

Appendix G-10c
Contaminant Concentration in Grain
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult

Contaminant	Pr grain		Cs Tilled (20 cm)		Br grain
	Non - Cancer	Cancer	Non - Cancer	Cancer	
Inorganics					
Antimony	1.7E-14	1.3E-14	5.7E-13	4.2E-13	3.00E-02
Arsenic	1.4E-11	1.1E-11	3.5E-09	2.6E-09	4.00E-03
Beryllium	1.1E-09	8.6E-10	7.7E-07	5.7E-07	1.50E-03
Cadmium	1.9E-08	1.4E-08	3.0E-07	2.3E-07	6.20E-02
Chromium +3	1.0E-07	7.5E-08	2.3E-05	1.7E-05	4.50E-03
Chromium +6	6.2E-08	4.5E-08	1.4E-05	9.9E-06	4.50E-03
Cobalt	9.8E-08	6.6E-08	1.4E-05	9.5E-06	7.00E-03
Copper	5.0E-05	3.1E-05	2.0E-04	1.3E-04	2.50E-01
Lead	4.5E-07	3.4E-07	5.0E-05	3.8E-05	9.00E-03
Manganese	7.5E-06	5.0E-06	1.5E-04	9.9E-05	5.00E-02
Mercury as HgCl2	1.8E-07	1.2E-07	2.0E-05	1.2E-05	9.30E-03
Mercury as Methyl Hg	7.7E-09	4.8E-09	4.0E-07	2.5E-07	1.90E-02
Nickel	3.0E-09	2.2E-09	5.0E-07	3.7E-07	6.00E-03
Selenium	1.4E-10	1.1E-10	7.1E-08	5.3E-08	2.00E-03
Zinc	3.0E-07	2.3E-07	5.6E-06	4.2E-06	5.40E-02
Dioxins/Furans					
2,3,7,8-TCDD-TEQ	1.0E-12	6.5E-13	2.2E-10	1.4E-10	4.55E-03
PCBs					
Total PCBs	3.3E-11	2.5E-11	3.3E-09	2.5E-09	1.00E-02
PAHs					
Acenaphthene	1.8E-10	1.4E-10	8.5E-10	6.4E-10	2.16E-01
Acenaphthylene	3.6E-09	2.7E-09	5.6E-13	4.2E-13	6.42E+03
Anthracene	1.2E-10	9.2E-11	1.3E-09	9.5E-10	9.71E-02
Benzo(a)anthracene	2.0E-09	1.5E-09	1.0E-07	7.7E-08	1.97E-02
Benzo(a)pyrene	1.6E-09	1.2E-09	1.2E-07	9.2E-08	1.32E-02
Benzo(b)fluoranthene	1.8E-10	1.4E-10	1.6E-08	1.2E-08	1.12E-02
Benzo(k)fluoranthene	7.7E-09	5.4E-09	6.7E-07	4.7E-07	1.15E-02
Benzo(ghi)perylene	3.9E-03	2.9E-03	1.6E-09	1.2E-09	2.44E+06
Chrysene	2.0E-08	1.5E-08	1.0E-06	7.5E-07	1.97E-02
Dibenzo(a,h)anthracene	3.4E-09	2.5E-09	5.0E-07	3.7E-07	6.78E-03
Fluoranthene	1.3E-10	9.6E-11	2.6E-09	1.9E-09	4.99E-02
Fluorene	2.5E-11	1.9E-11	1.7E-10	1.3E-10	1.45E-01
Indeno(1,2,3-cd)pyrene	2.0E-09	1.5E-09	3.3E-07	2.5E-07	5.93E-03
2-Methylnaphthalene	1.0E-11	7.9E-12	5.2E-16	3.9E-16	2.00E+04
Naphthalene	3.8E-11	2.8E-11	7.9E-11	5.9E-11	4.79E-01
Phenanthrene	1.1E-10	8.4E-11	1.2E-09	8.6E-10	9.71E-02
Pyrene	5.4E-10	3.9E-10	9.5E-09	6.8E-09	5.70E-02
Aldehyde Ketones					
Formaldehyde	1.1E-06	8.3E-07	1.3E-07	9.9E-08	8.38E+00

Appendix G-10d
Contaminant Concentration in Beef and Milk
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters

Abeef = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba beef * MF
Amilk = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba milk * MF

and:

Pi = Pdi + Pvi + Pri

Where:

Abeef = Concentration of COC in Beef (mg/kg):	CS*
Amilk = Concentration of COC in Milk (mg/kg):	CS*
Fi = Fraction of Plant type i Grown on Contaminated Soil (--):	1.0E+00
Qpi = Quantity of Plant Type i Eaten By Beef Cattle per day (kg/d):	See Below
Forage:	8.8E+00
Silage:	2.5E+00
Grain:	4.7E-01
Qpi = Quantity of Plant Type i Eaten By Dairy Cattle per day (kg/d):	See Below
Forage:	1.3E+01
Silage:	4.1E+00
Grain:	3.0E+00
Pi = Concentration of COC in Each Plant Type i (mg/kg):	CS*
Pd = Aboveground Produce Concentration of Plant Type i Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration of Plant Type i Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day (kg/d):	See Below:
Beef Cattle:	5.0E-01
Dairy Cattle:	4.0E-01
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba beef = COC Biotransfer Factor for Beef (d/kg):	CS*
Ba milk = COC Biotransfer Factor for Milk (d/kg):	CS*
MF = Metabolism Factor (--):	1.0E+00

Appendix G-10d

Contaminant Concentration in Beef and Milk

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Contaminant	A beef		A milk		P for		P sil		P gr		Cs Untilled (2 cm)		Babeef	Bamilk
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer		
Inorganics														
Antimony	1.3E-15	9.9E-16	2.0E-16	1.5E-16	1.1E-13	8.5E-14	1.1E-13	8.5E-14	1.7E-14	1.3E-14	5.7E-14	4.3E-14	1.0E-03	1.0E-04
Arsenic	2.1E-06	2.1E-06	9.6E-08	9.6E-08	1.1E-04	1.1E-04	3.3E-05	3.3E-05	1.4E-11	1.1E-11	3.5E-10	2.6E-10	2.0E-03	6.0E-05
Beryllium	1.7E-07	1.7E-07	2.4E-10	2.4E-10	1.8E-05	1.8E-05	5.4E-06	5.4E-06	1.1E-09	8.6E-10	7.7E-08	5.8E-08	1.0E-03	9.0E-07
Cadmium	1.8E-07	1.8E-07	1.4E-08	1.4E-08	1.5E-04	1.5E-04	4.6E-05	4.6E-05	1.9E-08	1.4E-08	3.0E-08	2.3E-08	1.2E-04	6.5E-06
Chromium +3	5.8E-06	5.8E-06	2.4E-06	2.4E-06	1.1E-04	1.1E-04	3.2E-05	3.2E-05	1.0E-07	7.5E-08	2.3E-05	1.7E-05	5.5E-03	1.5E-03
Chromium +6	3.5E-06	3.4E-06	1.4E-06	1.4E-06	6.5E-05	6.5E-05	1.9E-05	1.9E-05	6.2E-08	4.5E-08	1.4E-05	1.0E-05	5.5E-03	1.5E-03
Cobalt	6.4E-06	6.3E-06	9.5E-07	9.4E-07	3.2E-05	3.2E-05	9.8E-06	9.7E-06	9.8E-08	6.6E-08	1.6E-05	1.2E-05	2.0E-02	2.0E-03
Copper	3.8E-05	3.1E-05	7.7E-06	6.4E-06	2.8E-04	2.5E-04	1.4E-04	1.1E-04	5.0E-05	3.1E-05	1.9E-03	1.2E-03	1.0E-02	1.5E-03
Lead	5.0E-06	5.0E-06	6.3E-06	6.3E-06	1.7E-03	1.7E-03	5.1E-04	5.1E-04	4.5E-07	3.4E-07	5.0E-06	3.8E-06	3.0E-04	2.5E-04
Manganese	1.3E-06	1.2E-06	1.6E-06	1.6E-06	3.1E-04	3.0E-04	1.2E-04	1.1E-04	7.5E-06	5.0E-06	2.0E-04	1.5E-04	4.0E-04	3.5E-04
Mercury as HgCl2	8.4E-07	6.4E-07	3.9E-07	3.2E-07	6.1E-06	6.1E-06	3.1E-06	3.1E-06	1.8E-07	1.2E-07	2.0E-04	1.2E-04	5.2E-03	2.3E-03
Mercury as Methyl Hg	1.5E-09	9.6E-10	5.4E-10	3.5E-10	4.5E-09	4.5E-09	1.3E-09	1.3E-09	7.7E-09	4.8E-09	3.8E-06	2.4E-06	7.8E-04	3.4E-04
Nickel	1.4E-05	1.4E-05	3.4E-06	3.4E-06	2.4E-04	2.4E-04	7.0E-05	7.0E-05	3.0E-09	2.2E-09	5.0E-08	3.7E-08	6.0E-03	1.0E-03
Selenium	3.6E-06	3.6E-06	1.4E-05	1.4E-05	1.6E-04	1.6E-04	4.9E-05	4.9E-05	1.4E-10	1.1E-10	7.2E-09	5.4E-09	2.3E-03	5.9E-03
Zinc	2.4E-06	2.4E-06	1.3E-06	1.3E-06	2.8E-03	2.8E-03	8.4E-04	8.4E-04	3.0E-07	2.3E-07	5.7E-07	4.2E-07	9.0E-05	3.3E-05
Dioxins/Furans														
2,3,7,8-TCDD-TEQ	5.3E-10	5.2E-10	1.6E-10	1.6E-10	1.9E-09	1.9E-09	8.9E-10	8.9E-10	1.0E-12	6.5E-13	2.0E-09	1.3E-09	2.6E-02	5.5E-03
PCBs														
Total PCBs	5.0E-07	5.0E-07	2.4E-07	2.4E-07	1.2E-06	1.2E-06	5.3E-07	5.3E-07	3.3E-11	2.5E-11	2.5E-08	1.9E-08	4.1E-02	1.3E-02
PAHs														
Acenaphthene	1.4E-09	1.3E-09	4.3E-10	4.2E-10	5.2E-09	5.2E-09	2.7E-09	2.6E-09	1.8E-10	1.4E-10	8.4E-09	6.3E-09	2.4E-02	5.1E-03
Acenaphthylene	2.1E-10	2.0E-10	1.1E-10	9.8E-11	6.0E-10	6.0E-10	3.0E-10	3.0E-10	3.6E-09	2.7E-09	5.9E-14	4.5E-14	2.7E-02	5.7E-03
Anthracene	3.9E-09	3.8E-09	1.2E-09	1.2E-09	1.1E-08	1.1E-08	4.5E-09	4.4E-09	1.2E-10	9.2E-11	1.2E-08	9.4E-09	3.4E-02	7.1E-03
Benzo(a)anthracene	7.0E-07	7.0E-07	2.2E-07	2.2E-07	1.8E-06	1.8E-06	6.6E-07	6.6E-07	2.0E-09	1.5E-09	1.0E-06	7.7E-07	4.0E-02	8.4E-03
Benzo(a)pyrene	1.8E-06	1.8E-06	5.6E-07	5.6E-07	4.7E-06	4.7E-06	2.0E-06	2.0E-06	1.6E-09	1.2E-09	1.2E-06	9.2E-07	3.8E-02	7.9E-03
Benzo(b)fluoranthene	1.9E-07	1.9E-07	6.0E-08	5.9E-08	5.2E-07	5.2E-07	2.2E-07	2.2E-07	1.8E-10	1.4E-10	1.6E-07	1.2E-07	3.6E-02	7.6E-03
Benzo(k)fluoranthene	3.7E-06	3.6E-06	1.2E-06	1.2E-06	9.8E-06	9.8E-06	4.4E-06	4.4E-06	7.7E-09	5.4E-09	6.6E-06	4.7E-06	3.6E-02	7.7E-03
Benzo(ghi)perylene	1.2E-04	1.0E-04	9.2E-05	7.4E-05	2.3E-04	2.3E-04	1.1E-04	1.1E-04	3.9E-03	2.9E-03	1.2E-09	9.2E-10	2.9E-02	6.1E-03
Chrysene	3.3E-06	3.3E-06	1.0E-06	1.0E-06	8.2E-06	8.2E-06	2.5E-06	2.5E-06	2.0E-08	1.5E-08	1.0E-05	7.5E-06	4.0E-02	8.4E-03
Dibenzo(a,h)anthracene	1.1E-06	1.1E-06	3.5E-07	3.4E-07	3.6E-06	3.6E-06	1.0E-06	1.0E-06	3.4E-09	2.5E-09	5.0E-06	3.7E-06	3.1E-02	6.5E-03
Fluoranthene	3.4E-08	3.4E-08	1.1E-08	1.1E-08	8.5E-08	8.5E-08	3.9E-08	3.9E-08	1.3E-10	9.6E-11	2.6E-08	1.9E-08	3.9E-02	8.3E-03
Fluorene	1.1E-09	1.1E-09	3.6E-10	3.6E-10	3.8E-09	3.8E-09	1.9E-09	1.9E-09	2.5E-11	1.9E-11	1.7E-09	1.3E-09	2.9E-02	6.2E-03
Indeno(1,2,3-cd)pyrene	9.0E-07	8.8E-07	2.8E-07	2.8E-07	3.0E-06	3.0E-06	8.9E-07	8.9E-07	2.0E-09	1.5E-09	3.3E-06	2.5E-06	2.9E-02	6.2E-03
2-Methylnaphthalene	6.6E-12	6.6E-12	2.2E-12	2.2E-12	2.7E-11	2.7E-11	1.4E-11	1.4E-11	1.0E-11	7.9E-12	5.2E-17	3.9E-17	2.4E-02	5.0E-03
Naphthalene	4.4E-11	4.2E-11	1.4E-11	1.3E-11	2.7E-10	2.6E-10	1.5E-10	1.4E-10	3.8E-11	2.8E-11	4.0E-10	3.0E-10	1.5E-02	3.1E-03
Phenanthrene	9.4E-09	9.4E-09	3.0E-09	3.0E-09	2.7E-08	2.7E-08	1.3E-08	1.3E-08	1.1E-10	8.4E-11	1.1E-08	8.6E-09	3.4E-02	7.1E-03
Pyrene	3.4E-08	3.3E-08	1.1E-08	1.0E-08	8.3E-08	8.3E-08	3.9E-08	3.9E-08	5.4E-10	3.9E-10	9.3E-08	6.7E-08	3.8E-02	8.1E-03
Aldehyde Ketones														
Formaldehyde	1.6E-09	1.2E-09	5.7E-10	4.3E-10	1.1E-06	8.3E-07	1.1E-06	8.3E-07	1.1E-06	8.3E-07	1.9E-07	1.4E-07	1.2E-04	2.5E-05

Appendix G-10e

Contaminant Concentration in Pork

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters	
Apork = (Sum of (Fi * Qpi * Pi) + (Qs * Cs * Bs) * Ba pork * MF	
and:	
Pi = Pdi + Pvi + Pri	
Where:	
Apork = Concentration of COC in Pork (mg/kg):	CS*
Fi = Fraction of Plant type i Grown on Contaminated Soil (--):	1.0E+00
Qpi = Quantity of Plant Type i Eaten By Swine per day (kg/d):	See Below
Silage:	1.4E+00
Grain:	3.3E+00
Pi = Concentration of COC in Each Plant Type i (mg/kg):	CS*
Pd = Aboveground Produce Concentration of Plant Type i Due to Direct Exposure (mg/kg) :	CS*
Pv = Aboveground Produce Concentration of Plant Type i Due to Air-to-Plant Transfer (ug/g) :	CS*
Pr abvgrd = Exposed and Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day (kg/d):	3.7E-01
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba pork = COC Biotransfer Factor for Pork (d/kg):	CS*
MF = Metabolism Factor (--):	1.0E+00

Appendix G-10e
Contaminant Concentration in Pork
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Contaminant	A pork		P sil		P gr		Cs Untilled (2 cm)		Ba pork
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	
Inorganics									
Antimony	2.7E-17	2.0E-17	1.1E-13	8.5E-14	1.7E-14	1.3E-14	5.7E-14	4.3E-14	1.1E-04
Arsenic	5.4E-09	5.4E-09	3.3E-05	3.3E-05	1.4E-11	1.1E-11	3.5E-10	2.6E-10	1.2E-04
Beryllium	5.6E-11	5.6E-11	5.4E-06	5.4E-06	1.1E-09	8.6E-10	7.7E-08	5.8E-08	7.4E-06
Cadmium	1.2E-08	1.2E-08	4.6E-05	4.6E-05	1.9E-08	1.4E-08	3.0E-08	2.3E-08	1.9E-04
Chromium +3	5.4E-09	5.1E-09	3.2E-05	3.2E-05	1.0E-07	7.5E-08	2.3E-05	1.7E-05	9.9E-05
Chromium +6	ND	ND	1.9E-05	1.9E-05	6.2E-08	4.5E-08	1.4E-05	1.0E-05	ND
Cobalt	4.8E-07	4.4E-07	9.8E-06	9.7E-06	9.8E-08	6.6E-08	1.6E-05	1.2E-05	2.4E-02
Copper	1.3E-05	8.4E-06	1.4E-04	1.1E-04	5.0E-05	3.1E-05	1.9E-03	1.2E-03	1.2E-02
Lead	8.2E-08	8.2E-08	5.1E-04	5.1E-04	4.5E-07	3.4E-07	5.0E-06	3.8E-06	1.1E-04
Manganese	1.3E-07	1.1E-07	1.2E-04	1.1E-04	7.5E-06	5.0E-06	2.0E-04	1.5E-04	4.8E-04
Mercury as HgCl2	2.6E-09	1.7E-09	3.1E-06	3.1E-06	1.8E-07	1.2E-07	2.0E-04	1.2E-04	3.4E-05
Mercury as Methyl Hg	7.2E-12	4.6E-12	1.3E-09	1.3E-09	7.7E-09	4.8E-09	3.8E-06	2.4E-06	5.1E-06
Nickel	7.3E-10	7.3E-10	7.0E-05	7.0E-05	3.0E-09	2.2E-09	5.0E-08	3.7E-08	7.4E-06
Selenium	1.3E-05	1.3E-05	4.9E-05	4.9E-05	1.4E-10	1.1E-10	7.2E-09	5.4E-09	1.9E-01
Zinc	1.5E-07	1.5E-07	8.4E-04	8.4E-04	3.0E-07	2.3E-07	5.7E-07	4.2E-07	1.3E-04
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	6.4E-11	5.5E-11	8.9E-10	8.9E-10	1.0E-12	6.5E-13	2.0E-09	1.3E-09	3.2E-02
PCBs									
Total PCBs	3.7E-08	3.6E-08	5.3E-07	5.3E-07	3.3E-11	2.5E-11	2.5E-08	1.9E-08	4.9E-02
PAHs									
Acenaphthene	2.2E-10	1.9E-10	2.7E-09	2.6E-09	1.8E-10	1.4E-10	8.4E-09	6.3E-09	2.9E-02
Acenaphthylene	4.0E-10	3.1E-10	3.0E-10	3.0E-10	3.6E-09	2.7E-09	5.9E-14	4.5E-14	3.3E-02
Anthracene	4.6E-10	4.1E-10	4.5E-09	4.4E-09	1.2E-10	9.2E-11	1.2E-08	9.4E-09	4.1E-02
Benzo(a)anthracene	6.3E-08	5.9E-08	6.6E-07	6.6E-07	2.0E-09	1.5E-09	1.0E-06	7.7E-07	4.8E-02
Benzo(a)pyrene	1.5E-07	1.4E-07	2.0E-06	2.0E-06	1.6E-09	1.2E-09	1.2E-06	9.2E-07	4.5E-02
Benzo(b)fluoranthene	1.6E-08	1.6E-08	2.2E-07	2.2E-07	1.8E-10	1.4E-10	1.6E-07	1.2E-07	4.4E-02
Benzo(k)fluoranthene	3.8E-07	3.5E-07	4.4E-06	4.4E-06	7.7E-09	5.4E-09	6.6E-06	4.7E-06	4.4E-02
Benzo(ghi)perylene	4.5E-04	3.4E-04	1.1E-04	1.1E-04	3.9E-03	2.9E-03	1.2E-09	9.2E-10	3.5E-02
Chrysene	3.5E-07	3.1E-07	2.5E-06	2.5E-06	2.0E-08	1.5E-08	1.0E-05	7.5E-06	4.8E-02
Dibenzo(a,h)anthracene	1.3E-07	1.1E-07	1.0E-06	1.0E-06	3.4E-09	2.5E-09	5.0E-06	3.7E-06	3.7E-02
Fluoranthene	3.0E-09	2.9E-09	3.9E-08	3.9E-08	1.3E-10	9.6E-11	2.6E-08	1.9E-08	4.8E-02
Fluorene	1.2E-10	1.1E-10	1.9E-09	1.9E-09	2.5E-11	1.9E-11	1.7E-09	1.3E-09	3.5E-02
Indeno(1,2,3-cd)pyrene	8.8E-08	7.7E-08	8.9E-07	8.9E-07	2.0E-09	1.5E-09	3.3E-06	2.5E-06	3.6E-02
2-Methylnaphthalene	1.5E-12	1.3E-12	1.4E-11	1.4E-11	1.0E-11	7.9E-12	5.2E-17	3.9E-17	2.9E-02
Naphthalene	8.8E-12	7.3E-12	1.5E-10	1.4E-10	3.8E-11	2.8E-11	4.0E-10	3.0E-10	1.8E-02
Phenanthrene	9.3E-10	8.8E-10	1.3E-08	1.3E-08	1.1E-10	8.4E-11	1.1E-08	8.6E-09	4.1E-02
Pyrene	4.2E-09	3.7E-09	3.9E-08	3.9E-08	5.4E-10	3.9E-10	9.3E-08	6.7E-08	4.7E-02
Aldehyde Ketones									
Formaldehyde	7.7E-10	5.8E-10	1.1E-06	8.3E-07	1.1E-06	8.3E-07	1.9E-07	1.4E-07	1.5E-04

Appendix G-10f

Contaminant Concentration in Chicken and Eggs

Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameters	
Achicken = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba chicken Aegg = (Sum of (Fgr * Qgr * Pgr) + (Qs * Cs * Bs) * Ba egg and: Pgr = Prgr Where:	
Achicken = Concentration of COC in Chicken (mg/kg):	CS*
Aegg = Concentration of COC in Eggs (mg/kg):	CS*
Fgr = Fraction of Grain Grown on Contaminated Soil (--):	1.0E+00
Qgr = Quantity of Grain Eaten By Chickens per day (kg/d):	2.0E-01
Pgr = Concentration of COC in Grain (mg/kg):	CS*
Prgr = Grain Concentration Due to Root Uptake (mg/kg) :	CS*
Qs = Quantity of Soil Eaten Each Day by Chickens (kg/d):	2.2E-02
Cs = Average Soil Concentration Over Exposure Duration (mg/kg) :	CS*
Bs = Soil Bioavailability Factor (--):	1.0E+00
Ba chicken = COC Biotransfer Factor for Chickens (d/kg):	CS*
Ba egg = COC Biotransfer Factor for Eggs (d/kg):	CS*

Appendix G-10f
Contaminant Concentration in Chicken and Eggs
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Contaminant	A chicken		A egg		P gr		Cs Untilled (2 cm)		Ba chicken	Ba egg
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer		
Inorganics										
Antimony	3.2E-19	2.4E-19	1.8E-19	1.4E-19	1.7E-14	1.3E-14	5.7E-14	4.3E-14	6.9E-05	4.0E-05
Arsenic	7.6E-16	5.7E-16	4.3E-16	3.2E-16	1.4E-11	1.1E-11	3.5E-10	2.6E-10	7.2E-05	4.1E-05
Beryllium	8.7E-15	6.5E-15	5.0E-15	3.7E-15	1.1E-09	8.6E-10	7.7E-08	5.8E-08	4.5E-06	2.6E-06
Cadmium	4.7E-10	3.5E-10	1.1E-11	8.2E-12	1.9E-08	1.4E-08	3.0E-08	2.3E-08	1.1E-01	2.5E-03
Chromium +3	3.2E-11	2.4E-11	1.8E-11	1.4E-11	1.0E-07	7.5E-08	2.3E-05	1.7E-05	6.0E-05	3.4E-05
Chromium +6	ND	ND	ND	ND	6.2E-08	4.5E-08	1.4E-05	1.0E-05	ND	ND
Cobalt	6.0E-09	4.5E-09	ND	ND	9.8E-08	6.6E-08	1.6E-05	1.2E-05	1.6E-02	ND
Copper	4.2E-07	2.6E-07	ND	ND	5.0E-05	3.1E-05	1.9E-03	1.2E-03	8.0E-03	ND
Lead	1.4E-11	1.0E-11	7.9E-12	6.0E-12	4.5E-07	3.4E-07	5.0E-06	3.8E-06	6.9E-05	4.0E-05
Manganese	1.9E-09	1.4E-09	ND	ND	7.5E-06	5.0E-06	2.0E-04	1.5E-04	3.2E-04	ND
Mercury as HgCl2	1.0E-07	6.5E-08	1.0E-07	6.5E-08	1.8E-07	1.2E-07	2.0E-04	1.2E-04	2.4E-02	2.4E-02
Mercury as Methyl Hg	3.0E-10	1.9E-10	3.0E-10	1.9E-10	7.7E-09	4.8E-09	3.8E-06	2.4E-06	3.6E-03	3.6E-03
Nickel	7.6E-15	5.7E-15	4.4E-15	3.3E-15	3.0E-09	2.2E-09	5.0E-08	3.7E-08	4.5E-06	2.6E-06
Selenium	2.1E-10	1.6E-10	2.1E-10	1.6E-10	1.4E-10	1.1E-10	7.2E-09	5.4E-09	1.1E+00	1.1E+00
Zinc	6.4E-10	4.8E-10	6.4E-10	4.8E-10	3.0E-07	2.3E-07	5.7E-07	4.2E-07	8.8E-03	8.8E-03
Dioxins/Furans										
2,3,7,8-TCDD-TEQ	8.7E-13	5.7E-13	5.0E-13	3.2E-13	1.0E-12	6.5E-13	2.0E-09	1.3E-09	1.9E-02	1.1E-02
PCBs										
Total PCBs	1.8E-11	1.3E-11	7.1E-09	5.3E-09	3.3E-11	2.5E-11	2.5E-08	1.9E-08	3.2E-02	1.3E+01
PAHs										
Acenaphthene	4.0E-12	3.0E-12	2.3E-12	1.7E-12	1.8E-10	1.4E-10	8.4E-09	6.3E-09	1.8E-02	1.0E-02
Acenaphthylene	1.4E-11	1.1E-11	8.2E-12	6.2E-12	3.6E-09	2.7E-09	5.9E-14	4.5E-14	2.0E-02	1.1E-02
Anthracene	7.5E-12	5.6E-12	4.3E-12	3.2E-12	1.2E-10	9.2E-11	1.2E-08	9.4E-09	2.5E-02	1.4E-02
Benzo(a)anthracene	6.7E-10	5.0E-10	3.8E-10	2.9E-10	2.0E-09	1.5E-09	1.0E-06	7.7E-07	2.9E-02	1.7E-02
Benzo(a)pyrene	7.5E-10	5.6E-10	4.3E-10	3.2E-10	1.6E-09	1.2E-09	1.2E-06	9.2E-07	2.8E-02	1.6E-02
Benzo(b)fluoranthene	9.7E-11	7.2E-11	5.5E-11	4.1E-11	1.8E-10	1.4E-10	1.6E-07	1.2E-07	2.7E-02	1.5E-02
Benzo(k)fluoranthene	4.0E-09	2.8E-09	2.3E-09	1.6E-09	7.7E-09	5.4E-09	6.6E-06	4.7E-06	2.7E-02	1.5E-02
Benzo(ghi)perylene	1.7E-05	1.2E-05	9.4E-06	7.1E-06	3.9E-03	2.9E-03	1.2E-09	9.2E-10	2.1E-02	1.2E-02
Chrysene	6.6E-09	4.9E-09	3.8E-09	2.8E-09	2.0E-08	1.5E-08	1.0E-05	7.5E-06	2.9E-02	1.7E-02
Dibenzo(a,h)anthracene	2.5E-09	1.9E-09	1.5E-09	1.1E-09	3.4E-09	2.5E-09	5.0E-06	3.7E-06	2.3E-02	1.3E-02
Fluoranthene	1.7E-11	1.3E-11	9.7E-12	7.3E-12	1.3E-10	9.6E-11	2.6E-08	1.9E-08	2.9E-02	1.7E-02
Fluorene	9.3E-13	7.0E-13	5.3E-13	4.0E-13	2.5E-11	1.9E-11	1.7E-09	1.3E-09	2.2E-02	1.2E-02
Indeno(1,2,3-cd)pyrene	1.6E-09	1.2E-09	9.1E-10	6.8E-10	2.0E-09	1.5E-09	3.3E-06	2.5E-06	2.2E-02	1.2E-02
2-Methylnaphthalene	3.6E-14	2.7E-14	2.1E-14	1.6E-14	1.0E-11	7.9E-12	5.2E-17	3.9E-17	1.7E-02	1.0E-02
Naphthalene	1.8E-13	1.3E-13	1.0E-13	7.7E-14	3.8E-11	2.8E-11	4.0E-10	3.0E-10	1.1E-02	6.3E-03
Phenanthrene	6.8E-12	5.1E-12	3.9E-12	2.9E-12	1.1E-10	8.4E-11	1.1E-08	8.6E-09	2.5E-02	1.4E-02
Pyrene	6.1E-11	4.4E-11	3.5E-11	2.5E-11	5.4E-10	3.9E-10	9.3E-08	6.7E-08	2.8E-02	1.6E-02
Aldehyde Ketones										
Formaldehyde	2.0E-11	1.5E-11	1.1E-11	8.6E-12	1.1E-06	8.3E-07	1.9E-07	1.4E-07	8.9E-05	5.1E-05

Appendix G-10g
Calculation of Chemical Intakes
Farmer - Farm 6 (Maximum Actual Farm) Scenario: Adult

Parameter

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Adult Soil Consumption Rate (kg/d):	0.0001
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Adult Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.0003
CRpp=Adult Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00057
CRbg=Adult Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00014
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00114
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.00842
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.00053
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.00061
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.00062
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (adult) (kg):	70

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics																
Antimony	2.1E-17	1.6E-17	8.1E-20	6.1E-20	1.8E-17	1.4E-17	1.5E-18	1.1E-18	1.7E-18	1.3E-18	1.4E-20	1.1E-20	2.0E-22	1.5E-22	1.1E-22	8.5E-23
Arsenic	6.2E-09	6.2E-09	5.0E-16	3.8E-16	3.0E-09	3.0E-09	2.4E-09	2.4E-09	8.1E-10	8.1E-10	2.9E-12	2.9E-12	4.6E-19	3.5E-19	2.7E-19	2.0E-19
Beryllium	6.9E-10	6.9E-10	1.1E-13	8.2E-14	4.9E-10	4.9E-10	2.0E-10	2.0E-10	2.0E-12	2.0E-12	3.0E-14	3.0E-14	5.3E-18	4.0E-18	3.1E-18	2.3E-18
Cadmium	4.5E-09	4.5E-09	4.3E-14	3.2E-14	4.2E-09	4.2E-09	2.0E-10	2.0E-10	1.2E-10	1.2E-10	6.5E-12	6.5E-12	2.8E-13	2.1E-13	6.8E-15	5.1E-15
Chromium +3	3.0E-08	3.0E-08	3.3E-11	2.5E-11	3.1E-09	3.0E-09	6.6E-09	6.6E-09	2.0E-08	2.0E-08	2.9E-12	2.7E-12	2.0E-14	1.5E-14	1.1E-14	8.5E-15
Chromium +6	1.8E-08	1.8E-08	2.0E-11	1.5E-11	1.8E-09	1.8E-09	3.9E-09	3.9E-09	1.2E-08	1.2E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cobalt	1.6E-08	1.6E-08	2.3E-11	1.7E-11	8.6E-10	8.6E-10	7.2E-09	7.2E-09	8.0E-09	7.9E-09	2.5E-10	2.3E-10	3.7E-12	2.7E-12	0.0E+00	0.0E+00
Copper	1.2E-07	1.0E-07	2.8E-09	1.7E-09	5.3E-09	5.3E-09	4.3E-08	3.5E-08	6.5E-08	5.4E-08	6.8E-09	4.5E-09	2.6E-10	1.6E-10	0.0E+00	0.0E+00
Lead	1.1E-07	1.1E-07	7.2E-12	5.4E-12	4.7E-08	4.7E-08	5.7E-09	5.7E-09	5.3E-08	5.3E-08	4.3E-11	4.3E-11	8.5E-15	6.4E-15	4.9E-15	3.7E-15
Manganese	2.3E-08	2.2E-08	2.8E-10	2.1E-10	7.4E-09	7.4E-09	1.4E-09	1.4E-09	1.4E-08	1.3E-08	6.7E-11	5.6E-11	1.1E-12	8.3E-13	0.0E+00	0.0E+00
Mercury as HgCl2	1.0E-08	9.3E-09	2.8E-10	1.8E-10	5.7E-09	5.5E-09	9.5E-10	7.3E-10	3.3E-09	2.7E-09	1.4E-12	9.0E-13	6.4E-11	4.0E-11	6.5E-11	4.1E-11
Mercury as Methyl Hg	8.3E-10	8.2E-10	5.4E-12	3.4E-12	8.2E-10	8.2E-10	1.7E-12	1.1E-12	4.6E-12	2.9E-12	3.8E-15	2.4E-15	1.9E-13	1.2E-13	1.9E-13	1.2E-13
Nickel	5.1E-08	5.1E-08	7.1E-14	5.3E-14	6.4E-09	6.4E-09	1.6E-08	1.6E-08	2.9E-08	2.9E-08	3.9E-13	3.9E-13	4.7E-18	3.5E-18	2.7E-18	2.0E-18
Selenium	1.3E-07	1.3E-07	1.0E-14	7.7E-15	4.4E-09	4.4E-09	4.1E-09	4.1E-09	1.2E-07	1.2E-07	6.8E-09	6.8E-09	1.3E-13	9.6E-14	1.3E-13	9.7E-14
Zinc	9.1E-08	9.1E-08	8.1E-13	6.1E-13	7.7E-08	7.7E-08	2.8E-09	2.8E-09	1.1E-08	1.1E-08	7.9E-11	7.9E-11	3.9E-13	2.9E-13	4.0E-13	3.0E-13
Dioxins/Furans																
2,3,7,8-TCDD-TEQ	2.0E-12	2.0E-12	2.9E-15	1.9E-15	1.5E-14	1.4E-14	6.0E-13	5.9E-13	1.4E-12	1.4E-12	3.4E-14	2.9E-14	5.3E-16	3.5E-16	3.1E-16	2.0E-16
PCBs																
Total PCBs	2.6E-09	2.6E-09	3.5E-14	2.7E-14	1.5E-11	1.5E-11	5.7E-10	5.7E-10	2.0E-09	2.0E-09	1.9E-11	1.9E-11	1.1E-14	8.0E-15	4.4E-12	3.3E-12
PAHs																
Acenaphthene	7.0E-12	6.8E-12	1.2E-14	9.0E-15	1.7E-12	1.6E-12	1.6E-12	1.5E-12	3.6E-12	3.5E-12	1.2E-13	1.0E-13	2.4E-15	1.8E-15	1.4E-15	1.1E-15
Acenaphthylene	1.4E-12	1.2E-12	8.5E-20	6.4E-20	6.9E-15	5.6E-15	2.4E-13	2.3E-13	9.6E-13	8.3E-13	2.1E-13	1.6E-13	8.8E-15	6.6E-15	5.1E-15	3.8E-15
Anthracene	1.5E-11	1.5E-11	1.8E-14	1.3E-14	2.7E-13	2.4E-13	4.4E-12	4.4E-12	1.0E-11	1.0E-11	2.5E-13	2.2E-13	4.6E-15	3.4E-15	2.6E-15	2.0E-15
Benzo(a)anthracene	2.7E-09	2.7E-09	1.5E-12	1.1E-12	3.2E-11	3.2E-11	8.0E-10	8.0E-10	1.9E-09	1.9E-09	3.4E-11	3.1E-11	4.1E-13	3.1E-13	2.4E-13	1.8E-13
Benzo(a)pyrene	6.9E-09	6.8E-09	1.7E-12	1.3E-12	5.4E-11	5.3E-11	2.0E-09	2.0E-09	4.7E-09	4.7E-09	7.9E-11	7.6E-11	4.6E-13	3.4E-13	2.7E-13	2.0E-13
Benzo(b)fluoranthene	7.3E-10	7.3E-10	2.3E-13	1.7E-13	6.2E-12	6.2E-12	2.1E-10	2.1E-10	5.0E-10	5.0E-10	8.6E-12	8.2E-12	5.9E-14	4.4E-14	3.4E-14	2.6E-14
Benzo(k)fluoranthene	1.4E-08	1.4E-08	9.5E-12	6.7E-12	9.5E-11	9.3E-11	4.2E-09	4.2E-09	9.7E-09	9.7E-09	2.0E-10	1.9E-10	2.4E-12	1.7E-12	1.4E-12	1.0E-12
Benzo(ghi)perylene	1.2E-06	9.4E-07	1.8E-15	1.3E-15	6.1E-09	4.7E-09	1.3E-07	1.2E-07	7.7E-07	6.2E-07	2.4E-07	1.8E-07	1.0E-08	7.6E-09	5.9E-09	4.4E-09
Chrysene	1.3E-08	1.3E-08	1.4E-11	1.1E-11	2.2E-10	2.2E-10	3.8E-09	3.7E-09	8.7E-09	8.6E-09	1.9E-10	1.6E-10	4.0E-12	3.0E-12	2.3E-12	1.7E-12
Dibenzo(a,h)anthracene	4.4E-09	4.3E-09	7.2E-12	5.4E-12	9.8E-11	9.8E-11	1.3E-09	1.3E-09	2.9E-09	2.9E-09	6.6E-11	5.7E-11	1.6E-12	1.2E-12	9.0E-13	6.7E-13
Fluoranthene	1.3E-10	1.3E-10	3.7E-14	2.7E-14	8.3E-13	8.0E-13	3.8E-11	3.8E-11	9.0E-11	9.0E-11	1.6E-12	1.6E-12	1.0E-14	7.8E-15	6.0E-15	4.5E-15
Fluorene	4.4E-12	4.4E-12	2.5E-15	1.9E-15	3.3E-14	2.8E-14	1.3E-12	1.3E-12	3.0E-12	3.0E-12	6.4E-14	6.0E-14	5.7E-16	4.3E-16	3.3E-16	2.5E-16
Indeno(1,2,3-cd)pyrene	3.5E-09	3.5E-09	4.7E-12	3.5E-12	8.3E-11	8.2E-11	1.0E-09	1.0E-09	2.3E-09	2.3E-09	4.7E-11	4.1E-11	9.7E-13	7.2E-13	5.6E-13	4.2E-13
2-Methylnaphthalene	3.7E-14	3.6E-14	7.5E-23	5.6E-23	9.7E-15	9.3E-15	7.6E-15	7.5E-15	1.9E-14	1.8E-14	8.2E-16	6.8E-16	2.2E-17	1.7E-17	1.3E-17	9.7E-18
Naphthalene	2.8E-13	2.6E-13	5.7E-16	4.3E-16	1.0E-13	9.6E-14	5.0E-14	4.7E-14	1.2E-13	1.1E-13	4.6E-15	3.9E-15	1.1E-16	8.2E-17	6.4E-17	4.8E-17
Phenanthrene	3.7E-11	3.7E-11	1.6E-14	1.2E-14	2.8E-13	2.5E-13	1.1E-11	1.1E-11	2.5E-11	2.5E-11	4.9E-13	4.7E-13	4.2E-15	3.1E-15	2.4E-15	1.8E-15
Pyrene	1.3E-10	1.3E-10	1.3E-13	9.5E-14	1.0E-12	9.1E-13	3.8E-11	3.8E-11	8.8E-11	8.7E-11	2.2E-12	2.0E-12	3.7E-14	2.7E-14	2.2E-14	1.6E-14
Aldehyde Ketones																
Formaldehyde	6.6E-09	5.0E-09	2.7E-13	2.0E-13	6.6E-09	5.0E-09	1.8E-12	1.4E-12	4.8E-12	3.6E-12	4.1E-13	3.1E-13	1.2E-14	9.2E-15	7.1E-15	5.3E-15

Appendix G-10g
Calculation of Chemical Intakes
Farmer - Farm 6 (Maximum Actual Farm) Scenario: Child

Itot = Isoil + Iag + Ibeef + Imilk + Ipork + Ichicken + Ieggs

Where:
Isoil = Sc * CRsoil * Fsoil/BW
Iag = [((Pd+Pv+Prep)*CRag)+(Prpp*CRpp)+(Prbg*CRbg)] * Fag
Ibeef = Abeef * CRbeef * Fbeef
Imilk = Amilk * CRmilk * Fmilk
Ipork = Apork * Crpork * Fpork
Ichicken = Achicken * CRchicken * Fchicken
Ieggs = Aeggs * CReggs * Feggs

Where:

CS* = Values Specific to Contaminant:	
Itot = Total Daily Intake of Contaminant (mg/kg-d):	CS*
Isoil = Daily Intake of Contaminant from Soil (mg/kg-d):	CS*
Sc = Soil Concentration (untilled) (mg/kg):	CS*
CRsoil = Child Soil Consumption Rate (kg/d):	0.0002
Fsoil = Fraction of Consumed Soil that is Contaminated:	1
Iag = Daily Intake of Contaminant from Produce (mg/kg-d):	CS*
Pd = Above Ground Exposed Produce Concentration Due to Direct Deposition (mg/kg):	CS*
Pv = Above Ground Exposed Produce Concentration Due to Air-to-Plant Transfer (mg/kg):	CS*
Prep = Exposed Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
Prpp = Protected Aboveground Produce Concentration Due to Root Uptake (mg/kg) :	CS*
PRbg = Below Ground Produce Concentration Due to Root Uptake (mg/kg):	CS*
CRag = Child Consumption Rate of Above Ground Produce (kg/kg-d DW):	0.00042
CRpp=Child Consumption Rate of Protected Aboveground Produce (kg/kg-d DW):	0.00077
CRbg=Child Consumption Rate of Below Ground Produce (kg/kg-d DW):	0.00022
Fag = Fraction of Produce that is Contaminated:	1
Abeef = Total Contaminant Concentration in Beef (mg/kg):	CS*
CRbeef = Consumption Rate of Beef (kg/d FW):	0.00051
Fbeef = Fraction of Beef that is Contaminated:	1
Amilk = Total Contaminant Concentration in Milk (mg/kg):	CS*
CRmilk = Consumption Rate of Milk (kg/d):	0.01857
Fmilk = Fraction of Milk that is Contaminated:	1
Apork = Total Contaminant Concentration in Pork (mg/kg):	CS*
CRpork = Consumption Rate of Pork (kg/d):	0.000398
Fpork = Fraction of Pork that is Contaminated:	1
Achicken = Total Contaminant Concentration in Chicken (mg/kg):	CS*
CRchicken = Consumption Rate of Chicken (kg/d):	0.000425
Fchicken = Fraction of Chicken that is Contaminated:	1
Aeggs = Total Contaminant Concentration in Eggs (mg/kg):	CS*
CReggs = Consumption Rate of Eggs (kg/d):	0.000438
Feggs = Fraction of Eggs that is Contaminated:	1
BW = Body weight (child) (kg):	15

Contaminant	Itot		Isoil		Iag		Ibeef		Imilk		Ipork		Ichicken		Iegg	
	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer	Non - Cancer	Cancer
Inorganics																
Antimony	3.0E-17	8.8E-18	7.6E-19	7.6E-19	2.5E-17	3.7E-18	6.7E-19	5.0E-19	3.8E-18	3.8E-18	1.1E-20	8.0E-21	1.4E-22	1.0E-22	8.0E-23	6.0E-23
Arsenic	7.0E-09	7.0E-09	4.7E-15	4.7E-15	4.2E-09	4.2E-09	1.1E-09	1.1E-09	1.8E-09	1.8E-09	2.1E-12	2.1E-12	3.2E-19	2.4E-19	1.9E-19	1.4E-19
Beryllium	7.8E-10	7.8E-10	1.0E-12	1.0E-12	6.9E-10	6.9E-10	8.8E-11	8.8E-11	4.4E-12	4.4E-12	2.2E-14	2.2E-14	3.7E-18	2.8E-18	2.2E-18	1.6E-18
Cadmium	6.2E-09	6.2E-09	4.0E-13	4.0E-13	5.9E-09	5.9E-09	9.0E-11	9.0E-11	2.7E-10	2.7E-10	4.9E-12	4.9E-12	2.0E-13	1.5E-13	4.8E-15	3.6E-15
Chromium +3	5.2E-08	5.2E-08	3.1E-10	3.0E-10	4.3E-09	4.2E-09	3.0E-09	3.0E-09	4.4E-08	4.4E-08	2.1E-12	2.0E-12	1.4E-14	1.0E-14	8.0E-15	6.0E-15
Chromium +6	3.1E-08	3.1E-08	1.8E-10	1.8E-10	2.5E-09	2.5E-09	1.8E-09	1.8E-09	2.6E-08	2.6E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	######
Cobalt	2.3E-08	2.2E-08	2.2E-10	2.0E-10	1.2E-09	1.2E-09	3.2E-09	3.2E-09	1.8E-08	1.8E-08	1.9E-10	1.7E-10	2.5E-12	1.9E-12	0.0E+00	######
Copper	2.0E-07	1.8E-07	2.6E-08	1.3E-08	7.4E-09	7.4E-09	1.9E-08	1.6E-08	1.4E-07	1.4E-07	5.1E-09	3.4E-09	1.8E-10	1.1E-10	0.0E+00	######
Lead	1.9E-07	1.9E-07	6.7E-11	6.7E-11	6.6E-08	6.6E-08	2.5E-09	2.5E-09	1.2E-07	1.2E-07	3.3E-11	3.3E-11	5.9E-15	4.4E-15	3.5E-15	2.6E-15
Manganese	4.4E-08	4.4E-08	2.7E-09	2.5E-09	1.0E-08	1.0E-08	6.4E-10	6.1E-10	3.1E-08	3.1E-08	5.0E-11	4.2E-11	8.0E-13	5.8E-13	0.0E+00	######
Mercury (Total) as HgCl2	1.8E-08	1.7E-08	2.6E-09	1.3E-09	7.9E-09	7.7E-09	4.3E-10	3.3E-10	7.3E-09	7.3E-09	1.1E-12	6.8E-13	4.4E-11	2.8E-11	4.6E-11	2.9E-11
Mercury (Total) as Methyl Hg	1.2E-09	1.2E-09	5.1E-11	2.6E-11	1.1E-09	1.1E-09	7.7E-13	4.9E-13	1.0E-11	1.0E-11	2.9E-15	1.8E-15	1.3E-13	8.1E-14	1.3E-13	8.3E-14
Nickel	8.0E-08	8.0E-08	6.6E-13	6.6E-13	9.0E-09	9.0E-09	7.0E-09	7.0E-09	6.4E-08	6.4E-08	2.9E-13	2.9E-13	3.2E-18	2.4E-18	1.9E-18	1.4E-18
Selenium	2.7E-07	2.7E-07	9.5E-14	9.5E-14	6.2E-09	6.2E-09	1.8E-09	1.8E-09	2.6E-07	2.6E-07	5.1E-09	5.1E-09	8.9E-14	6.7E-14	9.2E-14	6.9E-14
Zinc	1.3E-07	1.3E-07	7.5E-12	7.5E-12	1.1E-07	1.1E-07	1.2E-09	1.2E-09	2.5E-08	2.5E-08	6.0E-11	6.0E-11	2.7E-13	2.0E-13	2.8E-13	2.1E-13
Dioxins/Furans																
2,3,7,8-TCDD-TEQ	3.4E-12	3.4E-12	2.7E-14	1.6E-14	2.1E-14	2.0E-14	2.7E-13	2.6E-13	3.0E-12	3.0E-12	2.5E-14	2.2E-14	3.7E-16	2.4E-16	2.2E-16	1.4E-16
PCBs																
Total PCBs	4.7E-09	4.7E-09	3.3E-13	3.3E-13	2.1E-11	2.1E-11	2.5E-10	2.5E-10	4.4E-09	4.4E-09	1.5E-11	1.4E-11	7.5E-15	5.6E-15	3.1E-12	2.3E-12
PAHs																
Acenaphthene	1.1E-11	1.1E-11	1.1E-13	1.1E-13	2.4E-12	2.4E-12	7.0E-13	6.8E-13	7.9E-12	7.9E-12	8.8E-14	7.6E-14	1.7E-15	1.3E-15	9.9E-16	7.5E-16
Acenaphthylene	2.4E-12	2.4E-12	7.9E-19	7.9E-19	1.1E-14	1.1E-14	1.1E-13	1.0E-13	2.1E-12	2.1E-12	1.6E-13	1.2E-13	6.1E-15	4.6E-15	3.6E-15	2.7E-15
Anthracene	2.5E-11	2.5E-11	1.7E-13	1.6E-13	3.8E-13	3.7E-13	2.0E-12	2.0E-12	2.2E-11	2.2E-11	1.8E-13	1.6E-13	3.2E-15	2.4E-15	1.9E-15	1.4E-15
Benzo(a)anthracene	4.5E-09	4.5E-09	1.4E-11	1.2E-11	4.5E-11	4.5E-11	3.6E-10	3.6E-10	4.1E-09	4.1E-09	2.5E-11	2.3E-11	2.9E-13	2.1E-13	1.7E-13	1.3E-13
Benzo(a)pyrene	1.1E-08	1.1E-08	1.6E-11	1.5E-11	7.5E-11	7.5E-11	9.0E-10	9.0E-10	1.0E-08	1.0E-08	5.9E-11	5.7E-11	3.2E-13	2.4E-13	1.9E-13	1.4E-13
Benzo(b)fluoranthene	1.2E-09	1.2E-09	2.2E-12	2.0E-12	8.7E-12	8.7E-12	9.6E-11	9.6E-11	1.1E-09	1.1E-09	6.5E-12	6.2E-12	4.1E-14	3.1E-14	2.4E-14	1.8E-14
Benzo(k)fluoranthene	2.4E-08	2.4E-08	8.9E-11	6.7E-11	1.3E-10	1.3E-10	1.9E-09	1.9E-09	2.1E-08	2.1E-08	1.5E-10	1.4E-10	1.7E-12	1.2E-12	9.9E-13	7.0E-13
Benzo(ghi)perylene	2.0E-06	1.9E-06	1.6E-14	1.6E-14	9.5E-09	9.5E-09	6.0E-08	5.4E-08	1.7E-06	1.7E-06	1.8E-07	1.4E-07	7.0E-09	5.3E-09	4.1E-09	3.1E-09
Chrysene	2.1E-08	2.1E-08	1.3E-10	1.2E-10	3.1E-10	3.1E-10	1.7E-09	1.7E-09	1.9E-08	1.9E-08	1.4E-10	1.2E-10	2.8E-12	2.1E-12	1.7E-12	1.2E-12
Dibenzo(a,h)anthracene	7.3E-09	7.2E-09	6.7E-11	5.9E-11	1.4E-10	1.4E-10	5.8E-10	5.6E-10	6.4E-09	6.4E-09	5.0E-11	4.3E-11	1.1E-12	8.0E-13	6.4E-13	4.7E-13
Fluoranthene	2.2E-10	2.2E-10	3.4E-13	3.2E-13	1.2E-12	1.1E-12	1.7E-11	1.7E-11	2.0E-10	2.0E-10	1.2E-12	1.2E-12	7.2E-15	5.4E-15	4.3E-15	3.2E-15
Fluorene	7.4E-12	7.4E-12	2.3E-14	2.3E-14	4.6E-14	4.6E-14	5.8E-13	5.8E-13	6.7E-12	6.7E-12	4.8E-14	4.5E-14	4.0E-16	3.0E-16	2.3E-16	1.7E-16
Indeno(1,2,3-cd)pyrene	5.8E-09	5.8E-09	4.4E-11	4.0E-11	1.2E-10	1.2E-10	4.6E-10	4.5E-10	5.2E-09	5.2E-09	3.5E-11	3.1E-11	6.7E-13	5.0E-13	4.0E-13	3.0E-13
2-Methylnaphthalene	5.9E-14	5.9E-14	7.0E-22	7.0E-22	1.4E-14	1.4E-14	3.4E-15	3.4E-15	4.2E-14	4.2E-14	6.1E-16	5.1E-16	1.6E-17	1.2E-17	9.1E-18	6.8E-18
Naphthalene	4.4E-13	4.3E-13	5.3E-15	5.3E-15	1.5E-13	1.5E-13	2.2E-14	2.1E-14	2.6E-13	2.6E-13	3.5E-15	2.9E-15	7.6E-17	5.7E-17	4.5E-17	3.4E-17
Phenanthrene	6.1E-11	6.1E-11	1.5E-13	1.5E-13	3.9E-13	3.8E-13	4.8E-12	4.8E-12	5.6E-11	5.6E-11	3.7E-13	3.5E-13	2.9E-15	2.2E-15	1.7E-15	1.3E-15
Pyrene	2.2E-10	2.2E-10	1.2E-12	9.6E-13	1.4E-12	1.3E-12	1.7E-11	1.7E-11	2.0E-10	2.0E-10	1.7E-12	1.5E-12	2.6E-14	1.9E-14	1.5E-14	1.1E-14
Aldehyde Ketones																
Formaldehyde	1.0E-08	1.0E-08	2.5E-12	2.5E-12	1.0E-08	1.0E-08	8.1E-13	6.1E-13	1.1E-11	1.1E-11	3.1E-13	2.3E-13	8.5E-15	6.4E-15	5.0E-15	3.8E-15

Appendix G-10h
Summary of Cancer Risks and Hazard Indices (a)
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameter		Contaminant	RfDo mg/kg-d	SFo mg/kg-d-1	HQo Adult	CRo Adult	HQo Child	CRo Child	Noncarcinogenic Target Organ/Critical Effects
CRo = Itot * ED * EF * SFo/AT * UC		**Inorganics**							
HQo = Itot * ED * EF/ RfDo * AT * UC									
		Antimony	4.0E-04	NA	5.1E-14	NA	7.3E-14	NA	Longevity, blood glucose, cholesterol
Where:		Arsenic	3.0E-04	1.5E+00	2.0E-05	5E-09	2.2E-05	9E-10	Hyperpigmentation, keratosis, possible vascular effects
CS* = Values Specific to Contaminant:		Beryllium	2.0E-03	NA	3.3E-07	NA	3.7E-07	NA	Intestinal lesions
CRo = Cancer Risk oral (--):	CS*	Cadmium	1.0E-03	NA	4.3E-06	NA	6.0E-06	NA	Proteinuria
HQo = Ingestion Hazard Index (--):	CS*	Chromium +3	1.5E+00	NA	1.9E-08	NA	3.3E-08	NA	None observed
Itot = Total Daily Intake of Contaminant (mg/d):	CS*	Chromium +6	3.0E-03	5.0E-01	5.7E-06	5E-09	9.8E-06	1E-09	None observed
SFo = Ingestion Slope Factor ((mg/kg-d)-1):	CS*	Cobalt	3.0E-04	NA	5.2E-05	NA	7.2E-05	NA	Endocrine Effects
RfDo = Ingestion Reference Dose (mg/kg-d):	CS*	Copper	4.0E-02	NA	3.0E-06	NA	4.8E-06	NA	Gastrointestinal Effects
ED = Exposure Duration (see below) (yr):		Lead	NA	NA	NA	NA	NA	NA	
adult:	40	Manganese	1.4E-01	NA	1.6E-07	NA	3.0E-07	NA	CNS
child:	6	Mercury as HgCl2	3.0E-04	NA	3.3E-05	NA	5.9E-05	NA	Autoimmune Effects
EF = Exposure Frequency (day/yr):	350	Mercury as Methyl Hg	1.0E-04	NA	8.0E-06	NA	1.2E-05	NA	Developmental Effects
AT = Averaging Time (yr):	See Below	Nickel	2.0E-02	NA	2.4E-06	NA	3.8E-06	NA	Reduced body and organ weight
Cancer:	70	Selenium	5.0E-03	NA	2.5E-05	NA	5.2E-05	NA	Selenosis
Noncancer:	See Below	Zinc	3.0E-01	NA	2.9E-07	NA	4.3E-07	NA	Anemia
adult:	40								
child:	6	**Dioxins/Furans**							
UC = Units Conversion (day/yr):	365								
		2,3,7,8-TCDD-TEQ	7.0E-10	1.3E+05	2.8E-03	1E-07	4.6E-03	4E-08	Developmental
		PCBs							
		Total PCBs	2.0E-05	2.0E+00	1.3E-04	3E-09	2.3E-04	8E-10	Developmental
									0.00E+00
		PAHs							
		Acenaphthene	6.0E-02	NA	1.1E-10	NA	1.8E-10	NA	Liver
		Acenaphthylene	NA	NA	NA	NA	NA	NA	
		Anthracene	3.0E-01	NA	4.9E-11	NA	8.1E-11	NA	No Observed Effects
		Benzo(a)anthracene	NA	7.3E-01	NA	1E-09	NA	3E-10	
		Benzo(a)pyrene	NA	7.3E+00	NA	3E-08	NA	7E-09	
		Benzo(b)fluoranthene	NA	7.3E-01	NA	3E-10	NA	7E-11	
		Benzo(k)fluoranthene	NA	7.3E-02	NA	6E-10	NA	1E-10	
		Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	
		Chrysene	NA	7.3E-03	NA	5E-11	NA	1E-11	
		Dibenzo(a,h)anthracene	NA	7.3E+00	NA	2E-08	NA	4E-09	
		Fluoranthene	4.0E-02	NA	3.1E-09	NA	5.2E-09	NA	CNS, liver, blood
		Fluorene	4.0E-02	NA	1.1E-10	NA	1.8E-10	NA	Blood
		Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	1E-09	NA	3E-10	
		2-Methylnaphthalene	4.0E-03	NA	8.8E-12	NA	1.4E-11	NA	Lung
		Naphthalene	2.0E-02	NA	1.3E-11	NA	2.1E-11	NA	Decreased body weight gain
		Phenanthrene	NA	NA	NA	NA	NA	NA	
		Pyrene	3.0E-02	NA	4.2E-09	NA	6.9E-09	NA	Kidney
		Aldehyde Ketones							
		Formaldehyde	2.0E-01	NA	3.2E-08	NA	4.9E-08	NA	Decreased Body Weight

(a) Exposures routes include soil ingestion, produce consumption and home-raised livestock consumption
Organic process upset factor of 1.057 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Totals	3.2E-03	2E-07	5.4E-03	5E-08

Appendix G-10i
Chronic Inhalation of Ambient Constituents
Summary of Cancer Risks and Hazard Indices
Farmer - Farm 6 (Maximum Actual Farm) Scenario - Adult and Child

Parameter

$CRi = Ca * ED * EF * URF / AT * UC2$

$HQi = Ca * ED * EF * UC1 / RfC * AT * UC2$

And:

$Ca = Q * Fv * Cyv + (1 - Fv) * Cyp$

For Hg:

$Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Cyv + 1 - Fv (Hg2+) * Cypb$

$Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Cyv + 1 - Fv (Hg0) * Cypb$

Where:

CS* = Values specific to Contaminant:	
Values specific to Site:	RS*
CRi = Cancer Risk inhalation (--):	CS*
HQi = Inhalation Hazard Index (--):	CS*
Ca = Air Concentration (ug/m3)	CS*
URF = Unit Risk Factor ((ug/m3)-1):	CS*
RfC = Reference Concentration (mg/m3):	CS*
Q = COPC specific emission rate (g/s):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Cyv = Unitized Yearly Air Concentration From Vapor Phase (ug-s/g-m3):	RS*
Cyp = Unitized Yearly Air Concentration From Particle Phase (ug-s/g-m3):	RS*
ED = Exposure Duration (see below) (yr):	
adult:	40
child:	6
EF = Exposure Frequency (day/yr):	350
UC1 = Units Conversion (mg/ug):	0.001
AT = Averaging Time (yr):	See Below
Cancer:	70
Noncancer:	See Below
adult:	40
child:	6
UC2 = Units Conversion (day/yr):	365

Contaminant	Ca ug/m^3	Fv (unitless)	RfC	URF	HQi Adult	CRi Adult	HQi Child	CRi Child	Noncarcinogenic Critical Effects
Inorganics									
Antimony	1.18E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Arsenic	9.75E-07	6.0E-03	1.5E-05	4.3E-03	6.2E-05	2E-09	6.2E-05	3E-10	Cardiovascular, CNS, Developmental
Beryllium	1.53E-07	9.0E-03	2.0E-05	2.4E-03	7.3E-06	2E-10	7.3E-06	3E-11	Sensitization
Cadmium	1.30E-06	9.0E-03	1.0E-05	1.8E-03	1.2E-04	1E-09	1.2E-04	2E-10	
Chromium +3	9.21E-07	9.0E-03	NA	NA	NA	NA	NA	NA	
Chromium +6	5.46E-07	0.0E+00	1.0E-04	8.4E-02	5.2E-06	3E-08	5.2E-06	4E-09	Increased LDH in bronchoalveolar lavage fluid
Cobalt	2.70E-07	0.0E+00	6.0E-06	9.0E-03	4.3E-05	1E-09	4.3E-05	2E-10	
Copper	1.66E-06	0.0E+00	NA	NA	NA	NA	NA	NA	
Lead	1.46E-05	7.0E-03	NA	NA	NA	NA	NA	NA	
Manganese	2.31E-06	0.0E+00	5.0E-05	NA	4.4E-05	NA	4.4E-05	NA	CNS
Mercury (Total) as HgCl2	6.08E-06	8.5E-01	3.0E-04	NA	1.9E-05	NA	1.9E-05	NA	PNS, Autonomic Dysfunction
Mercury (Total) as Elemental Hg	2.54E-08	1.0E+00	3.0E-04	NA	8.1E-08	NA	8.1E-08	NA	PNS, Autonomic Dysfunction
Nickel	2.00E-06	9.0E-03	9.0E-05	2.4E-04	2.1E-05	3E-10	2.1E-05	4E-11	
Selenium	1.45E-06	0.0E+00	2.0E-02	NA	7.0E-08	NA	7.0E-08	NA	
Zinc	2.38E-05	8.0E-03	NA	NA	NA	NA	NA	NA	
Dioxins/Furans									
2,3,7,8-TCDD-TEQ	4.35E-11	6.6E-01	4.0E-08	3.8E+01	1.0E-06	9E-10	1.0E-06	1E-10	
PCBs									
Total PCBs	3.00E-06	9.9E-01	NA	5.7E-04	NA	9E-10	NA	1E-10	
PAHs									
Acenaphthene	1.20E-06	1.0E+00	NA	NA	NA	NA	NA	NA	
Acenaphthylene	1.65E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Anthracene	1.22E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	8.98E-08	4.8E-01	NA	1.1E-04	NA	5E-12	NA	8E-13	
Benzo(a)pyrene	1.01E-07	2.9E-01	NA	1.1E-03	NA	6E-11	NA	9E-12	
Benzo(b)fluoranthene	2.44E-07	9.7E-01	NA	1.1E-04	NA	1E-11	NA	2E-12	
Benzo(k)fluoranthene	1.52E-07	2.7E-01	NA	1.1E-04	NA	9E-12	NA	1E-12	
Benzo(ghi)perylene	1.11E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Chrysene	1.31E-06	7.4E-01	NA	1.1E-05	NA	8E-12	NA	1E-12	
Dibenzo(a,h)anthracene	1.17E-07	5.5E-02	NA	1.2E-03	NA	8E-11	NA	1E-11	
Fluoranthene	1.07E-07	9.9E-01	NA	NA	NA	NA	NA	NA	
Fluorene	1.72E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	9.98E-08	5.0E-03	NA	1.1E-04	NA	6E-12	NA	9E-13	
2-Methylnaphthalene	2.34E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Naphthalene	7.18E-07	1.0E+00	3.0E-03	3.4E-05	2.3E-07	1E-11	2.3E-07	2E-12	Nasal effects
Phenanthrene	1.83E-07	1.0E+00	NA	NA	NA	NA	NA	NA	
Pyrene	9.88E-08	9.9E-01	NA	NA	NA	NA	NA	NA	
Aldehyde Ketones									
Formaldehyde	1.36E-05	1.0E+00	9.8E-03	1.3E-05	1.3E-06	1E-10	1.3E-06	1E-11	Respiratory tract

Organic process upset factor of 1.05 applied

	Adult HQ	Adult Cancer Risk	Child HQ	Child Cancer Risk
Total	3.3E-04	3E-08	3.3E-04	5E-09

Appendix G-10j
Ingestion of Mother's Milk
Farmer - Farm 6 (Maximum Actual Farm) Scenario: Infant

Parameter		Contaminant	ADIinhal	Itot	m (a)	C milkfat	ADD
C milkfat = (m * h * f1 * UC1)/(0.693 * f2)		**Dioxins/Furans**					
m = Itot(dioxin) + ADI (dioxin)		TCDD, 2,3,7,8-	6.8E-15	2.0E-12	2.1E-12	2.35E+01	6.76E-02
ADI = Ca * IR * ET * EF *ED *0.001/BW adult * ATa * 365 d/yr							
ADD infant = Cmilkfat * f3 * f4 * IR milk * ED/ BW infant * ATi							
Where:							
Values specific to Contaminant:	CS*						
Cmilkfat = Concentration of Dioxin in Milkfat of Breast Milk (pg/kg):	CS*						
m = Average Maternal Intake of Dioxin (mg/kg/d):	CS*						
Itot = Total maternal intake of dioxin from indirect sources (mg/kg/d):	See Table G-10h						
ADI = Average daily dioxin intake via inhalation (mg/kg/d):	Calculated						
h = Half-Life of Dioxin in Adults (d):	2555						
f1 = Fraction of Ingested Dioxin Stored in Fat (--):	0.9						
UC1 = Units Conversion (pg/mg):	1.00E+09						
f2 = Fraction of Mother's Weight That is Fat (--):	0.3						
Ca = Air Concentration (ug/m3)							
IR = Inhalation Rate (m3/hr):	0.83						
ET = Exposure Time (hrs/day):	24						
EF = Exposure Frequency (day/yr):	350						
ED = Exposure Duration (yr):	30						
UC1 = Units Conversion (mg/ug):	0.001						
BW adult = Body Weight of adult (kg):	70						
ATa = Averaging Time - adult (yr):	70						
ADD infant = Average Daily Dose For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*						
F3 = Fraction of Mother's Breast Milk That is Fat (--):	0.04						
F4 = Fraction of Ingested Constituent That is Absorbed (--):	0.9						
IR milk = Ingestion Rate of Breast Milk By the Infant (kg/day):	0.8						
ED = Exposure Duration (yr):	1						
BW infant = Body Weight of Infant (kg):	10						
ATi = Averaging Time - infant (yr):	1						

Appendix G-10j

Ingestion of Mother's Milk

Farmer - Farm 6 (Maximum Actual Farm) Scenario: Infant

Parameters			ADD (TCDD)	ADD i/m	Ratio
		Dioxins/Furans			
Ratio = ADD (TCDD)/ADD i/m		2,3,7,8-TCDD TEQ	6.76E-02	6.0E+01	1.1E-03
And:					
ADD (TCDD) = (Sum of ADDi)					
Where:					
Values specific to Contaminant:	CS*				
Ratio = Comparison of ADD (TCDD-TEQ) to Target Intake Level:	CS*				
ADD i/m = Average infant intake level (pg/kg-day):	60				
ADDi = Average Daily Dose of Individual Dioxin/Furan and coplanar PCB Congeners For Infant Exposed to Contaminated Breast Milk (pg/kg-d):	CS*				

Appendix G-11

Acute Inhalation of Ambient Constituents

RME Residential Scenario - Adult and Child

Parameter

AHQi = Cacute * UC1/AIEC

And:

Cacute = Q * Fv * Chv + (1- Fv) * Chp

For Hg:

Ca (Hg2+) = 0.48Q(total) * Fv (Hg2+) * Chv + 1 - Fv (Hg2+) * Chpb

Ca (Hg0) = 0.002Q(total) * Fv (Hg0) * Chv + 1 - Fv (Hg0) * Chpb

Where:

Values specific to Contaminant :	CS*
Values specific to Site :	RS*
AHQi = Acute Inhalation Hazard Index (--):	CS*
Cacute = Acute Air Concentration (ug/m3)	CS*
AIEC = Acute Inhalation Exposure Criteria (mg/m3):	CS*
Q(total) = COPC specific emission rate for Total Hg (g/s):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Fv = Fraction of Constituent Air Concentration in Vapor Phase (--):	CS*
Chv = Unitized Hourly Air Concentration From Vapor Phase (ug/m3):	RS*
1-Fv = Fraction of Constituent Air Concentration in Particulate Phase (--):	CS*
Chp = Hourly Air Concentration From Particulate Phase (ug/m3):	RS*
UC1 = Units Conversion (mg/ug):	1.0E-03

Contaminant	Cacute ug/m3	Fv (unitless)	AIEC mg/m3	AHQi
Inorganics				
Antimony	9.60E-04	1.0E+00	5.0E-01	1.9E-06
Arsenic	5.38E-04	6.0E-03	2.0E-04	2.7E-03
Beryllium	8.43E-05	9.0E-03	2.3E-03	3.7E-05
Cadmium	7.17E-04	9.0E-03	1.0E-01	7.2E-06
Chromium +3	5.76E-04	9.0E-03	1.0E+00	5.8E-07
Chromium +6	2.95E-04	0.0E+00	1.5E+00	2.0E-07
Cobalt	1.49E-04	0.0E+00	1.8E-01	8.3E-07
Copper	9.18E-04	0.0E+00	1.0E-01	9.2E-06
Lead	8.06E-03	7.0E-03	1.5E-01	5.4E-05
Manganese	1.03E-03	0.0E+00	3.0E+00	3.4E-07
Mercury as HgCl2	4.93E-03	8.5E-01	6.0E-04	8.2E-03
Mercury as Methyl Hg	2.06E-05	1.0E+00	6.0E-04	3.4E-05
Nickel	1.11E-03	9.0E-03	2.0E-04	5.5E-03
Selenium	8.01E-04	0.0E+00	2.0E-01	4.0E-06
Zinc	1.21E-02	8.0E-03	1.9E+00	6.4E-06
Acid Gasses				
Hydrogen Chloride	5.58E+00	1.00E+00	2.7E+00	2.1E-03
Hydrogen Flouride	5.62E+00	1.00E+00	8.2E-01	6.9E-03
Sulfuric Acid	5.32E+00	1.00E+00	2.0E-01	2.7E-02
Dioxins/Furans				
2,3,7,8-TCDD-TEQ	3.37E-08	6.6E-01	3.0E-08	1.1E-03
PCBs				
Total PCBs	2.44E-03	9.9E-01	1.1E+00	2.2E-06
PAHs				
Acenaphthene	1.05E-03	1.0E+00	3.6E+00	2.9E-07
Acenaphthylene	1.11E-04	1.0E+00	1.0E+01	1.1E-08
Anthracene	1.10E-04	1.0E+00	2.7E-01	4.1E-07
Benzo(a)anthracene	4.22E-05	4.8E-01	1.2E+00	3.5E-08
Benzo(a)pyrene	4.69E-05	2.9E-01	6.0E-01	7.8E-08
Benzo(b)fluoranthene	1.67E-04	9.7E-01	3.1E-02	5.4E-06
Benzo(k)fluoranthene	8.88E-05	2.7E-01	1.9E-02	4.7E-06
Benzo(ghi)perylene	1.01E-04	1.0E+00	3.0E+01	3.4E-09
Chrysene	1.04E-03	7.4E-01	6.0E-01	1.7E-06
Dibenzo(a,h)anthracene	3.71E-05	5.5E-02	3.4E-02	1.1E-06
Fluoranthene	8.63E-05	9.9E-01	1.5E+00	5.8E-08
Fluorene	1.53E-04	1.0E+00	6.6E+00	2.3E-08
Indeno(1,2,3-cd)pyrene	4.09E-05	5.0E-03	1.5E-02	2.7E-06
2-Methylnaphthalene	1.90E-04	1.0E+00	3.0E+00	6.3E-08
Naphthalene	5.83E-04	1.0E+00	7.9E+01	7.4E-09
Phenanthrene	1.48E-04	1.0E+00	7.6E-01	1.9E-07
Pyrene	7.96E-05	9.9E-01	1.5E-01	5.3E-07
Aldehyde Ketones				
Formaldehyde	1.08E-02	1.0E+00	5.5E-02	2.0E-04

Organic process upset factor of 1.057 applied

	AHI
Total	5.4E-02

APPENDIX H

PHYSICAL/CHEMICAL PARAMETERS

Appendix H
Physical-Chemical Parameters
Montgomery County RRF
Dickerson, MD

Constituent	Henry's Law Constant ($atm\text{-}m^3/mol$)	Ref	Log Kow Value	Ref	Koc (L/kg)	Ref	Water Sol. (mg/L)	Ref	Dair (cm^2/sec)	Ref	Dwater (cm^2/sec)	Ref	Soil-Water Part. Coefficients: Soil (mL/g) Kds	Ref	Susp. Sed. (mL/g) Kdsw	Ref	Bot. Sec. (mL/g) Kdbs	Ref	Soil Loss ksg (yr-1)	Ref
Inorganics																				
Antimony	2.50E-02	1	7.30E-01	1	ND	1	2.30E+04	1	7.72E-02	1	9.57E-06	1	4.50E+01	1	4.50E+01	1	4.50E+01	1	0.00E+00	1
Arsenic	7.70E-01	1	6.80E-01	1	ND	1	3.47E+04	1	7.72E-02	1	9.57E-06	1	2.90E+01	1	2.90E+01	1	2.90E+01	1	0.00E+00	1
Barium	ND		2.30E-01	1	ND	1	5.48E+04	1	7.72E-02	1	9.57E-06	1	4.10E+01	1	4.10E+01	1	4.10E+01	1	0.00E+00	1
Beryllium	1.50E-02	1	-5.70E-01	1	ND	1	1.49E+05	1	7.72E-02	1	9.57E-06	1	7.90E+02	1	7.90E+02	1	7.90E+02	1	0.00E+00	1
Cadmium	3.10E-02	1	-7.00E-02	1	ND	1	1.23E+05	1	7.72E-02	1	9.57E-06	1	7.50E+01	1	7.50E+01	1	7.50E+01	1	0.00E+00	1
Chromium +3	ND		2.30E-01	1	ND	1	8.67E+04	1	1.27E-01	1	1.41E-05	1	1.90E+01	1	1.90E+01	1	1.90E+01	1	0.00E+00	1
Chromium +6	ND		ND		ND		ND		ND		ND		1.90E+01	1	1.90E+01	1	1.90E+01	1	0.00E+00	1
Cobalt	ND		ND		ND		ND		1.25E-01	2	1.45E-05	2	4.50E+01	3	4.50E+01	3	4.50E+01	3	0.00E+00	1
Copper	ND		ND		ND		ND		1.19E-01	2	1.38E-05	2	1.00E+04	2	1.00E+04	2	1.00E+04	2	0.00E+00	1
Lead	2.50E-02	1	7.30E-01	1	ND	1	9.58E+03	1	7.72E-02	1	9.57E-06	1	9.00E+02	1	9.00E+02	1	9.00E+02	1	0.00E+00	1
Manganese	ND		ND		ND		ND		1.31E-01	2	1.52E-05	2	6.50E+01	3	6.50E+01	3	6.50E+01	3	0.00E+00	1
Mercury (Total) as $HgCl_2$	7.10E-10	1	-2.15E-01	1	ND	1	6.90E+04	1	4.53E-02	1	5.25E-06	1	5.80E+04	1	1.00E+05	1	5.00E+04	1	0.00E+00	1
Mercury (Total) as Methyl Hg	4.70E-07	1	ND	1	ND	1	ND	1	5.28E-02	1	6.11E-06	1	7.00E+03	1	1.00E+05	1	3.00E+03	1	0.00E+00	1
Mercury (Total) as Elemental Hg	7.10E-03	1	6.20E-01	1	ND	1	6.00E-02	1	1.09E-02	1	3.01E-05	1	1.00E+03	1	1.00E+03	1	3.00E+03	1	0.00E+00	1
Nickel	2.50E-02	1	-5.70E-01	1	ND	1	4.22E+05	1	7.72E-02	1	9.57E-06	1	6.50E+01	1	6.50E+01	1	6.50E+01	1	0.00E+00	1
Selenium	9.70E-03	1	2.40E-01	1	ND	1	2.06E+03	1	7.72E-02	1	9.57E-06	1	5.00E+00	1	5.00E+00	1	5.00E+00	1	0.00E+00	1
Zinc	2.50E-02	1	-4.70E-01	1	ND	1	3.44E+05	1	7.72E-02	1	9.57E-06	1	6.20E+01	1	6.20E+01	1	6.20E+01	1	0.00E+00	1
Acid Gasses																				
Hydrogen Chloride	ND						ND		1.00E-03	1	1.00E-05	1								
Hydrogen Fluoride	1.00E-04	11					1.00E+06	11	3.88E-01	12	3.30E-05	12								
Sulfuric Acid	7.65E-12	11					1.00E+06	11	3.88E-01	6	1.03E-05	6								
2,3,7,8-TCDD - TEQ	3.29E-05	1	6.80E+00	1	3.89E+06	1	1.93E-05	1	1.04E-01	1	5.60E-06	1	3.89E+04	1	2.92E+05	1	1.56E+05	1	3.00E-02	1
Total PCBs	7.37E-04	7	6.21E+00	7	9.83E+04	7	5.15E-02	7	4.00E-02	7	4.64E-06	7	9.83E+02	7	7.37E+03	7	3.93E+03	7	5.06E+00	7
PAHs																				
Acenaphthene	1.60E-04	1	3.90E+00	1	4.90E+03	1	3.60E+00	1	1.00E-03	1	1.00E-05	1	1.10E+03	1	3.68E+02	1	1.96E+02	1	2.48E+00	1
Acenaphthylene	2.80E-04	9	4.07E+00	9	3.68E+00	9	3.93E+00	9	6.67E-02	6	2.17E-06	6	3.68E-02	6	2.76E-01	6	1.47E-01	6	0.00E+00	1
Anthracene	6.50E-05	1	4.50E+00	1	2.35E+04	1	4.30E-02	1	1.00E-03	1	1.00E-05	1	4.50E+03	1	1.76E+03	1	9.40E+02	1	5.50E-01	1
Benzo(a)anthracene	3.40E-06	1	5.70E+00	1	3.58E+05	1	9.40E-03	1	5.10E-02	1	9.00E-06	1	6.00E+04	1	2.69E+04	1	1.43E+04	1	3.70E-01	1
Benzo(a)pyrene	1.10E-06	1	6.00E+00	1	9.69E+05	1	1.60E-03	1	4.30E-02	1	9.00E-06	1	1.60E+05	1	7.27E+04	1	3.88E+04	1	4.80E-01	1
Benzo(b)fluoranthene	1.11E-04	1	6.12E+00	1	1.05E+06	1	1.50E-03	1	1.00E-03	1	1.00E-05	1	1.05E+04	1	7.86E+04	1	4.19E+04	1	4.10E-01	1
Benzo(k)fluoranthene	8.30E-07	1	6.10E+00	1	9.92E+05	4	8.00E-04	1	1.00E-03	1	1.00E-05	1	1.90E+05	1	7.44E+04	1	3.97E+04	1	1.20E-01	1
Benzo(ghi)perylene	2.66E-07	8	6.63E+00	8	9.06E-01	8	2.60E-04	8	4.48E-02	6	1.19E-06	6	9.06E-03	6	6.80E-02	6	3.62E-02	6	0.00E+00	1
Chrysene	9.50E-05	1	5.70E+00	1	4.01E+05	1	6.30E-03	1	1.00E-03	1	1.00E-05	1	6.00E+04	1	3.01E+04	1	1.60E+04	1	2.50E-01	1
Dibenzo(a,h)anthracene	1.50E-08	1	6.50E+00	1	1.79E+06	1	2.50E-03	1	1.00E-03	1	1.00E-05	1	5.80E+05	1	1.34E+05	1	7.16E+04	1	2.70E-01	1
Fluoranthene	1.60E-05	1	5.00E+00	1	4.91E+04	1	2.10E-01	1	1.00E-03	1	1.00E-05	1	1.10E+04	1	3.68E+03	1	1.96E+03	1	5.70E-01	1
Fluorene	6.40E-05	1	4.20E+00	1	7.71E+03	1	2.00E+00	1	1.00E-03	1	1.00E-05	1	2.10E+03	1	5.78E+02	1	3.08E+02	1	4.22E+00	1
Indeno(1,2,3-cd)pyrene	1.60E-06	1	6.60E+00	1	3.08E+06	1	2.20E-05	1	1.00E-03	1	1.00E-05	1	5.30E+05	1	2.31E+05	1	1.23E+05	1	3.50E-01	1
2-Methylnaphthalene	5.18E-03	10	3.86E+00	10	8.15E-01	10	2.46E+01	10	6.97E-02	6	2.32E-06	6	8.15E-03	6	6.11E-02	6	3.26E-02	6	0.00E+00	1
Naphthalene	4.80E-04	1	3.30E+00	1	1.19E+03	1	3.10E+01	1	5.90E-02	1	7.50E-06	1	3.00E+02	1	8.93E+01	1	4.76E+01	1	5.27E+00	1
Phenanthrene	2.30E-05	1	4.50E+00	1	2.65E+04	4	1.10E+00	1	1.00E-03	1	1.00E-05	1	3.70E+03	4	1.99E+03	4	1.06E+03	4	1.26E+00	1
Pyrene	1.10E-05	1	4.90E+00	1	6.80E+04	1	1.40E+00	1	1.00E-03	1	1.00E-05	1	9.50E+03	1	5.10E+03	1	2.72E+03	1	1.30E-01	1
Aldehyde Ketones																				
Formaldehyde	3.36E-07	1	3.50E-01	1	2.21E+00	1	5.50E+05	1	1.78E-01	1	1.98E-05	1	2.00E-02	1	1.70E-01	1	9.00E-02	1	3.61E+01	1

ND = No Data

1. 2005 HHRAP database (USEPA 2005b)
2. 1999 ERAP (USEPA 1999b)
3. Baes, 1984
4. 2005 HHRAP (USEPA 2005a)
5. Calculated (USEPA 1998 HHRAP)
6. Calculated (USEPA 2005 HHRAP)
7. 1999 HHRAP Errata (USEPA, 1999a)
8. RAIS 2013
9. Montgomery 1990 vol. 1
10. HSDB 2013
11. Physprop (www.syrres.com/eSc/physdemo.htm)
12. USEPA's Water9 Model

Appendix H
Physical-Chemical Parameters
Montgomery County RRF
Dickerson, MD

Constituent	Plant Uptake Factors from Soil: RCF (µg/g plant)/ (µg/mL pore H2O)	Ref	Br ag (µg/g plant)/ (µg/g soil)/	Ref	Br rootveg (µg/g plant)/ (µg/g soil)/	Ref	Br forage (µg/g plant)/ (µg/g soil)/	Ref	Br grain (µg/g plant)/ (µg/g soil)/	Ref	Air to Leaf Transfer Coefficients: Bv ag (µg/g plant)/ (µg/g air)	Ref	Bv forage (µg/g plant)/ (µg/g air)	Ref	Fraction Wet Fw (Unitless)	Ref	Fraction Vapor Fv (Unitless)	Ref
Inorganics																		
Antimony	ND		3.19E-02	1	3.00E-02	1	2.00E-01	1	3.00E-02	1	ND		ND		0.2	4	1.000	1
Arsenic	ND		6.33E-03	1	8.00E-03	1	3.60E-02	1	4.00E-03	1	ND		ND		0.2	4	0.006	1
Barium	ND		3.22E-02	1	1.50E-02	1	1.50E-01	1	1.50E-02	1	ND		ND		0.6	4	0.009	1
Beryllium	ND		2.58E-03	1	1.50E-03	1	1.00E-02	1	1.50E-03	1	ND		ND		0.6	4	0.009	1
Cadmium	ND		1.25E-01	1	6.40E-02	1	3.64E-01	1	6.20E-02	1	ND		ND		0.6	4	0.009	1
Chromium +3	ND		4.88E-03	1	4.50E-03	1	7.50E-03	1	4.50E-03	1	ND		ND		0.6	4	0.009	1
Chromium +6	ND		4.88E-03	1	4.50E-03	1	7.50E-03	1	4.50E-03	1	ND		ND		0.6	4	0.000	1
Cobalt	ND		ND		7.00E-03	1	2.00E-02	3	7.00E-03	3	ND		ND		0.6	4	0.000	4
Copper	ND		ND		2.50E-01	1	4.00E-01	3	2.50E-01	3	ND		ND		0.6	4	0.000	4
Lead	ND		1.36E-02	1	9.00E-03	1	4.50E-02	1	9.00E-03	1	ND		ND		0.6	4	0.007	1
Manganese	ND		ND		5.00E-02	1	2.50E-01	3	5.00E-02	3	ND		ND		0.6	4	0.000	4
Mercury (Total) as HgCl2	ND		1.45E-02	1	3.60E-02	1	ND		9.30E-03	1	1.80E+03	1	1.80E+03	1	0.6	4	0.850	1
Mercury (Total) as Methyl Hg	ND		2.94E-02	1	9.90E-02	1	ND		1.90E-02	1	ND		ND		0.6	4	0.000	1
Mercury (Total) as Elemental Hg	ND		ND		ND		ND		ND		ND		ND		0.6	4	1.000	1
Nickel	ND		9.31E-03	1	8.00E-03	1	3.20E-02	1	6.00E-03	1	ND		ND		0.6	4	0.009	1
Selenium	ND		1.95E-02	1	2.20E-02	1	1.60E-02	1	2.00E-03	1	ND		ND		0.2	4	0.000	1
Zinc	ND		9.70E-02	1	9.00E-01	1	2.50E-01	1	5.40E-02	1	ND		ND		0.6	4	0.008	1
Acid Gasses																		
Hydrogen Chloride																	1.000	1
Hydrogen Fluoride																	1.000	6
Sulfuric Acid																	1.000	6
2,3,7,8-TCDD - TEQ	4.00E+04	1	4.55E-03	1	1.03E+00	1	4.55E-03	1	4.55E-03	1	6.55E+04	1	6.55E+04	1	0.6	4	0.664	4
Total PCBs	1.40E+04	7	1.00E-02	7	1.42E+01	7	1.00E-02	7	1.00E-02	7	3.09E+02	7	3.09E+02	7	0.6	4	0.993	7
PAHs																		
Acenaphthene	2.34E+02	1	2.16E-01	1	2.13E-01	1	2.16E-01	1	2.16E-01	1	4.97E+00	1	4.97E+00	1	0.6	4	1.000	1
Acenaphthylene	2.36E+02	6	1.72E-01	6	6.42E+03	6	1.72E-01	6	6.42E+03	6	4.31E+00	6	4.31E+00	6	0.6	4	1.000	1
Anthracene	6.78E+02	1	9.71E-02	1	1.51E-01	1	9.71E-02	1	9.71E-02	1	5.33E+01	1	5.33E+01	1	0.6	4	0.998	1
Benzo(a)anthracene	5.69E+03	1	1.97E-02	1	9.48E-02	1	1.97E-02	1	1.97E-02	1	1.93E+04	1	1.93E+04	1	0.6	4	0.483	1
Benzo(a)pyrene	9.68E+03	1	1.32E-02	1	6.05E-02	1	1.32E-02	1	1.32E-02	1	1.25E+05	1	1.25E+05	1	0.6	4	0.294	1
Benzo(b)fluoranthene	1.21E+04	1	1.12E-02	1	1.15E+00	1	1.12E-02	1	1.12E-02	1	1.68E+03	1	1.68E+03	1	0.6	4	0.966	1
Benzo(k)fluoranthene	1.16E+04	1	1.15E-02	1	6.09E-02	1	1.15E-02	1	1.15E-02	1	2.11E+05	1	2.11E+05	1	0.6	4	0.273	1
Benzo(ghi)perylene	2.21E+04	6	5.70E-03	6	2.44E+06	6	5.70E-03	6	2.44E+06	6	2.42E+06	6	2.42E+06	6	0.6	4	1.000	1
Chrysene	5.69E+03	1	1.97E-02	1	9.48E-02	1	1.97E-02	1	1.97E-02	1	6.92E+02	1	6.92E+02	1	0.6	4	0.744	1
Dibenzo(a,h)anthracene	2.35E+04	1	6.78E-03	1	4.05E-02	4	6.78E-03	1	6.78E-03	1	3.12E+07	1	3.12E+07	1	0.6	4	0.055	1
Fluoranthene	1.64E+03	1	4.99E-02	1	1.50E-01	1	4.99E-02	1	4.99E-02	1	7.38E+02	1	7.38E+02	1	0.6	4	0.992	1
Fluorene	3.98E+02	1	1.45E-01	1	1.90E-01	1	1.45E-01	1	1.45E-01	1	2.60E+01	1	2.60E+01	1	0.6	4	1.000	1
Indeno(1,2,3-cd)pyrene	2.81E+04	1	5.93E-03	1	5.29E-02	1	5.93E-03	1	5.93E-03	1	3.73E+05	1	3.73E+05	1	0.6	4	0.005	1
2-Methylnaphthalene	1.63E+02	6	2.27E-01	6	2.00E+04	6	2.27E-01	6	2.00E+04	6	1.39E-01	6	1.39E-01	6	0.6	4	1.000	1
Naphthalene	8.07E+01	1	4.79E-01	1	2.69E-01	1	4.79E-01	1	4.79E-01	1	3.81E-01	1	3.81E-01	1	0.6	4	1.000	1
Phenanthrene	6.78E+02	1	9.70E-02	1	1.83E-01	1	9.71E-02	1	9.71E-02	1	1.51E+02	1	1.51E+02	1	0.6	4	0.999	1
Pyrene	1.38E+03	1	5.70E-02	1	1.45E-01	1	5.70E-02	1	5.70E-02	1	8.40E+02	1	8.40E+02	1	0.6	4	0.994	1
Aldehyde Ketones																		
Formaldehyde	6.74E+00	1	8.38E+00	1	3.05E+02	1	8.38E+00	1	8.38E+00	1	3.92E-01	1	3.92E-01	1	0.6	4	1.000	1

ND = No Data
1. 2005 HHRAP database (USEPA 2005b)
2. 1999 ERAP (USEPA 1999b)
3. Baes, 1984
4. 2005 HHRAP (USEPA 2005a)
5. Calculated (USEPA 1998 HHRAP)
6. Calculated (USEPA 2005 HHRAP)
7. 1999 HHRAP Errata (USEPA, 1999a)
8. RAIS 2013
9. Montgomery 1990 vol. 1
10. HSDB 2013
11. Physprop (www.syrres.com/eSc/physdemo.htm)
12. USEPA's Water9 Model

Appendix H
Physical-Chemical Parameters
Montgomery County RRF
Dickerson, MD

Constituent	Beef and Dairy Biotransfer Factors				Beef and Milk Modifying		Pork Biotransfer Factor		Chicken and Egg Biotransfer Factors				Fish Biotransfer Factors					
	Babeef (d/kg)	Ref	Bamilk (d/kg)	Ref	Factor (Unitless)	Ref	Bapork (d/kg)	Ref	Ba chicken (d/kg)	Ref	Ba egg (d/kg)	Ref	BCF (L/kg)	Ref	BAF (L/kg)	Ref	BSAF (L/kg)	Ref
Inorganics																		
Antimony	1.00E-03	1	1.00E-04	1	1	1	1.1E-04	6	6.9E-05	6	4.0E-05	1	4.00E+01	1	ND		ND	
Arsenic	2.00E-03	1	6.00E-05	1	1	1	1.2E-04	6	7.2E-05	6	4.1E-05	1	1.14E+02	1	ND		ND	
Barium	1.50E-04	1	3.50E-04	1	1	1	9.9E-05	6	6.0E-05	6	3.4E-05	1	6.33E+02	1	ND		ND	
Beryllium	1.00E-03	1	9.00E-07	1	1	1	7.4E-06	6	4.5E-06	6	2.6E-06	1	6.20E+01	1	ND		ND	
Cadmium	1.20E-04	1	6.50E-06	1	1	1	1.9E-04	1	1.1E-01	1	2.5E-03	1	9.07E+02	1	ND		ND	
Chromium +3	5.50E-03	1	1.50E-03	1	1	1	9.9E-05	6	6.0E-05	6	3.4E-05	1	1.90E+01	1	ND		ND	
Chromium +6	5.50E-03	1	1.50E-03	1	1	1	ND		ND		ND	1	3.16E+00	1	ND		ND	
Cobalt	2.00E-02	3	2.00E-03	3	1	1	2.4E-02	5	1.6E-02	5	ND		ND		ND		ND	
Copper	1.00E-02	3	1.50E-03	3	1	1	1.2E-02	5	8.0E-03	5	ND		ND		ND		ND	
Lead	3.00E-04	1	2.50E-04	1	1	1	1.1E-04	1	6.9E-05	1	4.0E-05	1	9.00E-02	1	ND		ND	
Manganese	4.00E-04	3	3.50E-04	3	1	1	4.8E-04	5	3.2E-04	5	ND		ND		ND		ND	
Mercury (Total) as HgCl2	5.22E-03	1	2.26E-03	1	1	1	3.4E-05	1	2.4E-02	1	2.4E-02	1	ND	1	ND		ND	
Mercury (Total) as Methyl Hg	7.80E-04	1	3.38E-04	1	1	1	5.1E-06	1	3.6E-03	1	3.6E-03	1	ND	1	6.80E+06	1	ND	
Mercury (Total) as Elemental Hg	ND		ND		ND		ND		ND		ND		ND	1	ND		ND	
Nickel	6.00E-03	1	1.00E-03	1	1	1	7.4E-06	6	4.5E-06	6	2.6E-06	6	7.80E+01	1	ND		ND	
Selenium	2.27E-03	1	5.86E-03	1	1	1	1.9E-01	1	1.1E+00	1	1.1E+00	1	1.29E+02	1	ND		ND	
Zinc	9.00E-05	1	3.25E-05	1	1	1	1.3E-04	1	8.8E-03	1	8.8E-03	1	2.06E+03	1	ND		ND	
Acid Gasses																		
Hydrogen Chloride																		
Hydrogen Fluoride																		
Sulfuric Acid																		
2,3,7,8-TCDD - TEQ	2.61E-02	1	5.50E-03	1	1	1	3.2E-02	1	1.9E-02	1	1.1E-02	1	ND		ND		9.00E-02	4
Total PCBs	4.05E-02	7	1.28E-02	7	1	7	4.9E-02	7	3.2E-02	7	1.3E+01	7	ND		ND		2.00E+00	4
PAHs																		
Acenaphthene	2.43E-02	1	5.12E-03	1	1	1	2.9E-02	1	1.8E-02	1	1.0E-02	1	2.01E+02	1	ND		ND	
Acenaphthylene	2.71E-02	6	5.72E-03	6	1	1	3.3E-02	6	2.0E-02	6	1.1E-02	6	ND		2.72E+02	6	ND	
Anthracene	3.38E-02	1	7.12E-03	1	1	1	4.1E-02	1	2.5E-02	1	1.4E-02	1	ND		1.03E+03	1	ND	
Benzo(a)anthracene	3.99E-02	1	8.41E-03	1	1	1	4.8E-02	1	2.9E-02	1	1.7E-02	1	ND		4.99E+04	1	ND	
Benzo(a)pyrene	3.76E-02	1	7.91E-03	1	1	1	4.5E-02	1	2.8E-02	1	1.6E-02	1	ND		1.33E+05	1	ND	
Benzo(b)fluoranthene	3.62E-02	1	7.62E-03	1	1	1	4.4E-02	1	2.7E-02	1	1.5E-02	1	ND		2.06E+05	1	ND	
Benzo(k)fluoranthene	3.65E-02	1	7.68E-03	1	1	1	4.4E-02	1	2.7E-02	1	1.5E-02	1	ND		1.77E+05	1	ND	
Benzo(ghi)perylene	2.89E-02	6	6.09E-03	6	1	1	3.5E-02	6	2.1E-02	6	1.2E-02	6	ND		2.54E+04	6	ND	
Chrysene	3.99E-02	1	8.41E-03	1	1	1	4.8E-02	1	2.9E-02	1	1.7E-02	1	ND		4.99E+04	1	ND	
Dibenzo(a,h)anthracene	3.10E-02	1	6.52E-03	1	1	1	3.7E-02	1	2.3E-02	1	1.3E-02	1	ND		4.97E+05	1	ND	
Fluoranthene	3.92E-02	1	8.26E-03	1	1	1	4.8E-02	1	2.9E-02	1	1.7E-02	1	ND		4.49E+03	1	ND	
Fluorene	2.93E-02	1	6.16E-03	1	1	1	3.5E-02	1	2.2E-02	1	1.2E-02	1	ND		4.72E+02	1	ND	
Indeno(1,2,3-cd)pyrene	2.94E-02	1	6.19E-03	1	1	1	3.6E-02	1	2.2E-02	1	1.2E-02	1	ND		6.18E+05	1	ND	
2-Methylnaphthalene	2.37E-02	6	4.98E-03	6	1	1	2.9E-02	6	1.7E-02	6	1.0E-02	6	1.87E+02	6	ND		ND	
Naphthalene	1.48E-02	1	3.13E-03	1	1	1	1.8E-02	1	1.1E-02	1	6.3E-03	1	6.93E+01	1	ND		ND	
Phenanthrene	3.38E-02	1	7.12E-03	1	1	1	4.1E-02	1	2.5E-02	1	1.4E-02	1	ND		1.03E+03	1	ND	
Pyrene	3.84E-02	1	8.09E-03	1	1	1	4.7E-02	1	2.8E-02	1	1.6E-02	1	ND		3.29E+03	1	ND	
Aldehyde Ketones																		
Formaldehyde	1.21E-04	1	2.54E-05	1	1	1	1.5E-04	1	8.9E-05	1	5.1E-05	1	3.42E+02	1	ND		ND	

ND = No Data
1. 2005 HHRAP database (USEPA 2005b)
2. 1999 ERAP (USEPA 1999b)
3. Baes, 1984
4. 2005 HHRAP (USEPA 2005a)
5. Calculated (USEPA 1998 HHRAP)
6. Calculated (USEPA 2005 HHRAP)
7. 1999 HHRAP Errata (USEPA, 1999a)
8. RAIS 2013
9. Montgomery 1990 vol. 1
10. HSDB 2013
11. Physprop (www.syrres.com/eSc/physdemo.htm)
12. USEPA's Water9 Model

APPENDIX I

PEER REVIEW COMMENTS AND RESPONSE TO COMMENTS

June 10, 2014

Ms. Karen Vetrano, Ph.D.
Manager, Risk Assessment and Toxicology
TRC Environmental Corporation
142 Ralyn Rd
Cotuit, MA 02635

Dear Karen,

I have had the opportunity to review the revised final draft of the risk assessment report prepared by TRC Associates regarding the Montgomery County Resource Recovery Facility (RRF). We reviewed two updated versions of the risk assessment, one dated December 2013, and a redline version of the report text dated June 2014.

This final peer review evaluated the revised report in light of the comments we submitted previously from my peer review of an earlier draft dated November 2013. As noted then, the methodologies followed are consistent with current guidance for this type of study, and the conclusions are consistent with findings in other risk assessment studies of similar waste to energy facilities. Again, I did not independently verify input values used in the calculations or check calculations presented in the draft report. I also accepted as accurate maps and figures provided in the draft report.

TRC did a thorough job of addressing all of my prior comments. I compared the revised draft section by section and confirmed that TRC addressed not only my previous technical comments, but also made substantial changes to the main report text to help make it more understandable to a less technical audience. I had a few additional minor comments on the revised risk assessment report which I was able to discuss with you and which have all been satisfactorily addressed. I also note that EPA provided comments to TRC on the draft report in April 2014 and, in response, TRC made additional changes to the report to address these comments.

In summary, it is my conclusion that this risk assessment relied on well-accepted and current methodologies and employed conservative (health-protective) information to evaluate potential impacts associated with air emissions from the stack and the residue handling building. The study shows that potential impacts associated with these RRF emissions into air are below regulatory and other benchmark risk levels for protection of human health.

Please feel free to contact me for any further clarification or if you have any questions.

Sincerely,

Sarah Foster

Sarah Foster, Principal
CPF Associates, Inc.

CPF ASSOCIATES, INC.
5404 Burling Rd ▪ Bethesda, MD 20814 ▪ T: (301) 657-2686 ▪ F: (301) 907-8230 ▪ www.cpfassociates.com

November 14, 2013

Ms. Karen Vetrano, Ph.D.
Manager, Risk Assessment and Toxicology
TRC Environmental Corporation
142 Ralyn Rd
Cotuit, MA 02635

Dear Karen,

I have peer reviewed the November 2013 draft of the risk assessment report prepared by TRC Associates regarding the Montgomery County Resource Recovery Facility (RRF). The purpose of this letter is to summarize my review of the draft document.

Overall Evaluation

In accordance with our scope of work for performing this peer review, I relied on several key criteria in assessing the draft report. These criteria consisted of the following:

- Accuracy – How closely do the results compare to those obtained from analogous facilities with similar air pollution controls and similar emission rates, including the previous risk assessments performed for this facility?
- Consistency – Do the methods address the recommendations provided in the peer review comments on the previous studies?
- State-of-the-Art – How well do the study methods reflect those currently recommended by regulatory agencies for risk assessment?
- Documentation and Inputs – Are assumptions, data, and uncertainties adequately documented and defined? Are assumptions, calculations, extrapolations, methodology, and regulatory criteria credible and consistent with regulatory agency guidance and similar studies of this kind?

It should be noted that I did not independently verify input values used in the calculations or check calculations presented in the draft report. It is my understanding that these items have been independently quality assured by TRC as part of its routine risk assessment quality assurance methods. I also accepted as accurate maps and figures provided in the draft report.

Overall I found that the methodologies followed were consistent with current guidance for this type of study, and that the conclusions were consistent with findings in other risk assessment studies of similar waste to energy facilities. I have identified several aspects in the draft study (described below) that may influence the results. I have also provided some suggestions on the text in redline format and on the main report tables to help make the report more understandable to a less technical audience.

Comments and Findings

The draft report's results were compared to those presented in similar studies of waste to energy (WTE) facilities equipped with similar air pollution controls and also to the 2006 risk assessment previously prepared for this specific facility. The draft risk results were found to be generally consistent with those reported in studies of other WTE facilities. Compared to the previous 2006 RRF risk assessment, the risks in the draft report were somewhat different, and slightly lower for the overall total maximum excess lifetime cancer risks and non-cancer hazard index values. These differences may reflect use of a longer record of stack test data from the RRF, reliance on current U.S. Environmental Protection Agency (USEPA) risk assessment guidance and use of USEPA's currently recommended AERMOD model; these factors reflect the proper use in this case of more current information in the draft study and would reasonably be predicted to produce somewhat different results than in the previous 2006 study.

I reviewed peer review comments provided in Attachment I of Montgomery County's RRF Request for Proposal[1] to identify risk assessment items relevant to this report. The peer review comments did not include specific risk assessment recommendations, with the exception of remarks related to nomenclature for dioxin and furan toxicity equivalency factors. This draft risk assessment report properly evaluated toxicity equivalency factors for dioxins and furans.

The draft risk assessment was conducted in accordance with methods that are currently recommended by USEPA and commonly used for WTE facility risk assessments. This includes use of USEPA's AERMOD model for dispersion and deposition modeling and reliance on risk assessment methods outlined in USEPA's 2005 Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities. These are the two most important and currently recommended USEPA methods for conducting WTE facility risk assessments.

Overall, the documentation and inputs in the draft report were clearly stated and well defined, and the assumptions, calculations, methodology, and regulatory criteria were credible and consistent with guidance and similar studies of this kind. There were, however, a few exceptions that warrant some additional consideration. These items are summarized below, and were also noted in comments provided in the draft report text and tables.

- It is recommended that additional discussion of the conservatism inherent in some emission rates be provided for compounds where most data from the stack tests were non-detected values, or in the event the emission rate carried forward in the risk assessment was higher than the highest value reported in the more than 10-year stack test dataset. A method that allows for identification of more plausible emission rates in these situations could also be considered.

[1] Montgomery County. 2013. Request for Proposals #1016212. Resource Recovery Facility Human Risk Assessment Update, Ambient Environmental Media Monitoring and Technical Assistance. January 11, 2013

- The AERMOD modeling domains used in the risk assessment could be more clearly explained. USEPA notes in HHRAP that a 10 km modeling distance from the source is generally adequate for characterizing exposure scenario locations, and that additional areas may also be addressed for characterizing waterbodies and watersheds.

- With respect to selection of compounds of potential concern (COPCs) for a WTE risk assessment, acid gases are customarily included, particularly to be able to address potential risks associated with short-term inhalation exposures. Although acid gases were not addressed in the 2006 ENSR report, it is recommended that acid gases (i.e., HCl, HF and H2SO4) be included.

- The draft report properly follows USEPA's HHRAP guidance for calculating upset emission factors, and uses opacity and carbon monoxide continuous emission monitoring (CEM) data to define the duration of upset conditions. The duration of upset conditions for opacity used in this calculation, which appears to be 6 minutes total over a more than 10-year period, does not appear to be comparable with data provided in the previous 2006 risk assessment report for the RRF, or data that I have observed for other similar WTE facilities. It is recommended that the upset emission factor based on CEMs opacity data be re-evaluated.

- The class of dioxins and furans are assessed in the risk assessment by calculating an emission rate for 2,3,7,8-tetrachlorodibenzodioxin toxic equivalents (TCDD-TEQs), using toxic equivalency factors (TEFs) consistent with current USEPA guidance. Treating the class of dioxins and furans as TCDD-TEQs is one of two commonly used methods for addressing these compounds in WTE facility risk assessments. The other method involves carrying forward each individual dioxin and furan compound through the risk calculations and applying TEFs at a later stage of the assessment, when risks are calculated. Both approaches are acceptable for this type of study, although they differ with respect to level of refinement (the former method is more of a screening-level approach than the latter). It is recommended that this topic be noted in the uncertainty section of the risk assessment.

- The approach used to calculate potential fugitive emissions from the Residue Handling Building (RHB) is very conservative and appears likely to greatly overestimate potential ambient air concentrations and associated inhalation risks. It is recommended that the conservatism inherent in the approach used to calculate fugitive emissions from the RHB be noted where relevant in the report.

- It appears that some of the evaluated receptor scenarios calculate exposures based on modeling results that occur at different locations. This is an extremely conservative, even unrealistic, approach because it assumes a person could be exposed simultaneously at different locations. It is recommended that the conservative nature of this type of scenario be clearly noted where applicable.

- Acute inhalation risks are calculated in the report based on calculated emission rates derived from stack test data. It is additionally recommended that potential short-term acute inhalation risks under upset conditions be discussed in the uncertainty section of the report.

- The regulatory benchmark risk level used to evaluate the potential for non-cancer health effects was a hazard index (HI) of 0.25. It is recommended that the report note that there is no strictly accepted single risk assessment benchmark criterion for HI results in WTE facility risk assessments (e.g., a common benchmark used by many USEPA regulatory programs is an HI of 1.0).

Please feel free to contact me for any further clarification or if you have any questions about this review.

Sincerely,

Sarah Foster

Sarah Foster, Principal
CPF Associates, Inc.

21 Griffin Road North
Windsor, CT 06095

860.298.9692 PHONE
860.298.6399 FAX

www.TRCsolutions.com

June 6, 2014

Ms. Sarah Foster
Principal
CPF Associates, Inc.
5404 Burling Road
Bethesda, MD 20814

Dear Sarah,

Thank you for your review of the Draft RRF Health Risk Assessment Update for the Montgomery County Resource Recovery Facility located in Dickerson, MD. I have provided a response to your comments below:

Comments and Findings

The draft report's results were compared to those presented in similar studies of waste to energy (WTE) facilities equipped with similar air pollution controls and also to the 2006 risk assessment previously prepared for this specific facility. The draft risk results were found to be generally consistent with those reported in studies of other WTE facilities. Compared to the previous 2006 RRF risk assessment, the risks in the draft report were somewhat different, and slightly lower for the overall total maximum excess lifetime cancer risks and non-cancer hazard index values. These differences may reflect use of a longer record of stack test data from the RRF, reliance on current U.S. Environmental Protection Agency (USEPA) risk assessment guidance and use of USEPA's currently recommended AERMOD model; these factors reflect the proper use in this case of more current information in the draft study and would reasonably be predicted to produce somewhat different results than in the previous 2006 study.

I reviewed peer review comments provided in Attachment I of Montgomery County's RRF Request for Proposal[1] to identify risk assessment items relevant to this report. The peer review comments did not include specific risk assessment recommendations, with the exception of remarks related to nomenclature for dioxin and furan toxicity equivalency factors. This draft risk assessment report properly evaluated toxicity equivalency factors for dioxins and furans.

The draft risk assessment was conducted in accordance with methods that are currently recommended by USEPA and commonly used for WTE facility risk assessments. This

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[1] Montgomery County. 2013. Request for Proposals #1016212. Resource Recovery Facility Human Risk Assessment Update, Ambient Environmental Media Monitoring and Technical Assistance. January 11, 2013

includes use of USEPA's AERMOD model for dispersion and deposition modeling and reliance on risk assessment methods outlined in USEPA's 2005 Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities. These are the two most important and currently recommended USEPA methods for conducting WTE facility risk assessments.

Overall, the documentation and inputs in the draft report were clearly stated and well defined, and the assumptions, calculations, methodology, and regulatory criteria were credible and consistent with guidance and similar studies of this kind. There were, however, a few exceptions that warrant some additional consideration. These items are summarized below, and were also noted in comments provided in the draft report text and tables.

- Additional discussion should be provided for those compounds with emission rates based on predominantly non-detected measurements from stack tests if they account for a relatively large proportion of final risk assessment results. The risk assessment uses a conservative approach for calculating emission rates which is expected to overestimate long-term facility emissions. In some cases, however, the emission calculation approach may result in excessively overestimated, hypothetical risks – for example, for compounds where most data from the stack tests were non-detected values, or where the emission rate carried forward in the risk assessment was higher than the highest value reported in the more than 10-year stack test dataset. A method that allows for identification of more plausible emission rates in these situations is recommended for consideration, particularly if the emission rate for a compound is calculated to be higher than the highest stack test result.

  TRC Response: TRC reviewed the 95% UCL output for those compounds with datasets with a preponderance of non-detects. Due to the skewness of the data or a very small sample size, some 95% UCLs exceeded the maximum emission rate for some of the Units. In the case of some metals analyzed in the Unit 2 and Unit 3 emissions (Chromium VI, cobalt, manganese and zinc), there were only three samples and thus the calculated UCL value exceeded the maximum. The maximum emission rate for these metals was carried through to the risk assessment and are denoted on Table 2-2. The use of the maximum detected concentration of metals did not impact the results of the risk assessment. In the case of PAHs analyzed in the Unit 2 and Unit 3 emissions, the recommended UCL (99% Chebyshev (Mean, Sd) UCL) exceeded the maximum detected concentration due to the skewness of the dataset. The 95% Chebyshev (Mean, SD) UCL was chosen as an alternative value (see Table 2-2 of the report for the individual COPCs).

  In addition, in some cases for those datasets with a lognormal distribution, the H-statistic was the chosen as the 95% UCL value by ProUCL. ProUCL generally does not recommend using the H-statistic because it yields an unstable value and can be biased either high or low. These UCL values were evaluated in accordance with Table 2-10 in the ProUCL Technical Guidance which provides guidance as to which UCL to use for a lognormal dataset. Based on the number of samples and the standard deviation of the log transformed data 0.5<SD or 1.0<SD<1.5, the Technical Guidance recommends the H-statistic. This UCL value was used to in the calculation of the total emission rate for the 3 units. Appendix B of the report provides the ProUCL output for all COPCs for the 3 units.

- The AERMOD modeling domains used in the risk assessment could be more clearly explained. USEPA notes in HHRAP that a 10 km modeling distance from the source is generally adequate for characterizing exposure scenario locations, and that additional areas may also be addressed for characterizing waterbodies and watersheds.

  TRC Response: TRC has updated the text and the figures. The text has been revised as follows: "The Receptor Pathway contains the nested Cartesian receptor node grid location coordinates and elevation values. The modeling domain consists of a 40 km by 40 km box centered on the RRF. The domain is covered by a nested Cartesian grid has consisting of receptor nodes beyond the facility property line every 100 meters out to 2 km from the property line, 250 meters to 5 km, 500 meters to 15 km and every 1,000 meters out to 20 km."

  The overall 40km by 40km modeling domain border is always the limit of the regions under consideration. TRC will put better captioning on the Figures to show the "Border of Modeling Domain" to clarify this.

- With respect to selection of compounds of potential concern (COPCs) for a WTE risk assessment, acid gases are customarily included, particularly to be able to address potential risks associated with short-term inhalation exposures. Although acid gases were not addressed in the 2006 ENSR report, it is recommended that acid gases (i.e., HCl, HF and H2SO4) be included.

  TRC Response: The acid gases (i.e, HCl, HF and H2SO4) have been included in the evaluation of acute risk.

- The draft report properly follows USEPA's HHRAP guidance for calculating upset emission factors, and uses opacity and carbon monoxide continuous emission monitoring (CEM) data to define the duration of upset conditions. The duration of upset conditions for opacity used in this calculation (6 minutes total over a more than 10-year period), however, does not appear to be comparable with data provided in the previous 2006 risk assessment report for the RRF, or data that I have observed for other similar WTE facilities. It is recommended that the upset emission factor based on CEMs opacity data be re-evaluated.

TRC Response: TRC requested additional clarification from the County and received a more appropriate data set to calculate the process upset factors. These data are comparable to the data used in 2006 report.

- The class of dioxins and furans are assessed in the risk assessment by calculating an emission rate for 2,3,7,8-tetrachlorodibenzodioxin toxic equivalents (TCDD-TEQs), using toxic equivalency factors (TEFs) consistent with current USEPA guidance. Treating the class of dioxins and furans as TCDD-TEQs is one of two commonly used methods for addressing these compounds in WTE facility risk assessments. The other method involves carrying forward each individual dioxin and furan compound through the risk calculations and applying TEFs at a later stage of the assessment, when risks are calculated. Both approaches are acceptable, although they differ with respect to level of refinement (the former method is more of a screening-level approach than the latter). It is recommended that this topic be noted in the uncertainty section of the risk assessment.

  TRC Response: A discussion of the use of treating the dioxins and furans as a TCDD-TEQ and carried through the risk assessment as such has been discussed in the Uncertainty Assessment.

- The approach used to calculate potential fugitive emissions from the Residue Handling Building (RHB) is very conservative and is likely to greatly overestimate potential ambient air concentrations and associated inhalation risks. It is recommended that the conservatism inherent in the approach used to calculate fugitive emissions from the RHB be noted where relevant in the report.

  TRC Response: Noted. Text has been added to the report to indicate the conservative nature of the evaluation of fugitive emissions.

- It appears that some of the evaluated receptor scenarios calculate exposures based on modeling results that occur at different locations. This is an extremely conservative, even unrealistic, approach because it assumes a person could be exposed simultaneously at different locations. It is recommended that the conservative nature of this type of scenario be clearly noted where applicable.

  TRC Response: Noted. Text has been added to the report to indicate the conservative nature of evaluating a receptor based upon modeling results that occur at different locations.

- Acute inhalation risks are calculated in the report based on calculated emission rates derived from stack test data. It is additionally recommended that potential short-term acute inhalation risks under upset conditions be discussed in the uncertainty section of the report.

  TRC Response: A discussion of acute inhalation risks under upset conditions has been added to the uncertainty section of the report.

- The regulatory benchmark risk level used to evaluate the potential for non-cancer health effects was a hazard index (HI) of 0.25. It should be noted that there is no strictly accepted risk assessment benchmark criterion for HI results, and that a more common benchmark used by many USEPA regulatory programs is an HI of 1.0.

  TRC Response: Additional text has been added to clarify that USEPA programs use the non-cancer target of 1.0 and that the use of the 0.25 non-cancer target is health protective.

Should you have any questions, or wish to further discuss these comments, please do not hesitate to contact me directly at (860) 298-6351.

Sincerely,

TRC

Karen M. Vetrano

Karen M. Vetrano, Ph.D.
Manager, Risk Assessment and Toxicology

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Date: April 21, 2014

Subject: Review of draft entitled, "RRF Health Risk Assessment Update – Montgomery County Resource Recovery Facility (RRF)"

From: Mark Morris
Air Toxics Assessment Group
Health and Environmental Impacts Division

To: Bill Davidson, Section Chief
Northern Operations, Emissions, Strategic Planning
Division of Solid Waste Services
Department of Environmental Protection
Montgomery County, Maryland

In response to your request for a review of the draft document entitled, "RRF Health Risk Assessment Update – Montgomery County Resource Recovery Facility (RRF)" (December 2013), we have reviewed the draft document and provide our comments in this memorandum. The draft document describes an updated human health risk assessment for the Montgomery County Resource Recovery Facility (RRF), located in Dickerson, MD. The facility began operations in 1995, and Montgomery County made commitments to the Dickerson community to conduct human health risk assessments relative to RRF emissions and environmental monitoring during both the preconstruction (pre-operational) and post-construction (operational) phases, and those assessments were performed in 1989 and 2006, respectively. The draft document describes an assessment that updates the 2006 assessment.

Several reviewers within the Health and Environmental Impacts Division and the Sector Policies and Programs Division (both in EPA's Office of Air Quality Planning and Standards), and the Office of Research and Development, reviewed the draft document, and their names and contact information are given below under the document sections they reviewed:

Facility Characterization
Charlene Spells, spells.charlene@epa.gov
Fuels and Incineration Group
Sector Policies and Programs Division

Ron Myers, myers.ron@epa.gov
Measurement Policy Group
Sector Policies and Programs Division

Air Dispersion and Deposition Modeling
Mark Morris, morris.mark@epa.gov
Air Toxics Assessment Group
Health and Environmental Impacts Division

Human Health Risk Assessment
James Hirtz, hirtz.james@epa.gov
Air Toxics Assessment Group
Health and Environmental Impacts Division

Dose-Response Assessment
Jace Cuje, cuje.jace@epa.gov
National Center for Environmental Assessment
Office of Research and Development

Matthew Lorber, Lorber.Matthew@epa.gov
National Center for Environmental Assessment
Office of Research and Development

Comments on the draft document are provided below for each major section of the document.

Facility Characterization

Generally, the emissions used for the RRF assessment appear reasonable and provide a conservative estimate of actual emissions. We reassessed the emission estimates for Unit 1 by extracting the emission rates and indicator of detection presented in Appendix A, and used ProUCL 5 to provide an estimated UCL. Generally, we found that the data were comparable, although there are some individual values for target analytes which are significantly different from those presented in Tables 2-1 and 2-2 of the document. The following are specific comments pertaining to comments in section 2.3.

Page 2-3

Because the number of samples and the standard deviation of the log-transformed data set fell within specified ranges (log standard deviations greater or equal to 0.5, but less than 1.0 for all number of samples; or log standard deviations greater or equal to 1.0 but less than 1.5 for more than 25 samples), it was determined that the H-statistic was an appropriate value.

It is unclear why only the H-statistic was selected when ProUCL provides a recommended UCL value based on a decision criterion within the application. Also, when we used ProUCL and selected UCL's/EPC's (and then with ND's then lognormal), we did not arrive at the same emission estimate as given in Table 2-1. The Table 2-1 value is greater than any value ProUCL generated for the 70 tests. This included ProUCL's value for the 95% H-UCL (Log ROS) and the D/2 substituted 95% H-UCL. The TEQ value generated from the data in the document is almost 13% higher than the value generated from the UCL recommended by ProUCL and about 40% higher than the ProUCL H-statistic for lognormal distribution.

While this is not a great difference, we suggest that there be a rationale presented for using a value other than the one recommended by Pro UCL. In ProUCL there are situations where it notes that the UCL is greater than the highest value. We found that in those cases ProUCL typically had three or four recommendations of which one of the values was significantly different and higher. We would exclude the use of that recommended value and use the highest of the ones that were relatively consistent. If there is only one recommendation or if all the recommended values are significantly higher than the highest value, then one may wish to develop a rationale for an alternative to the ProUCL recommendation.

Page 2-3

Finally, in some cases where the data set contained predominantly non-detect values, the calculated 95% UCL was higher than the maximum detected sample. In those cases, the average of the samples was used instead of the 95% UCL value.

For our work, the UCL/UPL would be used even if it were higher than the highest value measured. With that said, in the instance of this we observed, ProUCL generated more than one recommended value and only one was a value that was greater than the highest measured value.

The use of the average seems contrary to the intent of using a value that is protective of the public and provides a reasonably high estimate of the average emissions. If an alternative value were selected, we would not choose the average. The UCL is an upper value and is always greater (for TEQ it is 70% greater) than the average. If ProUCL produced no recommended UCL and there were no alternative to using any ProUCL calculated value, we would suggest using the 95 or 99 percentile or higher value. See suggestion for situations where ProUCL has a note that the UCL is greater than the highest value.

Page 2-4

As shown in Table 2-3, the 95% UCL emission rates of three metals (total chromium, cobalt and mercury) are less than the emission rates as compared to the emission rates used in the ENSR report,, while the emission rates of eleven metals (antimony, arsenic, beryllium, cadmium, chromium +6, copper, lead, manganese, nickel, selenium and zinc), PCBs and PAHs were higher than those used in the ENSR report. When comparing the average emission rates to the ENSR 2006 emission rates, the average emission rates of five metals (chromium +6, cobalt, copper, mercury and nickel) and TCDD-TEQ decreased as compared to the emission rates used in the ENSR report, while the average emission rates of nine metals (antimony, arsenic, beryllium, cadmium, total chromium, lead, manganese, selenium and zinc), PCBs and PAHs increased.

The document appears to provide no explanation of the reduction of the emissions over time. One could conclude that the emissions could have increased. Since almost all of the metals measured in the early tests were below the detection limit and at emission rates of 10^{-6} to 10^{-5}, and the latter tests did not have many non detects, one could make the alternative conclusion. For such compounds, guidance provided in the USEPA's 2005 Human Health Risk Assessment Protocol (HHRAP) was used for estimating emissions associated with measurements below detection limits.

Since ProUCL version 4 there has been guidance to avoid the use of the detection limit or 0.5 times the detection limit to replace MDL data. ProUCL incorporates a suggested replacement for left censored data. We understand the simplicity of using 0.5 times the MDL, but if the data are entered into ProUCL for calculating the UCL, then substituting data is more difficult than using the calculated replacement as determined by ProUCL. Perhaps that is the reason that the use of the ProUCL produces a 13% lower estimate for D/F TEF and much lower for PAH.

Page 2-4
For those compounds that were analyzed for, but not detected in an emission test run, the emission rates were numerically based on the method detection limit (MDL) or estimated detection limit (EDL) as supplied in the laboratory results. A detection limit is the lowest level of an analyte that can be detected using a particular analytical method.

While this would produce a maximum emission estimate, a more reasonable approach is supported by ProUCL to use an imputed value which is neither the MDL nor 0.5 of the MDL.

Page 2-5
To increase consistency and reproducibility with nondetects for emissions data, the 2005 HHRAP guidance (USEPA 2005a) recommends calculating a MDL-derived Reliable Detection Limit (RDL), by multiplying the MDL by a factor of 2.623.

The use of the multiplier does not seem to be supported by the analytical data. At 2.623 times the MDL, this is a value that has already been determined to be 99% confident that is less than the detection limit and as a result there is probably greater confidence (we estimate greater than 99.995% confident is lower than that value). This seems to be an excessive level of caution given that MDL's are comparable in their use between isotope dilution and metals analysis. Also, it sets up a situation where a facility that is just above the detection limit (i.e. there are reported values without a flag) has lower risk than a facility where no compounds were detected.

It is unclear whether this is being done for all the pollutants including D/F, PAH and Metals. It is also unclear how test data are handled when only one or two runs are reported when typically a test is three runs. We have flagged these events and ProUCL is handling that. We have added the result of the ProUCL analysis of the data from Appendix A for Unit 1 to Tables 2-1 and 2-2. For Dioxin/Furans the values are relatively close for most of the congeners. However, there are significant differences for PAH and Metals. Some of the differences may be due to the differences in handling non detects, but some are much greater than one would expect just due to a multiplication by 2.6.

Page 2-7

Figure D-1 shows that 305,455 6-minute averages were at 0% opacity, 171,391 6-minute averages were in the range of greater than 0% to less than or equal to 1% opacity, 33,449 6-minute averages were in the range of greater than 1% to less than or equal to 2%, 4,122 6-minute averages were in the range of greater than 2% to less than or equal to 3%. Only 46 6-minute averages were greater than 3% opacity. Upset conditions can be defined as those periods when opacity was significantly above the normal operating range. Based on the distribution of data, the normal operating range can be defined to be in the 0% to 3% opacity. Only 0.0089% of the data are above this range.

In reality, the variation of opacity below 5% is essentially instrument noise or a normal variation of opacity monitors which have not been certified for low opacity operations. Even then, it would be difficult to state that the particulate based metals were greater when the opacity was greater than 5% unless the facility determined that the fabric filter had a defect which was repaired. The minimal time that the facility operated above 3% opacity is very minimal and does not result in a significant increase in metals emissions.

Page 2-8

Figure D-2 shows that 158 hourly averages were at 0 ppm CO, 7,513 hourly averages were in the range of greater than 0 ppm to less than or equal to 5 ppm CO and 12,284 hours were in the range of greater than 5 ppm to less than or equal to 10 ppm CO. Most of the data are in the range of 5 ppm to 20 ppm CO. Only 282 hours out of a total 44,444 hours were greater than 50 ppm CO. The stack test data were collected under normal operating conditions with CO generally in the 5 ppm to 50 ppm range. It is TRC's opinion that small deviations from this range do not constitute an upset condition that would increase organic emissions by a factor of 10. However, to be conservative, the upset condition was defined as only periods when CO emissions exceed 50 ppm.

As above, CO at the levels cited in the report are probably indistinguishable from normal operation even when over 50 ppm. However, the time that the facility exceeded this minimal value did not result in a significant increase in estimated organic emissions and the increase provides an estimate that is protective of public health.

<u>Air Dispersion and Deposition Modeling</u>

The models and input data used to model the RRF were current at the time the assessment was performed, including AERMOD (version 12345) and current versions of the AERMOD preprocessors AERMET, AERMAP, AERSURFACE, and BPIPPRM. Five years (2008-2012) of onsite meteorological data were processed in AERMET, and good resolution elevation data (National Elevation Dataset (NED) 1 arc-second (about 30 meters)) were used in AERMAP to generate receptor elevations. The AERMOD runstream files in Figures 3-7 through 3-10 appear to reflect the data discussed in the text of the document. Although there are newer versions of AERMOD and some of its preprocessors, we wouldn't expect those to significantly affect the results of the assessment.

There is an unusual amount of detail in the document regarding the description of the model and model evaluation. However, we understand that this was included because of public comments from past assessments requesting such information.

Human Health Risk Assessment

The assessment appears to have followed the HHRAP. In the assessment, having the receptor be both the farmer and the fisher at the highest exposure level would be the worst-case and health protective. We note below several differences between the methodologies used in the assessment and those we currently use for multipathway assessments, which utilize the Total Risk Integrated Methodology (TRIM). We include these not as suggestions to revise the current assessment, but rather as information to consider for future assessments:

- Deposition modeling in the assessment is over 30 years, where hopefully steady state is achieved. We use 50 years.
- Exposure duration in the assessment is also over 30 years as an adult (fish) plus 6 years as a child, so 36 years over a lifetime (farmer receptor). We use 50 years.
- Fish ingestion rate used in the assessment is 88 grams/day because it is assumed that other agricultural products are consumed. We use a high-end fish ingestion rate estimate of 373 grams/day. Consequently, we may see higher receptor risks when we consider the fish receptor to be separate from the farm receptor.
- We would consider also modeling a lake in addition to the river, although the nearest lake to the RRF appears to be about nine miles away and unlikely to receive significant deposition from the RRF.

Dose-Response Assessment

It appears that the science is generally correct, based on the observation that the authors used the most relevant guidance, the 2005 Human Health Risk Assessment Protocol (HHRAP) for hazardous waste incineration. As documented in the introductory paragraphs in the Executive Summary (ES), this assessment has a long history, so we presume that erroneous details and values have been worked out. Nothing in the results jumps out as being odd or incorrect – most assessments on incinerators tend to find little impact.

Because our reviewer's expertise is mainly in dioxin exposure, the reviewer checked to verify that the current RfD for dioxin was used, and it was. The authors also used a "screening risk level" for the oral slope factor, which we suppose is appropriate since IRIS no longer contains a slope factor for dioxin. The authors estimate intakes and exposures based on a TEQ, using the most recent TEF scheme, which is appropriate. The authors developed conservative exposure scenarios, such as assuming farmers home-grew all sorts of produce and ate it. Moreover, they properly added across pathways and chemicals to get total cancer risk and a total hazard index (HI). Modeling and exposure setting locations (farmers, fishers) are based on actual possibilities – fishing from the Potomac, actual farming areas, etc., which is appropriate. We did not, however, assess whether all numbers were properly generated, or look for additional flaws. While scanning the Executive Summary, we observed only two items warranting additional attention:

Page ES-3

Per the 2005 HHRAP Guidance, calculated cancer risks and the potential for non-cancer effects are compared against USEPA target benchmark levels of 1 in 100,000 for cancer risks and 0.25 for non-cancer effects.

The document needs to be clear that they are not citing "USEPA target benchmark levels", but rather a guidance-specific recommended set of target levels since the HHRAP 2005 Guidance does not provide these benchmark comparisons. The HHRAP is a protocol, and instead makes this note about target levels (Chapter 7, page 7-10): "Target levels are risk management-based and set by the permitting authority. Target values are not a discrete indicator of observed adverse effect. If a risk estimate falls below target levels, a regulatory authority may, without further investigation, conclude that a proposed action does not present an unacceptable risk. A risk estimate that exceeds these targets, however, would not, in and of itself, necessarily indicate that the proposed action is not safe or that it presents an unacceptable risk. Rather, a risk estimate that exceeds a target value triggers further careful consideration of the underlying scientific basis for the calculation." On the EPA web page where the 2005 HHRAP Guidance resides, http://www.epa.gov/region6/6pd/rcra_c/protocol/protocol.htm, there is an additional download which is EPA's Region 6 Risk Management Addendum. These two risk levels, 10^{-5} and 0.25, are identified in that document. Benchmark levels, we believe, is terminology more reserved for slope factors and RfDs, for which there are EPA-sponsored values. Further, the authors should consider noting that different program offices and Regions use different "guidances". For example, the "target risk level" for Superfund is 10^{-6}, an order of magnitude lower than the 10^{-5} advocated in the Region 6 Addendum. This document should be clear as to the guidance it uses and not casually cite "EPA targets".

Page ES-4

Infant exposures through the ingestion of mother's breast milk are evaluated by calculating an average daily dose (ADD) for an exposed infant and comparing the ADD against the allowable 60 pg/kg-day TCDD average daily intake (ADI) level identified in the 2005 HHRAP.

Once again this was not provided in the Protocol, but rather in the Region 6 document. Also, it is not an "allowable" dose. Use of this kind of terminology seems sloppy and irresponsible. The 60 pg/kg-day was derived as an average intake an infant would get via breast milk based on background mother's milk data that were available at the time. Furthermore, there is no guidance about what to do with the "comparison" that is advocated above. The implication might be that this is analogous to the HQ, where concern is warranted when the ratio of ADD/ADI exceeds 1.0. Is this what is meant here? Other than the Region 6 document, we are unaware of this approach being endorsed. It is also worth noting that the background exposure is based on conditions in 1994, as cited in the Region 6 document. This is very outdated. Adult intakes were in the range of 1 to 3 pg/kg-day at that time (according to the Region 6 document). Today adult intakes are about 0.5 pg/kg-day. A simple extrapolation downwards from background infant intakes in 1994 to today might put average intakes at about 15 pg/kg-day rather than 60 pg/kg-day. How about comparing an infant's exposure to the Reference Dose of 0.7 pg/kg-day? Unfortunately, we do not believe that EPA has developed guidance for exposure of infants to dioxin via breast milk ingestion. Although the authors of this assessment view this as an informative exercise, we disagree and believe it should be deleted entirely. It is misleading and it is certainly not an "EPA endorsed" protocol. That is, something seems inherently wrong with "allowing" infants a dose that is about 2 orders of magnitude higher than is allowed for adults – the RfD for dioxin is 0.7 pg/day-day compared to the infant "allowable" intake of 60 pg/kg-day. It is (unfortunately) true that infants get a much higher dose than adults. If the authors do not remove this entire analysis, care should be taken to ensure the science is properly characterized as to what it is and include language such as, "Breast milk intakes of dioxin that are modeled to occur as a result of the RRF emission will be compared against typical infant intakes of dioxin. This approach to compare against typical background for the infant breast milk pathway was advocated in the Region 6 Addendum, which also recommended that such a comparison be done for only 2,3,7,8-TCDD Toxicity Equivalent Quotient (TEQ) (see p. ADD-5, R6 Addendum at http://www.epa.gov/region6/6pd/rcra_c/protocol/r6add.pdf)). These background intakes were calculated to be about 60 pg/kg-day in 1994; current estimates are not available. This comparison is not meant to be analogous to the comparison with health-based benchmarks such as the RfD, but in the absence of infant exposure benchmarks, it is expected that this comparison will be useful."

21 Griffin Road North
Windsor, CT 06095

860.298.9692 PHONE
860.298.6399 FAX

www.TRCsolutions.com

June 5, 2014

Mr. Bill Davidson
Section Chief
Division of Solid Waste Services
101 Monroe Street, 6th Floor
Rockville, MD 20850

Dear Bill,

TRC has reviewed the April 2014 USEPA comments on the Draft RRF Health Risk Assessment Update for the Montgomery County Resource Recovery Facility (RRF). Comments on the draft document were provided for each major section of the document. TRC has provided the USEPA comment and the corresponding response below. These response to comments have been reviewed by CPF Associates for responsiveness to the comment. All required changes have been incorporated into the RRF HHRA report.

Facility Characterization

Generally, the emissions used for the RRF assessment appear reasonable and provide a conservative estimate of actual emissions. We reassessed the emission estimates for Unit 1 by extracting the emission rates and indicator of detection presented in Appendix A, and used ProUCL 5 to provide an estimated UCL. Generally, we found that the data were comparable, although there are some individual values for target analytes which are significantly different from those presented in Tables 2-1 and 2-2 of the document. The following are specific comments pertaining to comments in section 2.3.

Page 2-3

Because the number of samples and the standard deviation of the log-transformed data set fell within specified ranges (log standard deviations greater or equal to 0.5, but less than 1.0 for all number of samples; or log standard deviations greater or equal to 1.0 but less than 1.5 for more than 25 samples), it was determined that the H-statistic was an appropriate value.

EPA Comment: It is unclear why only the H-statistic was selected when ProUCL provides a recommended UCL value based on a decision criterion within the application. Also, when we used ProUCL and selected UCL's/EPC's (and then with ND's then lognormal), we did not arrive at the same emission estimate as given in Table 2-1. The Table 2-1 value is greater than any value ProUCL generated for the 70 tests. This included ProUCL's value for the 95% H-UCL (Log ROS) and the D/2 substituted 95% H-UCL. The TEQ value generated from the data in the document is almost 13% higher than the value generated from the UCL recommended by ProUCL and about 40% higher than the ProUCL H-statistic for lognormal distribution.

TRC Response: The above cited text was taken out of context. The sentence prior to the above excerpted text states: "*In those cases* ***where the ProUCL recommended 95% UCL is the H-Statistic****, information by the ProUCL Technical Guidance was used to determine whether the H-Statistic was appropriate or whether an alternate value should be selected.*" All H-Statistic values selected by ProUCL were verified to have met the criteria outlined in Table 2-10 of the ProUCL Technical Guidance and were retained for the evaluation. See Appendix B for the ProUCL output.

Second, consistent with the HHRAP Guidance, emission rate estimates for non-detected COPCs were assumed to be present at a concentration equivalent to either the MDL-derived RDL for non-isotope dilution methods or the EDL, for isotope dilution methods. Therefore in calculating the UCLs, the input data was set up under the assumption that each data point was considered "a detect", regardless of whether it was an actual detected concentration or a non-detect at the appropriate detection level, resulting in UCL statistics for full uncensored datasets. Based upon EPA's evaluation above, in which the non-detects were entered as non-detects, the method used in the risk assessment was more conservative (i.e. health protective) than the way EPA calculated the UCLs. Text will be added to the report to clarify how non-detects were evaluated in calculating the UCLs, additionally a discussion of the use of the non-detect values as detects will be added to the uncertainty section.

EPA Comment: While this is not a great difference, we suggest that there be a rationale presented for using a value other than the one recommended by Pro UCL. In ProUCL there are situations where it notes that the UCL is greater than the highest value. We found that in those cases ProUCL typically had three or four recommendations of which one of the values was significantly different and higher. We would exclude the use of that recommended value and use the highest of the ones that were relatively consistent. If there is only one recommendation or if all the recommended values are significantly higher than the highest value, then one may wish to develop a rationale for an alternative to the ProUCL recommendation.

TRC Response: Table 2-2 has been revised to show which values are an alternate value other than recommended by ProUCL. In the case of the metals, where there were only 3 samples, all calculated UCL values exceeded the maximum detected value, therefore the maximum detected value was used as the UCL (see comment below). In the case of the PAHs, ProUCL selected the 99% Chebyshev (Mean, Sd) UCL however these values were greater than the maximum detected value. In this case the 95% Chebyshev (Mean, Sd) UCL was chosen as the alternate value.

Page 2-3
"Finally, in some cases where the data set contained predominantly non-detect values, the calculated 95% UCL was higher than the maximum detected sample. In those cases, the average of the samples was used instead of the 95% UCL value."

EPA Comment: For our work, the UCL/UPL would be used even if it were higher than the highest value measured. With that said, in the instance of this we observed, ProUCL generated more than one recommended value and only one was a value that was greater than the highest measured value.

The use of the average seems contrary to the intent of using a value that is protective of the public and provides a reasonably high estimate of the average emissions. If an alternative value were selected, we would not choose the average. The UCL is an upper value and is always greater (for TEQ it is 70% greater) than the average. If ProUCL produced no recommended UCL and there were no alternative to using any ProUCL calculated value, we would suggest using the 95 or 99 percentile or higher value. See suggestion for situations where ProUCL has a note that the UCL is greater than the highest value.

TRC Response: The UCL values have been revised as follows, in the case of the metals, where there were only 3 samples, all calculated UCL values exceeded the maximum detected value, therefore the maximum detected value was used as the UCL. In the case of the PAHs, ProUCL selected the 99% Chebyshev (Mean, SD) UCL, however these values were greater than the maximum detected value. In this case the 95% Chebyshev (Mean, SD) UCL was chosen as the alternate value. Table 2-2 has been revised.

Page 2-4
"As shown in Table 2-3, the 95% UCL emission rates of three metals (total chromium, cobalt and mercury) are less than the emission rates as compared to the emission rates used in the ENSR report, while the emission rates of eleven metals (antimony, arsenic, beryllium, cadmium, chromium +6, copper, lead, manganese, nickel, selenium and zinc), PCBs and PAHs were higher than those used in the ENSR report. When comparing the average emission rates to the ENSR 2006 emission rates, the average emission rates of five metals (chromium +6, cobalt, copper, mercury and nickel) and TCDD-TEQ decrease d as compared to the emission rates used in the ENSR report, while the average emission rates of nine metals (antimony, arsenic, beryllium, cadmium, total chromium, lead, manganese, selenium and zinc), PCBs and PAHs increased."

EPA Comment: The document appears to provide no explanation of the reduction of the emissions over time. One could conclude that the emissions could have increased. Since almost all of the metals measured in the early tests were below the detection limit and at emission rates of 10-6 to 10-5, and the latter tests did not have many non-detects, one could make the alternative conclusion. For such compounds, guidance provided in the USEPA's 2005 Human Health Risk Assessment Protocol (HHRAP) was used for estimating emissions associated with measurements below detection limits.

Since ProUCL version 4 there has been guidance to avoid the use of the detection limit or 0.5 times the detection limit to replace MDL data. ProUCL incorporates a suggested replacement for left censored data. We understand the simplicity of using 0.5 times the MDL, but if the data are entered into ProUCL for calculating the UCL, then substituting data is more difficult than using the calculated replacement as determined by ProUCL. Perhaps that is the reason that the use of the ProUCL produces a 13% lower estimate for D/F TEF and much lower for PAH.

TRC Response: It is beyond the scope of this document to determine why emission rates have increased or decreased throughout the years. An evaluation of the waste stream in concert with the emissions would perhaps show some insight, however, since this is a municipal resource recovery facility that burns garbage, the waste is not a measured waste feed such as one would find with a hazardous waste incinerator. Additionally, a statistical analysis, which is beyond the scope of this report was not conducted on the data sets to determine if there was a statistical increase or decrease in emissions. Due to the amount of data available, it was determined that the use of the 95% UCL would provide better coverage of the mean concentration rather than using the arithmetic mean as was used in the previous risk assessments.

To clarify, the full detection limit was used in the calculation, not 0.5 the detection limit. As stated above, the detection limits were used as full surrogates for detected data and were input into ProUCL as such. As evidenced by the UCL calculations that EPA made on Unit 1's emission data, the use of the full non-detect as a detected data point results in higher UCL values than if entered into ProUCL as non-detect and therefore is more health protective.

Page 2-4
"For those compounds that were analyzed for, but not detected in an emission test run, the emission rates were numerically based on the method detection limit (MDL) or estimated detection limit (EDL) as supplied in the laboratory results. A detection limit is the lowest level of an analyte that can be detected using a particular analytical method."

EPA Comment: While this would produce a maximum emission estimate a more reasonable approach is supported by ProUCL to use an imputed value which is neither the MDL nor 0.5 of the MDL.

TRC Response: Consistent with the HHRAP Guidance, emission rate estimates for non-detected COPCs were assumed to be present at a concentration equivalent to either the MDL-derived RDL for non-isotope dilution methods or the EDL, for isotope dilution methods.

Page 2-5
"To increase consistency and reproducibility with nondetects for emissions data, the 2005 HHRAP guidance (USEPA 2005a) recommends calculating a MDL-derived Reliable Detection Limit (RDL), by multiplying the MDL by a factor of 2.623."

EPA Comment: The use of the multiplier does not seem to be supported by the analytical data. At 2.623 times the MDL, this is a value that has already been determined to be 99% confident that is less than the detection limit and as a result there is probably greater confidence (we estimate greater than 99.995% confident is lower than that value). This seems to be an excessive level of caution given that MDL's are comparable in their use between isotope dilution and metals analysis. Also, it sets up a situation where a facility that is just above the detection limit (i.e. there are reported values without a flag) has lower risk than a facility where no compounds were detected.

It is unclear whether this is being done for all the pollutants including D/F, PAH and Metals. It is also unclear how test data are handled when only one or two runs are reported when typically a test is three runs. We have flagged these events and ProUCL is handling that. We have added the result of the ProUCL analysis of the data from Appendix A for Unit 1 to Tables 2-1 and 2-2. For Dioxin/Furans the values are relatively close for most of the congeners. However, there are significant differences for PAH and Metals. Some of the differences may be due to the differences in handling non detects, but some are much greater than one would expect just due to a multiplication by 2.6.

TRC Response: As stated in the sentence after the above quoted text: “Therefore, for metals, PCBs and formaldehyde not detected during a test run, their respective detection limit was multiplied by a factor of 2.623 before being utilized in the calculation of the overall emission rate.” The EDL is used in reporting the detection limit for Dioxin/Furans and PAHs and therefore the adjustment factor was not applied to these compounds.

As stated previously, the UCLs calculated by EPA were calculated with non-detects, while the UCLs calculated for the purpose of this risk assessment were calculated without non-detects, that is all non-detect values were treated as detected values. This results in higher UCL values than EPA’s calculated UCLs and thus results in a more health-protective assessment.

Page 2-7

“Figure D-1 shows that 305,455 6-minute averages were at 0% opacity, 171,391 6-minute averages were in the range of greater than 0% to less than or equal to 1% opacity, 33,449 6-minute averages were in the range of greater than 1% to less than or equal to 2%, 4,122 6-minute averages were in the range of greater than 2% to less than or equal to 3%. Only 46 6-minute averages were greater than 3% opacity. Upset conditions can be defined as those periods when opacity was significantly above the normal operating range. Based on the distribution of data, the normal operating range can be defined to be in the 0% to 3% opacity. Only 0.0089% of the data are above this range.”

EPA Comment: In reality, the variation of opacity below 5% is essentially instrument noise or a normal variation of opacity monitors which have not been certified for low opacity operations. Even then, it would be difficult to state that the particulate based metals were greater when the opacity was greater than 5% unless the facility determined that the fabric filter had a defect which was repaired. The minimal time that the facility operated above 3% opacity is very minimal and does not result in a significant increase in metals emissions.

TRC Response: Agreed.

Page 2-8
"Figure D-2 shows that 158 hourly averages were at 0 ppm CO, 7,513 hourly averages were in the range of greater than 0 ppm to less than or equal to 5 ppm CO and 12,284 hours were in the range of greater than 5 ppm to less than or equal to 10 ppm CO. Most of the data are in the range of 5 ppm to 20 ppm CO. Only 282 hours out of a total 44,444 hours were greater than 50 ppm CO. The stack test data were collected under normal operating conditions with CO generally in the 5 ppm to 50 ppm range. It is TRC's opinion that small deviations from this range do not constitute an upset condition that would increase organic emissions by a factor of 10. However, to be conservative, the upset condition was defined as only periods when CO emissions exceed 50 ppm."

EPA Comment: As above, CO at the levels cited in the report are probably indistinguishable from normal operation even when over 50 ppm. However, the time that the facility exceeded this minimal value did not result in a significant increase in estimated organic emissions and the increase provides an estimate that is protective of public health.

TRC Response: Agreed.

<u>Air Dispersion and Deposition Modeling</u>
EPA Comment: The models and input data used to model the RRF were current at the time the assessment was performed, including AERMOD (version 12345) and current versions of the AERMOD preprocessors AERMET, AERMAP, AERSURFACE, and BPIPPRM. Five years (2008-2012) of onsite meteorological data were processed in AERMET, and good resolution elevation data (National Elevation Dataset (NED) 1 arc-second (about 30 meters)) were used in AERMAP to generate receptor elevations. The AERMOD runstream files in Figures 3-7 through 3-10 appear to reflect the data discussed in the text of the document. Although there are newer versions of AERMOD and some of its preprocessors, we wouldn't expect those to significantly affect the results of the assessment.

There is an unusual amount of detail in the document regarding the description of the model and model evaluation. However, we understand that this was included because of public comments from past assessments requesting such information.

TRC Response: Noted. No changes were made to the HHRA based upon this comment.

Human Health Risk Assessment

EPA Comment: The assessment appears to have followed the HHRAP. In the assessment, having the receptor be both the farmer and the fisher at the highest exposure level would be the worst-case and health protective. We note below several differences between the methodologies used in the assessment and those we currently use for multipathway assessments, which utilize the Total Risk Integrated Methodology (TRIM). We include these not as suggestions to revise the current assessment, but rather as information to consider for future assessments:

- Deposition modeling in the assessment is over 30 years, where hopefully steady state is achieved. We use 50 years.
- Exposure duration in the assessment is also over 30 years as an adult (fish) plus 6 years as a child, so 36 years over a lifetime (farmer receptor). We use 50 years.
- Fish ingestion rate used in the assessment is 88 grams/day because it is assumed that other agricultural products are consumed. We use a high-end fish ingestion rate estimate of 373 grams/day. Consequently, we may see higher receptor risks when we consider the fish receptor to be separate from the farm receptor.
- We would consider also modeling a lake in addition to the river, although the nearest lake to the RRF appears to be about nine miles away and unlikely to receive significant deposition from the RRF.

TRC Response: Per the County Scope of Work, the 2006 risk assessment was to be updated with the 2005 HHRAP Guidance. This risk assessment follows the HHRAP guidance and the recommended input parameters. It is understood that USEPA utilizes TRIM, however according to the USEPA TRIM website, TRIM is in a BETA stage and not all components are available. According to the installation page (http://www2.epa.gov/fera/trim-installation-page), only TRIM.Expo_inhalation (exposure through inhalation) is available and not the ingestion component. No changes were made to the HHRA based upon this comment.

Dose-Response Assessment

EPA Comment: It appears that the science is generally correct, based on the observation that the authors used the most relevant guidance, the 2005 Human Health Risk Assessment Protocol (HHRAP) for hazardous waste incineration. As documented in the introductory paragraphs in the Executive Summary (ES), this assessment has a long history, so we presume that erroneous details and values have been worked out. Nothing in the results jumps out as being odd or incorrect- most assessments on incinerators tend to find little impact.

Because our reviewer's expertise is mainly in dioxin exposure, the reviewer checked to verify that the current RID for dioxin was used, and it was. The authors also used a "screening risk level" for the oral slope factor, which we suppose is appropriate since IRIS no longer contains a slope factor for dioxin. The authors estimate intakes and exposures based on a

TEQ, using the most recent TEF scheme, which is appropriate. The authors developed conservative exposure scenarios, such as assuming farmers home-grew all sorts of produce and ate it. Moreover, they properly added across pathways and chemicals to get total cancer risk and a total hazard index (HI). Modeling and exposure setting locations (farmers, fishers) are based on actual possibilities -fishing from the Potomac, actual farming areas, etc., which is appropriate. We did not, however, assess whether all numbers were properly generated, or look for additional flaws. While scanning the Executive Summary, we observed only two items warranting additional attention:

Page ES-3
"Per the 2005 HHRAP Guidance, calculated cancer risks and the potential for non-cancer effects are compared against USEPA target benchmark levels of 1 in 100,000 for cancer risks and 0.25 for non-cancer effects."

EPA Comment: The document needs to be clear that they are not citing "USEPA target benchmark levels", but rather a guidance-specific recommended set of target levels since the HHRAP 2005 Guidance does not provide these benchmark comparisons. The HHRAP is a protocol, and instead makes this note about target levels (Chapter 7, page 7-10): "Target levels are risk management-based and set by the permitting authority. Target values are not a discrete indicator of observed adverse effect. If a risk estimate falls below target levels, a regulatory authority may, without further investigation, conclude that a proposed action does not present an unacceptable risk. A risk estimate that exceeds these targets, however, would not, in and of itself, necessarily indicate that the proposed action is not safe or that it presents an unacceptable risk. Rather, a risk estimate that exceeds a target value triggers further careful consideration of the underlying scientific basis for the calculation." On the EPA web page where the 2005 HHRAP Guidance resides, http://www.epa.gov/region6/6pd/rcra_c/protocol/protocol.htm, there is an additional download which is EPA's Region 6 Risk Management Addendum. These two risk levels, 10-5 and 0.25, are identified in that document. Benchmark levels, we believe, is terminology more reserved for slope factors and RfDs, for which there are EPA-sponsored values. Further, the authors should consider noting that different program offices and Regions use different "guidances". For example, the "target risk level" for Superfund is 10-6, an order of magnitude lower than the 10-5 advocated in the Region 6 Addendum. This document should be clear as to the guidance it uses and not casually cite "EPA targets".

TRC Response: Noted. The text will be revised to reflect that 1E-05 and 0.25 are USEPA target risk levels, not benchmark levels and will properly cite USEPA Region VI.

Page ES-4
"Infant exposures through the ingestion of mother's breast milk are evaluated by calculating an average daily" dose (ADD) for an exposed infant and comparing the ADD against the allowable 60 pg/kg-day TCDD average daily intake (ADI) level identified in the 2005 HHRAP."

EPA Comment: Once again this was not provided in the Protocol, but rather in the Region 6 document. Also, it is not an "allowable" dose. Use of this kind of terminology seems sloppy and irresponsible. The 60 pg/kg-day was derived as an average intake an infant would get via breast milk based on background mother's milk data that were available at the time. Furthermore, there is no guidance about what to do with the "comparison" that is advocated above. The implication might be that this is analogous to the HQ, where concern is warranted when the ratio of ADD/ADI exceeds 1.0. Is this what is meant here? Other than the Region 6 document, we are unaware of this approach being endorsed. It is also worth noting that the background exposure is based on conditions in 1994, as cited in the Region 6 document. This is very outdated. Adult intakes were in the range of 1 to 3 pg/kg-day at that time (according to the Region 6 document). Today adult intakes are about 0.5 pg/kg-day. A simple extrapolation downwards from background infant intakes in 1994 to today might put average intakes at about 15 pg/kg-day rather than 60 pg/kg-day. How about comparing an infant's exposure to the Reference Dose of 0.7 pg/kg-day? Unfortunately, we do not believe that EPA has developed guidance for exposure of infants to dioxin via breast milk ingestion. Although the authors of this assessment view this as an informative exercise, we disagree and believe it should be deleted entirely. It is misleading and it is certainly not an "EPA endorsed" protocol. That is, something seems inherently wrong with "allowing" infants a dose that is about 2 orders of magnitude higher than is allowed for adults- the RID for dioxin is 0.7 pg/day-day compared to the infant "allowable" intake of 60 pg/kg-day. It is (unfortunately) true that infants get a much higher dose than adults. If the authors do not remove this entire analysis, care should be taken to ensure the science is properly characterized as to what it is and include language such as, "Breast milk intakes of dioxin that are modeled to occur as a result of the RRF emission will be compared against typical infant intakes of dioxin. This approach to compare against typical background for the infant breast milk pathway was advocated in the Region 6 Addendum, which also recommended that such a comparison be done for only 2,3,7,8-TCDD Toxicity Equivalent Quotient (TEQ) (see p. ADD-5, R6 Addendum at http://www.epa.gov/region6/6pd/rcra_c/protocol/r6add.pdf)). These background intakes were calculated to be about 60 pg/kg-day in 1994; current estimates are not available. This comparison is not meant to be analogous to the comparison with health-based benchmarks such as the RfD, but in the absence of infant exposure benchmarks, it is expected that this comparison will be useful."

TRC Response: The reviewer incorrectly states that the 60 pg/kg/day value is not provided in the Protocol. It should be noted that Chapter 2, Section 2.3.10.2 (PCDD/PCDF Noncancer Hazards) of the Protocol states: *"We generally recommend comparing PCDD and PCDF oral exposure estimates to national average background exposure levels using … 60 pg/kg/day for nursing infants."* The evaluation of dioxin exposure to nursing infants in the RRF assessment is consistent with this recommendation. Comparing the calculated dioxin ADD for breast-fed infants across all exposure scenarios resulted in ratios ranging from 0.001 to 0.000029, indicating that dioxin exposure through breast milk ingestion was well below the national average background exposure level (60 pg/kg/day). The reviewer does correctly state that the 60 pg/kg/day is not an "allowable" dose, but is rather a "comparison" value representing the national average background exposure level for nursing infants at the time the HHRAP was finalized.

As stated in the comment above, USEPA has recently developed a RfD for 2,3,7,8-TCDD of 7E-10 mg/kg-day (0.7 pg/kg-day). The use of the RfD in the infant breast milk ingestion pathway results in HQs ranging from 0.095 to 0.0022, indicating that dioxin exposure via breast milk ingestion is below the non-cancer target value of 0.25.

In order compare the results of this evaluation with previous risk assessments, the evaluation using the 60 pg/kg/day background value will be kept, however the text will be revised to indicate that this is not an "allowable" concentration nor a benchmark value, but an average national background level. The recommended text provided in the comment will be incorporated into the discussion. In addition, a discussion of the non-cancer risk using the TCDD RfD will be incorporated into the Uncertainty Analysis.

Should you have any questions, or wish to further discuss these comments, please do not hesitate to contact me directly at (860) 298-6351.

Sincerely,

TRC

Karen M. Vetrano

Karen M. Vetrano, Ph.D.
Manager, Risk Assessment and Toxicology