

Tables

Table 1

Sites Where On-Site or Local Disposal of PCB-Containing Soils and/or Sediments Has Been Part of EPA-Selected Remedy

Site	Location	Program (Agency(ies))	Source/Basis	Primary Contaminant	Volume (cubic yards)	Type of Disposal
GE-Pittsfield/ Housatonic River, incl. Upper ½ Mile and 1½ Mile Reaches of Housatonic River	Pittsfield, MA	Superfund, RCRA (EPA and MassDEP)	Federal Consent Decree (2000)	PCBs	245,000	<ul style="list-style-type: none"> Placement in two on-site consolidation areas at GE Plant – a new one for TSCA- and RCRA-regulated material and an existing one for other material
New Bedford Harbor	New Bedford, MA	Superfund (EPA)	ROD (1998); Fourth ESD for ROD 2 (2011)	PCBs	up to 550,000	<ul style="list-style-type: none"> Disposal of sediments in on-site CAD in Lower Harbor
Norwood PCBs – OU 1	Norwood, MA	Superfund (EPA)	ROD Amendment (1996)	PCBs	20,000	<ul style="list-style-type: none"> Consolidation of soils and sediments into portion of site to be covered with TSCA-compliant multi-layer cap
Sullivan's Ledge – OU 1 and OU 2	New Bedford, MA	Superfund (EPA)	ROD for OU 1 (1989); ROD for OU 2 (1991)	PCBs	26,100 (OU 1) + 5,200 (OU 2)	<ul style="list-style-type: none"> Disposal of excavated soils and sediments (after solidification of OU 1 soils) in on-site disposal area to be capped
Silresim Chemical Corp.	Lowell, MA	Superfund (EPA)	ROD (1991)	VOCs, PCBs, metals, PAHs	18,000	<ul style="list-style-type: none"> After in-situ treatment for VOCs, removal of soil with non-VOC contamination, solidification, and on-site disposal under RCRA cap
Alcoa Grasse River	Massena, NY	Superfund (EPA)	ROD (2013)	PCBs	109,000	<ul style="list-style-type: none"> Disposal in on-site landfill
Onondaga Lake	Syracuse, NY	Superfund (EPA and NYSDEC)	ROD (2005)	Mercury, chlorobenzene, PAHs, VOCs (BTEX), PCBs	2,650,000	<ul style="list-style-type: none"> Disposal of dredged sediments in on-site upland sediment consolidation areas (except for pure-phase chemicals, e.g., NAPL)
Lower Ley Creek Subsite of Onondaga Lake Site	Syracuse & Salina, NY	Superfund (EPA)	ROD (2014)	PCBs	160,000 total (~ 140,000 non-TSCA & non-RCRA)	<ul style="list-style-type: none"> Disposal in on-site local landfill(s) (if available) for soils and sediments with PCBs < 50 ppm and not RCRA hazardous waste Off-site disposal for TSCA/RCRA material
Grand Calumet River	Gary, IN	RCRA, CWA (EPA)	AOC under RCRA (1998); Consent Decree under CWA (1998)	PCBs	~800,000	<ul style="list-style-type: none"> On-site disposal of sediments in a RCRA CAMU
Fox River – SMU 56/57	Green Bay, WI	Superfund (EPA and WDNR)	AOC (2000); see also Final Report on Project (2001)	PCBs	81,000	<ul style="list-style-type: none"> Disposal at local industrial landfill owned by PRP located approximately 6 miles away

Site	Location	Program (Agency(ies))	Source/Basis	Primary Contaminant	Volume (cubic yards)	Type of Disposal
Ashtabula River	Ashtabula, OH	Great Lakes Legacy Act (EPA and Ohio EPA)	Ashtabula Legacy Act Cleanup (2005-07)	PCBs	500,000	<ul style="list-style-type: none"> On-site disposal on PRP's property
Ottawa River	Toledo, OH	Great Lakes Legacy Act (EPA)	Ottawa River Legacy Act Cleanup (2010)	PCBs, PAHs, lead, oil, grease	250,000	<ul style="list-style-type: none"> Disposal of sediments (except from limited "hot spots") in nearby landfill
River Raisin	Monroe, MI	Great Lakes Legacy Act (EPA and MDEQ)	River Raisin Legacy Project (2012)	PCBs	109,000	<ul style="list-style-type: none"> On-site disposal of less contaminated sediment (106,000 cy) at CDF 2 miles north of river mouth Off-site disposal of the most contaminated sediment (3,000 cy)
Outboard Marine Corporation Site, Waukegan Harbor – OU 2	Waukegan, IL	Superfund (EPA)	ROD Amendment (2009)	PCBs	124,000	<ul style="list-style-type: none"> On-site disposal at Outboard Marine Corporation Plant 2 property at newly constructed sediment consolidation facility
Kinnickinnic River	Milwaukee, WI	Great Lakes Legacy Act (EPA and WDNR)	Kinnickinnic River Legacy Act Cleanup (2009); see also Remedial Action Report (2011)	PCBs, PAHs	167,000	<ul style="list-style-type: none"> Disposal at newly constructed cell within the already existing on-site CDF
Allied Paper/Portage Creek/Kalamazoo River – OU 3	Kalamazoo, MI	Superfund (EPA)	ROD (1998)	PCBs	4,000+	<ul style="list-style-type: none"> Consolidation of soil/sediment into existing on-site landfill to be capped
Bryant Mill Pond (portion of Portage Creek)	Kalamazoo, MI	Superfund (EPA)	Time Critical Removal Action (1999)	PCBs	~ 150,000	<ul style="list-style-type: none"> Disposal in on-site former dewatering lagoons on PRP property
Willow Run Creek	Ypsilanti and Van Buren Townships, MI	Superfund and state law (EPA and MDEQ)	EE/CA (1994)	PCBs	450,000	<ul style="list-style-type: none"> Disposal in newly constructed on-site dedicated TSCA landfill
Fields Brook – Sediment OU	Ashtabula, OH	Superfund (EPA)	ROD (1986); ESDs (1997, 1999, 2001)	PCBs, radionuclides	14,000	<ul style="list-style-type: none"> Off-site thermal treatment of most contaminated sediments (3,000 cy) Disposal of other excavated sediments (11,000 cy) at on-site TSCA-equivalent landfill
Ormet Corporation (backwater sediments)	Hannibal, OH	Superfund (EPA)	ROD (1994)	PCBs, PAHs	Not specified	<ul style="list-style-type: none"> On-site consolidation of sediments with PCBs < 50 ppm under cap Off-site disposal of sediments with PCBs > 50 ppm

Site	Location	Program (Agency(ies))	Source/Basis	Primary Contaminant	Volume (cubic yards)	Type of Disposal
Twelve Mile Creek – OU 2	Pickens, SC	Superfund (EPA)	ESD (2009)	PCBs	Not specified	<ul style="list-style-type: none"> On-site disposal of sediments dredged from behind dams at upland SMU proximate to site
St. Lawrence River - Reynolds Metals Co.	Massena, NY	Superfund (EPA)	Decision Document Amendment (1998)	PCBs, PAHs, TDBFs	77,600	<ul style="list-style-type: none"> On-site disposal of sediments with PCBs < 50 ppm at industrial landfill on PRP property with RCRA cap Off-site disposal of sediments with PCBs > 50 ppm
Thea Foss/Wheeler Osgood Waterway – part of Commencement Bay	Tacoma, WA	Superfund (EPA)	ROD (1989); ESD (2000)	PAHs, PCBs, metals, phthalates, pesticides, phenols	620,000	<ul style="list-style-type: none"> Disposal of contaminated sediments in on-site near-shore fill area (St. Paul near-shore fill area)
Hylebos Waterway – part of Commencement Bay	Tacoma, WA	Superfund (EPA)	ROD (1989); ESD (2000)	Metals, PCBs, PAHs	940,000	<ul style="list-style-type: none"> Disposal of contaminated sediments at local near-shore man-made slip (Blair Slip 1) converted to CDF and at upland regional landfill

Abbreviations:

AOC = Administrative Order on Consent

BTEX = benzene, toluene, ethylbenzene, and xylenes

CAD = confined aquatic disposal

CAMU = corrective action management unit

CDF = confined disposal facility

CWA = Clean Water Act

cy = cubic yards

EE/CA = Engineering Evaluation/Cost Analysis

EPA = U.S. Environmental Protection Agency

ESD = Explanation of Significant Differences

MassDEP = Massachusetts Department of Environmental Protection

MDEQ = Michigan Department of Environmental Quality

NAPL = non-aqueous-phase liquid

NYSDEC = New York State Department of Environmental Conservation

Ohio EPA = Ohio Environmental Protection Agency

OU = operable unit

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

ppm = parts per million

PRP = potentially responsible party

RCRA = Resource Conservation and Recovery Act

ROD = Record of Decision

SMU = sediment management unit

TCSA = Toxic Substances Control Act

TDBFs = total dibenzofurans

VOCs = volatile organic compounds

WDNR = Wisconsin Department of Natural Resources

Table 2
Summary of PCB Mass Transported

		Annually ¹				For Duration of Project (During Operation and After Closure, where applicable) ¹		Pounds PCB per Truck or Rail Car
		PCBs Transported (lbs)		Truck Trips		Total PCB Mass Transported (lbs)	Truck Trips/Rail Cars	
		During Operation	After Closure	During Operation	After Closure			
On-Site Leachate Transport from TD 3 Facility to Building 64G WTF ²		0.091	0.005	1,357	82	1.7	25,800	0.000067
Off-Site Transport via Truck or Rail ³	TD 1 Transport to Off-site Disposal Facility (Truck)	2,960		6,360		38,450	82,700	0.465
	TD 1 RR Transport On-site to Rail Loading Facility (Truck)			7,960			103,400	0.372
	TD 1 RR Transport from Rail Loading Facility to Off-site Disposal Facility (Rail)			1,270			16,500	2.32

Notes:

1. "Annual" estimates assume total construction/operation duration of 13 years, consistent with EPA's estimated duration for its proposed remedy. Post-closure estimate assumes 100 years.
2. For a 1M cubic yard (cy) capacity TD 3 landfill, it is assumed that the footprint of the material consolidation area would be approximately 11 acres (based on assumed disposal at the Woods Pond Site). Leachate is assumed to be generated at 50,000 gal/acre/month during construction/operation (13 years) and at 3,000 gal/acre/month after closure (assumed to be 100 years for this estimate). It is assumed a 5,000 gallon capacity tanker would be used to transport leachate. It is assumed that the landfill would produce leachate with a PCB concentration of approximately 1.6 ppb or µg/L (i.e., lb/gallon).
3. It is assumed that 20-ton capacity trucks would be used to transport material off-site. It is assumed that 16-ton capacity trucks would be used for transport on-site to the TD 1 RR rail loading facility (assumed to be located near Woods Pond). It is assumed that each rail car can transport approximately 100 tons. Total PCB mass for the 998,000 cy removal volume is estimated at 38,450 lbs based on reach-specific numbers calculated for SED 9/FP 4 MOD.

Table 3
Estimated Greenhouse Gas Emissions for Transport/Disposal Alternatives

Emissions (tonnes CO ₂ -eq)					
	TD 1	TD 1 RR	TD 3		
			Woods Pond Site	Forest Street Site	Rising Pond Site
Total	164,800	70,000	6,600	36,000	20,000
Direct²	141,600	60,100	5,900	34,000	19,000
Off-site³	23,200	9,900	770	2,000	1,100

Number of passenger vehicles with equivalent annual CO ₂ -eq emissions ⁵				
TD 1	TD 1 RR	TD 3		
		Woods Pond Site	Forest Street Site	Rising Pond Site
34,700	14,700	1,400	7,600	4,200
29,800	12,700	1,200	7,200	4,000
4,900	2,100	160	420	230

Notes:

1. Assumptions and calculation methods are generally consistent with Appendix M to the 2010 Revised CMS Report, except as follows:

- TD 1 - Disposal of non-TSCA material assumed to occur at ADS Greentree Landfill in Kersey, PA (832-mile round trip); disposal of TSCA material assumed to occur at EQ's Wayne disposal facility in Belleville, MI (1,362-mile round trip).
- TD 1 RR - All disposal assumed to occur at EQ's Wayne disposal facility in Belleville, MI, using 100-ton capacity rail cars.
- Diesel fuel economy for train/locomotive assumed to be 400 ton-miles/gallon based on data collected by the Association of American Railroads, as discussed on page 3 of EPA Fact Sheet Emission Factors for Locomotives (April 2009; <http://www.epa.gov/nonroad/locomotiv/420f09025.pdf>).

2. Direct emissions include the following components:

- Transportation - Emissions resulting from transportation of material for disposal, as well as of equipment and materials brought to/from the site for rail loading facility construction (TD 1 RR) or landfill construction (for TD 3).
- Construction - Emissions resulting from construction of rail loading facility (for TD 1 RR) or landfill (for TD 3).
- Tree removal - Emissions resulting from tree removal and chipping of trees, and from decomposition of mulched trees and sequestration lost from removed trees (TD 3 only). (Since a location for a rail loading facility has not been selected, emissions resulting from tree removal/chipping for construction of such a facility have not been included for TD 1 RR.)

3. Refers to emissions resulting from off-site operations required to prepare materials used on-site.

4. Totals reflect rounding.

5. Values presented were generated from EPA's Greenhouse Gas Equivalencies Calculator (<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>) and have been rounded. Calculated based on 4.75 tonnes CO₂/vehicle/year; EPA provides details pertaining to this calculation at <http://www.epa.gov/cleanenergy/energy-resources/refs.html#vehicles>.

Table 4
Estimated Off-Site Truck Trips for Transport/Disposal Alternatives

	Truck Trips In for Facility Construction ¹	Truck Trips Out for Transport of Excavated Material ²
TD 1		
Tons of Material Out	--	1,654,400
Number of Off-Site Truck Trips	--	82,720
Average Off-Site Truck Trips Per Year ³	--	6,400
Approximate Number of Vehicle Miles Traveled	--	82,599,200
Average Vehicle Miles Traveled Per Year ³	--	6,353,800
TD 1 RR		
Tons of Material In	19,750	--
Number of Off-Site Truck Trips	1,234	--
Average Off-Site Truck Trips Per Year ³	617	--
Approximate Number of Vehicle Miles Traveled	61,700	--
Average Vehicle Miles Traveled Per Year ³	30,800	--
TD 3 - Woods Pond Site		
Tons of Material In	37,767	--
Number of Off-Site Truck Trips	2,360	--
Average Off-Site Truck Trips Per Year ³	180	--
Approximate Number of Vehicle Miles Traveled	118,000	--
Average Vehicle Miles Traveled Per Year ³	9,100	--
TD 3 - Forest Street Site		
Tons of Material In	1,087,732	--
Number of Off-Site Truck Trips	67,983	--
Average Off-Site Truck Trips Per Year ³	5,200	--
Approximate Number of Vehicle Miles Traveled	3,399,200	--
Average Vehicle Miles Traveled Per Year ³	261,500	--
TD 3 - Rising Pond Site		
Tons of Material In	41,994	--
Number of Off-Site Truck Trips	2,625	--
Average Off-Site Truck Trips Per Year ³	200	--
Approximate Number of Vehicle Miles Traveled	131,200	--
Average Vehicle Miles Traveled Per Year ³	10,100	--

Notes:

1. Volume of material "in" for the TD 1 RR alternative includes material for the construction of the rail loading facility and associated access road, and for the TD 3 alternatives includes material for the construction of the upland disposal facility (including cover) and associated access roads. The TD 3 numbers are scaled from tonnages provided in the Revised CMS. Number of truck trips assumes 16-ton trucks. Number of vehicle miles traveled assume round trip distance of 50 miles per truck trip, based on assumption that construction material would be available within 25 miles of the facility. Note: These estimates do not include off-site truck trips in to import material for backfill, capping, and construction of access roads and staging areas for the remediation, which are estimated at a total of 72,000 truck trips for all TD alternatives (see Table 13).
2. Volume of material "out" includes excavated sediments and soils. Number of truck trips assumes 20-ton trucks. Number of vehicle miles assumes 832-mile round trips for non-TSCA material (based on assumed use of ADS Greentree Landfill in Kersey, PA) and 1,362-mile round trips for TSCA material (based on assumed use of EQ's Wayne disposal facility in Belleville, MI). Note: These estimates do not include truck trips out to dispose of access road/staging area material used in the remediation, which are estimated at a total of 11,100 truck trips for all TD alternatives (see Table 13).
3. Based on the following total construction durations: For TD 1, 13 years to dispose of material from SED 9/FP 4 MOD; for TD 1 RR, 2 years for construction of a rail loading facility; and for TD 3, 13 years on the assumption that the upland disposal facility would be built in stages in cells over the duration of the project.

Table 5
Estimated On-Site Truck Trips for Transport/Disposal Alternatives

	TD 1 RR	TD 3	TD 3 with pumping to Woods Pond Site facility⁵
Tons of TSCA Material	519,000	519,000	151,000
Tons of Non-TSCA Material	1,135,400	1,135,400	479,000
Number of Truck Trips ²	103,400	103,400	39,400
Average Truck Trips Per Year ³	8,000	8,000	3,000
Approx. Number of Vehicle Miles Traveled ⁴	581,900	Woods Pond Site: 835,200 Forest Street Site: 1,584,800 Rising Pond Site: 3,100,100	613,100
Average Vehicle Miles Traveled Per Year ³	44,800	Woods Pond Site: 64,200 Forest Street Site: 121,900 Rising Pond Site: 238,500	47,200

Notes:

1. Volume of material consists of excavated material.
2. Assumes 16-ton trucks, where applicable.
3. Based on total construction duration of 13 years for SED 9/FP 4 MOD.
4. It is assumed that the distance to the TD 1 RR rail loading facility (assumed to be located near Woods Pond) as well as the three TD 3 facilities is measured from the approximate midpoint of each reach. All vehicle miles assume a round trip.
5. This alternative assumes that hydraulically dredged material removed from Reach 5C, Woods Pond, and the nearby backwaters would be pumped directly to an on-site disposal facility at the Woods Pond Site, thus avoiding the need for trucking that material, and that thus trucking would be necessary only for the remaining removed sediments and soils.

Table 6**Estimated Accident-Related Injuries and Fatalities Associated with Off-Site Transport for Transport/Disposal Alternatives¹**

	TD 1	TD 1RR	TD 3-WP	TD 3-FS	TD 3-RP
Number of Off-Site Vehicle Miles Traveled Via Truck	82,599,200	61,700	118,000	3,399,200	131,200
Number of Train Miles Traveled Via Rail ²	0	5,560,460	0	0	0
Total Estimated Non-fatal Injuries ^{3,4}	39	34	0.055	1.6	0.062
Average Annual Non-fatal Injuries ⁷	3	3	0.0043	0.12	0.0047
Total Estimated Fatalities ^{5,6}	1.8	6.5	0.0026	0.075	0.0029
Average Annual Fatalities ⁷	0.14	0.50	0.0002	0.0058	0.0002

Notes:

1. Includes off-site truck trips associated with transport of material from staging areas to the TD 1 off-site disposal facility by truck, importation of material by truck to construct the TD 1 RR rail loading facility and the TD 3 disposal facility, and transport of excavated material by rail from the on-site rail loading facility to the off-site disposal facility.
2. Train miles assume 4 cars carrying site material per train.
3. Assumes a non-fatal injury rate of 4.7×10^{-7} injuries per truck vehicle mile traveled (Source: Appendix N of the Revised CMS).
4. Assumes a non-fatal injury rate of 6.2×10^{-6} injuries per train mile traveled (Source: Federal Railroad Administration Office of Safety Analysis information for CSX trains; average rate over 10-year period ending in 2013).
5. Assumes a fatality rate of 2.2×10^{-8} fatalities per truck vehicle mile traveled (Source: Appendix N of the Revised CMS).
6. Assumes a fatality rate of 1.2×10^{-6} fatalities per train mile traveled (Source: Federal Railroad Administration Office of Safety Analysis information for CSX trains; average rate over 10-year period ending in 2013).
7. Total fatalities/injuries divided by total alternative duration of 13 years.

Table 7
Estimated On-Site Worker Injuries and Fatalities for Transport/Disposal Alternatives¹

Labor Category	TD 1 RR		TD 3	
	Non-Fatal Injuries	Fatalities	Non-Fatal Injuries	Fatalities
Construction Manager	1.73E-01	1.12E-03	2.47E-01	1.61E-03
Field Technician	1.31E-01	2.47E-04	1.87E-01	3.53E-04
Foreman - Land	1.93E-01	1.25E-03	3.09E-01	2.01E-03
Laborer - Land	7.11E-01	7.67E-03	1.57E+00	1.69E-02
Mechanic	1.72E-01	1.19E-03	2.65E-01	1.82E-03
Operator - Land	4.69E-01	5.01E-03	7.29E-01	7.79E-03
Superintendent	0.00E+00	0.00E+00	2.47E-01	1.59E-03
Industrial Truck Driver ²	6.92E-01	2.61E-03	6.92E-01	2.61E-03
Survey Technician	1.41E-01	1.27E-03	2.17E-01	1.96E-03
Gate Attendant	1.34E-01	1.09E-03	1.34E-01	1.09E-03
Health and Safety	1.73E-01	2.03E-04	2.47E-01	2.90E-04
Total Estimated³	3.0	0.022	4.8	0.038
Approximate Duration (years)	13	13	13	13
Average Annual⁴	0.23	0.0017	0.37	0.0029

Notes:

1. Based on labor hours associated with transport of material from staging areas to either the TD 1 RR rail loading facility or the TD 3 disposal facility, as well as daily operation and closure hours. Source of non-fatal injury and fatality data: Appendix N of the Revised CMS. (This table does not include TD 1 because the worker risks under that alternative would consist of risks to off-site truck drivers and employees of off-site disposal facilities, which have not been quantified.)
2. Based on hours required to move material from staging areas to TD 1 RR rail loading facility and TD 3 disposal facility.
3. Sum of the estimated number of non-fatal injuries or fatalities in each labor category.
4. Total Estimated divided by total Approximate Duration of 13 years.

Table 8
Cost Estimates for Transport/Disposal Alternatives

	Removal Volume (cy)	Total Estimated SED 9/FP 4 MOD Transport & Disposal Costs (Million \$)				
		TD 1 (Trucking)	TD 1 RR (Rail)	TD 3 (Woods Pond)	TD 3 (Forest Street)	TD 3 (Rising Pond)
Sediments	918,000	\$330	\$284	\$58	\$117	\$64
Floodplain Soil	80,000	\$38	\$30	\$5	\$10	\$6
TOTAL TD ALTERNATIVE (w/o EPA oversight)	998,000	\$368	\$314	\$63³	\$127³	\$70³

Notes:

1. The TD 1 cost is based on assumed transport of TSCA material by truck to EQ's Wayne disposal facility in Belleville, MI, and assumed transport of non-TSCA material by truck to ADS Greentree Landfill in Kersey, PA, along with per-ton unit costs provided by those facilities based on truck transport.
2. The TD 1 RR cost is based on assumed transport of TSCA and non-TSCA material by rail from an on-site rail loading facility to EQ's Wayne disposal facility in Belleville, MI, along with per-ton unit costs provided by that facility for TSCA material and estimated for non-TSCA material (from that facility's quote) based on rail transport.
3. The TD 3 costs assume that leachate is trucked to GE's Building 64G water treatment facility. If leachate is treated on-site at the upland disposal facility, the total estimated cost for on-site disposal would be approximately \$2 M less for each TD 3 alternative.

Table 9
Comparison of EPA Region's Assumed Exposure Frequencies with Floodplain User Survey Observations

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
1	General recreation (medium use), adult/older child	60	181	20	19 adults, 1 younger child	Walking/hiking/running (on trail): 11 (incl.1 younger child) Walking/hiking/running (off trail): 1 Fishing (on trail): 1 ATV/motorcycle use (off trail): 1 Biking (on trail): 6
2	General recreation (high use), adult/older child	90	181	3	Adults	Wild crop gathering (on trail): 2 Wild crop gathering (off trail): 1
2a	General recreation (low use), older child	30				
2b	General recreation (high use), older child	90				
3	General recreation (high use), adult	60	Not included in survey			
4	General recreation (high use), adult/older child	90	178	14	10 adults, 3 older children, 2 younger children	Walking/hiking/running (on trail): 6 (incl. 2 older children) ATV/motorcycle use (on trail): 3 (incl. 2 younger children & 1 older child) Wild crop gathering (on trail): 1 General recreation (on trail): 4 (incl. 1 younger child)
5	General recreation (high use), adult/older child	90	181	1	Older child	Walking/hiking/running
6	General recreation (low use), adult	30	60	0	None	None
7	General recreation (high use), adult/older child	90	181	2	Adults	General recreation (off trail): 2
8	Recreational canoeing, adult/older child	60/30	60	0	None	None
9	General recreation (low use), older child	30	60	0	None	None
10	General recreation (high use), young child	90	60*	0	None	None
10a	General recreation (high use), young child	90				

* Limited view of area from canoe survey.

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
11	General recreation (high use), adult	90	181	0	None	None
12	General recreation (high use), adult/older child	90	181	49	24 adults, 3 older children, 2 younger children	Walking/hiking/running (on trail): 29 (incl. 2 younger children & 2 older children) ATV/motorcycle use (on trail): 9 Biking (on trail): 9 (incl. 1 older child) General recreation (on trail): 1 Farming (on trail): 1
13	General recreation (high use), adult	90	181	0	None	None
14	General recreation (high use), adult	90	Not included in survey			
15	General recreation (high use), adult	90	Not included in survey			
16	General recreation (high use), adult	90	181	0	None	None
17	General recreation (high use), adult	90	181	0	None	None
18	General recreation (medium use), adult	60	60	0	None	None
19	General recreation (high use), adult	90	181	0	None	None
20	General recreation (high use), adult	90	181	2	Adults	Walking/hiking/running (on trail): 2
21	General recreation (high use), adult/older child	90	60	0	None	None
22	General recreation (high use), adult/older child	90	181	0	None	None
22a	Dirt biking/ATVing, older child	90				
23	General recreation (medium use), older child	60	178	1	Adult	General recreation (off trail): 1
24	General recreation (high use), adult	90	181	1	Adult	General recreation (off trail): 1
25	General recreation (high use), older child	90	60	1	Adult	Walking/hiking/running: 1

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
26a	General recreation (high use), adult/older child	90	182	45	43 adults, 2 older children	Walking/hiking/running (on trail): 8 (incl. 1 older child) Walking/hiking/running (off trail): 3 ATV/motorcycle use (on trail): 4 (incl. 1 older child) ATV/motorcycle use (off trail): 3 General recreation (on trail): 7 General recreation (off trail): 5 Hunting (off trail): 8 Paintball (on trail): 2 Horseback riding (off trail): 2 Farming (off trail): 3
26b	Agricultural use, adult farmer	40				
26F	General recreation (high use), adult/older child	90				
27	General recreation (high use), adult/older child	90	60	0	None	None
27a	Dirt biking/ATVing, older child	90				
28	General recreation (high use), adult/older child	90	60	1	Younger child	Walking/hiking/running: 1
28a	Dirt biking/ATVing, older child	90				
29	General recreation (low use), adult/older child	30	60	0	None	None
30	General recreation (high use), adult/older child	90	60	0	None	None
31	General recreation (high use), adult/older child	90	118	6	Adults	Walking/hiking/running: 1 General recreation: 5
31a	General recreation (high use), adult/older child	90				
32	General recreation (high use), adult	90	118	4	Adults	Walking/hiking/running: 3 General recreation: 1
33	General recreation (high use), adult	90	181	2	Adults	Hunting (off trail): 1 General recreation (off trail): 1
34	General recreation (medium use), adult	60	60	0	None	None
35	General recreation (high use), adult/older child	90	181	2	Adults	Walking/hiking/running (off trail): 1 Bird watching (on trail): 1
35a	General recreation (high use), adult/older child	90				

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
36a	Commercial (low use), groundskeeper	30	181	0	None	None
36b	Agricultural use, adult farmer	40				
37	General recreation (high use), adult/older child	90	182	36	35 adults, 1 older child	Walking/hiking/running (on trail): 9 Walking/hiking/running (off trail): 1 Hunting (on trail): 2 Hunting (off trail): 17 (incl. 1 older child) Horseback riding (on trail): 2 General recreation (on trail): 5
37a	Bank fishing, adult/older child	30				
37b	General recreation (high use), adult/older child	90				
38	General recreation (high use), adult	90	118	6	Adults	Walking/hiking/running: 5 Bird watching: 1
38a	Bank fishing, adult/older child	30				
39	Marathon canoeing, adult	150	181	12	11 adults, 1 older child	Walking/hiking/running (on trail): 1 Fishing (on trail): 8 (incl. 1 older child) Bird watching (off trail): 1 Hunting (on trail): 2
40	General recreation (high use), adult/older child	90	181	70	62 adults, 6 older children, 2 younger children	Walking/hiking/running (on trail): 11 (incl. 2 older children) Walking/hiking/running (off trail): 4 Hunting (on trail): 6 Hunting (off trail): 11 Bow shooting tournament (on trail): 10 (incl. 2 older children) Bow shooting tournament (off trail): 12 (incl. 2 older children & 2 younger children) General recreation (on trail): 7 General recreation (off trail): 6 Fishing (on trail): 3
40a	Bank fishing, adult/older child	30				
40b	General recreation (high use), adult/older child	90				
41	General recreation (medium use), adult	60	181	0	None	None
41a	Bank fishing, adult/older child	30				

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
42	General recreation (medium use), adult	60	118	6	Adults	Walking/hiking/running: 1 Bird watching: 1 General recreation: 4
42a	Bank fishing, adult/older child	30				
43	General recreation (medium use), adult	60	60	1	Adult	Walking/hiking/running: 1
43a	Bank fishing, adult/older child	30				
44	General recreation (high use), adult	90	60	1	Adult	Walking/hiking/running: 1
45	General recreation (high use), adult	90	118	11	Adults	Walking/hiking/running: 6 General recreation: 5
46	General recreation (high use), adult	90	118	6	Adults	Hunting: 2 General recreation: 3
47	Recreational canoeing, adult/older child	60/30	118	4	Adults	Walking/hiking/running: 3 General recreation: 1
47F	Recreational canoeing, adult/older child	60/30				
48	General recreation (high use), adult	90	118	9	Adults	Walking/hiking/running: 4 Hunting: 1 General recreation: 4
49	General recreation (low use), adult	30	60	0	None	None
50	General recreation (low use), adult	30	60	0	None	None
50a	Waterfowl hunting, adult/older child	14				
51	General recreation (low use), adult	30	60	0	None	None
51a	Waterfowl hunting, adult/older child	14				
52	Recreational canoeing, adult/older child	60/30	118	3	Adults	Walking/hiking/running: 2 Fishing: 1
53	Recreational canoeing, adult/older child	60/30	118	26	Adults	Walking/hiking/running: 4 Fishing: 2 Hunting: 12 General recreation: 6

Exposure Area	EPA Region's Proposal		Observations from 2002 Floodplain User Survey			
	Exposure Scenario, Receptor	Exposure Frequency (day/yr)	Survey Days	Observed Visits	Age Groups	Breakdown of Observed Visits
54	General recreation (high use), adult	90	118	9	Adults	Walking/hiking/running: 1 Fishing: 1 General recreation: 7
55	General recreation (high use), adult/older child	90	118	28	27 adults, 1 younger child	Walking/hiking/running: 12 Picnicking: 2 (incl. 1 younger child) General recreation: 13
55a	Waterfowl hunting, adult/older child	14				
56	General recreation (medium use), adult/older child	60	118	2	Older children	Biking: 2
56a	Waterfowl hunting, adult/older child	14				
57	General recreation (high use), adult/older child	90	118	31	30 adults, 1 younger child	Walking/hiking/running: 24 (incl. 1 younger child) Fishing: 2 Bird watching: 1 General recreation: 4
58	General recreation (high use), adult	90	118	25	Adults	Walking/hiking/running: 7 Fishing: 3 ATV/motorcycle use: 6 General recreation: 4
59	General recreation (high use), adult/older child	90	118	34	32 adults, 2 younger children	Walking/hiking/running: 15 (incl. 2 younger children) Fishing: 7 Hunting: 2 Bird watching: 1 General recreation: 9
59a	Bank fishing, adult/older child	30				
60	General recreation (high use), adult/older child	90	118	198	194 adults, 4 younger children	Walking/hiking/running: 102 (incl. 4 younger children) ATV/motorcycle use: 2 Biking: 2 Fishing: 10 Bird watching: 2 General recreation: 80
60a	Recreational canoeing, adult/older child	60/30				

Table 10a
Alternate Cleanup Standards for PCBs in Top Foot of Floodplain Soil (in mg/kg) Based
on Direct Human Contact (RME Assumptions)

Exposure Areas	Exposure Scenario, Receptor	EPA Proposed Standards			Alternate Standards ¹		
		Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)	Secondary (RME 10 ⁻⁴ /HI=1)	Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)	Secondary (RME 10 ⁻⁴ /HI=1)
10a, 70, 87	High-use Gen Rec, young child	90 d/yr	4.6	4.6	60 d/yr ²	16	16
10	High-use Gen Rec, young child	90 d/yr	4.6	6.9	60 d/yr ²	16	16
2b, 25, 78, 85b	High-use Gen Rec, older child	90 d/yr	27	27	60 d/yr ²	88	88
3, 11, 13-17, 19, 20, 24, 32, 33, 38, 44-46, 48, 54, 67-69, 73-77, 79, 89	High-use Gen Rec, adult	90 d/yr	14	38	60 d/yr ²	44	117
4, 12, 26a, 35a, 37b, 40, 58, 59 (Frequent Use EAs)	High-use Gen Rec, adult/older child	90 d/yr	14	27	90 d/yr ²	29	59
2, 5, 7, 21, 22, 26F, 27, 28, 30, 31, 31a, 35, 37, 40b, 55, 57, 60, 90	High-use Gen Rec, adult/older child	90 d/yr	14	27	60 d/yr ²	44	88
1, 56	Medium-use Gen Rec, adult/older child	60 d/yr	21	40	30 d/yr	87	176
23, 88	Medium-use Gen Rec, older child	60 d/yr	40	40	30 d/yr	176	176
18, 34, 41, 42, 43	Medium-use Gen Rec, adult	60 d/yr	21	58	30 d/yr	87	234
6, 49, 50, 51, 80a, 81, 82, 84	Low-use Gen Rec, adult	30 d/yr	43	115	15 d/yr	174	468
2a, 9	Low-use Gen Rec, older child	30 d/yr	80	80	15 d/yr	353	353
29	Low-use Gen Rec, adult/older child	30 d/yr	43	80	15 d/yr	174	353
37a, 38a, 40a, 41a, 42a, 43a, 59a, 70a, 71, 72, 87a	Bank fishing, adult/older child	30 d/yr	26	42	30 d/yr	31	53
22a, 27a, 28a	Dirt biking/ATVing, older child	90 d/yr	14	14	72 d/yr	41	41
39	Marathon canoeist, adult	150 d/yr	7.8	13	150 d/yr	7.8	13
8, 47, 47F, 52, 53, 60a, 85a	Recreational canoeist, adult/older child	60/30 d/yr	12	28	60/30 d/yr	15	33
50a, 51a, 55a, 56a	Waterfowl hunting, adult/older child	14 d/yr	90	140	14 d/yr	124	199
26b, 36b, 80b	Agricultural use, farmer	40 d/yr	12	43	40 d/yr	15	55

Exposure Areas	Exposure Scenario, Receptor	EPA Proposed Standards			Alternate Standards ¹		
		Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)	Secondary (RME 10 ⁻⁴ /HI=1)	Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)	Secondary (RME 10 ⁻⁴ /HI=1)
83, 86	High-use commercial, groundskeeper	25 d/yr	18	25	25 d/yr	28	40
36a	Low-use commercial, groundskeeper	30 d/yr	89	126	30 d/yr	141	201
61-66	Utility worker	5 d/yr	169	242	5 d/yr	312	446

1. Developed using more supportable and realistic exposure assumptions for soil ingestion rate, fraction of soil ingested from the Site (for recreational scenarios), and exposure frequencies for general recreation and dirt biking/ATVing scenarios, but using EPA's toxicity values.
2. An exposure frequency of 90 d/yr is used for Frequent Use EAs (as defined in RCMS) and a frequency of 60 d/yr is used for all other EAs identified by EPA as high-use areas.

Table 10b

Alternate Cleanup Standards for PCBs in Top 3 Feet of Floodplain Soil (in mg/kg) in Frequently Used Subareas, Based on Direct Human Contact (RME Assumptions)

Exposure Areas	Exposure Scenario, Receptor	EPA Proposed Standards		Alternate Standards	
		Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)	Freq of Use	Primary (RME 10 ⁻⁵ /HI=1)
4, 12, 26a, 37b, 40, 58, 59	High-use Gen Rec, adult/older child	90 d/yr	14	90 d/yr	29
39	Marathon canoeist, adult	150 d/yr	7.8	150 d/yr	7.8
47, 52, 53, 60a	Recreational canoeist, adult/older child	60/30 d/yr	12	60/30 d/yr	15

1. Developed using more supportable and realistic exposure assumptions for soil ingestion rate and fraction of soil ingested from the Site (for recreational scenarios), but using EPA's toxicity values.

Table 10c

Alternate Interim Media Protection Goals (IMPGs) for PCBs in Surface Sediments (Top 6 Inches) (in mg/kg), Based on Direct Human Contact (RME Assumptions)

Exposure Areas	Exposure Scenario, Receptor	EPA IMPGs			Alternate IMPGs ¹		
		Freq of Use	RME 10 ⁻⁵ / HI=1	RME 10 ⁻⁴ / HI=1	Freq of Use	RME 10 ⁻⁵ / HI=1	RME 10 ⁻⁴ / HI=1
SA 1 through SA 8	Sediment exposure, adult/older child	36 d/yr	13	31	24 d/yr	23	56

1. Developed using more supportable and realistic exposure assumptions for sediment ingestion rate and exposure frequency, but using EPA's toxicity values.

Table 11
Summary of Impacts on Habitat Types Under SED 9/FP 4 MOD¹

Habitat	Acres of Habitat	Impacted Area (acres)		
		Remediation	Access/Staging	Total
Aquatic Riverine Habitat	126	126	--	126
Riverbank (linear miles)	14 ²	3.5+ ²	--	3.5+ ²
Impoundment Habitat	139	116	--	116
Backwater	86	50	--	50
Floodplain Wetland Forest	485	30	6.1	36
Shrub and Shallow Emergent Wetlands	364	7.9	5.7	14
Deep Marshes	48	0.1	0.1	0.2
Vernal Pools Acres (number of pools) ³	34	27 (43)	--	27 (43)
Disturbed Upland Habitats	78	3.9	5.2	9.1
Upland Forested Habitats	86	1.0	1.7	2.7
Sub-total⁴	1,446	362	19	381
Unmapped Habitats ⁵		2.8	55	58
Total		365	74	439

Notes:

1. This table summarizes the impacts of remediation activities (including application of activated carbon) and construction of access roads and staging areas on various habitat types.

2. Riverbank habitat and impacts are presented in linear miles rather than acres. Total riverbank habitat (14 miles) includes Reaches 5A and 5B; riverbank impacts for SED 9/FP 4 MOD reflect EPA's estimate for Reach 5A only (assuming no remediation in Reach 5B).

3. Number of vernal pools impacted and associated acreage reflect upper-bound estimate involving the remediation of all identified vernal pools in the PSA with average PCB concentrations greater than 3.3 mg/kg and located outside of Core Area 1. If fewer pools are subject to remediation, the impacted acreage would decrease accordingly.

4. Sub-totals include in-river habitat impacts for Reaches 5-8; however, floodplain impacts are limited to the PSA (Reaches 5/6) within the boundaries of the Woodlot (2002) natural community mapping.

5. Unmapped habitats include impacts outside of Woodlot (2002) natural community mapping coverage.

Table 12

Summary of Impacts on State-Listed Species Under Proposed Remedy (SED 9/FP 4 MOD)¹

Species with Priority Habitat Affected by Proposed Remedy²	Would a Take Occur?³	Impact on Significant Portion of Local Population?³
American bittern	Yes	Yes
Bald eagle	Yes	Unlikely
Bristly buttercup	Yes	No
Brook snaketail	Yes	Yes
Bur oak	Yes	No
Common moorhen	Yes	Yes
Creeper*	Yes	No
Crooked-stem aster	Yes	No
Foxtail sedge	Yes	Possibly
Gray's sedge	Yes	No
Hairy wild rye	Yes	No
Intermediate spike-sedge	Yes	Yes
Jefferson salamander	Yes	Unlikely
Longnose sucker*	Yes	No
Mustard white	Yes	Unlikely
Narrow-leaved spring beauty	Yes	Unlikely
Ostrich fern borer moth	Yes	No
Rapids clubtail	Yes	Possibly
Rifle snaketail	Yes	Yes
Skillet clubtail*	Yes	No
Spine-crowned clubtail	Yes	Yes
Stygian shadowdragon*	Yes	No
Wapato	Yes	Yes
Water shrew	Yes	Yes
Wood turtle	Yes	Yes

1. This table is based on the more detailed assessment in Attachment E to these comments.
2. This table does not include four species that were de-listed in February of 2012 (triangle floater, arrow clubtail, zebra clubtail, and black maple).
3. All of the Take and Significance assessments apply to impacts in Reaches 5/6, except for the four species marked with asterisks, which occur only in Reaches 7/8 and thus have been evaluated for those Reaches. In addition, the wood turtle has a second local population in Reaches 7/8 that would experience a take, but that take would not impact a significant portion of the local population.

Table 13
Estimated Truck Trips for SED 9/FP 4 MOD and Select Components

	All Reaches	Reach 6 (Woods Pond)		Reach 7 Impoundments		Reach 8 (Rising Pond)			Backwaters	
	SED 9/FP 4 MOD	SED 9/FP 4 MOD (340,000 cy)	Shallow dredging (44,400 cy)/ cap all	SED 9/FP 4 MOD (53,000 cy)	Thin-Layer Capping	SED 9/FP 4 MOD (50,000 cy)	Shallow dredging (15,300 cy)/ cap all	Thin-Layer Capping	SED 9/FP 4 MOD (95,000 cy)	3.3 mg/kg SWAC (excl CA 1) (40,000 cy)
Importation of Backfill, Cap Material, Staging/Access Material¹										
Tons of Material	1,151,900	176,300	100,600	87,900	52,100	79,500	50,800	45,200	137,800	57,500
Number of Truck Trips ²	72,000	11,000	6,300	5,500	3,300	5,000	3,200	2,800	8,600	3,600
Number of Vehicle Miles Traveled ³	3,600,000	550,000	315,000	275,000	165,000	250,000	160,000	140,000	430,000	180,000
Disposition of Staging/Access Material⁴										
Tons of Material	222,200	0	0	13,400	11,700	14,200	13,400	6,400	0	0
Number of Truck Trips ⁵	11,110	0	0	670	585	710	670	320	0	0
Number of Vehicle Miles Traveled ⁶	9,248,000	0	0	557,700	487,000	591,000	557,700	266,400	0	0
Disposition of Excavated Sediments/Soils⁷										
Tons of TSCA Material	519,000	224,400	38,800	0	0	0	0	0	38,000	19,800
Tons of Non-TSCA Material	1,135,400	336,600	34,500	87,500	0	82,500	25,300	0	118,800	45,700
Number of Truck Trips for Off-site Transport to TD 1 Facilities ⁸	82,750	28,050	3,665	4,375	0	4,125	1,265	0	7,840	3,275
Number of Truck Trips for On-Site Transport to TD 1 RR Rail Loading Facility or TD 3 Upland Disposal Facility ⁹	103,400	35,063	4,581	5,469	0	5,156	1,581	0	9,800	4,094
Number of Vehicle Miles to TD 1 Facilities ¹⁰	82,599,200	29,290,900	4,078,200	3,641,800	0	3,433,700	1,053,000	0	7,532,300	3,250,400
Number of Vehicle Miles to TD 1 RR Rail Loading Facility ¹¹	581,900	35,100	4,600	53,000	0	133,000	40,800	0	27,400	11,500
Number of Vehicle Miles to TD 3 Woods Pond Site Disposal Facility ¹¹	835,200	77,100	10,100	60,200	0	162,900	50,000	0	49,000	20,500
Number of Vehicle Miles to TD 3 Forest Street Site Disposal Facility ¹¹	1,584,800	413,700	54,100	55,000	0	116,500	35,700	0	137,200	57,300
Number of Vehicle Miles to TD 3 Rising Pond Site Disposal Facility ¹¹	3,100,100	1,037,900	135,600	101,200	0	1,000	300	0	317,500	132,600
Total Number of Truck Trips Assuming TD 1	165,830	39,050	9,965	10,545	3,885	9,835	5,135	3,120	16,440	6,875
Total Number of Truck Trips Assuming TD 1 RR or TD 3	186,510	46,063	10,881	11,639	3,885	10,866	5,451	3,120	18,400	7,694
Range of Average Truck Trips Per Year ¹²	12,800 – 14,300	9,200 - 10,900	8,100 - 8,800	4,800 - 5,300	2,800	9,500 - 10,500	9,900 - 10,500	4,100	5,900 - 6,600	6,300 - 7,000
Total Number of Vehicle Miles Assuming TD 1	95,500,000	29,840,900	4,393,200	4,474,500	652,000	4,274,700	1,770,700	406,400	7,962,300	3,430,400
Total Number of Vehicle Miles Assuming TD 1 RR	13,400,000	585,100	319,600	885,700	652,000	974,000	758,500	406,400	457,400	191,500
Total Number of Vehicle Miles Assuming TD 3-Woods Pond Site	13,700,000	627,100	325,100	892,900	652,000	1,003,900	767,700	406,400	479,000	200,500
Total Number of Vehicle Miles Assuming TD 3-Forest Street Site	14,400,000	963,700	369,100	887,700	652,000	957,500	753,400	406,400	567,200	237,300
Total Number of Vehicle Miles Assuming TD 3-Rising Pond Site	16,000,000	1,587,900	450,600	933,900	652,000	842,000	718,000	406,400	747,500	312,600

Table 13 (cont'd)
Estimated Truck Trips for SED 9/FP 4 MOD and Select Components

Notes:

1. Tons of material "in" includes sand, stone, and rip rap used for backfill, capping, and staging areas/access roads, as well as material used for stabilization of excavated sediments.
2. Assumes 16-ton trucks for sand, stone, rip rap, and stabilization material. The number of truck trips also includes number of trips required for importation of material used for bank stabilization and site restoration.
3. Assumes a 50-mile round trip based on assumption that construction material would be available within 25 miles of the facility .
4. Volume of material "out" includes sand, stone, riprap, and other materials used for staging areas/access roads.
5. Assumes 20-ton trucks, where applicable.
6. Assumes a 832-mile round trip to landfill in Kersey, PA (non-TSCA trucking).
7. Volume of material "out" includes excavated material.
8. Assumes 20-ton truck for off-site transport.
9. Assumes 16-ton trucks for transport to on-site TD 1 RR rail loading facility or TD 3 upland disposal facility.
10. It is assumed that the distance to the TD 1 facility is a 832-mile round trip to landfill in Kersey, PA (for non-TSCA material) and a 1,362-mile round trip to EQ's Wayne disposal facility in Belleville, MI (for TSCA material).
11. It is assumed that the distance to the TD 1RR loading facility (assumed to be located near Woods Pond) as well as the three TD 3 facilities is measured from the approximate midpoint of each Reach. All vehicle miles assume a round trip.
12. Based on total estimated construction schedule for each alternative.

Table 14
Estimated Greenhouse Gas Emissions for SED 9/FP 4 MOD and Select Components

	Total SED 9/FP 4 MOD (includes Reach 5)	Woods Pond		Reach 7 Impoundments			Rising Pond			Backwaters	
		SED 9/ FP 4 MOD	Shallow dredging (44,400 cy)/cap all	SED 9/ FP 4 MOD ¹	MNR	Thin-layer capping	SED 9/ FP 4 MOD	Shallow dredging (15,300 cy)/ cap all	Thin-layer capping	SED 9/ FP 4 MOD	3.3 mg/kg SWAC (excl CA 1) (40,000 cy)
Emissions (tonnes CO ₂ eq)											
Total	170,000	51,000	7,800	10,000	0	3,100	9,600	8,800	1,400	17,000	6,400
Direct ²	61,400	9,100	2,100	3,100	0	2,500	3,000	5,500	1,100	4,500	1,300
Indirect ³	3,300	1,400	180	190	0	0	210	520	0	520	220
Off-site ⁴	105,000	41,000	5,600	6,700	0	600	6,400	2,700	320	12,000	4,800
Number of passenger vehicles with equivalent annual CO ₂ -eq emissions ⁷											
Total	35,800	10,700	1,600	2,100	0	650	2,000	1,900	290	3,600	1,300
Direct	12,900	1,900	440	650	0	530	600	1,200	230	950	270
Indirect	700	290	38	40	0	0	44	110	0	100	46
Off-Site	22,100	8,600	1,200	1,400	0	130	1,300	600	70	2,500	1,000

Notes:

- For Reach 7 impoundments, assumes removal of all sediments > 1 mg/kg in Reaches 7B and 7C and removal to achieve SWAC of 1 mg/kg in Reaches 7E and 7G.
- Direct emissions include the following components:
 - Transportation - Emissions resulting from equipment and materials brought to/from the site.
 - Construction - Emissions resulting from hauling excavated materials to the stockpile areas.
 - Restoration - Emissions resulting from transportation and installation of new trees and other plantings.
 - Tree removal - Emissions resulting from tree removal and chipping of trees.
 - Changes in carbon stocks - Net emissions resulting from decomposition of mulched trees and differences in sequestration lost from removed mature trees and gained by replanted saplings, up through the anticipated time to fully implement each alternative.
- Indirect emissions are due to the purchase of electricity for operating the water treatment system.
- Refers to emissions resulting from off-site operations required to prepare materials used on-site.
- Totals reflect rounding.
- Assumptions and calculation methods are consistent with Appendix M from the 2010 Revised CMS Report.
- Values presented were generated from EPA's Greenhouse Gas Equivalencies Calculator (<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>), and have been rounded. Calculated based on 4.75 tonnes CO₂/vehicle/year; EPA provides details pertaining to this calculation here: <http://www.epa.gov/cleanenergy/energy-resources/refs.html#vehicles>.

Table 15
Cost Estimates for SED 9/FP 4 MOD and Select Components

Component	SED 9/FP 4 MOD (<i>alternative Reach options presented in italics</i>) (Costs in Million \$, rounded)							
	Description	Removal Volume (cy)	Total Estimated Up-Front Cost	Total Estimated Cost				
				With off-site TD-1 (Trucking)	With off-site TD 1 RR (Rail)	With on-site TD 3		
						WP	FS	RP
Reach 5A	SED 9/FP 4 MOD (2.5 ft removal w/ cap to grade [~168,000 cy]; bank excavation/stabilization [~25,000 cy])	193,000	\$78	\$144	\$136	\$90	\$103	\$92
Reach 5B	SED 9/FP 4 MOD (remove/cap > 50 mg/kg; 27 acre AC)	1,000	\$10	\$10	\$10	\$10	\$10	\$10
Reach 5C	SED 9/FP 4 MOD (2 ft removal w/ cap to grade)	186,000	\$100	\$170	\$159	\$112	\$123	\$113
Reach 5 Backwaters	SED 9/FP 4 MOD (removal/cap to SWAC of 1 mg/kg, except remove/cap > 50 mg/kg & apply AC in Core Area 1)	95,000	\$29	\$61	\$58	\$35	\$41	\$36
	<i>Remove/cap to SWAC of 3.3 mg/kg, except remove/cap > 50 mg/kg in Core Area 1 (40,000 cy of removal)</i>	40,000	\$14	\$28	\$26	\$16	\$19	\$17
Reach 6 (Woods Pond)	SED 9/FP 4 MOD (6 ft removal, 1 ft cap over 60 acres)	340,000	\$52	\$188	\$164	\$73	\$95	\$75
	<i>Shallow dredging in shallow areas (44,400 cy) + cap entire pond (60 acres)</i>	44,400	\$18	\$39	\$34	\$21	\$24	\$21
Reach 7	SED 9/FP 4 MOD (assume removal/capping > 1 mg/kg in 7B and 7C and to achieve SWAC of 1 mg/kg in 7E and 7G)	53,000	\$23	\$36	\$37	\$27	\$30	\$27
	<i>Thin-layer capping in all impoundments</i>	0	\$14	\$14	\$14	\$14	\$14	\$14
Reach 8 (Rising Pond)	SED 9/FP 4 MOD (removal/cap to SWAC of 1 mg/kg)	50,000	\$18	\$30	\$31	\$22	\$25	\$22
	<i>Shallow dredging in shallow areas (15,300 cy) + cap entire pond</i>	15,300	\$13	\$17	\$17	\$14	\$15	\$14
	<i>Thin-layer capping</i>	0	\$10	\$10	\$10	\$10	\$10	\$10
Total Sediments		918,000	\$310	\$640	\$595	\$368	\$427	\$374
Floodplain	SED 9/FP 4 MOD (direct contact)	80,000	\$25	\$63	\$55	\$30	\$35	\$31
Long-Term Monitoring (10-year program)			\$3.5	\$3.5	\$3.5	\$3.5	\$3.5	\$3.5
TOTAL (w/o EPA oversight)		998,000	\$339	\$707	\$653	\$402	\$465	\$409
EPA Oversight			\$25	\$25	\$25	\$25	\$25	\$25
TOTAL		998,000	\$364	\$732	\$678	\$427	\$490	\$434

Notes:

1. Up-front costs (including transport and disposal of access road/staging area material) have been adjusted for 2014 dollars with a 2.5% assumed inflation factor.
2. TD 1 costs are based on assumed transport by truck of TSCA material to EQ's Wayne disposal facility in Belleville, MI, and non-TSCA material to ADS Greentree Landfill in Kersey, PA, along with per-ton unit costs provided by those facilities based on truck transport.
3. TD 1 RR costs are based on assumed transport by rail of TSCA and non-TSCA materials to EQ's Wayne disposal facility in Belleville, MI, along with per-ton unit costs provided by that facility (or estimated from facility's quote) based on rail transport.
4. TD 3 costs assume that leachate is trucked to GE's Building 64G treatment plant. If leachate is treated on-site at the disposal facility, the total estimated costs for each TD alternative would be reduced by approximately \$2 million.

Table 16**Examples of Residential Properties Identified in the HHRA as
Having No Reasonable Potential for Change in Use**

HHRA Parcel ID	Property Type	HHRA Exposure Area	HHRA Exposure Scenario	HHRA Page Number (Vol. III.A)
I6-1-42	Residential	3	General Recreation	5-14
I6-3-1	Residential	4	General Recreation	5-15
I6-3-13	Residential	7	General Recreation	5-20
I6-3-1				
J6-2-3	Residential	9	General Recreation	5-23
J5-2-4	Residential	17	General Recreation	5-34
J3-1-11	Residential	23	General Recreation	5-44
J3-1-12				
J3-1-13				
J3-1-14				
J3-2-2	Residential	25	General Recreation	5-46
J3-2-3				
J3-2-4				
J3-2-6				
K3-1-2	Residential	28	General Recreation	5-52
K2-1-10	Residential	30	General Recreation	5-56
24-6	Residential	43	General Recreation	5-83
24-5				
24-4	Residential	44	General Recreation	5-85
24-3				
24-1				
9-16	Residential	60	General Recreation	5-117
8-38	Residential	70	General Recreation	5-131
12-205	Residential	74	General Recreation	5-138
12A-52	Residential	75	General Recreation	5-139
18A-21A	Residential	77	General Recreation	5-141
25-6	Residential	79	General Recreation	5-144
35-2	Residential	81	General Recreation	5-147
8-30 (New ID: 223-41)	Residential	88	General Recreation	5-159