APPENDIX A

SCREENING LEVELS

APPENDIX A
TABLE A-1 (PAGE 1 OF 2)
SCREENING LEVELS FOR SELECTION OF COPCs IN CCBs AND SEDIMENT
PINES AREA OF INVESTIGATION
HUMAN HEALTH RISK ASSESSMENT WORK PLAN

Constituent	CAS Number	Screening Level						Units
		Residential			Industrial			
		Level		Basis	Level		Basis	
Inorganics								
Aluminum	7429-90-5	76000	(a)	NC	100000	(a)	max	mg/kg
Antimony	7440-36-0	31	(a)	NC	409	(a)	NC	mg/kg
Arsenic	7440-38-2	0.39	(a)	C	1.6	(a)	C	mg/kg
Barium	7440-39-3	5400	(a)	NC	66577	(a)	NC	mg/kg
Beryllium	7440-41-7	150	(a)	NC	1941	(a)	C	mg/kg
Boron	7440-42-8	16000	(a)	NC	100000	(a)	max	mg/kg
Cadmium	7440-43-9	37	(a)	NC	451	(a)	NC	mg/kg
Calcium	7440-70-2	EN			EN			
Chromium (total)	7440-47-3	210	(a,b)	C	450	(a,b)	C	mg/kg
Cobalt	7440-48-4	900	(a)	NC	1921	(a)	C	mg/kg
Copper	7440-50-8	3100	(a)	NC	40877	(a)	NC	mg/kg
Iron	7439-89-6	EN			EN			
Lead	7439-92-1	400	(a,c)	NC	800	(a,c)	NC	mg/kg
Magnesium	7439-95-4	EN			EN			
Manganese	7439-96-5	1800	(a)	NC	19458	(a)	NC	mg/kg
Mercury	7439-97-6	23	(a,d)	NC	310	(a,d)	NC	mg/kg
Molybdenum	7439-97-7	390	(a)	NC	5100	(a)	NC	mg/kg
Nickel	7440-02-0	1600	(a,e)	NC	20439	(a,e)	NC	mg/kg
Potassium	7440-09-7	EN			EN			
Selenium	7782-49-2	390	(a)	NC	5110	(a)	NC	mg/kg
Silver	7440-22-4	390	(a)	NC	5110	(a)	NC	mg/kg
Sodium	7440-23-5	EN			EN			
Thallium	7440-28-0	5.2	(a)	NC	67	(a)	NC	mg/kg
Uranium	7440-61-6	16	(a)	NC	200	(a)	NC	mg/kg
Vanadium	7440-62-2	78	(a)	NC	1022	(a)	NC	mg/kg
Zinc	7440-66-6	23000	(a)	NC	100000	(a)	max	mg/kg
Polycyclic Aromatic Hydrocarbons (PAHs)								
2-Methylnaphthalene	91-57-6	56	(a,f)	NC	188	(a,f)	NC	mg/kg
Acenaphthene	83-32-9	3700	(a)	NC	29219	(a)	NC	mg/kg
Acenaphthylene	208-96-8	3700	(a,g)	NC	29219	(a,g)	NC	mg/kg
Anthracene	120-12-7	22000	(a)	NC	100000	(a)	max	mg/kg
Benzo(a)anthracene	56-55-3	0.62	(a)	C	2.11	(a)	C	mg/kg
Benzo(g,h,i)perylene	191-24-2	2300	(a,h)	NC	29126	(a,h)	NC	mg/kg
Benzo(a)pyrene	50-32-8	0.062	(a)	C	0.21	(a)	C	mg/kg
Benzo(b)fluoranthene	205-99-2	0.62	(a)	C	2.11	(a)	C	mg/kg
Benzo(k)fluoranthene	207-08-9	6.2	(a)	C	21	(a)	C	mg/kg
Chrysene	218-01-9	62	(a)	C	211	(a)	C	mg/kg
Dibenzo(ah)anthracene	53-70-3	0.062	(a)	C	0.21	(a)	C	mg/kg
Fluoranthene	206-44-0	2300	(a)	NC	22000	(a)	NC	mg/kg
Fluorene	86-73-7	2700	(a)	NC	26281	(a)	NC	mg/kg
Indeno(1,2,3-cd)pyrene	193-39-5	0.62	(a)	C	2.11	(a)	C	mg/kg
Naphthalene	91-20-3	56	(a)	NC	188	(a)	NC	mg/kg
Phenanthrene	85-01-8	22000	(a,i)	NC	100000	(a,i)	max	mg/kg
Pyrene	129-00-0	2300	(a)	NC	29126	(a)	NC	mg/kg

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TABLE A-1 (PAGE 2 OF 2)
SCREENING LEVELS FOR SELECTION OF COPCs IN CCBs AND SEDIMENT
PINES AREA OF INVESTIGATION
HUMAN HEALTH RISK ASSESSMENT WORK PLAN

Constituent	CAS Number	Screening Level					Units
		Residential			Industrial		
		Level		Basis	Level		Basis	
PCDD/PCDFs								
TCDD-TEQ	1746-01-6	0.001	(j)	C	0.02	(j)		mg/kg
Radionuclides								
Actinium (89)	Ac-227	2.53	(k)	C	11.4		C	pCi/g
Protactinium (91)	Pa-231	0.461	(k)	C	1.38		C	pCi/g
Lead (82)	Pb-210	0.328	(k)	C	4.19		C	pCi/g
Polonium (84)	Po-210	37.9	(k)	C	273		C	pCi/g
Radium (88)	Ra-226	0.193	(k)	C	3.7		C	pCi/g
Radium (88)	Ra-228	0.26	(k)	C	8.4		C	pCi/g
Thorium (90)	Th-228	24.2	(k)	C	125		C	pCi/g
Thorium (90)	Th-230	3.49	(k)	C	20.2		C	pCi/g
Thorium (90)	Th-232	3.1	(k)	C	19		C	pCi/g
Uranium (92)	U-234	4.01	(k)	C	32.4		C	pCi/g
Uranium (92)	U-235	0.205	(k)	C	0.417		C	pCi/g
Uranium (92)	U-238	4.46	(k)	C	36.8		C	pCi/g

Notes:
C - Potentially carcinogenic effects.
CAS - Chemical Abstracts Service.
CCB - Coal Combustion By-Product.
COPC - Constituent of Potential Concern.
EN - Essential nutrient. Will not be included in the selection of COPCs.
max - PRG is based on ceiling limit of 100,000 mg/kg.
NC - Noncarcinogenic effects.
PCDD - Polychlorinated Dibenzodioxin.
PCDF - Polychlorinated Dibenzofuran.
PRG - Preliminary Remediation Goal.
TCDD-TEQ - 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalence concentration.
(a) - USEPA, 2004b. USEPA Region 9 PRG Table. October 2004.
(b) - PRG for total chromium (1:6 ratio hexavalent:trivalent).
(c) - Based on noncarcinogenic effects; developed using an integrated exposure model (USEPA, 1994b, 1996c).
(d) - PRG for mercury and compounds.
(e) - PRG for nickel soluble salts.
(f) - No PRG available. Due to structural similarities, the value for naphthalene was used.
(g) - No PRG available. Due to structural similarities, the value for acenaphthene was used.
(h) - No PRG available. Due to structural similarities, the value for pyrene was used.
(i) - No PRG available. Due to structural similarities, the value for anthracene was used.
(j) USEPA, 1998d. Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites.
Value for dioxins. [OSWER Directive 9200.4-26].
(k) - Preliminary Remediation Goals (PRGs) for Radionuclides. USEPA, 2004f. August 4, 2004.
http://epa-prgs.ornl.gov/radionuclides/prg_search.shtml

APPENDIX A
TABLE A-2
SCREENING LEVELS FOR SELECTION OF COPCs IN WATER
PINES AREA OF INVESTIGATION
HUMAN HEALTH RISK ASSESSMENT WORK PLAN

Constituent	CAS Number	Units	MCL (a)	RAL (b)	PRG (c)	Screening Level (d)
Inorganics						
Aluminum	7429-90-5	ug/L	NA	NA	36000 NC	36000
Arsenic	7440-38-2	ug/L	10	50	0.045 C	10
Barium	7440-39-3	ug/L	2000	2000	2600 NC	2000
Boron	7440-42-8	ug/L	NA	900 (f)	7300 NC	900
Cadmium	7440-43-9	ug/L	5	5	18 NC	5
Calcium	7440-70-2	ug/L	EN	EN	EN	EN
Chromium	7440-47-3	ug/L	100 (h)	200	110 (g) NC	100
Copper	7440-50-8	ug/L	1300 (e)	1300	1500 NC	1300
Iron	7439-89-6	ug/L	EN	EN	EN	EN
Lead	7439-92-1	ug/L	15 (e)	30	NA	15
Magnesium	7439-95-4	ug/L	EN	EN	EN	EN
Manganese	7439-96-5	ug/L	NA	NA	880 NC	880
Molybdenum	7439-97-7	ug/L	NA	10	180 NC	10
Nickel	7440-02-0	ug/L	NA	500	730 (i) NC	500
Potassium	7440-09-7	ug/L	EN	EN	EN	EN
Selenium	7782-49-2	ug/L	50	200	180 NC	50
Sodium	7440-23-5	ug/L	EN	EN	EN	EN
Strontium	7440-24-6	ug/L	NA	25000	22000 NC	25000
Thallium	7440-28-0	ug/L	2	2	2.4 NC	2
Vanadium	7440-62-2	ug/L	NA	250	36 NC	250
Zinc	7440-66-6	ug/L	NA	3000	11000 NC	3000
Radionuclides						
Radium (88)	Ra-226	pCi/L	NA	NA	0.000823 (j) C	0.000823
Radium (88)	Ra-228	pCi/L	NA	NA	0.0458 (j) C	0.0458
Uranium (92)	U-234	pCi/L	NA	NA	0.674 (j) C	0.674
Uranium (92)	U-235	pCi/L	NA	NA	0.684 (j) C	0.684
Uranium (92)	U-238	pCi/L	NA	NA	0.744 (j) C	0.744

Notes:
C - Potentially carcinogenic effects.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EN - Essential nutrient. Will not be included in the selection of COPCs.
MCL - Maximum Contaminant Level.
NA - Not Available.
NC - Noncarcinogenic effects.
PRG - Preliminary Remediation Goal.
RAL - Removal Action Level.
(a) - USEPA. 2004c. Drinking Water Standards and Health Advisories. Winter 2004.
(b) - USEPA. 1998c. Resubmittal of the Latest Superfund Removal Action Levels.
Office of Solid Waste and Emergency Response. USEPA. November 10, 1998.
(c) - USEPA. 2004b. USEPA Region 9 PRG Table. October 2004. Value for tapwater.
(d) - MCL where available. RAL where no MCL is available. PRG where no MCL or RAL is available.
Units are ug/L unless otherwise stated.
(e) - Treatment Technology Action Level.
(f) - Based on outdated dose-response data.
(g) - PRG for hexavalent chromium (no total chromium 1:6 ratio value available for tapwater).
(h) - MCL is for total chromium.
(i) - PRG for nickel, soluble salts.
(j) - Preliminary Remediation Goals (PRGs) for Radionuclides. USEPA, 2004f. August 4, 2004.
http://epa-prgs.ornl.gov/radionuclides/prg_search.shtml

APPENDIX A
TABLE A-3
SCREENING LEVELS FOR SELECTION OF COPCs IN FISH TISSUE
PINES AREA OF INVESTIGATION
HUMAN HEALTH RISK ASSESSMENT WORK PLAN

Constituent	CAS Number	Screening Level		Units	Basis
Inorganics					
Aluminum	7429-90-5	1352	(a)	mg/kg	NC
Arsenic	7440-38-2	0.002	(a)	mg/kg	C
Barium	7440-39-3	95	(a)	mg/kg	NC
Boron	7440-42-8	270	(a)	mg/kg	NC
Cadmium	7440-43-9	1.35	(a,b)	mg/kg	NC
Calcium	7440-70-2	EN			
Chromium (total)	7440-47-3	2000	(a,c)	mg/kg	NC
Copper	7440-50-8	54	(a)	mg/kg	NC
Iron	7439-89-6	EN			
Lead	7439-92-1	--	(d)		
Magnesium	7439-95-4	EN			
Manganese	7439-96-5	189	(a,b)	mg/kg	NC
Molybdenum	7439-97-7	6.8	(a)	mg/kg	NC
Nickel	7440-02-0	27	(a)	mg/kg	NC
Potassium	7440-09-7	EN			
Selenium	7782-49-2	6.8	(a)	mg/kg	NC
Silver	7440-22-4	6.8	(a)	mg/kg	NC
Sodium	7440-23-5	EN			
Strontium	7440-24-6	810	(a)	mg/kg	NC
Thallium	7440-28-0	0.09	(a)	mg/kg	NC
Vanadium	7440-62-2	1.35	(a)	mg/kg	NC
Zinc	7440-66-6	406	(a)	mg/kg	NC

Notes:
C - Potentially carcinogenic effects.
CAS - Chemical Abstracts Service.
COPC - Constituent of Potential Concern.
EN - Essential nutrient. Will not be included in the selection of COPCs.
NA - Not Available.
NC - Noncarcinogenic effects.
RBC - Risk-Based Concentration.
(a) - USEPA. 2004d. USEPA Region 3 RBC Table. October 2004. Value for fish tissue.
(b) - RBC for food.
(c) - RBC for Chromium III (Chromium VI is not expected to occur in fish tissue).
(d) - Not expected to bioaccumulate; not a COPC in fish tissue.