Superfund Records Center
SITE: Centredale
BREAK: 3.4
OTHER: 206720

APPENDIX L

FOOD WEB EXPOSURE MODELS - INSECTIVOROUS WILDLIFE

SDMS DocID 000206720

APPENDIX L

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TABLE L-1.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	1.9E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.7E-04	1.7E-05
Beryllium	5.5E-05	mg/L	1.2E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	7.9E-05	7.9E-06
Chromium	2.5E-03	mg/L	5.3E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	5.3E-04	1.1E-04
Cobalt	1.2E-04	mg/L	2.5E-05	mg/kg-d					
Copper	5.4E-03	mg/L	1.1E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.4E-05	1.8E-05
Lead	2.9E-03	mg/L	6.1E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	5.4E-04	5.4E-05
Manganese	1.3E-01	mg/L	2.8E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	2.8E-05	2.8E-06
Nickel	1.9E-03	mg/L	4.1E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.3E-06	3.8E-06
Selenium	8.7E-05	mg/L	1.8E-05	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	4.6E-05	2.3E-05
Thallium	7.4E-06	mg/L	1.6E-06	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	4.5E-07	3.1E-07
Zinc	2.0E-02	mg/L	4.3E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	3.0E-04	3.3E-05
Nitrogen, Ammonia	3.9E-01	mg/L	8.3E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	7.2E-09	mg/L	1.5E-09	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.1E-04	1.1E-05
							HAZARD INDICES:	1.8E-03	2.8E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-1.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	4.2E-06	mg/kg	3.0E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.1E-01	2.1E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	6.6E-06	mg/kg	4.6E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.3E-01	3.3E-02
oxicity Equivalency (PCB) - Mammal	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	5.4E-01	5.4E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-1.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 5.5E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Birds		-	-	3.3E-01	-	3.3E-01	***61%***
Toxicity Equivalency - Birds	1.1E-04	-	-	2.1E-01	-	2.1E-01	***39%***
Lead	5.4E-04	-	-		-	5.4E-04	0%
Chromium	5.3E-04	-	-		-	5.3E-04	0%
Zinc	3.0E-04	-	-		-	3.0E-04	0%
Aluminum	1.7E-04					1.7E-04	0%
Beryllium	7.9E-05					7.9E-05	0%
Selenium	4.6E-05	-	-		-	4.6E-05	0%
Manganese	2.8E-05					2.8E-05	0%
Copper	2.4E-05	-	-		-	2.4E-05	0%
Nickel	5.3E-06					5.3E-06	0%
Thallium	4.5E-07	-	-		-	4.5E-07	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		

TABLE L-1.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: TREE SWALLOW	
TOTAL RISK (HI):	5.5E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
alpha-Chlordane		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**1.8E-03**	**-**	**-**	**5.4E-01**	**-**	**5.5E-01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-1.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 5.5E-02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Birds		-	-	3.3E-02	-	3.3E-02	***61%***
Toxicity Equivalency - Birds	1.1E-05	-	-	2.1E-02	-	2.1E-02	***39%***
Chromium	1.1E-04	-	-		-	1.1E-04	0%
Lead	5.4E-05	-	-		-	5.4E-05	0%
Zinc	3.3E-05	-	-		-	3.3E-05	0%
Selenium	2.3E-05	-	-		-	2.3E-05	0%
Copper	1.8E-05	-	-		-	1.8E-05	0%
Aluminum	1.7E-05					1.7E-05	0%
Beryllium	7.9E-06					7.9E-06	0%
Nickel	3.8E-06					3.8E-06	0%
Manganese	2.8E-06					2.8E-06	0%
Thallium	3.1E-07	-	-		-	3.1E-07	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		

TABLE L-1.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: TREE SWALLOW	
TOTAL RISK (HI):	5.5E-02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

	Exposure Medium[a]						
Analyte	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish	Combined HQs[b]	Percent Contribution[c]
alpha-Chlordane		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**2.8E-04**	**-**	**-**	**5.4E-02**	**-**	**5.5E-02**	
PERCENTAGE OF TOTAL RISK	**1%**			**99%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-2.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	2.1E-04	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.9E-05	1.9E-06
alpha-Chlordane	6.9E-07	mg/L	1.5E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.1E-09	6.1E-10
Endosulfan Sulfate	5.9E-05	mg/L	1.3E-05	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.0E-05	2.0E-06
gamma-Chlordane	2.5E-05	mg/L	5.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.2E-07	2.2E-08
Aluminum	6.5E-01	mg/L	1.4E-01	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.2E-03	1.2E-04
Beryllium	5.0E-05	mg/L	1.1E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	7.1E-05	7.1E-06
Chromium	5.1E-03	mg/L	1.1E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.1E-03	2.2E-04
Cobalt	6.0E-04	mg/L	1.3E-04	mg/kg-d					
Copper	1.3E-02	mg/L	2.8E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	6.0E-05	4.6E-05
Lead	2.1E-02	mg/L	4.4E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.9E-03	3.9E-04
Manganese	4.0E-01	mg/L	8.4E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	8.6E-05	8.6E-06
Nickel	4.9E-03	mg/L	1.0E-03	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.3E-05	9.8E-06
Selenium	2.4E-03	mg/L	5.0E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.3E-03	6.3E-04
Silver	8.3E-04	mg/L	1.8E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	7.4E-07	7.4E-08
Thallium	3.7E-03	mg/L	7.8E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	2.2E-04	1.6E-04
Zinc	6.5E-02	mg/L	1.4E-02	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	9.4E-04	1.0E-04
Nitrogen, Ammonia	2.4E-01	mg/L	5.1E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.1E-06	mg/L	2.4E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.7E-02	1.7E-03
							HAZARD INDICES:	2.6E-02	3.4E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-2.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	5.7E-04	mg/kg	4.0E-04	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**2.9E+01**	**2.9E+00**
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	1.2E-05	mg/kg	8.2E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	5.9E-01	5.9E-02
oxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	**2.9E+01**	**2.9E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-2.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 2.9E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	1.7E-02	-	-	2.9E+01	-	***2.9E+01***	***98%***
Toxicity Equivalency (PCB) - Birds		-	-	5.9E-01	-	5.9E-01	2%
Lead	3.9E-03	-	-		-	3.9E-03	0%
Selenium	1.3E-03	-	-		-	1.3E-03	0%
Aluminum	1.2E-03					1.2E-03	0%
Chromium	1.1E-03	-	-		-	1.1E-03	0%
Zinc	9.4E-04	-	-		-	9.4E-04	0%
Thallium	2.2E-04	-	-		-	2.2E-04	0%
Manganese	8.6E-05					8.6E-05	0%
Beryllium	7.1E-05					7.1E-05	0%
Copper	6.0E-05	-	-		-	6.0E-05	0%
Endosulfan sulfate	2.0E-05	-	-		-	2.0E-05	0%
bis(2-Ethylhexyl)phthalate	1.9E-05	-	-		-	1.9E-05	0%
Nickel	1.3E-05					1.3E-05	0%
Silver	7.4E-07	-	-		-	7.4E-07	0%
gamma-Chlordane	2.2E-07	-	-		-	2.2E-07	0%
alpha-Chlordane	6.1E-09	-	-		-	6.1E-09	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-2.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 2.9E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**2.6E-02**	**-**	**-**	**2.9E+01**	**-**	**2.9E+01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-2.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 2.9E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	1.7E-03	-	-	2.9E+00	-	***2.9E+00***	***98%***
Toxicity Equivalency (PCB) - Birds		-	-	5.9E-02	-	5.9E-02	2%
Selenium	6.3E-04	-	-		-	6.3E-04	0%
Lead	3.9E-04	-	-		-	3.9E-04	0%
Chromium	2.2E-04	-	-		-	2.2E-04	0%
Thallium	1.6E-04	-	-		-	1.6E-04	0%
Aluminum	1.2E-04					1.2E-04	0%
Zinc	1.0E-04	-	-		-	1.0E-04	0%
Copper	4.6E-05	-	-		-	4.6E-05	0%
Nickel	9.8E-06					9.8E-06	0%
Manganese	8.6E-06					8.6E-06	0%
Beryllium	7.1E-06					7.1E-06	0%
Endosulfan sulfate	2.0E-06	-	-		-	2.0E-06	0%
bis(2-Ethylhexyl)phthalate	1.9E-06	-	-		-	1.9E-06	0%
Silver	7.4E-08	-	-		-	7.4E-08	0%
gamma-Chlordane	2.2E-08	-	-		-	2.2E-08	0%
alpha-Chlordane	6.1E-10	-	-		-	6.1E-10	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-2.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 2.9E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**3.4E-03**	**-**	**-**	**2.9E+00**	**-**	**2.9E+00**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-3.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	**9-Apr-03**	**SJD**
Checked:	**17-Jul-03**	**RAR**

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	3.6E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	3.2E-04	3.2E-05
alpha-Chlordane	1.9E-05	mg/L	4.0E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.7E-07	1.7E-08
Endosulfan Sulfate	3.2E-06	mg/L	6.8E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.1E-06	1.1E-07
gamma-Chlordane	2.1E-05	mg/L	4.4E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.8E-07	1.8E-08
Aluminum	1.8E-01	mg/L	3.8E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	3.4E-04	3.4E-05
Beryllium	2.0E-04	mg/L	4.2E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.9E-04	2.9E-05
Chromium	2.3E-03	mg/L	4.8E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.8E-04	9.6E-05
Cobalt	4.2E-04	mg/L	8.8E-05	mg/kg-d					
Copper	8.7E-03	mg/L	1.8E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	3.9E-05	3.0E-05
Lead	4.4E-03	mg/L	9.3E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	8.2E-04	8.2E-05
Manganese	1.3E-01	mg/L	2.7E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	2.7E-05	2.7E-06
Nickel	1.9E-03	mg/L	3.9E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.1E-06	3.7E-06
Silver	5.9E-04	mg/L	1.3E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	5.3E-07	5.3E-08
Thallium	2.2E-03	mg/L	4.7E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.4E-04	9.5E-05
Zinc	2.8E-02	mg/L	5.9E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	4.1E-04	4.5E-05
Nitrogen, Ammonia	1.4E-01	mg/L	3.0E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.3E-07	mg/L	2.8E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.0E-03	2.0E-04
							HAZARD INDICES:	4.8E-03	6.5E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-3.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	1.5E-04	mg/kg	1.1E-04	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**7.8E+00**	7.8E-01
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	2.6E-05	mg/kg	1.9E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**1.3E+00**	1.3E-01
oxicity Equivalency (PCB) - Mammal	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	**9.1E+00**	9.1E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-3.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: TREE SWALLOW	
TOTAL RISK (HI):	9.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.0E-03	-	-	7.8E+00	-	***7.8E+00***	***85%***
Toxicity Equivalency (PCB) - Birds		-	-	1.3E+00	-	***1.3E+00***	***15%***
Lead	8.2E-04	-	-		-	8.2E-04	0%
Chromium	4.8E-04	-	-		-	4.8E-04	0%
Zinc	4.1E-04	-	-		-	4.1E-04	0%
Aluminum	3.4E-04					3.4E-04	0%
bis(2-Ethylhexyl)phthalate	3.2E-04	-	-		-	3.2E-04	0%
Beryllium	2.9E-04					2.9E-04	0%
Thallium	1.4E-04	-	-		-	1.4E-04	0%
Copper	3.9E-05	-	-		-	3.9E-05	0%
Manganese	2.7E-05					2.7E-05	0%
Nickel	5.1E-06					5.1E-06	0%
Endosulfan sulfate	1.1E-06	-	-		-	1.1E-06	0%
Silver	5.3E-07	-	-		-	5.3E-07	0%
gamma-Chlordane	1.8E-07	-	-		-	1.8E-07	0%
alpha-Chlordane	1.7E-07	-	-		-	1.7E-07	0%
4,4'-DDT							
Toxicity Equivalency - Mammals							
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Selenium		-	-		-		
Molybdenum		-	-		-		
Toxicity Equivalency (PCB) - Mammals							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		

TABLE L-3.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: TREE SWALLOW	
TOTAL RISK (HI):	9.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**4.8E-03**	**-**	**-**	**9.1E+00**	**-**	**9.1E+00**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-3.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 9.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.0E-04	-	-	7.8E-01	-	7.8E-01	***85%***
Toxicity Equivalency (PCB) - Birds		-	-	1.3E-01	-	1.3E-01	***15%***
Chromium	9.6E-05	-	-		-	9.6E-05	0%
Thallium	9.5E-05	-	-		-	9.5E-05	0%
Lead	8.2E-05	-	-		-	8.2E-05	0%
Zinc	4.5E-05	-	-		-	4.5E-05	0%
Aluminum	3.4E-05					3.4E-05	0%
bis(2-Ethylhexyl)phthalate	3.2E-05	-	-		-	3.2E-05	0%
Copper	3.0E-05	-	-		-	3.0E-05	0%
Beryllium	2.9E-05					2.9E-05	0%
Nickel	3.7E-06					3.7E-06	0%
Manganese	2.7E-06					2.7E-06	0%
Endosulfan sulfate	1.1E-07	-	-		-	1.1E-07	0%
Silver	5.3E-08	-	-		-	5.3E-08	0%
gamma-Chlordane	1.8E-08	-	-		-	1.8E-08	0%
alpha-Chlordane	1.7E-08	-	-		-	1.7E-08	0%
4,4'-DDT							
Toxicity Equivalency - Mammals							
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Selenium		-	-		-		
Molybdenum		-	-		-		
Toxicity Equivalency (PCB) - Mammals							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		

TABLE L-3.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 9.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**6.5E-04**	**-**	**-**	**9.1E-01**	**-**	**9.1E-01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. *Combined risk across all media exposures.*

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-4.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	1.0E-04	mg/kg	7.3E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**5.2E+00**	5.2E-01
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
oxicity Equivalency (PCB) - Mamma	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	**5.2E+00**	5.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-4.2
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 5.2E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	5.2E+00	-	***5.2E+00***	***100%***
Aroclor, Total							
Aroclor-1254							
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE							
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury							
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							
Beryllium							

TABLE L-4.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: MANTON POND REACH - CT	
RECEPTOR: TREE SWALLOW	
TOTAL RISK (HI):	5.2E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds				-			
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	5.2E+00	-	5.2E+00	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-4.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 5.2E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	5.2E-01	-	5.2E-01	*100%*
Aroclor, Total							
Aroclor-1254							
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE							
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury							
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							
Beryllium							

TABLE L-4.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 5.2E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds				-			
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	5.2E-01	-	5.2E-01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-5.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW

Prepared:	**9-Apr-03**	**SJD**
Checked:	**17-Jul-03**	**RAR**

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	2.8E-05	mg/kg	2.0E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**1.4E+00**	1.4E-01
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	7.6E-06	mg/kg	5.4E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.8E-01	3.8E-02
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	**1.8E+00**	1.8E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-5.2
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 1.8E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	1.4E+00	-	***1.4E+00***	***79%***
Toxicity Equivalency (PCB) - Birds		-	-	3.8E-01	-	3.8E-01	***21%***
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE		-	-		-		
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-5.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 1.8E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane							
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	1.8E+00	-	1.8E+00	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-5.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 1.8E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	1.4E-01	-	1.4E-01	***79%***
Toxicity Equivalency (PCB) - Birds		-	-	3.8E-02	-	3.8E-02	***21%***
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE		-	-		-		
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-5.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW
TOTAL RISK (HI): 1.8E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane							
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	1.8E-01	-	1.8E-01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-6.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW NESTLING

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	1.8E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.6E-04	1.6E-05
Beryllium	5.5E-05	mg/L	1.1E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	7.5E-05	7.5E-06
Chromium	2.5E-03	mg/L	5.1E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	5.1E-04	1.0E-04
Cobalt	1.2E-04	mg/L	2.4E-05	mg/kg-d					
Copper	5.4E-03	mg/L	1.1E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.3E-05	1.8E-05
Lead	2.9E-03	mg/L	5.8E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	5.1E-04	5.1E-05
Manganese	1.3E-01	mg/L	2.6E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	2.7E-05	2.7E-06
Nickel	1.9E-03	mg/L	3.9E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.1E-06	3.7E-06
Selenium	8.7E-05	mg/L	1.8E-05	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	4.4E-05	2.2E-05
Thallium	7.4E-06	mg/L	1.5E-06	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	4.3E-07	3.0E-07
Zinc	2.0E-02	mg/L	4.1E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.8E-04	3.1E-05
Nitrogen, Ammonia	3.9E-01	mg/L	8.0E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	7.2E-09	mg/L	1.5E-09	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	1.5E-05	1.5E-06
							HAZARD INDICES:	1.7E-03	2.6E-04

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-6.2

ALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW NESTLIN

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	4.2E-06	mg/kg	1.6E-06	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	1.6E-02	1.6E-03
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	6.6E-06	mg/kg	2.5E-06	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	2.5E-02	2.5E-03
oxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	4.0E-02	4.0E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-6.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 4.2E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Birds		-	-	2.5E-02	-	2.5E-02	***59%***
Toxicity Equivalency - Birds	1.5E-05	-	-	1.6E-02	-	1.6E-02	***38%***
Lead	5.1E-04	-	-		-	5.1E-04	1%
Chromium	5.1E-04	-	-		-	5.1E-04	1%
Zinc	2.8E-04	-	-		-	2.8E-04	1%
Aluminum	1.6E-04					1.6E-04	0%
Beryllium	7.5E-05					7.5E-05	0%
Selenium	4.4E-05	-	-		-	4.4E-05	0%
Manganese	2.7E-05					2.7E-05	0%
Copper	2.3E-05	-	-		-	2.3E-05	0%
Nickel	5.1E-06					5.1E-06	0%
Thallium	4.3E-07	-	-		-	4.3E-07	0%
bis(2-Ethylhexyl)phthalate		-	-		-		
4,4'-DDT							
Silver		-	-		-		
Endosulfan sulfate							
gamma-Chlordane		-	-		-		
alpha-Chlordane		-	-		-		
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							

TABLE L-6.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 4.2E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**1.7E-03**	-	-	**4.0E-02**	-	**4.2E-02**	
PERCENTAGE OF TOTAL RISK	**4%**			**96%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-6.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 4.3E-03

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Birds		-	-	2.5E-03	-	2.5E-03	***57%***
Toxicity Equivalency - Birds	1.5E-06	-	-	1.6E-03	-	1.6E-03	***37%***
Chromium	1.0E-04	-	-		-	1.0E-04	2%
Lead	5.1E-05	-	-		-	5.1E-05	1%
Zinc	3.1E-05	-	-		-	3.1E-05	1%
Selenium	2.2E-05	-	-		-	2.2E-05	1%
Copper	1.8E-05	-	-		-	1.8E-05	0%
Aluminum	1.6E-05					1.6E-05	0%
Beryllium	7.5E-06					7.5E-06	0%
Nickel	3.7E-06					3.7E-06	0%
Manganese	2.7E-06					2.7E-06	0%
Thallium	3.0E-07	-	-		-	3.0E-07	0%
bis(2-Ethylhexyl)phthalate		-	-		-		
4,4'-DDT							
Silver		-	-		-		
Endosulfan sulfate							
gamma-Chlordane		-	-		-		
alpha-Chlordane		-	-		-		
Heptachlor epoxide							
Aroclor-1260		-	-		-		
Aroclor-1254		-	-		-		
Aroclor-1268		-	-		-		
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor, Total		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Chrysene		-	-		-		
Mercury (methyl)		-	-		-		
Benzo(a)pyrene		-	-		-		
Dibenzo(a,h)anthracene		-	-		-		
Benzo(a)anthracene		-	-		-		
Technical Chlordane		-	-		-		
gamma-BHC							
4-Chloro-3-methylphenol							
Dieldrin		-	-		-		
N-Nitroso-di-n-propylamine							
Endrin		-	-		-		
4,4'-DDD		-	-		-		
4,4'-DDE		-	-		-		
Mercury		-	-		-		
Molybdenum		-	-		-		
Antimony							

TABLE L-6.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 4.3E-03

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Arsenic		-	-		-		
Barium		-	-		-		
Cadmium		-	-		-		
Cobalt							
Vanadium							
Phenanthrene		-	-		-		
Pentachlorophenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**2.6E-04**	**-**	**-**	**4.0E-03**	**-**	**4.3E-03**	
PERCENTAGE OF TOTAL RISK	**6%**			**94%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-7.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW NESTLING

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	2.0E-04	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.8E-05	1.8E-06
alpha-Chlordane	6.9E-07	mg/L	1.4E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	5.8E-09	5.8E-10
Endosulfan Sulfate	5.9E-05	mg/L	1.2E-05	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.9E-05	1.9E-06
gamma-Chlordane	2.5E-05	mg/L	5.1E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.1E-07	2.1E-08
Aluminum	6.5E-01	mg/L	1.3E-01	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.2E-03	1.2E-04
Beryllium	5.0E-05	mg/L	1.0E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	6.8E-05	6.8E-06
Chromium	5.1E-03	mg/L	1.0E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.0E-03	2.1E-04
Cobalt	6.0E-04	mg/L	1.2E-04	mg/kg-d					
Copper	1.3E-02	mg/L	2.7E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	5.8E-05	4.4E-05
Lead	2.1E-02	mg/L	4.2E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.7E-03	3.7E-04
Manganese	4.0E-01	mg/L	8.1E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	8.3E-05	8.3E-06
Nickel	4.9E-03	mg/L	1.0E-03	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.3E-05	9.4E-06
Selenium	2.4E-03	mg/L	4.8E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.2E-03	6.1E-04
Silver	8.3E-04	mg/L	1.7E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	7.1E-07	7.1E-08
Thallium	3.7E-03	mg/L	7.4E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	2.1E-04	1.5E-04
Zinc	6.5E-02	mg/L	1.3E-02	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	9.1E-04	1.0E-04
Nitrogen, Ammonia	2.4E-01	mg/L	4.9E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.1E-06	mg/L	2.3E-07	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	2.3E-03	2.3E-04
							HAZARD INDICES:	1.1E-02	1.9E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-7.2

ALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW NESTLIN

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	5.7E-04	mg/kg	2.1E-04	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	**2.1E+00**	2.1E-01
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	1.2E-05	mg/kg	4.3E-06	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	4.3E-02	4.3E-03
oxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	**2.2E+00**	2.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-7.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 2.2E+00

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.3E-03	-	-	2.1E+00	-	***2.1E+00***	***98%***
Toxicity Equivalency (PCB) - Birds		-	-	4.3E-02	-	4.3E-02	2%
Lead	3.7E-03	-	-		-	3.7E-03	0%
Selenium	1.2E-03	-	-		-	1.2E-03	0%
Aluminum	1.2E-03					1.2E-03	0%
Chromium	1.0E-03	-	-		-	1.0E-03	0%
Zinc	9.1E-04	-	-		-	9.1E-04	0%
Thallium	2.1E-04	-	-		-	2.1E-04	0%
Manganese	8.3E-05					8.3E-05	0%
Beryllium	6.8E-05					6.8E-05	0%
Copper	5.8E-05	-	-		-	5.8E-05	0%
Endosulfan sulfate	1.9E-05	-	-		-	1.9E-05	0%
bis(2-Ethylhexyl)phthalate	1.8E-05	-	-		-	1.8E-05	0%
Nickel	1.3E-05					1.3E-05	0%
Silver	7.1E-07	-	-		-	7.1E-07	0%
gamma-Chlordane	2.1E-07	-	-		-	2.1E-07	0%
alpha-Chlordane	5.8E-09	-	-		-	5.8E-09	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-7.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 2.2E+00

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**1.1E-02**	**-**	**-**	**2.2E+00**	**-**	**2.2E+00**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-7.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 2.2E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.3E-04	-	-	2.1E-01	-	2.1E-01	**97%**
Toxicity Equivalency (PCB) - Birds		-	-	4.3E-03	-	4.3E-03	2%
Selenium	6.1E-04	-	-		-	6.1E-04	0%
Lead	3.7E-04	-	-		-	3.7E-04	0%
Chromium	2.1E-04	-	-		-	2.1E-04	0%
Thallium	1.5E-04	-	-		-	1.5E-04	0%
Aluminum	1.2E-04					1.2E-04	0%
Zinc	1.0E-04	-	-		-	1.0E-04	0%
Copper	4.4E-05	-	-		-	4.4E-05	0%
Nickel	9.4E-06					9.4E-06	0%
Manganese	8.3E-06					8.3E-06	0%
Beryllium	6.8E-06					6.8E-06	0%
Endosulfan sulfate	1.9E-06	-	-		-	1.9E-06	0%
bis(2-Ethylhexyl)phthalate	1.8E-06	-	-		-	1.8E-06	0%
Silver	7.1E-08	-	-		-	7.1E-08	0%
gamma-Chlordane	2.1E-08	-	-		-	2.1E-08	0%
alpha-Chlordane	5.8E-10	-	-		-	5.8E-10	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-7.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 2.2E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**1.9E-03**	-	-	**2.2E-01**	-	**2.2E-01**	
PERCENTAGE OF TOTAL RISK	**1%**			**99%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-8.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / TREE SWALLOW NESTLING

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	3.4E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	3.1E-04	3.1E-05
alpha-Chlordane	1.9E-05	mg/L	3.8E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.6E-07	1.6E-08
Endosulfan Sulfate	3.2E-06	mg/L	6.5E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.0E-06	1.0E-07
gamma-Chlordane	2.1E-05	mg/L	4.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.8E-07	1.8E-08
Aluminum	1.8E-01	mg/L	3.6E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	3.3E-04	3.3E-05
Beryllium	2.0E-04	mg/L	4.1E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.7E-04	2.7E-05
Chromium	2.3E-03	mg/L	4.6E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.6E-04	9.2E-05
Cobalt	4.2E-04	mg/L	8.5E-05	mg/kg-d					
Copper	8.7E-03	mg/L	1.8E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	3.8E-05	2.9E-05
Lead	4.4E-03	mg/L	8.9E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	7.9E-04	7.9E-05
Manganese	1.3E-01	mg/L	2.6E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	2.6E-05	2.6E-06
Nickel	1.9E-03	mg/L	3.8E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	4.9E-06	3.5E-06
Silver	5.9E-04	mg/L	1.2E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	5.1E-07	5.1E-08
Thallium	2.2E-03	mg/L	4.6E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.3E-04	9.1E-05
Zinc	2.8E-02	mg/L	5.6E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	3.9E-04	4.3E-05
Nitrogen, Ammonia	1.4E-01	mg/L	2.8E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.3E-07	mg/L	2.7E-08	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	2.7E-04	2.7E-05
							HAZARD INDICES:	3.0E-03	4.6E-04

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-8.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW NESTLING

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	1.5E-04	mg/kg	5.8E-05	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	5.8E-01	5.8E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	2.6E-05	mg/kg	9.9E-06	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	9.9E-02	9.9E-03
oxicity Equivalency (PCB) - Mammal	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	6.8E-01	6.8E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-8.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 6.8E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.7E-04	-	-	5.8E-01	-	5.8E-01	***85%***
Toxicity Equivalency (PCB) - Birds		-	-	9.9E-02	-	9.9E-02	***15%***
Lead	7.9E-04	-	-		-	7.9E-04	0%
Chromium	4.6E-04	-	-		-	4.6E-04	0%
Zinc	3.9E-04	-	-		-	3.9E-04	0%
Aluminum	3.3E-04					3.3E-04	0%
bis(2-Ethylhexyl)phthalate	3.1E-04	-	-		-	3.1E-04	0%
Beryllium	2.7E-04					2.7E-04	0%
Thallium	1.3E-04	-	-		-	1.3E-04	0%
Copper	3.8E-05	-	-		-	3.8E-05	0%
Manganese	2.6E-05					2.6E-05	0%
Nickel	4.9E-06					4.9E-06	0%
Endosulfan sulfate	1.0E-06	-	-		-	1.0E-06	0%
Silver	5.1E-07	-	-		-	5.1E-07	0%
gamma-Chlordane	1.8E-07	-	-		-	1.8E-07	0%
alpha-Chlordane	1.6E-07	-	-		-	1.6E-07	0%
4,4'-DDT							
Aroclor, Total		-	-		-		
Selenium		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Cobalt							
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		

TABLE L-8.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 6.8E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**3.0E-03**	-	-	**6.8E-01**	-	**6.8E-01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-8.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 6.8E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.7E-05	-	-	5.8E-02	-	5.8E-02	***85%***
Toxicity Equivalency (PCB) - Birds		-	-	9.9E-03	-	9.9E-03	***14%***
Chromium	9.2E-05	-	-		-	9.2E-05	0%
Thallium	9.1E-05	-	-		-	9.1E-05	0%
Lead	7.9E-05	-	-		-	7.9E-05	0%
Zinc	4.3E-05	-	-		-	4.3E-05	0%
Aluminum	3.3E-05					3.3E-05	0%
bis(2-Ethylhexyl)phthalate	3.1E-05	-	-		-	3.1E-05	0%
Copper	2.9E-05	-	-		-	2.9E-05	0%
Beryllium	2.7E-05					2.7E-05	0%
Nickel	3.5E-06					3.5E-06	0%
Manganese	2.6E-06					2.6E-06	0%
Endosulfan sulfate	1.0E-07	-	-		-	1.0E-07	0%
Silver	5.1E-08	-	-		-	5.1E-08	0%
gamma-Chlordane	1.8E-08	-	-		-	1.8E-08	0%
alpha-Chlordane	1.6E-08	-	-		-	1.6E-08	0%
4,4'-DDT							
Heptachlor epoxide							
Aroclor-1260		-	-		-		
Aroclor-1254		-	-		-		
Aroclor-1268		-	-		-		
2,4-Dinitrotoluene							
Aroclor-1248		-	-		-		
Aroclor, Total		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Chrysene		-	-		-		
Mercury (methyl)		-	-		-		
Benzo(a)pyrene		-	-		-		
Dibenzo(a,h)anthracene		-	-		-		
Benzo(a)anthracene		-	-		-		
Technical Chlordane		-	-		-		
gamma-BHC							
4-Chloro-3-methylphenol							
Dieldrin		-	-		-		
N-Nitroso-di-n-propylamine							
Endrin		-	-		-		
4,4'-DDD		-	-		-		
4,4'-DDE		-	-		-		
Mercury		-	-		-		
Molybdenum		-	-				
Antimony							
Arsenic		-	-		-		

TABLE L-8.4

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: TREE SWALLOW NESTLING	
TOTAL RISK (HI):	6.8E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Barium		-	-		-		
Cadmium		-	-		-		
Cobalt							
Vanadium							
Selenium		-	-		-		
Phenanthrene		-	-		-		
Pentachlorophenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**4.6E-04**	**-**	**-**	**6.8E-02**	**-**	**6.8E-02**	
PERCENTAGE OF TOTAL RISK	**1%**			**99%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-9.1

ALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW NESTLIN

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	1.0E-04	mg/kg	3.9E-05	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	3.9E-01	3.9E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	0.0E+00	0.0E+00
oxicity Equivalency (PCB) - Mammal	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	3.9E-01	3.9E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-9.2

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 3.9E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	3.9E-01	-	3.9E-01	*100%*
Toxicity Equivalency (PCB) - Birds				-			
Lead		-	-		-		
Aluminum							
Chromium		-	-		-		
Aroclor, Total							
Zinc		-	-		-		
Selenium							
Aroclor-1254							
Endrin							
Thallium							
Manganese							
Copper		-	-		-		
Endosulfan sulfate							
Nickel							
Beryllium							
bis(2-Ethylhexyl)phthalate		-	-		-		
Silver							
gamma-Chlordane		-	-		-		
alpha-Chlordane		-	-		-		
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Molybdenum							
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
4,4'-DDE							
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury							
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
Aroclor-1260							

TABLE L-9.2

IMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: MANTON POND REACH - CT	
RECEPTOR: TREE SWALLOW NESTLING	
TOTAL RISK (HI):	3.9E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	3.9E-01	-	3.9E-01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-9.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 3.9E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	3.9E-02	-	3.9E-02	*100%*
Toxicity Equivalency (PCB) - Birds				-			
Lead		-	-		-		
Aroclor, Total							
Selenium							
Chromium		-	-		-		
Aluminum							
Zinc		-	-		-		
Thallium							
Aroclor-1254							
Copper		-	-		-		
Endrin							
Nickel							
Manganese							
Endosulfan sulfate							
Beryllium							
bis(2-Ethylhexyl)phthalate		-	-		-		
Silver							
gamma-Chlordane		-	-		-		
alpha-Chlordane		-	-		-		
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Molybdenum							
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
4,4'-DDE							
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury							
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
Aroclor-1260							

TABLE L-9.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 3.9E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	3.9E-02	-	3.9E-02	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-10.1

ALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / TREE SWALLOW NESTLIN

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW NESTLING

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	2.8E-05	mg/kg	1.1E-05	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	1.1E-01	1.1E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Birds	7.6E-06	mg/kg	2.8E-06	mg/kg-d	1.0E-04	1.0E-03	mg/kg-d	2.8E-02	2.8E-03
oxicity Equivalency (PCB) - Mammal	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
							HAZARD INDICES:	1.3E-01	1.3E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-4.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-10.2

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 1.3E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	1.1E-01	-	1.1E-01	***79%***
Toxicity Equivalency (PCB) - Birds		-	-	2.8E-02	-	2.8E-02	***21%***
Lead		-	-		-		
bis(2-Ethylhexyl)phthalate		-	-		-		
Aluminum							
Chromium		-	-		-		
Zinc		-	-		-		
4,4'-DDT							
Thallium							
Beryllium							
Copper		-	-		-		
Manganese							
Nickel							
Silver							
Endosulfan sulfate		-	-		-		
gamma-Chlordane							
alpha-Chlordane		-	-		-		
Aroclor, Total		-	-		-		
Selenium							
Aroclor-1254		-	-		-		
Endrin							
Cobalt							
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Molybdenum							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							

TABLE L-10.2

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 1.3E-01

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	1.3E-01	-	1.3E-01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-10.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 1.3E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		-	-	1.1E-02	-	1.1E-02	***79%***
Toxicity Equivalency (PCB) - Birds		-	-	2.8E-03	-	2.8E-03	***21%***
Lead		-	-		-		
Thallium							
bis(2-Ethylhexyl)phthalate		-	-		-		
Chromium		-	-		-		
Aluminum							
Zinc		-	-		-		
Copper		-	-		-		
4,4'-DDT							
Beryllium							
Manganese							
Nickel							
Silver							
Endosulfan sulfate		-	-		-		
gamma-Chlordane							
alpha-Chlordane		-	-		-		
Heptachlor epoxide							
Aroclor-1260							
Aroclor-1254		-	-		-		
Aroclor-1268		-	-		-		
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor, Total		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Chrysene		-	-		-		
Mercury (methyl)							
Benzo(a)pyrene		-	-		-		
Dibenzo(a,h)anthracene		-	-		-		
Benzo(a)anthracene		-	-		-		
Technical Chlordane							
gamma-BHC							
4-Chloro-3-methylphenol							
Dieldrin		-	-		-		
N-Nitroso-di-n-propylamine							
Endrin							
4,4'-DDD		-	-		-		
4,4'-DDE		-	-		-		
Mercury		-	-		-		
Molybdenum							
Antimony							
Arsenic		-	-		-		

TABLE L-10.3

MMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : TREE SWALLOW NESTL

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: TREE SWALLOW NESTLING
TOTAL RISK (HI): 1.3E-02

Prepared:	16-Jul-03	NAR
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Barium		-	-		-		
Cadmium		-	-		-		
Cobalt							
Vanadium							
Selenium							
Phenanthrene		-	-		-		
Pentachlorophenol							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Heptachlor							
Dibenzofuran							
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole							
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	1.3E-02	-	1.3E-02	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-11.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	1.4E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	7.5E-03	7.5E-04
Beryllium	5.5E-05	mg/L	8.9E-06	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.4E-05	1.4E-06
Chromium	2.5E-03	mg/L	4.1E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.8E-07	2.8E-08
Cobalt	1.2E-04	mg/L	1.9E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.6E-04	2.6E-05
Copper	5.4E-03	mg/L	8.7E-04	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	2.1E-03	2.1E-04
Lead	2.9E-03	mg/L	4.7E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.7E-06	1.2E-06
Manganese	1.3E-01	mg/L	2.1E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.4E-04	7.5E-05
Nickel	1.9E-03	mg/L	3.2E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	1.0E-05	6.1E-06
Selenium	8.7E-05	mg/L	1.4E-05	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	7.0E-05	4.3E-05
Thallium	7.4E-06	mg/L	1.2E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	8.6E-06	8.6E-07
Zinc	2.0E-02	mg/L	3.3E-03	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	2.1E-05	1.0E-05
Nitrogen, Ammonia	3.9E-01	mg/L	6.4E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	5.6E-09	mg/L	9.2E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	9.2E-04	9.2E-05
							HAZARD INDICES:	1.1E-02	1.2E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-11.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency - Mammals	3.6E-06	mg/kg	1.3E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.3E+00**	1.3E-01
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Mammals	5.7E-06	mg/kg	2.0E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.0E+00**	2.0E-01
							HAZARD INDICES:	**3.2E+00**	3.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-11.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 3.3E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Mammals		-	-	2.0E+00	-	***2.0E+00***	***61%***
Toxicity Equivalency - Mammals	9.2E-04	-	-	1.3E+00	-	***1.3E+00***	***38%***
Aluminum	7.5E-03					7.5E-03	0%
Copper	2.1E-03	-	-		-	2.1E-03	0%
Cobalt	2.6E-04	-	-		-	2.6E-04	0%
Manganese	2.4E-04					2.4E-04	0%
Selenium	7.0E-05	-	-		-	7.0E-05	0%
Zinc	2.1E-05	-	-		-	2.1E-05	0%
Beryllium	1.4E-05					1.4E-05	0%
Nickel	1.0E-05					1.0E-05	0%
Thallium	8.6E-06	-	-		-	8.6E-06	0%
Lead	3.7E-06	-	-		-	3.7E-06	0%
Chromium	2.8E-07	-	-		-	2.8E-07	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		

TABLE L-11.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 3.3E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
alpha-Chlordane		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	1.1E-02	-	-	3.2E+00	-	3.3E+00	
PERCENTAGE OF TOTAL RISK	0%			100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-11.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 3.3E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency (PCB) - Mammals		-	-	2.0E-01	-	2.0E-01	***61%***
Toxicity Equivalency - Mammals	9.2E-05	-	-	1.3E-01	-	1.3E-01	***38%***
Aluminum	7.5E-04					7.5E-04	0%
Copper	2.1E-04	-	-		-	2.1E-04	0%
Manganese	7.5E-05					7.5E-05	0%
Selenium	4.3E-05	-	-		-	4.3E-05	0%
Cobalt	2.6E-05	-	-		-	2.6E-05	0%
Zinc	1.0E-05	-	-		-	1.0E-05	0%
Nickel	6.1E-06					6.1E-06	0%
Beryllium	1.4E-06					1.4E-06	0%
Lead	1.2E-06	-	-		-	1.2E-06	0%
Thallium	8.6E-07	-	-		-	8.6E-07	0%
Chromium	2.8E-08	-	-		-	2.8E-08	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260		-	-		-		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		

TABLE L-11.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: LITTLE BROWN BAT	
TOTAL RISK (HI):	3.3E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
alpha-Chlordane		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**1.2E-03**	**-**	**-**	**3.2E-01**	**-**	**3.3E-01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-12.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	*1.0E-03*	*mg/L*	*1.6E-04*	*mg/kg-d*	*1.8E+01*	*1.8E+02*	*mg/kg-d*	*8.9E-06*	*8.9E-07*
alpha-Chlordane	6.9E-07	mg/L	1.1E-07	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.4E-08	1.2E-08
Endosulfan Sulfate	5.9E-05	mg/L	9.6E-06	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	5.7E-05	3.8E-06
gamma-Chlordane	2.5E-05	mg/L	4.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.8E-07	4.4E-07
Aluminum	6.5E-01	mg/L	1.1E-01	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	5.5E-02	5.5E-03
Beryllium	5.0E-05	mg/L	8.1E-06	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.2E-05	1.2E-06
Chromium	5.1E-03	mg/L	8.4E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	5.7E-07	5.7E-08
Cobalt	6.0E-04	mg/L	9.7E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.3E-03	1.3E-04
Copper	1.3E-02	mg/L	2.2E-03	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	5.2E-03	5.2E-04
Lead	2.1E-02	mg/L	3.4E-03	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.7E-05	9.0E-06
Manganese	4.0E-01	mg/L	6.5E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	7.4E-04	2.3E-04
Nickel	4.9E-03	mg/L	8.0E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	2.6E-05	1.6E-05
Selenium	2.4E-03	mg/L	3.9E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.9E-03	1.2E-03
Silver	8.3E-04	mg/L	1.4E-04	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	6.1E-06	6.1E-07
Thallium	3.7E-03	mg/L	6.0E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	4.3E-03	4.3E-04
Zinc	6.5E-02	mg/L	1.1E-02	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	6.6E-05	3.3E-05
Nitrogen, Ammonia	2.4E-01	mg/L	3.9E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.1E-06	mg/L	1.8E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.8E-01	1.8E-02
							HAZARD INDICES:	2.5E-01	2.6E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-12.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency - Mammals	6.2E-04	mg/kg	2.2E-04	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.2E+02**	**2.2E+01**
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Mammals	2.7E-08	mg/kg	9.6E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	9.6E-03	9.6E-04
							HAZARD INDICES:	**2.2E+02**	**2.2E+01**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-12.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 2.2E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	1.8E-01	-	-	2.2E+02	-	***2.2E+02***	***100%***
Aluminum	5.5E-02					5.5E-02	0%
Toxicity Equivalency (PCB) - Mammals		-	-	9.6E-03	-	9.6E-03	0%
Copper	5.2E-03	-	-		-	5.2E-03	0%
Thallium	4.3E-03	-	-		-	4.3E-03	0%
Selenium	1.9E-03	-	-		-	1.9E-03	0%
Cobalt	1.3E-03	-	-		-	1.3E-03	0%
Manganese	7.4E-04					7.4E-04	0%
Zinc	6.6E-05	-	-		-	6.6E-05	0%
Endosulfan sulfate	5.7E-05	-	-		-	5.7E-05	0%
Lead	2.7E-05	-	-		-	2.7E-05	0%
Nickel	2.6E-05					2.6E-05	0%
Beryllium	1.2E-05					1.2E-05	0%
bis(2-Ethylhexyl)phthalate	8.9E-06	-	-		-	8.9E-06	0%
Silver	6.1E-06	-	-		-	6.1E-06	0%
gamma-Chlordane	8.8E-07	-	-		-	8.8E-07	0%
Chromium	5.7E-07	-	-		-	5.7E-07	0%
alpha-Chlordane	2.4E-08	-	-		-	2.4E-08	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-12.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 2.2E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**2.5E-01**	**-**	**-**	**2.2E+02**	**-**	**2.2E+02**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-12.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	1.8E-02	-	-	2.2E+01	-	***2.2E+01***	***100%***
Aluminum	5.5E-03					5.5E-03	0%
Selenium	1.2E-03	-	-		-	1.2E-03	0%
Toxicity Equivalency (PCB) - Mammals		-	-	9.6E-04	-	9.6E-04	0%
Copper	5.2E-04	-	-		-	5.2E-04	0%
Thallium	4.3E-04	-	-		-	4.3E-04	0%
Manganese	2.3E-04					2.3E-04	0%
Cobalt	1.3E-04	-	-		-	1.3E-04	0%
Zinc	3.3E-05	-	-		-	3.3E-05	0%
Nickel	1.6E-05					1.6E-05	0%
Lead	9.0E-06	-	-		-	9.0E-06	0%
Endosulfan sulfate	3.8E-06	-	-		-	3.8E-06	0%
Beryllium	1.2E-06					1.2E-06	0%
bis(2-Ethylhexyl)phthalate	8.9E-07	-	-		-	8.9E-07	0%
Silver	6.1E-07	-	-		-	6.1E-07	0%
gamma-Chlordane	4.4E-07	-	-		-	4.4E-07	0%
Chromium	5.7E-08	-	-		-	5.7E-08	0%
alpha-Chlordane	1.2E-08	-	-		-	1.2E-08	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Endrin		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-12.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide		-	-		-		
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**2.6E-02**	-	-	**2.2E+01**	-	**2.2E+01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-13.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	2.8E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.5E-04	1.5E-05
alpha-Chlordane	1.9E-05	mg/L	3.1E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.7E-07	3.4E-07
Endosulfan Sulfate	3.2E-06	mg/L	5.2E-07	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	3.1E-06	2.1E-07
gamma-Chlordane	2.1E-05	mg/L	3.4E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.4E-07	3.7E-07
Aluminum	1.8E-01	mg/L	2.9E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.5E-02	1.5E-03
Beryllium	2.0E-04	mg/L	3.2E-05	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	4.9E-05	4.9E-06
Chromium	2.3E-03	mg/L	3.7E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.5E-07	2.5E-08
Cobalt	4.2E-04	mg/L	6.8E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	8.9E-04	8.9E-05
Copper	8.7E-03	mg/L	1.4E-03	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	3.4E-03	3.4E-04
Lead	4.4E-03	mg/L	7.2E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	5.7E-06	1.9E-06
Manganese	1.3E-01	mg/L	2.1E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.3E-04	7.3E-05
Nickel	1.9E-03	mg/L	3.0E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	9.8E-06	5.8E-06
Silver	5.9E-04	mg/L	9.6E-05	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	4.3E-06	4.3E-07
Thallium	2.2E-03	mg/L	3.6E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.6E-03	2.6E-04
Zinc	2.8E-02	mg/L	4.5E-03	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	2.8E-05	1.4E-05
Nitrogen, Ammonia	1.4E-01	mg/L	2.3E-02	mg/kg-d	#N/A	#N/A			
oxicity Equivalency - Mamma	1.3E-07	mg/L	2.1E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.1E-02	2.1E-03
							HAZARD INDICES:	4.3E-02	4.4E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-13.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency - Mammals	1.7E-04	mg/kg	5.9E-05	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**5.9E+01**	**5.9E+00**
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Mammals	6.9E-06	mg/kg	2.4E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.4E+00**	2.4E-01
							HAZARD INDICES:	**6.1E+01**	**6.1E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-13.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 6.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	2.1E-02	-	-	5.9E+01	-	***5.9E+01***	***96%***
Toxicity Equivalency (PCB) - Mammals		-	-	2.4E+00	-	***2.4E+00***	4%
Aluminum	1.5E-02					1.5E-02	0%
Copper	3.4E-03	-	-		-	3.4E-03	0%
Thallium	2.6E-03	-	-		-	2.6E-03	0%
Cobalt	8.9E-04	-	-		-	8.9E-04	0%
Manganese	2.3E-04					2.3E-04	0%
bis(2-Ethylhexyl)phthalate	1.5E-04	-	-		-	1.5E-04	0%
Beryllium	4.9E-05					4.9E-05	0%
Zinc	2.8E-05	-	-		-	2.8E-05	0%
Nickel	9.8E-06					9.8E-06	0%
Lead	5.7E-06	-	-		-	5.7E-06	0%
Silver	4.3E-06	-	-		-	4.3E-06	0%
Endosulfan sulfate	3.1E-06	-	-		-	3.1E-06	0%
gamma-Chlordane	7.4E-07	-	-		-	7.4E-07	0%
alpha-Chlordane	6.7E-07	-	-		-	6.7E-07	0%
Chromium	2.5E-07	-	-		-	2.5E-07	0%
4,4'-DDT							
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Selenium		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-13.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 6.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**4.3E-02**	**-**	**-**	**6.1E+01**	**-**	**6.2E+01**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-13.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 6.2E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	2.1E-03	-	-	5.9E+00	-	***5.9E+00***	***96%***
Toxicity Equivalency (PCB) - Mammals		-	-	2.4E-01	-	2.4E-01	4%
Aluminum	1.5E-03					1.5E-03	0%
Copper	3.4E-04	-	-		-	3.4E-04	0%
Thallium	2.6E-04	-	-		-	2.6E-04	0%
Cobalt	8.9E-05	-	-		-	8.9E-05	0%
Manganese	7.3E-05					7.3E-05	0%
bis(2-Ethylhexyl)phthalate	1.5E-05	-	-		-	1.5E-05	0%
Zinc	1.4E-05	-	-		-	1.4E-05	0%
Nickel	5.8E-06					5.8E-06	0%
Beryllium	4.9E-06					4.9E-06	0%
Lead	1.9E-06	-	-		-	1.9E-06	0%
Silver	4.3E-07	-	-		-	4.3E-07	0%
gamma-Chlordane	3.7E-07	-	-		-	3.7E-07	0%
alpha-Chlordane	3.4E-07	-	-		-	3.4E-07	0%
Endosulfan sulfate	2.1E-07	-	-		-	2.1E-07	0%
Chromium	2.5E-08	-	-		-	2.5E-08	0%
4,4'-DDT							
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Mercury (methyl)		-	-		-		
Arsenic		-	-		-		
Antimony		-	-		-		
Aroclor-1268		-	-		-		
Selenium		-	-		-		
Molybdenum		-	-		-		
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane		-	-		-		
N-Nitroso-di-n-propylamine							
4,4'-DDE		-	-		-		
Pentachlorophenol							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248		-	-		-		
Aroclor-1260		-	-		-		

TABLE L-13.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 6.2E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
4-Chloro-3-methylphenol							
2-Chlorophenol							
Endrin		-	-		-		
4-Nitrophenol							
Fluoranthene		-	-		-		
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor		-	-		-		
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	**4.4E-03**	**-**	**-**	**6.1E+00**	**-**	**6.2E+00**	
PERCENTAGE OF TOTAL RISK	**0%**			**100%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-14.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency - Mammals	1.1E-04	mg/kg	4.0E-05	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**4.0E+01**	**4.0E+00**
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	4.0E+01	4.0E+00

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-14.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 4.0E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		-	-	4.0E+01	-	***4.0E+01***	***100%***
Aroclor, Total							
Aroclor-1254							
Cobalt		-	-		-		
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Copper		-	-		-		
Selenium							
Molybdenum							
Toxicity Equivalency (PCB) - Mammals				-			
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE							
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury							
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-14.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 4.0E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole		-	-		-		
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	4.0E+01	-	4.0E+01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-14.3
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 4.0E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		-	-	4.0E+00	-	***4.0E+00***	***100%***
Aroclor, Total							
Aroclor-1254							
Cobalt		-	-		-		
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268							
Copper		-	-		-		
Selenium							
Molybdenum							
Toxicity Equivalency (PCB) - Mammals				-			
Vanadium							
Dieldrin							
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE							
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury							
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD							
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene							
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-14.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 4.0E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane		-	-		-		
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
Acenaphthylene							
Naphthalene							
Pyrene		-	-		-		
2-Methylnaphthalene							
Carbazole		-	-		-		
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	4.0E+00	-	4.0E+00	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-15.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: LITTLE BROWN BAT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency - Mammals	2.6E-05	mg/kg	9.1E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**9.1E+00**	9.1E-01
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Toxicity Equivalency (PCB) - Mammals	1.8E-08	mg/kg	6.2E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	6.2E-03	6.2E-04
							HAZARD INDICES:	9.1E+00	9.1E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-5.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-15.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 9.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		-	-	9.1E+00	-	***9.1E+00***	***100%***
Toxicity Equivalency (PCB) - Mammals		-	-	6.2E-03	-	6.2E-03	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt		-	-		-		
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE		-	-		-		
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-15.2

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 9.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane							
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	9.1E+00	-	9.1E+00	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-15.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: LITTLE BROWN BAT
TOTAL RISK (HI): 9.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		-	-	9.1E-01	-	9.1E-01	***100%***
Toxicity Equivalency (PCB) - Mammals		-	-	6.2E-04	-	6.2E-04	0%
Aroclor, Total		-	-		-		
Aroclor-1254		-	-		-		
Cobalt		-	-		-		
Mercury (methyl)							
Arsenic		-	-		-		
Antimony							
Aroclor-1268		-	-		-		
Copper		-	-		-		
Selenium							
Molybdenum							
Vanadium							
Dieldrin		-	-		-		
Cadmium		-	-		-		
Technical Chlordane							
N-Nitroso-di-n-propylamine							
Manganese							
4,4'-DDE		-	-		-		
Zinc		-	-		-		
Pentachlorophenol							
Aluminum							
Chrysene		-	-		-		
Benzo(k)fluoranthene		-	-		-		
Thallium							
Mercury		-	-		-		
Benzo(a)pyrene		-	-		-		
Lead		-	-		-		
2,4-Dinitrotoluene							
Benzo(a)anthracene		-	-		-		
Indeno(1,2,3-cd)pyrene		-	-		-		
Benzo(g,h,i)perylene		-	-		-		
Barium		-	-		-		
4,4'-DDD		-	-		-		
Aroclor-1248							
bis(2-Ethylhexyl)phthalate		-	-		-		
Aroclor-1260							
gamma-BHC							
Dibenzo(a,h)anthracene		-	-		-		
Benzo(b)fluoranthene		-	-		-		
Heptachlor epoxide							
Phenanthrene		-	-		-		
alpha-Chlordane		-	-		-		
Nickel							
4-Chloro-3-methylphenol							

TABLE L-15.3

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : LITTLE BROWN BAT

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: DYERVILLE REACH - CT	
RECEPTOR: LITTLE BROWN BAT	
TOTAL RISK (HI):	9.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium							
4,4'-DDT							
gamma-Chlordane							
2-Chlorophenol							
Chromium		-	-		-		
Endrin							
4-Nitrophenol							
Fluoranthene		-	-		-		
Silver							
Acenaphthene		-	-		-		
Phenol							
Fluorene		-	-		-		
Endosulfan II							
Endosulfan sulfate		-	-		-		
Heptachlor							
Dibenzofuran		-	-		-		
Acenaphthylene		-	-		-		
Naphthalene		-	-		-		
Pyrene		-	-		-		
2-Methylnaphthalene		-	-		-		
Carbazole		-	-		-		
Anthracene		-	-		-		
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
Di-n-Butylphthalate		-	-		-		
TOTAL MEDIUM-SPECIFIC RISK	-	-	-	9.1E-01	-	9.1E-01	
PERCENTAGE OF TOTAL RISK				100%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-16.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	8.9E-03	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	8.1E-05	8.1E-06
Beryllium	5.5E-05	mg/L	5.5E-06	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	3.7E-05	3.7E-06
Chromium	2.5E-03	mg/L	2.5E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	2.5E-04	5.0E-05
Cobalt	1.2E-04	mg/L	1.2E-05	mg/kg-d					
Copper	5.4E-03	mg/L	5.3E-04	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.1E-05	8.7E-06
Lead	2.9E-03	mg/L	2.9E-04	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	7.4E-05	7.4E-06
Manganese	1.3E-01	mg/L	1.3E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.3E-05	1.3E-06
Nickel	1.9E-03	mg/L	1.9E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	2.5E-06	1.8E-06
Selenium	8.7E-05	mg/L	8.6E-06	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	2.0E-05	5.8E-06
Thallium	7.4E-06	mg/L	7.4E-07	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	2.1E-07	1.5E-07
Zinc	2.0E-02	mg/L	2.0E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.4E-04	1.5E-05
Nitrogen, Ammonia	3.9E-01	mg/L	3.9E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	7.2E-09	mg/L	7.2E-10	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	5.1E-05	5.1E-06
							HAZARD INDICES:	6.8E-04	1.1E-04

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-16.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	7.1E-01	mg/kg	4.2E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.3E-04	2.3E-05
Benzo(a)anthracene	3.1E+00	mg/kg	1.9E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-03	1.0E-04
Benzo(a)pyrene	3.1E+00	mg/kg	1.8E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-03	1.0E-04
Benzo(b)fluoranthene	3.5E+00	mg/kg	2.1E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.1E-03	1.1E-04
Benzo(g,h,i)perylene	2.3E+00	mg/kg	1.4E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.6E-04	7.6E-05
Benzo(k)fluoranthene	3.2E+00	mg/kg	1.9E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-03	1.0E-04
Chrysene	3.8E+00	mg/kg	2.3E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-03	1.3E-04
Dibenzo(a,h)anthracene	6.1E-01	mg/kg	3.7E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-04	2.0E-05
Fluoranthene	7.0E+00	mg/kg	4.2E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.3E-03	2.3E-04
Indeno(1,2,3-cd)pyrene	2.5E+00	mg/kg	1.5E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.2E-04	8.2E-05
Phenanthrene	4.0E+00	mg/kg	2.4E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-03	1.3E-04
Pyrene	5.8E+00	mg/kg	3.5E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.9E-03	1.9E-04
4,4'-DDD	8.2E-03	mg/kg	4.9E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.8E-01	1.8E-02
4,4'-DDE	1.3E-02	mg/kg	8.0E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.9E-01	2.9E-02
4,4'-DDT	8.5E-03	mg/kg	5.1E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.8E-01	1.8E-02
Aroclor-1254	5.2E-01	mg/kg	3.1E-02	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.7E-01	1.7E-0[illegible]
Aroclor-1268	8.4E-02	mg/kg	5.0E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.6E-03	4.6E-04
Dieldrin	6.3E-03	mg/kg	3.8E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	4.9E-03	4.9E-04
Technical Chlordane	4.3E-01	mg/kg	2.6E-02	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	9.2E-02	9.2E-03
Antimony	6.2E-01	mg/kg	3.7E-02	mg/kg-d					
Arsenic	7.7E+00	mg/kg	4.6E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	9.0E-02	3.6E-02
Barium	2.3E+02	mg/kg	1.4E+01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	3.3E-01	1.7E-01
Beryllium	3.1E+00	mg/kg	1.8E-01	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	**1.2E+00**	1.2E-01
Cadmium	1.6E+00	mg/kg	9.8E-02	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.7E-02	4.9E-03
Chromium	2.3E+02	mg/kg	1.4E+01	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**1.4E+01**	**2.8E+00**
Cobalt	1.3E+01	mg/kg	7.9E-01	mg/kg-d					
Copper	2.1E+02	mg/kg	1.2E+01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.6E-01	2.0E-01
Lead	4.5E+02	mg/kg	2.7E+01	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	**7.0E+00**	7.0E-01
Manganese	1.8E+03	mg/kg	1.1E+02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.1E-01	1.1E-02
Mercury	5.8E-01	mg/kg	3.5E-02	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	7.8E-02	3.9E-02
Molybdenum	5.4E+01	mg/kg	3.2E+00	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	9.2E-01	9.2E-02
Selenium	7.0E-01	mg/kg	4.2E-02	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	9.6E-02	2.8E-02
Thallium	4.6E-01	mg/kg	2.8E-02	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	7.9E-03	5.5E-03
Vanadium	8.2E+01	mg/kg	4.9E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	4.3E-01	4.3E-02
Zinc	2.9E+02	mg/kg	1.7E+01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	**1.2E+00**	1.3E-01
Toxicity Equivalency - Birds	9.0E-05	mg/kg	5.4E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.9E-01	3.9E-02
Toxicity Equivalency (PCB) - Birds	6.0E-05	mg/kg	3.6E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.6E-01	2.6E-02
							HAZARD INDICES:	**2.7E+01**	**4.5E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-16.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.3E-03	mg/kg	5.4E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.9E-01	1.9E-02
4,4'-DDE	1.7E-03	mg/kg	6.9E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.4E-01	2.4E-02
4,4'-DDT	9.6E-04	mg/kg	3.8E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.4E-01	1.4E-02
alpha-Chlordane	1.4E-03	mg/kg	5.8E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	2.0E-03	2.0E-04
Aroclor, Total	5.0E-02	mg/kg	2.0E-02	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.8E-01	7.3E-02
Aroclor-1254	3.9E-02	mg/kg	1.6E-02	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	8.6E-02	8.6E-03
Aroclor-1268	1.1E-02	mg/kg	4.6E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.1E-03	4.1E-04
Dieldrin	8.1E-04	mg/kg	3.2E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	4.2E-03	4.2E-04
Endosulfan Sulfate	1.4E-03	mg/kg	5.5E-04	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	8.8E-04	8.8E-05
gamma-Chlordane	1.3E-03	mg/kg	5.1E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	1.8E-03	1.8E-04
Heptachlor Epoxide	3.1E-04	mg/kg	1.2E-04	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	3.0E-06	3.0E-07
Technical Chlordane	4.1E-02	mg/kg	1.6E-02	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	5.8E-02	5.8E-03
Antimony	2.2E-01	mg/kg	9.0E-02	mg/kg-d					
Arsenic	6.0E-01	mg/kg	2.4E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	4.7E-02	1.9E-02
Barium	3.6E+01	mg/kg	1.4E+01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	3.5E-01	1.7E-01
Beryllium	2.5E-01	mg/kg	1.0E-01	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	6.8E-01	6.8E-02
Cadmium	3.0E+00	mg/kg	1.2E+00	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	8.2E-01	5.9E-02
Chromium	9.5E+00	mg/kg	3.8E+00	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**3.8E+00**	7.6E-01
Cobalt	1.2E+00	mg/kg	4.6E-01	mg/kg-d					
Copper	1.4E+01	mg/kg	5.6E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.2E-01	9.1E-02
Lead	2.8E+01	mg/kg	1.1E+01	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	**3.0E+00**	3.0E-01
Manganese	2.3E+02	mg/kg	9.1E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	9.3E-02	9.3E-03
Mercury	4.8E-02	mg/kg	1.9E-02	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	4.2E-02	2.1E-02
Mercury (methyl)	4.0E-03	mg/kg	1.6E-03	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	2.5E-01	2.5E-02
Molybdenum	2.3E+00	mg/kg	9.1E-01	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.6E-01	2.6E-02
Nickel	5.0E+00	mg/kg	2.0E+00	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	2.6E-02	1.9E-02
Selenium	5.6E-01	mg/kg	2.3E-01	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	5.1E-01	1.5E-01
Silver	1.9E-01	mg/kg	7.4E-02	mg/kg-d	9.0E+01	9.0E+02	mg/kg-d	8.3E-04	8.3E-05
Thallium	5.5E-02	mg/kg	2.2E-02	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	6.3E-03	4.4E-03
Vanadium	4.0E+00	mg/kg	1.6E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.4E-01	1.4E-02
Zinc	8.5E+01	mg/kg	3.4E+01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	**2.4E+00**	2.6E-01
Toxicity Equivalency - Birds	4.3E-06	mg/kg	1.7E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.2E-01	1.2E-02
Toxicity Equivalency (PCB) - Birds	1.7E-05	mg/kg	6.8E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.9E-01	4.9E-02
							HAZARD INDICES:	**1.4E+01**	**2.2E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-16.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 4.1E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Chromium	2.5E-04	1.4E+01	-	3.8E+00	-	-	***1.8E+01***	***43%***
Lead	7.4E-05	7.0E+00	-	3.0E+00	-	-	***1.0E+01***	***24%***
Zinc	1.4E-04	1.2E+00	-	2.4E+00	-	-	***3.6E+00***	9%
Beryllium	3.7E-05	1.2E+00	-	6.8E-01	-	-	***1.9E+00***	5%
Molybdenum		9.2E-01	-	2.6E-01	-	-	***1.2E+00***	3%
Cadmium		6.7E-02	-	8.2E-01	-	-	8.9E-01	2%
Toxicity Equivalency (PCB) - Birds		2.6E-01	-	4.9E-01	-	-	7.4E-01	2%
Barium		3.3E-01	-	3.5E-01	-	-	6.8E-01	2%
Selenium	2.0E-05	9.6E-02	-	5.1E-01	-	-	6.1E-01	1%
Vanadium		4.3E-01	-	1.4E-01	-	-	5.7E-01	1%
4,4'-DDE		2.9E-01	-	2.4E-01	-	-	5.3E-01	1%
Toxicity Equivalency - Birds	5.1E-05	3.9E-01	-	1.2E-01	-	-	5.1E-01	1%
Copper	1.1E-05	2.6E-01	-	1.2E-01	-	-	3.8E-01	1%
4,4'-DDD		1.8E-01	-	1.9E-01	-	-	3.7E-01	1%
4,4'-DDT		1.8E-01	-	1.4E-01	-	-	3.2E-01	1%
Aroclor-1254		1.7E-01	-	8.6E-02	-	-	2.6E-01	1%
Mercury (methyl)				2.5E-01			2.5E-01	1%
Manganese	1.3E-05	1.1E-01	-	9.3E-02	-	-	2.1E-01	0%
Aroclor, Total				1.8E-01			1.8E-01	0%
Technical Chlordane		9.2E-02	-	5.8E-02	-	-	1.5E-01	0%
Arsenic		9.0E-02	-	4.7E-02	-	-	1.4E-01	0%
Mercury		7.8E-02	-	4.2E-02	-	-	1.2E-01	0%
Nickel	2.5E-06			2.6E-02			2.6E-02	0%
Thallium	2.1E-07	7.9E-03	-	6.3E-03	-	-	1.4E-02	0%
Dieldrin		4.9E-03	-	4.2E-03	-	-	9.1E-03	0%
Aroclor-1268		4.6E-03	-	4.1E-03	-	-	8.7E-03	0%
Fluoranthene		2.3E-03	-		-	-	2.3E-03	0%
alpha-Chlordane				2.0E-03			2.0E-03	0%
Pyrene		1.9E-03	-		-	-	1.9E-03	0%
gamma-Chlordane				1.8E-03			1.8E-03	0%
Phenanthrene		1.3E-03	-		-	-	1.3E-03	0%
Chrysene		1.3E-03	-		-	-	1.3E-03	0%
Benzo(b)fluoranthene		1.1E-03	-		-	-	1.1E-03	0%
Benzo(k)fluoranthene		1.0E-03	-		-	-	1.0E-03	0%
Benzo(a)anthracene		1.0E-03	-		-	-	1.0E-03	0%
Benzo(a)pyrene		1.0E-03	-		-	-	1.0E-03	0%
Endosulfan Sulfate				8.8E-04			8.8E-04	0%
Silver				8.3E-04			8.3E-04	0%
Indeno(1,2,3-cd)pyrene		8.2E-04	-		-	-	8.2E-04	0%
Benzo(g,h,i)perylene		7.6E-04	-		-	-	7.6E-04	0%
Anthracene		2.3E-04	-		-	-	2.3E-04	0%
Dibenzo(a,h)anthracene		2.0E-04	-		-	-	2.0E-04	0%
Aluminum	8.1E-05						8.1E-05	0%
Heptachlor Epoxide				3.0E-06			3.0E-06	0%
bis(2-Ethylhexyl)phthalate								

TABLE L-16.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: WOODCOCK	
TOTAL RISK (HI):	4.1E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
TOTAL MEDIUM-SPECIFIC RISK	**6.8E-04**	**2.7E+01**	**-**	**1.4E+01**	**-**	**-**	**4.1E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**66%**		**34%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-16.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 6.7E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Chromium	5.0E-05	2.8E+00	-	7.6E-01	-	-	***3.5E+00***	***53%***
Lead	7.4E-06	7.0E-01	-	3.0E-01	-	-	1.0E+00	***15%***
Zinc	1.5E-05	1.3E-01	-	2.6E-01	-	-	3.9E-01	6%
Barium		1.7E-01	-	1.7E-01	-	-	3.4E-01	5%
Copper	8.7E-06	2.0E-01	-	9.1E-02	-	-	2.9E-01	4%
Beryllium	3.7E-06	1.2E-01	-	6.8E-02	-	-	1.9E-01	3%
Selenium	5.8E-06	2.8E-02	-	1.5E-01	-	-	1.8E-01	3%
Molybdenum		9.2E-02	-	2.6E-02	-	-	1.2E-01	2%
Toxicity Equivalency (PCB) - Birds		2.6E-02	-	4.9E-02	-	-	7.4E-02	1%
Aroclor, Total				7.3E-02			7.3E-02	1%
Cadmium		4.9E-03	-	5.9E-02	-	-	6.4E-02	1%
Mercury		3.9E-02	-	2.1E-02	-	-	6.0E-02	1%
Vanadium		4.3E-02	-	1.4E-02	-	-	5.7E-02	1%
Arsenic		3.6E-02	-	1.9E-02	-	-	5.5E-02	1%
4,4'-DDE		2.9E-02	-	2.4E-02	-	-	5.3E-02	1%
Toxicity Equivalency - Birds	5.1E-06	3.9E-02	-	1.2E-02	-	-	5.1E-02	1%
4,4'-DDD		1.8E-02	-	1.9E-02	-	-	3.7E-02	1%
4,4'-DDT		1.8E-02	-	1.4E-02	-	-	3.2E-02	0%
Aroclor-1254		1.7E-02	-	8.6E-03	-	-	2.6E-02	0%
Mercury (methyl)				2.5E-02			2.5E-02	0%
Manganese	1.3E-06	1.1E-02	-	9.3E-03	-	-	2.1E-02	0%
Nickel	1.8E-06			1.9E-02			1.9E-02	0%
Technical Chlordane		9.2E-03	-	5.8E-03	-	-	1.5E-02	0%
Thallium	1.5E-07	5.5E-03	-	4.4E-03	-	-	9.9E-03	0%
Dieldrin		4.9E-04	-	4.2E-04	-	-	9.1E-04	0%
Aroclor-1268		4.6E-04	-	4.1E-04	-	-	8.7E-04	0%
Fluoranthene		2.3E-04	-		-	-	2.3E-04	0%
alpha-Chlordane				2.0E-04			2.0E-04	0%
Pyrene		1.9E-04	-		-	-	1.9E-04	0%
gamma-Chlordane				1.8E-04			1.8E-04	0%
Phenanthrene		1.3E-04	-		-	-	1.3E-04	0%
Chrysene		1.3E-04	-		-	-	1.3E-04	0%
Benzo(b)fluoranthene		1.1E-04	-		-	-	1.1E-04	0%
Benzo(k)fluoranthene		1.0E-04	-		-	-	1.0E-04	0%
Benzo(a)anthracene		1.0E-04	-		-	-	1.0E-04	0%
Benzo(a)pyrene		1.0E-04	-		-	-	1.0E-04	0%
Endosulfan Sulfate				8.8E-05			8.8E-05	0%
Silver				8.3E-05			8.3E-05	0%
Indeno(1,2,3-cd)pyrene		8.2E-05	-		-	-	8.2E-05	0%
Benzo(g,h,i)perylene		7.6E-05	-		-	-	7.6E-05	0%
Anthracene		2.3E-05	-		-	-	2.3E-05	0%
Dibenzo(a,h)anthracene		2.0E-05	-		-	-	2.0E-05	0%
Aluminum	8.1E-06						8.1E-06	0%
Heptachlor Epoxide				3.0E-07			3.0E-07	0%
bis(2-Ethylhexyl)phthalate								

TABLE L-16.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 6.7E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
TOTAL MEDIUM-SPECIFIC RISK	**1.1E-04**	**4.5E+00**	**-**	**2.2E+00**	**-**	**-**	**6.7E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**67%**		**33%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-17.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	8.4E-05	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	7.6E-06	7.6E-07
alpha-Chlordane	6.9E-07	mg/L	5.8E-08	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	2.1E-07	2.1E-08
Endosulfan Sulfate	5.9E-05	mg/L	5.0E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	8.0E-06	8.0E-07
gamma-Chlordane	2.5E-05	mg/L	2.1E-06	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	7.5E-06	7.5E-07
Aluminum	6.5E-01	mg/L	5.5E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	5.0E-04	5.0E-05
Beryllium	5.0E-05	mg/L	4.2E-06	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.9E-05	2.9E-06
Chromium	5.1E-03	mg/L	4.3E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.3E-04	8.7E-05
Cobalt	6.0E-04	mg/L	5.1E-05	mg/kg-d					
Copper	1.3E-02	mg/L	1.1E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.4E-05	1.8E-05
Lead	2.1E-02	mg/L	1.8E-03	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	4.6E-04	4.6E-05
Manganese	4.0E-01	mg/L	3.4E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	3.4E-05	3.4E-06
Nickel	4.9E-03	mg/L	4.2E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.4E-06	3.9E-06
Selenium	2.4E-03	mg/L	2.0E-04	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	4.6E-04	1.3E-04
Silver	8.3E-04	mg/L	7.0E-05	mg/kg-d	9.0E+01	9.0E+02	mg/kg-d	7.8E-07	7.8E-08
Thallium	3.7E-03	mg/L	3.1E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	8.9E-05	6.2E-05
Zinc	6.5E-02	mg/L	5.5E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	3.8E-04	4.2E-05
Nitrogen, Ammonia	2.4E-01	mg/L	2.0E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.1E-06	mg/L	9.5E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	6.8E-03	6.8E-04
							HAZARD INDICES:	9.2E-03	1.1E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-17.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	5.0E-01	mg/kg	2.5E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.4E-04	1.4E-05
Benzo(a)anthracene	1.1E+00	mg/kg	5.4E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.0E-04	3.0E-05
Benzo(a)pyrene	9.9E-01	mg/kg	5.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.7E-04	2.7E-05
Benzo(b)fluoranthene	1.6E+00	mg/kg	8.3E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-04	4.5E-05
Benzo(g,h,i)perylene	5.0E-01	mg/kg	2.5E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.4E-04	1.4E-05
Benzo(k)fluoranthene	6.5E-01	mg/kg	3.3E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.8E-04	1.8E-05
Chrysene	1.2E+00	mg/kg	6.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.2E-04	3.2E-05
Dibenzo(a,h)anthracene	3.5E-01	mg/kg	1.8E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.7E-05	9.7E-06
Fluoranthene	2.4E+00	mg/kg	1.2E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.7E-04	6.7E-05
Indeno(1,2,3-cd)pyrene	5.3E-01	mg/kg	2.7E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.5E-04	1.5E-05
Phenanthrene	1.6E+00	mg/kg	8.3E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-04	4.5E-05
Pyrene	2.2E+00	mg/kg	1.1E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.2E-04	6.2E-05
4,4'-DDD	9.6E-03	mg/kg	4.9E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.7E-01	1.7E-02
4,4'-DDE	1.9E-02	mg/kg	9.5E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.4E-01	3.4E-02
4,4'-DDT	2.8E-02	mg/kg	1.4E-03	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	5.0E-01	5.0E-02
Aroclor-1248	5.7E-01	mg/kg	2.9E-02	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	2.6E-01	1.0E-01
Aroclor-1254	2.1E+00	mg/kg	1.1E-01	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	5.8E-01	5.8E-02
beta-BHC	3.1E-03	mg/kg	1.6E-04	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	2.8E-04	7.0E-05
Dieldrin	8.6E-03	mg/kg	4.4E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	5.7E-03	5.7E-04
Endrin	8.7E-03	mg/kg	4.4E-04	mg/kg-d	1.0E-01	1.0E-01	mg/kg-d	4.3E-03	4.3E-03
Technical Chlordane	6.1E-03	mg/kg	3.1E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	1.1E-03	1.1E-04
Antimony	5.9E-01	mg/kg	3.0E-02	mg/kg-d					
Arsenic	2.3E+00	mg/kg	1.2E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	2.3E-02	9.2E-03
Barium	3.5E+01	mg/kg	1.8E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	4.3E-02	2.1E-02
Beryllium	4.9E-01	mg/kg	2.5E-02	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	1.7E-01	1.7E-02
Cadmium	2.1E-01	mg/kg	1.1E-02	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	7.5E-03	5.4E-04
Chromium	1.2E+01	mg/kg	6.1E-01	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	6.1E-01	1.2E-01
Cobalt	5.3E+00	mg/kg	2.7E-01	mg/kg-d					
Copper	1.7E+01	mg/kg	8.6E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.8E-02	1.4E-02
Lead	5.2E+01	mg/kg	2.7E+00	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	6.9E-01	6.9E-02
Manganese	3.3E+02	mg/kg	1.7E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.7E-02	1.7E-03
Mercury	6.8E-02	mg/kg	3.5E-03	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	7.7E-03	3.9E-03
Molybdenum	2.2E+00	mg/kg	1.1E-01	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	3.2E-02	3.2E-03
Selenium	1.4E+00	mg/kg	7.1E-02	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	1.6E-01	4.7E-02
Vanadium	1.7E+01	mg/kg	8.8E-01	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	7.7E-02	7.7E-03
Zinc	6.1E+01	mg/kg	3.1E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.1E-01	2.4E-02
Toxicity Equivalency - Birds	8.3E-04	mg/kg	4.2E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**3.0E+00**	3.0E-01
							HAZARD INDICES:	**7.0E+00**	9.1E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-17.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	2.1E-03	mg/kg	7.1E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.5E-01	2.5E-02
4,4'-DDE	2.3E-03	mg/kg	7.8E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.8E-01	2.8E-02
alpha-Chlordane	2.6E-03	mg/kg	8.7E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	3.1E-03	3.1E-04
Aroclor, Total	8.8E-02	mg/kg	3.0E-02	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	2.7E-01	1.1E-01
Aroclor-1254	8.3E-02	mg/kg	2.8E-02	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.6E-01	1.6E-02
Aroclor-1268	5.2E-03	mg/kg	1.8E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.6E-03	1.6E-04
delta-BHC	4.6E-04	mg/kg	1.5E-04	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	2.7E-04	6.9E-05
Dieldrin	2.9E-03	mg/kg	9.7E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	1.3E-02	1.3E-03
Endosulfan Sulfate	2.9E-03	mg/kg	9.7E-04	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.5E-03	1.5E-04
gamma-Chlordane	3.6E-03	mg/kg	1.2E-03	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	4.3E-03	4.3E-04
Heptachlor Epoxide	5.5E-04	mg/kg	1.9E-04	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	4.5E-06	4.5E-07
Methoxychlor	2.0E-03	mg/kg	6.6E-04	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	8.3E-06	8.3E-07
Technical Chlordane	9.4E-02	mg/kg	3.2E-02	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	1.1E-01	1.1E-02
Antimony	2.1E-01	mg/kg	7.0E-02	mg/kg-d					
Arsenic	5.7E-01	mg/kg	1.9E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	3.7E-02	1.5E-02
Barium	4.4E+01	mg/kg	1.5E+01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	3.6E-01	1.8E-01
Beryllium	2.6E-01	mg/kg	8.7E-02	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	5.9E-01	5.9E-02
Cadmium	2.4E+00	mg/kg	8.0E-01	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	5.5E-01	4.0E-02
Chromium	8.2E+00	mg/kg	2.8E+00	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**2.8E+00**	5.5E-01
Cobalt	9.6E-01	mg/kg	3.3E-01	mg/kg-d					
Copper	1.0E+01	mg/kg	3.5E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	7.4E-02	5.7E-02
Lead	2.8E+01	mg/kg	9.6E+00	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	**2.5E+00**	2.5E-01
Manganese	1.6E+02	mg/kg	5.4E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	5.5E-02	5.5E-03
Mercury	4.5E-02	mg/kg	1.5E-02	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	3.4E-02	1.7E-02
Mercury (methyl)	3.3E-03	mg/kg	1.1E-03	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	1.7E-01	1.7E-02
Molybdenum	1.3E+00	mg/kg	4.3E-01	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	1.2E-01	1.2E-02
Nickel	2.8E+00	mg/kg	9.5E-01	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.2E-02	8.9E-03
Selenium	3.2E-01	mg/kg	1.1E-01	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	2.5E-01	7.3E-02
Silver	7.7E-02	mg/kg	2.6E-02	mg/kg-d	9.0E+01	9.0E+02	mg/kg-d	2.9E-04	2.9E-05
Thallium	6.8E-02	mg/kg	2.3E-02	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	6.6E-03	4.6E-03
Vanadium	4.8E+00	mg/kg	1.6E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.4E-01	1.4E-02
Zinc	1.0E+02	mg/kg	3.4E+01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	**2.4E+00**	2.6E-01
Toxicity Equivalency - Birds	1.7E-04	mg/kg	5.7E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**4.1E+00**	4.1E-01
							HAZARD INDICES:	**1.5E+01**	**2.2E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-17.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Birds	6.8E-03	3.0E+00	-	4.1E+00	-	-	***7.1E+00***	***32%***
Chromium	4.3E-04	6.1E-01	-	2.8E+00	-	-	***3.4E+00***	***15%***
Lead	4.6E-04	6.9E-01	-	2.5E+00	-	-	***3.2E+00***	***14%***
Zinc	3.8E-04	2.1E-01	-	2.4E+00	-	-	***2.6E+00***	***12%***
Beryllium	2.9E-05	1.7E-01	-	5.9E-01	-	-	7.6E-01	3%
Aroclor-1254		5.8E-01	-	1.6E-01	-	-	7.4E-01	3%
4,4'-DDE		3.4E-01	-	2.8E-01	-	-	6.1E-01	3%
Cadmium		7.5E-03	-	5.5E-01	-	-	5.6E-01	3%
4,4'-DDT		5.0E-01	-		-	-	5.0E-01	2%
4,4'-DDD		1.7E-01	-	2.5E-01	-	-	4.3E-01	2%
Selenium	4.6E-04	1.6E-01	-	2.5E-01	-	-	4.1E-01	2%
Barium		4.3E-02	-	3.6E-01	-	-	4.0E-01	2%
Aroclor, Total				2.7E-01			2.7E-01	1%
Aroclor-1248		2.6E-01	-		-	-	2.6E-01	1%
Vanadium		7.7E-02	-	1.4E-01	-	-	2.2E-01	1%
Mercury (methyl)				1.7E-01			1.7E-01	1%
Molybdenum		3.2E-02	-	1.2E-01	-	-	1.5E-01	1%
Technical Chlordane		1.1E-03	-	1.1E-01	-	-	1.1E-01	1%
Copper	2.4E-05	1.8E-02	-	7.4E-02	-	-	9.3E-02	0%
Manganese	3.4E-05	1.7E-02	-	5.5E-02	-	-	7.2E-02	0%
Arsenic		2.3E-02	-	3.7E-02	-	-	6.0E-02	0%
Mercury		7.7E-03	-	3.4E-02	-	-	4.1E-02	0%
Dieldrin		5.7E-03	-	1.3E-02	-	-	1.8E-02	0%
Nickel	5.4E-06			1.2E-02			1.2E-02	0%
Thallium	8.9E-05			6.6E-03			6.7E-03	0%
gamma-Chlordane	7.5E-06			4.3E-03			4.3E-03	0%
Endrin		4.3E-03	-		-	-	4.3E-03	0%
alpha-Chlordane	2.1E-07			3.1E-03			3.1E-03	0%
Aroclor-1268				1.6E-03			1.6E-03	0%
Endosulfan Sulfate	8.0E-06			1.5E-03			1.6E-03	0%
Fluoranthene		6.7E-04	-		-	-	6.7E-04	0%
Pyrene		6.2E-04	-		-	-	6.2E-04	0%
Aluminum	5.0E-04						5.0E-04	0%
Benzo(b)fluoranthene		4.5E-04	-		-	-	4.5E-04	0%
Phenanthrene		4.5E-04	-		-	-	4.5E-04	0%
Chrysene		3.2E-04	-		-	-	3.2E-04	0%
Benzo(a)anthracene		3.0E-04	-		-	-	3.0E-04	0%
Silver	7.8E-07			2.9E-04			2.9E-04	0%
beta-BHC		2.8E-04	-		-	-	2.8E-04	0%
delta-BHC				2.7E-04			2.7E-04	0%
Benzo(a)pyrene		2.7E-04	-		-	-	2.7E-04	0%
Benzo(k)fluoranthene		1.8E-04	-		-	-	1.8E-04	0%
Indeno(1,2,3-cd)pyrene		1.5E-04	-		-	-	1.5E-04	0%
Benzo(g,h,i)perylene		1.4E-04	-		-	-	1.4E-04	0%
Anthracene		1.4E-04	-		-	-	1.4E-04	0%

TABLE L-17.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ALLENDALE POND REACH - CT	
RECEPTOR: WOODCOCK	
TOTAL RISK (HI):	2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Dibenzo(a,h)anthracene		9.7E-05	-		-	-	9.7E-05	0%
Methoxychlor				8.3E-06			8.3E-06	0%
bis(2-Ethylhexyl)phthalate	7.6E-06						7.6E-06	0%
Heptachlor Epoxide				4.5E-06			4.5E-06	0%
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**9.2E-03**	**7.0E+00**	**-**	**1.5E+01**	**-**	**-**	**2.2E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**31%**		**69%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-17.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 3.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Birds	6.8E-04	3.0E-01	-	4.1E-01	-	-	7.1E-01	***23%***
Chromium	8.7E-05	1.2E-01	-	5.5E-01	-	-	6.8E-01	***22%***
Lead	4.6E-05	6.9E-02	-	2.5E-01	-	-	3.2E-01	***10%***
Zinc	4.2E-05	2.4E-02	-	2.6E-01	-	-	2.9E-01	9%
Barium		2.1E-02	-	1.8E-01	-	-	2.0E-01	7%
Selenium	1.3E-04	4.7E-02	-	7.3E-02	-	-	1.2E-01	4%
Aroclor, Total				1.1E-01			1.1E-01	4%
Aroclor-1248		1.0E-01	-		-	-	1.0E-01	3%
Beryllium	2.9E-06	1.7E-02	-	5.9E-02	-	-	7.6E-02	2%
Aroclor-1254		5.8E-02	-	1.6E-02	-	-	7.4E-02	2%
Copper	1.8E-05	1.4E-02	-	5.7E-02	-	-	7.1E-02	2%
4,4'-DDE		3.4E-02	-	2.8E-02	-	-	6.1E-02	2%
4,4'-DDT		5.0E-02	-		-	-	5.0E-02	2%
4,4'-DDD		1.7E-02	-	2.5E-02	-	-	4.3E-02	1%
Cadmium		5.4E-04	-	4.0E-02	-	-	4.1E-02	1%
Arsenic		9.2E-03	-	1.5E-02	-	-	2.4E-02	1%
Vanadium		7.7E-03	-	1.4E-02	-	-	2.2E-02	1%
Mercury		3.9E-03	-	1.7E-02	-	-	2.1E-02	1%
Mercury (methyl)				1.7E-02			1.7E-02	1%
Molybdenum		3.2E-03	-	1.2E-02	-	-	1.5E-02	0%
Technical Chlordane		1.1E-04	-	1.1E-02	-	-	1.1E-02	0%
Nickel	3.9E-06			8.9E-03			8.9E-03	0%
Manganese	3.4E-06	1.7E-03	-	5.5E-03	-	-	7.2E-03	0%
Thallium	6.2E-05			4.6E-03			4.7E-03	0%
Endrin		4.3E-03	-		-	-	4.3E-03	0%
Dieldrin		5.7E-04	-	1.3E-03	-	-	1.8E-03	0%
gamma-Chlordane	7.5E-07			4.3E-04			4.3E-04	0%
alpha-Chlordane	2.1E-08			3.1E-04			3.1E-04	0%
Aroclor-1268				1.6E-04			1.6E-04	0%
Endosulfan Sulfate	8.0E-07			1.5E-04			1.6E-04	0%
beta-BHC		7.0E-05	-		-	-	7.0E-05	0%
delta-BHC				6.9E-05			6.9E-05	0%
Fluoranthene		6.7E-05	-		-	-	6.7E-05	0%
Pyrene		6.2E-05	-		-	-	6.2E-05	0%
Aluminum	5.0E-05						5.0E-05	0%
Benzo(b)fluoranthene		4.5E-05	-		-	-	4.5E-05	0%
Phenanthrene		4.5E-05	-		-	-	4.5E-05	0%
Chrysene		3.2E-05	-		-	-	3.2E-05	0%
Benzo(a)anthracene		3.0E-05	-		-	-	3.0E-05	0%
Silver	7.8E-08			2.9E-05			2.9E-05	0%
Benzo(a)pyrene		2.7E-05	-		-	-	2.7E-05	0%
Benzo(k)fluoranthene		1.8E-05	-		-	-	1.8E-05	0%
Indeno(1,2,3-cd)pyrene		1.5E-05	-		-	-	1.5E-05	0%
Benzo(g,h,i)perylene		1.4E-05	-		-	-	1.4E-05	0%
Anthracene		1.4E-05	-		-	-	1.4E-05	0%

TABLE L-17.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 3.1E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Dibenzo(a,h)anthracene		9.7E-06	-		-	-	9.7E-06	0%
Methoxychlor				8.3E-07			8.3E-07	0%
bis(2-Ethylhexyl)phthalate	7.6E-07						7.6E-07	0%
Heptachlor Epoxide				4.5E-07			4.5E-07	0%
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**1.1E-03**	**9.1E-01**	**-**	**2.2E+00**	**-**	**-**	**3.1E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**30%**		**70%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-18.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	1.4E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.3E-04	1.3E-05
alpha-Chlordane	1.9E-05	mg/L	1.6E-06	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	5.7E-06	5.7E-07
Endosulfan Sulfate	3.2E-06	mg/L	2.7E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	4.3E-07	4.3E-08
gamma-Chlordane	2.1E-05	mg/L	1.8E-06	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	6.3E-06	6.3E-07
Aluminum	1.8E-01	mg/L	1.5E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.4E-04	1.4E-05
Beryllium	2.0E-04	mg/L	1.7E-05	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	1.1E-04	1.1E-05
Chromium	2.3E-03	mg/L	1.9E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.9E-04	3.8E-05
Cobalt	4.2E-04	mg/L	3.5E-05	mg/kg-d					
Copper	8.7E-03	mg/L	7.4E-04	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.6E-05	1.2E-05
Lead	4.4E-03	mg/L	3.7E-04	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	9.7E-05	9.7E-06
Manganese	1.3E-01	mg/L	1.1E-02	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.1E-05	1.1E-06
Nickel	1.9E-03	mg/L	1.6E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	2.0E-06	1.5E-06
Silver	5.9E-04	mg/L	5.0E-05	mg/kg-d	9.0E+01	9.0E+02	mg/kg-d	5.6E-07	5.6E-08
Thallium	2.2E-03	mg/L	1.9E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	5.4E-05	3.8E-05
Zinc	2.8E-02	mg/L	2.4E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.6E-04	1.8E-05
Nitrogen, Ammonia	1.4E-01	mg/L	1.2E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.3E-07	mg/L	1.1E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	7.9E-04	7.9E-05
							HAZARD INDICES:	1.7E-03	2.4E-04

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-18.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.3E-01	mg/kg	6.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-05	3.5E-06
Benzo(a)anthracene	7.6E-01	mg/kg	3.9E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.1E-04	2.1E-05
Benzo(a)pyrene	9.0E-01	mg/kg	4.6E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.5E-04	2.5E-05
Benzo(b)fluoranthene	1.2E+00	mg/kg	6.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.3E-04	3.3E-05
Benzo(g,h,i)perylene	8.3E-01	mg/kg	4.2E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.3E-04	2.3E-05
Benzo(k)fluoranthene	1.0E+00	mg/kg	5.1E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.8E-04	2.8E-05
Chrysene	1.2E+00	mg/kg	6.1E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.3E-04	3.3E-05
Dibenzo(a,h)anthracene	2.0E-01	mg/kg	1.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.5E-05	5.5E-06
Fluoranthene	2.1E+00	mg/kg	1.1E-01	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.8E-04	5.8E-05
Indeno(1,2,3-cd)pyrene	8.9E-01	mg/kg	4.5E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.5E-04	2.5E-05
Phenanthrene	9.3E-01	mg/kg	4.8E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.6E-04	2.6E-05
Pyrene	1.7E+00	mg/kg	8.4E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.6E-04	4.6E-05
4,4'-DDD	6.9E-03	mg/kg	3.5E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.3E-01	1.3E-02
4,4'-DDE	1.7E-02	mg/kg	8.5E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.1E-01	3.1E-02
4,4'-DDT	1.8E-02	mg/kg	9.2E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.3E-01	3.3E-02
Aroclor-1254	1.5E-01	mg/kg	7.8E-03	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	4.3E-02	4.3E-0
Aroclor-1268	2.4E-02	mg/kg	1.2E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.1E-03	1.1E-04
Dieldrin	2.8E-03	mg/kg	1.4E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	1.8E-03	1.8E-04
Technical Chlordane	2.1E-01	mg/kg	1.1E-02	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	3.7E-02	3.7E-03
Antimony	3.2E-01	mg/kg	1.6E-02	mg/kg-d					
Arsenic	5.5E+00	mg/kg	2.8E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	5.5E-02	2.2E-02
Barium	3.4E+02	mg/kg	1.7E+01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	4.1E-01	2.1E-01
Beryllium	8.0E-01	mg/kg	4.1E-02	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.8E-01	2.8E-02
Cadmium	1.8E+00	mg/kg	9.2E-02	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.3E-02	4.6E-03
Chromium	5.2E+01	mg/kg	2.6E+00	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**2.6E+00**	5.2E-01
Cobalt	5.8E+00	mg/kg	3.0E-01	mg/kg-d					
Copper	1.7E+02	mg/kg	8.8E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.9E-01	1.4E-01
Lead	4.4E+02	mg/kg	2.2E+01	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	**5.8E+00**	5.8E-01
Manganese	5.1E+02	mg/kg	2.6E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	2.6E-02	2.6E-03
Mercury	2.0E-01	mg/kg	1.0E-02	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	2.3E-02	1.2E-02
Molybdenum	2.5E+00	mg/kg	1.3E-01	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	3.6E-02	3.6E-03
Selenium	4.3E-01	mg/kg	2.2E-02	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	5.0E-02	1.5E-02
Thallium	3.8E-01	mg/kg	1.9E-02	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	5.5E-03	3.9E-03
Vanadium	3.8E+01	mg/kg	1.9E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.7E-01	1.7E-02
Zinc	4.9E+02	mg/kg	2.5E+01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	**1.7E+00**	1.9E-01
Toxicity Equivalency - Birds	4.7E-04	mg/kg	2.4E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	**1.7E+00**	1.7E-01
Toxicity Equivalency (PCB) - Birds	2.3E-05	mg/kg	1.2E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	8.3E-02	8.3E-03
							HAZARD INDICES:	**1.4E+01**	**2.0E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-18.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.2E-03	mg/kg	4.1E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.5E-01	1.5E-02
4,4'-DDE	3.2E-03	mg/kg	1.1E-03	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.9E-01	3.9E-02
4,4'-DDT	2.8E-03	mg/kg	9.5E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.4E-01	3.4E-02
alpha-Chlordane	2.4E-03	mg/kg	8.1E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	2.9E-03	2.9E-04
Aroclor, Total	4.2E-02	mg/kg	1.4E-02	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.3E-01	5.1E-02
Aroclor-1254	3.5E-02	mg/kg	1.2E-02	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	6.5E-02	6.5E-03
Aroclor-1268	7.3E-03	mg/kg	2.5E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.2E-03	2.2E-04
Dieldrin	8.2E-04	mg/kg	2.8E-04	mg/kg-d	7.7E-02	7.7E-01	mg/kg-d	3.6E-03	3.6E-04
Endosulfan Sulfate	1.1E-03	mg/kg	3.7E-04	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	5.9E-04	5.9E-05
gamma-Chlordane	1.3E-03	mg/kg	4.4E-04	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	1.6E-03	1.6E-04
Heptachlor Epoxide	5.4E-04	mg/kg	1.8E-04	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	4.4E-06	4.4E-07
Methoxychlor	9.6E-04	mg/kg	3.3E-04	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	4.1E-06	4.1E-07
Technical Chlordane	4.2E-02	mg/kg	1.4E-02	mg/kg-d	2.8E-01	2.8E+00	mg/kg-d	5.1E-02	5.1E-03
Antimony	1.4E-01	mg/kg	4.7E-02	mg/kg-d					
Arsenic	7.4E-01	mg/kg	2.5E-01	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	4.9E-02	2.0E-02
Barium	2.8E+01	mg/kg	9.4E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.3E-01	1.1E-01
Beryllium	1.2E-01	mg/kg	4.0E-02	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.7E-01	2.7E-02
Cadmium	5.3E+00	mg/kg	1.8E+00	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	**1.2E+00**	9.0E-02
Chromium	3.1E+00	mg/kg	1.1E+00	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**1.1E+00**	2.1E-01
Cobalt	6.3E-01	mg/kg	2.1E-01	mg/kg-d					
Copper	7.4E+00	mg/kg	2.5E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	5.3E-02	4.1E-02
Lead	6.4E+01	mg/kg	2.2E+01	mg/kg-d	3.9E+00	3.9E+01	mg/kg-d	**5.6E+00**	5.6E-01
Manganese	4.7E+01	mg/kg	1.6E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.6E-02	1.6E-03
Mercury	7.2E-02	mg/kg	2.4E-02	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	5.4E-02	2.7E-02
Mercury (methyl)	1.1E-03	mg/kg	3.8E-04	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	5.9E-02	5.9E-03
Molybdenum	2.8E-01	mg/kg	9.5E-02	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.7E-02	2.7E-03
Nickel	1.3E+00	mg/kg	4.3E-01	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.5E-03	4.0E-03
Selenium	2.0E+00	mg/kg	6.8E-01	mg/kg-d	4.4E-01	1.5E+00	mg/kg-d	**1.5E+00**	4.5E-01
Silver	1.0E-01	mg/kg	3.5E-02	mg/kg-d	9.0E+01	9.0E+02	mg/kg-d	3.9E-04	3.9E-05
Thallium	5.6E-02	mg/kg	1.9E-02	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	5.4E-03	3.8E-03
Vanadium	2.6E+00	mg/kg	8.9E-01	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	7.8E-02	7.8E-03
Zinc	1.7E+02	mg/kg	5.9E+01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	**4.1E+00**	4.5E-01
Toxicity Equivalency - Birds	3.4E-05	mg/kg	1.1E-05	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	8.2E-01	8.2E-02
Toxicity Equivalency (PCB) - Birds	1.0E-05	mg/kg	3.5E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.5E-01	2.5E-02
							HAZARD INDICES:	**1.7E+01**	**2.3E+00**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-6.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-18.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 3.1E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Lead	9.7E-05	5.8E+00	-	5.6E+00	-	-	***1.1E+01***	***37%***
Zinc	1.6E-04	1.7E+00	-	4.1E+00	-	-	***5.8E+00***	***19%***
Chromium	1.9E-04	2.6E+00	-	1.1E+00	-	-	***3.7E+00***	***12%***
Toxicity Equivalency - Birds	7.9E-04	1.7E+00	-	8.2E-01	-	-	***2.5E+00***	8%
Selenium		5.0E-02	-	1.5E+00	-	-	***1.6E+00***	5%
Cadmium		6.3E-02	-	1.2E+00	-	-	***1.3E+00***	4%
4,4'-DDE		3.1E-01	-	3.9E-01	-	-	7.0E-01	2%
4,4'-DDT		3.3E-01	-	3.4E-01	-	-	6.7E-01	2%
Barium		4.1E-01	-	2.3E-01	-	-	6.4E-01	2%
Beryllium	1.1E-04	2.8E-01	-	2.7E-01	-	-	5.5E-01	2%
Toxicity Equivalency (PCB) - Birds		8.3E-02	-	2.5E-01	-	-	3.3E-01	1%
4,4'-DDD		1.3E-01	-	1.5E-01	-	-	2.7E-01	1%
Vanadium		1.7E-01	-	7.8E-02	-	-	2.5E-01	1%
Copper	1.6E-05	1.9E-01	-	5.3E-02	-	-	2.4E-01	1%
Aroclor, Total				1.3E-01			1.3E-01	0%
Aroclor-1254		4.3E-02	-	6.5E-02	-	-	1.1E-01	0%
Arsenic		5.5E-02	-	4.9E-02	-	-	1.0E-01	0%
Technical Chlordane		3.7E-02	-	5.1E-02	-	-	8.8E-02	0%
Mercury		2.3E-02	-	5.4E-02	-	-	7.7E-02	0%
Molybdenum		3.6E-02	-	2.7E-02	-	-	6.3E-02	0%
Mercury (methyl)				5.9E-02			5.9E-02	0%
Manganese	1.1E-05	2.6E-02	-	1.6E-02	-	-	4.3E-02	0%
Thallium	5.4E-05	5.5E-03	-	5.4E-03	-	-	1.1E-02	0%
Nickel	2.0E-06			5.5E-03			5.5E-03	0%
Dieldrin		1.8E-03	-	3.6E-03	-	-	5.4E-03	0%
Aroclor-1268		1.1E-03	-	2.2E-03	-	-	3.3E-03	0%
alpha-Chlordane	5.7E-06			2.9E-03			2.9E-03	0%
gamma-Chlordane	6.3E-06			1.6E-03			1.6E-03	0%
Endosulfan Sulfate	4.3E-07			5.9E-04			5.9E-04	0%
Fluoranthene		5.8E-04	-		-	-	5.8E-04	0%
Pyrene		4.6E-04	-		-	-	4.6E-04	0%
Silver	5.6E-07			3.9E-04			3.9E-04	0%
Chrysene		3.3E-04	-		-	-	3.3E-04	0%
Benzo(b)fluoranthene		3.3E-04	-		-	-	3.3E-04	0%
Benzo(k)fluoranthene		2.8E-04	-		-	-	2.8E-04	0%
Phenanthrene		2.6E-04	-		-	-	2.6E-04	0%
Benzo(a)pyrene		2.5E-04	-		-	-	2.5E-04	0%
Indeno(1,2,3-cd)pyrene		2.5E-04	-		-	-	2.5E-04	0%
Benzo(g,h,i)perylene		2.3E-04	-		-	-	2.3E-04	0%
Benzo(a)anthracene		2.1E-04	-		-	-	2.1E-04	0%
Aluminum	1.4E-04						1.4E-04	0%
bis(2-Ethylhexyl)phthalate	1.3E-04						1.3E-04	0%
Dibenzo(a,h)anthracene		5.5E-05	-		-	-	5.5E-05	0%
Anthracene		3.5E-05	-		-	-	3.5E-05	0%
Heptachlor Epoxide				4.4E-06			4.4E-06	0%

TABLE L-18.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 3.1E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Methoxychlor				4.1E-06			4.1E-06	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
TOTAL MEDIUM-SPECIFIC RISK	1.7E-03	1.4E+01	-	1.7E+01	-	-	3.1E+01	
PERCENTAGE OF TOTAL RISK	0%	46%		54%			100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-18.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 4.3E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Lead	9.7E-06	5.8E-01	-	5.6E-01	-	-	***1.1E+00***	***27%***
Chromium	3.8E-05	5.2E-01	-	2.1E-01	-	-	7.4E-01	***17%***
Zinc	1.8E-05	1.9E-01	-	4.5E-01	-	-	6.4E-01	***15%***
Selenium		1.5E-02	-	4.5E-01	-	-	4.7E-01	***11%***
Barium		2.1E-01	-	1.1E-01	-	-	3.2E-01	7%
Toxicity Equivalency - Birds	7.9E-05	1.7E-01	-	8.2E-02	-	-	2.5E-01	6%
Copper	1.2E-05	1.4E-01	-	4.1E-02	-	-	1.8E-01	4%
Cadmium		4.6E-03	-	9.0E-02	-	-	9.4E-02	2%
4,4'-DDE		3.1E-02	-	3.9E-02	-	-	7.0E-02	2%
4,4'-DDT		3.3E-02	-	3.4E-02	-	-	6.7E-02	2%
Beryllium	1.1E-05	2.8E-02	-	2.7E-02	-	-	5.5E-02	1%
Aroclor, Total				5.1E-02			5.1E-02	1%
Arsenic		2.2E-02	-	2.0E-02	-	-	4.1E-02	1%
Mercury		1.2E-02	-	2.7E-02	-	-	3.9E-02	1%
Toxicity Equivalency (PCB) - Birds		8.3E-03	-	2.5E-02	-	-	3.3E-02	1%
4,4'-DDD		1.3E-02	-	1.5E-02	-	-	2.7E-02	1%
Vanadium		1.7E-02	-	7.8E-03	-	-	2.5E-02	1%
Aroclor-1254		4.3E-03	-	6.5E-03	-	-	1.1E-02	0%
Technical Chlordane		3.7E-03	-	5.1E-03	-	-	8.8E-03	0%
Thallium	3.8E-05	3.9E-03	-	3.8E-03	-	-	7.7E-03	0%
Molybdenum		3.6E-03	-	2.7E-03	-	-	6.3E-03	0%
Mercury (methyl)				5.9E-03			5.9E-03	0%
Manganese	1.1E-06	2.6E-03	-	1.6E-03	-	-	4.3E-03	0%
Nickel	1.5E-06			4.0E-03			4.0E-03	0%
Dieldrin		1.8E-04	-	3.6E-04	-	-	5.4E-04	0%
Aroclor-1268		1.1E-04	-	2.2E-04	-	-	3.3E-04	0%
alpha-Chlordane	5.7E-07			2.9E-04			2.9E-04	0%
gamma-Chlordane	6.3E-07			1.6E-04			1.6E-04	0%
Endosulfan Sulfate	4.3E-08			5.9E-05			5.9E-05	0%
Fluoranthene		5.8E-05	-		-	-	5.8E-05	0%
Pyrene		4.6E-05	-		-	-	4.6E-05	0%
Silver	5.6E-08			3.9E-05			3.9E-05	0%
Chrysene		3.3E-05	-		-	-	3.3E-05	0%
Benzo(b)fluoranthene		3.3E-05	-		-	-	3.3E-05	0%
Benzo(k)fluoranthene		2.8E-05	-		-	-	2.8E-05	0%
Phenanthrene		2.6E-05	-		-	-	2.6E-05	0%
Benzo(a)pyrene		2.5E-05	-		-	-	2.5E-05	0%
Indeno(1,2,3-cd)pyrene		2.5E-05	-		-	-	2.5E-05	0%
Benzo(g,h,i)perylene		2.3E-05	-		-	-	2.3E-05	0%
Benzo(a)anthracene		2.1E-05	-		-	-	2.1E-05	0%
Aluminum	1.4E-05						1.4E-05	0%
bis(2-Ethylhexyl)phthalate	1.3E-05						1.3E-05	0%
Dibenzo(a,h)anthracene		5.5E-06	-		-	-	5.5E-06	0%
Anthracene		3.5E-06	-		-	-	3.5E-06	0%
Heptachlor Epoxide				4.4E-07			4.4E-07	0%

TABLE L-18.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : WOODCOCK

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: WOODCOCK
TOTAL RISK (HI): 4.3E+00

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Methoxychlor				4.1E-07			4.1E-07	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Antimony								
Cobalt								
Toxicity Equivalency - Mammals								
Toxicity Equivalency (PCB) - Mammals								
TOTAL MEDIUM-SPECIFIC RISK	2.4E-04	2.0E+00	-	2.3E+00	-	-	4.3E+00	
PERCENTAGE OF TOTAL RISK	0%	47%		53%			100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-19.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]				Estimated Tissue Concentration			
		Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	7.1E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**1.5E-02**	7.3E-01	3.0E-02	3.0E-02
Benzo(a)anthracene	3.1E+00	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**1.1E-02**	3.3E+00	2.7E+00	2.7E+00
Benzo(a)pyrene	3.1E+00	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**6.8E-03**	3.3E+00	6.3E+00	6.3E+00
Benzo(b)fluoranthene	3.5E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**1.2E-02**	3.7E+00	3.1E+00	3.1E+00
Benzo(g,h,i)perylene	2.3E+00	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**2.7E-03**	2.5E+00	1.5E+01	1.5E+01
Benzo(k)fluoranthene	3.2E+00	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**7.3E-03**	3.4E+00	6.2E+00	6.2E+00
Chrysene	3.8E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**1.3E-02**	4.1E+00	3.7E+00	3.7E+00
Dibenzo(a,h)anthracene	6.1E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**6.0E-04**	6.7E-01	5.2E+00	5.2E+00
Fluoranthene	7.0E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**5.7E-02**	7.4E+00	1.5E+00	1.5E+00
Indeno(1,2,3-cd)pyrene	2.5E+00	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**2.6E-03**	2.8E+00	1.9E+01	1.9E+01
Phenanthrene	4.0E+00	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**8.1E-02**	4.1E+00	1.7E-01	1.7E-01
Pyrene	5.8E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**6.8E-02**	6.1E+00	6.6E-01	6.6E-01
4,4'-DDD	8.2E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**2.0E-05**	8.8E-03	1.4E-02	1.4E-02
4,4'-DDE	1.3E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.3E-05**	1.5E-02	1.2E-01	1.2E-01
4,4'-DDT	8.5E-03	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**1.2E-05**	9.3E-03	3.6E-02	3.6E-02
Aroclor-1254	5.2E-01	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**7.0E-04**	5.6E-01	2.5E+00	2.5E+00
Aroclor-1268	8.4E-02	3.4E-04	1.1E+00	5.3E+01	5.3E+01	**2.8E-05**	9.4E-02	4.5E+00	4.5E+00
Dieldrin	6.3E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**4.2E-05**	6.6E-03	1.9E-03	1.9E-03
Technical Chlordane	4.3E-01	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**1.1E-03**	4.6E-01	6.5E-01	6.5E-01
Antimony	6.2E-01	2.0E-03	-	5.0E-02	5.0E-02	**1.3E-03**	0.0E+00	3.1E-02	3.1E-02
Arsenic	7.7E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**7.7E-02**	1.9E-01	8.6E-03	8.6E-03
Barium	2.3E+02	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**7.2E+00**	4.2E+00	1.6E+01	1.6E+01
Beryllium	3.1E+00	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**6.2E-03**	2.8E-02	1.5E-01	1.5E-01
Cadmium	1.6E+00	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**7.1E-02**	1.7E+00	6.8E-01	6.8E-01
Chromium	2.3E+02	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**1.9E+00**	1.4E+01	9.9E+00	9.9E+00
Cobalt	1.3E+01	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**2.0E-02**	3.2E-01	7.5E-02	7.5E-02
Copper	2.1E+02	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**2.0E+01**	4.0E+01	5.1E+01	5.1E+01
Lead	4.5E+02	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**8.7E+00**	4.6E+01	4.5E+01	4.5E+01
Manganese	1.8E+03	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**2.9E+01**	7.9E+01	7.5E+00	7.5E+00
Mercury	5.8E-01	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**1.5E-02**	2.7E-02	2.6E-05	2.6E-05
Molybdenum	5.4E+01	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**2.7E+00**	1.0E+01	1.6E+01	1.6E+01
Selenium	7.0E-01	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**9.1E-02**	7.1E-02	2.2E-02	2.2E-02
Thallium	4.6E-01	8.0E-04	-	2.2E-02	2.2E-02	**3.7E-04**	0.0E+00	1.0E-02	1.0E-02
Vanadium	8.2E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**8.0E-02**	6.9E-01	2.0E-01	2.0E-01
Zinc	2.9E+02	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**1.0E+02**	1.0E+03	6.1E+02	6.1E+02
Toxicity Equivalency - Mammals	5.5E-05					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	3.8E-05					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (I.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF.

TABLE L-19.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	1.3E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	6.9E-03	6.9E-04
Beryllium	5.5E-05	mg/L	8.2E-06	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.2E-05	1.2E-06
Chromium	2.5E-03	mg/L	3.7E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.5E-07	2.5E-08
Cobalt	1.2E-04	mg/L	1.8E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.4E-04	2.4E-05
Copper	5.4E-03	mg/L	8.0E-04	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	1.9E-03	1.9E-04
Lead	2.9E-03	mg/L	4.3E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.4E-06	1.1E-06
Manganese	1.3E-01	mg/L	1.9E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.2E-04	6.8E-05
Nickel	1.9E-03	mg/L	2.9E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	9.4E-06	5.6E-06
Selenium	8.7E-05	mg/L	1.3E-05	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	6.4E-05	3.9E-05
Thallium	7.4E-06	mg/L	1.1E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	7.9E-06	7.9E-07
Zinc	2.0E-02	mg/L	3.0E-03	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	1.9E-05	9.4E-06
Nitrogen, Ammonia	3.9E-01	mg/L	5.8E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	5.6E-09	mg/L	8.4E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	8.4E-04	8.4E-05
							HAZARD INDICES:	1.0E-02	1.1E-

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-19.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	7.1E-01	mg/kg	2.6E-02	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.3E-04	1.3E-05
Benzo(a)anthracene	3.1E+00	mg/kg	1.1E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-01	1.1E-02
Benzo(a)pyrene	3.1E+00	mg/kg	1.1E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-01	1.1E-02
Benzo(b)fluoranthene	3.5E+00	mg/kg	1.3E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-01	1.3E-02
Benzo(g,h,i)perylene	2.3E+00	mg/kg	8.6E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.6E-02	8.6E-03
Benzo(k)fluoranthene	3.2E+00	mg/kg	1.2E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-01	1.2E-02
Chrysene	3.8E+00	mg/kg	1.4E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-01	1.4E-02
Dibenzo(a,h)anthracene	6.1E-01	mg/kg	2.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-02	2.3E-03
Fluoranthene	7.0E+00	mg/kg	2.6E-01	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	2.1E-03	1.0E-03
Indeno(1,2,3-cd)pyrene	2.5E+00	mg/kg	9.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.3E-02	9.3E-03
Phenanthrene	4.0E+00	mg/kg	1.5E-01	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	9.7E-03	9.7E-04
Pyrene	5.8E+00	mg/kg	2.1E-01	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	2.9E-03	1.7E-03
4,4'-DDD	8.2E-03	mg/kg	3.0E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.8E-04	7.6E-05
4,4'-DDE	1.3E-02	mg/kg	4.9E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.2E-04	1.2E-04
4,4'-DDT	8.5E-03	mg/kg	3.1E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.9E-04	7.9E-05
Aroclor-1254	5.2E-01	mg/kg	1.9E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	2.8E-01	2.8E-02
Aroclor-1268	8.4E-02	mg/kg	3.1E-03	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	4.6E-02	4.6E-03
Dieldrin	6.3E-03	mg/kg	2.3E-04	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	8.4E-03	8.4E-04
Technical Chlordane	4.3E-01	mg/kg	1.6E-02	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.5E-03	1.7E-03
Antimony	6.2E-01	mg/kg	2.3E-02	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	8.8E-01	8.8E-02
Arsenic	7.7E+00	mg/kg	2.8E-01	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	**2.3E+00**	2.3E-01
Barium	2.3E+02	mg/kg	8.5E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.1E-01	5.3E-02
Beryllium	3.1E+00	mg/kg	1.1E-01	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.7E-01	1.7E-02
Cadmium	1.6E+00	mg/kg	6.0E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.0E-02	6.0E-03
Chromium	2.3E+02	mg/kg	8.5E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	5.8E-03	5.8E-04
Cobalt	1.3E+01	mg/kg	4.8E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**6.4E+00**	6.4E-01
Copper	2.1E+02	mg/kg	7.6E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**1.8E+01**	**1.8E+00**
Lead	4.5E+02	mg/kg	1.7E+01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.3E-01	4.4E-02
Manganese	1.8E+03	mg/kg	6.8E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	7.7E-01	2.4E-01
Mercury	5.8E-01	mg/kg	2.1E-02	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	8.1E-02	8.1E-03
Molybdenum	5.4E+01	mg/kg	2.0E+00	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**1.0E+01**	**1.0E+00**
Selenium	7.0E-01	mg/kg	2.6E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.3E-01	7.9E-02
Thallium	4.6E-01	mg/kg	1.7E-02	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.2E-01	1.2E-02
Vanadium	8.2E+01	mg/kg	3.0E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**7.2E+00**	**1.4E+00**
Zinc	2.9E+02	mg/kg	1.1E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	6.6E-02	3.3E-02
Toxicity Equivalency - Mammals	5.5E-05	mg/kg	2.0E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.0E+00**	2.0E-01
Toxicity Equivalency (PCB) - Mammals	3.8E-05	mg/kg	1.4E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.4E+00**	1.4E-01
							HAZARD INDICES:	**5.1E+01**	**6.2E+00**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-19.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.5E-02	mg/kg	1.5E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	7.7E-06	7.7E-07
Benzo(a)anthracene	1.1E-02	mg/kg	1.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-03	1.2E-04
Benzo(a)pyrene	6.8E-03	mg/kg	7.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.2E-04	7.2E-05
Benzo(b)fluoranthene	1.2E-02	mg/kg	1.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-03	1.3E-04
Benzo(g,h,i)perylene	2.7E-03	mg/kg	2.8E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.8E-04	2.8E-05
Benzo(k)fluoranthene	7.3E-03	mg/kg	7.7E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.7E-04	7.7E-05
Chrysene	1.3E-02	mg/kg	1.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-03	1.4E-04
Dibenzo(a,h)anthracene	6.0E-04	mg/kg	6.3E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.3E-05	6.3E-06
Fluoranthene	5.7E-02	mg/kg	6.0E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.8E-05	2.4E-05
Indeno(1,2,3-cd)pyrene	2.6E-03	mg/kg	2.7E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-04	2.7E-05
Phenanthrene	8.1E-02	mg/kg	8.5E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	5.7E-04	5.7E-05
Pyrene	6.8E-02	mg/kg	7.1E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	9.5E-05	5.7E-05
4,4'-DDD	2.0E-05	mg/kg	2.1E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.6E-06	5.3E-07
4,4'-DDE	1.3E-05	mg/kg	1.3E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.7E-06	3.4E-07
4,4'-DDT	1.2E-05	mg/kg	1.3E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.6E-06	3.2E-07
Aroclor-1254	7.0E-04	mg/kg	7.4E-05	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	1.1E-03	1.
Aroclor-1268	2.8E-05	mg/kg	3.0E-06	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	4.3E-05	4.3E-06
Dieldrin	4.2E-05	mg/kg	4.4E-06	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	1.6E-04	1.6E-05
Technical Chlordane	1.1E-03	mg/kg	1.2E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.6E-05	1.3E-05
Antimony	1.3E-03	mg/kg	1.3E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	5.1E-03	5.1E-04
Arsenic	7.7E-02	mg/kg	8.1E-03	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	6.4E-02	6.4E-03
Barium	7.2E+00	mg/kg	7.6E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.0E-02	4.7E-03
Beryllium	6.2E-03	mg/kg	6.5E-04	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	9.8E-04	9.8E-05
Cadmium	7.1E-02	mg/kg	7.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.5E-03	7.5E-04
Chromium	1.9E+00	mg/kg	2.0E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.4E-04	1.4E-05
Cobalt	2.0E-02	mg/kg	2.1E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.7E-02	2.7E-03
Copper	2.0E+01	mg/kg	2.1E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**5.0E+00**	5.0E-01
Lead	8.7E+00	mg/kg	9.1E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	7.2E-03	2.4E-03
Manganese	2.9E+01	mg/kg	3.1E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.5E-02	1.1E-02
Mercury	1.5E-02	mg/kg	1.6E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	6.0E-03	6.0E-04
Molybdenum	2.7E+00	mg/kg	2.8E-01	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**1.5E+00**	1.5E-01
Selenium	9.1E-02	mg/kg	9.5E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	4.8E-02	2.9E-02
Thallium	3.7E-04	mg/kg	3.9E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.8E-04	2.8E-05
Vanadium	8.0E-02	mg/kg	8.4E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	2.0E-02	4.0E-03
Zinc	1.0E+02	mg/kg	1.0E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	6.6E-02	3.3E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	**6.8E+00**	7.4E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-19.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.3E-03	mg/kg	8.4E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.1E-03	2.1E-04
4,4'-DDE	1.7E-03	mg/kg	1.1E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.3E-03	2.7E-04
4,4'-DDT	9.6E-04	mg/kg	6.1E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.6E-04	1.5E-04
alpha-Chlordane	1.4E-03	mg/kg	9.1E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.0E-04	9.9E-05
Aroclor, Total	5.0E-02	mg/kg	3.2E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	4.7E-01	4.7E-02
Aroclor-1254	3.9E-02	mg/kg	2.5E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	3.6E-01	3.6E-02
Aroclor-1268	1.1E-02	mg/kg	7.2E-03	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	1.1E-01	1.1E-02
Dieldrin	8.1E-04	mg/kg	5.1E-04	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	1.9E-02	1.9E-03
Endosulfan Sulfate	1.4E-03	mg/kg	8.6E-04	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	5.1E-03	3.4E-04
gamma-Chlordane	1.3E-03	mg/kg	8.1E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.8E-04	8.8E-05
Heptachlor Epoxide	3.1E-04	mg/kg	2.0E-04	mg/kg-d	2.5E-02	2.5E-01	mg/kg-d	7.8E-03	7.8E-04
Technical Chlordane	4.1E-02	mg/kg	2.6E-02	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	5.6E-03	2.8E-03
Antimony	2.2E-01	mg/kg	1.4E-01	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	**5.4E+00**	5.4E-01
Arsenic	6.0E-01	mg/kg	3.8E-01	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	**3.0E+00**	3.0E-01
Barium	3.6E+01	mg/kg	2.3E+01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	3.0E-01	1.4E-01
Beryllium	2.5E-01	mg/kg	1.6E-01	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	2.4E-01	2.4E-02
Cadmium	3.0E+00	mg/kg	1.9E+00	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	**1.9E+00**	1.9E-01
Chromium	9.5E+00	mg/kg	6.0E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	4.1E-03	4.1E-04
Cobalt	1.2E+00	mg/kg	7.3E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**9.6E+00**	9.6E-01
Copper	1.4E+01	mg/kg	8.8E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**2.1E+01**	**2.1E+00**
Lead	2.8E+01	mg/kg	1.8E+01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.4E-01	4.8E-02
Manganese	2.3E+02	mg/kg	1.4E+02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	**1.6E+00**	5.0E-01
Mercury	4.8E-02	mg/kg	3.0E-02	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	1.1E-01	1.1E-02
Mercury (methyl)	4.0E-03	mg/kg	2.5E-03	mg/kg-d	3.2E-02	1.6E-01	mg/kg-d	7.8E-02	1.6E-02
Molybdenum	2.3E+00	mg/kg	1.4E+00	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**7.6E+00**	7.6E-01
Nickel	5.0E+00	mg/kg	3.1E+00	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	1.0E-01	6.1E-02
Selenium	5.6E-01	mg/kg	3.5E-01	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	**1.8E+00**	**1.1E+00**
Silver	1.9E-01	mg/kg	1.2E-01	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	5.3E-03	5.3E-04
Thallium	5.5E-02	mg/kg	3.5E-02	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.5E-01	2.5E-02
Vanadium	4.0E+00	mg/kg	2.5E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**6.0E+00**	**1.2E+00**
Zinc	8.5E+01	mg/kg	5.4E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	3.4E-01	1.7E-01
Toxicity Equivalency - Mammals	3.5E-06	mg/kg	2.2E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.2E+00**	2.2E-01
Toxicity Equivalency (PCB) - Mammals	1.1E-05	mg/kg	6.9E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**6.9E+00**	6.9E-01
							HAZARD INDICES:	**7.0E+01**	**9.1E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-19.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 1.3E+02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Copper	1.9E-03	1.8E+01	5.0E+00	2.1E+01	-	-	***4.4E+01***	***34%***
Molybdenum		1.0E+01	1.5E+00	7.6E+00	-	-	***2.0E+01***	***15%***
Cobalt	2.4E-04	6.4E+00	2.7E-02	9.6E+00	-	-	***1.6E+01***	***13%***
Vanadium		7.2E+00	2.0E-02	6.0E+00	-	-	***1.3E+01***	***10%***
Toxicity Equivalency (PCB) - Mammals		1.4E+00	-	6.9E+00	-	-	***8.3E+00***	7%
Antimony		8.8E-01	5.1E-03	5.4E+00	-	-	***6.3E+00***	5%
Arsenic		2.3E+00	6.4E-02	3.0E+00	-	-	***5.3E+00***	4%
Toxicity Equivalency - Mammals	8.4E-04	2.0E+00	-	2.2E+00	-	-	***4.2E+00***	3%
Manganese	2.2E-04	7.7E-01	3.5E-02	1.6E+00	-	-	***2.4E+00***	2%
Selenium	6.4E-05	1.3E-01	4.8E-02	1.8E+00	-	-	***2.0E+00***	2%
Cadmium		6.0E-02	7.5E-03	1.9E+00	-	-	***1.9E+00***	2%
Aroclor-1254		2.8E-01	1.1E-03	3.6E-01	-	-	6.4E-01	1%
Zinc	1.9E-05	6.6E-02	6.6E-02	3.4E-01	-	-	4.7E-01	0%
Aroclor, Total				4.7E-01			4.7E-01	0%
Barium		1.1E-01	1.0E-02	3.0E-01	-	-	4.3E-01	0%
Beryllium	1.2E-05	1.7E-01	9.8E-04	2.4E-01	-	-	4.1E-01	0%
Thallium	7.9E-06	1.2E-01	2.8E-04	2.5E-01	-	-	3.7E-01	0%
Lead	3.4E-06	1.3E-01	7.2E-03	1.4E-01	-	-	2.8E-01	0%
Mercury		8.1E-02	6.0E-03	1.1E-01	-	-	2.0E-01	0%
Aroclor-1268		4.6E-02	4.3E-05	1.1E-01	-	-	1.5E-01	0%
Chrysene		1.4E-01	1.4E-03		-	-	1.4E-01	0%
Benzo(b)fluoranthene		1.3E-01	1.3E-03		-	-	1.3E-01	0%
Benzo(k)fluoranthene		1.2E-01	7.7E-04		-	-	1.2E-01	0%
Benzo(a)anthracene		1.1E-01	1.2E-03		-	-	1.2E-01	0%
Benzo(a)pyrene		1.1E-01	7.2E-04		-	-	1.1E-01	0%
Nickel	9.4E-06			1.0E-01			1.0E-01	0%
Indeno(1,2,3-cd)pyrene		9.3E-02	2.7E-04		-	-	9.3E-02	0%
Benzo(g,h,i)perylene		8.6E-02	2.8E-04		-	-	8.6E-02	0%
Mercury (methyl)				7.8E-02			7.8E-02	0%
Dieldrin		8.4E-03	1.6E-04	1.9E-02	-	-	2.7E-02	0%
Dibenzo(a,h)anthracene		2.3E-02	6.3E-05		-	-	2.3E-02	0%
Phenanthrene		9.7E-03	5.7E-04		-	-	1.0E-02	0%
Chromium	2.5E-07	5.8E-03	1.4E-04	4.1E-03	-	-	1.0E-02	0%
Technical Chlordane		3.5E-03	2.6E-05	5.6E-03	-	-	9.1E-03	0%
Heptachlor Epoxide				7.8E-03			7.8E-03	0%
Aluminum	6.9E-03						6.9E-03	0%
Silver				5.3E-03			5.3E-03	0%
Endosulfan Sulfate				5.1E-03			5.1E-03	0%
Pyrene		2.9E-03	9.5E-05		-	-	3.0E-03	0%
Fluoranthene		2.1E-03	4.8E-05		-	-	2.1E-03	0%
4,4'-DDE		6.2E-04	1.7E-06	1.3E-03	-	-	2.0E-03	0%
4,4'-DDD		3.8E-04	2.6E-06	1.1E-03	-	-	1.4E-03	0%
4,4'-DDT		3.9E-04	1.6E-06	7.6E-04	-	-	1.2E-03	0%
alpha-Chlordane				2.0E-04			2.0E-04	0%
gamma-Chlordane				1.8E-04			1.8E-04	0%

TABLE L-19.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	1.3E+02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Anthracene		1.3E-04	7.7E-06		-	-	1.4E-04	0%
bis(2-Ethylhexyl)phthalate								
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	1.0E-02	5.1E+01	6.8E+00	7.0E+01	-	-	1.3E+02	
PERCENTAGE OF TOTAL RISK	0%	40%	5%	54%			100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-19.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 1.6E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Copper	1.9E-04	1.8E+00	5.0E-01	2.1E+00	-	-	***4.4E+00***	***27%***
Vanadium		1.4E+00	4.0E-03	1.2E+00	-	-	***2.7E+00***	***16%***
Molybdenum		1.0E+00	1.5E-01	7.6E-01	-	-	***2.0E+00***	***12%***
Cobalt	2.4E-05	6.4E-01	2.7E-03	9.6E-01	-	-	***1.6E+00***	10%
Selenium	3.9E-05	7.9E-02	2.9E-02	1.1E+00	-	-	***1.2E+00***	7%
Toxicity Equivalency (PCB) - Mammals		1.4E-01	-	6.9E-01	-	-	8.3E-01	5%
Manganese	6.8E-05	2.4E-01	1.1E-02	5.0E-01	-	-	7.5E-01	5%
Antimony		8.8E-02	5.1E-04	5.4E-01	-	-	6.3E-01	4%
Arsenic		2.3E-01	6.4E-03	3.0E-01	-	-	5.3E-01	3%
Toxicity Equivalency - Mammals	8.4E-05	2.0E-01	-	2.2E-01	-	-	4.2E-01	3%
Zinc	9.4E-06	3.3E-02	3.3E-02	1.7E-01	-	-	2.3E-01	1%
Barium		5.3E-02	4.7E-03	1.4E-01	-	-	2.0E-01	1%
Cadmium		6.0E-03	7.5E-04	1.9E-01	-	-	1.9E-01	1%
Lead	1.1E-06	4.4E-02	2.4E-03	4.8E-02	-	-	9.4E-02	1%
Aroclor-1254		2.8E-02	1.1E-04	3.6E-02	-	-	6.4E-02	0%
Nickel	5.6E-06			6.1E-02			6.1E-02	0%
Aroclor, Total				4.7E-02			4.7E-02	0%
Beryllium	1.2E-06	1.7E-02	9.8E-05	2.4E-02	-	-	4.1E-02	0%
Thallium	7.9E-07	1.2E-02	2.8E-05	2.5E-02	-	-	3.7E-02	0%
Mercury		8.1E-03	6.0E-04	1.1E-02	-	-	2.0E-02	0%
Mercury (methyl)				1.6E-02			1.6E-02	0%
Aroclor-1268		4.6E-03	4.3E-06	1.1E-02	-	-	1.5E-02	0%
Chrysene		1.4E-02	1.4E-04		-	-	1.4E-02	0%
Benzo(b)fluoranthene		1.3E-02	1.3E-04		-	-	1.3E-02	0%
Benzo(k)fluoranthene		1.2E-02	7.7E-05		-	-	1.2E-02	0%
Benzo(a)anthracene		1.1E-02	1.2E-04		-	-	1.2E-02	0%
Benzo(a)pyrene		1.1E-02	7.2E-05		-	-	1.1E-02	0%
Indeno(1,2,3-cd)pyrene		9.3E-03	2.7E-05		-	-	9.3E-03	0%
Benzo(g,h,i)perylene		8.6E-03	2.8E-05		-	-	8.6E-03	0%
Technical Chlordane		1.7E-03	1.3E-05	2.8E-03	-	-	4.5E-03	0%
Dieldrin		8.4E-04	1.6E-05	1.9E-03	-	-	2.7E-03	0%
Dibenzo(a,h)anthracene		2.3E-03	6.3E-06		-	-	2.3E-03	0%
Pyrene		1.7E-03	5.7E-05		-	-	1.8E-03	0%
Fluoranthene		1.0E-03	2.4E-05		-	-	1.1E-03	0%
Phenanthrene		9.7E-04	5.7E-05		-	-	1.0E-03	0%
Chromium	2.5E-08	5.8E-04	1.4E-05	4.1E-04	-	-	1.0E-03	0%
Heptachlor Epoxide				7.8E-04			7.8E-04	0%
Aluminum	6.9E-04						6.9E-04	0%
Silver				5.3E-04			5.3E-04	0%
4,4'-DDE		1.2E-04	3.4E-07	2.7E-04	-	-	3.9E-04	0%
Endosulfan Sulfate				3.4E-04			3.4E-04	0%
4,4'-DDD		7.6E-05	5.3E-07	2.1E-04	-	-	2.9E-04	0%
4,4'-DDT		7.9E-05	3.2E-07	1.5E-04	-	-	2.3E-04	0%
alpha-Chlordane				9.9E-05			9.9E-05	0%
gamma-Chlordane				8.8E-05			8.8E-05	0%

TABLE L-19.7

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	1.6E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Anthracene		1.3E-05	7.7E-07		-	-	1.4E-05	0%
bis(2-Ethylhexyl)phthalate								
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	1.1E-03	6.2E+00	7.4E-01	9.1E+00	-	-	1.6E+01	
PERCENTAGE OF TOTAL RISK	0%	39%	5%	57%			100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-20.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: ALLENDALE POND REACH - CT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

		Literature-based BAFs[a]				Estimated Tissue Concentration			
Analyte	Medium EPC Value	Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	5.0E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**1.0E-02**	5.1E-01	2.1E-02	2.1E-02
Benzo(a)anthracene	1.1E+00	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**3.9E-03**	1.1E+00	9.3E-01	9.3E-01
Benzo(a)pyrene	9.9E-01	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**2.2E-03**	1.1E+00	2.0E+00	2.0E+00
Benzo(b)fluoranthene	1.6E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**5.8E-03**	1.7E+00	1.5E+00	1.5E+00
Benzo(g,h,i)perylene	5.0E-01	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**5.7E-04**	5.4E-01	3.2E+00	3.2E+00
Benzo(k)fluoranthene	6.5E-01	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**1.5E-03**	7.0E-01	1.3E+00	1.3E+00
Chrysene	1.2E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**4.0E-03**	1.3E+00	1.1E+00	1.1E+00
Dibenzo(a,h)anthracene	3.5E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**3.4E-04**	3.8E-01	3.0E+00	3.0E+00
Fluoranthene	2.4E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**2.0E-02**	2.6E+00	5.3E-01	5.3E-01
Indeno(1,2,3-cd)pyrene	5.3E-01	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**5.5E-04**	5.7E-01	4.0E+00	4.0E+00
Phenanthrene	1.6E+00	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**3.3E-02**	1.7E+00	7.1E-02	7.1E-02
Pyrene	2.2E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**2.6E-02**	2.3E+00	2.6E-01	2.6E-01
4,4'-DDD	9.6E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**2.3E-05**	1.0E-02	1.7E-02	1.7E-02
4,4'-DDE	1.9E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.8E-05**	2.0E-02	1.6E-01	1.6E-01
4,4'-DDT	2.8E-02	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**4.0E-05**	3.0E-02	1.2E-01	1.2E-01
Aroclor-1248	5.7E-01	2.0E-03	1.1E+00	2.4E+00	2.4E+00	**1.1E-03**	6.1E-01	1.4E+00	1.4E+00
Aroclor-1254	2.1E+00	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**2.8E-03**	2.2E+00	9.9E+00	9.9E+00
beta-BHC	3.1E-03	5.1E-02	1.0E+00	9.1E-03	9.1E-03	**1.6E-04**	3.2E-03	2.8E-05	2.8E-05
Dieldrin	8.6E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**5.8E-05**	9.1E-03	2.6E-03	2.6E-03
Endrin	8.7E-03	7.6E-03	1.1E+00	2.4E-01	2.4E-01	**6.6E-05**	9.1E-03	2.1E-03	2.1E-03
Technical Chlordane	6.1E-03	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**1.6E-05**	6.5E-03	9.2E-03	9.2E-03
Antimony	5.9E-01	2.0E-03	-	5.0E-02	5.0E-02	**1.2E-03**	0.0E+00	3.0E-02	3.0E-02
Arsenic	2.3E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**2.3E-02**	5.7E-02	2.6E-03	2.6E-03
Barium	3.5E+01	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**1.1E+00**	6.4E-01	2.4E+00	2.4E+00
Beryllium	4.9E-01	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**9.9E-04**	4.4E-03	2.5E-02	2.5E-02
Cadmium	2.1E-01	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**9.3E-03**	2.2E-01	8.9E-02	8.9E-02
Chromium	1.2E+01	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**9.9E-02**	7.4E-01	5.2E-01	5.2E-01
Cobalt	5.3E+00	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**7.9E-03**	1.3E-01	3.1E-02	3.1E-02
Copper	1.7E+01	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**1.6E+00**	3.3E+00	4.2E+00	4.2E+00
Lead	5.2E+01	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**1.0E+00**	5.4E+00	5.2E+00	5.2E+00
Manganese	3.3E+02	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**5.2E+00**	1.4E+01	1.3E+00	1.3E+00
Mercury	6.8E-02	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**1.8E-03**	3.2E-03	3.1E-06	3.1E-06
Molybdenum	2.2E+00	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**1.1E-01**	4.3E-01	6.7E-01	6.7E-01
Selenium	1.4E+00	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**1.8E-01**	1.4E-01	4.4E-02	4.4E-02
Vanadium	1.7E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**1.7E-02**	1.4E-01	4.2E-02	4.2E-02
Zinc	6.1E+01	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**2.1E+01**	2.2E+02	1.3E+02	1.3E+02
Toxicity Equivalency - Mammals	8.3E-04					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (I.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF

TABLE L-20.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	1.5E-04	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	8.1E-06	8.1E-07
alpha-Chlordane	6.9E-07	mg/L	1.0E-07	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.2E-08	1.1E-08
Endosulfan Sulfate	5.9E-05	mg/L	8.8E-06	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	5.2E-05	3.5E-06
gamma-Chlordane	2.5E-05	mg/L	3.7E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.1E-07	4.0E-07
Aluminum	6.5E-01	mg/L	9.6E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	5.0E-02	5.0E-03
Beryllium	5.0E-05	mg/L	7.4E-06	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.1E-05	1.1E-06
Chromium	5.1E-03	mg/L	7.6E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	5.2E-07	5.2E-08
Cobalt	6.0E-04	mg/L	8.9E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.2E-03	1.2E-04
Copper	1.3E-02	mg/L	2.0E-03	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	4.7E-03	4.7E-04
Lead	2.1E-02	mg/L	3.1E-03	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.4E-05	8.2E-06
Manganese	4.0E-01	mg/L	5.9E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.7E-04	2.1E-04
Nickel	4.9E-03	mg/L	7.3E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	2.4E-05	1.4E-05
Selenium	2.4E-03	mg/L	3.5E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.8E-03	1.1E-03
Silver	8.3E-04	mg/L	1.2E-04	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	5.6E-06	5.6E-07
Thallium	3.7E-03	mg/L	5.5E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	3.9E-03	3.9E-04
Zinc	6.5E-02	mg/L	9.6E-03	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	6.0E-05	3.0E-05
Nitrogen, Ammonia	2.4E-01	mg/L	3.6E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.1E-06	mg/L	1.7E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.7E-01	1.7E-02
							HAZARD INDICES:	2.3E-01	2.4E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-20.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	5.0E-01	mg/kg	1.8E-02	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	9.1E-05	9.1E-06
Benzo(a)anthracene	1.1E+00	mg/kg	3.9E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.9E-02	3.9E-03
Benzo(a)pyrene	9.9E-01	mg/kg	3.7E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.7E-02	3.7E-03
Benzo(b)fluoranthene	1.6E+00	mg/kg	6.0E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.0E-02	6.0E-03
Benzo(g,h,i)perylene	5.0E-01	mg/kg	1.8E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-02	1.8E-03
Benzo(k)fluoranthene	6.5E-01	mg/kg	2.4E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.4E-02	2.4E-03
Chrysene	1.2E+00	mg/kg	4.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.3E-02	4.3E-03
Dibenzo(a,h)anthracene	3.5E-01	mg/kg	1.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-02	1.3E-03
Fluoranthene	2.4E+00	mg/kg	9.0E-02	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	7.2E-04	3.6E-04
Indeno(1,2,3-cd)pyrene	5.3E-01	mg/kg	1.9E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-02	1.9E-03
Phenanthrene	1.6E+00	mg/kg	6.0E-02	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	4.0E-03	4.0E-04
Pyrene	2.2E+00	mg/kg	8.2E-02	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	1.1E-03	6.6E-04
4,4'-DDD	9.6E-03	mg/kg	3.5E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.4E-04	8.8E-05
4,4'-DDE	1.9E-02	mg/kg	6.9E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.6E-04	1.7E-04
4,4'-DDT	2.8E-02	mg/kg	1.0E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.3E-03	2.6E-04
Aroclor-1248	5.7E-01	mg/kg	2.1E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	3.1E-01	3.1E-02
Aroclor-1254	2.1E+00	mg/kg	7.6E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	**1.1E+00**	1.1E-01
beta-BHC	3.1E-03	mg/kg	1.1E-04	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	7.1E-05	3.6E-05
Dieldrin	8.6E-03	mg/kg	3.2E-04	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	1.2E-02	1.2E-03
Endrin	8.7E-03	mg/kg	3.2E-04	mg/kg-d	6.5E-02	6.5E-01	mg/kg-d	4.9E-03	4.9E-04
Technical Chlordane	6.1E-03	mg/kg	2.3E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.9E-05	2.5E-05
Antimony	5.9E-01	mg/kg	2.2E-02	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	8.3E-01	8.3E-02
Arsenic	2.3E+00	mg/kg	8.5E-02	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	6.8E-01	6.8E-02
Barium	3.5E+01	mg/kg	1.3E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.7E-02	8.1E-03
Beryllium	4.9E-01	mg/kg	1.8E-02	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	2.8E-02	2.8E-03
Cadmium	2.1E-01	mg/kg	7.9E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.9E-03	7.9E-04
Chromium	1.2E+01	mg/kg	4.4E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.0E-04	3.0E-05
Cobalt	5.3E+00	mg/kg	2.0E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**2.6E+00**	2.6E-01
Copper	1.7E+01	mg/kg	6.2E-01	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**1.5E+00**	1.5E-01
Lead	5.2E+01	mg/kg	1.9E+00	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.5E-02	5.1E-03
Manganese	3.3E+02	mg/kg	1.2E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.4E-01	4.2E-02
Mercury	6.8E-02	mg/kg	2.5E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	9.5E-03	9.5E-04
Molybdenum	2.2E+00	mg/kg	8.3E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.3E-01	4.3E-02
Selenium	1.4E+00	mg/kg	5.2E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	2.6E-01	1.6E-01
Vanadium	1.7E+01	mg/kg	6.4E-01	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**1.5E+00**	3.0E-01
Zinc	6.1E+01	mg/kg	2.2E+00	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	1.4E-02	7.0E-03
Toxicity Equivalency - Mammals	8.3E-04	mg/kg	3.1E-05	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**3.1E+01**	**3.1E+00**
							HAZARD INDICES:	**4.0E+01**	**4.4E+00**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-20.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.0E-02	mg/kg	1.1E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	5.4E-06	5.4E-07
Benzo(a)anthracene	3.9E-03	mg/kg	4.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.1E-04	4.1E-05
Benzo(a)pyrene	2.2E-03	mg/kg	2.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-04	2.3E-05
Benzo(b)fluoranthene	5.8E-03	mg/kg	6.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.1E-04	6.1E-05
Benzo(g,h,i)perylene	5.7E-04	mg/kg	5.9E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.9E-05	5.9E-06
Benzo(k)fluoranthene	1.5E-03	mg/kg	1.5E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-04	1.5E-05
Chrysene	4.0E-03	mg/kg	4.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.2E-04	4.2E-05
Dibenzo(a,h)anthracene	3.4E-04	mg/kg	3.6E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.6E-05	3.6E-06
Fluoranthene	2.0E-02	mg/kg	2.1E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	1.6E-05	8.2E-06
Indeno(1,2,3-cd)pyrene	5.5E-04	mg/kg	5.7E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.7E-05	5.7E-06
Phenanthrene	3.3E-02	mg/kg	3.5E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.3E-04	2.3E-05
Pyrene	2.6E-02	mg/kg	2.7E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	3.7E-05	2.2E-05
4,4'-DDD	2.3E-05	mg/kg	2.4E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.1E-06	6.1E-07
4,4'-DDE	1.8E-05	mg/kg	1.9E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.3E-06	4.7E-07
4,4'-DDT	4.0E-05	mg/kg	4.2E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.3E-06	1.1E-06
Aroclor-1248	1.1E-03	mg/kg	1.2E-04	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	1.8E-03	1.8E-0
Aroclor-1254	2.8E-03	mg/kg	2.9E-04	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	4.3E-03	4.3E-04
beta-BHC	1.6E-04	mg/kg	1.6E-05	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	1.0E-05	5.2E-06
Dieldrin	5.8E-05	mg/kg	6.0E-06	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	2.2E-04	2.2E-05
Endrin	6.6E-05	mg/kg	7.0E-06	mg/kg-d	6.5E-02	6.5E-01	mg/kg-d	1.1E-04	1.1E-05
Technical Chlordane	1.6E-05	mg/kg	1.7E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.7E-07	1.8E-07
Antimony	1.2E-03	mg/kg	1.3E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	4.8E-03	4.8E-04
Arsenic	2.3E-02	mg/kg	2.4E-03	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	1.9E-02	1.9E-03
Barium	1.1E+00	mg/kg	1.1E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.5E-03	7.2E-04
Beryllium	9.9E-04	mg/kg	1.0E-04	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.6E-04	1.6E-05
Cadmium	9.3E-03	mg/kg	9.8E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.8E-04	9.8E-05
Chromium	9.9E-02	mg/kg	1.0E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	7.1E-06	7.1E-07
Cobalt	7.9E-03	mg/kg	8.3E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.1E-02	1.1E-03
Copper	1.6E+00	mg/kg	1.7E-01	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	4.1E-01	4.1E-02
Lead	1.0E+00	mg/kg	1.1E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	8.4E-04	2.8E-04
Manganese	5.2E+00	mg/kg	5.4E-01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.2E-03	1.9E-03
Mercury	1.8E-03	mg/kg	1.9E-04	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	7.0E-04	7.0E-05
Molybdenum	1.1E-01	mg/kg	1.2E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	6.2E-02	6.2E-03
Selenium	1.8E-01	mg/kg	1.9E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	9.5E-02	5.8E-02
Vanadium	1.7E-02	mg/kg	1.8E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	4.2E-03	8.4E-04
Zinc	2.1E+01	mg/kg	2.2E+00	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	1.4E-02	6.9E-03
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	6.4E-01	1.2E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-20.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	2.1E-03	mg/kg	1.3E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.6E-03	3.3E-04
4,4'-DDE	2.3E-03	mg/kg	1.4E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.8E-03	3.6E-04
alpha-Chlordane	2.6E-03	mg/kg	1.6E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.5E-04	1.8E-04
Aroclor, Total	8.8E-02	mg/kg	5.6E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	8.2E-01	8.2E-02
Aroclor-1254	8.3E-02	mg/kg	5.3E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	7.7E-01	7.7E-02
Aroclor-1268	5.2E-03	mg/kg	3.3E-03	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	4.8E-02	4.8E-03
delta-BHC	4.6E-04	mg/kg	2.9E-04	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	1.8E-04	9.0E-05
Dieldrin	2.9E-03	mg/kg	1.8E-03	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	6.6E-02	6.6E-03
Endosulfan Sulfate	2.9E-03	mg/kg	1.8E-03	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	1.1E-02	7.2E-04
gamma-Chlordane	3.6E-03	mg/kg	2.3E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.9E-04	2.5E-04
Heptachlor Epoxide	5.5E-04	mg/kg	3.5E-04	mg/kg-d	2.5E-02	2.5E-01	mg/kg-d	1.4E-02	1.4E-03
Methoxychlor	2.0E-03	mg/kg	1.2E-03	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	2.5E-04	3.5E-05
Technical Chlordane	9.4E-02	mg/kg	5.9E-02	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.3E-02	6.5E-03
Antimony	2.1E-01	mg/kg	1.3E-01	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	**5.0E+00**	5.0E-01
Arsenic	5.7E-01	mg/kg	3.6E-01	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	**2.8E+00**	2.8E-01
Barium	4.4E+01	mg/kg	2.8E+01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	3.7E-01	1.7E-01
Beryllium	2.6E-01	mg/kg	1.6E-01	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	2.5E-01	2.5E-02
Cadmium	2.4E+00	mg/kg	1.5E+00	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	**1.5E+00**	1.5E-01
Chromium	8.2E+00	mg/kg	5.1E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.5E-03	3.5E-04
Cobalt	9.6E-01	mg/kg	6.1E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**8.0E+00**	8.0E-01
Copper	1.0E+01	mg/kg	6.5E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**1.5E+01**	**1.5E+00**
Lead	2.8E+01	mg/kg	1.8E+01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.4E-01	4.7E-02
Manganese	1.6E+02	mg/kg	1.0E+02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	**1.1E+00**	3.5E-01
Mercury	4.5E-02	mg/kg	2.8E-02	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	1.1E-01	1.1E-02
Mercury (methyl)	3.3E-03	mg/kg	2.1E-03	mg/kg-d	3.2E-02	1.6E-01	mg/kg-d	6.5E-02	1.3E-02
Molybdenum	1.3E+00	mg/kg	7.9E-01	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**4.2E+00**	4.2E-01
Nickel	2.8E+00	mg/kg	1.8E+00	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	5.7E-02	3.4E-02
Selenium	3.2E-01	mg/kg	2.0E-01	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	**1.0E+00**	6.2E-01
Silver	7.7E-02	mg/kg	4.8E-02	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	2.2E-03	2.2E-04
Thallium	6.8E-02	mg/kg	4.3E-02	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	3.1E-01	3.1E-02
Vanadium	4.8E+00	mg/kg	3.0E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**7.2E+00**	**1.4E+00**
Zinc	1.0E+02	mg/kg	6.4E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	4.0E-01	2.0E-01
Toxicity Equivalency - Mammals	1.7E-04	mg/kg	1.1E-04	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.1E+02**	**1.1E+01**
							HAZARD INDICES:	**1.6E+02**	**1.8E+01**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-20.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 2.0E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.7E-01	3.1E+01	-	1.1E+02	-	-	***1.4E+02***	***70%***
Copper	4.7E-03	1.5E+00	4.1E-01	1.5E+01	-	-	***1.7E+01***	9%
Cobalt	1.2E-03	2.6E+00	1.1E-02	8.0E+00	-	-	***1.1E+01***	5%
Vanadium		1.5E+00	4.2E-03	7.2E+00	-	-	***8.8E+00***	4%
Antimony		8.3E-01	4.8E-03	5.0E+00	-	-	***5.8E+00***	3%
Molybdenum		4.3E-01	6.2E-02	4.2E+00	-	-	***4.7E+00***	2%
Arsenic		6.8E-01	1.9E-02	2.8E+00	-	-	***3.5E+00***	2%
Aroclor-1254		1.1E+00	4.3E-03	7.7E-01	-	-	***1.9E+00***	1%
Cadmium		7.9E-03	9.8E-04	1.5E+00	-	-	***1.5E+00***	1%
Selenium	1.8E-03	2.6E-01	9.5E-02	1.0E+00	-	-	***1.4E+00***	1%
Manganese	6.7E-04	1.4E-01	6.2E-03	1.1E+00	-	-	***1.3E+00***	1%
Aroclor, Total				8.2E-01			8.2E-01	0%
Zinc	6.0E-05	1.4E-02	1.4E-02	4.0E-01	-	-	4.3E-01	0%
Barium		1.7E-02	1.5E-03	3.7E-01	-	-	3.9E-01	0%
Aroclor-1248		3.1E-01	1.8E-03		-	-	3.1E-01	0%
Thallium	3.9E-03			3.1E-01			3.1E-01	0%
Beryllium	1.1E-05	2.8E-02	1.6E-04	2.5E-01	-	-	2.7E-01	0%
Lead	2.4E-05	1.5E-02	8.4E-04	1.4E-01	-	-	1.6E-01	0%
Mercury		9.5E-03	7.0E-04	1.1E-01	-	-	1.2E-01	0%
Dieldrin		1.2E-02	2.2E-04	6.6E-02	-	-	7.7E-02	0%
Mercury (methyl)				6.5E-02			6.5E-02	0%
Benzo(b)fluoranthene		6.0E-02	6.1E-04		-	-	6.1E-02	0%
Nickel	2.4E-05			5.7E-02			5.7E-02	0%
Aluminum	5.0E-02						5.0E-02	0%
Aroclor-1268				4.8E-02			4.8E-02	0%
Chrysene		4.3E-02	4.2E-04		-	-	4.4E-02	0%
Benzo(a)anthracene		3.9E-02	4.1E-04		-	-	4.0E-02	0%
Benzo(a)pyrene		3.7E-02	2.3E-04		-	-	3.7E-02	0%
Benzo(k)fluoranthene		2.4E-02	1.5E-04		-	-	2.4E-02	0%
Indeno(1,2,3-cd)pyrene		1.9E-02	5.7E-05		-	-	1.9E-02	0%
Benzo(g,h,i)perylene		1.8E-02	5.9E-05		-	-	1.8E-02	0%
Heptachlor Epoxide				1.4E-02			1.4E-02	0%
Technical Chlordane		4.9E-05	3.7E-07	1.3E-02	-	-	1.3E-02	0%
Dibenzo(a,h)anthracene		1.3E-02	3.6E-05		-	-	1.3E-02	0%
Endosulfan Sulfate	5.2E-05			1.1E-02			1.1E-02	0%
Endrin		4.9E-03	1.1E-04		-	-	5.0E-03	0%
Phenanthrene		4.0E-03	2.3E-04		-	-	4.2E-03	0%
Chromium	5.2E-07	3.0E-04	7.1E-06	3.5E-03	-	-	3.8E-03	0%
4,4'-DDE		8.6E-04	2.3E-06	1.8E-03	-	-	2.7E-03	0%
Silver	5.6E-06			2.2E-03			2.2E-03	0%
4,4'-DDD		4.4E-04	3.1E-06	1.6E-03	-	-	2.1E-03	0%
4,4'-DDT		1.3E-03	5.3E-06		-	-	1.3E-03	0%
Pyrene		1.1E-03	3.7E-05		-	-	1.1E-03	0%
Fluoranthene		7.2E-04	1.6E-05		-	-	7.3E-04	0%
gamma-Chlordane	8.1E-07			4.9E-04			4.9E-04	0%

TABLE L-20.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ALLENDALE POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	2.0E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

	Exposure Medium[a]							
Analyte	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Combined HQs[b]	Percent Contribution[c]
alpha-Chlordane	2.2E-08			3.5E-04			3.5E-04	0%
Methoxychlor				2.5E-04			2.5E-04	0%
delta-BHC				1.8E-04			1.8E-04	0%
Anthracene		9.1E-05	5.4E-06		-	-	9.7E-05	0%
beta-BHC		7.1E-05	1.0E-05		-	-	8.2E-05	0%
bis(2-Ethylhexyl)phthalate	8.1E-06						8.1E-06	0%
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.3E-01**	**4.0E+01**	**6.4E-01**	**1.6E+02**	**-**	**-**	**2.0E+02**	
PERCENTAGE OF TOTAL RISK	**0%**	**20%**	**0%**	**79%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-20.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.7E-02	3.1E+00	-	1.1E+01	-	-	***1.4E+01***	***63%***
Vanadium		3.0E-01	8.4E-04	1.4E+00	-	-	***1.8E+00***	8%
Copper	4.7E-04	1.5E-01	4.1E-02	1.5E+00	-	-	***1.7E+00***	8%
Cobalt	1.2E-04	2.6E-01	1.1E-03	8.0E-01	-	-	***1.1E+00***	5%
Selenium	1.1E-03	1.6E-01	5.8E-02	6.2E-01	-	-	8.3E-01	4%
Antimony		8.3E-02	4.8E-04	5.0E-01	-	-	5.8E-01	3%
Molybdenum		4.3E-02	6.2E-03	4.2E-01	-	-	4.7E-01	2%
Manganese	2.1E-04	4.2E-02	1.9E-03	3.5E-01	-	-	4.0E-01	2%
Arsenic		6.8E-02	1.9E-03	2.8E-01	-	-	3.5E-01	2%
Zinc	3.0E-05	7.0E-03	6.9E-03	2.0E-01	-	-	2.1E-01	1%
Aroclor-1254		1.1E-01	4.3E-04	7.7E-02	-	-	1.9E-01	1%
Barium		8.1E-03	7.2E-04	1.7E-01	-	-	1.8E-01	1%
Cadmium		7.9E-04	9.8E-05	1.5E-01	-	-	1.5E-01	1%
Aroclor, Total				8.2E-02			8.2E-02	0%
Lead	8.2E-06	5.1E-03	2.8E-04	4.7E-02	-	-	5.3E-02	0%
Nickel	1.4E-05			3.4E-02			3.4E-02	0%
Aroclor-1248		3.1E-02	1.8E-04		-	-	3.1E-02	0%
Thallium	3.9E-04			3.1E-02			3.1E-02	0%
Beryllium	1.1E-06	2.8E-03	1.6E-05	2.5E-02	-	-	2.7E-02	0%
Mercury (methyl)				1.3E-02			1.3E-02	0%
Mercury		9.5E-04	7.0E-05	1.1E-02	-	-	1.2E-02	0%
Dieldrin		1.2E-03	2.2E-05	6.6E-03	-	-	7.7E-03	0%
Technical Chlordane		2.5E-05	1.8E-07	6.5E-03	-	-	6.5E-03	0%
Benzo(b)fluoranthene		6.0E-03	6.1E-05		-	-	6.1E-03	0%
Aluminum	5.0E-03						5.0E-03	0%
Aroclor-1268				4.8E-03			4.8E-03	0%
Chrysene		4.3E-03	4.2E-05		-	-	4.4E-03	0%
Benzo(a)anthracene		3.9E-03	4.1E-05		-	-	4.0E-03	0%
Benzo(a)pyrene		3.7E-03	2.3E-05		-	-	3.7E-03	0%
Benzo(k)fluoranthene		2.4E-03	1.5E-05		-	-	2.4E-03	0%
Indeno(1,2,3-cd)pyrene		1.9E-03	5.7E-06		-	-	1.9E-03	0%
Benzo(g,h,i)perylene		1.8E-03	5.9E-06		-	-	1.8E-03	0%
Heptachlor Epoxide				1.4E-03			1.4E-03	0%
Dibenzo(a,h)anthracene		1.3E-03	3.6E-06		-	-	1.3E-03	0%
Endosulfan Sulfate	3.5E-06			7.2E-04			7.2E-04	0%
Pyrene		6.6E-04	2.2E-05		-	-	6.8E-04	0%
4,4'-DDE		1.7E-04	4.7E-07	3.6E-04	-	-	5.3E-04	0%
Endrin		4.9E-04	1.1E-05		-	-	5.0E-04	0%
Phenanthrene		4.0E-04	2.3E-05		-	-	4.2E-04	0%
4,4'-DDD		8.8E-05	6.1E-07	3.3E-04	-	-	4.2E-04	0%
Chromium	5.2E-08	3.0E-05	7.1E-07	3.5E-04	-	-	3.8E-04	0%
Fluoranthene		3.6E-04	8.2E-06		-	-	3.7E-04	0%
4,4'-DDT		2.6E-04	1.1E-06		-	-	2.6E-04	0%
gamma-Chlordane	4.0E-07			2.5E-04			2.5E-04	0%
Silver	5.6E-07			2.2E-04			2.2E-04	0%

TABLE L-20.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ALLENDALE POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	2.2E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

	Exposure Medium[a]							
Analyte	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Combined HQs[b]	Percent Contribution[c]
alpha-Chlordane	1.1E-08			1.8E-04			1.8E-04	0%
delta-BHC				9.0E-05			9.0E-05	0%
beta-BHC		3.6E-05	5.2E-06		-	-	4.1E-05	0%
Methoxychlor				3.5E-05			3.5E-05	0%
Anthracene		9.1E-06	5.4E-07		-	-	9.7E-06	0%
bis(2-Ethylhexyl)phthalate	8.1E-07						8.1E-07	0%
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.4E-02**	**4.4E+00**	**1.2E-01**	**1.8E+01**	**-**	**-**	**2.2E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**20%**	**1%**	**80%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-21.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: LYMAN MILL POND REACH - CT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]				Estimated Tissue Concentration			
		Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	1.3E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**2.6E-03**	1.3E-01	5.3E-03	5.3E-03
Benzo(a)anthracene	7.6E-01	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**2.8E-03**	8.1E-01	6.6E-01	6.6E-01
Benzo(a)pyrene	9.0E-01	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**2.0E-03**	9.7E-01	1.8E+00	1.8E+00
Benzo(b)fluoranthene	1.2E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**4.2E-03**	1.3E+00	1.1E+00	1.1E+00
Benzo(g,h,i)perylene	8.3E-01	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**9.5E-04**	9.0E-01	5.3E+00	5.3E+00
Benzo(k)fluoranthene	1.0E+00	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**2.3E-03**	1.1E+00	2.0E+00	2.0E+00
Chrysene	1.2E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**4.1E-03**	1.3E+00	1.2E+00	1.2E+00
Dibenzo(a,h)anthracene	2.0E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**1.9E-04**	2.2E-01	1.7E+00	1.7E+00
Fluoranthene	2.1E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**1.7E-02**	2.2E+00	4.5E-01	4.5E-01
Indeno(1,2,3-cd)pyrene	8.9E-01	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**9.3E-04**	9.8E-01	6.8E+00	6.8E+00
Phenanthrene	9.3E-01	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**1.9E-02**	9.7E-01	4.1E-02	4.1E-02
Pyrene	1.7E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**1.9E-02**	1.7E+00	1.9E-01	1.9E-01
4,4'-DDD	6.9E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**1.7E-05**	7.4E-03	1.2E-02	1.2E-02
4,4'-DDE	1.7E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.6E-05**	1.8E-02	1.5E-01	1.5E-01
4,4'-DDT	1.8E-02	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**2.6E-05**	2.0E-02	7.7E-02	7.7E-02
Aroclor-1254	1.5E-01	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**2.1E-04**	1.7E-01	7.3E-01	7.3E-01
Aroclor-1268	2.4E-02	3.4E-04	1.1E+00	5.3E+01	5.3E+01	**7.9E-06**	2.6E-02	1.3E+00	1.3E+00
Dieldrin	2.8E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**1.9E-05**	2.9E-03	8.4E-04	8.4E-04
Technical Chlordane	2.1E-01	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**5.5E-04**	2.2E-01	3.1E-01	3.1E-01
Antimony	3.2E-01	2.0E-03	-	5.0E-02	5.0E-02	**6.6E-04**	0.0E+00	1.6E-02	1.6E-02
Arsenic	5.5E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**5.5E-02**	1.4E-01	6.2E-03	6.2E-03
Barium	3.4E+02	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**1.1E+01**	6.2E+00	2.3E+01	2.3E+01
Beryllium	8.0E-01	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**1.6E-03**	7.2E-03	4.0E-02	4.0E-02
Cadmium	1.8E+00	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**7.9E-02**	1.9E+00	7.5E-01	7.5E-01
Chromium	5.2E+01	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**4.2E-01**	3.2E+00	2.2E+00	2.2E+00
Cobalt	5.8E+00	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**8.7E-03**	1.4E-01	3.3E-02	3.3E-02
Copper	1.7E+02	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**1.7E+01**	3.4E+01	4.3E+01	4.3E+01
Lead	4.4E+02	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**8.4E+00**	4.5E+01	4.3E+01	4.3E+01
Manganese	5.1E+02	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**8.0E+00**	2.2E+01	2.1E+00	2.1E+00
Mercury	2.0E-01	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**5.3E-03**	9.6E-03	9.2E-06	9.2E-06
Molybdenum	2.5E+00	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**1.3E-01**	4.8E-01	7.6E-01	7.6E-01
Selenium	4.3E-01	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**5.6E-02**	4.3E-02	1.4E-02	1.4E-02
Thallium	3.8E-01	8.0E-04	-	2.2E-02	2.2E-02	**3.0E-04**	0.0E+00	8.6E-03	8.6E-03
Vanadium	3.8E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**3.6E-02**	3.2E-01	9.2E-02	9.2E-02
Zinc	4.9E+02	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**1.7E+02**	1.8E+03	1.0E+03	1.0E+03
Toxicity Equivalency - Mammals	4.6E-04					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	6.1E-06					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (I.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF.

TABLE L-21.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	2.5E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.4E-04	1.4E-05
alpha-Chlordane	1.9E-05	mg/L	2.8E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.2E-07	3.1E-07
Endosulfan Sulfate	3.2E-06	mg/L	4.8E-07	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	2.8E-06	1.9E-07
gamma-Chlordane	2.1E-05	mg/L	3.1E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.8E-07	3.4E-07
Aluminum	1.8E-01	mg/L	2.6E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.4E-02	1.4E-03
Beryllium	2.0E-04	mg/L	3.0E-05	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	4.5E-05	4.5E-06
Chromium	2.3E-03	mg/L	3.4E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.3E-07	2.3E-08
Cobalt	4.2E-04	mg/L	6.2E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	8.2E-04	8.2E-05
Copper	8.7E-03	mg/L	1.3E-03	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	3.1E-03	3.1E-04
Lead	4.4E-03	mg/L	6.5E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	5.2E-06	1.7E-06
Manganese	1.3E-01	mg/L	1.9E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.1E-04	6.7E-05
Nickel	1.9E-03	mg/L	2.8E-04	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	8.9E-06	5.3E-06
Silver	5.9E-04	mg/L	8.8E-05	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	4.0E-06	4.0E-07
Thallium	2.2E-03	mg/L	3.3E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.4E-03	2.4E-04
Zinc	2.8E-02	mg/L	4.1E-03	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	2.6E-05	1.3E-05
Nitrogen, Ammonia	1.4E-01	mg/L	2.1E-02	mg/kg-d	#N/A	#N/A			
oxicity Equivalency - Mamma	1.3E-07	mg/L	1.9E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.9E-02	1.9E-03
							HAZARD INDICES:	4.0E-02	4.0E-03

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-21.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.3E-01	mg/kg	4.6E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	2.3E-05	2.3E-06
Benzo(a)anthracene	7.6E-01	mg/kg	2.8E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.8E-02	2.8E-03
Benzo(a)pyrene	9.0E-01	mg/kg	3.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.3E-02	3.3E-03
Benzo(b)fluoranthene	1.2E+00	mg/kg	4.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.3E-02	4.3E-03
Benzo(g,h,i)perylene	8.3E-01	mg/kg	3.1E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.1E-02	3.1E-03
Benzo(k)fluoranthene	1.0E+00	mg/kg	3.7E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.7E-02	3.7E-03
Chrysene	1.2E+00	mg/kg	4.4E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.4E-02	4.4E-03
Dibenzo(a,h)anthracene	2.0E-01	mg/kg	7.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.3E-03	7.3E-04
Fluoranthene	2.1E+00	mg/kg	7.7E-02	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	6.2E-04	3.1E-04
Indeno(1,2,3-cd)pyrene	8.9E-01	mg/kg	3.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.3E-02	3.3E-03
Phenanthrene	9.3E-01	mg/kg	3.4E-02	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.3E-03	2.3E-04
Pyrene	1.7E+00	mg/kg	6.1E-02	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	8.1E-04	4.9E-04
4,4'-DDD	6.9E-03	mg/kg	2.5E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.2E-04	6.4E-05
4,4'-DDE	1.7E-02	mg/kg	6.2E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.7E-04	1.5E-04
4,4'-DDT	1.8E-02	mg/kg	6.7E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.4E-04	1.7E-04
Aroclor-1254	1.5E-01	mg/kg	5.6E-03	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	8.3E-02	8.3E-03
Aroclor-1268	2.4E-02	mg/kg	8.7E-04	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	1.3E-02	1.3E-03
Dieldrin	2.8E-03	mg/kg	1.0E-04	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	3.7E-03	3.7E-04
Technical Chlordane	2.1E-01	mg/kg	7.6E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.7E-03	8.4E-04
Antimony	3.2E-01	mg/kg	1.2E-02	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	4.6E-01	4.6E-02
Arsenic	5.5E+00	mg/kg	2.0E-01	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	**1.6E+00**	1.6E-01
Barium	3.4E+02	mg/kg	1.3E+01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.7E-01	7.8E-02
Beryllium	8.0E-01	mg/kg	3.0E-02	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	4.5E-02	4.5E-03
Cadmium	1.8E+00	mg/kg	6.6E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.6E-02	6.6E-03
Chromium	5.2E+01	mg/kg	1.9E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.3E-03	1.3E-04
Cobalt	5.8E+00	mg/kg	2.1E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**2.8E+00**	2.8E-01
Copper	1.7E+02	mg/kg	6.4E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**1.5E+01**	**1.5E+00**
Lead	4.4E+02	mg/kg	1.6E+01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.3E-01	4.3E-02
Manganese	5.1E+02	mg/kg	1.9E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.1E-01	6.6E-02
Mercury	2.0E-01	mg/kg	7.5E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	2.9E-02	2.9E-03
Molybdenum	2.5E+00	mg/kg	9.3E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.9E-01	4.9E-02
Selenium	4.3E-01	mg/kg	1.6E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	7.9E-02	4.8E-02
Thallium	3.8E-01	mg/kg	1.4E-02	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.0E-01	1.0E-02
Vanadium	3.8E+01	mg/kg	1.4E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**3.3E+00**	6.6E-01
Zinc	4.9E+02	mg/kg	1.8E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	1.1E-01	5.6E-02
Toxicity Equivalency - Mammals	4.6E-04	mg/kg	1.7E-05	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.7E+01**	**1.7E+00**
Toxicity Equivalency (PCB) - Mammals	6.1E-06	mg/kg	2.2E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.2E-01	2.2E-02
							HAZARD INDICES:	**4.2E+01**	**4.8E+00**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-21.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	2.6E-03	mg/kg	2.7E-04	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.4E-06	1.4E-07
Benzo(a)anthracene	2.8E-03	mg/kg	2.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.9E-04	2.9E-05
Benzo(a)pyrene	2.0E-03	mg/kg	2.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.1E-04	2.1E-05
Benzo(b)fluoranthene	4.2E-03	mg/kg	4.4E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.4E-04	4.4E-05
Benzo(g,h,i)perylene	9.5E-04	mg/kg	9.9E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.9E-05	9.9E-06
Benzo(k)fluoranthene	2.3E-03	mg/kg	2.4E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.4E-04	2.4E-05
Chrysene	4.1E-03	mg/kg	4.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.3E-04	4.3E-05
Dibenzo(a,h)anthracene	1.9E-04	mg/kg	2.0E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.0E-05	2.0E-06
Fluoranthene	1.7E-02	mg/kg	1.8E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	1.4E-05	7.1E-06
Indeno(1,2,3-cd)pyrene	9.3E-04	mg/kg	9.8E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.8E-05	9.8E-06
Phenanthrene	1.9E-02	mg/kg	2.0E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.3E-04	1.3E-05
Pyrene	1.9E-02	mg/kg	2.0E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	2.7E-05	1.6E-05
4,4'-DDD	1.7E-05	mg/kg	1.8E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.2E-06	4.4E-07
4,4'-DDE	1.6E-05	mg/kg	1.7E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.1E-06	4.2E-07
4,4'-DDT	2.6E-05	mg/kg	2.8E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.5E-06	6.9E-07
Aroclor-1254	2.1E-04	mg/kg	2.2E-05	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	3.2E-04	3.2E-05
Aroclor-1268	7.9E-06	mg/kg	8.3E-07	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	1.2E-05	1.2E-06
Dieldrin	1.9E-05	mg/kg	2.0E-06	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	7.1E-05	7.1E-06
Technical Chlordane	5.5E-04	mg/kg	5.7E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.3E-05	6.3E-06
Antimony	6.6E-04	mg/kg	7.0E-05	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	2.7E-03	2.7E-04
Arsenic	5.5E-02	mg/kg	5.8E-03	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	4.6E-02	4.6E-03
Barium	1.1E+01	mg/kg	1.1E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.5E-02	7.0E-03
Beryllium	1.6E-03	mg/kg	1.7E-04	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	2.6E-04	2.6E-05
Cadmium	7.9E-02	mg/kg	8.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.3E-03	8.3E-04
Chromium	4.2E-01	mg/kg	4.4E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.0E-05	3.0E-06
Cobalt	8.7E-03	mg/kg	9.1E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.2E-02	1.2E-03
Copper	1.7E+01	mg/kg	1.8E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**4.2E+00**	4.2E-01
Lead	8.4E+00	mg/kg	8.8E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	7.0E-03	2.3E-03
Manganese	8.0E+00	mg/kg	8.4E-01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	9.6E-03	3.0E-03
Mercury	5.3E-03	mg/kg	5.6E-04	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	2.1E-03	2.1E-04
Molybdenum	1.3E-01	mg/kg	1.3E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	7.0E-02	7.0E-03
Selenium	5.6E-02	mg/kg	5.8E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	2.9E-02	1.8E-02
Thallium	3.0E-04	mg/kg	3.2E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.3E-04	2.3E-05
Vanadium	3.6E-02	mg/kg	3.8E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	9.1E-03	1.8E-03
Zinc	1.7E+02	mg/kg	1.8E+01	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	1.1E-01	5.6E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	**4.5E+00**	5.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-21.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.2E-03	mg/kg	7.7E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	9.6E-04	1.9E-04
4,4'-DDE	3.2E-03	mg/kg	2.0E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.5E-03	5.1E-04
4,4'-DDT	2.8E-03	mg/kg	1.8E-03	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.2E-03	4.4E-04
alpha-Chlordane	2.4E-03	mg/kg	1.5E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.3E-04	1.6E-04
Aroclor, Total	4.2E-02	mg/kg	2.6E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	3.9E-01	3.9E-02
Aroclor-1254	3.5E-02	mg/kg	2.2E-02	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	3.2E-01	3.2E-02
Aroclor-1268	7.3E-03	mg/kg	4.6E-03	mg/kg-d	6.8E-02	6.8E-01	mg/kg-d	6.8E-02	6.8E-03
Dieldrin	8.2E-04	mg/kg	5.2E-04	mg/kg-d	2.8E-02	2.8E-01	mg/kg-d	1.9E-02	1.9E-03
Endosulfan Sulfate	1.1E-03	mg/kg	6.9E-04	mg/kg-d	1.7E-01	2.5E+00	mg/kg-d	4.1E-03	2.7E-04
gamma-Chlordane	1.3E-03	mg/kg	8.2E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.8E-04	9.0E-05
Heptachlor Epoxide	5.4E-04	mg/kg	3.4E-04	mg/kg-d	2.5E-02	2.5E-01	mg/kg-d	1.4E-02	1.4E-03
Methoxychlor	9.6E-04	mg/kg	6.1E-04	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	1.2E-04	1.7E-05
Technical Chlordane	4.2E-02	mg/kg	2.7E-02	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	5.8E-03	2.9E-03
Antimony	1.4E-01	mg/kg	8.7E-02	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	**3.3E+00**	3.3E-01
Arsenic	7.4E-01	mg/kg	4.7E-01	mg/kg-d	1.3E-01	1.3E+00	mg/kg-d	**3.7E+00**	3.7E-01
Barium	2.8E+01	mg/kg	1.8E+01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.3E-01	1.1E-01
Beryllium	1.2E-01	mg/kg	7.5E-02	mg/kg-d	6.6E-01	6.6E+00	mg/kg-d	1.1E-01	1.1E-02
Cadmium	5.3E+00	mg/kg	3.3E+00	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	**3.3E+00**	3.3E-01
Chromium	3.1E+00	mg/kg	2.0E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.4E-03	1.4E-04
Cobalt	6.3E-01	mg/kg	4.0E-01	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**5.2E+00**	5.2E-01
Copper	7.4E+00	mg/kg	4.7E+00	mg/kg-d	4.2E-01	4.2E+00	mg/kg-d	**1.1E+01**	**1.1E+00**
Lead	6.4E+01	mg/kg	4.0E+01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.2E-01	1.1E-01
Manganese	4.7E+01	mg/kg	3.0E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.4E-01	1.0E-01
Mercury	7.2E-02	mg/kg	4.5E-02	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	1.7E-01	1.7E-02
Mercury (methyl)	1.1E-03	mg/kg	7.0E-04	mg/kg-d	3.2E-02	1.6E-01	mg/kg-d	2.2E-02	4.4E-03
Molybdenum	2.8E-01	mg/kg	1.8E-01	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	9.3E-01	9.3E-02
Nickel	1.3E+00	mg/kg	7.9E-01	mg/kg-d	3.1E+01	5.2E+01	mg/kg-d	2.6E-02	1.5E-02
Selenium	2.0E+00	mg/kg	1.3E+00	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	**6.3E+00**	**3.8E+00**
Silver	1.0E-01	mg/kg	6.5E-02	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	2.9E-03	2.9E-04
Thallium	5.6E-02	mg/kg	3.5E-02	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.5E-01	2.5E-02
Vanadium	2.6E+00	mg/kg	1.7E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**3.9E+00**	7.9E-01
Zinc	1.7E+02	mg/kg	1.1E+02	mg/kg-d	1.6E+02	3.2E+02	mg/kg-d	6.8E-01	3.4E-01
Toxicity Equivalency - Mammals	3.4E-05	mg/kg	2.1E-05	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.1E+01**	**2.1E+00**
Toxicity Equivalency (PCB) - Mammals	2.5E-06	mg/kg	1.6E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.6E+00**	1.6E-01
							HAZARD INDICES:	**6.4E+01**	**1.0E+01**

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-7.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE L-21.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 1.1E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.9E-02	1.7E+01	-	2.1E+01	-	-	***3.8E+01***	***35%***
Copper	3.1E-03	1.5E+01	4.2E+00	1.1E+01	-	-	***3.0E+01***	***28%***
Cobalt	8.2E-04	2.8E+00	1.2E-02	5.2E+00	-	-	***8.1E+00***	7%
Vanadium		3.3E+00	9.1E-03	3.9E+00	-	-	***7.3E+00***	7%
Selenium		7.9E-02	2.9E-02	6.3E+00	-	-	***6.4E+00***	6%
Arsenic		1.6E+00	4.6E-02	3.7E+00	-	-	***5.4E+00***	5%
Antimony		4.6E-01	2.7E-03	3.3E+00	-	-	***3.8E+00***	3%
Cadmium		6.6E-02	8.3E-03	3.3E+00	-	-	***3.4E+00***	3%
Toxicity Equivalency (PCB) - Mammals		2.2E-01	-	1.6E+00	-	-	***1.8E+00***	2%
Molybdenum		4.9E-01	7.0E-02	9.3E-01	-	-	***1.5E+00***	1%
Zinc	2.6E-05	1.1E-01	1.1E-01	6.8E-01	-	-	9.1E-01	1%
Manganese	2.1E-04	2.1E-01	9.6E-03	3.4E-01	-	-	5.6E-01	1%
Lead	5.2E-06	1.3E-01	7.0E-03	3.2E-01	-	-	4.5E-01	0%
Barium		1.7E-01	1.5E-02	2.3E-01	-	-	4.2E-01	0%
Aroclor-1254		8.3E-02	3.2E-04	3.2E-01	-	-	4.0E-01	0%
Aroclor, Total				3.9E-01			3.9E-01	0%
Thallium	2.4E-03	1.0E-01	2.3E-04	2.5E-01	-	-	3.6E-01	0%
Mercury		2.9E-02	2.1E-03	1.7E-01	-	-	2.0E-01	0%
Beryllium	4.5E-05	4.5E-02	2.6E-04	1.1E-01	-	-	1.6E-01	0%
Aroclor-1268		1.3E-02	1.2E-05	6.8E-02	-	-	8.0E-02	0%
Chrysene		4.4E-02	4.3E-04		-	-	4.5E-02	0%
Benzo(b)fluoranthene		4.3E-02	4.4E-04		-	-	4.4E-02	0%
Benzo(k)fluoranthene		3.7E-02	2.4E-04		-	-	3.8E-02	0%
Benzo(a)pyrene		3.3E-02	2.1E-04		-	-	3.3E-02	0%
Indeno(1,2,3-cd)pyrene		3.3E-02	9.8E-05		-	-	3.3E-02	0%
Benzo(g,h,i)perylene		3.1E-02	9.9E-05		-	-	3.1E-02	0%
Benzo(a)anthracene		2.8E-02	2.9E-04		-	-	2.8E-02	0%
Nickel	8.9E-06			2.6E-02			2.6E-02	0%
Dieldrin		3.7E-03	7.1E-05	1.9E-02	-	-	2.3E-02	0%
Mercury (methyl)				2.2E-02			2.2E-02	0%
Aluminum	1.4E-02						1.4E-02	0%
Heptachlor Epoxide				1.4E-02			1.4E-02	0%
Technical Chlordane		1.7E-03	1.3E-05	5.8E-03	-	-	7.5E-03	0%
Dibenzo(a,h)anthracene		7.3E-03	2.0E-05		-	-	7.3E-03	0%
Endosulfan Sulfate	2.8E-06			4.1E-03			4.1E-03	0%
4,4'-DDE		7.7E-04	2.1E-06	2.5E-03	-	-	3.3E-03	0%
4,4'-DDT		8.4E-04	3.5E-06	2.2E-03	-	-	3.0E-03	0%
Silver	4.0E-06			2.9E-03			2.9E-03	0%
Chromium	2.3E-07	1.3E-03	3.0E-05	1.4E-03	-	-	2.7E-03	0%
Phenanthrene		2.3E-03	1.3E-04		-	-	2.4E-03	0%
4,4'-DDD		3.2E-04	2.2E-06	9.6E-04	-	-	1.3E-03	0%
Pyrene		8.1E-04	2.7E-05		-	-	8.4E-04	0%
Fluoranthene		6.2E-04	1.4E-05		-	-	6.3E-04	0%
alpha-Chlordane	6.2E-07			3.3E-04			3.3E-04	0%
gamma-Chlordane	6.8E-07			1.8E-04			1.8E-04	0%

TABLE L-21.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	1.1E+02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
bis(2-Ethylhexyl)phthalate	1.4E-04						1.4E-04	0%
Methoxychlor				1.2E-04			1.2E-04	0%
Anthracene		2.3E-05	1.4E-06		-	-	2.5E-05	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**4.0E-02**	**4.2E+01**	**4.5E+00**	**6.4E+01**	**-**	**-**	**1.1E+02**	
PERCENTAGE OF TOTAL RISK	**0%**	**38%**	**4%**	**58%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE L-21.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: SHREW
TOTAL RISK (HI): 1.6E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Selenium		4.8E-02	1.8E-02	3.8E+00	-	-	***3.9E+00***	***25%***
Toxicity Equivalency - Mammals	1.9E-03	1.7E+00	-	2.1E+00	-	-	***3.8E+00***	***24%***
Copper	3.1E-04	1.5E+00	4.2E-01	1.1E+00	-	-	***3.0E+00***	***19%***
Vanadium		6.6E-01	1.8E-03	7.9E-01	-	-	***1.5E+00***	9%
Cobalt	8.2E-05	2.8E-01	1.2E-03	5.2E-01	-	-	8.1E-01	5%
Arsenic		1.6E-01	4.6E-03	3.7E-01	-	-	5.4E-01	3%
Zinc	1.3E-05	5.6E-02	5.6E-02	3.4E-01	-	-	4.5E-01	3%
Antimony		4.6E-02	2.7E-04	3.3E-01	-	-	3.8E-01	2%
Cadmium		6.6E-03	8.3E-04	3.3E-01	-	-	3.4E-01	2%
Barium		7.8E-02	7.0E-03	1.1E-01	-	-	1.9E-01	1%
Toxicity Equivalency (PCB) - Mammals		2.2E-02	-	1.6E-01	-	-	1.8E-01	1%
Manganese	6.7E-05	6.6E-02	3.0E-03	1.0E-01	-	-	1.7E-01	1%
Lead	1.7E-06	4.3E-02	2.3E-03	1.1E-01	-	-	1.5E-01	1%
Molybdenum		4.9E-02	7.0E-03	9.3E-02	-	-	1.5E-01	1%
Aroclor-1254		8.3E-03	3.2E-05	3.2E-02	-	-	4.0E-02	0%
Aroclor, Total				3.9E-02			3.9E-02	0%
Thallium	2.4E-04	1.0E-02	2.3E-05	2.5E-02	-	-	3.6E-02	0%
Mercury		2.9E-03	2.1E-04	1.7E-02	-	-	2.0E-02	0%
Beryllium	4.5E-06	4.5E-03	2.6E-05	1.1E-02	-	-	1.6E-02	0%
Nickel	5.3E-06			1.5E-02			1.5E-02	0%
Aroclor-1268		1.3E-03	1.2E-06	6.8E-03	-	-	8.0E-03	0%
Chrysene		4.4E-03	4.3E-05		-	-	4.5E-03	0%
Benzo(b)fluoranthene		4.3E-03	4.4E-05		-	-	4.4E-03	0%
Mercury (methyl)				4.4E-03			4.4E-03	0%
Benzo(k)fluoranthene		3.7E-03	2.4E-05		-	-	3.8E-03	0%
Technical Chlordane		8.4E-04	6.3E-06	2.9E-03	-	-	3.7E-03	0%
Benzo(a)pyrene		3.3E-03	2.1E-05		-	-	3.3E-03	0%
Indeno(1,2,3-cd)pyrene		3.3E-03	9.8E-06		-	-	3.3E-03	0%
Benzo(g,h,i)perylene		3.1E-03	9.9E-06		-	-	3.1E-03	0%
Benzo(a)anthracene		2.8E-03	2.9E-05		-	-	2.8E-03	0%
Dieldrin		3.7E-04	7.1E-06	1.9E-03	-	-	2.3E-03	0%
Aluminum	1.4E-03						1.4E-03	0%
Heptachlor Epoxide				1.4E-03			1.4E-03	0%
Dibenzo(a,h)anthracene		7.3E-04	2.0E-06		-	-	7.3E-04	0%
4,4'-DDE		1.5E-04	4.2E-07	5.1E-04	-	-	6.6E-04	0%
4,4'-DDT		1.7E-04	6.9E-07	4.4E-04	-	-	6.1E-04	0%
Pyrene		4.9E-04	1.6E-05		-	-	5.0E-04	0%
Fluoranthene		3.1E-04	7.1E-06		-	-	3.2E-04	0%
Silver	4.0E-07			2.9E-04			2.9E-04	0%
Endosulfan Sulfate	1.9E-07			2.7E-04			2.7E-04	0%
Chromium	2.3E-08	1.3E-04	3.0E-06	1.4E-04	-	-	2.7E-04	0%
4,4'-DDD		6.4E-05	4.4E-07	1.9E-04	-	-	2.6E-04	0%
Phenanthrene		2.3E-04	1.3E-05		-	-	2.4E-04	0%
alpha-Chlordane	3.1E-07			1.6E-04			1.6E-04	0%
gamma-Chlordane	3.4E-07			9.0E-05			9.0E-05	0%

TABLE L-21.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : SHREW

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: SHREW	
TOTAL RISK (HI):	1.6E+01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Methoxychlor				1.7E-05			1.7E-05	0%
bis(2-Ethylhexyl)phthalate	1.4E-05						1.4E-05	0%
Anthracene		2.3E-06	1.4E-07		-	-	2.5E-06	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**4.0E-03**	**4.8E+00**	**5.2E-01**	**1.0E+01**	**-**	**-**	**1.6E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**30%**	**3%**	**66%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

APPENDIX M

TREE SWALLOW REPORT

Final Report [⇓]

Exposure and effects of dioxins, furans, and other organochlorine chemicals to tree swallows (*Tachycineta bicolor*) nesting along the Woonasquatucket River, Rhode Island

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Introduction

From at least 1921 to 1940, a stretch of the Woonasquatucket River, near Providence, RI, hereafter called the Centredale Manor Restoration Project site, was the location of textile manufacturing activities of the Centredale Worsted Mill and then the Olneyville Wool Combing Company. Between 1943 and 1971, the Atlantic Chemical Company/Metro-Atlantic, Inc. used the site for chemical manufacturing and New England Container Company, Inc. used the site for drum recycling. Aerial photographs taken during the 1960s and 1970s showed areas of uncovered, outdoor drum storage in the central area of the site, along with disturbed areas in the southern portion of the site. Sanborn Fire Insurance Rate maps compiled in 1956 and 1965 depicted areas of drum storage and drum cleaning bordering the former tail race (now the drainage channel) in the southern portion of the site. During the early 1970s, the mill buildings that housed the former textile and chemical companies on the property were demolished.

[⇓] RI-Rept5, April 2003; data are third party validated

In 1977, the Rhode Island Department of Health, Division of Air Pollution Control responded to complaints of fumes at the property, which resulted in the discovery of more than 50 abandoned drums. In the early 1980s, additional abandoned drums were identified at the site by the Rhode Island Department of Environmental Management (RI DEM) Division of Air and Hazardous Waste Management. One drum apparently contained polychlorinated biphenyls (PCBs), while some drums may have contained an acid or caustic material (based on the presence of polyliners), solvents, and ink wastes. A Notice of Violation was issued for violations of the State Hazardous Waste Management Act. In February 1982, approximately 300 drums were removed under the supervision of RI DEM.

An estimated 219,869 square feet of contaminated fill are present at the Centredale Manor Restoration site. The dioxin congener, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) has been disposed of or has come to be located at the site (EPA Website, Feb. 2000). Historical information indicated that former mill and drum recycling activities took place in portions of the area of contaminated fill. The source of the hazardous substances present in the contaminated fill is unknown, but is likely due to the largely unregulated use, storage, and disposal of hazardous substances on the property from at least 1921 until 1977. On February 16 and 17, 1999, shallow soil samples were collected from the contaminated fill. TCDD was detected at concentrations up to 116 parts per billion (ppb or ng/g). For additional details see the Centredale Manor Restoration Project Engineering Evaluation/Cost Analysis (Tetra Tech 2000).

Swallows, especially tree swallows (*Tachycineta bicolor*) are now being widely used as a study species for research on the distribution and effects of local sediment

contamination (Shaw 1983, DeWeese 1985, Kraus 1989, Ankley et al. 1993, King et al. 1994, Bishop et al. 1995, Nichols et al. 1995, Custer et al. 1998, 2000, 2001, 2003). Tree swallows will readily use nest boxes, so study sites can be established at specific locations of interest. They feed near their nest box (within 400 m, Quinney and Ankney 1985) on emergent aquatic insects (Blancher and McNicol 1991) so residues in their tissues reflect sediment contamination for those chemicals that transfer into the biota (Fairchild et al. 1992). They also will nest relatively densely so that adequate sample sizes can be obtained. Data are now available on contaminant levels in tree swallows at a number of locations across North America for PCBs (Bishop et al. 1995, Custer et al. 1998, 2000, 2003), other organochlorines (Shaw 1983, DeWeese et al. 1985, Elliott et al. 1994), metals (Kraus 1989, King et al. 1994, Custer et al. 2001, 2002), and polycyclic aromatic hydrocarbons (Custer et al. 2001). Data collections are also ongoing to quantify the effects of various classes of chemicals on reproduction.

The objectives of this study were to determine whether dioxins, furans, and other organochlorines were being accumulated and causing reproductive impairment in tree swallows nesting along the Woonasquatucket River, near Providence, RI.

Methods

Field Work

Fifty-nine swallow boxes were attached to posts during early spring 2000 along the shoreline of Allendale Mill Pond (29 boxes), hereafter called Allendale, and Greystone Mill Pond (30 boxes), hereafter called Greystone (Fig. 1). An additional 30 boxes were put up on Lyman Mill Pond, hereafter called Lyman, in 2001. Allendale is

just downstream of the Centredale and Brook Village apartment complexes and is within the Centredale Manor Restoration site. Lyman is the first pond downstream of Allendale, and Greystone is the first pond upstream of the contaminated area. Predator guards were attached to poles after nest building and egg laying commenced. Each nest box was visited approximately once per week beginning in early May of each year. The stage of nest building, and number of eggs and young present in the box were recorded during each visit.

A sample of 2 - 3 eggs was collected at approximately mid incubation in 2000 (N = 5 - 7 clutches/site) and as each clutch started to hatch in 2001 (all nests/site). An 11-13 day-old tree swallow nestling was also collected from 5 nest boxes per site where sibling eggs had previously been collected. Clutches $\leq$ 5 eggs had only 2 eggs collected; clutches $\geq$ 6 eggs had 3 eggs collected. Eggs that failed to hatch were also collected. Food samples were collected from the stomachs of tree swallow nestlings on the day they were collected and sacrificed, and pooled by site into 1 sample. All samples were collected under appropriate state and federal collecting permits.

Sample preparation

Eggs or nestlings were removed from the nest box, weighed, and visually examined for gross abnormalities. Contents of eggs from an individual nest box were emptied into a chemically-clean jar; eggshells were discarded. Nestlings were decapitated with a sharp pair of scissors (Anonymous 1993). Contents in the upper gastrointestinal tract were removed with forceps, weighed, and placed in a chemically-clean jar. A small piece ($\leq$0.2g) of the liver was removed, placed in a cryotube, covered with 1 - 2 drops of glycerin, and snap frozen in liquid nitrogen for later ethoxyresorufin-

O-dealkylase (EROD) analysis. See further details in Bioindicator section below. The carcass remainder, including the head and the remaining portion of the liver, was then placed in a chemically-clean jar. The egg, carcass remainder, and diet samples were frozen later that day and maintained frozen until shipped or otherwise transported to the analytical laboratory following chain of custody procedure. The EROD liver samples were maintained in liquid nitrogen until shipped on dry ice to Patuxent Wildlife Research Center, Laurel, MD for analysis by a cooperator.

In 2001, sample collection and preparation were similar to 2000 except that 2 12-day-old nestlings were collected from 5 nest boxes/site. The livers from both young were excised, a small portion ($\leq$ 0.2g) of the liver from the first nestling (*a*-nestling) was removed for EROD analysis (as above), and that liver remainder and the entire liver from the *b*-nestling were pooled by nest box, and analyzed for trace elements. The head from the *b*-nestling was preserved in 10% buffered formalin for later sectioning to assess brain asymmetry (Henshel et al. 1997). Blood was collected during the decapitation process for genetic damage assessment by flow cytometry.

Bioindicators

Ethoxyresorufin-*O*-dealkylase activity was assayed in 12-day-old liver microsomes (Custer et al. 1998) by USGS, Patuxent Wildlife Research Center personnel using the methods of Burke and Mayer (1983) as adapted to a fluorescence microwell plate scanner (Melancon 1996). Hepatic microsomes were prepared from homogenates of thawed liver samples by differential centrifugation. The 11,000-*g* supernatant was centrifuged at 40,000 rpm for 60 min to obtain the microsomal pellet. Each 100,000-*g* pellet was resuspended in 2.0 ml/g of tissue weight of 0.05 M Na/K PO_4, 0.001 M disodium ethylenediamine tetraacetate, pH 7.6. The 260-µl total assay volume contained

microsomes equivalent to 0.65 mg liver, 2.5 μM substrate and 0.125 mM NADPH in 0.066 M Tris buffer, pH 7.4. Protein concentrations were determined by a 50% reduced volume Lowry et al. (1951) assay. Activities were calculated as pmol product/min/mg microsomal protein.

Blood for flow cytometry was collected in heparinized capillary tubes, aspirated into freezing media (Hams F10 media with18% fetal bovine serum and 10% glycerin), inverted several times, and then frozen in liquid nitrogen. Nuclear preparation and staining followed the method of Vindelov et al. (1983). Nuclear suspensions were prepared following lysis with detergent and trypsin digestion. Nuclear suspensions were treated with RNAse, and stained with propidium iodide. Nuclear DNA content was analyzed in approximately 10,000 cells per individual on a Coulter Elite flow cytometer by quantification of nuclear fluorescence. The mean half-peak coefficient of variation (HPCV) in the G1 peak was quantified. This value expresses the amount of variation in the DNA content of the 10,000 cells measured. Somatic chromosome damage is suggested when the HPCV in a population is significantly greater than the HPCV in a reference population.

For brain asymmetry, each brain was removed from the 10% formalin buffer solution in which it had been stored, stained with thionine, imbedded in paraffin, and then sectioned both horizontally and vertically into 16 sections. The height and width of the left and right sides for each section were measured (mm) and the absolute difference between the right and left side was calculated. An average absolute difference for all sections combined was calculated for each individual.

Tree swallows nesting along the upper Mississippi River in Houston Co., eastern Minnesota and from Threemile Pond, Berkshire Co., western Massachusetts were used as out-of-basin reference sites for all 3 bioindicator assessments. These out-of basin reference sites were used to further assess normal levels for the bioindicators.

Statistical analysis

Data were analyzed with one-way analysis of variance (ANOVA) to compare year/site means for concentrations of organic chemicals and trace elements, accumulation rates, and bioindicators. Contaminant concentrations were log transformed prior to analysis to satisfy the homogeneity of variance (Levene's and Bartletts tests) requirement of ANOVA. Geometric means (mean of the logs which were back-transformed) $\pm$ 95% confidence interval (CI) are presented in tables and text. Only chemicals found above the detection limit in $\geq$ 50% of samples were statistically analyzed. Half the detection limit was substituted for samples which had nondetectable concentrations. Accumulation rates (mass of contaminant in the nestling minus the mass in the egg divided by the age of the nestling) were calculated and compared between year/sites using ANOVA. Values were rank transformed to equalize the variances. Bioindicators were compared among sites without additional transformations. Ethoxyresorufin-*O*-dealkylase was compared among sites for each year individually because EROD assays for each year were done on different days. Flow cytometry and brain asymmetry results were only compared among study sites because data were only collected in 2001.

The association of dioxin and furan congener concentrations with one another was evaluated using Pearson's correlation coefficients. Additionally, the association between TCDD concentrations in nestlings and the 2 brain asymmetry measurements, and TCDD

concentrations in eggs, nestlings, diet, and accumulation rate were assessed with Pearson's correlation coefficients. Correlations of TCDD among egg and nestling concentrations and accumulation rate were correlated based on data from individual clutches. Concentrations in pooled diet were correlated with means for the above 3 measurements for each year/site because only 1 value per year/site was available for diet because of pooling.

Daily survival estimates of eggs were calculated for the egg laying and incubation period using the Mayfield method (Mayfield 1961, 1975) and compared between sites using contrasts according to Hensler and Nichols (1981). Eggs lost because of depredation or human activities were not included in the Mayfield analyses. The relationship between the hatching success of each clutch and TCDD concentrations in that clutch of eggs was tested with logistic regression models. The concentration in eggs at which hatching success was reduced by 50% (CE_{50}) was estimated visually. The CE_{50} estimate does not specifically address or imply the mechanism for reduced hatching success.

Chemical analyses

Dioxins (N = 7 congeners) and furans (N = 10 congeners) were analyzed in tree swallow egg, nestling carcass, and diet samples in 2000 and 2001. Additionally, the concentrations of total PCBs and 107 PCB congeners were measured in all 12-day-old nestling carcasses in 2000 and in 1 carcass per site in 2001. Total PCBs, PCB congeners, and other organochlorine chemicals were analyzed in 2001 in a sample of eggs. Trace elements were analyzed in liver tissue of nestlings in 2001. Battelle Inc., laboratories performed all chemical analyses. See their reports (Battelle 2001) for detection limits

and quality assurance information. Chemicals analyzed included the dioxin and furan congeners 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF and OCDF. Other organochlorine chemicals analyzed were aldrin, alpha-BHC, alpha-chlordane, gamma-chlordane, technical chlordane, beta-BHC, delta-BHC, gamma-BHC, DDD, DDE, DDT, dieldrin, endosulfan I, endosulfan II, ensodsulfan sulfate, endrin, endrin aldehyde, endrin ketone, heptachlor, heptachlor epoxide, methoxychlor, and toxaphene. Trace elements analyzed included aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, methyl-mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

Toxic equivalents

Toxic equivalents (TEQs) were calculated using both Kennedy (Kennedy et al. 1996) and the World Health Organization (WHO, van den Berg et al. 1998) toxic equivalent factors (TEFs). The total TEQs in a sample was the sum of the product of each congener concentration multiplied by that congener's TEF. The TEQ values presented in this report are reported separately for the sum of the dioxin and furan congeners and the sum of the PCB congeners.

Results

Study sites

In 2000 the dam on Allendale had been partially breached by the beginning of the field season. This exposed mud flats in the central portion of the pond, but the lower end

of the pond immediately above the dam remained filled with water. By 2001, the dam had further deteriorated causing the lower end of the pond above the dam to contain less water compared to the levels in 2000. Water levels in Greystone were similar between 2000 and 2001.

Chemical contamination - dioxin and furans

Tree swallow eggs from Greystone had significantly lower concentrations of TCDD (< 30 pg/g wet wt.) than eggs from Allendale in 2000 (826 pg/g wet wt.) and 2001 (314 pg/g) and Lyman (1013 pg/g) in 2001 (Table 1). Concentrations of TCDD in eggs were similar at Allendale in 2000 and 2001 and Lyman in 2001 (Table 1). Nestling carcasses demonstrated the same locational differences and similarities as eggs (Table 2); Allendale and Lyman had significantly higher nestling carcass concentrations (>500 pg/g) than Greystone (<10 pg/g) in both years.

Concentrations of TCDD in eggs or nestlings were similar between nests located at the north end and south end of Lyman. Mean TCDD concentration in eggs at the north end was 1006.1 pg/g and 1022.6 pg/g at the south end ($df = 1,7$; $P = 0.957$). In nestling carcasses, the mean concentration was 753.0 pg/g at the north end and 984.1 pg/g at the south end ($df = 1,3$; $P = 0.795$).

The remaining 6 dioxins and 9 of 10 furans were detected in >50% of eggs and nestling samples (Tables 1 and 2). These other dioxin and furan congeners tended to be present at much lower concentrations than TCDD except for 1,2,3,4,6,7,8-HpCDD, OCDD, and 1,2,3,4,6,7,8-HpCDF in eggs at Greystone (Table 1). Although concentrations of the other dioxin and furan congeners varied among study sites (12 of 15 congeners for eggs and nestlings) the magnitude of the differences among sites for these

other congeners were much less than the differences among sites for TCDD. The magnitudes of the differences between the highest and lowest mean TCDD concentration were 59 times (eggs, 17.2 pg/g vs. 1013.3 pg/g) and 173 times (nestlings, 5.73 pg/g vs. 990.0 pg/g). For the other 15 congeners the average magnitude of the difference between the highest and lowest mean values was a factor of 3.7 for eggs (1.7 - 8.9 times different) and 3.2 times for nestling (1.7 - 7.1 times different).

Concentration of TCDD in eggs was highly correlated with the other dioxin and furan congeners except 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF and OCDF (Table 3). The correlation among dioxin and furan congeners in nestlings (Table 4) was similar in to the pattern in eggs, except that TCDD was not correlated with OCDD and OCDF.

Toxic equivalents (TEQs)

In eggs, the TEQs associated with dioxins and furans were significantly lower at Greystone than Allendale in 2000 and Lyman in 2001 (Table 1). For nestlings, TEQs at Greystone were less than at Allendale and Lyman in 2001 (Table 2). The patterns among sites for both eggs and nestlings were similar regardless of whether the Kennedy or WHO TEFs were used.

Toxic equivalents and TCDD for dioxins and furans were highly correlated (R = 0.99) for both Kennedy and WHO methods in both eggs and nestlings (Tables 3 and 4). At Allendale and Lyman in excess of 89% of the total TEQs were associated with TCDD (Table 5 and 6). The average percent of TEQs associated with TCDD was between 42 and 62% at Greystone.

Accumulation rate and diet

Accumulation rates were positive for TCDD at all study sites in both years (Table 7, Figs. 2 and 3). The magnitude of the accumulation per day was much higher for TCDD (> 900 pg/day) at both Allendale and Lyman than for Greystone (< 15 pg/day). Concentrations of TCDD in tree swallow diet ranged from non-detected to 5.7 pg/g at Greystone and between 71 and 219 at Allendale and Lyman (Table 8).

Accumulation rates of 2 dioxins 1,2,3,4,6,7,8-HpCDD ($P = 0.465$) and OCDD ($P = 0.205$) and 2 furan congeners, 1,2,3,6,7,8-HpCDF ($P = 0.319$) and OCDF ($P = 0.438$) did not differ among sites. The remaining 4 dioxins and 6 furans had positive accumulation rates that varied among sites (Table 7). For these 10 congeners the maximum accumulation rate was < 15 pg/day. In many of these comparisons (16 of 20 possible), Greystone did not differ from Allendale and the magnitude of the differences among sites was small. For example, the average accumulation rate for TCDD was 147 times greater at Allendale than at Greystone in 2000, and 122 times greater in 2001. The difference in accumulation rate for the other dioxin and furan congeners, between Allendale and Greystone or Lyman and Greystone was less than a factor of 4.

Accumulation rate was highly correlated with both concentration in eggs ($P = 0.007$, $R = 0.538$, $N = 24$) and nestlings ($P < 0.001$, $R = 0.990$). The concentration of TCDD in eggs and nestlings were highly correlated with one another ($P = 0.004$, $R = 0.567$) as well. Concentrations in pooled diet were correlated with mean concentrations in nestlings ($P = 0.016$, $R = 0.945$, $N = 5$) and accumulation rate ($P = 0.027$, $R = 0.920$), but not with egg concentrations ($P = 0.506$, $R = 0.399$).

Other chemical contaminants

Only 7 of 22 other organochlorine chemicals were detected in tree swallow egg or nestling samples (Table 9). Of the 7 organochlorine chemicals detected, none varied among study sites in eggs. In nestlings, DDE and DDD varied among study sites with Lyman having significantly higher concentrations than Greystone (Table 9). Allendale had higher concentrations than Lyman for DDT. Alpha chlordane, chlordane and dieldrin did not vary among study sites in nestling samples. Concentrations in both tissue types were less than 0.5 μg/g wet wt. except for total PCBs which averaged 1.1 μg/g wet wt. in eggs and 0.6 μg/g wet wt. in nestling carcasses.

Trace elements

Twenty of 21 trace elements were detected in tree swallow nestling livers (Table 10). Only beryllium was detected in fewer than 50% of samples (7 of 15 livers). Three trace elements, cadmium, manganese, and thallium, differed among study sites with Allendale having significantly higher concentrations than either Greystone or Lyman.

Hatching success

Hatching success (percent of eggs laid that hatched) was significantly higher at Greystone than at Allendale during both 2000 and 2001 (Table 11). Only 47 and 51% of eggs hatched at Allendale compared with 92 and 77% at Greystone for the 2 years respectively. Seventy percent of the eggs hatched at Lyman. All eggs in a clutch failed to hatch in 47 and 57% of clutches at Allendale (Table 12) and in 27% of clutches at Lyman. Between 0 and 17% of clutches were total failures at Greystone. Clutches that were lost to predation or that were human-caused were not included in the analyses.

There was a significant negative logistic regression ($P < 0.001$) for percent hatching and TCDD concentrations in eggs ($N = 48$, Fig. 4), as well as for the sum of Kennedy's and WHO TEQs in eggs for 2000 and 2001 combined ($P < 0.001$). Each year individually also had a significant negative logistic regression. Visually estimating the concentration in eggs where hatching was reduced by 50% (CE_{50}) provided an estimate of between 1.5 and 1.9 ng/g wet wt. TCDD (1500 – 1900 pg/g). Two values for 50% of "normal" hatching were used: the nationwide hatching success average (approx. 87%, Robertson et al. 1992) and the y-intercept in this study (approx. 73%).

Bioindicators

In 2000, EROD activity was significantly induced at Allendale compared to the 2 out-of-basin reference areas, but Allendale was not statistically different than Greystone (Table 13). This lack of difference between Allendale and Greystone in 2000 was due to 1 bird that was induced at Greystone and one bird that was not induced at Allendale (Fig. 6). Both Allendale and Lyman had significantly induced EROD in 2001 compared to Greystone and the out-of-basin reference site. EROD activity was similar between Greystone and the out-of-basin reference locations in eastern Minnesota and western Massachusetts in 2000 and 2001.

The half-peak coefficient of variation in DNA content of 10,000 individual red blood cells did not differ among the 3 Woonasquatucket River sites, but the eastern Minnesota reference location had significantly greater HPCV than Allendale ($P = 0.002$, $df = 3,19$, Fig. 6). The eastern Minnesota site did not differ from either Lyman or Greystone.

The difference in the height (P = 0.148, *df* = 2,7) or width (P = 0.666, *df* = 2,4) between the right and left halves of individual brains of 12-day old nestlings did not differ among sites. Additionally, concentration of TCDD in the nestling carcass and the absolute difference in size between the right and left sides were not correlated either for height (P = 0.229, Fig. 7) or width P = (0.752) differences.

Discussion

Chemical contamination - TCDD

Concentrations of TCDD in tree swallow eggs at Allendale (means in 2000 and 2001 = 314 and 826 pg/g; maximum value = 2299 pg/g) and Lyman (mean = 1013 pg/g, maximum value = 1949 pg/g) were consistently higher than at the upstream reference site (Greystone) and are hundreds of times higher than reported elsewhere for swallows. Ankley et al (1993) reported that tree swallow eggs contained 5.3 pg/g TCDD at sites along the Fox River and lower Green Bay, Lake Michigan. Custer et al. (2002) reported that only 13% of tree swallow clutches contained detectable concentrations (detection limit = 1 pg/g) of TCDD from sites along the Wisconsin River downstream of historic pulp and paper mills.

Tree swallows at Allendale and Lyman also had much higher TCDD concentrations in eggs than other bird species that feed higher on the food chain and which would be expected to contain higher concentrations due to biomagnification. For example, great blue herons (*Ardea herodias*) nesting in British Columbia (BC) in the vicinity of paper mills contained between 4 and 209 pg/g wet wt. TCDD in eggs (Elliott et al. 2001) and double-crested cormorants (*Phalacrocorax auritus*) nesting at 2 colonies

during the late 1980s within 10 – 15 km of pulp and paper mills in the Strait of Georgia, BC contained between 30 and 74 pg/g wet wt. in eggs (Harris et al. 2003). Osprey (*Pandion heliaetus*) nesting along the Wisconsin River, central WI contained between 59 and 108 pg/g wet wt. TCDD in eggs (Woodford et al. 1998), osprey nesting downstream of pulp and paper mills in the Fraser River basin contained average concentrations of between 5.5 and 47 pg/g wet wt., and those nesting in the Columbia River basin contained between 9.5 and 21 pg/g wet wt. in eggs (Elliott et al. 1998). Forster's terns (*Sterna forsteri*) in Green Bay, Lake Michigan contained only between 5 and 20 pg/g wet TCDD wt. in eggs (Ankley et al 1993).

There was some between year variability in TCDD concentrations at Allendale. It is unknown why concentrations of TCDD in eggs at Allendale in 2001 were about half the concentration present in 2000; this difference, however, was not statistically significant. This same pattern was not reflected in concentrations in nestling carcasses or diet, or in the accumulation rates at Allendale between 2000 and 2001. Perhaps female swallows were in the area prior to egg laying for a shorter period of time in 2001 compared to 2000 or they were feeding on more terrestrial insects during that time. The nestling concentrations and the accumulation rates are a better indicator of local contamination, however, because the nestlings are only fed from the local environment.

The magnitude of the difference in concentrations between Greystone and the 2 ponds downstream was greater for TCDD than the other 15 congeners. The concentrations of TCDD were between 11 and 48 times higher in eggs from Allendale or Lyman compared to Greystone and between 90 and 106 times higher in nestlings. This contrasts with an average factor of only 3.7 and 3.2 (eggs and nestlings) between the

highest and lowest concentrations for the other 15 dioxin/furan congeners. Additionally, 13 of 15 congeners in 2000 (Allendale), 15 of 15 in 2001 (Allendale), and 10 of 15 congeners in 2001 (Lyman) did not differ from Greystone. This indicates that these other dioxin and furan congeners were present at roughly the same concentrations throughout the system and can be considered background concentrations for this general location. Only TCDD exhibited a pattern strongly consistent with contamination originating from the Centredale Manor Superfund site.

Greater than 89% of the TEQs were associated with TCDD at Allendale and Lyman, but only 42 and 62% of the TEQs were associated with TCDD at Greystone. Because of the lower concentration of TCDD at Greystone relative to the other dioxin and furan congeners, these percentages should be less because they all have to sum to 100%.

Accumulation rate

The very high and positive accumulation rates of TCDD in nestlings at Allendale and Lyman are indicative of local contamination from the respective ponds where the birds nested. This is because nestlings are only fed from the local environment and the concentration in the egg has been factored out. Average accumulation rates for TCDD at Allendale were 988 and 1736 pg/day in 2000 and 2001, and was 1686 pg/day at Lyman. Accumulation rates were positive at Greystone as well, but only averaged 6.7 and 14.2 pg/day.

The pattern of TCDD concentrations in diet and accumulation rates were similar among study sites. Concentration of TCDD in pooled food samples were 71 and 219 pg/g at Allendale in 2000 and 2001, and were either not detected (2000) or 5.7 pg/g

(2001) at Greystone. The higher concentrations in food from Allendale and Greystone in 2001 compared to 2000 are reflected in the higher accumulation rate at both these study sites in 2001 compared to 2000.

Diet samples at Allendale and Lyman were between 6 and 18 times above safe levels. The concentration of TCDD in avian diet that is considered safe is 10 - 12 pg/g wet wt. (Eisler 2000). Concentrations of the sum of polychlorinated dibenzo-*p*-dioxin congeners (PCDD) present in fish from the Strait of Georgia, BC in the 1980s and early 1990s near pulp and paper mills ranged between < 0.1 and 90 pg/g wet wt. (Elliott et al. 2001). The PCDDs in food (insects) at Allendale were more than 4 times the concentration found in fish in BC; Lyman food samples contained twice as much PCDDs. Insects generally contain lower concentrations of organic contaminants than fish because of their position lower on the food chain. This further emphasizes how contaminated Allendale and Lyman are compared to other locations in the U.S. and Canada.

Local exposure

Accumulation rate is one of the best measures of local exposure. Accumulation rate integrates what the nestling was exposed to over a 12-day period, or whatever the age was when the nestling was collected. Accumulation rate also factors out any contaminant in the egg, which reflects what the female was exposed to prior to and during egg laying. Concentration in nestling carcasses is the next best measure of local exposure. It does not factor out the contribution from the egg, although at contaminated sites the contribution of contaminants in the egg can be negligible compared to what the nestling was exposed to. Growth dilution, however, needs to be considered because there can be considerable exposure (on a concentrations basis) that is masked by increased (growth) nestling mass

as it grows. Diet concentration is the third best measurement of exposure. Concentrations in an individual diet sample reflect exposure for only the previous few hours. Diet represents a snap shot in time for each individual. A pooled diet sample, however, integrates a number of individuals collected over several days or weeks, so it can provide an integrated sample as well. Depending on how many diet samples are collected over what time period, diet samples may offer less temporal or spatial integrations than does accumulation rate or nestling concentration. Finally, we have found that concentrations in eggs also reflect local exposure. Concentrations in eggs were highly correlated with both accumulation rate and nestling concentration. Egg concentrations can be more variable than these other measures of local exposure probably because females may have been in the area of interest for differing amounts of time prior to egg laying or may have migrated through different areas for example.

Hatching success

The probability of an egg hatching was significantly higher at Greystone than at Allendale during both years. Hatching success was intermediate at Lyman and did not differ from either Allendale or Greystone. Reduced hatching tended to be the result of total clutch failure and not due to partial losses within a clutch. Regardless of study site, hatching success was negatively correlated with concentration of TCDD in eggs in each year of the study individually and for both years combined. Forty-seven and 51% of eggs hatched at Allendale in 2000 and 2001, whereas 92 and 77% of eggs hatched at Greystone. The lower percent hatching at Greystone in 2001 was initially cause for concern, but examination of TCDD concentrations in those clutches were consistent with TCDD as the probable causative agent for poor hatching success. One nest that was a

total failure at Greystone contained 284 pg/g wet wt. TCDD. Another clutch that contained dead embryos contained 130 pg/g TCDD. The other total failure at Greystone was a late clutch and no eggs were collected from it for chemical analysis.

The estimated CE_{50} for tree swallows is approximately 10 times higher than the estimate for chickens (*Gallus domesticus*). The LD_{50} (lethal dose) for injected chicken eggs is 150 pg/g (Powell et al. 1996). The estimated CE_{50} for tree swallows, based on visual inspection of Fig. 4 was between 1.5 and 1.9 ng/g (1500 - 1900 pg/g wet wt.). The range in the visual estimate of the 50% hatching level for tree swallows is a result of using either the 87% nationwide average hatching success in successful nest number (Robertson et al. 1992) or the y-intercept from this study. Chickens are considered one of the most sensitive avian species (Giesy et al. 1994). Additionally, data from field studies may have other factors that affect hatchability that cannot be controlled for or assessed in a field situation.

The tree swallow field data reported here do not address causality or mode of action. Reduced hatching could be the result of direct toxicity of the contaminants in the eggs, some behavioral response such as less consistent incubation as reported for PCBs by Peakall and Peakall (1973), or a combination of causes. The only way to definitively address the mode of action is through laboratory exposure of eggs in a controlled factorial experiment.

Few other avian data are availably with which to compare estimated CE_{50} values. The LD_{50} for TCDD for double-crested cormorants was between 5 and 26 ng/g wet wt. (Powell et al. 1997). These data should be used carefully, however, because the authors

were extrapolating beyond the limits of their data. Regardless, the lower range of Powell's cormorant estimate is similar to what we estimated for tree swallows.

There are a few other studies that assessed dioxin and furan effects on hatching success in field situations. Woodford et al. (1998) found no effect of dioxins/furans on hatching success of osprey nesting along the Wisconsin River below pulp and paper mills. Mean TCDD concentrations ranged between 59 – 108 pg/g wet wt., and they estimated a no-effects level in eggs of 136 pg/g. Elliott et al. (1989) found no difference among 4 great blue heron colonies in average number of young fledged per success nest, nor a relationship between dioxin and furan concentrations and hatching success. Mean concentrations of TCDD in eggs at those 4 colonies ranged between 9 and 210 pg/g wet wt. Both of these studies had much lower TCDD concentrations than present in our study and are consistent with our data where we estimated a 50% reduction in hatching at approximately 1900 pg/g wet wt. There was also no relationship between concentration of dioxins and furans on hatching success of bald eagle (*Haliaeetus leucocephalus*) or osprey eggs from birds nesting along the Pacific coast of Canada (Elliott and Nordstrom 1998; Elliott et al. 2001). Concentrations were reported from either blood plasma on a wet wt. basis or yolk sacs on a lipid wt. basis so they cannot be directly compared to the tree swallow study. Elliott et al (2001), however, estimated concentrations in whole osprey eggs from that location of between 2 and 4 pg/g wet wt., so they are considerable lower than even our reference site at Greystone.

Other chemicals

Other organochlorine and trace element concentrations were either not detected or were present at background levels. Total PCBs averaged ≤ 1 µg/g wet wt. in eggs and

nestlings and did not vary among study sites. These egg concentrations were too low to contribute to poor hatching success (Custer et al. 1998, Custer et al. 2003). On the Housatonic River, reduced hatching was detected beginning at 30 - 50 μg/g wet wt. PCBs in eggs (Custer et al. 2003). Concentrations of DDE were also below known-effects levels (Blus 1967, 1968). The most sensitive avian species have a threshold of 3 - 6 μg/g wet wt. DDE before hatching success becomes compromised. Few other organochlorine chemicals were detected.

Mercury (0.14 μg/g wet wt.) concentrations along the Woonasquatucket River did not vary among sites and were similar to or lower than found in tree swallow eggs from Colorado (0.16 - 0.18 μg/g dry wt., Custer et al. 2002), Wyoming (0.3 μg/g dry wt., Custer et al. 2001), or western Massachusetts (0.64 μg/g dry wt., Custer et al. 2003). Mercury concentrations were 18 times less than the 2.5 μg g dry wt. that has been found to be detrimental to reproduction in birds (Thompson 1996). Cadmium concentrations (0.4 μg/g dry wt.) were 10 times lower than the threshold effects level for birds (Furness 1996).

Bioindicators

It was expected that EROD would be induced in tree swallow liver microsomes as it has been shown in other studies where swallows were exposed to organic contaminants such as PCBs (Custer 2002) and polycyclic aromatic hydrocarbons (Custer et al. 2001). There was no difference between Allendale and Greystone in 2000, but both Allendale and Lyman were significantly induced compared to Greystone in 2001. The lack of difference between Allendale and Greystone in 2000 was the results of 1 nestling that had induced EROD at Greystone and 1 that lacked a response at Allendale. Laboratory

studies have shown that some individuals are not induced even thought exposed to AHH activity chemicals.

Neither the coefficient of variation of DNA content nor symmetry of brains varied among study sites along the Woonasquatucket River. This result was expected with the coefficient of variation of DNA content because dioxins are not known to be clastogenic. We wanted to test the genetic damage bioindicator at this site because of the extremely high levels of TCDD. Information from the literature indicated that organics such as PCBs and dioxins have been correlated with brain asymmetry (Henshel et al. 1997). We did not see any difference in symmetry in the brain. If dioxins cause asymmetry in brains then we would have expected to see it along the Woonasquatucket River because of the extremely high concentrations at the site. Because our reference site (Greystone) was still relatively contaminated compared to other locations in the U.S., contamination at Greystone might have been sufficient to cause asymmetry and thus we were not able to detect differences among sites. Additionally, the procedures used by Henshel et al. (1997) were different than the technique that we used which may also have accounted for the different results.

Conclusions

Tree swallows nesting on Allendale and Lyman Ponds were exposed to and accumulated more TCDD than swallows nesting on nearby Greystone Pond. This is consistent with EPA's assessment that TCDD contamination originated from the Centredale Manor Restoration site on Allendale Pond and that it is the primary contaminant of concern. Concentrations of TCDD in eggs and nestlings are some of the

highest ever reported in a bird species, including birds that feed higher on the food chain such as great blue herons and osprey. Exposure was the result of eating insects that contained high concentrations of TCDD. Concentrations of TCDD in diet were 6 – 18 times greater than safe levels for bird species and 2 – 4 times higher than in fish collected near pulp and paper mills along the Pacific coast of Canada. Concentrations of TCDD in eggs and nestlings were markedly higher on Allendale and Lymen ($\geq$ 90 times higher) compared to the upstream reference area, whereas the rest of the dioxin and furan congeners were more similar among the 3 sites, differing by only a factor of 3. Hatchability of eggs was reduced on Allendale compared with Greystone and the reduced hatchability was correlated with concentrations of TCDD in eggs. This is the first time that dioxins have been implicated in reduced hatching success in a field study. Other organochlorine and trace element concentrations were either not detected or present at background or no-effect concentrations.

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Figure Titles

Figure 1. Map of Woonasquatucket River, Rhode Island study sites.

Figure 2. Accumulation rates (slope of lines) for TCDD in tree swallows nesting at Greystone and Allendale Ponds along the Woonasquatucket River, Rhode Island in 2000.

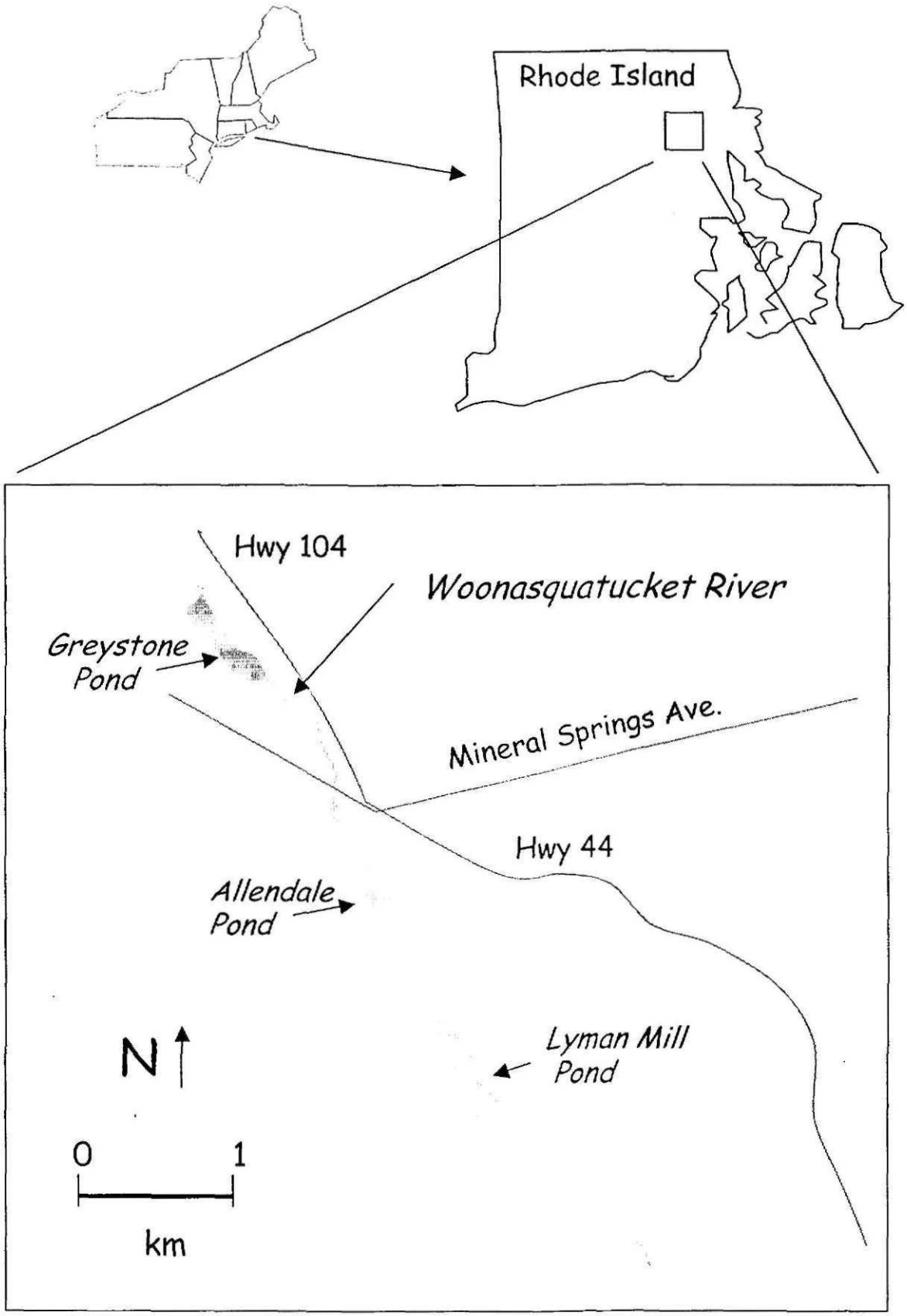
Figure 3. Accumulation rates (slope of lines) for TCDD in tree swallows nesting at Greystone, Allendale, and Lyman Ponds along the Woonasquatucket River, Rhode Island in 2001.

Figure 4. Logistic regression for TCDD (ng/g wet wt.) in eggs and percent hatching of tree swallow clutches for birds nesting along the Woonasquatucket River, Rhode Island in 2000 and 2001. CE_{50} values are visually estimated. Each point on the graph represents an individual clutch of eggs.

Figure 5. Ethoxyresorufin-*O*-dealkylase activity in liver microsomes in 2000 for tree swallows nesting at Allendale and Greystone on the Woonasquatucket River, RI and at 2 out-of-basin reference areas.

Figure 6. Half peak coefficient of variation of DNA content for tree swallow nestling blood samples, Woonasquatucket River, RI and eastern Minnesota, 2001. Means sharing same letter are not significantly different.

Figure 7. Measurement of asymmetry for brain height regressed against TCDD concentration in nestling carcasses for tree swallows nesting along the Woonasquatucket River, RI and eastern Minnesota, 2001.


Rhode Island
Hwy 104
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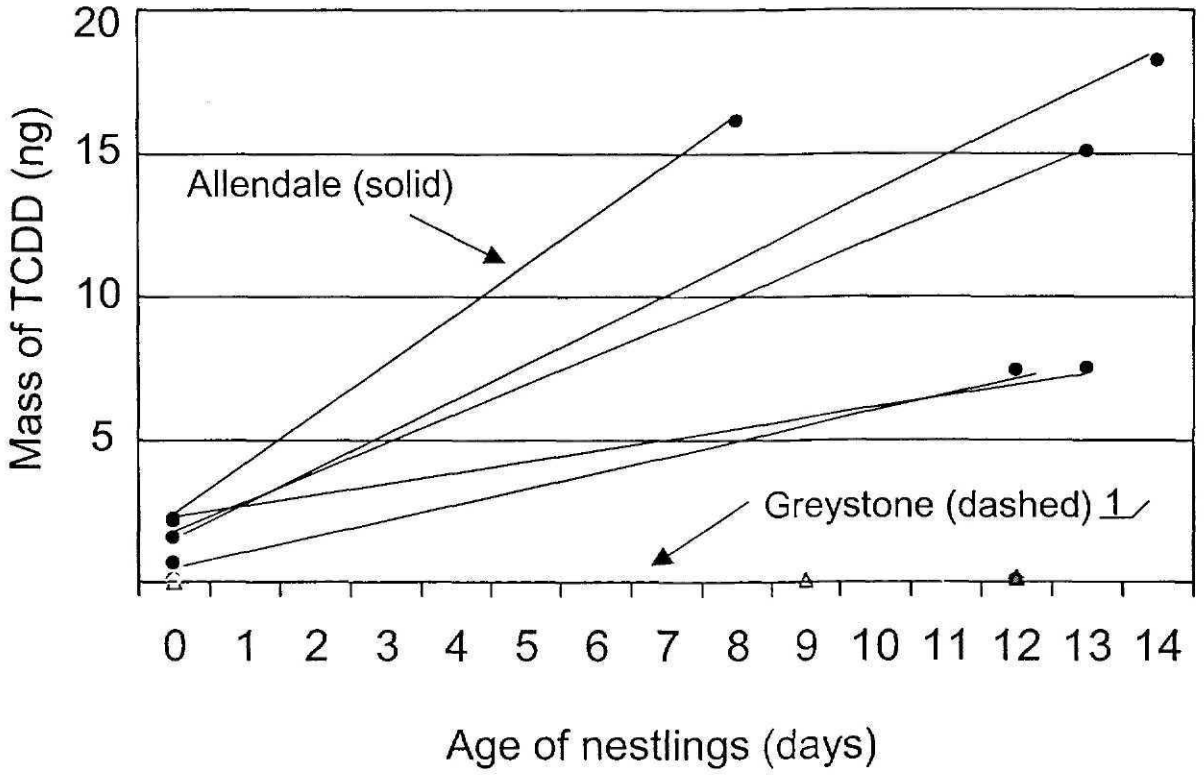
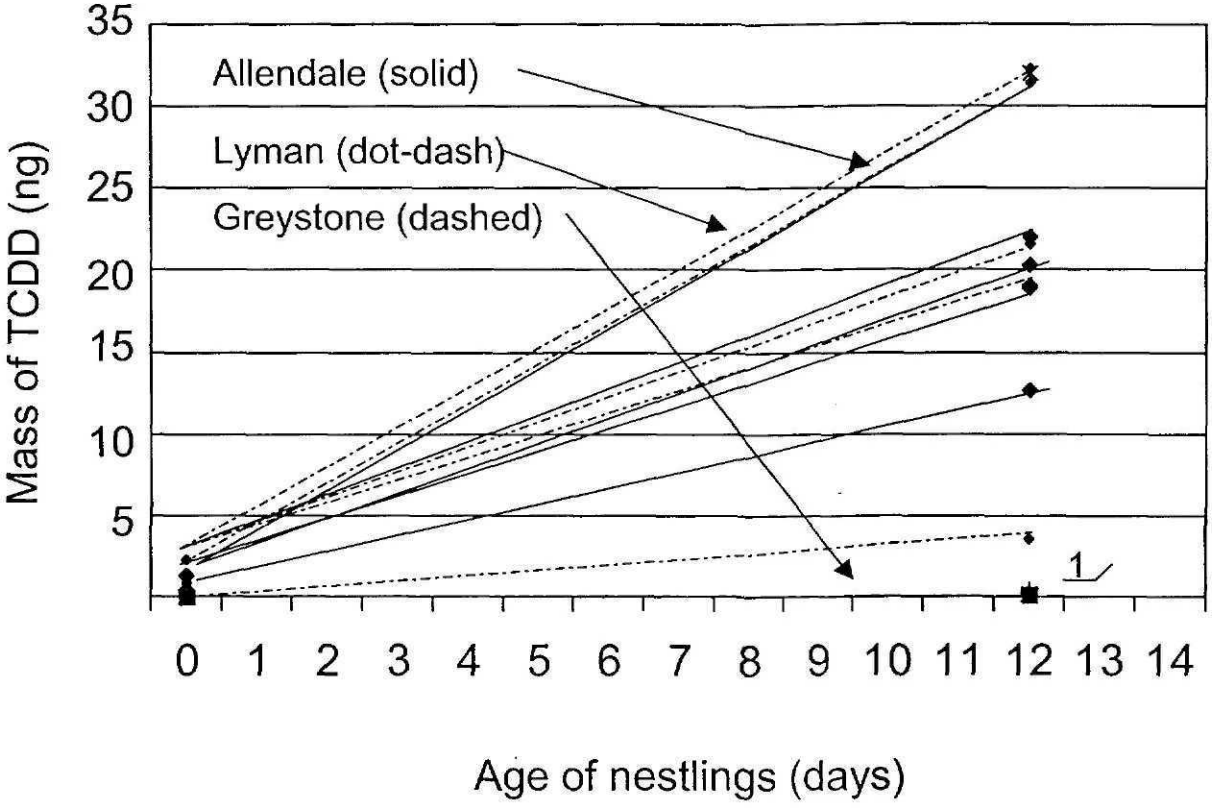
Greystone Pond
Mineral Springs Ave.
Hwy 44
Allendale Pond
Lyman Mill Pond
N
0
1
km



1/ 5 lines from Greystone (- - -) are superimposed on each other along the x-axis at this scale.



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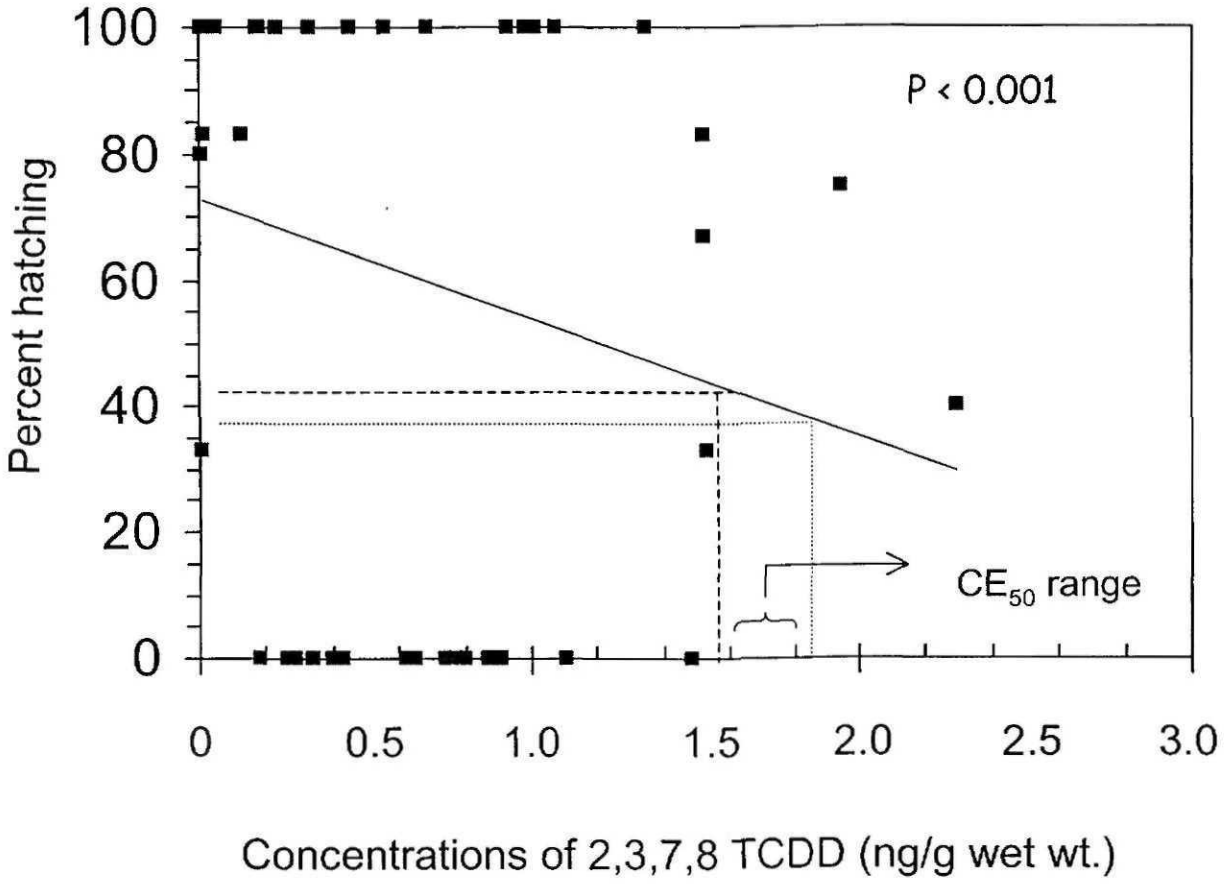
100
80
60
40
20
0
Percent hatching
P < 0.001
CE50 range
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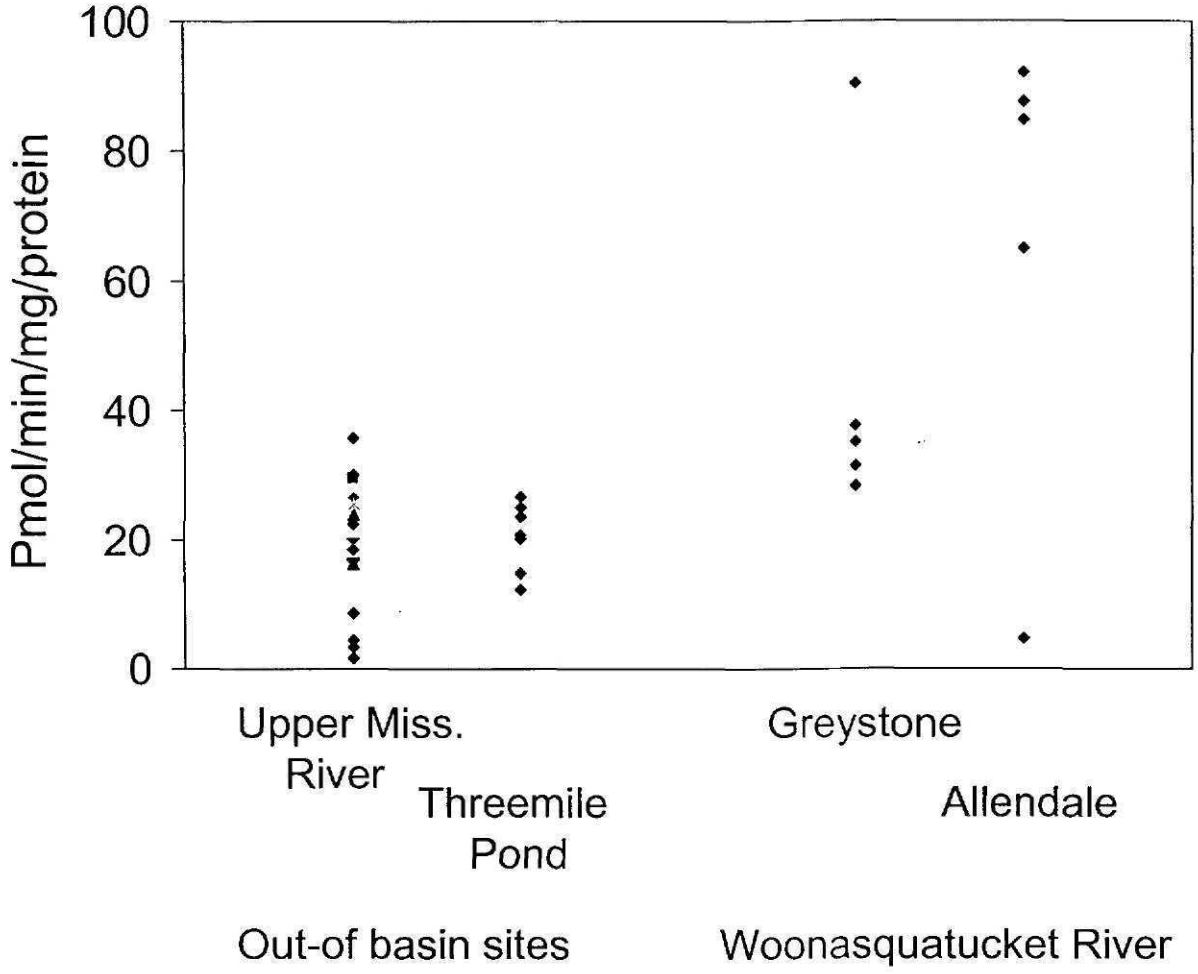
0.5
1.0
1.5
2.0
2.5
3.0
Concentrations of 2,3,7,8 TCDD (ng/g wet wt.)


100
80
60
40
20
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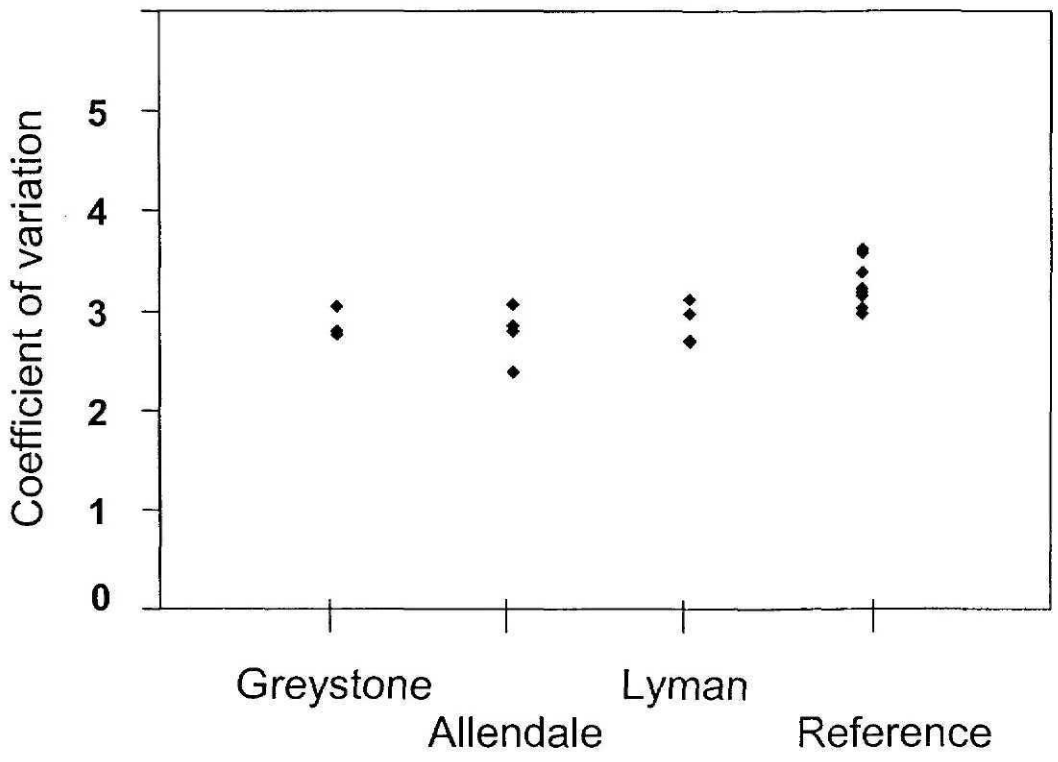
Pmol/min/mg/protein
Upper Miss. River
Threemile Pond
Greystone
Allendale
Out-of basin sites
Woonasquatucket River


Coefficient of variation
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1
2
3
4
5
Greystone
Allendale
Lyman
Reference

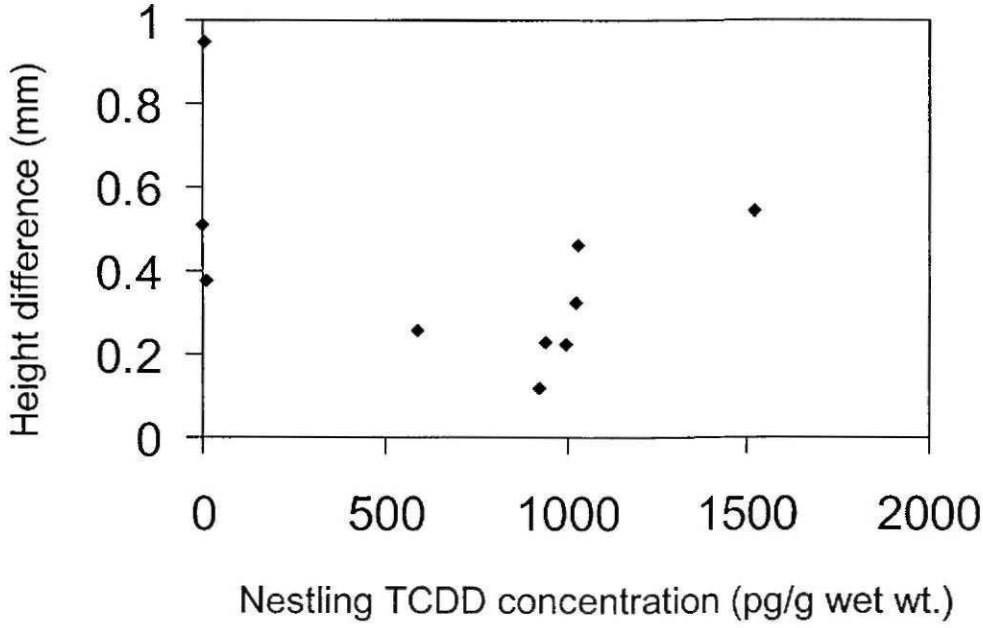
Height difference (mm)
1
0.8
0.6
0.4
0.2
0
0
500
1000
1500
2000
Nestling TCDD concentration (pg/g wet wt.)

Table 1. Geometric mean (pg/g wet wt.) and 95% Confidence Intervals for dioxins and furans, their associated TEQs, and total PCBs (µg/g wet wt.) in tree swallow egg samples collected along the Woonasquatucket River, RI in 2000 and 2001.

	Year and Location				
	2000		2001		
Chemical	Allendale N = 13	Greystone N = 7	Allendale N = 13	Greystone N = 6	Lyman N = 9
2,3,7,8-TCDD [1]	825.5 A[2]	17.21 B	313.6 A	29.43 B	1013.3 A
P < 0.001	720.6-945.7	11.73-25.25	243.1-404.6	16.0-54.1	885.1-1160
1,2,3,7,8-PeCDD	13.74 A	6.09 AB	6.25 AB	2.96 B	9.11 A
P = 0.001	11.9-15.9	5.04-7.35	4.83-8.097	2.00-4.37	7.78-10.7
			1ND [3]	1ND	
1,2,3,4,7,8-HxCDD	13.65 A	5.88 B	7.69 AB	4.64 B	8.63 AB
P < 0.001	12.0-15.5	4.85-7.14	6.61-8.95	4.10-5.25	7.45-10.0
1,2,3,6,7,8-HxCDD	59.02 A	31.97 AB	46.88 AB	25.47 B	59.06 A
P = 0.023	49.9-69.8	24.2-42.2	39.39- 55.78	23.3-27.8	49.4-70.6
1,2,3,7,8,9-HxCDD	9.15 A	3.72 C	6.53 ABC	4.20 BC	6.83 AB
P < 0.001	7.93-10.6	3.24-4.27	5.85-7.29	3.90-4.51	6.00-7.79
1,2,3,4,6,7,8-HpCDD	149.2 AB	77.91 B	145.4 AB	243.2 A	292.9 A
P = 0.007	126.3-176.3	63.8-95.1	113.5-186.1	185.4-318.9	234.9-365.1
OCDD	107.9 B	63.83 B	167.7 AB	429.6 A	567.6 A
P < 0.001	86.8-134.2	52.4-77.7	121.7-231.1	294.2-627.3	399.6-806.1
2,3,7,8-TCDF	15.94 A	11.69 AB	12.13 AB	6.42 B	13.12 A
P = 0.008	14.2-17.9	9.92-13.8	10.7-13.7	4.70-8.77	11.9-14.5
1,2,3,7,8-PeCDF	3.97	2.59	3.59	1.71	2.76
P = 0.091	3.53-4.47	2.15-3.11	3.21-4.01	1.27-2.32	1.93-3.96
				1ND	2ND

Table 1 cont.

	Year and Location				
	2000		2001		
Chemical	Allendale	Greystone	Allendale	Greystone	Lyman
2,3,4,7,8-PeCDF P = 0.067	7.35 6.30-8.58	4.79 4.06-5.64	3.72 2.83-4.90 2ND	2.44 1.89-3.16	4.32 3.10-6.02 1ND
1,2,3,4,7,8-HxCDF P = 0.028	5.47 AB [4] 4.87-6.14	3.74 B 3.17-4.41	4.41 AB 3.54-5.48 1ND	3.70 B 3.43-3.98	8.17 A 6.91-9.67
1,2,3,6,7,8-HxCDF P = 0.005	5.82 AB 5.15-6.58	3.14 B 2.68-3.68	3.78 AB 3.10-4.61 1ND	2.97 B 2.71-3.25	6.44 A 5.76-7.21
1,2,3,7,8,9-HxCDF	11ND	6ND	11ND	6ND	7ND
2,3,4,6,7,8-HxCDF P = 0.270	3.13 2.77-3.53	1.82 1.54-2.14	2.55 2.14-3.05 1ND	1.80 1.65-1.97	2.51 1.82-3.45 2ND
1,2,3,4,6,7,8-HpCDF P = 0.001	18.53 B 15.7-21.9	10.90 B 8.75-13.6	22.13 AB 16.42-29.83	32.3 AB 27.0-38.6	57.0 A 45.0-72.1
1,2,3,4,7,8,9-HpCDF P = 0.004	0.94 B 0.80-1.10 3ND	0.81 B 0.68-0.95 1ND	1.02 AB 0.81-1.28 3ND	1.70 AB 1.30-2.22	2.80 A 2.06-3.80
OCDF P = 0.002	3.77 BC 3.11-4.57	2.46 C 2.07-2.93	4.26 ABC 2.68-6.75 2ND	11.67 AB 8.22-16.5	19.6 A 14.3-26.9
Total PCBs (μg/g)	NA [5]	NA	1.00 (n=3) [6] 0.87 - 1.15	NA	1.13(n=2)[6] 0.95 - 1.34

Table 1 cont.

	Year and Location				
	2000		2001		
Chemical	Allendale	Greystone	Allendale	Greystone	Lyman
TEQs [7]					
Kennedy-dioxin/furan	949.9 AB	46.5 C	495.8 BC	89.9 C	1117.6 A
P < 0.0001	837.8-1062.0	35.3-57.6	335.6-656.1	42.5-137.5	963.7-1271.5
WHO-dioxin/furan	960.0 AB	52.2 C	502.6 BC	94.2 C	1126.4 A
P < 0.0001	847.2-1072.6	40.6-64.0	343.2-663.94	46.34-142.4	973.0-1281.0
Kennedy - PCBs	---- [8]	----	549.4 (n=3) [6] 415.6 – 683.2	----	465.6 (n=2)[6] 381.9 - 549.3
WHO - PCBs	----	----	220.9 (n=3) [6] 167.0 - 274.8	----	143.8 (n=2) [6] 119.6 - 168.1

[1] *df* = 4,42; alpha for Bonferroni mean separations = 0.05 except where noted.

[2] means sharing the same letter are not significantly different among year/locations. See P values above table.

[3] number in front of ND is number not detected. If no notation then all samples with detectable concentrations.

[4] alpha = 0.075 for Bonferroni mean separations.

[5] NA = no samples analyzed.

[6] sample sizes for total PCBs, PCB congeners, and TEQ analyses only.

[7] means for TEQs are arithmetic not geometric and are expressed in pg/g wet wt. for both dioxin/furans and PCBs.

[8] --- TEQ not calculated because no sample was analyzed for PCBs.

Table 2. Geometric mean (pg/g wet wt.) and 95% Confidence Intervals for dioxins and furans, their associated TEQs, and total PCBs (μg/g wet wt.) in tree swallow nestling carcass samples collected along the Woonasquatucket River, RI in 2000 and 2001.

	Year and Location				
	2000		2001		
Chemical	Allendale N = 5	Greystone N = 5	Allendale N = 5	Greystone N = 5	Lyman N = 5
2,3,7,8-TCDD[1] P < 0.001	572.0 A[2] 485.2-674.3	5.73 B 5.30-6.20	990.0 A 836.7-1171	9.32 B 7.21-12.06	838.1 A 558.5-1258
1,2,3,7,8-PeCDD P < 0.001	2.77 AB 2.42-3.17	1.49 BC 1.34-1.66	3.38 AB 3.11-3.69	1.03 C 0.72-1.51 1ND[3]	3.93 A 3.57-4.31
1,2,3,4,7,8-HxCDD P < 0.001	2.52 AB 2.16-2.94	1.37 C 1.25-1.51	3.46 A 3.22-3.72	1.74 BC 1.55-1.96	3.72 A 3.28-4.21
1,2,3,6,7,8-HxCDD P = 0.001	7.89 AB 6.51-9.55	4.73 B 4.15-5.39	12.11 A 10.84-13.54	5.07 B 4.36-5.90	11.09 A 8.96-13.72
1,2,3,7,8,9-HxCDD P = 0.002	1.14 AB 0.78-1.68 1ND	0.82 B 0.77-0.88	2.89 A 2.59-3.25	0.92 B 0.75-1.13	1.94 AB 1.67-2.25
1,2,3,4,6,7,8-HpCDD P = 0.013	17.53 AB 13.23-23.22	12.27 B 9.99-15.06	37.99 A 30.12-47.91	15.49 AB 11.93-20.12	32.17 AB 26.35-39.28
OCDD P = 0.026	11.69 AB[4] 9.22-14.82	9.26 B 7.17-11.96	34.57 A 24.37-49.05	23.09 AB 15.28-34.91	30.57 AB 23.06-40.52
2,3,7,8-TCDF P = 0.004	4.79 AB 4.06-5.66	3.94 B 3.63-4.28	7.17 A 6.54-7.85	4.47 AB 3.75-5.33	7.59 A 7.04-8.18
1,2,3,7,8-PeCDF P = 0.008	0.98 AB 0.82-1.19	0.77 B 0.69-0.86	1.54 A 1.39-1.69	0.92 AB 0.812-1.05	1.45 A 1.25-1.68
2,3,4,7,8-PeCDF P = 0.055	1.51 1.30-1.76	0.91 0.83-1.00	2.92 2.40-3.56	1.13 0.98-1.29	1.67 1.00-2.80 1ND

Table 2 cont.

	Year and Location				
	2000		2001		
Chemical	Allendale	Greystone	Allendale	Greystone	Lyman
1,2,3,4,7,8-HxCDF P < 0.001	1.13 B 0.93-1.37	0.89 B 0.84-0.96	2.92 A 2.40-3.56	1.09 B 0.92-1.30	2.47 A 2.32-2.62
1,2,3,6,7,8-HxCDF P < 0.001	1.27 AB 1.03-1.56	0.85 B 0.79-0.92	2.239 A 2.11-2.70	0.86 B 0.73-1.02	2.21 A 1.96-2.50
1,2,3,7,8,9-HxCDF	5ND	5ND	5ND	5ND	5ND
2,3,4,6,7,8-HxCDF P < 0.001	0.65 AB 0.50-0.84 1ND	0.30 C 0.28-0.33 1ND	1.15 A 1.06-1.24	0.45 BC 0.38-0.53	0.85 AB 0.77-0.93
1,2,3,4,6,7,8-HpCDF P = 0.008	2.38 AB 1.73-3.27	1.41 B 1.27-1.58	5.52 A 4.72-6.45	1.39 B 0.81-2.39 1ND	4.562 AB 4.16-5.00
1,2,3,4,7,8,9-HpCDF	--- 4ND	--- 5ND	0.35 0.30-0.42 1ND	--- 4ND	0.32 0.29-0.35 2ND
OCDF P = 0.007	0.56 AB 0.54-0.58	0.31 B 0.27-0.35	2.19 A 1.36-3.52	1.32 AB 0.77-2.26	1.11 AB 0.85-1.46
Total PCBs (µg/g) P < 0.001	0.41 A 0.36 - 0.47	0.11 B 0.10 - 0.12	0.71 --- [5]	0.21 ---	1.72 ---
TEQs [6]					
Kennedy-dioxin/furan P < 0.001	610.7 AB 519.1-702.3	11.9 B 11.05-12.70	1059.9 A 877.9-1241.8	17.4 B 17.49-450.0	1067.4 A 810.6-1324.1
WHO-dioxin/furan P < 0.001	612.3 AB 520.6-704.1	12.8 B 11.9-13.6	1063.4 A 887.9-1241.9	18.6 B 18.76-451.4	1069.9 A 812.5-1327.4

Table 2 cont.

	Year and Location				
	2000		2001		
Chemical	Allendale	Greystone	Allendale	Greystone	Lyman
Kennedy-PCBs	338.5 291.1 – 385.8	83.5 78.0 – 88.9	411.7 ---- [5]	81.3 ----	666.8 ----
WHO-PCBs	133.4 111.5 – 155.3	32.8 31.3 – 34.3	152.0 ----	27.1 ----	179.4 ----

[1] *df* = 4,20; alpha = 0.05 for Bonferroni mean separations, except where noted.

[2] means sharing the same letter are not significantly different among year/sites. See P values in table above.

[3] number in front of ND is number not detected. If no notation then all samples with detectable concentrations.

[4] alpha = 0.10 for Bonferroni mean separation.

[5] no variance estimate because only 1 sample/site in 2001.

[6] means are arithmetic not geometric for TEQs and are expressed as pg/g wet wt. for both dioxins/furans and PCBs.

Table 3. Correlation matrix of dioxin and furan congeners, including toxic equivalents, in tree swallow eggs (N = 48) from the Woonasquatucket River, RI in 2000 and 2001. R-value is the top number and P-value is immediately underneath. N values are on the third row.

	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF1	2,3,4,7,8-PECDF2	1,2,3,7,8-HXCDF	1,2,3,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	OCDF	2,3,4,6,7,8-HXCDF	TEQs WHO	TEQs Kennedy
2,3,7,8-TCDD	1	0.39949	0.40201	0.31175	0.39841	0.13218	0.10395	0.49235	0.38585	0.43968	0.3315	0.49075	0.15126	0.12646	0.44492	0.99971	0.99982
		0.006	0.0046	0.031	0.005	0.3705	0.482	0.0004	0.0089	0.0025	0.0228	0.0005	0.3048	0.4023	0.0022	<.0001	<.0001
		46	48	48	48	48	48	48	45	45	47	47	48	46	45	48	48
1,2,3,7,8-PECD		1	0.96227	0.85119	0.79478	0.17982	-0.02403	0.58259	0.69103	0.81573	0.45641	0.75103	0.03612	-0.08314	0.6905	0.41924	0.41471
			<.0001	<.0001	<.0001	0.2318	0.8741	<.0001	<.0001	<.0001	0.0014	<.0001	0.8116	0.5871	<.0001	0.0037	0.0042
			46	46	46	46	46	46	44	44	46	46	46	45	44	46	46
1,2,3,4,7,8-HXCDD			1	0.87999	0.84904	0.2117	-0.03841	0.55771	0.71752	0.80116	0.51048	0.81584	0.07226	-0.06347	0.74688	0.42184	0.41676
				<.0001	<.0001	0.1486	0.7955	<.0001	<.0001	<.0001	0.0002	<.0001	0.6255	0.6752	<.0001	0.0028	0.0032
				48	48	48	48	48	45	45	47	47	48	46	45	48	48
1,2,3,6,7,8-HXCDD6				1	0.77082	0.41033	0.15053	0.3631	0.79749	0.79641	0.67038	0.84676	0.29969	0.17085	0.84647	0.32969	0.32387
					<.0001	0.0038	0.3071	0.0112	<.0001	<.0001	<.0001	<.0001	0.0385	0.2563	<.0001	0.0221	0.0247
					48	48	48	48	45	45	47	47	48	46	45	48	48
1,2,3,4,7,8,9-HXCDD					1	0.48069	0.21022	0.3828	0.58891	0.65011	0.6618	0.91381	0.37405	0.20547	0.87826	0.41344	0.40887
						0.0005	0.1515	0.0072	<.0001	<.0001	<.0001	<.0001	0.0088	0.1707	<.0001	0.0035	0.0039
						48	48	48	45	45	47	47	48	46	45	48	48
1,2,3,4,6,7,8-HPCDD						1	0.90372	-0.16822	0.1791	0.04262	0.75903	0.56432	0.92987	0.84798	0.6261	0.13332	0.13113
							<.0001	0.2531	0.2391	0.781	<.0001	<.0001	<.0001	<.0001	<.0001	0.3663	0.3743
							48	48	45	45	47	47	48	46	45	48	48
OCDD OCDD							1	-0.22631	-0.00561	-0.14867	0.67712	0.32735	0.91139	0.91355	0.36921	0.10005	0.09979
								0.1219	0.9708	0.3297	<.0001	0.0247	<.0001	<.0001	0.0126	0.4986	0.4998
								48	45	45	47	47	48	46	45	48	48
2,3,7,8-								1	0.49043	0.58533	0.21252	0.43231	-0.14578	-0.14668	0.34326	0.50761	0.50613

TCDF	0.0006	<.0001	0.1515	0.0024	0.3228	0.3307	0.021	0.0002	0.0002
	45	45	47	47	48	46	45	48	48
1,2,3,7,8-PECDF	1	0.87655	0.58779	0.74077	0.15077	0.0788	0.69413	0.40167	0.39637
		<.0001	<.0001	<.0001	0.3228	0.6155	<.0001	0.0062	0.007
		43	44	44	45	43	43	45	45
2,3,4,7,8-PECDF		1	0.47624	0.70032	-0.02566	-0.1021	0.64999	0.45773	0.45221
			0.0009	<.0001	0.8671	0.5096	<.0001	0.0016	0.0018
			45	45	45	44	44	45	45
1,2,3,4,7,8-HXCDF			1	0.82957	0.7807	0.67353	0.79812	0.34033	0.33635
				<.0001	<.0001	<.0001	<.0001	0.0192	0.0208
				47	47	46	45	47	47
1,2,3,6,7,8-HXCDF					0.51376	0.35283	0.95364	0.50485	0.5001
					0.0002	0.0162	<.0001	0.0003	0.0003
					47	46	45	47	47
1,2,3,4,6,7,8-HPCDF						1	0.91499	0.59038	0.15012	0.14857
							<.0001	<.0001	0.3085	0.3136
							46	45	48	48
OCDF							1	0.41878	0.12259	0.12235
OCDF								0.0047	0.417	0.4179
								44	46	46
2,3,4,6,7,8-HXCDF2								1	0.4572	0.45271
									0.0016	0.0018
									45	45
TEQs WHO									1	0.99997
										<.0001
										48

Table 4. Correlation matrix of dioxin and furan congeners, including toxic equivalents, in tree swallow nestling carcasses (N = 25) from the Woonasquatucket River, RI in 2000 and 2001. R-value is the top number and P-value is immediately underneath. N values are on the third row.

	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF1	2,3,4,7,8-PECDF2	1,2,3,7,8-HXCDF	1,2,3,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	OCDF	2,3,4,6,7,8-HXCDF	TEQs WHO	TEQs Kennedy
2,3,7,8-TCDD	1	0.83983	0.83242	0.73977	0.78618	0.49554	0.1684	0.79613	0.79829	0.67675	0.76622	0.92048	0.58078	0.05696	0.76539	0.99999	1
		<.0001	<.0001	<.0001	<.0001	0.0118	0.421	<.0001	<.0001	0.0003	<.0001	<.0001	0.0029	0.7868	<.0001	<.0001	<.0001
		24	25	25	24	25	25	25	25	24	25	25	24	25	23	25	25
1,2,3,7,8-PECD		1	0.96251	0.9186	0.79428	0.61613	0.36102	0.79234	0.81344	0.68791	0.8162	0.85016	0.73944	0.3222	0.78908	0.84119	0.84101
			<.0001	<.0001	<.0001	0.0013	0.0831	<.0001	<.0001	0.0003	<.0001	<.0001	<.0001	0.1247	<.0001	<.0001	<.0001
			24	24	23	24	24	24	24	23	24	24	23	24	22	24	24
1,2,3,4,7,8-HXCDD			1	0.93977	0.8079	0.70243	0.39209	0.79218	0.82869	0.68143	0.80822	0.864	0.73408	0.14358	0.82997	0.83379	0.8335
				<.0001	<.0001	<.0001	0.0526	<.0001	<.0001	0.0002	<.0001	<.0001	<.0001	0.4935	<.0001	<.0001	<.0001
				25	24	25	25	25	25	24	25	25	24	25	23	25	25
1,2,3,6,7,8-HXCDD6				1	0.85511	0.77536	0.47489	0.68014	0.76699	0.69453	0.75073	0.77339	0.73726	0.23701	0.82252	0.74138	0.74078
					<.0001	<.0001	0.0164	0.0002	<.0001	0.0002	<.0001	<.0001	<.0001	0.254	<.0001	<.0001	<.0001
					24	25	25	25	25	24	25	25	24	25	23	25	25
1,2,3,4,7,8,9-HXCDD					1	0.66072	0.3769	0.73612	0.76529	0.78482	0.81242	0.83015	0.73756	0.45012	0.92071	0.78748	0.78675
						0.0004	0.0695	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0273	<.0001	<.0001	<.0001
						24	24	24	24	23	24	24	23	24	23	24	24
1,2,3,4,6,7,8-HPCDD						1	0.87133	0.3681	0.43374	0.35097	0.53432	0.5919	0.83964	0.20441	0.63295	0.4961	0.49586
							<.0001	0.0702	0.0303	0.0927	0.0059	0.0018	<.0001	0.327	0.0012	0.0117	0.0117
							25	25	25	24	25	25	24	25	23	25	25
OCDD							1	0.06058	0.16551	0.10495	0.33743	0.28663	0.76422	0.3603	0.34802	0.16844	0.16823
OCDD								0.7736	0.4291	0.6255	0.099	0.1648	<.0001	0.0769	0.1037	0.4209	0.4215
								25	25	24	25	25	24	25	23	25	25

2,3,7,8-TCDF	1	0.86308	0.71164	0.80191	0.89018	0.56982	0.15847	0.70871	0.79815	0.79787
		<.0001	<.0001	<.0001	<.0001	0.0037	0.4493	0.0002	<.0001	<.0001
		25	24	25	25	24	25	23	25	25
1,2,3,7,8-PECDF		1	0.83159	0.89091	0.88502	0.691	0.27653	0.79913	0.80007	0.79931
			<.0001	<.0001	<.0001	0.0002	0.1808	<.0001	<.0001	<.0001
			24	25	25	24	25	23	25	25
2,3,4,7,8-PECDF			1	0.81498	0.71553	0.53706	0.52591	0.68296	0.67894	0.67756
				<.0001	<.0001	0.0082	0.0083	0.0005	0.0003	0.0003
				24	24	23	24	22	24	24
1,2,3,4,7,8-HXCDF				1	0.89858	0.78293	0.44278	0.83006	0.76775	0.76712
					<.0001	<.0001	0.0267	<.0001	<.0001	<.0001
					25	24	25	23	25	25
1,2,3,6,7,8-HXCDF					1	0.74345	0.16188	0.84988	0.92143	0.92124
						<.0001	0.4395	<.0001	<.0001	<.0001
						24	25	23	25	25
1,2,3,4,6,7,8-HPCDF						1	0.43895	0.79579	0.58157	0.58106
							0.0319	<.0001	0.0029	0.0029
							24	22	24	24
OCDF							1	0.30934	0.05847	0.0572
OCDF								0.1509	0.7813	0.7859
								23	25	25
2,3,4,6,7,8-HXCDF2								1	0.76647	0.76594
									<.0001	<.0001
									23	23
TEQs - WHO									1	1
										<.0001
										25

Table 5. Percent of Kennedy and WHO dioxin/furan TEQs (mean ± 1 standard error) in tree swallow egg samples that were associated with TCDD along the Woonasquatucket River, RI in 2000 and 2001.

Year & Location	Mean	N	SE	Min.	Max.
Kennedy TEQs					
2000					
Allendale	95.6 A[1]	13	0.6	90.3	98.1
Greystone	47.0 C	7	6.1	26.1	65.5
2001					
Allendale	91.7 A	13	2.0	71.6	98.4
Greystone	69.4 B	6	9.0	41.1	93.6
Lyman	97.5 A	9	0.3	96.0	98.9
WHO TEQs					
2000					
Allendale	94.5 A[1]	13	0.9	88.1	97.7
Greystone	41.5 C	7	6.1	22.3	60.1
2001					
Allendale	89.4 A	13	2.7	63.2	97.9
Greystone	62.3 B	6	9.6	37.8	91.6
Lyman	96.6 A	9	0.4	94.8	98.9

[1] means sharing same letter are not significantly different among year/sites. $P < 0.001$, $df = 4,43$ for both TEQ analyses.

Table 6. Percent of Kennedy and WHO dioxin/furan TEQs (mean ± 1 standard error) in tree swallow nestling carcass samples that were associated with TCDD along the Woonasquatucket River, RI in 2000 and 2001.

Years & Locations	Mean	N	SE	Min.	Max.
Kennedy TEQs					
2000					
Allendale	98.5 A[1]	5	1.4	98.0	98.8
Greystone	48.9 B	5	1.9	44.2	54.6
2001					
Allendale	98.8 A	5	0.1	98.4	99.1
Greystone	58.9 B	5	8.5	31.7	83.2
Lyman	98.0 A	5	0.9	94.6	99.2
WHO TEQs					
2000					
Allendale	98.3 A[1]	5	0.2	97.5	98.7
Greystone	45.6 C	5	1.9	40.9	51.4
2001					
Allendale	98.5 A	5	0.2	97.9	99.0
Greystone	55.1 B	5	7.9	29.9	77.4
Lyman	97.8 A	5	0.8	94.6	99.0

[1] means sharing same letter are not significantly different among year/sites $P < 0.001$, $df = 4,20$ for both TEQ analyses.

Table 7. Mean accumulation rates (pg/day) for dioxin and furan congeners that varied among year/sites in tree swallows nesting along the Woonasquatucket River, Rhode Island in 2000 and 2001.

Analyte	Year	Location	N	Arithmetic mean		SE	Min.	Max.
TCDD P < 0.001	2000	Greystone	5	6.70	B[1]	1.03	3.2	9.3
		Allendale	5	987.7	A	236.8	410	1738
	2001	Greystone	5	14.18	B	6.19	3.1	37.9
		Allendale	5	1736.4	A	250.4	1052	2597
		Lyman	5	1685.9	A	421.4	230	2599
1,2,3,7,8-PeCDD	2000	Greystone	5	1.78	B	0.19	1.25	2.19
P = 0.003		Allendale	5	3.18	AB	0.67	0.96	4.54
	2001	Greystone	5	3.72	B	2.96	-0.75	15.3
		Allendale	5	5.15	AB	0.43	4.10	6.54
		Lyman	5	6.01	A	0.55	4.57	7.08
1,2,3,4,7,8-HxCDD	2000	Greystone	5	1.57	B	0.22	0.93	2.15
P < 0.001		Allendale	5	2.97	AB	0.78	0.65	4.80
	2001	Greystone	5	2.42	B	0.36	1.43	3.52
		Allendale	5	5.24	A	0.42	4.09	6.36
		Lyman	5	5.69	A	0.67	3.72	6.89
1,2,3,6,7,8-HxCDD	2000	Greystone	5	3.15	C	0.91	-0.21	5.01
P < 0.001		Allendale	5	6.10	BC	1.91	1.05	12.68
	2001	Greystone	5	5.55	ABC	1.42	0.02	7.69
		Allendale	5	15.3	A	2.88	9.14	23.88
		Lyman	5	14.1	AB	2.90	5.75	21.03

Table 7 cont.

Analyte	Year	Location	N	Arithmetic mean		SE	Min.	Max.
1,2,3,7,8,9-HxCDD	2000	Greystone	5	1.00	C	0.08	0.88	1.28
P < 0.001		Allendale	5	1.36	BC	0.47	-0.45	2.07
	2001	Greystone	5	1.13	C	0.34	0.03	1.91
		Allendale	5	4.23	A	0.74	3.04	6.90
		Lyman	5	2.59	AB	0.34	1.39	3.24
2,3,7,8-TCDF	2000	Greystone	5	5.44	B	0.47	4.25	6.92
P = 0.003		Allendale	5	6.67	AB	1.77	1.69	11.87
	2001	Greystone	5	7.10	AB	1.29	4.37	12.84
		Allendale	5	11.41	A	0.98	9.40	14.34
		Lyman	5	11.77	A	1.03	8.91	14.94
1,2,3,7,8-PeCDF	2000	Greystone	5	1.02	B	0.10	0.71	1.25
P = 0.001		Allendale	5	1.35	AB	0.36	0.23	2.34
	2001	Greystone	5	1.40	AB	0.18	0.93	1.90
		Allendale	5	2.29	A	0.21	1.72	2.85
		Lyman	5	2.14	A	0.22	1.51	2.87
2,3,4,7,8-PeCDF	2000	Greystone	5	1.03	B	0.11	0.79	1.32
P = 0.001		Allendale	5	1.61	B	0.44	0.13	2.39
	2001	Greystone	5	1.67	B	0.25	0.99	2.49
		Allendale	5	5.18	A	1.42	3.22	10.8
		Lyman	5	3.54	AB	1.32	0.10	8.29

Table 7 cont.

Analyte	Year	Location	N	Arithmetic mean		SE	Min.	Max.
1,2,3,4,7,8-HxCDF	2000	Greystone	5	1.09	C	0.09	0.85	1.36
P < 0.001		Allendale	5	1.46	BC	0.41	0.23	2.71
	2001	Greystone	5	1.47	BC	0.39	0.55	2.91
		Allendale	5	3.52	A	0.51	2.12	5.07
		Lyman	5	3.03	AB	0.42	1.57	3.89
1,2,3,6,7,8-HxCDF	2000	Greystone	5	1.11	C	0.09	0.91	1.37
P < 0.001		Allendale	5	1.72	BC	0.47	0.25	3.14
	2001	Greystone	5	1.15	C	0.25	0.36	1.86
		Allendale	5	3.28	A	0.23	2.59	3.79
		Lyman	5	3.11	AB	0.46	2.17	4.29
2,3,4,6,7,8-HxCDF	2000	Greystone	5	0.30	C	0.05	0.14	0.40
P = 0.045		Allendale	5	1.09	AB	0.20	0.73	1.85
	2001	Greystone	5	0.57	BC	0.14	0.16	1.21
		Allendale	5	1.59	A	0.19	1.13	2.00
		Lyman	5	1.09	AB	0.15	0.72	1.43

[1] means sharing same letter are not significantly different among year/sites. Each analyte is analyzed separately.

Table 8. Concentrations (pg/g wet wt.) of dioxins and furans in pooled diet samples from tree swallows nesting along the Woonasquatucket River, RI in 2000 and 2001.

	Location and Year				
	2000		2001		
Chemical	Allendale	Greystone	Allendale	Greystone	Lyman
2,3,7,8-TCDD	71.4	ND [1]	218.5	5.66	119.5
1,2,3,7,8-PeCDD	ND	ND	1.97	ND	ND
1,2,3,4,7,8-HxCDD	ND	ND	1.41	0.52	0.82
1,2,3,6,7,8-HxCDD	1.48	0.80	7.34	1.85	2.22
1,2,3,7,8,9-HxCDD	ND	0.79	1.83	0.36	0.58
1,2,3,4,6,7,8-HpCDD	ND	ND	55.1	30.3	24.1
OCDD	ND	ND	183.9	62.0	51.1
2,3,7,8-TCDF	0.86	0.70	2.24	0.49	0.92
1,2,3,7,8-PeCDF	ND	ND	1.81	ND	ND
2,3,4,7,8-PeCDF	ND	ND	1.90	0.13	ND
1,2,3,4,7,8-HxCDF	ND	ND	2.81	0.64	0.61
1,2,3,6,7,8-HxCDF	ND	ND	2.54	0.41	0.41
1,2,3,7,8,9-HxCDF	1.40	0.86	1.45	ND	ND
2,3,4,6,7,8-HxCDF	ND	ND	2.26	ND	0.17
1,2,3,4,6,7,8-HpCDF	ND	ND	12.9	4.21	3.20
1,2,3,4,7,8,9-HpCDF	ND	ND	0.94	0.30	0.15
OCDF	ND	ND	1.07	1.83	0.71

[1] ND = not detected

Table 9. Geometric mean (µg/g wet wt.) and 95% Confidence Intervals for other organochlorine chemicals in tree swallow egg and nestling samples collected along the Woonasquatucket River, RI in 2001.

Matrix and Chemical	Overall Mean	Location: Greystone	Allendale	Lyman	P-value (among locations)
Eggs	N = 8 [1]	N = 3	N = 3	N = 2	
p,p-DDE	0.309 0.251 - 0.379	--- [2]	---	---	0.343
p,p'DDD	0.006 0.005 - 0.007	---	---	---	0.728
p,p'DDT	0.005 0.004 - 0.005	---	---	---	0.165
alpha chlordane	0.009 0.006 - 0.014	---	---	---	0.908
chlordane	0.457 0.371 - 0.565	---	---	---	0.945
dieldrin	0.017 0.015 - 0.020	---	---	---	0.069
total PCBs	1.05 (n=5) 0.95 - 1.16	NA [3]	1.00 0.87 - 1.15	1.13 0.95 - 1.34	0.614
Nestlings	N=15	N = 5	N = 5	N = 5	
p,p'DDE	--- [4]	0.017 B [5] 0.015 - 0.019	0.025 AB 0.024 - 0.026	0.036 A 0.030 - 0.044	0.009
p,p'DDD	---	0.003 B 0.002 - 0.003	0.003 AB 0.003 - 0.004	0.005 A 0.004 - 0.005	0.017
p,p'DDT	---	0.001 AB 0.001 - 0.002	0.003 A 0.002 - 0.003	0.0009 B 0.0007 - 0.001	0.015

Table 9 cont.

Matrix and Chemical	Overall Mean	Location: Greystone	Allendale	Lyman	P-value (among locations)
alpha chlordane	0.005 0.004 - 0.007	--- [2]	---	---	0.226
chlordane	0.326 0.285 - 0.372	---	---	---	0.055
dieldrin	0.007 0.006 - 0.007	---	---	---	0.382
total PCBs	0.64 0.35 - 1.17	0.21	0.71	1.72	+++ [6]

[1] sample size.

[2] no statistical difference among sites so means were not calculated for each site separately except for total PCBs.

[3] NA = no samples analyzed.

[4] statistical differences among sites were present so an overall mean was not calculated.

[5] means sharing same letter are not significantly different among locations.

[6] no statistical analysis because only 1 sample per site analyzed for total PCBs.

Table 10. Daily survival probabilities for the nestling period for tree swallows nesting along the Woonasquatucket River, Rhode Island, USA in 2000 and 2001.

Year and Location	Daily survival probability: Mean		SE	95% CI	Percent successful [1]
2000					
Greystone	1.0007	A[2]	--- [3]	---	100%
Allendale	0.9727	B	0.0097	0.9535 - 0.9915	71%
2001					
Greystone	0.9904	A	0.0055	0.9796 - 1.0012	89%
Allendale	0.9904	A	0.0055	0.9796 - 1.0012	89%
Lyman	1.0000	A	---	---	100%

[1] Percent successful was calculated by raising the daily survival probability to the 12th power. Percent successful is the percent of the nestlings that hatched that survived until 12 days of age.

[2] means, within year, sharing same letter are not significantly different. $\chi^2 = 7.92$, $df = 1$, $P = 0.005$ (2000); $\chi^2 = 0.00$, $df = 1$, $P = 1.000$ (Greystone vs Allendale, 2001); $\chi^2 = 3.046$, $df = 1$, $P = 0.0810$ (Allendale vs Lyman, 2001); $\chi^2 = 3.046$, $df = 1$, $P = 0.0810$ (Greystone vs Lyman, 2001).

[3] --- no variance estimates because all nestlings survived.

Table 10. *Geometric mean (µg/g wet wt.) and 95% Confidence Intervals for trace elements in tree swallow* nestling liver samples collected along the Woonasquatucket River, RI in 2001.

Matrix and Chemical	Overall Mean wet wt; dry wt [1]	Location			P-value (among locations)
		Greystone	Allendale	Lyman	
	N = 15 [2]	N = 5	N = 5	N = 5	
Aluminum	0 41; 1.37 0.251 - 0.379 [3]	--- [4]	---	---	0.651
Antimony	0.001; 0.003 0.0009 - 0.0016	---	---	---	0.388
Arsenic	0.035; 0.117 0.031 - 0.039	---	---	---	0.525
Barium	0.021; 0.070 0.018 - 0.025	---	---	---	0.230
Cadmium	0.12; 0.40 0.011 - 0.014	0.009 B [5]	0.021 A	0.010 B	0.006
Chromium	0.085; 0.28 0.075 - 0.095	---	---	---	0.750
Cobalt	0.008; 0.027 0.008 - 0.009	---	---	---	0.130
Copper	4.95; 16.5 4.64 - 5.28	---	---	---	0.129
Iron	272.1; 907 245.7 - 301.3	---	---	---	0.109
Lead	0.022; 0.07 0.017 - 0.029	---	---	---	0.226
Manganese	1.28; 4.27 1.21 - 1.35	1.14 B 1.06 - 1.22	1.59 A 1.49 - 1.70	1.15 B 1.10 - 1.20	0.003
Mercury	0.043; 0.14 0.040 - 0.045	---	---	---	0.663

Table 10 cont.

Matrix and Chemical	Overall Mean wet wt; dry wt [1]	Location: Greystone	Allendale	Lyman	P-value (among locations)
Methyl-mercury	0.035; 0.11 0.033 - 0.036	---	---	---	0.629
Molybdenum	0.57; 3.33 0.55 - 0.59	---	---	---	0.308
Nickel	0.017; 0 057 0.016 - 0.020	---	---	---	0.386
Selenium	0.53; 1.76 0.51 - 0.55	---	---	---	0.276
Silver	0.009; 0.03 0.007 - 0.012	---	---	---	0.686
Thallium	0.006; 0.02 0.005 - 0.006	0.005 B 0.004 - 0.005	0.008 A 0.008 - 0.009	0.005 B 0.004 - 0.005	< 0.001
Vanadium	0.006; 0.02 0.004 - 0.008	---	---	---	0.620
Zinc	20.2; 67.3 19.7 - 20.8	---	---	---	0.757

[1] dry wt. estimated by dividing wet wt. by 0.30 (70% moisture in livers).

[2] sample size.

[3] 95% CI for wet wt. geometric means.

[4] no statistical difference among sites so means were not calculated for each site separately .

[5] means sharing same letter are not significantly different among locations.

Table 11. Daily survival probabilities during egg laying and incubation for tree swallows nesting along the Woonasquatucket River, Rhode Island in 2000 and 2001.

Year and Location	Daily egg survival probability				Percent Hatching [1]
	Mean		SE	95% CI	
2000					
Greystone	0.9937	A[2]	0.0036	0.9866 - 1.0008	92%
Allendale	0.9436	B	0.0075	0.9289 - 0.9582	47%
2001					
Greystone	0.9796	A	0.0053	0.9693 - 0.9900	77%
Allendale	0.9497	B	0.0084	0.9332 - 0.9662	51%
Lyman	0.9739	AB	0.0062	0.9618 - 0.9860	70%

[1] percent hatching was calculated by raising daily survival probability to the 13th power. Thirteen days is the length of the incubation period.

[2] means sharing same letter are not significantly different among sites. Each year analyzed separately. $\chi^2 = 36.3$, $df = 1$, $P < 0.001$ (2000); $\chi^2 = 9.2$, $df = 2$, $P = 0.010$ (2001).

Table 12. Number of nest attempts[1], and number and percentage in which all eggs failed to hatch for tree swallows nesting along the Woonasquatucket River, RI in 2000 and 2001.

Year and Location	Number of nest attempts	Number of total failures	Percent total failures
2000			
Greystone	8	0	0
Allendale	23	13	57
2001			
Greystone	12	2	17
Allendale	17	8	47
Lyman	11	3	27

[1] does not include dump eggs (clutches of 1) nor any clutch lost due to human disturbance or depredation.

Table 12. Whole body weights, liver weights, and liver weight:body weight ratios (means ± 1 SE) for 12-day old nestling tree swallows from along the Woonasquatucket River, Rhode Island in 2001.

	Weight (g)		
Location	Whole body	Liver	Liver :Body
Greystone	23.6 ± 0.87	1.10 ± 0.05	0.047 ± 0.001
Allendale	23.4 ± 0.61	1.03 ± 0.06	0.044 ± 0.002
Lyman	23.4 ± 0.40	1.10 ± 0.05	0.047 ± 0.002
P-value (among locations)	0.972	0.542	0.391

Table 13. Ethoxyresorufin-*O*-dealkylase (EROD) activity in tree swallow liver samples from the Woonasquatucket River, RI area and at out-of-basin reference areas in 2000 and 2001

Year and Location	EROD activity (pmoles/min/mg)		SE	N	Minimum	Maximum
2000						
Greystone	44.6	AB [1]	11.5	5	28.4	90.3
Allendale	66.9	A	16.1	5	4.9	92.0
E. Minn.	20.9	B	1.9	20	3.4	35.8
W. Mass.	20.6	B	2.0	7	12.5	26.8
2001						
Greystone	45.6	B	8.6	5	18.3	65.7
Allendale	210.3	A	44.0	5	49.0	307.9
Lyman	260.3	A	22.5	5	190.0	331.9
E. Minn.	49.4	B	9.8	14	6.5	129.7

[1] means sharing same letter are not significantly different among sites. Each year analyzed separately. $P < 0.001$, $df = 3,33$ (2000) and $P < 0.001$, $df = 3,25$ (2001).

Report - Further exploration of exposure and effects of polychlorinated dibenzo-*p*-dioxins to tree swallows along the Woonasquatucket River, Rhode Island.

by

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INTRODUCTION

A stretch of the Woonasquatucket River, northwest of Providence, Rhode Island, hereafter called the Superfund Site, was the location of textile and chemical manufacturing plants as well as a drum recycling operation. The Site is currently undergoing an ecological risk assessment by the U.S. Environmental Protection Agency. Sediments at the Superfund Site are highly contaminated with 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) (Beliveau et al. 2003). Tree swallows (*Tachycineta bicolor*) nesting at three ponds along the Woonasquatucket River in the vicinity of the Superfund Site are contaminated with TCDD and hatching success is negatively associated with TCDD concentrations in eggs (Custer et al. 2003, Custer et al. 2004).

OBJECTIVE

Our objective was to expand the scope of the original investigations to more fully understand the extent of TCDD contamination along the Woonasquatucket River; additional tree swallow nesting sites were studied upstream and downstream of locations studied earlier. A second objective was to investigate the mode of action of TCDD on hatching success of tree swallow eggs. By switching eggs between uncontaminated and

contaminated clutches we tested whether TCDD was directly toxic to the embryos, indirectly toxic because of altered incubation patterns, or toxic because of a combination of factors.

METHODS

Pond description and sample collection

Approximately 30 tree swallow nest boxes were already in place at Allendale Mill Pond, hereafter called Allendale; Greystone Mill Pond, hereafter called Greystone; and Lyman Mill Pond, hereafter called Lyman (Fig. 1) along the Woonasquatucket River, Rhode Island from a previous study (Custer et al. 2003, Custer et al. 2004). In 2002 twenty nest boxes were put up on Woonasquatucket Reservoir (hereafter called Fire Station), which was farther upstream from the Superfund Site. In 2003 eight nest boxes were put up on Manton Pond, which was immediately downstream of Lyman, and was now the farthest downstream swallow pond from the Superfund Site. These two new ponds bracketed both ends of the Superfund Site, one above and one below. Nest monitoring and egg and nestling samples were collected following the protocol outlined in Custer et al. 2004.

Egg swapping

On the day following clutch completion, eggs were transferred between nests at a reference location (Greystone or Fire Station) and nests at a contaminated location (Allendale or Lyman). Nest pairs eligible for egg swapping had to have a similar clutch size and be completed within one day of each other. Egg swapping at a pair of nests (reference and contaminated) was done in a 4-step process. Two to four eggs (½ the

clutch) were removed from the first nest and transported to the receiving nest. All eggs were removed from the receiving nest and replaced with the 2 to 4 eggs from the first nest. The entire clutch from the receiving nest was transported back to the first nest and replaced the remaining ½ clutch. Finally, the remaining ½ clutch from the first nest was placed in the receiving nest. In this way, a box was never left without eggs during the swapping process. The "first nest" was alternated between contaminated and reference locations.

Sample preparation

Eggs or nestlings were removed from the nest box and weighed. Contents of two eggs from an individual nest box were pooled by box and emptied into a chemically clean jar; eggshells were discarded. One nestling per box was weighed and then decapitated with a sharp pair of scissors (Anonymous 1993). Contents in the upper gastrointestinal (GI) tract were removed from the nestling with forceps and placed in a chemically clean jar. The carcass remainder was placed in a chemically clean jar as well. Upper GI tract contents were analyzed separately from the nestling carcass remainder. Upper GI tract samples were pooled by pond. All samples were analyzed for dioxin and furan congeners by Battelle in Columbus, Ohio. All data are presented on a wet wt. basis.

Statistical analysis

Data were analyzed with one-way analysis of variance (ANOVA) to compare pond means for concentrations of TCDD. Contaminant concentrations were log transformed prior to analysis to satisfy the homogeneity of variance (Bartlett's tests)

requirement of ANOVA. Geometric means (antilog) ± 95% confidence interval (CI) are presented in tables and text.

Accumulation rates (mass of contaminant in the nestling minus the mass in the egg divided by the age of the nestling) for each egg/nestling pair were calculated. Contaminant mass was calculated by multiplying the concentration in the sample by the sample weight.

RESULTS

Concentrations of TCDD in tree swallow eggs in 2002 differed among the four ponds. Fire Station, the farthest upstream pond had an average TCDD concentration of 5 pg/g and Lyman, the farthest downstream pond had an average concentration of 1127 pg/g (Table 1). Concentrations of TCDD in 2003 were similar to levels in 2002, but no statistical analyses were performed because of small sample sizes. Concentrations of TCDD in eggs and nestlings at Manton (2003) were 445 and 516 pg/g (Table 2). Concentration of TCDD in the diet sample from Manton was 70 pg/g. Concentrations of other dioxin and furan are listed in Appendix A and B.

Eight pairs of nests were swapped in 2002. Only 2 pairs were swapped in 2003 so those data will not be considered further. Sample size was limited in 2003 because few nests were initiated at the same time. Hatching success of eggs (number of eggs hatched divided by the number of eggs laid) in swapped nests varied between 73 and 92% (Table 3). Of the eggs that originated at either Allendale or Lyman but were incubated by females at Fire Station or Greystone, 91.7% hatched. Of the eggs that originated at Fire Station or Greystone, but were incubated at either Allendale or Lyman, 73.3% hatched.

Finally, only 59.7% of eggs that originated and were incubated at Allendale or Lyman hatched. Hatching success for all sites in 2002 and 2003 are included in Table 4.

DISCUSSION

Dioxin-contaminated sediments seem to have moved farther downstream and have contaminated Manton Pond. Concentrations in Manton swallow eggs (516 pg/g, Table 2) in 2003 were intermediate to concentrations at Allendale in 2000 and 2001 but similar to concentrations at Allendale in 2002. Manton egg concentrations were lower than concentrations at Lyman in 2001 and 2002.

Dioxin concentrations in tree swallow eggs in 2002 were similar to concentrations found in 2000 and 2001 at the same ponds (Custer et al. 2004). This consistency among years is reassuring because sample sizes were generally small (<10/pond).

Concentrations of TCDD in 12-day old nestlings from Manton (445 pg/g) tended to be lower than nestling concentrations at either Allendale or Lyman in 2000 and 2001. Minimum and maximum concentrations in Manton nestlings were 390 and 518 pg/g. Concentration of TCDD in tree swallow diet at Manton was similar to concentrations at Allendale in 2000 (Custer et al. 2004). The accumulation rate for TCDD of 620 pg per day at Manton (Fig. 2) was also similar to Allendale in 2000 (Custer et al. 2003). Because nestlings are only fed from the immediate vicinity of the nest boxes, the TCDD contamination originated from the local area.

The hatching success in 2002 and 2003 at Allendale and Lyman was similar to the hatching rate in 2000 and 2001 and was consistently much less that the nationwide average of approximately 85% (Robertson et al. 1992). The consistently poor hatching success in all four years at both Allendale and Lyman suggests that this was not an

artifact and was most likely due to TCDD contamination. Hatching success at the reference locations was variable among years and is problematic in this study. Sample sizes were small and there were issues with sparrow depredation as well as human disturbance at nest boxes. These issues were often difficult to discern.

The swapped-egg results support the hypothesis that adult behavior is playing a role in reduced hatching success that is associated with increased concentrations of TCDD in eggs. While 91.7% of contaminated eggs incubated by "clean" female hatched, only 73.3% of "clean" eggs incubated by contaminated females hatched. Contaminated eggs incubated by contaminated females hatched at the lowest rate, 59.7%. This may indicate that adult behavior is playing a significant role in reduced hatching success. Because of the small number of nests available for swapping, a larger field study or laboratory study are needed to fully test this hypothesis. This may indicate that there is an interaction between behavior and embryo toxicity that deserved further study as well.

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Table 1. Concentrations of 2,3,7,8-polychlorinated dibenzo-*p*-dioxin in tree swallow eggs from four ponds along the Woonasquatucket River, Rhode Island in 2002 and 2003.

Year and pond	Geometric mean		N	95% CI
2002				
Fire Station	5.3	d [1]	7	4.3 - 6.4
Greystone	66.4	c	4	55.3 - 79.8
Allendale	432.4	b	5	398 - 470
Lyman	1127.	a	3	806 - 1574
2003				
Fire Station	4.2		1	NC [2]
Greystone	96.1		1	NC
Allendale	893.5		2	NC

[1] Means sharing same letter are not different ($P<0.001$, df=3,15, $F=155.2$)

[2] NC = not calculated.

Table 2. Concentrations of 2,3,7,8-polychlorinated dibenzo-*p*-dioxin in tree swallow eggs, 12-day old nestlings, and diet from Manton Pond, Woonasquatucket River, Rhode Island in 2003.

Matrix	Geometric mean	N	95% CI
Eggs	516.4	4	452 - 589
Nestlings	445.2	4	420 - 472
Diet	69.6	1	NC [1]

[1] NC = not calculated.

Table 3. Percent hatching of tree swallow eggs in 2002 with different contaminant and incubation histories.

	Clean females	Contaminated females
Clean eggs	_____	73.3% 33 of 45 eggs hatched
Contaminated eggs	91.7% 44 of 48 eggs hatched	59.7% 40 of 67 eggs hatched

Table 4. Hatching success of tree swallow eggs along the Woonasquatucket River, Rhode Island in 2002 and 2003 excluding nests where eggs were swapped.

Year and Pond	Percent Hatching	N
2002		
Fire Station	23.3	7
Greystone	100.0	3
Allendale	74.1	5
Lyman	50.0	10
2003		
Fire Station	72.5	12
Greystone	0.0	2
Allendale	69.9	15
Lyman	32.6	11
Manton	100.0	4

Appendix A. Dioxin congeners in tree swallow eggs, nestling carcasses, and diet samples in 2002 and 2003, Woonasquatucket River, Rhode Island.

Sample Number	Year	Matrix	SamplLoc	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD
RA32	2002	egg	Allendale	567.29	13.23	14.57	99.2	5.17	105.32	66.02
RA34	2002	egg	Allendale	462.9	9.25	9.29	52.78	5.49	220.93	131.16
RA35	2002	egg	Allendale	373.3	9.17	9.46	45.09	5.75	52.33	
RA36	2002	egg	Allendale	435.49	13.92	11.97	45.98	3.35	55.25	
RA41	2002	egg	Allendale	354.2	13.12	11.53	90.07	4.49	241.45	308.19
RAP33	2003	egg	Allendale	727.39						
RAP43	2003	egg	Allendale	1097.55						
RF02	2002	egg	FireStation	7.51	24.09	30.79	78.28	14.42	267.49	274.65
RF06	2002	egg	FireStation	3.67	17.48	25.52	69.75	7.37	135.25	
RF08	2002	egg	FireStation	13.67	28.85	41.79	100.92	9.45	288.92	176.33
RF11	2002	egg	FireStation	3.07	8.77	10.77	29.93	4.07	105.5	56.44
RF13	2002	egg	FireStation	4.69	30.66	53.5	288.53	73.59	1793.64	2305.48
RF14	2002	egg	FireStation	5.43	28.78	45.94	144.09	38.27	961.27	1437.97
RF21	2002	egg	FireStation	3.84	12.84	20.72	61.06	5.83	146.4	54.88
RFS07	2003	egg	FireStation	4.18						
RG110	2002	egg	Greystone	41.94	10.19	10.6	60.74	7.07	291.04	642.21
RG94	2002	egg	Greystone	102.79	7.61	7.72	43.54	4.77	115.07	
RG96	2002	egg	Greystone	70.01	12.89	10.91	150.62	5.41	273.85	347.79
RG98	2002	egg	Greystone	64.53	5.2	4.77	31.77	2.23	60.22	61.6
RGP106	2003	egg	Greystone	96.05						
RL65	2002	egg	Lyman	1959.18	7.43	7.03	59.93	3.61	410.96	767.31
RL66	2002	egg	Lyman	616.96	5.51	5.96	43.39	3.56	226.8	278.82
RL74	2002	egg	Lyman	1182.96	9.82	8.44	57.31	3.81	126.67	275.68
RMP120-E	2003	egg	Manton	564.8			101.51			
RMP123-E	2003	egg	Manton	469.33						
RMP124-E	2003	egg	Manton	706.49						
RMP129-E	2003	egg	Manton	379.79						
RMP120-N	2003	nestl	Manton	389.6					200.56	
RMP123-N	2003	nestl	Manton	517.53					198.21	
RMP124-N	2003	nestl	Manton	449.13						
RMP129-N	2003	nestl	Manton	433.7						
MANTONF	2003	diet	Manton	69.59						

C.M.Custer, August 4, 2004

Appendix B. Furan congeners in tree swallow eggs, nestling carcasses, and diet samples in 2002 and 2003, Woonasquatucket River, Rhode Island.

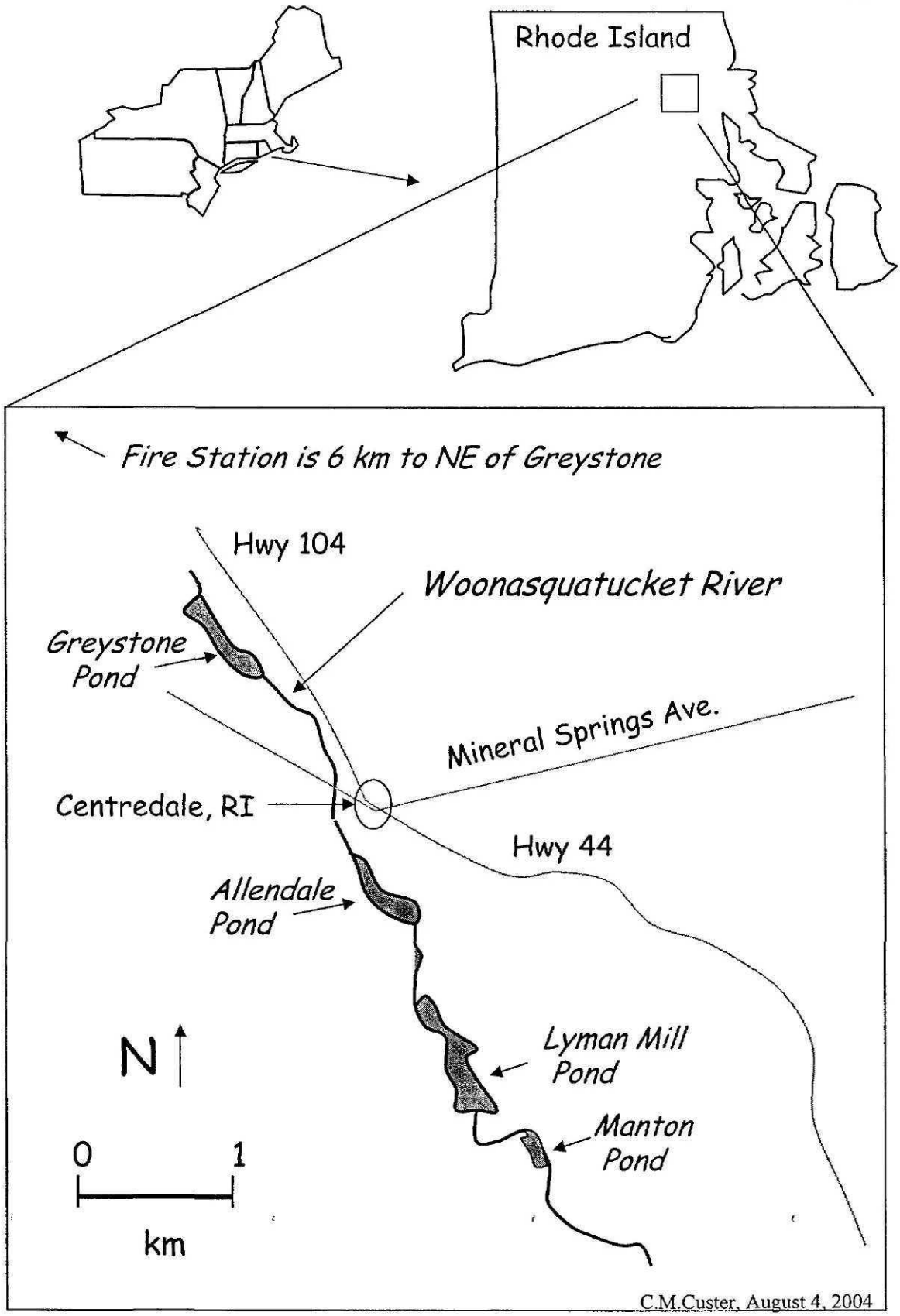
Sample Number	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8 HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
RA32	23.15	4.99	8.91	7.52	6.03		2.8			
RA34	12.42	3.73	4.91	5.82	5.13		2.98	22.31	1.17	
RA35	16.53	4.2	6.6	3.93	4.76	1.5	3.44		4.95	19.09
RA36	42.73	5.13	8.77	3.08	3.18		1.33			
RA41	21.93	6.36	10.35	7.25	5.21	0.27	2.39	25.6	1.49	8.27
RAP33	6.42	1.77								
RAP43	11.1	3.02								
RF02	24.45	9.4	10.97	14.72	15.79		5.4			
RF06	19.64	7.46	10.26	8.84	9.41	0.1	2.75			
RF08	33.89	11.64	11.47	19.26	16.05	0.39	3.19	20.1		
RF11	15.14	4.7	5.36	5.84	5.7		1.59			
RF13	21.22	15.75	18.93	49.21	35.06	0.78	23.08	220.5	11.16	63.86
RF14	21.96	10.68	10.83	18.62	20.95		8.95	122.28	5.34	43.66
RF21	12.38	4.86	5.26	7.69	7.7	0.25	2.3	10.42	0.44	
RFS07	16.91	6.38								
RG110	27.2	5.01	9.37	6.89	5.51					
RG94	17.3	3.65	4.98	4.82	3.8					
RG96	18.76	9.57	12.07	10.03	7.1	0.39	4.58	33.55	1.5	10.97
RG98	7.07	2.11	3.4	2.88	2.33		1.25	6.12	0.24	
RGP106	15.27	3.53								
RL65	10.96	2.76	5.22	5.98	5.58		3.54	123.07	3.02	40.72
RL66	9.09	1.96	2.62	4.35	2.94	0.09	1.58	26.6	1.63	9.32
RL74	13.47	4.1	6.1	7.83	3.98		1.81	18.41	1.73	
RMP120-E	15.6	5.68								
RMP123-E	7.68	3.69								
RMP124-E	16.57	3								
RMP129-E	13.42	3.33								
RMP120-N	5.79	2.32								
RMP123-N	7.08	2								
RMP124-N	5.61	2.1								
RMP129-N	5.96									
MANTONF	0.85									

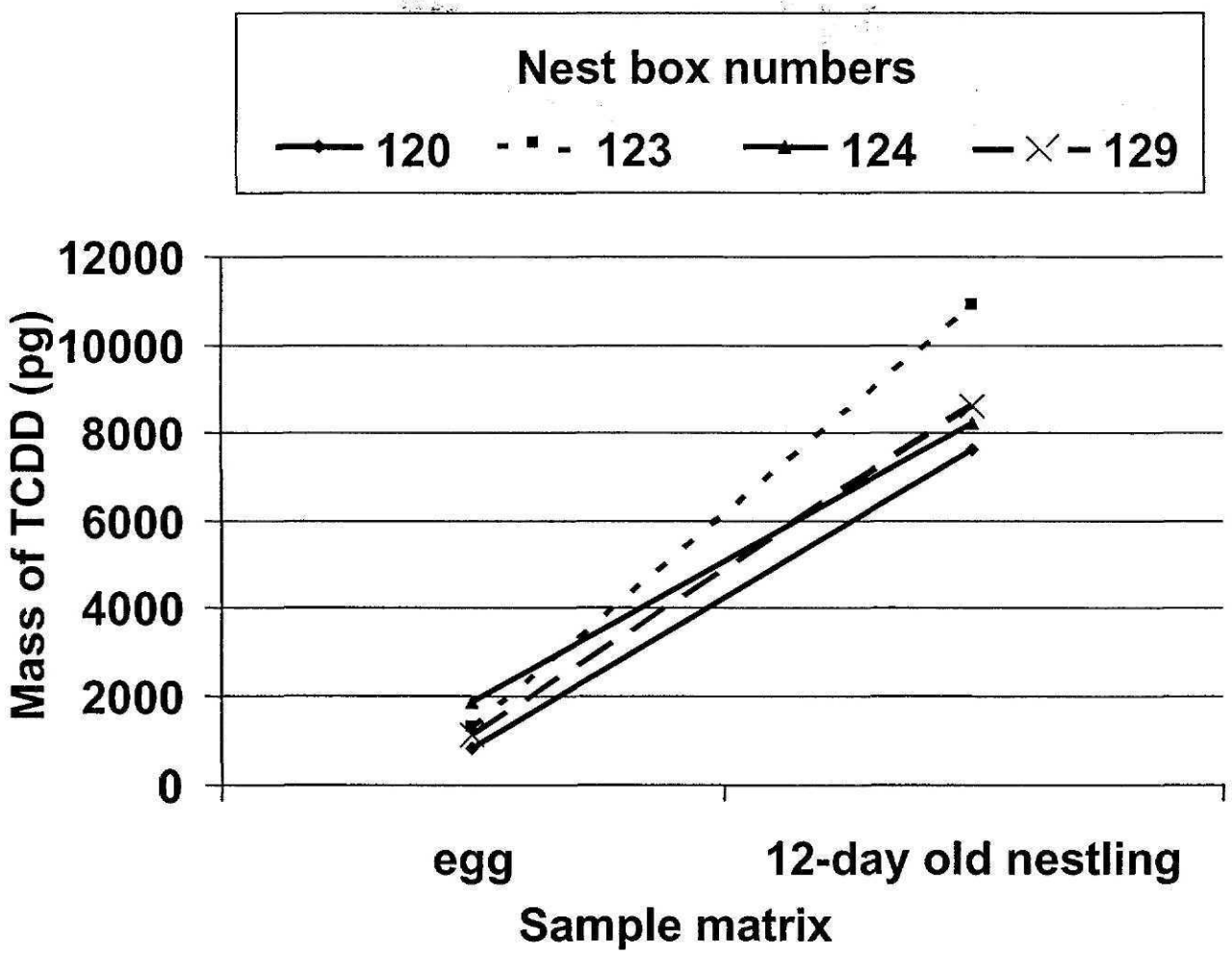
C.M.Custer, August 4, 2004

Figure titles

Figure 1. Map of Woonasquatucket River study sites, 2002 and 2003.

Figure 2. Accumulation rates of 2,3,7,8-polychlorinated dibenzo-*p*-dioxin in tree swallows nesting on Manton Pond, Woonasquatucket River, Rhode Island in 2003.


Rhode Island
Fire Station is 6 km to NE of Greystone
Hwy 104
Woonasquatucket River
Greystone Pond
Mineral Springs Ave.
Centredale, RI
Hwy 44
Allendale Pond
Lyman Mill Pond
Manton Pond
N
0
1
km
C.M.Custer, August 4, 2004


Nest box numbers
120
123
124
129
12000
10000
8000
6000
4000
2000
0
Mass of TCDD (pg)
egg
12-day old nestling
Sample matrix

APPENDIX N

FOOD WEB EXPOSURE MODELS - OMNIVOROUS WILDLIFE

APPENDIX N

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TABLE N-1.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
2-Methylnaphthalene	7.5E-02	4.5E-02	1.0E+00	4.7E+00	**3.4E-03**	7.7E-02	3.5E-01
Acenaphthene	4.8E-01	4.2E-02	1.0E+00	3.0E-02	**2.0E-02**	4.9E-01	1.4E-02
Acenaphthylene	1.9E-01	4.1E-02	1.0E+00	7.6E-01	**7.9E-03**	2.0E-01	1.5E-01
Anthracene	9.3E-01	2.1E-02	1.0E+00	1.1E-01	**1.9E-02**	9.6E-01	1.0E-01
Benzo(a)anthracene	1.5E+00	3.6E-03	1.1E+00	3.4E-01	**5.4E-03**	1.6E+00	5.0E-01
Benzo(a)pyrene	1.4E+00	2.2E-03	1.1E+00	2.2E-01	**3.1E-03**	1.5E+00	3.1E-01
Benzo(b)fluoranthene	1.5E+00	3.5E-03	1.1E+00	4.2E-01	**5.3E-03**	1.6E+00	6.3E-01
Benzo(g,h,i)perylene	8.6E-01	1.1E-03	1.1E+00	4.7E-02	**9.8E-04**	9.3E-01	4.0E-02
Benzo(k)fluoranthene	1.4E+00	2.3E-03	1.1E+00	2.9E-01	**3.2E-03**	1.5E+00	4.1E-01
bis(2-Ethylhexyl)phthalate	9.5E-01	3.1E-04	1.1E+00	1.0E+00	**3.0E-04**	1.1E+00	9.5E-01
Carbazole	6.6E-01	5.5E-02	1.0E+00	5.6E-01	**3.6E-02**	6.8E-01	3.7E-01
Chrysene	1.8E+00	3.4E-03	1.1E+00	4.4E-01	**6.1E-03**	1.9E+00	7.9E-01
Dibenzo(a,h)anthracene	7.7E-01	9.7E-04	1.1E+00	3.8E-01	**7.5E-04**	8.4E-01	2.9E-01
Dibenzofuran	2.9E-01	3.2E-02	1.0E+00	1.0E+00	**9.3E-03**	3.0E-01	2.9E-01
Di-n-Butylphthalate	4.7E-01	1.9E-02	1.0E+00	1.0E+00	**9.1E-03**	4.9E-01	4.7E-01
Fluoranthene	3.3E+00	8.1E-03	1.1E+00	8.0E-01	**2.7E-02**	3.5E+00	2.6E+00
Fluorene	4.7E-01	3.0E-02	1.0E+00	9.6E-01	**1.4E-02**	4.8E-01	4.5E-01
Indeno(1,2,3-cd)pyrene	1.0E+00	1.0E-03	1.1E+00	2.8E-01	**1.1E-03**	1.1E+00	2.9E-01
Naphthalene	9.4E-02	9.6E-02	1.0E+00	2.6E+00	**9.0E-03**	9.8E-02	2.5E-01
Phenanthrene	2.1E+00	2.0E-02	1.0E+00	3.0E-01	**4.2E-02**	2.1E+00	6.3E-01
Pyrene	2.8E+00	1.2E-02	1.0E+00	5.1E-01	**3.3E-02**	2.9E+00	1.4E+00
4,4'-DDD	4.9E-03	2.4E-03	1.1E+00	2.8E-01	**1.2E-05**	5.2E-03	1.4E-03
4,4'-DDE	6.0E-03	9.6E-04	1.1E+00	7.7E+00	**5.8E-06**	6.6E-03	4.6E-02
alpha-Chlordane	6.1E-03	2.6E-03	1.1E+00	4.8E+00	**1.6E-05**	6.5E-03	2.9E-02
Aroclor, Total	2.1E-01	6.1E-04	1.1E+00	8.0E-01	**1.3E-04**	2.3E-01	1.7E-01
Aroclor-1254	1.5E-01	1.4E-03	1.1E+00	8.1E-01	**2.0E-04**	1.6E-01	1.2E-01
Aroclor-1260	2.5E-02	3.4E-04	1.1E+00	2.3E-01	**8.4E-06**	2.8E-02	5.7E-03
Aroclor-1268	1.4E-01	3.4E-04	1.1E+00	2.3E-01	**4.6E-05**	1.5E-01	3.1E-02
Dieldrin	2.6E-03	6.7E-03	1.1E+00	6.7E+00	**1.7E-05**	2.7E-03	1.7E-02
Endrin	1.9E-03	7.6E-03	1.1E+00	1.8E+00	**1.5E-05**	2.0E-03	3.4E-03
gamma-Chlordane	4.8E-03	2.6E-03	1.1E+00	2.2E+00	**1.3E-05**	5.1E-03	1.1E-02
Technical Chlordane	4.0E-01	2.6E-03	1.1E+00	2.0E+00	**1.1E-03**	4.3E-01	8.0E-01
Antimony	7.3E-01	2.0E-03	-	-	**1.5E-03**	0.0E+00	0.0E+00
Arsenic	3.9E+00	1.0E-02	1.3E-01	1.3E-01	**3.9E-02**	4.9E-01	4.9E-01
Barium	1.3E+02	3.1E-02	1.8E-02	-	**4.2E+00**	2.4E+00	0.0E+00
Cadmium	8.1E-01	4.4E-02	4.6E-01	4.6E-01	**3.5E-02**	3.7E-01	3.7E-01
Chromium	9.9E+01	8.2E-03	1.2E+01	1.2E+01	**8.1E-01**	1.2E+03	1.2E+03
Cobalt	8.1E+00	1.5E-03	2.4E-02	-	**1.2E-02**	2.0E-01	0.0E+00
Copper	7.3E+01	9.7E-02	7.4E+01	7.4E+01	**7.0E+00**	5.4E+03	5.4E+03
Lead	1.8E+02	1.9E-02	6.6E-02	6.6E-02	**3.5E+00**	1.2E+01	1.2E+01
Mercury	2.1E-01	2.6E-02	4.0E+00	4.0E+00	**5.4E-03**	8.4E-01	8.4E-01
Mercury (methyl)	2.6E-04	1.8E-01	3.4E-01	-	**4.6E-05**	8.6E-05	0.0E+00
Molybdenum	1.3E+01	5.0E-02	1.9E-01	-	**6.3E-01**	2.4E+00	0.0E+00
Selenium	1.1E+00	1.3E-01	1.0E-01	-	**1.5E-01**	1.1E-01	0.0E+00
Silver	2.6E+00	2.8E-03	4.1E-01	-	**7.2E-03**	1.1E+00	0.0E+00
Thallium	3.7E-01	8.0E-04	-	-	**2.9E-04**	0.0E+00	0.0E+00

TABLE N-1.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
Zinc	2.2E+02	3.5E-01	2.2E+02	2.2E+02	**7.7E+01**	4.9E+04	4.9E+04
Toxicity Equivalency - Birds	4.5E-05		-	-	**0.0E+00**	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	3.4E-05		-	-	**0.0E+00**	0.0E+00	0.0E+00

Footnotes:
a. Literature-derived BAFs are summarized in Table J-1.
b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-1.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	5.2E-03	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	4.7E-05	4.7E-06
Beryllium	5.5E-05	mg/L	3.2E-06	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	2.2E-05	2.2E-06
Chromium	2.5E-03	mg/L	1.5E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.5E-04	2.9E-05
Cobalt	1.2E-04	mg/L	7.0E-06	mg/kg-d					
Copper	5.4E-03	mg/L	3.1E-04	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	6.6E-06	5.1E-06
Lead	2.9E-03	mg/L	1.7E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.5E-04	1.5E-05
Manganese	1.3E-01	mg/L	7.6E-03	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	7.8E-06	7.8E-07
Nickel	1.9E-03	mg/L	1.1E-04	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.5E-06	1.1E-06
Selenium	8.7E-05	mg/L	5.1E-06	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.3E-05	6.3E-06
Thallium	7.4E-06	mg/L	4.3E-07	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.2E-07	8.6E-08
Zinc	2.0E-02	mg/L	1.2E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	8.1E-05	9.0E-06
Nitrogen, Ammonia	3.9E-01	mg/L	2.3E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	7.2E-09	mg/L	4.2E-10	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.0E-05	3.0E-06
							HAZARD INDICES:	5.0E-04	7.6E-05

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-1.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	7.5E-02	mg/kg	8.2E-04	mg/kg-d					
Acenaphthene	4.8E-01	mg/kg	5.3E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.9E-05	2.9E-06
Acenaphthylene	1.9E-01	mg/kg	2.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.2E-05	1.2E-06
Anthracene	9.3E-01	mg/kg	1.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.6E-05	5.6E-06
Benzo(a)anthracene	1.5E+00	mg/kg	1.6E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.8E-05	8.8E-06
Benzo(a)pyrene	1.4E+00	mg/kg	1.5E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.3E-05	8.3E-06
Benzo(b)fluoranthene	1.5E+00	mg/kg	1.7E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.0E-05	9.0E-06
Benzo(g,h,i)perylene	8.6E-01	mg/kg	9.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.1E-05	5.1E-06
Benzo(k)fluoranthene	1.4E+00	mg/kg	1.5E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.4E-05	8.4E-06
bis(2-Ethylhexyl)phthalate	9.5E-01	mg/kg	1.0E-02	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	9.5E-04	9.5E-05
Carbazole	6.6E-01	mg/kg	7.3E-03	mg/kg-d					
Chrysene	1.8E+00	mg/kg	2.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.1E-04	1.1E-05
Dibenzo(a,h)anthracene	7.7E-01	mg/kg	8.5E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.6E-05	4.6E-06
Dibenzofuran	2.9E-01	mg/kg	3.2E-03	mg/kg-d					
Di-n-Butylphthalate	4.7E-01	mg/kg	5.2E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.7E-03	4.7E-04
Fluoranthene	3.3E+00	mg/kg	3.6E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-04	2.0[illegible]
Fluorene	4.7E-01	mg/kg	5.2E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.8E-05	2.8[illegible]
Indeno(1,2,3-cd)pyrene	1.0E+00	mg/kg	1.1E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.1E-05	6.1E-06
Naphthalene	9.4E-02	mg/kg	1.0E-03	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	1.9E-05	1.9E-06
Phenanthrene	2.1E+00	mg/kg	2.3E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.2E-04	1.2E-05
Pyrene	2.8E+00	mg/kg	3.1E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.7E-04	1.7E-05
4,4'-DDD	4.9E-03	mg/kg	5.3E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.9E-02	1.9E-03
4,4'-DDE	6.0E-03	mg/kg	6.6E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.4E-02	2.4E-03
alpha-Chlordane	6.1E-03	mg/kg	6.7E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.8E-06	2.8E-07
Aroclor, Total	2.1E-01	mg/kg	2.3E-03	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	2.1E-02	8.3E-03
Aroclor-1254	1.5E-01	mg/kg	1.6E-03	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	9.1E-03	9.1E-04
Aroclor-1260	2.5E-02	mg/kg	2.8E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.5E-03	1.5E-04
Aroclor-1268	1.4E-01	mg/kg	1.5E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.4E-03	1.4E-04
Dieldrin	2.6E-03	mg/kg	2.8E-05	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	3.7E-06	3.7E-07
Endrin	1.9E-03	mg/kg	2.1E-05	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	4.2E-04	7.0E-05
gamma-Chlordane	4.8E-03	mg/kg	5.3E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.2E-06	2.2E-07
Technical Chlordane	4.0E-01	mg/kg	4.4E-03	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.8E-04	1.8E-05
Antimony	7.3E-01	mg/kg	8.1E-03	mg/kg-d					
Arsenic	3.9E+00	mg/kg	4.3E-02	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	8.4E-03	3.3E-03
Barium	1.3E+02	mg/kg	1.5E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	3.5E-02	1.8E-02
Cadmium	8.1E-01	mg/kg	8.9E-03	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.1E-03	4.4E-04
Chromium	9.9E+01	mg/kg	1.1E+00	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	**1.1E+00**	2.2E-01
Cobalt	8.1E+00	mg/kg	8.9E-02	mg/kg-d					
Copper	7.3E+01	mg/kg	8.0E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.7E-02	1.3E-02
Lead	1.8E+02	mg/kg	2.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	**1.7E+00**	1.7E-01
Mercury	2.1E-01	mg/kg	2.3E-03	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	5.2E-03	2.6E-03
Mercury (methyl)	2.6E-04	mg/kg	2.8E-06	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	4.4E-04	4.4E-05
Molybdenum	1.3E+01	mg/kg	1.4E-01	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	3.9E-02	3.9E-03
Selenium	1.1E+00	mg/kg	1.3E-02	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	3.1E-02	1.6[illegible]2
Silver	2.6E+00	mg/kg	2.8E-02	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	1.2E-04	1.2[illegible]5
Thallium	3.7E-01	mg/kg	4.1E-03	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.2E-03	8.1E-04

TABLE N-1.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Zinc	2.2E+02	mg/kg	2.4E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.7E-01	1.9E-02
Toxicity Equivalency - Birds	4.5E-05	mg/kg	5.0E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.6E-02	3.6E-03
Toxicity Equivalency (PCB) - Birds	3.4E-05	mg/kg	3.7E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.7E-02	2.7E-03
							HAZARD INDICES:	3.3E+00	4.9E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-1.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	3.4E-03	mg/kg	2.0E-04	mg/kg-d					
Acenaphthene	2.0E-02	mg/kg	1.2E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.3E-06	6.3E-07
Acenaphthylene	7.9E-03	mg/kg	4.5E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.5E-06	2.5E-07
Anthracene	1.9E-02	mg/kg	1.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.0E-06	6.0E-07
Benzo(a)anthracene	5.4E-03	mg/kg	3.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.7E-06	1.7E-07
Benzo(a)pyrene	3.1E-03	mg/kg	1.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.7E-07	9.7E-08
Benzo(b)fluoranthene	5.3E-03	mg/kg	3.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.7E-06	1.7E-07
Benzo(g,h,i)perylene	9.8E-04	mg/kg	5.6E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.1E-07	3.1E-08
Benzo(k)fluoranthene	3.2E-03	mg/kg	1.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-06	1.0E-07
bis(2-Ethylhexyl)phthalate	3.0E-04	mg/kg	1.7E-05	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.6E-06	1.6E-07
Carbazole	3.6E-02	mg/kg	2.1E-03	mg/kg-d					
Chrysene	6.1E-03	mg/kg	3.5E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.9E-06	1.9E-07
Dibenzo(a,h)anthracene	7.5E-04	mg/kg	4.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.3E-07	2.3E-08
Dibenzofuran	9.3E-03	mg/kg	5.4E-04	mg/kg-d					
Di-n-Butylphthalate	9.1E-03	mg/kg	5.3E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.7E-04	4.7E-05
Fluoranthene	2.7E-02	mg/kg	1.5E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.3E-06	8.3E
Fluorene	1.4E-02	mg/kg	8.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.4E-06	4.4E
Indeno(1,2,3-cd)pyrene	1.1E-03	mg/kg	6.1E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.3E-07	3.3E-08
Naphthalene	9.0E-03	mg/kg	5.2E-04	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	9.6E-06	9.6E-07
Phenanthrene	4.2E-02	mg/kg	2.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-05	1.3E-06
Pyrene	3.3E-02	mg/kg	1.9E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-05	1.0E-06
4,4'-DDD	1.2E-05	mg/kg	6.8E-07	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.4E-04	2.4E-05
4,4'-DDE	5.8E-06	mg/kg	3.3E-07	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.2E-04	1.2E-05
alpha-Chlordane	1.6E-05	mg/kg	9.2E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.8E-08	3.8E-09
Aroclor, Total	1.3E-04	mg/kg	7.3E-06	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.6E-05	2.7E-05
Aroclor-1254	2.0E-04	mg/kg	1.2E-05	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	6.5E-05	6.5E-06
Aroclor-1260	8.4E-06	mg/kg	4.8E-07	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	2.7E-06	2.7E-07
Aroclor-1268	4.6E-05	mg/kg	2.6E-06	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.4E-06	2.4E-07
Dieldrin	1.7E-05	mg/kg	9.8E-07	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	1.3E-07	1.3E-08
Endrin	1.5E-05	mg/kg	8.4E-07	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	1.7E-05	2.8E-06
gamma-Chlordane	1.3E-05	mg/kg	7.3E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.0E-08	3.0E-09
Technical Chlordane	1.1E-03	mg/kg	6.1E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.5E-06	2.5E-07
Antimony	1.5E-03	mg/kg	8.6E-05	mg/kg-d					
Arsenic	3.9E-02	mg/kg	2.2E-03	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	4.4E-04	1.7E-04
Barium	4.2E+00	mg/kg	2.4E-01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	5.8E-03	2.9E-03
Cadmium	3.5E-02	mg/kg	2.0E-03	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	1.4E-03	1.0E-04
Chromium	8.1E-01	mg/kg	4.7E-02	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.7E-02	9.4E-03
Cobalt	1.2E-02	mg/kg	6.9E-04	mg/kg-d					
Copper	7.0E+00	mg/kg	4.1E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	8.6E-03	6.6E-03
Lead	3.5E+00	mg/kg	2.0E-01	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.8E-01	1.8E-02
Mercury	5.4E-03	mg/kg	3.1E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	7.0E-04	3.5E-04
Mercury (methyl)	4.6E-05	mg/kg	2.6E-06	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	4.1E-04	4.1E-05
Molybdenum	6.3E-01	mg/kg	3.6E-02	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	1.0E-02	1.0E-03
Selenium	1.5E-01	mg/kg	8.5E-03	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	2.1E-02	1.1E
Silver	7.2E-03	mg/kg	4.1E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	1.7E-06	1.7E
Thallium	2.9E-04	mg/kg	1.7E-05	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	4.8E-06	3.4E-06

TABLE N-1.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Zinc	7.7E+01	mg/kg	4.4E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	3.0E-01	3.4E-02
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	5.8E-01	8.3E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-1.5

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDE	4.3E-03	mg/kg	7.0E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.5E-01	2.5E-02
alpha-Chlordane	2.8E-04	mg/kg	4.5E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.9E-06	1.9E-07
Aroclor, Total	4.4E-02	mg/kg	7.1E-03	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.5E-02	2.6E-02
Aroclor-1254	3.8E-02	mg/kg	6.1E-03	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	3.4E-02	3.4E-03
Aroclor-1268	6.2E-03	mg/kg	1.0E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	9.1E-04	9.1E-05
Endosulfan Sulfate	5.1E-04	mg/kg	8.3E-05	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.3E-04	1.3E-05
gamma-Chlordane	9.0E-05	mg/kg	1.5E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.1E-07	6.1E-08
Technical Chlordane	1.8E-02	mg/kg	3.0E-03	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.2E-04	1.2E-05
Aluminum	9.0E-01	mg/kg	1.5E-01	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.3E-03	1.3E-04
Antimony	1.4E-02	mg/kg	2.3E-03	mg/kg-d					
Barium	2.6E+01	mg/kg	4.1E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	1.0E-01	5.0E-02
Cadmium	8.6E-02	mg/kg	1.4E-02	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	9.6E-03	7.0E-04
Chromium	2.2E-01	mg/kg	3.6E-02	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	3.6E-02	7.3E-03
Cobalt	2.4E-01	mg/kg	3.9E-02	mg/kg-d					
Copper	2.7E+01	mg/kg	4.3E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	9.3E-02	7.0E-02
Lead	5.2E-01	mg/kg	8.4E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	7.5E-02	7.5E
Manganese	1.2E+02	mg/kg	1.9E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.9E-02	1.9E
Mercury	2.2E-02	mg/kg	3.6E-03	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	8.1E-03	4.0E-03
Mercury (methyl)	2.2E-02	mg/kg	3.6E-03	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	5.7E-01	5.7E-02
Molybdenum	1.4E-01	mg/kg	2.3E-02	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	6.5E-03	6.5E-04
Nickel	2.8E-01	mg/kg	4.6E-02	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.9E-04	4.3E-04
Selenium	1.2E-01	mg/kg	2.0E-02	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	5.1E-02	2.5E-02
Silver	2.2E-01	mg/kg	3.5E-02	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	1.5E-04	1.5E-05
Thallium	9.9E-03	mg/kg	1.6E-03	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	4.6E-04	3.2E-04
Vanadium	1.7E-01	mg/kg	2.7E-02	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	2.4E-03	2.4E-04
Zinc	2.3E+01	mg/kg	3.7E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.5E-01	2.8E-02
Toxicity Equivalency - Birds	4.3E-06	mg/kg	6.9E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	5.0E-02	5.0E-03
Toxicity Equivalency (PCB) - Birds	2.3E-06	mg/kg	3.7E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.7E-02	2.7E-03
							HAZARD INDICES:	1.6E+00	3.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-1.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Lead	1.5E-04	1.7E+00	1.8E-01	7.5E-02	-	***2.0E+00***	***36%***
Chromium	1.5E-04	1.1E+00	4.7E-02	3.6E-02	-	***1.2E+00***	***21%***
Zinc	8.1E-05	1.7E-01	3.0E-01	2.5E-01	-	7.2E-01	***13%***
Mercury (methyl)		4.4E-04	4.1E-04	5.7E-01	-	5.7E-01	***10%***
4,4'-DDE		2.4E-02	1.2E-04	2.5E-01	-	2.8E-01	5%
Barium		3.5E-02	5.8E-03	1.0E-01	-	1.4E-01	3%
Copper	6.6E-06	1.7E-02	8.6E-03	9.3E-02	-	1.2E-01	2%
Selenium	1.3E-05	3.1E-02	2.1E-02	5.1E-02	-	1.0E-01	2%
Aroclor, Total		2.1E-02	6.6E-05	6.5E-02	-	8.5E-02	2%
Toxicity Equivalency - Birds	3.0E-05	3.6E-02	-	5.0E-02	-	8.5E-02	2%
Molybdenum		3.9E-02	1.0E-02	6.5E-03	-	5.6E-02	1%
Toxicity Equivalency (PCB) - Birds		2.7E-02	-	2.7E-02	-	5.3E-02	1%
Aroclor-1254		9.1E-03	6.5E-05	3.4E-02	-	4.3E-02	1%
Manganese	7.8E-06			1.9E-02		1.9E-02	0%
4,4'-DDD		1.9E-02	2.4E-04		-	1.9E-02	0%
Cadmium		6.1E-03	1.4E-03	9.6E-03	-	1.7E-02	0%
Mercury		5.2E-03	7.0E-04	8.1E-03	-	1.4E-02	0%
Arsenic		8.4E-03	4.4E-04		-	8.8E-03	0%
Di-n-Butylphthalate		4.7E-03	4.7E-04		-	5.1E-03	0%
Vanadium				2.4E-03		2.4E-03	0%
Aroclor-1268		1.4E-03	2.4E-06	9.1E-04	-	2.3E-03	0%
Thallium	1.2E-07	1.2E-03	4.8E-06	4.6E-04	-	1.6E-03	0%
Aroclor-1260		1.5E-03	2.7E-06		-	1.5E-03	0%
Aluminum	4.7E-05			1.3E-03		1.4E-03	0%
bis(2-Ethylhexyl)phthalate		9.5E-04	1.6E-06		-	9.5E-04	0%
Nickel	1.5E-06			5.9E-04		5.9E-04	0%
Endrin		4.2E-04	1.7E-05		-	4.4E-04	0%
Technical Chlordane		1.8E-04	2.5E-06	1.2E-04	-	3.1E-04	0%
Silver		1.2E-04	1.7E-06	1.5E-04	-	2.7E-04	0%
Fluoranthene		2.0E-04	8.3E-06		-	2.1E-04	0%
Pyrene		1.7E-04	1.0E-05		-	1.8E-04	0%
Phenanthrene		1.2E-04	1.3E-05		-	1.4E-04	0%
Endosulfan sulfate				1.3E-04		1.3E-04	0%
Chrysene		1.1E-04	1.9E-06		-	1.1E-04	0%
Benzo(b)fluoranthene		9.0E-05	1.7E-06		-	9.2E-05	0%
Benzo(a)anthracene		8.8E-05	1.7E-06		-	9.0E-05	0%
Benzo(k)fluoranthene		8.4E-05	1.0E-06		-	8.5E-05	0%
Benzo(a)pyrene		8.3E-05	9.7E-07		-	8.4E-05	0%
Anthracene		5.6E-05	6.0E-06		-	6.2E-05	0%
Indeno(1,2,3-cd)pyrene		6.1E-05	3.3E-07		-	6.2E-05	0%
Benzo(g,h,i)perylene		5.1E-05	3.1E-07		-	5.2E-05	0%
Dibenzo(a,h)anthracene		4.6E-05	2.3E-07		-	4.6E-05	0%
Acenaphthene		2.9E-05	6.3E-06		-	3.5E-05	0%
Fluorene		2.8E-05	4.4E-06		-	3.3E-05	0%
Naphthalene		1.9E-05	9.6E-06		-	2.9E-05	0%

TABLE N-1.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium	2.2E-05					2.2E-05	0%
Acenaphthylene		1.2E-05	2.5E-06		-	1.4E-05	0%
alpha-Chlordane		2.8E-06	3.8E-08	1.9E-06	-	4.7E-06	0%
Dieldrin		3.7E-06	1.3E-07		-	3.8E-06	0%
gamma-Chlordane		2.2E-06	3.0E-08	6.1E-07	-	2.8E-06	0%
4,4'-DDT							
gamma-BHC							
Heptachlor epoxide							
Cobalt							
Toxicity Equivalency - Mammals							
Antimony							
Toxicity Equivalency (PCB) - Mammals							
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
1,1'-Biphenyl							
Pentachlorophenol							
Aroclor-1248							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endosulfan II							
Endrin aldehyde							
Heptachlor							
4-Methylphenol							
2,4,5-Trichlorophenol							
Methoxychlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**5.0E-04**	**3.3E+00**	**5.8E-01**	**1.6E+00**	**-**	**5.5E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**60%**	**10%**	**30%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-1.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 8.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Chromium	2.9E-05	2.2E-01	9.4E-03	7.3E-03	-	2.4E-01	***27%***
Lead	1.5E-05	1.7E-01	1.8E-02	7.5E-03	-	2.0E-01	***22%***
Copper	5.1E-06	1.3E-02	6.6E-03	7.0E-02	-	9.0E-02	***10%***
Zinc	9.0E-06	1.9E-02	3.4E-02	2.8E-02	-	8.0E-02	9%
Barium		1.8E-02	2.9E-03	5.0E-02	-	7.0E-02	8%
Mercury (methyl)		4.4E-05	4.1E-05	5.7E-02	-	5.7E-02	6%
Selenium	6.3E-06	1.6E-02	1.1E-02	2.5E-02	-	5.2E-02	6%
Aroclor, Total		8.3E-03	2.7E-05	2.6E-02	-	3.4E-02	4%
4,4'-DDE		2.4E-03	1.2E-05	2.5E-02	-	2.8E-02	3%
Toxicity Equivalency - Birds	3.0E-06	3.6E-03	-	5.0E-03	-	8.5E-03	1%
Mercury		2.6E-03	3.5E-04	4.0E-03	-	7.0E-03	1%
Molybdenum		3.9E-03	1.0E-03	6.5E-04	-	5.6E-03	1%
Toxicity Equivalency (PCB) - Birds		2.7E-03	-	2.7E-03	-	5.3E-03	1%
Aroclor-1254		9.1E-04	6.5E-06	3.4E-03	-	4.3E-03	0%
Arsenic		3.3E-03	1.7E-04		-	3.5E-03	0%
Manganese	7.8E-07			1.9E-03		1.9E-03	0%
4,4'-DDD		1.9E-03	2.4E-05		-	1.9E-03	0%
Cadmium		4.4E-04	1.0E-04	7.0E-04	-	1.2E-03	0%
Thallium	8.6E-08	8.1E-04	3.4E-06	3.2E-04	-	1.1E-03	0%
Di-n-Butylphthalate		4.7E-04	4.7E-05		-	5.1E-04	0%
Nickel	1.1E-06			4.3E-04		4.3E-04	0%
Vanadium				2.4E-04		2.4E-04	0%
Aroclor-1268		1.4E-04	2.4E-07	9.1E-05	-	2.3E-04	0%
Aroclor-1260		1.5E-04	2.7E-07		-	1.5E-04	0%
Aluminum	4.7E-06			1.3E-04		1.4E-04	0%
bis(2-Ethylhexyl)phthalate		9.5E-05	1.6E-07		-	9.5E-05	0%
Endrin		7.0E-05	2.8E-06		-	7.3E-05	0%
Technical Chlordane		1.8E-05	2.5E-07	1.2E-05	-	3.1E-05	0%
Silver		1.2E-05	1.7E-07	1.5E-05	-	2.7E-05	0%
Fluoranthene		2.0E-05	8.3E-07		-	2.1E-05	0%
Pyrene		1.7E-05	1.0E-06		-	1.8E-05	0%
Phenanthrene		1.2E-05	1.3E-06		-	1.4E-05	0%
Endosulfan sulfate				1.3E-05		1.3E-05	0%
Chrysene		1.1E-05	1.9E-07		-	1.1E-05	0%
Benzo(b)fluoranthene		9.0E-06	1.7E-07		-	9.2E-06	0%
Benzo(a)anthracene		8.8E-06	1.7E-07		-	9.0E-06	0%
Benzo(k)fluoranthene		8.4E-06	1.0E-07		-	8.5E-06	0%
Benzo(a)pyrene		8.3E-06	9.7E-08		-	8.4E-06	0%
Anthracene		5.6E-06	6.0E-07		-	6.2E-06	0%
Indeno(1,2,3-cd)pyrene		6.1E-06	3.3E-08		-	6.2E-06	0%
Benzo(g,h,i)perylene		5.1E-06	3.1E-08		-	5.2E-06	0%
Dibenzo(a,h)anthracene		4.6E-06	2.3E-08		-	4.6E-06	0%
Acenaphthene		2.9E-06	6.3E-07		-	3.5E-06	0%
Fluorene		2.8E-06	4.4E-07		-	3.3E-06	0%
Naphthalene		1.9E-06	9.6E-07		-	2.9E-06	0%

TABLE N-1.7

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 8.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Beryllium	2.2E-06					2.2E-06	0%
Acenaphthylene		1.2E-06	2.5E-07		-	1.4E-06	0%
alpha-Chlordane		2.8E-07	3.8E-09	1.9E-07	-	4.7E-07	0%
Dieldrin		3.7E-07	1.3E-08		-	3.8E-07	0%
gamma-Chlordane		2.2E-07	3.0E-09	6.1E-08	-	2.8E-07	0%
4,4'-DDT							
gamma-BHC							
Heptachlor epoxide							
Cobalt							
Toxicity Equivalency - Mammals							
Antimony							
Toxicity Equivalency (PCB) - Mammals							
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
1,1'-Biphenyl							
Pentachlorophenol							
Aroclor-1248							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endosulfan II							
Endrin aldehyde							
Heptachlor							
4-Methylphenol							
2,4,5-Trichlorophenol							
Methoxychlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**7.6E-05**	**4.9E-01**	**8.3E-02**	**3.2E-01**	**-**	**8.9E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**55%**	**9%**	**35%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-2.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: ALLENDALE POND REACH - CT

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
2-Methylnaphthalene	1.4E-01	4.5E-02	1.0E+00	4.7E+00	**6.2E-03**	1.4E-01	6.3E-01
Acenaphthene	1.2E+00	4.2E-02	1.0E+00	3.0E-02	**5.0E-02**	1.2E+00	3.6E-02
Acenaphthylene	9.7E-01	4.1E-02	1.0E+00	7.6E-01	**4.0E-02**	1.0E+00	7.4E-01
Anthracene	1.2E+00	2.1E-02	1.0E+00	1.1E-01	**2.6E-02**	1.3E+00	1.3E-01
Benzo(a)anthracene	2.2E+00	3.6E-03	1.1E+00	3.4E-01	**8.0E-03**	2.4E+00	7.4E-01
Benzo(a)pyrene	2.3E+00	2.2E-03	1.1E+00	2.2E-01	**5.1E-03**	2.5E+00	5.1E-01
Benzo(b)fluoranthene	2.8E+00	3.5E-03	1.1E+00	4.2E-01	**9.7E-03**	2.9E+00	1.1E+00
Benzo(g,h,i)perylene	2.0E+00	1.1E-03	1.1E+00	4.7E-02	**2.3E-03**	2.2E+00	9.4E-02
Benzo(k)fluoranthene	2.6E+00	2.3E-03	1.1E+00	2.9E-01	**5.8E-03**	2.8E+00	7.5E-01
bis(2-Ethylhexyl)phthalate	2.3E+00	3.1E-04	1.1E+00	1.0E+00	**7.1E-04**	2.5E+00	2.3E+00
Carbazole	1.5E+00	5.5E-02	1.0E+00	5.6E-01	**8.3E-02**	1.6E+00	8.5E-01
Chrysene	3.0E+00	3.4E-03	1.1E+00	4.4E-01	**1.0E-02**	3.2E+00	1.3E+00
Dibenzo(a,h)anthracene	1.4E+00	9.7E-04	1.1E+00	3.8E-01	**1.4E-03**	1.5E+00	5.3E-01
Dibenzofuran	6.4E-01	3.2E-02	1.0E+00	1.0E+00	**2.1E-02**	6.6E-01	6.4E-01
Di-n-Butylphthalate	6.1E-01	1.9E-02	1.0E+00	1.0E+00	**1.2E-02**	6.3E-01	6.1E-01
Fluoranthene	5.2E+00	8.1E-03	1.1E+00	8.0E-01	**4.2E-02**	5.4E+00	4.1E+00
Fluorene	9.3E-01	3.0E-02	1.0E+00	9.6E-01	**2.8E-02**	9.6E-01	9.0E-01
Indeno(1,2,3-cd)pyrene	1.9E+00	1.0E-03	1.1E+00	2.8E-01	**2.0E-03**	2.1E+00	5.4E-01
Naphthalene	1.8E-01	9.6E-02	1.0E+00	2.6E+00	**1.7E-02**	1.9E-01	4.8E-01
Phenanthrene	2.9E+00	2.0E-02	1.0E+00	3.0E-01	**5.9E-02**	3.0E+00	8.8E-01
Pyrene	4.4E+00	1.2E-02	1.0E+00	5.1E-01	**5.2E-02**	4.6E+00	2.3E+00
4,4'-DDD	6.0E-03	2.4E-03	1.1E+00	2.8E-01	**1.5E-05**	6.5E-03	1.7E-03
4,4'-DDE	1.6E-02	9.6E-04	1.1E+00	7.7E+00	**1.5E-05**	1.8E-02	1.2E-01
alpha-Chlordane	1.1E-02	2.6E-03	1.1E+00	4.8E+00	**3.0E-05**	1.2E-02	5.4E-02
Aroclor, Total	1.5E+00	6.1E-04	1.1E+00	8.0E-01	**9.3E-04**	1.7E+00	1.2E+00
Aroclor-1248	1.4E-01	2.0E-03	1.1E+00	1.6E+00	**2.8E-04**	1.5E-01	2.2E-01
Aroclor-1254	1.5E+00	1.4E-03	1.1E+00	8.1E-01	**2.0E-03**	1.6E+00	1.2E+00
Aroclor-1260	2.0E-01	3.4E-04	1.1E+00	2.3E-01	**6.7E-05**	2.2E-01	4.5E-02
Aroclor-1268	7.9E-02	3.4E-04	1.1E+00	2.3E-01	**2.7E-05**	8.8E-02	1.8E-02
Dieldrin	9.0E-03	6.7E-03	1.1E+00	6.7E+00	**6.0E-05**	9.5E-03	6.0E-02
Endosulfan II	3.7E-02	4.7E-02	1.0E+00	1.8E+00	**1.8E-03**	3.8E-02	6.7E-02
Endosulfan sulfate	2.7E-03	5.9E-02	1.0E+00	2.7E+00	**1.6E-04**	2.7E-03	7.2E-03
Endrin	3.2E-03	7.6E-03	1.1E+00	1.8E+00	**2.4E-05**	3.3E-03	5.7E-03
gamma-Chlordane	9.7E-03	2.6E-03	1.1E+00	2.2E+00	**2.6E-05**	1.0E-02	2.1E-02
Methoxychlor	1.1E-02	9.0E-03	1.0E+00	1.2E+00	**9.7E-05**	1.1E-02	1.3E-02
Technical Chlordane	5.2E-01	2.6E-03	1.1E+00	2.0E+00	**1.4E-03**	5.5E-01	1.0E+00
Antimony	2.3E+00	2.0E-03	-	-	**4.7E-03**	0.0E+00	0.0E+00
Arsenic	5.8E+00	1.0E-02	1.3E-01	1.3E-01	**5.8E-02**	7.4E-01	7.4E-01
Barium	1.4E+02	3.1E-02	1.8E-02	-	**4.3E+00**	2.5E+00	0.0E+00
Cadmium	1.2E+00	4.4E-02	4.6E-01	4.6E-01	**5.3E-02**	5.6E-01	5.6E-01
Chromium	1.4E+02	8.2E-03	1.2E+01	1.2E+01	**1.2E+00**	1.7E+03	1.7E+03
Cobalt	7.1E+00	1.5E-03	2.4E-02	-	**1.1E-02**	1.7E-01	0.0E+00
Copper	1.2E+02	9.7E-02	7.4E+01	7.4E+01	**1.2E+01**	8.8E+03	8.8E+03
Cyanide	2.4E+00	-	-	-	**0.0E+00**	0.0E+00	0.0E+00
Lead	3.3E+02	1.9E-02	6.6E-02	6.6E-02	**6.3E+00**	2.2E+01	2.2E+01
Mercury	4.7E-01	2.6E-02	4.0E+00	4.0E+00	**1.2E-02**	1.9E+00	1.9E+00

TABLE N-2.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: ALLENDALE POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
Mercury (methyl)	8.0E-04	1.8E-01	3.4E-01	-	**1.4E-04**	2.7E-04	0.0E+00
Molybdenum	1.3E+01	5.0E-02	1.9E-01	-	**6.6E-01**	2.5E+00	0.0E+00
Selenium	1.1E+00	1.3E-01	1.0E-01	-	**1.4E-01**	1.1E-01	0.0E+00
Silver	2.8E+00	2.8E-03	4.1E-01	-	**7.8E-03**	1.1E+00	0.0E+00
Thallium	6.8E+00	8.0E-04	-	-	**5.4E-03**	0.0E+00	0.0E+00
Zinc	3.5E+02	3.5E-01	2.2E+02	2.2E+02	**1.2E+02**	7.9E+04	7.9E+04
Toxicity Equivalency - Birds	5.8E-03		-	-	**0.0E+00**	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	5.6E-05		-	-	**0.0E+00**	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-2.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	2.5E-06	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	2.2E-07	2.2E-08
alpha-Chlordane	6.9E-07	mg/L	1.7E-09	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	7.1E-11	7.1E-12
Endosulfan Sulfate	5.9E-05	mg/L	1.5E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.3E-07	2.3E-08
gamma-Chlordane	2.5E-05	mg/L	6.2E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.6E-09	2.6E-10
Aluminum	6.5E-01	mg/L	1.6E-03	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	1.5E-05	1.5E-06
Beryllium	5.0E-05	mg/L	1.2E-07	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	8.3E-07	8.3E-08
Chromium	5.1E-03	mg/L	1.3E-05	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.3E-05	2.5E-06
Cobalt	6.0E-04	mg/L	1.5E-06	mg/kg-d					
Copper	1.3E-02	mg/L	3.3E-05	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	7.0E-07	5.3E-07
Lead	2.1E-02	mg/L	5.1E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.5E-05	4.5E-06
Manganese	4.0E-01	mg/L	9.9E-04	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.0E-06	1.0E-07
Nickel	4.9E-03	mg/L	1.2E-05	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.6E-07	1.1E-07
Selenium	2.4E-03	mg/L	5.9E-06	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.5E-05	7.4E-06
Silver	8.3E-04	mg/L	2.1E-06	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	8.7E-09	8.7E-10
Thallium	3.7E-03	mg/L	9.1E-06	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	2.6E-06	1.8E-06
Zinc	6.5E-02	mg/L	1.6E-04	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.1E-05	1.2E-06
Nitrogen, Ammonia	2.4E-01	mg/L	6.0E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.1E-06	mg/L	2.8E-09	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.0E-04	2.0E-05
							HAZARD INDICES:	3.0E-04	4.0E-05

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-2.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.4E-01	mg/kg	6.4E-05	mg/kg-d					
Acenaphthene	1.2E+00	mg/kg	5.6E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.0E-06	3.0E-07
Acenaphthylene	9.7E-01	mg/kg	4.5E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.5E-06	2.5E-07
Anthracene	1.2E+00	mg/kg	5.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.1E-06	3.1E-07
Benzo(a)anthracene	2.2E+00	mg/kg	1.0E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.6E-06	5.6E-07
Benzo(a)pyrene	2.3E+00	mg/kg	1.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.9E-06	5.9E-07
Benzo(b)fluoranthene	2.8E+00	mg/kg	1.3E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.0E-06	7.0E-07
Benzo(g,h,i)perylene	2.0E+00	mg/kg	9.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.1E-06	5.1E-07
Benzo(k)fluoranthene	2.6E+00	mg/kg	1.2E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.5E-06	6.5E-07
bis(2-Ethylhexyl)phthalate	2.3E+00	mg/kg	1.1E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	9.6E-05	9.6E-06
Carbazole	1.5E+00	mg/kg	7.1E-04	mg/kg-d					
Chrysene	3.0E+00	mg/kg	1.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.6E-06	7.6E-07
Dibenzo(a,h)anthracene	1.4E+00	mg/kg	6.6E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.6E-06	3.6E-07
Dibenzofuran	6.4E-01	mg/kg	3.0E-04	mg/kg-d					
Di-n-Butylphthalate	6.1E-01	mg/kg	2.9E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.6E-04	2.6E-05
Fluoranthene	5.2E+00	mg/kg	2.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-05	1.3E-06
Fluorene	9.3E-01	mg/kg	4.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.4E-06	2.4E-07
Indeno(1,2,3-cd)pyrene	1.9E+00	mg/kg	9.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.9E-06	4.9E-07
Naphthalene	1.8E-01	mg/kg	8.5E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	1.6E-06	1.6E-07
Phenanthrene	2.9E+00	mg/kg	1.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.4E-06	7.4E-07
Pyrene	4.4E+00	mg/kg	2.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.1E-05	1.1E-06
4,4'-DDD	6.0E-03	mg/kg	2.8E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.0E-03	1.0E-04
4,4'-DDE	1.6E-02	mg/kg	7.5E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.7E-03	2.7E-04
alpha-Chlordane	1.1E-02	mg/kg	5.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.2E-07	2.2E-08
Aroclor, Total	1.5E+00	mg/kg	7.2E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.5E-03	2.6E-03
Aroclor-1248	1.4E-01	mg/kg	6.5E-05	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	5.9E-04	2.4E-04
Aroclor-1254	1.5E+00	mg/kg	7.1E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	3.9E-03	3.9E-04
Aroclor-1260	2.0E-01	mg/kg	9.3E-05	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	5.2E-04	5.2E-05
Aroclor-1268	7.9E-02	mg/kg	3.7E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.3E-05	3.3E-06
Dieldrin	9.0E-03	mg/kg	4.2E-06	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	5.5E-07	5.5E-08
Endosulfan II	3.7E-02	mg/kg	1.7E-05	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.8E-05	2.8E-06
Endosulfan sulfate	2.7E-03	mg/kg	1.2E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.0E-06	2.0E-07
Endrin	3.2E-03	mg/kg	1.5E-06	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	3.0E-05	4.9E-06
gamma-Chlordane	9.7E-03	mg/kg	4.5E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.9E-07	1.9E-08
Methoxychlor	1.1E-02	mg/kg	5.1E-06	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	6.3E-08	6.3E-09
Technical Chlordane	5.2E-01	mg/kg	2.4E-04	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.0E-05	1.0E-06
Antimony	2.3E+00	mg/kg	1.1E-03	mg/kg-d					
Arsenic	5.8E+00	mg/kg	2.7E-03	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	5.3E-04	2.1E-04
Barium	1.4E+02	mg/kg	6.4E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	1.5E-03	7.7E-04
Cadmium	1.2E+00	mg/kg	5.7E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	3.9E-04	2.8E-05
Chromium	1.4E+02	mg/kg	6.6E-02	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	6.6E-02	1.3E-02
Cobalt	7.1E+00	mg/kg	3.3E-03	mg/kg-d					
Copper	1.2E+02	mg/kg	5.6E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.2E-03	9.0E-04
Cyanide	2.4E+00	mg/kg	1.1E-03	mg/kg-d	5.3E-01	1.1E+00	mg/kg-d	2.1E-03	1.0E-03
Lead	3.3E+02	mg/kg	1.5E-01	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.4E-01	1.4E-02
Mercury	4.7E-01	mg/kg	2.2E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	4.9E-04	2.4E-04

TABLE N-2.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Mercury (methyl)	8.0E-04	mg/kg	3.8E-07	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	5.9E-05	5.9E-06
Molybdenum	1.3E+01	mg/kg	6.2E-03	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	1.7E-03	1.7E-04
Selenium	1.1E+00	mg/kg	5.0E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.2E-03	6.2E-04
Silver	2.8E+00	mg/kg	1.3E-03	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	5.5E-06	5.5E-07
Thallium	6.8E+00	mg/kg	3.2E-03	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	9.1E-04	6.4E-04
Zinc	3.5E+02	mg/kg	1.7E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.1E-02	1.3E-03
Toxicity Equivalency - Birds	5.8E-03	mg/kg	2.7E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.9E-01	1.9E-02
xicity Equivalency (PCB) - Bi	5.6E-05	mg/kg	2.6E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.9E-03	1.9E-04
							HAZARD INDICES:	4.3E-01	5.6E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-2.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	6.2E-03	mg/kg	1.5E-05	mg/kg-d					
Acenaphthene	5.0E-02	mg/kg	1.2E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.7E-07	6.7E-08
Acenaphthylene	4.0E-02	mg/kg	9.7E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.3E-07	5.3E-08
Anthracene	2.6E-02	mg/kg	6.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.4E-07	3.4E-08
Benzo(a)anthracene	8.0E-03	mg/kg	2.0E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.1E-07	1.1E-08
Benzo(a)pyrene	5.1E-03	mg/kg	1.2E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.8E-08	6.8E-09
Benzo(b)fluoranthene	9.7E-03	mg/kg	2.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-07	1.3E-08
Benzo(g,h,i)perylene	2.3E-03	mg/kg	5.6E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.0E-08	3.0E-09
Benzo(k)fluoranthene	5.8E-03	mg/kg	1.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.8E-08	7.8E-09
bis(2-Ethylhexyl)phthalate	7.1E-04	mg/kg	1.7E-06	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.6E-07	1.6E-08
Carbazole	8.3E-02	mg/kg	2.0E-04	mg/kg-d					
Chrysene	1.0E-02	mg/kg	2.5E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.3E-07	1.3E-08
Dibenzo(a,h)anthracene	1.4E-03	mg/kg	3.3E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.8E-08	1.8E-09
Dibenzofuran	2.1E-02	mg/kg	5.0E-05	mg/kg-d					
Di-n-Butylphthalate	1.2E-02	mg/kg	2.9E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.6E-05	2.6E-06
Fluoranthene	4.2E-02	mg/kg	1.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.5E-07	5.5E-08
Fluorene	2.8E-02	mg/kg	6.7E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
Indeno(1,2,3-cd)pyrene	2.0E-03	mg/kg	4.9E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.6E-08	2.6E-09
Naphthalene	1.7E-02	mg/kg	4.2E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	7.9E-07	7.9E-08
Phenanthrene	5.9E-02	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.9E-07	7.9E-08
Pyrene	5.2E-02	mg/kg	1.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.8E-07	6.8E-08
4,4'-DDD	1.5E-05	mg/kg	3.6E-08	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.3E-05	1.3E-06
4,4'-DDE	1.5E-05	mg/kg	3.8E-08	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.3E-05	1.3E-06
alpha-Chlordane	3.0E-05	mg/kg	7.2E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.0E-09	3.0E-10
Aroclor, Total	9.3E-04	mg/kg	2.3E-06	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	2.1E-05	8.3E-06
Aroclor-1248	2.8E-04	mg/kg	6.9E-07	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.2E-06	2.5E-06
Aroclor-1254	2.0E-03	mg/kg	5.0E-06	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	2.8E-05	2.8E-06
Aroclor-1260	6.7E-05	mg/kg	1.6E-07	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	9.0E-07	9.0E-08
Aroclor-1268	2.7E-05	mg/kg	6.5E-08	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	5.9E-08	5.9E-09
Dieldrin	6.0E-05	mg/kg	1.5E-07	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	1.9E-08	1.9E-09
Endosulfan II	1.8E-03	mg/kg	4.3E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	6.9E-06	6.9E-07
Endosulfan sulfate	1.6E-04	mg/kg	3.8E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	6.2E-07	6.2E-08
Endrin	2.4E-05	mg/kg	5.9E-08	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	1.2E-06	2.0E-07
gamma-Chlordane	2.6E-05	mg/kg	6.2E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.6E-09	2.6E-10
Methoxychlor	9.7E-05	mg/kg	2.4E-07	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	3.0E-09	3.0E-10
Technical Chlordane	1.4E-03	mg/kg	3.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.4E-07	1.4E-08
Antimony	4.7E-03	mg/kg	1.1E-05	mg/kg-d					
Arsenic	5.8E-02	mg/kg	1.4E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	2.8E-05	1.1E-05
Barium	4.3E+00	mg/kg	1.0E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.5E-04	1.3E-04
Cadmium	5.3E-02	mg/kg	1.3E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	8.9E-05	6.5E-06
Chromium	1.2E+00	mg/kg	2.8E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	2.8E-03	5.7E-04
Cobalt	1.1E-02	mg/kg	2.6E-05	mg/kg-d					
Copper	1.2E+01	mg/kg	2.8E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	6.0E-04	4.6E-04
Cyanide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.3E-01	1.1E+00	mg/kg-d	0.0E+00	0.0E+00
Lead	6.3E+00	mg/kg	1.5E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.4E-02	1.4E-03
Mercury	1.2E-02	mg/kg	2.9E-05	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	6.6E-05	3.3E-05

TABLE N-2.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Mercury (methyl)	1.4E-04	mg/kg	3.5E-07	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	5.5E-05	5.5E-06
Molybdenum	6.6E-01	mg/kg	1.6E-03	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	4.6E-04	4.6E-05
Selenium	1.4E-01	mg/kg	3.3E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	8.4E-04	4.2E-04
Silver	7.8E-03	mg/kg	1.9E-05	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	8.1E-08	8.1E-09
Thallium	5.4E-03	mg/kg	1.3E-05	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	3.8E-06	2.7E-06
Zinc	1.2E+02	mg/kg	3.0E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.1E-02	2.3E-03
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
xicity Equivalency (PCB) - Bi	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	4.0E-02	5.3E-03

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-2.5

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	3.7E-04	mg/kg	2.5E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	9.1E-04	9.1E-05
4,4'-DDE	3.2E-03	mg/kg	2.2E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	7.9E-03	7.9E-04
alpha-Chlordane	3.0E-04	mg/kg	2.1E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	8.6E-08	8.6E-09
Aroclor, Total	7.6E-02	mg/kg	5.2E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	4.7E-03	1.9E-03
Aroclor-1254	7.0E-02	mg/kg	4.8E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	2.7E-03	2.7E-04
Aroclor-1268	6.0E-03	mg/kg	4.1E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.7E-05	3.7E-06
Dieldrin	4.7E-04	mg/kg	3.2E-06	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	4.2E-07	4.2E-08
Technical Chlordane	1.6E-02	mg/kg	1.1E-04	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	4.7E-06	4.7E-07
Aluminum	1.6E+00	mg/kg	1.1E-02	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	9.8E-05	9.8E-06
Antimony	1.7E-02	mg/kg	1.2E-04	mg/kg-d					
Barium	2.1E+01	mg/kg	1.4E-01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	3.5E-03	1.7E-03
Cadmium	9.2E-02	mg/kg	6.3E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	4.3E-04	3.1E-05
Chromium	2.8E-01	mg/kg	1.9E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.9E-03	3.9E-04
Cobalt	1.7E-01	mg/kg	1.2E-03	mg/kg-d					
Copper	3.0E+01	mg/kg	2.1E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	4.4E-03	3.4E-03
Lead	5.9E-01	mg/kg	4.1E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.6E-03	3.6E-04
Manganese	7.2E+01	mg/kg	4.9E-01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	5.1E-04	5.1E-05
Mercury	2.5E-02	mg/kg	1.7E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	3.8E-04	1.9E-04
Mercury (methyl)	2.3E-02	mg/kg	1.6E-04	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	2.4E-02	2.4E-03
Molybdenum	1.3E-01	mg/kg	8.8E-04	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.5E-04	2.5E-05
Nickel	3.2E-01	mg/kg	2.2E-03	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	2.8E-05	2.0E-05
Selenium	1.3E-01	mg/kg	8.7E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	2.2E-03	1.1E-03
Silver	2.1E-01	mg/kg	1.4E-03	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	6.1E-06	6.1E-07
Thallium	8.9E-03	mg/kg	6.1E-05	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.7E-05	1.2E-05
Vanadium	2.2E-01	mg/kg	1.5E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.3E-04	1.3E-05
Zinc	2.1E+01	mg/kg	1.4E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	9.9E-03	1.1E-03
Toxicity Equivalency - Birds	1.8E-04	mg/kg	1.2E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	8.9E-02	8.9E-03
							HAZARD INDICES:	1.6E-01	2.3E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-2.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 6.3E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.0E-04	1.9E-01	-	8.9E-02	-	2.8E-01	***45%***
Lead	4.5E-05	1.4E-01	1.4E-02	3.6E-03	-	1.5E-01	***24%***
Chromium	1.3E-05	6.6E-02	2.8E-03	1.9E-03	-	7.1E-02	***11%***
Zinc	1.1E-05	1.1E-02	2.1E-02	9.9E-03	-	4.2E-02	7%
Mercury (methyl)		5.9E-05	5.5E-05	2.4E-02	-	2.4E-02	4%
Aroclor, Total		6.5E-03	2.1E-05	4.7E-03	-	1.1E-02	2%
4,4'-DDE		2.7E-03	1.3E-05	7.9E-03	-	1.1E-02	2%
Aroclor-1254		3.9E-03	2.8E-05	2.7E-03	-	6.6E-03	1%
Copper	7.0E-07	1.2E-03	6.0E-04	4.4E-03	-	6.2E-03	1%
Barium		1.5E-03	2.5E-04	3.5E-03	-	5.3E-03	1%
Selenium	1.5E-05	1.2E-03	8.4E-04	2.2E-03	-	4.3E-03	1%
Molybdenum		1.7E-03	4.6E-04	2.5E-04	-	2.5E-03	0%
Cyanide		2.1E-03	-		-	2.1E-03	0%
4,4'-DDD		1.0E-03	1.3E-05	9.1E-04	-	1.9E-03	0%
Toxicity Equivalency (PCB) - Birds		1.9E-03	-		-	1.9E-03	0%
Thallium	2.6E-06	9.1E-04	3.8E-06	1.7E-05	-	9.3E-04	0%
Mercury		4.9E-04	6.6E-05	3.8E-04	-	9.3E-04	0%
Cadmium		3.9E-04	8.9E-05	4.3E-04	-	9.2E-04	0%
Aroclor-1248		5.9E-04	6.2E-06		-	6.0E-04	0%
Arsenic		5.3E-04	2.8E-05		-	5.6E-04	0%
Aroclor-1260		5.2E-04	9.0E-07		-	5.2E-04	0%
Manganese	1.0E-06			5.1E-04		5.1E-04	0%
Di-n-Butylphthalate		2.6E-04	2.6E-05		-	2.8E-04	0%
Vanadium				1.3E-04		1.3E-04	0%
Aluminum	1.5E-05			9.8E-05		1.1E-04	0%
bis(2-Ethylhexyl)phthalate	2.2E-07	9.6E-05	1.6E-07		-	9.6E-05	0%
Aroclor-1268		3.3E-05	5.9E-08	3.7E-05	-	7.1E-05	0%
Endosulfan II		2.8E-05	6.9E-06		-	3.5E-05	0%
Endrin		3.0E-05	1.2E-06		-	3.1E-05	0%
Nickel	1.6E-07			2.8E-05		2.8E-05	0%
Technical Chlordane		1.0E-05	1.4E-07	4.7E-06	-	1.5E-05	0%
Fluoranthene		1.3E-05	5.5E-07		-	1.4E-05	0%
Pyrene		1.1E-05	6.8E-07		-	1.2E-05	0%
Silver	8.7E-09	5.5E-06	8.1E-08	6.1E-06	-	1.2E-05	0%
Phenanthrene		7.4E-06	7.9E-07		-	8.1E-06	0%
Chrysene		7.6E-06	1.3E-07		-	7.7E-06	0%
Benzo(b)fluoranthene		7.0E-06	1.3E-07		-	7.1E-06	0%
Benzo(k)fluoranthene		6.5E-06	7.8E-08		-	6.6E-06	0%
Benzo(a)pyrene		5.9E-06	6.8E-08		-	5.9E-06	0%
Benzo(a)anthracene		5.6E-06	1.1E-07		-	5.7E-06	0%
Benzo(g,h,i)perylene		5.1E-06	3.0E-08		-	5.1E-06	0%
Indeno(1,2,3-cd)pyrene		4.9E-06	2.6E-08		-	4.9E-06	0%
Acenaphthene		3.0E-06	6.7E-07		-	3.7E-06	0%
Dibenzo(a,h)anthracene		3.6E-06	1.8E-08		-	3.6E-06	0%
Anthracene		3.1E-06	3.4E-07		-	3.5E-06	0%

TABLE N-2.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 6.3E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Acenaphthylene		2.5E-06	5.3E-07		-	3.0E-06	0%
Endosulfan sulfate	2.3E-07	2.0E-06	6.2E-07		-	2.8E-06	0%
Fluorene		2.4E-06	3.7E-07		-	2.7E-06	0%
Naphthalene		1.6E-06	7.9E-07		-	2.4E-06	0%
Dieldrin		5.5E-07	1.9E-08	4.2E-07	-	1.0E-06	0%
Beryllium	8.3E-07					8.3E-07	0%
alpha-Chlordane	7.1E-11	2.2E-07	3.0E-09	8.6E-08	-	3.1E-07	0%
gamma-Chlordane	2.6E-09	1.9E-07	2.6E-09		-	1.9E-07	0%
Methoxychlor		6.3E-08	3.0E-09		-	6.6E-08	0%
Pentachlorophenol							
Aroclor-1242							
4-Methylphenol							
Endrin Ketone							
Endrin aldehyde							
gamma-BHC							
Heptachlor							
Heptachlor epoxide							
Toxicity Equivalency - Mammals							
Antimony							
Cobalt							
4,4'-DDT							
Toxicity Equivalency (PCB) - Mammals							
Dibenzofuran							
2,4,5-Trichlorophenol							
Carbazole							
2-Methylnaphthalene							
1,1'-Biphenyl							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**3.0E-04**	**4.3E-01**	**4.0E-02**	**1.6E-01**	**-**	**6.3E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**69%**	**6%**	**25%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-2.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 8.4E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds	2.0E-05	1.9E-02	-	8.9E-03	-	2.8E-02	***34%***
Lead	4.5E-06	1.4E-02	1.4E-03	3.6E-04	-	1.5E-02	***18%***
Chromium	2.5E-06	1.3E-02	5.7E-04	3.9E-04	-	1.4E-02	***17%***
Copper	5.3E-07	9.0E-04	4.6E-04	3.4E-03	-	4.7E-03	6%
Zinc	1.2E-06	1.3E-03	2.3E-03	1.1E-03	-	4.7E-03	6%
Aroclor, Total		2.6E-03	8.3E-06	1.9E-03	-	4.5E-03	5%
Barium		7.7E-04	1.3E-04	1.7E-03	-	2.6E-03	3%
Mercury (methyl)		5.9E-06	5.5E-06	2.4E-03	-	2.4E-03	3%
Selenium	7.4E-06	6.2E-04	4.2E-04	1.1E-03	-	2.1E-03	3%
4,4'-DDE		2.7E-04	1.3E-06	7.9E-04	-	1.1E-03	1%
Cyanide		1.0E-03	-		-	1.0E-03	1%
Aroclor-1254		3.9E-04	2.8E-06	2.7E-04	-	6.6E-04	1%
Thallium	1.8E-06	6.4E-04	2.7E-06	1.2E-05	-	6.5E-04	1%
Mercury		2.4E-04	3.3E-05	1.9E-04	-	4.6E-04	1%
Molybdenum		1.7E-04	4.6E-05	2.5E-05	-	2.5E-04	0%
Aroclor-1248		2.4E-04	2.5E-06		-	2.4E-04	0%
Arsenic		2.1E-04	1.1E-05		-	2.2E-04	0%
4,4'-DDD		1.0E-04	1.3E-06	9.1E-05	-	1.9E-04	0%
Toxicity Equivalency (PCB) - Birds		1.9E-04	-		-	1.9E-04	0%
Cadmium		2.8E-05	6.5E-06	3.1E-05	-	6.6E-05	0%
Aroclor-1260		5.2E-05	9.0E-08		-	5.2E-05	0%
Manganese	1.0E-07			5.1E-05		5.1E-05	0%
Di-n-Butylphthalate		2.6E-05	2.6E-06		-	2.8E-05	0%
Nickel	1.1E-07			2.0E-05		2.1E-05	0%
Vanadium				1.3E-05		1.3E-05	0%
Aluminum	1.5E-06			9.8E-06		1.1E-05	0%
bis(2-Ethylhexyl)phthalate	2.2E-08	9.6E-06	1.6E-08		-	9.6E-06	0%
Aroclor-1268		3.3E-06	5.9E-09	3.7E-06	-	7.1E-06	0%
Endrin		4.9E-06	2.0E-07		-	5.1E-06	0%
Endosulfan II		2.8E-06	6.9E-07		-	3.5E-06	0%
Technical Chlordane		1.0E-06	1.4E-08	4.7E-07	-	1.5E-06	0%
Fluoranthene		1.3E-06	5.5E-08		-	1.4E-06	0%
Pyrene		1.1E-06	6.8E-08		-	1.2E-06	0%
Silver	8.7E-10	5.5E-07	8.1E-09	6.1E-07	-	1.2E-06	0%
Phenanthrene		7.4E-07	7.9E-08		-	8.1E-07	0%
Chrysene		7.6E-07	1.3E-08		-	7.7E-07	0%
Benzo(b)fluoranthene		7.0E-07	1.3E-08		-	7.1E-07	0%
Benzo(k)fluoranthene		6.5E-07	7.8E-09		-	6.6E-07	0%
Benzo(a)pyrene		5.9E-07	6.8E-09		-	5.9E-07	0%
Benzo(a)anthracene		5.6E-07	1.1E-08		-	5.7E-07	0%
Benzo(g,h,i)perylene		5.1E-07	3.0E-09		-	5.1E-07	0%
Indeno(1,2,3-cd)pyrene		4.9E-07	2.6E-09		-	4.9E-07	0%
Acenaphthene		3.0E-07	6.7E-08		-	3.7E-07	0%
Dibenzo(a,h)anthracene		3.6E-07	1.8E-09		-	3.6E-07	0%
Anthracene		3.1E-07	3.4E-08		-	3.5E-07	0%

TABLE N-2.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 8.4E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Acenaphthylene		2.5E-07	5.3E-08		-	3.0E-07	0%
Endosulfan sulfate	2.3E-08	2.0E-07	6.2E-08		-	2.8E-07	0%
Fluorene		2.4E-07	3.7E-08		-	2.7E-07	0%
Naphthalene		1.6E-07	7.9E-08		-	2.4E-07	0%
Dieldrin		5.5E-08	1.9E-09	4.2E-08	-	1.0E-07	0%
Beryllium	8.3E-08					8.3E-08	0%
alpha-Chlordane	7.1E-12	2.2E-08	3.0E-10	8.6E-09	-	3.1E-08	0%
gamma-Chlordane	2.6E-10	1.9E-08	2.6E-10		-	1.9E-08	0%
Methoxychlor		6.3E-09	3.0E-10		-	6.6E-09	0%
Pentachlorophenol							
Aroclor-1242							
4-Methylphenol							
Endrin Ketone							
Endrin aldehyde							
gamma-BHC							
Heptachlor							
Heptachlor epoxide							
Toxicity Equivalency - Mammals							
Antimony							
Cobalt							
4,4'-DDT							
Toxicity Equivalency (PCB) - Mammals							
Dibenzofuran							
2,4,5-Trichlorophenol							
Carbazole							
2-Methylnaphthalene							
1,1'-Biphenyl							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**4.0E-05**	**5.6E-02**	**5.3E-03**	**2.3E-02**	**-**	**8.4E-02**	
PERCENTAGE OF TOTAL RISK	**0%**	**66%**	**6%**	**27%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-3.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: LYMAN MILL POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
		Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
2-Methylnaphthalene	1.0E-01	4.5E-02	1.0E+00	4.7E+00	**4.5E-03**	1.0E-01	4.7E-01
Acenaphthene	9.3E-01	4.2E-02	1.0E+00	3.0E-02	**3.9E-02**	9.5E-01	2.8E-02
Acenaphthylene	4.3E-01	4.1E-02	1.0E+00	7.6E-01	**1.8E-02**	4.4E-01	3.3E-01
Anthracene	7.9E-01	2.1E-02	1.0E+00	1.1E-01	**1.6E-02**	8.1E-01	8.5E-02
Benzo(a)anthracene	1.4E+00	3.6E-03	1.1E+00	3.4E-01	**5.1E-03**	1.5E+00	4.7E-01
Benzo(a)pyrene	1.4E+00	2.2E-03	1.1E+00	2.2E-01	**3.0E-03**	1.5E+00	3.0E-01
Benzo(b)fluoranthene	2.1E+00	3.5E-03	1.1E+00	4.2E-01	**7.5E-03**	2.3E+00	8.8E-01
Benzo(g,h,i)perylene	1.3E+00	1.1E-03	1.1E+00	4.7E-02	**1.4E-03**	1.4E+00	5.9E-02
Benzo(k)fluoranthene	1.1E+00	2.3E-03	1.1E+00	2.9E-01	**2.5E-03**	1.2E+00	3.2E-01
bis(2-Ethylhexyl)phthalate	2.6E+00	3.1E-04	1.1E+00	1.0E+00	**8.1E-04**	2.9E+00	2.6E+00
Carbazole	8.0E-01	5.5E-02	1.0E+00	5.6E-01	**4.4E-02**	8.2E-01	4.5E-01
Chrysene	1.7E+00	3.4E-03	1.1E+00	4.4E-01	**5.6E-03**	1.8E+00	7.3E-01
Dibenzo(a,h)anthracene	7.7E-01	9.7E-04	1.1E+00	3.8E-01	**7.5E-04**	8.5E-01	2.9E-01
Dibenzofuran	3.1E-01	3.2E-02	1.0E+00	1.0E+00	**1.0E-02**	3.2E-01	3.1E-01
Di-n-Butylphthalate	9.9E-01	1.9E-02	1.0E+00	1.0E+00	**1.9E-02**	1.0E+00	9.9E-01
Fluoranthene	2.7E+00	8.1E-03	1.1E+00	8.0E-01	**2.2E-02**	2.8E+00	2.2E+00
Fluorene	6.7E-01	3.0E-02	1.0E+00	9.6E-01	**2.0E-02**	6.9E-01	6.5E-01
Indeno(1,2,3-cd)pyrene	1.3E+00	1.0E-03	1.1E+00	2.8E-01	**1.3E-03**	1.4E+00	3.6E-01
Naphthalene	1.9E-01	9.6E-02	1.0E+00	2.6E+00	**1.8E-02**	1.9E-01	4.9E-01
Phenanthrene	1.5E+00	2.0E-02	1.0E+00	3.0E-01	**3.1E-02**	1.6E+00	4.7E-01
Pyrene	2.4E+00	1.2E-02	1.0E+00	5.1E-01	**2.8E-02**	2.5E+00	1.2E+00
4,4'-DDD	9.3E-03	2.4E-03	1.1E+00	2.8E-01	**2.3E-05**	9.9E-03	2.6E-03
4,4'-DDE	8.3E-03	9.6E-04	1.1E+00	7.7E+00	**7.9E-06**	9.0E-03	6.4E-02
alpha-Chlordane	1.6E-02	2.6E-03	1.1E+00	4.8E+00	**4.1E-05**	1.7E-02	7.4E-02
Aroclor, Total	2.6E-01	6.1E-04	1.1E+00	8.0E-01	**1.6E-04**	2.9E-01	2.1E-01
Aroclor-1248	2.5E-02	2.0E-03	1.1E+00	1.6E+00	**5.0E-05**	2.7E-02	3.9E-02
Aroclor-1254	2.7E-01	1.4E-03	1.1E+00	8.1E-01	**3.7E-04**	2.9E-01	2.2E-01
Aroclor-1260	2.4E-02	3.4E-04	1.1E+00	2.3E-01	**8.1E-06**	2.7E-02	5.5E-03
Dieldrin	3.8E-03	6.7E-03	1.1E+00	6.7E+00	**2.5E-05**	4.0E-03	2.5E-02
Endosulfan II	3.8E-03	4.7E-02	1.0E+00	1.8E+00	**1.8E-04**	3.9E-03	6.9E-03
Endosulfan sulfate	2.9E-03	5.9E-02	1.0E+00	2.7E+00	**1.7E-04**	2.9E-03	7.7E-03
Endrin	2.6E-03	7.6E-03	1.1E+00	1.8E+00	**2.0E-05**	2.8E-03	4.7E-03
Methoxychlor	5.3E-03	9.0E-03	1.0E+00	1.2E+00	**4.8E-05**	5.6E-03	6.4E-03
Aroclor-1268	1.2E-01	3.4E-04	1.1E+00	2.3E-01	**3.9E-05**	1.3E-01	2.7E-02
gamma-Chlordane	8.9E-03	2.6E-03	1.1E+00	2.2E+00	**2.4E-05**	9.6E-03	2.0E-02
Technical Chlordane	1.3E+00	2.6E-03	1.1E+00	2.0E+00	**3.4E-03**	1.4E+00	2.6E+00
Antimony	1.3E+00	2.0E-03	-	-	**2.7E-03**	0.0E+00	0.0E+00
Arsenic	5.2E+00	1.0E-02	1.3E-01	1.3E-01	**5.2E-02**	6.6E-01	6.6E-01
Barium	1.3E+02	3.1E-02	1.8E-02	-	**4.1E+00**	2.4E+00	0.0E+00
Cadmium	2.1E+00	4.4E-02	4.6E-01	4.6E-01	**9.3E-02**	9.8E-01	9.8E-01
Chromium	9.9E+01	8.2E-03	1.2E+01	1.2E+01	**8.1E-01**	1.2E+03	1.2E+03
Cobalt	7.8E+00	1.5E-03	2.4E-02	-	**1.2E-02**	1.9E-01	0.0E+00
Copper	1.1E+02	9.7E-02	7.4E+01	7.4E+01	**1.1E+01**	8.3E+03	8.3E+03
Lead	2.4E+02	1.9E-02	6.6E-02	6.6E-02	**4.5E+00**	1.6E+01	1.6E+01
Mercury	2.9E-01	2.6E-02	4.0E+00	4.0E+00	**7.5E-03**	1.1E+00	1.1E+00
Mercury (methyl)	2.1E-03	1.8E-01	3.4E-01	-	**3.7E-04**	7.0E-04	0.0E+00

TABLE N-3.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: LYMAN MILL POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
Molybdenum	6.5E+00	5.0E-02	1.9E-01	-	**3.2E-01**	1.2E+00	0.0E+00
Selenium	9.6E-01	1.3E-01	1.0E-01	-	**1.2E-01**	9.6E-02	0.0E+00
Silver	2.9E+00	2.8E-03	4.1E-01	-	**8.1E-03**	1.2E+00	0.0E+00
Thallium	5.8E-01	8.0E-04	-	-	**4.6E-04**	0.0E+00	0.0E+00
Zinc	3.9E+02	3.5E-01	2.2E+02	2.2E+02	**1.4E+02**	8.7E+04	8.7E+04
Toxicity Equivalency - Birds	1.8E-03		-	-	**0.0E+00**	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	1.5E-04		-	-	**0.0E+00**	0.0E+00	0.0E+00

Footnotes:
a. Literature-derived BAFs are summarized in Table J-1.
b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-3.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	4.2E-05	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	3.8E-06	3.8E-07
alpha-Chlordane	1.9E-05	mg/L	4.7E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.0E-09	2.0E-10
Endosulfan Sulfate	3.2E-06	mg/L	7.9E-09	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.3E-08	1.3E-09
gamma-Chlordane	2.1E-05	mg/L	5.2E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.2E-09	2.2E-10
Aluminum	1.8E-01	mg/L	4.4E-04	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	4.0E-06	4.0E-07
Beryllium	2.0E-04	mg/L	4.9E-07	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	3.3E-06	3.3E-07
Chromium	2.3E-03	mg/L	5.6E-06	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	5.6E-06	1.1E-06
Cobalt	4.2E-04	mg/L	1.0E-06	mg/kg-d					
Copper	8.7E-03	mg/L	2.1E-05	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	4.6E-07	3.5E-07
Lead	4.4E-03	mg/L	1.1E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	9.6E-06	9.6E-07
Manganese	1.3E-01	mg/L	3.1E-04	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	3.2E-07	3.2E-08
Nickel	1.9E-03	mg/L	4.6E-06	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.9E-08	4.3E-08
Silver	5.9E-04	mg/L	1.5E-06	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	6.2E-09	6.2E-10
Thallium	2.2E-03	mg/L	5.5E-06	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.6E-06	1.1E-06
Zinc	2.8E-02	mg/L	6.9E-05	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	4.7E-06	5.2E-07
Nitrogen, Ammonia	1.4E-01	mg/L	3.5E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	1.3E-07	mg/L	3.2E-10	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.3E-05	2.3E-06
							HAZARD INDICES:	5.7E-05	7.6E-06

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-3.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.0E-01	mg/kg	4.7E-05	mg/kg-d					
Acenaphthene	9.3E-01	mg/kg	4.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.4E-06	2.4E-07
Acenaphthylene	4.3E-01	mg/kg	2.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.1E-06	1.1E-07
Anthracene	7.9E-01	mg/kg	3.7E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-06	2.0E-07
Benzo(a)anthracene	1.4E+00	mg/kg	6.5E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Benzo(a)pyrene	1.4E+00	mg/kg	6.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Benzo(b)fluoranthene	2.1E+00	mg/kg	9.9E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.4E-06	5.4E-07
Benzo(g,h,i)perylene	1.3E+00	mg/kg	5.9E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.2E-06	3.2E-07
Benzo(k)fluoranthene	1.1E+00	mg/kg	5.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.8E-06	2.8E-07
bis(2-Ethylhexyl)phthalate	2.6E+00	mg/kg	1.2E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.1E-04	1.1E-05
Carbazole	8.0E-01	mg/kg	3.7E-04	mg/kg-d					
Chrysene	1.7E+00	mg/kg	7.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.2E-06	4.2E-07
Dibenzo(a,h)anthracene	7.7E-01	mg/kg	3.6E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-06	2.0E-07
Dibenzofuran	3.1E-01	mg/kg	1.4E-04	mg/kg-d					
Di-n-Butylphthalate	9.9E-01	mg/kg	4.6E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.2E-04	4.2E-05
Fluoranthene	2.7E+00	mg/kg	1.3E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.9E-06	6.9E-07
Fluorene	6.7E-01	mg/kg	3.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.7E-06	1.7E-07
Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.3E-06	3.3E-07
Naphthalene	1.9E-01	mg/kg	8.7E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	1.6E-06	1.6E-07
Phenanthrene	1.5E+00	mg/kg	7.2E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.9E-06	3.9E-07
Pyrene	2.4E+00	mg/kg	1.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.1E-06	6.1E-07
4,4'-DDD	9.3E-03	mg/kg	4.3E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.5E-03	1.5E-04
4,4'-DDE	8.3E-03	mg/kg	3.9E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.4E-03	1.4E-04
alpha-Chlordane	1.6E-02	mg/kg	7.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.0E-07	3.0E-08
Aroclor, Total	2.6E-01	mg/kg	1.2E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.1E-03	4.4E-04
Aroclor-1248	2.5E-02	mg/kg	1.2E-05	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.1E-04	4.2E-05
Aroclor-1254	2.7E-01	mg/kg	1.3E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	7.0E-04	7.0E-05
Aroclor-1260	2.4E-02	mg/kg	1.1E-05	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	6.3E-05	6.3E-06
Dieldrin	3.8E-03	mg/kg	1.8E-06	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	2.3E-07	2.3E-08
Endosulfan II	3.8E-03	mg/kg	1.8E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.9E-06	2.9E-07
Endosulfan sulfate	2.9E-03	mg/kg	1.3E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	2.1E-06	2.1E-07
Endrin	2.6E-03	mg/kg	1.2E-06	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	2.4E-05	4.1E-06
Methoxychlor	5.3E-03	mg/kg	2.5E-06	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	3.1E-08	3.1E-09
Aroclor-1268	1.2E-01	mg/kg	5.4E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.9E-05	4.9E-06
gamma-Chlordane	8.9E-03	mg/kg	4.2E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.7E-07	1.7E-08
Technical Chlordane	1.3E+00	mg/kg	6.0E-04	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.5E-05	2.5E-06
Antimony	1.3E+00	mg/kg	6.2E-04	mg/kg-d					
Arsenic	5.2E+00	mg/kg	2.4E-03	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	4.8E-04	1.9E-04
Barium	1.3E+02	mg/kg	6.1E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	1.5E-03	7.3E-04
Cadmium	2.1E+00	mg/kg	1.0E-03	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.9E-04	5.0E-05
Chromium	9.9E+01	mg/kg	4.6E-02	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.6E-02	9.2E-03
Cobalt	7.8E+00	mg/kg	3.6E-03	mg/kg-d					
Copper	1.1E+02	mg/kg	5.2E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.1E-03	8.5E-04
Lead	2.4E+02	mg/kg	1.1E-01	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	9.7E-02	9.7E-03
Mercury	2.9E-01	mg/kg	1.3E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	3.0E-04	1.5E-04
Mercury (methyl)	2.1E-03	mg/kg	9.7E-07	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	1.5E-04	1.5E-05
Molybdenum	6.5E+00	mg/kg	3.0E-03	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	8.5E-04	8.5E-05
Selenium	9.6E-01	mg/kg	4.5E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.1E-03	5.6E-04
Silver	2.9E+00	mg/kg	1.3E-03	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	5.7E-06	5.7E-07
Thallium	5.8E-01	mg/kg	2.7E-04	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	7.7E-05	5.4E-05
Zinc	3.9E+02	mg/kg	1.8E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.3E-02	1.4E-03
Toxicity Equivalency - Birds	1.8E-03	mg/kg	8.5E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	6.0E-02	6.0E-03

TABLE N-3.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency (PCB) - Birds	1.5E-04	mg/kg	6.9E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.9E-03	4.9E-04
							HAZARD INDICES:	2.3E-01	3.1E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-3.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	4.5E-03	mg/kg	1.1E-05	mg/kg-d					
Acenaphthene	3.9E-02	mg/kg	9.5E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.2E-07	5.2E-08
Acenaphthylene	1.8E-02	mg/kg	4.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.3E-07	2.3E-08
Anthracene	1.6E-02	mg/kg	4.0E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.2E-07	2.2E-08
Benzo(a)anthracene	5.1E-03	mg/kg	1.2E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.7E-08	6.7E-09
Benzo(a)pyrene	3.0E-03	mg/kg	7.4E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.0E-08	4.0E-09
Benzo(b)fluoranthene	7.5E-03	mg/kg	1.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.9E-08	9.9E-09
Benzo(g,h,i)perylene	1.4E-03	mg/kg	3.5E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.9E-08	1.9E-09
Benzo(k)fluoranthene	2.5E-03	mg/kg	6.1E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.3E-08	3.3E-09
bis(2-Ethylhexyl)phthalate	8.1E-04	mg/kg	2.0E-06	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.8E-07	1.8E-08
Carbazole	4.4E-02	mg/kg	1.1E-04	mg/kg-d					
Chrysene	5.6E-03	mg/kg	1.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.5E-08	7.5E-09
Dibenzo(a,h)anthracene	7.5E-04	mg/kg	1.8E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-08	1.0E-09
Dibenzofuran	1.0E-02	mg/kg	2.4E-05	mg/kg-d					
Di-n-Butylphthalate	1.9E-02	mg/kg	4.7E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.2E-05	4.2E-06
Fluoranthene	2.2E-02	mg/kg	5.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.9E-07	2.9E-08
Fluorene	2.0E-02	mg/kg	4.9E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.6E-07	2.6E-08
Indeno(1,2,3-cd)pyrene	1.3E-03	mg/kg	3.2E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.8E-08	1.8E-09
Naphthalene	1.8E-02	mg/kg	4.3E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	8.1E-07	8.1E-08
Phenanthrene	3.1E-02	mg/kg	7.7E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.2E-07	4.2E-08
Pyrene	2.8E-02	mg/kg	6.9E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
4,4'-DDD	2.3E-05	mg/kg	5.5E-08	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.0E-05	2.0E-06
4,4'-DDE	7.9E-06	mg/kg	1.9E-08	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	6.9E-06	6.9E-07
alpha-Chlordane	4.1E-05	mg/kg	1.0E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	4.2E-09	4.2E-10
Aroclor, Total	1.6E-04	mg/kg	3.9E-07	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	3.5E-06	1.4E-06
Aroclor-1248	5.0E-05	mg/kg	1.2E-07	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.1E-06	4.4E-07
Aroclor-1254	3.7E-04	mg/kg	9.0E-07	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	5.0E-06	5.0E-07
Aroclor-1260	8.1E-06	mg/kg	2.0E-08	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.1E-07	1.1E-08
Dieldrin	2.5E-05	mg/kg	6.2E-08	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	8.2E-09	8.2E-10
Endosulfan II	1.8E-04	mg/kg	4.4E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	7.1E-07	7.1E-08
Endosulfan sulfate	1.7E-04	mg/kg	4.2E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	6.7E-07	6.7E-08
Endrin	2.0E-05	mg/kg	4.9E-08	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	9.8E-07	1.6E-07
Methoxychlor	4.8E-05	mg/kg	1.2E-07	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	1.5E-09	1.5E-10
Aroclor-1268	3.9E-05	mg/kg	9.5E-08	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	8.6E-08	8.6E-09
gamma-Chlordane	2.4E-05	mg/kg	5.7E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	2.4E-09	2.4E-10
Technical Chlordane	3.4E-03	mg/kg	8.3E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.5E-07	3.5E-08
Antimony	2.7E-03	mg/kg	6.6E-06	mg/kg-d					
Arsenic	5.2E-02	mg/kg	1.3E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	2.5E-05	9.9E-06
Barium	4.1E+00	mg/kg	9.9E-03	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.4E-04	1.2E-04
Cadmium	9.3E-02	mg/kg	2.3E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	1.6E-04	1.1E-05
Chromium	8.1E-01	mg/kg	2.0E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	2.0E-03	4.0E-04
Cobalt	1.2E-02	mg/kg	2.8E-05	mg/kg-d					
Copper	1.1E+01	mg/kg	2.6E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	5.6E-04	4.3E-04
Lead	4.5E+00	mg/kg	1.1E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	9.8E-03	9.8E-04
Mercury	7.5E-03	mg/kg	1.8E-05	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	4.0E-05	2.0E-05
Mercury (methyl)	3.7E-04	mg/kg	9.1E-07	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	1.4E-04	1.4E-05
Molybdenum	3.2E-01	mg/kg	7.9E-04	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.2E-04	2.2E-05
Selenium	1.2E-01	mg/kg	3.0E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	7.5E-04	3.8E-04

TABLE N-3.4

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Silver	8.1E-03	mg/kg	2.0E-05	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	8.3E-08	8.3E-09
Thallium	4.6E-04	mg/kg	1.1E-06	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	3.2E-07	2.3E-07
Zinc	1.4E+02	mg/kg	3.3E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.3E-02	2.5E-03
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	3.7E-02	4.9E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-3.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	2.7E-04	mg/kg	1.9E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	6.6E-04	6.6E-05
4,4'-DDE	4.0E-03	mg/kg	2.8E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	9.9E-03	9.9E-04
alpha-Chlordane	3.2E-04	mg/kg	2.2E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	9.3E-08	9.3E-09
Aroclor, Total	7.7E-02	mg/kg	5.3E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	4.8E-03	1.9E-03
Aroclor-1254	7.1E-02	mg/kg	4.9E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	2.7E-03	2.7E-04
Aroclor-1268	5.2E-03	mg/kg	3.6E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	3.2E-05	3.2E-06
Dieldrin	4.4E-04	mg/kg	3.0E-06	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	4.0E-07	4.0E-08
Endosulfan Sulfate	5.5E-04	mg/kg	3.8E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	6.0E-06	6.0E-07
gamma-Chlordane	3.6E-04	mg/kg	2.5E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.0E-07	1.0E-08
Heptachlor	2.2E-04	mg/kg	1.5E-06	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	3.6E-08	3.6E-09
Technical Chlordane	2.3E-02	mg/kg	1.6E-04	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.5E-06	6.5E-07
Antimony	1.5E-02	mg/kg	1.0E-04	mg/kg-d					
Barium	*2.8E+01*	*mg/kg*	*1.9E-01*	*mg/kg-d*	*4.2E+01*	*8.3E+01*	*mg/kg-d*	*4.6E-03*	*2.3E-03*
Cadmium	8.9E-02	mg/kg	6.1E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	4.2E-04	3.1E-05
Chromium	2.4E-01	mg/kg	1.7E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.7E-03	3.4E-04
Cobalt	2.6E-01	mg/kg	1.8E-03	mg/kg-d					
Copper	3.0E+01	mg/kg	2.1E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	4.4E-03	3.3E-03
Lead	8.6E-01	mg/kg	5.9E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	5.2E-03	5.2E-04
Manganese	*1.3E+02*	*mg/kg*	*8.6E-01*	*mg/kg-d*	*9.8E+02*	*9.8E+03*	*mg/kg-d*	*8.8E-04*	*8.8E-05*
Mercury	2.0E-02	mg/kg	1.4E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	3.1E-04	1.6E-04
Mercury (methyl)	1.5E-02	mg/kg	1.1E-04	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	1.6E-02	1.6E-03
Molybdenum	1.2E-01	mg/kg	8.5E-04	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.4E-04	2.4E-05
Nickel	4.9E-01	mg/kg	3.3E-03	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	4.3E-05	3.1E-05
Selenium	1.4E-01	mg/kg	9.5E-04	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	2.4E-03	1.2E-03
Silver	2.4E-01	mg/kg	1.7E-03	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	7.1E-06	7.1E-07
Thallium	9.6E-03	mg/kg	6.6E-05	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.9E-05	1.3E-05
Vanadium	2.7E-01	mg/kg	1.9E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.6E-04	1.6E-05
Zinc	2.6E+01	mg/kg	1.8E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.2E-02	1.4E-03
Toxicity Equivalency - Birds	1.0E-04	mg/kg	7.2E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	5.1E-02	5.1E-03
Toxicity Equivalency (PCB) - Birds	8.1E-06	mg/kg	5.6E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.0E-03	4.0E-04
							HAZARD INDICES:	1.2E-01	2.0E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-3.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 3.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Lead	9.6E-06	9.7E-02	9.8E-03	5.2E-03	-	1.1E-01	***29%***
Toxicity Equivalency - Birds	2.3E-05	6.0E-02	-	5.1E-02	-	1.1E-01	***28%***
Chromium	5.6E-06	4.6E-02	2.0E-03	1.7E-03	-	5.0E-02	***13%***
Zinc	4.7E-06	1.3E-02	2.3E-02	1.2E-02	-	4.8E-02	***12%***
Mercury (methyl)		1.5E-04	1.4E-04	1.6E-02	-	1.7E-02	4%
4,4'-DDE		1.4E-03	6.9E-06	9.9E-03	-	1.1E-02	3%
Toxicity Equivalency (PCB) - Birds		4.9E-03	-	4.0E-03	-	8.9E-03	2%
Barium		1.5E-03	2.4E-04	4.6E-03	-	6.3E-03	2%
Copper	4.6E-07	1.1E-03	5.6E-04	4.4E-03	-	6.1E-03	2%
Aroclor, Total		1.1E-03	3.5E-06	4.8E-03	-	5.9E-03	1%
Selenium		1.1E-03	7.5E-04	2.4E-03	-	4.2E-03	1%
Aroclor-1254		7.0E-04	5.0E-06	2.7E-03	-	3.4E-03	1%
4,4'-DDD		1.5E-03	2.0E-05	6.6E-04	-	2.2E-03	1%
Molybdenum		8.5E-04	2.2E-04	2.4E-04	-	1.3E-03	0%
Cadmium		6.9E-04	1.6E-04	4.2E-04	-	1.3E-03	0%
Manganese	3.2E-07			8.8E-04		8.8E-04	0%
Mercury		3.0E-04	4.0E-05	3.1E-04	-	6.5E-04	0%
Arsenic		4.8E-04	2.5E-05		-	5.0E-04	0%
Di-n-Butylphthalate		4.2E-04	4.2E-05		-	4.6E-04	0%
Vanadium				1.6E-04		1.6E-04	0%
bis(2-Ethylhexyl)phthalate	3.8E-06	1.1E-04	1.8E-07		-	1.1E-04	0%
Aroclor-1248		1.1E-04	1.1E-06		-	1.1E-04	0%
Thallium	1.6E-06	7.7E-05	3.2E-07	1.9E-05	-	9.8E-05	0%
Aroclor-1268		4.9E-05	8.6E-08	3.2E-05	-	8.2E-05	0%
Aroclor-1260		6.3E-05	1.1E-07		-	6.3E-05	0%
Nickel	5.9E-08			4.3E-05		4.3E-05	0%
Technical Chlordane		2.5E-05	3.5E-07	6.5E-06	-	3.2E-05	0%
Endrin		2.4E-05	9.8E-07		-	2.5E-05	0%
Silver	6.2E-09	5.7E-06	8.3E-08	7.1E-06	-	1.3E-05	0%
Endosulfan sulfate	1.3E-08	2.1E-06	6.7E-07	6.0E-06	-	8.8E-06	0%
Fluoranthene		6.9E-06	2.9E-07		-	7.2E-06	0%
Pyrene		6.1E-06	3.7E-07		-	6.5E-06	0%
Benzo(b)fluoranthene		5.4E-06	9.9E-08		-	5.5E-06	0%
Phenanthrene		3.9E-06	4.2E-07		-	4.3E-06	0%
Chrysene		4.2E-06	7.5E-08		-	4.3E-06	0%
Aluminum	4.0E-06					4.0E-06	0%
Benzo(a)anthracene		3.5E-06	6.7E-08		-	3.6E-06	0%
Endosulfan II		2.9E-06	7.1E-07		-	3.6E-06	0%
Benzo(a)pyrene		3.5E-06	4.0E-08		-	3.5E-06	0%
Beryllium	3.3E-06					3.3E-06	0%
Indeno(1,2,3-cd)pyrene		3.3E-06	1.8E-08		-	3.3E-06	0%
Benzo(g,h,i)perylene		3.2E-06	1.9E-08		-	3.2E-06	0%
Acenaphthene		2.4E-06	5.2E-07		-	2.9E-06	0%
Benzo(k)fluoranthene		2.8E-06	3.3E-08		-	2.8E-06	0%
Naphthalene		1.6E-06	8.1E-07		-	2.4E-06	0%

TABLE N-3.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 3.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Anthracene		2.0E-06	2.2E-07		-	2.2E-06	0%
Dibenzo(a,h)anthracene		2.0E-06	1.0E-08		-	2.0E-06	0%
Fluorene		1.7E-06	2.6E-07		-	2.0E-06	0%
Acenaphthylene		1.1E-06	2.3E-07		-	1.3E-06	0%
Dieldrin		2.3E-07	8.2E-09	4.0E-07	-	6.4E-07	0%
alpha-Chlordane	2.0E-09	3.0E-07	4.2E-09	9.3E-08	-	4.0E-07	0%
gamma-Chlordane	2.2E-09	1.7E-07	2.4E-09	1.0E-07	-	2.8E-07	0%
Heptachlor				3.6E-08		3.6E-08	0%
Methoxychlor		3.1E-08	1.5E-09		-	3.2E-08	0%
Pentachlorophenol							
Dimethylphthalate							
4,4'-DDT							
gamma-BHC							
Heptachlor epoxide							
Toxicity Equivalency - Mammals							
Antimony							
Cobalt							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
Toxicity Equivalency (PCB) - Mammals							
4-Methylphenol							
Dibenzofuran							
2,4,5-Trichlorophenol							
Carbazole							
2-Methylnaphthalene							
1,1'-Biphenyl							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**5.7E-05**	**2.3E-01**	**3.7E-02**	**1.2E-01**	**-**	**3.9E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**59%**	**9%**	**31%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-3.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.5E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Lead	9.6E-07	9.7E-03	9.8E-04	5.2E-04	-	1.1E-02	***20%***
Toxicity Equivalency - Birds	2.3E-06	6.0E-03	-	5.1E-03	-	1.1E-02	***20%***
Chromium	1.1E-06	9.2E-03	4.0E-04	3.4E-04	-	1.0E-02	***18%***
Zinc	5.2E-07	1.4E-03	2.5E-03	1.4E-03	-	5.3E-03	10%
Copper	3.5E-07	8.5E-04	4.3E-04	3.3E-03	-	4.6E-03	8%
Barium		7.3E-04	1.2E-04	2.3E-03	-	3.2E-03	6%
Aroclor, Total		4.4E-04	1.4E-06	1.9E-03	-	2.4E-03	4%
Selenium		5.6E-04	3.8E-04	1.2E-03	-	2.1E-03	4%
Mercury (methyl)		1.5E-05	1.4E-05	1.6E-03	-	1.7E-03	3%
4,4'-DDE		1.4E-04	6.9E-07	9.9E-04	-	1.1E-03	2%
Toxicity Equivalency (PCB) - Birds		4.9E-04	-	4.0E-04	-	8.9E-04	2%
Aroclor-1254		7.0E-05	5.0E-07	2.7E-04	-	3.4E-04	1%
Mercury		1.5E-04	2.0E-05	1.6E-04	-	3.3E-04	1%
4,4'-DDD		1.5E-04	2.0E-06	6.6E-05	-	2.2E-04	0%
Arsenic		1.9E-04	9.9E-06		-	2.0E-04	0%
Molybdenum		8.5E-05	2.2E-05	2.4E-05	-	1.3E-04	0%
Cadmium		5.0E-05	1.1E-05	3.1E-05	-	9.2E-05	0%
Manganese	3.2E-08			8.8E-05		8.8E-05	0%
Thallium	1.1E-06	5.4E-05	2.3E-07	1.3E-05	-	6.9E-05	0%
Di-n-Butylphthalate		4.2E-05	4.2E-06		-	4.6E-05	0%
Aroclor-1248		4.2E-05	4.4E-07		-	4.2E-05	0%
Nickel	4.3E-08			3.1E-05		3.1E-05	0%
Vanadium				1.6E-05		1.6E-05	0%
bis(2-Ethylhexyl)phthalate	3.8E-07	1.1E-05	1.8E-08		-	1.1E-05	0%
Aroclor-1268		4.9E-06	8.6E-09	3.2E-06	-	8.2E-06	0%
Aroclor-1260		6.3E-06	1.1E-08		-	6.3E-06	0%
Endrin		4.1E-06	1.6E-07		-	4.2E-06	0%
Technical Chlordane		2.5E-06	3.5E-08	6.5E-07	-	3.2E-06	0%
Silver	6.2E-10	5.7E-07	8.3E-09	7.1E-07	-	1.3E-06	0%
Endosulfan sulfate	1.3E-09	2.1E-07	6.7E-08	6.0E-07	-	8.8E-07	0%
Fluoranthene		6.9E-07	2.9E-08		-	7.2E-07	0%
Pyrene		6.1E-07	3.7E-08		-	6.5E-07	0%
Benzo(b)fluoranthene		5.4E-07	9.9E-09		-	5.5E-07	0%
Phenanthrene		3.9E-07	4.2E-08		-	4.3E-07	0%
Chrysene		4.2E-07	7.5E-09		-	4.3E-07	0%
Aluminum	4.0E-07					4.0E-07	0%
Benzo(a)anthracene		3.5E-07	6.7E-09		-	3.6E-07	0%
Endosulfan II		2.9E-07	7.1E-08		-	3.6E-07	0%
Benzo(a)pyrene		3.5E-07	4.0E-09		-	3.5E-07	0%
Beryllium	3.3E-07					3.3E-07	0%
Indeno(1,2,3-cd)pyrene		3.3E-07	1.8E-09		-	3.3E-07	0%
Benzo(g,h,i)perylene		3.2E-07	1.9E-09		-	3.2E-07	0%
Acenaphthene		2.4E-07	5.2E-08		-	2.9E-07	0%
Benzo(k)fluoranthene		2.8E-07	3.3E-09		-	2.8E-07	0%
Naphthalene		1.6E-07	8.1E-08		-	2.4E-07	0%

TABLE N-3.7

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.5E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Anthracene		2.0E-07	2.2E-08		-	2.2E-07	0%
Dibenzo(a,h)anthracene		2.0E-07	1.0E-09		-	2.0E-07	0%
Fluorene		1.7E-07	2.6E-08		-	2.0E-07	0%
Acenaphthylene		1.1E-07	2.3E-08		-	1.3E-07	0%
Dieldrin		2.3E-08	8.2E-10	4.0E-08	-	6.4E-08	0%
alpha-Chlordane	2.0E-10	3.0E-08	4.2E-10	9.3E-09	-	4.0E-08	0%
gamma-Chlordane	2.2E-10	1.7E-08	2.4E-10	1.0E-08	-	2.8E-08	0%
Heptachlor				3.6E-09		3.6E-09	0%
Methoxychlor		3.1E-09	1.5E-10		-	3.2E-09	0%
Pentachlorophenol							
Dimethylphthalate							
4,4'-DDT							
gamma-BHC							
Heptachlor epoxide							
Toxicity Equivalency - Mammals							
Antimony							
Cobalt							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
Toxicity Equivalency (PCB) - Mammals							
4-Methylphenol							
Dibenzofuran							
2,4,5-Trichlorophenol							
Carbazole							
2-Methylnaphthalene							
1,1'-Biphenyl							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**7.6E-06**	**3.1E-02**	**4.9E-03**	**2.0E-02**	**-**	**5.5E-02**	
PERCENTAGE OF TOTAL RISK	**0%**	**55%**	**9%**	**36%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-4.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: MANTON POND REACH - CT

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

Analyte	Medium EPC Value	Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
		Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
Benzo(a)anthracene	1.5E-01	3.6E-03	1.1E+00	3.4E-01	**5.3E-04**	1.5E-01	4.9E-02
Benzo(a)pyrene	1.8E-01	2.2E-03	1.1E+00	2.2E-01	**3.9E-04**	1.9E-01	4.0E-02
Benzo(b)fluoranthene	3.1E-01	3.5E-03	1.1E+00	4.2E-01	**1.1E-03**	3.3E-01	1.3E-01
Benzo(g,h,i)perylene	1.1E-01	1.1E-03	1.1E+00	4.7E-02	**1.3E-04**	1.2E-01	5.4E-03
Benzo(k)fluoranthene	1.8E-01	2.3E-03	1.1E+00	2.9E-01	**4.0E-04**	1.9E-01	5.1E-02
bis(2-Ethylhexyl)phthalate	3.1E-01	3.1E-04	1.1E+00	1.0E+00	**9.6E-05**	3.4E-01	3.1E-01
Carbazole	5.2E-02	5.5E-02	1.0E+00	5.6E-01	**2.9E-03**	5.3E-02	2.9E-02
Chrysene	2.3E-01	3.4E-03	1.1E+00	4.4E-01	**7.7E-04**	2.4E-01	1.0E-01
Fluoranthene	3.9E-01	8.1E-03	1.1E+00	8.0E-01	**3.1E-03**	4.1E-01	3.1E-01
Indeno(1,2,3-cd)pyrene	1.5E-01	1.0E-03	1.1E+00	2.8E-01	**1.5E-04**	1.6E-01	4.1E-02
Phenanthrene	1.4E-01	2.0E-02	1.0E+00	3.0E-01	**2.9E-03**	1.5E-01	4.3E-02
Pyrene	3.0E-01	1.2E-02	1.0E+00	5.1E-01	**3.5E-03**	3.1E-01	1.5E-01
alpha-Chlordane	2.2E-03	2.6E-03	1.1E+00	4.8E+00	**5.7E-06**	2.3E-03	1.0E-02
Arsenic	7.7E-01	1.0E-02	1.3E-01	1.3E-01	**7.7E-03**	9.8E-02	9.8E-02
Barium	2.4E+01	3.1E-02	1.8E-02	-	**7.6E-01**	4.4E-01	0.0E+00
Cadmium	6.8E-01	4.4E-02	4.6E-01	4.6E-01	**3.0E-02**	3.1E-01	3.1E-01
Chromium	1.3E+01	8.2E-03	1.2E+01	1.2E+01	**1.1E-01**	1.6E+02	1.6E+02
Cobalt	2.3E+00	1.5E-03	2.4E-02	-	**3.5E-03**	5.7E-02	0.0E+00
Copper	3.0E+01	9.7E-02	7.4E+01	7.4E+01	**2.9E+00**	2.2E+03	2.2E+03
gamma-Chlordane	2.5E-03	2.6E-03	1.1E+00	2.2E+00	**6.6E-06**	2.7E-03	5.6E-03
Lead	4.6E+01	1.9E-02	6.6E-02	6.6E-02	**8.9E-01**	3.0E+00	3.0E+00
Zinc	7.9E+01	3.5E-01	2.2E+02	2.2E+02	**2.7E+01**	1.8E+04	1.8E+04
Toxicity Equivalency - Birds	4.3E-04		-	-	**0.0E+00**	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-4.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Benzo(a)anthracene	1.5E-01	mg/kg	6.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
Benzo(a)pyrene	1.8E-01	mg/kg	8.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-07	4.5E-08
Benzo(b)fluoranthene	3.1E-01	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.8E-07	7.8E-08
Benzo(g,h,i)perylene	1.1E-01	mg/kg	5.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.9E-07	2.9E-08
Benzo(k)fluoranthene	1.8E-01	mg/kg	8.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-07	4.5E-08
bis(2-Ethylhexyl)phthalate	3.1E-01	mg/kg	1.4E-04	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	1.3E-05	1.3E-06
Carbazole	5.2E-02	mg/kg	2.4E-05	mg/kg-d					
Chrysene	2.3E-01	mg/kg	1.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.8E-07	5.8E-08
Fluoranthene	3.9E-01	mg/kg	1.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.9E-07	9.9E-08
Indeno(1,2,3-cd)pyrene	1.5E-01	mg/kg	6.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
Phenanthrene	1.4E-01	mg/kg	6.6E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.6E-07	3.6E-08
Pyrene	3.0E-01	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.5E-07	7.5E-08
alpha-Chlordane	2.2E-03	mg/kg	1.0E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	4.2E-08	4.2E-09
Arsenic	7.7E-01	mg/kg	3.6E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	7.0E-05	2.8E-05
Barium	2.4E+01	mg/kg	1.1E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.7E-04	1.4E-04
Cadmium	6.8E-01	mg/kg	3.2E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	2.2E-04	1.
Chromium	1.3E+01	mg/kg	6.3E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	6.3E-03	1.3E-03
Cobalt	2.3E+00	mg/kg	1.1E-03	mg/kg-d					
Copper	3.0E+01	mg/kg	1.4E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.9E-04	2.2E-04
gamma-Chlordane	2.5E-03	mg/kg	1.2E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	4.9E-08	4.9E-09
Lead	4.6E+01	mg/kg	2.1E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.9E-02	1.9E-03
Zinc	7.9E+01	mg/kg	3.7E-02	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.5E-03	2.8E-04
Toxicity Equivalency - Birds	4.3E-04	mg/kg	2.0E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.4E-02	1.4E-03
							HAZARD INDICES:	4.3E-02	5.3E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-4.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Benzo(a)anthracene	5.3E-04	mg/kg	1.3E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.0E-09	7.0E-10
Benzo(a)pyrene	3.9E-04	mg/kg	9.6E-07	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.2E-09	5.2E-10
Benzo(b)fluoranthene	1.1E-03	mg/kg	2.7E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.4E-08	1.4E-09
Benzo(g,h,i)perylene	1.3E-04	mg/kg	3.2E-07	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.7E-09	1.7E-10
Benzo(k)fluoranthene	4.0E-04	mg/kg	9.8E-07	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.3E-09	5.3E-10
bis(2-Ethylhexyl)phthalate	9.6E-05	mg/kg	2.3E-07	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	2.1E-08	2.1E-09
Carbazole	2.9E-03	mg/kg	7.0E-06	mg/kg-d					
Chrysene	7.7E-04	mg/kg	1.9E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.0E-08	1.0E-09
Fluoranthene	3.1E-03	mg/kg	7.7E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.2E-08	4.2E-09
Indeno(1,2,3-cd)pyrene	1.5E-04	mg/kg	3.7E-07	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-09	2.0E-10
Phenanthrene	2.9E-03	mg/kg	7.0E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.8E-08	3.8E-09
Pyrene	3.5E-03	mg/kg	8.5E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.6E-08	4.6E-09
alpha-Chlordane	5.7E-06	mg/kg	1.4E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	5.8E-10	5.8E-11
Arsenic	7.7E-03	mg/kg	1.9E-05	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	3.7E-06	1.5E-06
Barium	7.6E-01	mg/kg	1.9E-03	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	4.5E-05	2.2E-05
Cadmium	3.0E-02	mg/kg	7.3E-05	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	5.0E-05	3.6E-06
Chromium	1.1E-01	mg/kg	2.7E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	2.7E-04	5.4E-05
Cobalt	3.5E-03	mg/kg	8.5E-06	mg/kg-d					
Copper	2.9E+00	mg/kg	7.0E-03	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.5E-04	1.1E-04
gamma-Chlordane	6.6E-06	mg/kg	1.6E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.7E-10	6.7E-11
Lead	8.9E-01	mg/kg	2.2E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.9E-03	1.9E-04
Zinc	2.7E+01	mg/kg	6.6E-02	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	4.6E-03	5.1E-04
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	7.0E-03	8.9E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-4.4

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	2.7E-04	mg/kg	1.8E-06	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.3E-01	1.3E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Aluminum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	0.0E+00	0.0E+00
Antimony	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Arsenic	3.2E-02	mg/kg	2.2E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	4.2E-05	1.7E-05
Barium	5.3E+00	mg/kg	3.7E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	8.8E-04	4.4E-04
Beryllium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	0.0E+00	0.0E+00
Cadmium	1.4E-01	mg/kg	9.7E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.7E-04	4.9E-05
Chromium	4.5E-02	mg/kg	3.1E-04	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	3.1E-04	6.3E-05
Cobalt	1.0E-01	mg/kg	7.0E-04	mg/kg-d					
Copper	1.9E+01	mg/kg	1.3E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.8E-03	2.1E-03
Lead	3.0E-01	mg/kg	2.0E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.8E-03	1.8E-04
Manganese	0.0E+00	mg/kg	0.0E+00	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	0.0E+00	0.0E+00
Mercury	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	0.0E+00	0.0E+00
Mercury (methyl)	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	0.0E+00	0.0E+00
Molybdenum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	0.0E+00	0.0E+00
Nickel	0.0E+00	mg/kg	0.0E+00	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	0.0E+00	0.0E+00
Selenium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	0.0E+00	0.0E+00
Silver	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	0.0E+00	0.0E+00
Thallium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	0.0E+00	0.0E+00
Vanadium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	0.0E+00	0.0E+00
Zinc	7.6E+00	mg/kg	5.3E-02	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	3.6E-03	4.0E-04
alpha-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
oxicity Equivalency (PCB) - Bird	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
icity Equivalency (PCB) - Mamm	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Technical Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	0.0E+00	0.0E+00
beta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
delta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
gamma-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.0E+00	2.0E+01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	0.0E+00	0.0E+00
Aldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.8E-01	5.8E+00	mg/kg-d	0.0E+00	0.0E+00
Heptachlor Epoxide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan I	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00
Dieldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDE	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	0.0E+00	0.0E+00
Endrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
Endosulfan II	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDD	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan Sulfate	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDT	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	0.0E+00	0.0E+00
Methoxychlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	0.0E+00	0.0E+00
Endrin Ketone	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
Endrin Aldehyde	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
alpha-Chlordane	2.8E-04	mg/kg	1.9E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	8.0E-08	8.0E-09
gamma-Chlordane	1.8E-03	mg/kg	1.3E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	5.2E-07	5.2E-08
Toxaphene	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00

TABLE N-4.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aroclor-1016	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1221	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1232	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1242	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.1E-01	4.1E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1248	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1254	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1260	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1268	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	0.0E+00	0.0E+00
Aroclor, Total	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	1.4E-01	1.6E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-4.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 1.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		1.4E-02	-	1.3E-01	-	1.5E-01	*76%*
Lead		1.9E-02	1.9E-03	1.8E-03	-	2.3E-02	*12%*
Zinc		2.5E-03	4.6E-03	3.6E-03	-	1.1E-02	6%
Chromium		6.3E-03	2.7E-04	3.1E-04	-	6.9E-03	4%
Copper		2.9E-04	1.5E-04	2.8E-03	-	3.2E-03	2%
Barium		2.7E-04	4.5E-05	8.8E-04	-	1.2E-03	1%
Cadmium		2.2E-04	5.0E-05	6.7E-04	-	9.4E-04	0%
Arsenic		7.0E-05	3.7E-06	4.2E-05	-	1.2E-04	0%
bis(2-Ethylhexyl)phthalate		1.3E-05	2.1E-08		-	1.3E-05	0%
Fluoranthene		9.9E-07	4.2E-08		-	1.0E-06	0%
Pyrene		7.5E-07	4.6E-08		-	8.0E-07	0%
Benzo(b)fluoranthene		7.8E-07	1.4E-08		-	8.0E-07	0%
Chrysene		5.8E-07	1.0E-08		-	5.9E-07	0%
gamma-Chlordane		4.9E-08	6.7E-10	5.2E-07	-	5.7E-07	0%
Benzo(a)pyrene		4.5E-07	5.2E-09		-	4.6E-07	0%
Benzo(k)fluoranthene		4.5E-07	5.3E-09		-	4.5E-07	0%
Phenanthrene		3.6E-07	3.8E-08		-	4.0E-07	0%
Benzo(a)anthracene		3.7E-07	7.0E-09		-	3.8E-07	0%
Indeno(1,2,3-cd)pyrene		3.7E-07	2.0E-09		-	3.7E-07	0%
Benzo(g,h,i)perylene		2.9E-07	1.7E-09		-	2.9E-07	0%
alpha-Chlordane		4.2E-08	5.8E-10	8.0E-08	-	1.2E-07	0%
Toxicity Equivalency - Mammals							
Aroclor, Total				-			
Aroclor-1254				-			
Cobalt							
Mercury (methyl)				-			
Antimony							
Aroclor-1268				-			
Selenium				-			
Molybdenum				-			
Toxicity Equivalency (PCB) - Mammals							
Vanadium				-			
Dieldrin				-			
Technical Chlordane				-			
N-Nitroso-di-n-propylamine							
Manganese				-			
4,4'-DDE				-			
Pentachlorophenol							
Aluminum				-			
Thallium				-			
Mercury				-			
2,4-Dinitrotoluene							
4,4'-DDD				-			
Aroclor-1248				-			
Aroclor-1260				-			

TABLE N-4.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: MANTON POND REACH - CT	
RECEPTOR: MALLARD	
TOTAL RISK (HI):	1.9E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC				-			
Dibenzo(a,h)anthracene							
Heptachlor epoxide				-			
Nickel				-			
4-Chloro-3-methylphenol							
Beryllium				-			
4,4'-DDT				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II				-			
Endosulfan sulfate				-			
Heptachlor				-			
Dibenzofuran							
Acenaphthylene							
Naphthalene							
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds				-			
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	4.3E-02	7.0E-03	1.4E-01	-	1.9E-01	
PERCENTAGE OF TOTAL RISK		23%	4%	74%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-4.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 2.3E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Birds		1.4E-03	-	1.3E-02	-	1.5E-02	***65%***
Copper		2.2E-04	1.1E-04	2.1E-03	-	2.4E-03	***11%***
Lead		1.9E-03	1.9E-04	1.8E-04	-	2.3E-03	***10%***
Chromium		1.3E-03	5.4E-05	6.3E-05	-	1.4E-03	6%
Zinc		2.8E-04	5.1E-04	4.0E-04	-	1.2E-03	5%
Barium		1.4E-04	2.2E-05	4.4E-04	-	6.0E-04	3%
Cadmium		1.6E-05	3.6E-06	4.9E-05	-	6.8E-05	0%
Arsenic		2.8E-05	1.5E-06	1.7E-05	-	4.7E-05	0%
bis(2-Ethylhexyl)phthalate		1.3E-06	2.1E-09		-	1.3E-06	0%
Fluoranthene		9.9E-08	4.2E-09		-	1.0E-07	0%
Pyrene		7.5E-08	4.6E-09		-	8.0E-08	0%
Benzo(b)fluoranthene		7.8E-08	1.4E-09		-	8.0E-08	0%
Chrysene		5.8E-08	1.0E-09		-	5.9E-08	0%
gamma-Chlordane		4.9E-09	6.7E-11	5.2E-08	-	5.7E-08	0%
Benzo(a)pyrene		4.5E-08	5.2E-10		-	4.6E-08	0%
Benzo(k)fluoranthene		4.5E-08	5.3E-10		-	4.5E-08	0%
Phenanthrene		3.6E-08	3.8E-09		-	4.0E-08	0%
Benzo(a)anthracene		3.7E-08	7.0E-10		-	3.8E-08	0%
Indeno(1,2,3-cd)pyrene		3.7E-08	2.0E-10		-	3.7E-08	0%
Benzo(g,h,i)perylene		2.9E-08	1.7E-10		-	2.9E-08	0%
alpha-Chlordane		4.2E-09	5.8E-11	8.0E-09	-	1.2E-08	0%
Toxicity Equivalency - Mammals							
Aroclor, Total				-			
Aroclor-1254				-			
Cobalt				-			
Mercury (methyl)				-			
Antimony				-			
Aroclor-1268				-			
Selenium				-			
Molybdenum				-			
Toxicity Equivalency (PCB) - Mammals							
Vanadium				-			
Dieldrin				-			
Technical Chlordane				-			
N-Nitroso-di-n-propylamine							
Manganese				-			
4,4'-DDE				-			
Pentachlorophenol							
Aluminum				-			
Thallium				-			
Mercury				-			
2,4-Dinitrotoluene							
4,4'-DDD				-			
Aroclor-1248				-			
Aroclor-1260				-			

TABLE N-4.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 2.3E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-BHC				-			
Dibenzo(a,h)anthracene							
Heptachlor epoxide				-			
Nickel				-			
4-Chloro-3-methylphenol							
Beryllium				-			
4,4'-DDT				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Acenaphthene							
Phenol							
Fluorene							
Endosulfan II				-			
Endosulfan sulfate				-			
Heptachlor				-			
Dibenzofuran							
Acenaphthylene							
Naphthalene							
2-Methylnaphthalene							
Carbazole							
Anthracene							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds				-			
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	5.3E-03	8.9E-04	1.6E-02	-	2.3E-02	
PERCENTAGE OF TOTAL RISK		23%	4%	73%		100%	

Footnotes:
a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.
b. Combined risk across all media exposures.
c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-5.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: DYERVILLE REACH

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
2-Methylnaphthalene	3.1E-02	4.5E-02	1.0E+00	4.7E+00	**1.4E-03**	3.2E-02	1.4E-01
Acenaphthene	1.4E-01	4.2E-02	1.0E+00	3.0E-02	**5.7E-03**	1.4E-01	4.1E-03
Acenaphthylene	1.6E-01	4.1E-02	1.0E+00	7.6E-01	**6.4E-03**	1.6E-01	1.2E-01
Anthracene	3.0E-01	2.1E-02	1.0E+00	1.1E-01	**6.1E-03**	3.1E-01	3.2E-02
Benzo(a)anthracene	1.4E+00	3.6E-03	1.1E+00	3.4E-01	**5.2E-03**	1.5E+00	4.8E-01
Benzo(a)pyrene	1.4E+00	2.2E-03	1.1E+00	2.2E-01	**3.1E-03**	1.5E+00	3.1E-01
Benzo(b)fluoranthene	2.5E+00	3.5E-03	1.1E+00	4.2E-01	**8.7E-03**	2.6E+00	1.0E+00
Benzo(g,h,i)perylene	1.1E+00	1.1E-03	1.1E+00	4.7E-02	**1.2E-03**	1.2E+00	5.0E-02
Benzo(k)fluoranthene	7.1E-01	2.3E-03	1.1E+00	2.9E-01	**1.6E-03**	7.6E-01	2.1E-01
bis(2-Ethylhexyl)phthalate	1.1E+00	3.1E-04	1.1E+00	1.0E+00	**3.4E-04**	1.2E+00	1.1E+00
Carbazole	2.2E-01	5.5E-02	1.0E+00	5.6E-01	**1.2E-02**	2.3E-01	1.2E-01
Chrysene	1.5E+00	3.4E-03	1.1E+00	4.4E-01	**5.2E-03**	1.6E+00	6.7E-01
Dibenzo(a,h)anthracene	2.0E-01	9.7E-04	1.1E+00	3.8E-01	**2.0E-04**	2.2E-01	7.6E-02
Dibenzofuran	1.0E-01	3.2E-02	1.0E+00	1.0E+00	**3.2E-03**	1.0E-01	1.0E-01
Di-n-Butylphthalate	5.1E-02	1.9E-02	1.0E+00	1.0E+00	**9.9E-04**	5.3E-02	5.1E-02
Fluoranthene	2.8E+00	8.1E-03	1.1E+00	8.0E-01	**2.3E-02**	2.9E+00	2.2E+00
Fluorene	1.2E-01	3.0E-02	1.0E+00	9.6E-01	**3.7E-03**	1.3E-01	1.2E-01
Indeno(1,2,3-cd)pyrene	1.4E+00	1.0E-03	1.1E+00	2.8E-01	**1.4E-03**	1.5E+00	3.8E-01
Naphthalene	6.4E-02	9.6E-02	1.0E+00	2.6E+00	**6.1E-03**	6.7E-02	1.7E-01
Phenanthrene	1.4E+00	2.0E-02	1.0E+00	3.0E-01	**2.8E-02**	1.4E+00	4.2E-01
Pyrene	2.4E+00	1.2E-02	1.0E+00	5.1E-01	**2.8E-02**	2.5E+00	1.2E+00
4,4'-DDD	5.8E-03	2.4E-03	1.1E+00	2.8E-01	**1.4E-05**	6.3E-03	1.6E-03
4,4'-DDE	3.9E-03	9.6E-04	1.1E+00	7.7E+00	**3.8E-06**	4.3E-03	3.0E-02
alpha-Chlordane	4.3E-03	2.6E-03	1.1E+00	4.8E+00	**1.1E-05**	4.6E-03	2.1E-02
Aroclor, Total	1.4E+00	6.1E-04	1.1E+00	8.0E-01	**8.7E-04**	1.6E+00	1.1E+00
Aroclor-1254	4.9E-01	1.4E-03	1.1E+00	8.1E-01	**6.7E-04**	5.3E-01	4.0E-01
Aroclor-1268	1.2E-01	3.4E-04	1.1E+00	2.3E-01	**4.0E-05**	1.3E-01	2.7E-02
Dieldrin	1.2E-02	6.7E-03	1.1E+00	6.7E+00	**7.7E-05**	1.2E-02	7.6E-02
Endosulfan sulfate	5.2E-03	5.9E-02	1.0E+00	2.7E+00	**3.1E-04**	5.3E-03	1.4E-02
Arsenic	2.1E+00	1.0E-02	1.3E-01	1.3E-01	**2.1E-02**	2.7E-01	2.7E-01
Barium	6.8E+01	3.1E-02	1.8E-02	-	**2.1E+00**	1.2E+00	0.0E+00
Cadmium	1.7E+00	4.4E-02	4.6E-01	4.6E-01	**7.3E-02**	7.7E-01	7.7E-01
Chromium	1.6E+02	8.2E-03	1.2E+01	1.2E+01	**1.3E+00**	1.9E+03	1.9E+03
Cobalt	5.8E+00	1.5E-03	2.4E-02	-	**8.7E-03**	1.4E-01	0.0E+00
Copper	9.0E+01	9.7E-02	7.4E+01	7.4E+01	**8.8E+00**	6.7E+03	6.7E+03
Lead	1.6E+02	1.9E-02	6.6E-02	6.6E-02	**3.1E+00**	1.1E+01	1.1E+01
Mercury	4.0E-01	2.6E-02	4.0E+00	4.0E+00	**1.0E-02**	1.6E+00	1.6E+00
Zinc	7.2E+02	3.5E-01	2.2E+02	2.2E+02	**2.5E+02**	1.6E+05	1.6E+05
Toxicity Equivalency - Birds	9.8E-05		-	-	**0.0E+00**	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	1.3E-05		-	-	**0.0E+00**	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-5.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	3.1E-02	mg/kg	1.4E-05	mg/kg-d					
Acenaphthene	1.4E-01	mg/kg	6.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-07	3.5E-08
Acenaphthylene	1.6E-01	mg/kg	7.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.0E-07	4.0E-08
Anthracene	3.0E-01	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.5E-07	7.5E-08
Benzo(a)anthracene	1.4E+00	mg/kg	6.7E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.6E-06	3.6E-07
Benzo(a)pyrene	1.4E+00	mg/kg	6.6E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.6E-06	3.6E-07
Benzo(b)fluoranthene	2.5E+00	mg/kg	1.2E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.3E-06	6.3E-07
Benzo(g,h,i)perylene	1.1E+00	mg/kg	5.0E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.7E-06	2.7E-07
Benzo(k)fluoranthene	7.1E-01	mg/kg	3.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.8E-06	1.8E-07
bis(2-Ethylhexyl)phthalate	1.1E+00	mg/kg	5.1E-04	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	4.6E-05	4.6E-06
Carbazole	2.2E-01	mg/kg	1.0E-04	mg/kg-d					
Chrysene	1.5E+00	mg/kg	7.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.9E-06	3.9E-07
Dibenzo(a,h)anthracene	2.0E-01	mg/kg	9.5E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.1E-07	5.1E-08
Dibenzofuran	1.0E-01	mg/kg	4.7E-05	mg/kg-d					
Di-n-Butylphthalate	5.1E-02	mg/kg	2.4E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.1E-05	2.1E
Fluoranthene	2.8E+00	mg/kg	1.3E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.1E-06	7.1E
Fluorene	1.2E-01	mg/kg	5.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.2E-07	3.2E-08
Indeno(1,2,3-cd)pyrene	1.4E+00	mg/kg	6.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Naphthalene	6.4E-02	mg/kg	3.0E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	5.6E-07	5.6E-08
Phenanthrene	1.4E+00	mg/kg	6.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Pyrene	2.4E+00	mg/kg	1.1E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.0E-06	6.0E-07
4,4'-DDD	5.8E-03	mg/kg	2.7E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	9.7E-04	9.7E-05
4,4'-DDE	3.9E-03	mg/kg	1.8E-06	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	6.6E-04	6.6E-05
alpha-Chlordane	4.3E-03	mg/kg	2.0E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	8.4E-08	8.4E-09
Aroclor, Total	1.4E+00	mg/kg	6.6E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.0E-03	2.4E-03
Aroclor-1254	4.9E-01	mg/kg	2.3E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.3E-03	1.3E-04
Aroclor-1268	1.2E-01	mg/kg	5.6E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	5.1E-05	5.1E-06
Dieldrin	1.2E-02	mg/kg	5.4E-06	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	7.1E-07	7.1E-08
Endosulfan sulfate	5.2E-03	mg/kg	2.4E-06	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	3.9E-06	3.9E-07
Arsenic	2.1E+00	mg/kg	9.8E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	1.9E-04	7.6E-05
Barium	6.8E+01	mg/kg	3.2E-02	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	7.6E-04	3.8E-04
Cadmium	1.7E+00	mg/kg	7.8E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	5.4E-04	3.9E-05
Chromium	1.6E+02	mg/kg	7.3E-02	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	7.3E-02	1.5E-02
Cobalt	5.8E+00	mg/kg	2.7E-03	mg/kg-d					
Copper	9.0E+01	mg/kg	4.2E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	9.0E-04	6.9E-04
Lead	1.6E+02	mg/kg	7.5E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	6.6E-02	6.6E-03
Mercury	4.0E-01	mg/kg	1.8E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	4.1E-04	2.1E-04
Zinc	7.2E+02	mg/kg	3.4E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.3E-02	2.6E-03
Toxicity Equivalency - Birds	9.8E-05	mg/kg	4.6E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.3E-03	3.3E-04
Toxicity Equivalency (PCB) - Birds	1.3E-05	mg/kg	5.9E-09	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.2E-04	4.2E-05
							HAZARD INDICES:	1.8E-01	2.8E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-5.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.4E-03	mg/kg	3.4E-06	mg/kg-d					
Acenaphthene	5.7E-03	mg/kg	1.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.6E-08	7.6E-09
Acenaphthylene	6.4E-03	mg/kg	1.6E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.6E-08	8.6E-09
Anthracene	6.1E-03	mg/kg	1.5E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.2E-08	8.2E-09
Benzo(a)anthracene	5.2E-03	mg/kg	1.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.9E-08	6.9E-09
Benzo(a)pyrene	3.1E-03	mg/kg	7.6E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.1E-08	4.1E-09
Benzo(b)fluoranthene	8.7E-03	mg/kg	2.1E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.2E-07	1.2E-08
Benzo(g,h,i)perylene	1.2E-03	mg/kg	3.0E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.6E-08	1.6E-09
Benzo(k)fluoranthene	1.6E-03	mg/kg	3.9E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.1E-08	2.1E-09
bis(2-Ethylhexyl)phthalate	3.4E-04	mg/kg	8.4E-07	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	7.6E-08	7.6E-09
Carbazole	1.2E-02	mg/kg	3.0E-05	mg/kg-d					
Chrysene	5.2E-03	mg/kg	1.3E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.9E-08	6.9E-09
Dibenzo(a,h)anthracene	2.0E-04	mg/kg	4.8E-07	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.6E-09	2.6E-10
Dibenzofuran	3.2E-03	mg/kg	7.9E-06	mg/kg-d					
Di-n-Butylphthalate	9.9E-04	mg/kg	2.4E-06	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.2E-06	2.2E-07
Fluoranthene	2.3E-02	mg/kg	5.5E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.0E-07	3.0E-08
Fluorene	3.7E-03	mg/kg	9.0E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.9E-08	4.9E-09
Indeno(1,2,3-cd)pyrene	1.4E-03	mg/kg	3.4E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.9E-08	1.9E-09
Naphthalene	6.1E-03	mg/kg	1.5E-05	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	2.8E-07	2.8E-08
Phenanthrene	2.8E-02	mg/kg	6.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
Pyrene	2.8E-02	mg/kg	6.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
4,4'-DDD	1.4E-05	mg/kg	3.5E-08	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.2E-05	1.2E-06
4,4'-DDE	3.8E-06	mg/kg	9.2E-09	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	3.3E-06	3.3E-07
alpha-Chlordane	1.1E-05	mg/kg	2.8E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.2E-09	1.2E-10
Aroclor, Total	8.7E-04	mg/kg	2.1E-06	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.9E-05	7.6E-06
Aroclor-1254	6.7E-04	mg/kg	1.6E-06	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	9.0E-06	9.0E-07
Aroclor-1268	4.0E-05	mg/kg	9.8E-08	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	8.9E-08	8.9E-09
Dieldrin	7.7E-05	mg/kg	1.9E-07	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	2.5E-08	2.5E-09
Endosulfan sulfate	3.1E-04	mg/kg	7.5E-07	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	1.2E-06	1.2E-07
Arsenic	2.1E-02	mg/kg	5.1E-05	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	1.0E-05	4.0E-06
Barium	2.1E+00	mg/kg	5.2E-03	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	1.2E-04	6.2E-05
Cadmium	7.3E-02	mg/kg	1.8E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	1.2E-04	8.9E-06
Chromium	1.3E+00	mg/kg	3.1E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	3.1E-03	6.2E-04
Cobalt	8.7E-03	mg/kg	2.1E-05	mg/kg-d					
Copper	8.8E+00	mg/kg	2.1E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	4.5E-04	3.5E-04
Lead	3.1E+00	mg/kg	7.5E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	6.7E-03	6.7E-04
Mercury	1.0E-02	mg/kg	2.5E-05	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	5.5E-05	2.8E-05
Zinc	2.5E+02	mg/kg	6.1E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	4.2E-02	4.6E-03
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	5.3E-02	6.4E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-5.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Birds	7.2E-05	mg/kg	5.0E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	3.6E-02	3.6E-03
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Aluminum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	0.0E+00	0.0E+00
Antimony	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Arsenic	1.0E-01	mg/kg	7.1E-04	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	1.4E-04	5.5E-05
Barium	1.8E+01	mg/kg	1.2E-01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.9E-03	1.5E-03
Beryllium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	0.0E+00	0.0E+00
Cadmium	4.1E-01	mg/kg	2.8E-03	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	2.0E-03	1.4E-04
Chromium	6.3E-01	mg/kg	4.3E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.3E-03	8.7E-04
Cobalt	3.0E-01	mg/kg	2.1E-03	mg/kg-d					
Copper	6.9E+01	mg/kg	4.8E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.0E-02	7.7E-03
Lead	1.2E+00	mg/kg	8.5E-03	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	7.5E-03	7.5E-04
Manganese	0.0E+00	mg/kg	0.0E+00	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	0.0E+00	0.0E+00
Mercury	1.9E-01	mg/kg	1.3E-03	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	2.8E-03	1.4E-03
Mercury (methyl)	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	0.0E+00	0.0E+00
Molybdenum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	0.0E+00	0.0E+00
Nickel	0.0E+00	mg/kg	0.0E+00	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	0.0E+00	0.0E+00
Selenium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	0.0E+00	0.0E+00
Silver	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	0.0E+00	0.0E+00
Thallium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	0.0E+00	0.0E+00
Vanadium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	0.0E+00	0.0E+00
Zinc	8.4E+01	mg/kg	5.8E-01	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	4.0E-02	4.4E-03
alpha-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Birds	2.9E-06	mg/kg	2.0E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	1.4E-03	1.4E-04
xicity Equivalency (PCB) - Mamma	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Technical Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	0.0E+00	0.0E+00
beta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
delta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.6E-01	2.3E+00	mg/kg-d	0.0E+00	0.0E+00
gamma-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.0E+00	2.0E+01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	0.0E+00	0.0E+00
Aldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.8E-01	5.8E+00	mg/kg-d	0.0E+00	0.0E+00
Heptachlor Epoxide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan I	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00
Dieldrin	4.1E-03	mg/kg	2.8E-05	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	3.7E-06	3.7E-07
4,4'-DDE	6.4E-03	mg/kg	4.4E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.6E-02	1.6E-03
Endrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
Endosulfan II	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDD	2.8E-02	mg/kg	1.9E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	6.8E-02	6.8E-03
Endosulfan Sulfate	7.4E-03	mg/kg	5.1E-05	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	8.2E-05	8.2E-06
4,4'-DDT	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	0.0E+00	0.0E+00
Methoxychlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E+01	8.0E+02	mg/kg-d	0.0E+00	0.0E+00
Endrin Ketone	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
Endrin Aldehyde	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E-02	3.0E-01	mg/kg-d	0.0E+00	0.0E+00
alpha-Chlordane	6.7E-04	mg/kg	4.6E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	1.9E-07	1.9E-08
gamma-Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	0.0E+00	0.0E+00
Toxaphene	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.2E-01	6.2E+00	mg/kg-d	0.0E+00	0.0E+00

TABLE N-5.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aroclor-1016	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1221	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1232	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1242	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.1E-01	4.1E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1248	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1254	4.0E-01	mg/kg	2.8E-03	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.5E-02	1.5E-03
Aroclor-1260	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1268	3.4E-02	mg/kg	2.4E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.1E-04	2.1E-05
Aroclor, Total	9.8E-01	mg/kg	6.7E-03	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	6.1E-02	2.4E-02
							HAZARD INDICES:	2.7E-01	5.5E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-5.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.0E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Zinc		2.3E-02	4.2E-02	4.0E-02	-	1.0E-01	***21%***
Lead		6.6E-02	6.7E-03	7.5E-03	-	8.0E-02	***16%***
Chromium		7.3E-02	3.1E-03	4.3E-03	-	8.0E-02	***16%***
4,4'-DDD		9.7E-04	1.2E-05	6.8E-02	-	6.9E-02	***14%***
Aroclor, Total		6.0E-03	1.9E-05	6.1E-02	-	6.7E-02	***13%***
Toxicity Equivalency - Birds		3.3E-03	-	3.6E-02	-	3.9E-02	8%
Aroclor-1254		1.3E-03	9.0E-06	1.5E-02	-	1.7E-02	3%
4,4'-DDE		6.6E-04	3.3E-06	1.6E-02	-	1.6E-02	3%
Copper		9.0E-04	4.5E-04	1.0E-02	-	1.1E-02	2%
Barium		7.6E-04	1.2E-04	2.9E-03	-	3.8E-03	1%
Mercury		4.1E-04	5.5E-05	2.8E-03	-	3.3E-03	1%
Cadmium		5.4E-04	1.2E-04	2.0E-03	-	2.6E-03	1%
Toxicity Equivalency (PCB) - Birds		4.2E-04	-	1.4E-03	-	1.8E-03	0%
Arsenic		1.9E-04	1.0E-05	1.4E-04	-	3.4E-04	0%
Aroclor-1268		5.1E-05	8.9E-08	2.1E-04	-	2.7E-04	0%
Endosulfan sulfate		3.9E-06	1.2E-06	8.2E-05	-	8.7E-05	0%
bis(2-Ethylhexyl)phthalate		4.6E-05	7.6E-08		-	4.7E-05	0%
Di-n-Butylphthalate		2.1E-05	2.2E-06		-	2.4E-05	0%
Fluoranthene		7.1E-06	3.0E-07		-	7.4E-06	0%
Pyrene		6.0E-06	3.7E-07		-	6.4E-06	0%
Benzo(b)fluoranthene		6.3E-06	1.2E-07		-	6.4E-06	0%
Dieldrin		7.1E-07	2.5E-08	3.7E-06	-	4.4E-06	0%
Chrysene		3.9E-06	6.9E-08		-	3.9E-06	0%
Phenanthrene		3.5E-06	3.7E-07		-	3.8E-06	0%
Benzo(a)anthracene		3.6E-06	6.9E-08		-	3.7E-06	0%
Benzo(a)pyrene		3.6E-06	4.1E-08		-	3.6E-06	0%
Indeno(1,2,3-cd)pyrene		3.5E-06	1.9E-08		-	3.5E-06	0%
Benzo(g,h,i)perylene		2.7E-06	1.6E-08		-	2.7E-06	0%
Benzo(k)fluoranthene		1.8E-06	2.1E-08		-	1.8E-06	0%
Naphthalene		5.6E-07	2.8E-07		-	8.3E-07	0%
Anthracene		7.5E-07	8.2E-08		-	8.3E-07	0%
Dibenzo(a,h)anthracene		5.1E-07	2.6E-09		-	5.2E-07	0%
Acenaphthylene		4.0E-07	8.6E-08		-	4.9E-07	0%
Acenaphthene		3.5E-07	7.6E-08		-	4.2E-07	0%
Fluorene		3.2E-07	4.9E-08		-	3.6E-07	0%
alpha-Chlordane		8.4E-08	1.2E-09	1.9E-07	-	2.8E-07	0%
Atrazine							
Toxicity Equivalency - Mammals							
Cobalt							
Mercury (methyl)				-			
Antimony							
Selenium				-			
Molybdenum				-			
Toxicity Equivalency (PCB) - Mammals							
Vanadium				-			

TABLE N-5.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD
TOTAL RISK (HI): 5.0E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Technical Chlordane				-			
N-Nitroso-di-n-propylamine							
Manganese				-			
Pentachlorophenol							
Aluminum				-			
Thallium				-			
2,4-Dinitrotoluene							
Aroclor-1248				-			
Aroclor-1260				-			
gamma-BHC				-			
Heptachlor epoxide				-			
Nickel				-			
4-Chloro-3-methylphenol							
Beryllium				-			
4,4'-DDT				-			
gamma-Chlordane				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Phenol							
Endosulfan II				-			
Heptachlor				-			
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	-	1.8E-01	5.3E-02	2.7E-01	-	5.0E-01	
PERCENTAGE OF TOTAL RISK		36%	11%	54%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-5.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH
RECEPTOR: MALLARD
TOTAL RISK (HI): 8.9E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor, Total		2.4E-03	7.6E-06	2.4E-02	-	2.7E-02	***30%***
Chromium		1.5E-02	6.2E-04	8.7E-04	-	1.6E-02	***18%***
Zinc		2.6E-03	4.6E-03	4.4E-03	-	1.2E-02	***13%***
Copper		6.9E-04	3.5E-04	7.7E-03	-	8.7E-03	10%
Lead		6.6E-03	6.7E-04	7.5E-04	-	8.0E-03	9%
4,4'-DDD		9.7E-05	1.2E-06	6.8E-03	-	6.9E-03	8%
Toxicity Equivalency - Birds		3.3E-04	-	3.6E-03	-	3.9E-03	4%
Barium		3.8E-04	6.2E-05	1.5E-03	-	1.9E-03	2%
Aroclor-1254		1.3E-04	9.0E-07	1.5E-03	-	1.7E-03	2%
Mercury		2.1E-04	2.8E-05	1.4E-03	-	1.7E-03	2%
4,4'-DDE		6.6E-05	3.3E-07	1.6E-03	-	1.6E-03	2%
Cadmium		3.9E-05	8.9E-06	1.4E-04	-	1.9E-04	0%
Toxicity Equivalency (PCB) - Birds		4.2E-05	-	1.4E-04	-	1.8E-04	0%
Arsenic		7.6E-05	4.0E-06	5.5E-05	-	1.4E-04	0%
Aroclor-1268		5.1E-06	8.9E-09	2.1E-05	-	2.7E-05	0%
Endosulfan sulfate		3.9E-07	1.2E-07	8.2E-06	-	8.7E-06	0%
bis(2-Ethylhexyl)phthalate		4.6E-06	7.6E-09		-	4.7E-06	0%
Di-n-Butylphthalate		2.1E-06	2.2E-07		-	2.4E-06	0%
Fluoranthene		7.1E-07	3.0E-08		-	7.4E-07	0%
Pyrene		6.0E-07	3.7E-08		-	6.4E-07	0%
Benzo(b)fluoranthene		6.3E-07	1.2E-08		-	6.4E-07	0%
Dieldrin		7.1E-08	2.5E-09	3.7E-07	-	4.4E-07	0%
Chrysene		3.9E-07	6.9E-09		-	3.9E-07	0%
Phenanthrene		3.5E-07	3.7E-08		-	3.8E-07	0%
Benzo(a)anthracene		3.6E-07	6.9E-09		-	3.7E-07	0%
Benzo(a)pyrene		3.6E-07	4.1E-09		-	3.6E-07	0%
Indeno(1,2,3-cd)pyrene		3.5E-07	1.9E-09		-	3.5E-07	0%
Benzo(g,h,i)perylene		2.7E-07	1.6E-09		-	2.7E-07	0%
Benzo(k)fluoranthene		1.8E-07	2.1E-09		-	1.8E-07	0%
Naphthalene		5.6E-08	2.8E-08		-	8.3E-08	0%
Anthracene		7.5E-08	8.2E-09		-	8.3E-08	0%
Dibenzo(a,h)anthracene		5.1E-08	2.6E-10		-	5.2E-08	0%
Acenaphthylene		4.0E-08	8.6E-09		-	4.9E-08	0%
Acenaphthene		3.5E-08	7.6E-09		-	4.2E-08	0%
Fluorene		3.2E-08	4.9E-09		-	3.6E-08	0%
alpha-Chlordane		8.4E-09	1.2E-10	1.9E-08	-	2.8E-08	0%
Atrazine							
Toxicity Equivalency - Mammals							
Cobalt							
Mercury (methyl)				-			
Antimony							
Selenium				-			
Molybdenum				-			
Toxicity Equivalency (PCB) - Mammals							
Vanadium				-			

TABLE N-5.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: DYERVILLE REACH	
RECEPTOR: MALLARD	
TOTAL RISK (HI):	8.9E-02

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Technical Chlordane				-			
N-Nitroso-di-n-propylamine							
Manganese				-			
Pentachlorophenol							
Aluminum				-			
Thallium				-			
2,4-Dinitrotoluene							
Aroclor-1248				-			
Aroclor-1260				-			
gamma-BHC				-			
Heptachlor epoxide				-			
Nickel				-			
4-Chloro-3-methylphenol							
Beryllium				-			
4,4'-DDT				-			
gamma-Chlordane				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Phenol							
Endosulfan II				-			
Heptachlor				-			
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	-	2.8E-02	6.4E-03	5.5E-02	-	8.9E-02	
PERCENTAGE OF TOTAL RISK		32%	7%	61%		100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-6.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: ASSAPUMPSET POND - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish
2-Methylnaphthalene	1.9E-02	4.5E-02	1.0E+00	4.7E+00	**8.4E-04**	1.9E-02	8.6E-02
Acenaphthene	3.4E-02	4.2E-02	1.0E+00	3.0E-02	**1.4E-03**	3.5E-02	1.0E-03
Acenaphthylene	5.9E-02	4.1E-02	1.0E+00	7.6E-01	**2.4E-03**	6.1E-02	4.5E-02
Anthracene	1.5E-01	2.1E-02	1.0E+00	1.1E-01	**3.1E-03**	1.5E-01	1.6E-02
Benzo(a)anthracene	5.2E-01	3.6E-03	1.1E+00	3.4E-01	**1.9E-03**	5.5E-01	1.7E-01
Benzo(a)pyrene	5.3E-01	2.2E-03	1.1E+00	2.2E-01	**1.2E-03**	5.8E-01	1.2E-01
Benzo(b)fluoranthene	6.3E-01	3.5E-03	1.1E+00	4.2E-01	**2.2E-03**	6.7E-01	2.6E-01
Benzo(g,h,i)perylene	4.0E-01	1.1E-03	1.1E+00	4.7E-02	**4.5E-04**	4.3E-01	1.9E-02
Benzo(k)fluoranthene	4.1E-01	2.3E-03	1.1E+00	2.9E-01	**9.3E-04**	4.4E-01	1.2E-01
bis(2-Ethylhexyl)phthalate	4.7E-01	3.1E-04	1.1E+00	1.0E+00	**1.5E-04**	5.3E-01	4.7E-01
Carbazole	8.9E-02	5.5E-02	1.0E+00	5.6E-01	**4.9E-03**	9.2E-02	5.0E-02
Chrysene	6.8E-01	3.4E-03	1.1E+00	4.4E-01	**2.3E-03**	7.2E-01	3.0E-01
Dibenzo(a,h)anthracene	1.5E-01	9.7E-04	1.1E+00	3.8E-01	**1.4E-04**	1.6E-01	5.6E-02
Dibenzofuran	3.6E-02	3.2E-02	1.0E+00	1.0E+00	**1.2E-03**	3.7E-02	3.6E-02
Di-n-Butylphthalate	8.0E-02	1.9E-02	1.0E+00	1.0E+00	**1.6E-03**	8.3E-02	8.0E-02
Fluoranthene	1.1E+00	8.1E-03	1.1E+00	8.0E-01	**8.8E-03**	1.1E+00	8.7E-01
Fluorene	8.1E-02	3.0E-02	1.0E+00	9.6E-01	**2.4E-03**	8.3E-02	7.8E-02
Indeno(1,2,3-cd)pyrene	4.3E-01	1.0E-03	1.1E+00	2.8E-01	**4.5E-04**	4.7E-01	1.2E-01
Naphthalene	1.9E-02	9.6E-02	1.0E+00	2.6E+00	**1.8E-03**	2.0E-02	5.0E-02
Phenanthrene	5.4E-01	2.0E-02	1.0E+00	3.0E-01	**1.1E-02**	5.6E-01	1.6E-01
Pyrene	9.4E-01	1.2E-02	1.0E+00	5.1E-01	**1.1E-02**	9.8E-01	4.8E-01
4,4'-DDD	2.6E-03	2.4E-03	1.1E+00	2.8E-01	**6.4E-06**	2.8E-03	7.4E-04
4,4'-DDE	3.3E-03	9.6E-04	1.1E+00	7.7E+00	**3.2E-06**	3.6E-03	2.6E-02
alpha-Chlordane	1.3E-03	2.6E-03	1.1E+00	4.8E+00	**3.5E-06**	1.4E-03	6.3E-03
Aroclor, Total	5.8E-02	6.1E-04	1.1E+00	8.0E-01	**3.5E-05**	6.4E-02	4.6E-02
Aroclor-1254	3.2E-02	1.4E-03	1.1E+00	8.1E-01	**4.4E-05**	3.5E-02	2.6E-02
Aroclor-1268	2.3E-02	3.4E-04	1.1E+00	2.3E-01	**7.7E-06**	2.6E-02	5.3E-03
Dieldrin	1.9E-03	6.7E-03	1.1E+00	6.7E+00	**1.3E-05**	2.0E-03	1.3E-02
gamma-Chlordane	6.5E-04	2.6E-03	1.1E+00	2.2E+00	**1.7E-06**	7.0E-04	1.4E-03
Technical Chlordane	1.1E-01	2.6E-03	1.1E+00	2.0E+00	**2.9E-04**	1.2E-01	2.2E-01
Arsenic	2.7E+00	1.0E-02	1.3E-01	1.3E-01	**2.7E-02**	3.4E-01	3.4E-01
Barium	9.4E+01	3.1E-02	1.8E-02	-	**2.9E+00**	1.7E+00	0.0E+00
Cadmium	3.7E-01	4.4E-02	4.6E-01	4.6E-01	**1.6E-02**	1.7E-01	1.7E-01
Chromium	1.0E+01	8.2E-03	1.2E+01	1.2E+01	**8.5E-02**	1.3E+02	1.3E+02
Cobalt	6.2E+00	1.5E-03	2.4E-02	-	**9.2E-03**	1.5E-01	0.0E+00
Copper	1.2E+01	9.7E-02	7.4E+01	7.4E+01	**1.1E+00**	8.7E+02	8.7E+02
Lead	4.1E+01	1.9E-02	6.6E-02	6.6E-02	**7.8E-01**	2.7E+00	2.7E+00
Mercury	5.1E-02	2.6E-02	4.0E+00	4.0E+00	**1.3E-03**	2.0E-01	2.0E-01
Mercury (methyl)	5.6E-04	1.8E-01	3.4E-01	-	**1.0E-04**	1.9E-04	0.0E+00
Molybdenum	1.6E+00	5.0E-02	1.9E-01	-	**7.9E-02**	3.0E-01	0.0E+00
Selenium	6.2E-01	1.3E-01	1.0E-01	-	**8.1E-02**	6.3E-02	0.0E+00
Silver	1.6E+00	2.8E-03	4.1E-01	-	**4.4E-03**	6.4E-01	0.0E+00
Thallium	3.5E-01	8.0E-04	-	-	**2.8E-04**	0.0E+00	0.0E+00
Zinc	1.0E+02	3.5E-01	2.2E+02	2.2E+02	**3.5E+01**	2.2E+04	2.2E+04
Toxicity Equivalency - Birds	5.1E-06		-	-	**0.0E+00**	0.0E+00	0.0E+00

TABLE N-6.1
ESTIMATED AQUATIC PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: AQUATIC PREY
EXPOSURE POINT: ASSAPUMPSET POND - CT

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

		Literature-based BAFs[a]			Estimated Tissue Concentration[b]		
Analyte	Medium EPC Value	Aquatic Plants	Aquatic Invertebrates	Fish	Aquatic Plants	Aquatic Invertebrates	Fish

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated prey item concentrations calculated by multiplying the sediment EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

TABLE N-6.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	5.8E-05	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	5.3E-06	5.3E-07
Aluminum	1.6E-01	mg/L	9.1E-03	mg/kg-d	1.1E+02	1.1E+03	mg/kg-d	8.3E-05	8.3E-06
Beryllium	4.9E-05	mg/L	2.8E-06	mg/kg-d	1.5E-01	1.5E+00	mg/kg-d	1.9E-05	1.9E-06
Cobalt	1.1E-04	mg/L	6.6E-06	mg/kg-d					
Copper	2.1E-03	mg/L	1.2E-04	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.6E-06	2.0E-06
Lead	3.7E-04	mg/L	2.1E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.9E-05	1.9E-06
Manganese	1.4E-01	mg/L	7.9E-03	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	8.0E-06	8.0E-07
Nickel	1.7E-03	mg/L	9.9E-05	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	1.3E-06	9.2E-07
Selenium	8.2E-05	mg/L	4.7E-06	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.2E-05	5.9E-06
Thallium	5.1E-06	mg/L	3.0E-07	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	8.5E-08	5.9E-08
Zinc	3.4E-02	mg/L	2.0E-03	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.4E-04	1.5E-05
Nitrogen, Ammonia	1.1E-02	mg/L	6.4E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Birds	7.0E-09	mg/L	4.1E-10	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	2.9E-05	2.9E-06
							HAZARD INDICES:	3.2E-04	4.0E-05

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-6.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.9E-02	mg/kg	2.0E-04	mg/kg-d					
Acenaphthene	3.4E-02	mg/kg	3.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.0E-06	2.0E-07
Acenaphthylene	5.9E-02	mg/kg	6.5E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Anthracene	1.5E-01	mg/kg	1.6E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.8E-06	8.8E-07
Benzo(a)anthracene	5.2E-01	mg/kg	5.7E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.1E-05	3.1E-06
Benzo(a)pyrene	5.3E-01	mg/kg	5.9E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.2E-05	3.2E-06
Benzo(b)fluoranthene	6.3E-01	mg/kg	6.9E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.8E-05	3.8E-06
Benzo(g,h,i)perylene	4.0E-01	mg/kg	4.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.4E-05	2.4E-06
Benzo(k)fluoranthene	4.1E-01	mg/kg	4.5E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.5E-05	2.5E-06
bis(2-Ethylhexyl)phthalate	4.7E-01	mg/kg	5.2E-03	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	4.7E-04	4.7E-05
Carbazole	8.9E-02	mg/kg	9.8E-04	mg/kg-d					
Chrysene	6.8E-01	mg/kg	7.4E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.0E-05	4.0E-06
Dibenzo(a,h)anthracene	1.5E-01	mg/kg	1.6E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	8.9E-06	8.9E-07
Dibenzofuran	3.6E-02	mg/kg	4.0E-04	mg/kg-d					
Di-n-Butylphthalate	8.0E-02	mg/kg	8.8E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	7.9E-04	7.9E-05
Fluoranthene	1.1E+00	mg/kg	1.2E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.5E-05	6.5E-06
Fluorene	8.1E-02	mg/kg	8.9E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.8E-06	4.8E-07
Indeno(1,2,3-cd)pyrene	4.3E-01	mg/kg	4.7E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.6E-05	2.6E-06
Naphthalene	1.9E-02	mg/kg	2.1E-04	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	3.9E-06	3.9E-07
Phenanthrene	5.4E-01	mg/kg	6.0E-03	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.2E-05	3.2E-06
Pyrene	9.4E-01	mg/kg	1.0E-02	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.6E-05	5.6E-06
4,4'-DDD	2.6E-03	mg/kg	2.9E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.0E-02	1.0E-03
4,4'-DDE	3.3E-03	mg/kg	3.7E-05	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.3E-02	1.3E-03
alpha-Chlordane	1.3E-03	mg/kg	1.5E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.1E-07	6.1E-08
Aroclor, Total	5.8E-02	mg/kg	6.4E-04	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	5.8E-03	2.3E-03
Aroclor-1254	3.2E-02	mg/kg	3.5E-04	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	2.0E-03	2.0E-04
Aroclor-1268	2.3E-02	mg/kg	2.5E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.3E-04	2.3E-05
Dieldrin	1.9E-03	mg/kg	2.1E-05	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	2.8E-06	2.8E-07
gamma-Chlordane	6.5E-04	mg/kg	7.2E-06	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	3.0E-07	3.0E-08
Technical Chlordane	1.1E-01	mg/kg	1.2E-03	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	5.0E-05	5.0E-06
Arsenic	2.7E+00	mg/kg	2.9E-02	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	5.7E-03	2.3E-03
Barium	9.4E+01	mg/kg	1.0E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	2.5E-02	1.2E-02
Cadmium	3.7E-01	mg/kg	4.0E-03	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	2.8E-03	2.0E-04
Chromium	1.0E+01	mg/kg	1.1E-01	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	1.1E-01	2.3E-02
Cobalt	6.2E+00	mg/kg	6.8E-02	mg/kg-d					
Copper	1.2E+01	mg/kg	1.3E-01	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	2.8E-03	2.1E-03
Lead	4.1E+01	mg/kg	4.5E-01	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.0E-01	4.0E-02
Mercury	5.1E-02	mg/kg	5.6E-04	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	1.3E-03	6.3E-04
Mercury (methyl)	5.6E-04	mg/kg	6.2E-06	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	9.7E-04	9.7E-05
Molybdenum	1.6E+00	mg/kg	1.7E-02	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	4.9E-03	4.9E-04
Selenium	6.2E-01	mg/kg	6.9E-03	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.7E-02	8.6E-03
Silver	1.6E+00	mg/kg	1.7E-02	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	7.3E-05	7.3E-06
Thallium	3.5E-01	mg/kg	3.9E-03	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	1.1E-03	7.8E-04
Zinc	1.0E+02	mg/kg	1.1E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	7.6E-02	8.5E-03
Toxicity Equivalency - Birds	5.1E-06	mg/kg	5.6E-08	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.0E-03	4.0E-04

TABLE N-6.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
							HAZARD INDICES:	6.8E-01	1.0E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-6.4

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	8.4E-04	mg/kg	4.9E-05	mg/kg-d					
Acenaphthene	1.4E-03	mg/kg	8.2E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-07	4.5E-08
Acenaphthylene	2.4E-03	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.5E-07	7.5E-08
Anthracene	3.1E-03	mg/kg	1.8E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	9.6E-07	9.6E-08
Benzo(a)anthracene	1.9E-03	mg/kg	1.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	5.9E-07	5.9E-08
Benzo(a)pyrene	1.2E-03	mg/kg	6.8E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.7E-07	3.7E-08
Benzo(b)fluoranthene	2.2E-03	mg/kg	1.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	6.9E-07	6.9E-08
Benzo(g,h,i)perylene	4.5E-04	mg/kg	2.6E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.4E-07	1.4E-08
Benzo(k)fluoranthene	9.3E-04	mg/kg	5.4E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.9E-07	2.9E-08
bis(2-Ethylhexyl)phthalate	1.5E-04	mg/kg	8.5E-06	mg/kg-d	1.1E+01	1.1E+02	mg/kg-d	7.7E-07	7.7E-08
Carbazole	4.9E-03	mg/kg	2.8E-04	mg/kg-d					
Chrysene	2.3E-03	mg/kg	1.3E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.2E-07	7.2E-08
Dibenzo(a,h)anthracene	1.4E-04	mg/kg	8.3E-06	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	4.5E-08	4.5E-09
Dibenzofuran	1.2E-03	mg/kg	6.6E-05	mg/kg-d					
Di-n-Butylphthalate	1.6E-03	mg/kg	8.9E-05	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	8.1E-05	8.1E-06
Fluoranthene	8.8E-03	mg/kg	5.1E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	2.7E-06	2.7E-07
Fluorene	2.4E-03	mg/kg	1.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	7.5E-07	7.5E-08
Indeno(1,2,3-cd)pyrene	4.5E-04	mg/kg	2.6E-05	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	1.4E-07	1.4E-08
Naphthalene	1.8E-03	mg/kg	1.1E-04	mg/kg-d	5.4E+01	5.4E+02	mg/kg-d	2.0E-06	2.0E-07
Phenanthrene	1.1E-02	mg/kg	6.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
Pyrene	1.1E-02	mg/kg	6.4E-04	mg/kg-d	1.8E+02	1.8E+03	mg/kg-d	3.5E-06	3.5E-07
4,4'-DDD	6.4E-06	mg/kg	3.7E-07	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	1.3E-04	1.3E-05
4,4'-DDE	3.2E-06	mg/kg	1.8E-07	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	6.6E-05	6.6E-06
alpha-Chlordane	3.5E-06	mg/kg	2.0E-07	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	8.4E-09	8.4E-10
Aroclor, Total	3.5E-05	mg/kg	2.0E-06	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.8E-05	7.3E-06
Aroclor-1254	4.4E-05	mg/kg	2.5E-06	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	1.4E-05	1.4E-06
Aroclor-1268	7.7E-06	mg/kg	4.5E-07	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.0E-07	4.0E-08
Dieldrin	1.3E-05	mg/kg	7.4E-07	mg/kg-d	7.6E+00	7.6E+01	mg/kg-d	9.7E-08	9.7E-09
gamma-Chlordane	1.7E-06	mg/kg	9.9E-08	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	4.1E-09	4.1E-10
Technical Chlordane	2.9E-04	mg/kg	1.6E-05	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.8E-07	6.8E-08
Arsenic	2.7E-02	mg/kg	1.5E-03	mg/kg-d	5.1E+00	1.3E+01	mg/kg-d	3.0E-04	1.2E-04
Barium	2.9E+00	mg/kg	1.7E-01	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	4.0E-03	2.0E-03
Cadmium	1.6E-02	mg/kg	9.2E-04	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	6.3E-04	4.6E-05
Chromium	8.5E-02	mg/kg	4.9E-03	mg/kg-d	1.0E+00	5.0E+00	mg/kg-d	4.9E-03	9.8E-04
Cobalt	9.2E-03	mg/kg	5.3E-04	mg/kg-d					
Copper	1.1E+00	mg/kg	6.6E-02	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	1.4E-03	1.1E-03
Lead	7.8E-01	mg/kg	4.5E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	4.0E-02	4.0E-03
Mercury	1.3E-03	mg/kg	7.6E-05	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	1.7E-04	8.5E-05
Mercury (methyl)	1.0E-04	mg/kg	5.8E-06	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	9.1E-04	9.1E-05
Molybdenum	7.9E-02	mg/kg	4.5E-03	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	1.3E-03	1.3E-04
Selenium	8.1E-02	mg/kg	4.6E-03	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	1.2E-02	5.8E-03
Silver	4.4E-03	mg/kg	2.5E-04	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	1.1E-06	1.1E-07
Thallium	2.8E-04	mg/kg	1.6E-05	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	4.7E-06	3.3E-06
Zinc	3.5E+01	mg/kg	2.0E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	1.4E-01	1.5E-02
Toxicity Equivalency - Birds	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	0.0E+00	0.0E+00

TABLE N-6.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC PLANTS / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: AQUATIC PLANTS
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
							HAZARD INDICES:	2.0E-01	3.0E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-6.5

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDE	3.6E-03	mg/kg	5.9E-04	mg/kg-d	2.8E-03	2.8E-02	mg/kg-d	2.1E-01	2.1E-02
Aroclor, Total	1.1E-02	mg/kg	1.8E-03	mg/kg-d	1.1E-01	2.8E-01	mg/kg-d	1.6E-02	6.5E-03
Aroclor-1254	1.0E-02	mg/kg	1.7E-03	mg/kg-d	1.8E-01	1.8E+00	mg/kg-d	9.3E-03	9.3E-04
Aroclor-1268	6.9E-04	mg/kg	1.1E-04	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	1.0E-04	1.0E-05
Heptachlor Epoxide	9.0E-05	mg/kg	1.5E-05	mg/kg-d	4.2E+01	4.2E+02	mg/kg-d	3.5E-07	3.5E-08
Technical Chlordane	8.8E-03	mg/kg	1.4E-03	mg/kg-d	2.4E+01	2.4E+02	mg/kg-d	6.0E-05	6.0E-06
Barium	4.0E+01	mg/kg	6.5E+00	mg/kg-d	4.2E+01	8.3E+01	mg/kg-d	1.5E-01	7.7E-02
Cadmium	8.2E-02	mg/kg	1.3E-02	mg/kg-d	1.5E+00	2.0E+01	mg/kg-d	9.2E-03	6.6E-04
Cobalt	8.3E-02	mg/kg	1.3E-02	mg/kg-d					
Copper	1.5E+01	mg/kg	2.4E+00	mg/kg-d	4.7E+01	6.2E+01	mg/kg-d	5.2E-02	3.9E-02
Lead	1.4E-01	mg/kg	2.3E-02	mg/kg-d	1.1E+00	1.1E+01	mg/kg-d	2.0E-02	2.0E-03
Manganese	1.1E+02	mg/kg	1.8E+01	mg/kg-d	9.8E+02	9.8E+03	mg/kg-d	1.9E-02	1.9E-03
Mercury	3.9E-02	mg/kg	6.3E-03	mg/kg-d	4.5E-01	9.0E-01	mg/kg-d	1.4E-02	7.0E-03
Mercury (methyl)	3.9E-02	mg/kg	6.3E-03	mg/kg-d	6.4E-03	6.4E-02	mg/kg-d	9.9E-01	9.9E-02
Molybdenum	4.3E-02	mg/kg	6.9E-03	mg/kg-d	3.5E+00	3.5E+01	mg/kg-d	2.0E-03	2.0E-04
Nickel	2.5E-01	mg/kg	4.1E-02	mg/kg-d	7.7E+01	1.1E+02	mg/kg-d	5.2E-04	3.8E-04
Selenium	1.3E-01	mg/kg	2.0E-02	mg/kg-d	4.0E-01	8.0E-01	mg/kg-d	5.1E-02	2.5E-02
Silver	2.2E-01	mg/kg	3.5E-02	mg/kg-d	2.4E+02	2.4E+03	mg/kg-d	1.5E-04	1.5E-05
Thallium	7.1E-03	mg/kg	1.2E-03	mg/kg-d	3.5E+00	5.0E+00	mg/kg-d	3.3E-04	2.3E-04
Zinc	2.3E+01	mg/kg	3.7E+00	mg/kg-d	1.5E+01	1.3E+02	mg/kg-d	2.6E-01	2.8E-02
Toxicity Equivalency - Birds	3.7E-06	mg/kg	6.1E-07	mg/kg-d	1.4E-05	1.4E-04	mg/kg-d	4.3E-02	4.3E-03
							HAZARD INDICES:	1.8E+00	3.1E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-8.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-6.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 2.7E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Mercury (methyl)		9.7E-04	9.1E-04	9.9E-01	-	9.9E-01	***36%***
Zinc	1.4E-04	7.6E-02	1.4E-01	2.6E-01	-	4.7E-01	***17%***
Lead	1.9E-05	4.0E-01	4.0E-02	2.0E-02	-	4.5E-01	***17%***
4,4'-DDE		1.3E-02	6.6E-05	2.1E-01	-	2.2E-01	8%
Barium		2.5E-02	4.0E-03	1.5E-01	-	1.8E-01	7%
Chromium		1.1E-01	4.9E-03		-	1.2E-01	4%
Selenium	1.2E-05	1.7E-02	1.2E-02	5.1E-02	-	8.0E-02	3%
Copper	2.6E-06	2.8E-03	1.4E-03	5.2E-02	-	5.6E-02	2%
Toxicity Equivalency - Birds	2.9E-05	4.0E-03	-	4.3E-02	-	4.7E-02	2%
Aroclor, Total		5.8E-03	1.8E-05	1.6E-02	-	2.2E-02	1%
Manganese	8.0E-06			1.9E-02		1.9E-02	1%
Mercury		1.3E-03	1.7E-04	1.4E-02	-	1.5E-02	1%
Cadmium		2.8E-03	6.3E-04	9.2E-03	-	1.3E-02	0%
Aroclor-1254		2.0E-03	1.4E-05	9.3E-03	-	1.1E-02	0%
4,4'-DDD		1.0E-02	1.3E-04		-	1.0E-02	0%
Molybdenum		4.9E-03	1.3E-03	2.0E-03	-	8.2E-03	0%
Arsenic		5.7E-03	3.0E-04		-	6.0E-03	0%
Thallium	8.5E-08	1.1E-03	4.7E-06	3.3E-04	-	1.5E-03	0%
Di-n-Butylphthalate		7.9E-04	8.1E-05		-	8.7E-04	0%
Nickel	1.3E-06			5.2E-04		5.3E-04	0%
bis(2-Ethylhexyl)phthalate	5.3E-06	4.7E-04	7.7E-07		-	4.7E-04	0%
Aroclor-1268		2.3E-04	4.0E-07	1.0E-04	-	3.3E-04	0%
Silver		7.3E-05	1.1E-06	1.5E-04	-	2.2E-04	0%
Technical Chlordane		5.0E-05	6.8E-07	6.0E-05	-	1.1E-04	0%
Aluminum	8.3E-05					8.3E-05	0%
Fluoranthene		6.5E-05	2.7E-06		-	6.8E-05	0%
Pyrene		5.6E-05	3.5E-06		-	6.0E-05	0%
Chrysene		4.0E-05	7.2E-07		-	4.1E-05	0%
Benzo(b)fluoranthene		3.8E-05	6.9E-07		-	3.8E-05	0%
Phenanthrene		3.2E-05	3.5E-06		-	3.6E-05	0%
Benzo(a)pyrene		3.2E-05	3.7E-07		-	3.2E-05	0%
Benzo(a)anthracene		3.1E-05	5.9E-07		-	3.2E-05	0%
Indeno(1,2,3-cd)pyrene		2.6E-05	1.4E-07		-	2.6E-05	0%
Benzo(k)fluoranthene		2.5E-05	2.9E-07		-	2.5E-05	0%
Benzo(g,h,i)perylene		2.4E-05	1.4E-07		-	2.4E-05	0%
Beryllium	1.9E-05					1.9E-05	0%
Anthracene		8.8E-06	9.6E-07		-	9.8E-06	0%
Dibenzo(a,h)anthracene		8.9E-06	4.5E-08		-	9.0E-06	0%
Naphthalene		3.9E-06	2.0E-06		-	5.9E-06	0%
Fluorene		4.8E-06	7.5E-07		-	5.6E-06	0%
Acenaphthylene		3.5E-06	7.5E-07		-	4.3E-06	0%
Dieldrin		2.8E-06	9.7E-08		-	2.9E-06	0%
Acenaphthene		2.0E-06	4.5E-07		-	2.5E-06	0%
alpha-Chlordane		6.1E-07	8.4E-09		-	6.2E-07	0%
Heptachlor epoxide				3.5E-07		3.5E-07	0%

TABLE N-6.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 2.7E+00

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-Chlordane		3.0E-07	4.1E-09		-	3.0E-07	0%
Toxicity Equivalency - Mammals							
Cobalt							
Antimony							
Toxicity Equivalency (PCB) - Mammals							
Vanadium							
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor-1260							
gamma-BHC							
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
Endrin							
4-Nitrophenol							
Phenol							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**3.2E-04**	**6.8E-01**	**2.0E-01**	**1.8E+00**	**-**	**2.7E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**25%**	**7%**	**68%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-6.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: MALLARD
TOTAL RISK (HI): 4.5E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Mercury (methyl)		9.7E-05	9.1E-05	9.9E-02	-	9.9E-02	***22%***
Barium		1.2E-02	2.0E-03	7.7E-02	-	9.2E-02	***20%***
Zinc	1.5E-05	8.5E-03	1.5E-02	2.8E-02	-	5.2E-02	***12%***
Lead	1.9E-06	4.0E-02	4.0E-03	2.0E-03	-	4.5E-02	***10%***
Copper	2.0E-06	2.1E-03	1.1E-03	3.9E-02	-	4.3E-02	10%
Selenium	5.9E-06	8.6E-03	5.8E-03	2.5E-02	-	4.0E-02	9%
Chromium		2.3E-02	9.8E-04		-	2.4E-02	5%
4,4'-DDE		1.3E-03	6.6E-06	2.1E-02	-	2.2E-02	5%
Aroclor, Total		2.3E-03	7.3E-06	6.5E-03	-	8.8E-03	2%
Mercury		6.3E-04	8.5E-05	7.0E-03	-	7.7E-03	2%
Toxicity Equivalency - Birds	2.9E-06	4.0E-04	-	4.3E-03	-	4.7E-03	1%
Arsenic		2.3E-03	1.2E-04		-	2.4E-03	1%
Manganese	8.0E-07			1.9E-03		1.9E-03	0%
Aroclor-1254		2.0E-04	1.4E-06	9.3E-04	-	1.1E-03	0%
4,4'-DDD		1.0E-03	1.3E-05		-	1.0E-03	0%
Thallium	5.9E-08	7.8E-04	3.3E-06	2.3E-04	-	1.0E-03	0%
Cadmium		2.0E-04	4.6E-05	6.6E-04	-	9.1E-04	0%
Molybdenum		4.9E-04	1.3E-04	2.0E-04	-	8.2E-04	0%
Nickel	9.2E-07			3.8E-04		3.8E-04	0%
Di-n-Butylphthalate		7.9E-05	8.1E-06		-	8.7E-05	0%
bis(2-Ethylhexyl)phthalate	5.3E-07	4.7E-05	7.7E-08		-	4.7E-05	0%
Aroclor-1268		2.3E-05	4.0E-08	1.0E-05	-	3.3E-05	0%
Silver		7.3E-06	1.1E-07	1.5E-05	-	2.2E-05	0%
Technical Chlordane		5.0E-06	6.8E-08	6.0E-06	-	1.1E-05	0%
Aluminum	8.3E-06					8.3E-06	0%
Fluoranthene		6.5E-06	2.7E-07		-	6.8E-06	0%
Pyrene		5.6E-06	3.5E-07		-	6.0E-06	0%
Chrysene		4.0E-06	7.2E-08		-	4.1E-06	0%
Benzo(b)fluoranthene		3.8E-06	6.9E-08		-	3.8E-06	0%
Phenanthrene		3.2E-06	3.5E-07		-	3.6E-06	0%
Benzo(a)pyrene		3.2E-06	3.7E-08		-	3.2E-06	0%
Benzo(a)anthracene		3.1E-06	5.9E-08		-	3.2E-06	0%
Indeno(1,2,3-cd)pyrene		2.6E-06	1.4E-08		-	2.6E-06	0%
Benzo(k)fluoranthene		2.5E-06	2.9E-08		-	2.5E-06	0%
Benzo(g,h,i)perylene		2.4E-06	1.4E-08		-	2.4E-06	0%
Beryllium	1.9E-06					1.9E-06	0%
Anthracene		8.8E-07	9.6E-08		-	9.8E-07	0%
Dibenzo(a,h)anthracene		8.9E-07	4.5E-09		-	9.0E-07	0%
Naphthalene		3.9E-07	2.0E-07		-	5.9E-07	0%
Fluorene		4.8E-07	7.5E-08		-	5.6E-07	0%
Acenaphthylene		3.5E-07	7.5E-08		-	4.3E-07	0%
Dieldrin		2.8E-07	9.7E-09		-	2.9E-07	0%
Acenaphthene		2.0E-07	4.5E-08		-	2.5E-07	0%
alpha-Chlordane		6.1E-08	8.4E-10		-	6.2E-08	0%
Heptachlor epoxide				3.5E-08		3.5E-08	0%

TABLE N-6.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : MALLARD

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ASSAPUMPSET POND - CT	
RECEPTOR: MALLARD	
TOTAL RISK (HI):	4.5E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
gamma-Chlordane		3.0E-08	4.1E-10		-	3.0E-08	0%
Toxicity Equivalency - Mammals							
Cobalt							
Antimony							
Toxicity Equivalency (PCB) - Mammals							
Vanadium							
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor-1260							
gamma-BHC							
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
Endrin							
4-Nitrophenol							
Phenol							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dibenzofuran							
2-Methylnaphthalene							
Carbazole							
Dimethylphthalate							
1,1'-Biphenyl							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**4.0E-05**	**1.0E-01**	**3.0E-02**	**3.1E-01**	**-**	**4.5E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**23%**	**7%**	**70%**		**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-7.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	3.7E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.9E-03	1.9E-04
Beryllium	5.5E-05	mg/L	2.3E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.9E-06	1.9E-07
Chromium	2.5E-03	mg/L	1.0E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	7.0E-08	7.0E-09
Cobalt	1.2E-04	mg/L	4.9E-06	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.5E-05	6.5E-06
Copper	5.4E-03	mg/L	2.2E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.9E-05	1.5E-05
Lead	2.9E-03	mg/L	1.2E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	9.4E-07	3.1E-07
Manganese	1.3E-01	mg/L	5.4E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.1E-05	1.9E-05
Nickel	1.9E-03	mg/L	8.0E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	3.2E-06	1.3E-06
Selenium	8.7E-05	mg/L	3.6E-06	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.8E-05	1.1E-05
Thallium	7.4E-06	mg/L	3.1E-07	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.2E-06	2.2E-07
Zinc	2.0E-02	mg/L	8.4E-04	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	4.3E-06	2.1E-06
Nitrogen, Ammonia	3.9E-01	mg/L	1.6E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	5.6E-09	mg/L	2.3E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.3E-04	2.3E-05
							HAZARD INDICES:	2.3E-03	2.7E-04

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-7.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	7.5E-02	mg/kg	4.5E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.5E-05	1.5E-06
Acenaphthene	4.8E-01	mg/kg	2.9E-03	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	8.3E-05	8.3E-06
Acenaphthylene	1.9E-01	mg/kg	1.2E-03	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	3.3E-05	3.3E-06
Anthracene	9.3E-01	mg/kg	5.6E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	2.8E-05	2.8E-06
Benzo(a)anthracene	1.5E+00	mg/kg	8.9E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.9E-03	8.9E-04
Benzo(a)pyrene	1.4E+00	mg/kg	8.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.4E-03	8.4E-04
Benzo(b)fluoranthene	1.5E+00	mg/kg	9.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.1E-03	9.1E-04
Benzo(g,h,i)perylene	8.6E-01	mg/kg	5.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.2E-03	5.2E-04
Benzo(k)fluoranthene	1.4E+00	mg/kg	8.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.4E-03	8.4E-04
bis(2-Ethylhexyl)phthalate	9.5E-01	mg/kg	5.7E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	3.1E-04	3.1E-05
Carbazole	6.6E-01	mg/kg	4.0E-03	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	4.0E-05	4.0E-06
Chrysene	1.8E+00	mg/kg	1.1E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-02	1.1E-03
Dibenzo(a,h)anthracene	7.7E-01	mg/kg	4.7E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.7E-03	4.7E-04
Dibenzofuran	2.9E-01	mg/kg	1.8E-03	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	7.0E-05	7.0E-06
Di-n-Butylphthalate	4.7E-01	mg/kg	2.8E-03	mg/kg-d	1.0E+02	4.0E+02	mg/kg-d	2.8E-05	7.1E-
Fluoranthene	3.3E+00	mg/kg	2.0E-02	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	1.6E-04	8.0E-
Fluorene	4.7E-01	mg/kg	2.8E-03	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.1E-04	1.1E-05
Indeno(1,2,3-cd)pyrene	1.0E+00	mg/kg	6.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.2E-03	6.2E-04
Naphthalene	9.4E-02	mg/kg	5.7E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.9E-05	1.9E-06
Phenanthrene	2.1E+00	mg/kg	1.2E-02	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	8.3E-04	8.3E-05
Pyrene	2.8E+00	mg/kg	1.7E-02	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	2.2E-04	1.3E-04
4,4'-DDD	4.9E-03	mg/kg	2.9E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.7E-05	7.3E-06
4,4'-DDE	6.0E-03	mg/kg	3.6E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.5E-05	9.1E-06
alpha-Chlordane	6.1E-03	mg/kg	3.7E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.0E-06	4.0E-06
Aroclor, Total	2.1E-01	mg/kg	1.3E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	8.4E-02	8.4E-03
Aroclor-1254	1.5E-01	mg/kg	9.0E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	6.0E-02	6.0E-03
Aroclor-1260	2.5E-02	mg/kg	1.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.0E-02	1.0E-03
Aroclor-1268	1.4E-01	mg/kg	8.3E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	5.5E-02	5.5E-03
Dieldrin	2.6E-03	mg/kg	1.5E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.0E-03	1.0E-04
Endrin	1.9E-03	mg/kg	1.2E-05	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	4.6E-04	2.3E-04
gamma-Chlordane	4.8E-03	mg/kg	2.9E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.3E-06	3.2E-06
Technical Chlordane	4.0E-01	mg/kg	2.4E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	5.3E-04	2.6E-04
Antimony	7.3E-01	mg/kg	4.4E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.7E-01	1.7E-02
Arsenic	3.9E+00	mg/kg	2.4E-02	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	4.9E-01	4.9E-02
Barium	1.3E+02	mg/kg	8.1E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.1E-02	5.1E-03
Cadmium	8.1E-01	mg/kg	4.9E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.9E-03	4.9E-04
Chromium	9.9E+01	mg/kg	6.0E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	4.1E-04	4.1E-05
Cobalt	8.1E+00	mg/kg	4.9E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.4E-01	6.4E-02
Copper	7.3E+01	mg/kg	4.4E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.8E-02	2.9E-02
Lead	1.8E+02	mg/kg	1.1E+00	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	8.6E-03	2.9E-03
Mercury	2.1E-01	mg/kg	1.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-03	1.3E-04
Mercury (methyl)	2.6E-04	mg/kg	1.5E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	1.0E-04	6.2E-05
Molybdenum	1.3E+01	mg/kg	7.6E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.0E-01	4.0E-
Selenium	1.1E+00	mg/kg	6.9E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	3.4E-02	2.1E-
Silver	2.6E+00	mg/kg	1.6E-02	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	7.0E-04	7.0E-05
Thallium	3.7E-01	mg/kg	2.2E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.6E-02	1.6E-03

TABLE N-7.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Zinc	2.2E+02	mg/kg	1.3E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	6.8E-03	3.4E-03
Toxicity Equivalency - Mammals	3.5E-05	mg/kg	2.1E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.1E-01	2.1E-02
oxicity Equivalency (PCB) - Mamma	2.5E-05	mg/kg	1.5E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.5E-01	1.5E-02
							HAZARD INDICES:	2.5E+00	3.0E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-7.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDE	4.3E-03	mg/kg	5.1E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.3E-04	1.3E-04
alpha-Chlordane	2.8E-04	mg/kg	3.3E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.1E-06	3.6E-06
Aroclor, Total	4.4E-02	mg/kg	5.1E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.4E-01	3.4E-02
Aroclor-1254	3.8E-02	mg/kg	4.4E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.9E-01	2.9E-02
Aroclor-1268	6.2E-03	mg/kg	7.2E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	4.8E-02	4.8E-03
Endosulfan Sulfate	5.1E-04	mg/kg	6.0E-05	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	1.1E-04	3.2E-05
gamma-Chlordane	9.0E-05	mg/kg	1.0E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.3E-06	1.1E-06
Technical Chlordane	1.8E-02	mg/kg	2.1E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.7E-04	2.3E-04
Aluminum	9.0E-01	mg/kg	1.0E-01	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	5.4E-02	5.4E-03
Antimony	1.4E-02	mg/kg	1.6E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	6.2E-02	6.2E-03
Barium	2.6E+01	mg/kg	3.0E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	4.0E-02	1.9E-02
Cadmium	8.6E-02	mg/kg	1.0E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.0E-02	1.0E-03
Chromium	2.2E-01	mg/kg	2.6E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.8E-05	1.8E-06
Cobalt	2.4E-01	mg/kg	2.8E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	3.7E-01	3.7E-02
Copper	2.7E+01	mg/kg	3.1E+00	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	2.7E-01	2.1E-01
Lead	5.2E-01	mg/kg	6.0E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	4.8E-04	1.6
Manganese	1.2E+02	mg/kg	1.4E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.5E-01	4.8E-02
Mercury	2.2E-02	mg/kg	2.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.6E-03	2.6E-04
Mercury (methyl)	2.2E-02	mg/kg	2.6E-03	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	1.7E-01	1.1E-01
Molybdenum	1.4E-01	mg/kg	1.6E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	8.6E-02	8.6E-03
Nickel	2.8E-01	mg/kg	3.3E-02	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.3E-03	5.2E-04
Selenium	1.2E-01	mg/kg	1.5E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	7.3E-02	4.4E-02
Silver	2.2E-01	mg/kg	2.5E-02	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	1.1E-03	1.1E-04
Thallium	9.9E-03	mg/kg	1.2E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	8.2E-03	8.2E-04
Vanadium	1.7E-01	mg/kg	1.9E-02	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	4.6E-02	9.2E-03
Zinc	2.3E+01	mg/kg	2.6E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.3E-02	6.7E-03
Toxicity Equivalency - Mammals	3.1E-06	mg/kg	3.7E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.7E-01	3.7E-02
Toxicity Equivalency (PCB) - Mammals	1.2E-06	mg/kg	1.4E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.4E-01	1.4E-02
							HAZARD INDICES:	2.6E+00	6.2E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-7.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
1,1'-Biphenyl	1.4E-03	mg/kg	5.7E-06	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	1.1E-07	2.3E-08
2-Methylnaphthalene	5.5E-03	mg/kg	2.3E-05	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	7.8E-07	7.8E-08
Acenaphthene	4.0E-03	mg/kg	1.7E-05	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	4.9E-07	4.9E-08
Acenaphthylene	3.9E-03	mg/kg	1.6E-05	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	4.7E-07	4.7E-08
Anthracene	4.6E-03	mg/kg	1.9E-05	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	9.6E-08	9.6E-09
Benzo(a)anthracene	1.7E-03	mg/kg	7.4E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.4E-06	7.4E-07
Benzo(a)pyrene	1.1E-03	mg/kg	4.7E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.7E-06	4.7E-07
Benzo(b)fluoranthene	1.5E-03	mg/kg	6.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.2E-06	6.2E-07
Benzo(g,h,i)perylene	9.9E-04	mg/kg	4.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.2E-06	4.2E-07
Benzo(k)fluoranthene	1.4E-03	mg/kg	5.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.9E-06	5.9E-07
Chrysene	3.2E-03	mg/kg	1.3E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-05	1.3E-06
Dibenzo(a,h)anthracene	3.9E-04	mg/kg	1.6E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-06	1.6E-07
Dibenzofuran	3.6E-03	mg/kg	1.5E-05	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	6.0E-07	6.0E-08
Fluoranthene	1.3E-02	mg/kg	5.5E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.4E-07	2.2E-07
Fluorene	6.1E-03	mg/kg	2.6E-05	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.0E-06	1.0E-07
Naphthalene	2.3E-03	mg/kg	9.8E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	3.3E-07	3.3E-08
Phenanthrene	1.7E-02	mg/kg	7.2E-05	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	4.8E-06	4.8E-07
Pyrene	5.8E-03	mg/kg	2.4E-05	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	3.2E-07	1.9E-07
4,4'-DDD	1.7E-02	mg/kg	7.3E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	9.2E-05	1.8E-05
4,4'-DDE	4.3E-02	mg/kg	1.8E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.3E-04	4.5E-05
4,4'-DDT	6.3E-03	mg/kg	2.6E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.3E-05	6.6E-06
alpha-Chlordane	2.1E-02	mg/kg	8.8E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.9E-05	9.6E-06
Aroclor, Total	2.6E-01	mg/kg	1.1E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.2E-02	7.2E-03
Aroclor-1254	2.0E-01	mg/kg	8.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	5.7E-02	5.7E-03
Aroclor-1268	5.5E-02	mg/kg	2.3E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.5E-02	1.5E-03
Dieldrin	4.2E-03	mg/kg	1.8E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.2E-03	1.2E-04
gamma-BHC	8.1E-04	mg/kg	3.4E-06	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	2.5E-04	2.5E-05
gamma-Chlordane	1.1E-02	mg/kg	4.7E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.0E-05	5.1E-06
Heptachlor Epoxide	8.1E-04	mg/kg	3.4E-06	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	2.7E-05	2.0E-05
Technical Chlordane	2.8E-01	mg/kg	1.2E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.6E-04	1.3E-04
Aluminum	3.0E+01	mg/kg	1.3E-01	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	6.6E-02	6.6E-03
Antimony	1.1E-03	mg/kg	4.4E-06	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.7E-04	1.7E-05
Barium	9.1E-01	mg/kg	3.8E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.1E-05	2.4E-05
Beryllium	5.2E-03	mg/kg	2.2E-05	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.8E-05	1.8E-06
Cadmium	2.9E-02	mg/kg	1.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-04	1.2E-05
Chromium	1.2E-01	mg/kg	5.0E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.4E-07	3.4E-08
Cobalt	7.9E-02	mg/kg	3.3E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	4.4E-03	4.4E-04
Copper	1.0E+00	mg/kg	4.2E-03	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.6E-04	2.8E-04
Lead	1.2E-02	mg/kg	5.1E-05	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	4.0E-07	1.4E-07
Manganese	6.2E+00	mg/kg	2.6E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.0E-04	9.2E-05
Mercury	1.9E-01	mg/kg	8.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.9E-04	7.9E-05
Mercury (methyl)	1.9E-01	mg/kg	8.1E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	5.4E-02	3.3E-02
Nickel	7.1E-02	mg/kg	3.0E-04	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.2E-05	4.7E-06
Silver	3.1E-02	mg/kg	1.3E-04	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	5.9E-06	5.9E-07
Thallium	1.9E-03	mg/kg	8.1E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	5.8E-05	5.8E-06
Vanadium	1.0E-01	mg/kg	4.3E-04	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.0E-03	2.0E-04

TABLE N-7.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Zinc	1.6E+01	mg/kg	6.8E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	3.5E-04	1.7E-04
Toxicity Equivalency - Mammals	2.1E-06	mg/kg	8.9E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	8.9E-03	8.9E-04
Toxicity Equivalency (PCB) - Mammals	1.2E-05	mg/kg	4.9E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	4.9E-02	4.9E-03
							HAZARD INDICES:	3.3E-01	6.1E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-7.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 5.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Cobalt	6.5E-05	6.4E-01	-	3.7E-01	4.4E-03	***1.0E+00***	***19%***
Toxicity Equivalency - Mammals	2.3E-04	2.1E-01	-	3.7E-01	8.9E-03	5.9E-01	***11%***
Aroclor, Total		8.4E-02	-	3.4E-01	7.2E-02	5.0E-01	9%
Arsenic		4.9E-01	-			4.9E-01	9%
Molybdenum		4.0E-01	-	8.6E-02		4.9E-01	9%
Aroclor-1254		6.0E-02	-	2.9E-01	5.7E-02	4.1E-01	8%
Toxicity Equivalency (PCB) - Mammals		1.5E-01	-	1.4E-01	4.9E-02	3.4E-01	6%
Copper	1.9E-05	3.8E-02	-	2.7E-01	3.6E-04	3.0E-01	6%
Antimony		1.7E-01	-	6.2E-02	1.7E-04	2.3E-01	4%
Mercury (methyl)		1.0E-04	-	1.7E-01	5.4E-02	2.3E-01	4%
Manganese	6.1E-05			1.5E-01	3.0E-04	1.5E-01	3%
Aluminum	1.9E-03			5.4E-02	6.6E-02	1.2E-01	2%
Aroclor-1268		5.5E-02	-	4.8E-02	1.5E-02	1.2E-01	2%
Selenium	1.8E-05	3.4E-02	-	7.3E-02		1.1E-01	2%
Barium		1.1E-02	-	4.0E-02	5.1E-05	5.1E-02	1%
Vanadium				4.6E-02	1.0E-03	4.7E-02	1%
Thallium	2.2E-06	1.6E-02	-	8.2E-03	5.8E-05	2.4E-02	0%
Zinc	4.3E-06	6.8E-03	-	1.3E-02	3.5E-04	2.1E-02	0%
Cadmium		4.9E-03	-	1.0E-02	1.2E-04	1.5E-02	0%
Chrysene		1.1E-02	-		1.3E-05	1.1E-02	0%
Aroclor-1260		1.0E-02	-			1.0E-02	0%
Benzo(b)fluoranthene		9.1E-03	-		6.2E-06	9.1E-03	0%
Lead	9.4E-07	8.6E-03	-	4.8E-04	4.0E-07	9.1E-03	0%
Benzo(a)anthracene		8.9E-03	-		7.4E-06	8.9E-03	0%
Benzo(k)fluoranthene		8.4E-03	-		5.9E-06	8.5E-03	0%
Benzo(a)pyrene		8.4E-03	-		4.7E-06	8.4E-03	0%
Indeno(1,2,3-cd)pyrene		6.2E-03	-			6.2E-03	0%
Benzo(g,h,i)perylene		5.2E-03	-		4.2E-06	5.2E-03	0%
Dibenzo(a,h)anthracene		4.7E-03	-		1.6E-06	4.7E-03	0%
Mercury		1.3E-03	-	2.6E-03	7.9E-04	4.6E-03	0%
Dieldrin		1.0E-03	-		1.2E-03	2.2E-03	0%
Silver		7.0E-04	-	1.1E-03	5.9E-06	1.8E-03	0%
Nickel	3.2E-06			1.3E-03	1.2E-05	1.3E-03	0%
Technical Chlordane		5.3E-04	-	4.7E-04	2.6E-04	1.3E-03	0%
4,4'-DDE		4.5E-05	-	6.3E-04	2.3E-04	9.0E-04	0%
Phenanthrene		8.3E-04	-		4.8E-06	8.3E-04	0%
Endrin		4.6E-04	-			4.6E-04	0%
Chromium	7.0E-08	4.1E-04	-	1.8E-05	3.4E-07	4.3E-04	0%
bis(2-Ethylhexyl)phthalate		3.1E-04	-			3.1E-04	0%
gamma-BHC					2.5E-04	2.5E-04	0%
Pyrene		2.2E-04	-		3.2E-07	2.2E-04	0%
Fluoranthene		1.6E-04	-		4.4E-07	1.6E-04	0%
4,4'-DDD		3.7E-05	-		9.2E-05	1.3E-04	0%
Fluorene		1.1E-04	-		1.0E-06	1.1E-04	0%
Endosulfan sulfate				1.1E-04		1.1E-04	0%

TABLE N-7.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	5.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Acenaphthene		8.3E-05	-		4.9E-07	8.3E-05	0%
Dibenzofuran		7.0E-05	-		6.0E-07	7.1E-05	0%
Carbazole		4.0E-05	-			4.0E-05	0%
alpha-Chlordane		8.0E-06	-	7.1E-06	1.9E-05	3.4E-05	0%
Acenaphthylene		3.3E-05	-		4.7E-07	3.4E-05	0%
4,4'-DDT					3.3E-05	3.3E-05	0%
Di-n-Butylphthalate		2.8E-05	-			2.8E-05	0%
Anthracene		2.8E-05	-		9.6E-08	2.8E-05	0%
Heptachlor epoxide					2.7E-05	2.7E-05	0%
Beryllium	1.9E-06				1.8E-05	2.0E-05	0%
Naphthalene		1.9E-05	-		3.3E-07	1.9E-05	0%
gamma-Chlordane		6.3E-06	-	2.3E-06	1.0E-05	1.9E-05	0%
2-Methylnaphthalene		1.5E-05	-		7.8E-07	1.6E-05	0%
1,1'-Biphenyl					1.1E-07	1.1E-07	0%
Pentachlorophenol							
Aroclor-1248							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endosulfan II							
Endrin aldehyde							
Heptachlor							
4-Methylphenol							
2,4,5-Trichlorophenol							
Methoxychlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	2.3E-03	2.5E+00	-	2.6E+00	3.3E-01	5.3E+00	
PERCENTAGE OF TOTAL RISK	0%	46%		48%	6%	100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-7.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 9.8E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Copper	1.5E-05	2.9E-02	-	2.1E-01	2.8E-04	2.4E-01	***24%***
Mercury (methyl)		6.2E-05	-	1.1E-01	3.3E-02	1.4E-01	***14%***
Cobalt	6.5E-06	6.4E-02	-	3.7E-02	4.4E-04	1.0E-01	***10%***
Selenium	1.1E-05	2.1E-02	-	4.4E-02		6.5E-02	7%
Toxicity Equivalency - Mammals	2.3E-05	2.1E-02	-	3.7E-02	8.9E-04	5.9E-02	6%
Aroclor, Total		8.4E-03	-	3.4E-02	7.2E-03	5.0E-02	5%
Arsenic		4.9E-02	-			4.9E-02	5%
Molybdenum		4.0E-02	-	8.6E-03		4.9E-02	5%
Manganese	1.9E-05			4.8E-02	9.2E-05	4.8E-02	5%
Aroclor-1254		6.0E-03	-	2.9E-02	5.7E-03	4.1E-02	4%
Toxicity Equivalency (PCB) - Mammals		1.5E-02	-	1.4E-02	4.9E-03	3.4E-02	3%
Barium		5.1E-03	-	1.9E-02	2.4E-05	2.4E-02	2%
Antimony		1.7E-02	-	6.2E-03	1.7E-05	2.3E-02	2%
Aluminum	1.9E-04			5.4E-03	6.6E-03	1.2E-02	1%
Aroclor-1268		5.5E-03	-	4.8E-03	1.5E-03	1.2E-02	1%
Zinc	2.1E-06	3.4E-03	-	6.7E-03	1.7E-04	1.0E-02	1%
Vanadium				9.2E-03	2.0E-04	9.4E-03	1%
Lead	3.1E-07	2.9E-03	-	1.6E-04	1.4E-07	3.0E-03	0%
Thallium	2.2E-07	1.6E-03	-	8.2E-04	5.8E-06	2.4E-03	0%
Cadmium		4.9E-04	-	1.0E-03	1.2E-05	1.5E-03	0%
Chrysene		1.1E-03	-		1.3E-06	1.1E-03	0%
Aroclor-1260		1.0E-03	-			1.0E-03	0%
Benzo(b)fluoranthene		9.1E-04	-		6.2E-07	9.1E-04	0%
Benzo(a)anthracene		8.9E-04	-		7.4E-07	8.9E-04	0%
Benzo(k)fluoranthene		8.4E-04	-		5.9E-07	8.5E-04	0%
Benzo(a)pyrene		8.4E-04	-		4.7E-07	8.4E-04	0%
Technical Chlordane		2.6E-04	-	2.3E-04	1.3E-04	6.3E-04	0%
Indeno(1,2,3-cd)pyrene		6.2E-04	-			6.2E-04	0%
Nickel	1.3E-06			5.2E-04	4.7E-06	5.3E-04	0%
Benzo(g,h,i)perylene		5.2E-04	-		4.2E-07	5.2E-04	0%
Dibenzo(a,h)anthracene		4.7E-04	-		1.6E-07	4.7E-04	0%
Mercury		1.3E-04	-	2.6E-04	7.9E-05	4.6E-04	0%
Endrin		2.3E-04	-			2.3E-04	0%
Dieldrin		1.0E-04	-		1.2E-04	2.2E-04	0%
Silver		7.0E-05	-	1.1E-04	5.9E-07	1.8E-04	0%
4,4'-DDE		9.1E-06	-	1.3E-04	4.5E-05	1.8E-04	0%
Pyrene		1.3E-04	-		1.9E-07	1.3E-04	0%
Phenanthrene		8.3E-05	-		4.8E-07	8.3E-05	0%
Fluoranthene		8.0E-05	-		2.2E-07	8.0E-05	0%
Chromium	7.0E-09	4.1E-05	-	1.8E-06	3.4E-08	4.3E-05	0%
Endosulfan sulfate				3.2E-05		3.2E-05	0%
bis(2-Ethylhexyl)phthalate		3.1E-05	-			3.1E-05	0%
4,4'-DDD		7.3E-06	-		1.8E-05	2.6E-05	0%
gamma-BHC					2.5E-05	2.5E-05	0%
Heptachlor epoxide					2.0E-05	2.0E-05	0%

TABLE N-7.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 9.8E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
alpha-Chlordane		4.0E-06	-	3.6E-06	9.6E-06	1.7E-05	0%
Fluorene		1.1E-05	-		1.0E-07	1.1E-05	0%
gamma-Chlordane		3.2E-06	-	1.1E-06	5.1E-06	9.4E-06	0%
Acenaphthene		8.3E-06	-		4.9E-08	8.3E-06	0%
Di-n-Butylphthalate		7.1E-06	-			7.1E-06	0%
Dibenzofuran		7.0E-06	-		6.0E-08	7.1E-06	0%
4,4'-DDT					6.6E-06	6.6E-06	0%
Carbazole		4.0E-06	-			4.0E-06	0%
Acenaphthylene		3.3E-06	-		4.7E-08	3.4E-06	0%
Anthracene		2.8E-06	-		9.6E-09	2.8E-06	0%
Beryllium	1.9E-07				1.8E-06	2.0E-06	0%
Naphthalene		1.9E-06	-		3.3E-08	1.9E-06	0%
2-Methylnaphthalene		1.5E-06	-		7.8E-08	1.6E-06	0%
1,1'-Biphenyl					2.3E-08	2.3E-08	0%
Pentachlorophenol							
Aroclor-1248							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endosulfan II							
Endrin aldehyde							
Heptachlor							
4-Methylphenol							
2,4,5-Trichlorophenol							
Methoxychlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**2.7E-04**	**3.0E-01**	**-**	**6.2E-01**	**6.1E-02**	**9.8E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**31%**		**63%**	**6%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-8.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	8.7E-06	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	4.8E-07	4.8E-08
alpha-Chlordane	6.9E-07	mg/L	6.0E-09	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.3E-09	6.6E-10
Endosulfan Sulfate	5.9E-05	mg/L	5.2E-07	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	9.1E-07	2.7E-07
gamma-Chlordane	2.5E-05	mg/L	2.2E-07	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.8E-08	2.4E-08
Aluminum	6.5E-01	mg/L	5.7E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	2.9E-03	2.9E-04
Beryllium	5.0E-05	mg/L	4.4E-07	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	3.6E-07	3.6E-08
Chromium	5.1E-03	mg/L	4.5E-05	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.1E-08	3.1E-09
Cobalt	6.0E-04	mg/L	5.2E-06	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.9E-05	6.9E-06
Copper	1.3E-02	mg/L	1.2E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.0E-05	7.7E-06
Lead	2.1E-02	mg/L	1.8E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.4E-06	4.8E-07
Manganese	4.0E-01	mg/L	3.5E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	4.0E-05	1.2E-05
Nickel	4.9E-03	mg/L	4.3E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.7E-06	6.9E-07
Selenium	2.4E-03	mg/L	2.1E-05	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.0E-04	6.3E-05
Silver	8.3E-04	mg/L	7.3E-06	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	3.3E-07	3.3E-08
Thallium	3.7E-03	mg/L	3.2E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.3E-04	2.3E-05
Zinc	6.5E-02	mg/L	5.7E-04	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.9E-06	1.5E-06
Nitrogen, Ammonia	2.4E-01	mg/L	2.1E-03	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.1E-06	mg/L	9.8E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	9.8E-03	9.8E-04
							HAZARD INDICES:	1.3E-02	1.4E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-8.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.4E-01	mg/kg	1.7E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	5.8E-06	5.8E-07
Acenaphthene	1.2E+00	mg/kg	1.5E-03	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	4.4E-05	4.4E-06
Acenaphthylene	9.7E-01	mg/kg	1.2E-03	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	3.5E-05	3.5E-06
Anthracene	1.2E+00	mg/kg	1.6E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	7.9E-06	7.9E-07
Benzo(a)anthracene	2.2E+00	mg/kg	2.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.8E-03	2.8E-04
Benzo(a)pyrene	2.3E+00	mg/kg	3.0E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.0E-03	3.0E-04
Benzo(b)fluoranthene	2.8E+00	mg/kg	3.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.5E-03	3.5E-04
Benzo(g,h,i)perylene	2.0E+00	mg/kg	2.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.6E-03	2.6E-04
Benzo(k)fluoranthene	2.6E+00	mg/kg	3.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.3E-03	3.3E-04
bis(2-Ethylhexyl)phthalate	2.3E+00	mg/kg	2.9E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.6E-04	1.6E-05
Carbazole	1.5E+00	mg/kg	1.9E-03	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	1.9E-05	1.9E-06
Chrysene	3.0E+00	mg/kg	3.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.8E-03	3.8E-04
Dibenzo(a,h)anthracene	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-03	1.8E-04
Dibenzofuran	6.4E-01	mg/kg	8.2E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	3.3E-05	3.3E-06
Di-n-Butylphthalate	6.1E-01	mg/kg	7.8E-04	mg/kg-d	1.0E+02	4.0E+02	mg/kg-d	7.8E-06	2.0E
Fluoranthene	5.2E+00	mg/kg	6.6E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	5.3E-05	2.7
Fluorene	9.3E-01	mg/kg	1.2E-03	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	4.8E-05	4.8E-06
Indeno(1,2,3-cd)pyrene	1.9E+00	mg/kg	2.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.5E-03	2.5E-04
Naphthalene	1.8E-01	mg/kg	2.3E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	7.7E-06	7.7E-07
Phenanthrene	2.9E+00	mg/kg	3.7E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.5E-04	2.5E-05
Pyrene	4.4E+00	mg/kg	5.6E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	7.5E-05	4.5E-05
4,4'-DDD	6.0E-03	mg/kg	7.7E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	9.6E-06	1.9E-06
4,4'-DDE	1.6E-02	mg/kg	2.1E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.6E-05	5.1E-06
alpha-Chlordane	1.1E-02	mg/kg	1.4E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.1E-06	1.6E-06
Aroclor, Total	1.5E+00	mg/kg	2.0E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.3E-01	1.3E-02
Aroclor-1248	1.4E-01	mg/kg	1.8E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.2E-02	1.2E-03
Aroclor-1254	1.5E+00	mg/kg	1.9E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.3E-01	1.3E-02
Aroclor-1260	2.0E-01	mg/kg	2.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.7E-02	1.7E-03
Aroclor-1268	7.9E-02	mg/kg	1.0E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	6.8E-03	6.8E-04
Dieldrin	9.0E-03	mg/kg	1.2E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.7E-04	7.7E-05
Endosulfan II	3.7E-02	mg/kg	4.8E-05	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	8.4E-05	2.5E-05
Endosulfan sulfate	2.7E-03	mg/kg	3.4E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	6.0E-06	1.8E-06
Endrin	3.2E-03	mg/kg	4.1E-06	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	1.6E-04	8.1E-05
gamma-Chlordane	9.7E-03	mg/kg	1.2E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.7E-06	1.4E-06
Methoxychlor	1.1E-02	mg/kg	1.4E-05	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	2.8E-06	3.9E-07
Technical Chlordane	5.2E-01	mg/kg	6.6E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.4E-04	7.2E-05
Antimony	2.3E+00	mg/kg	2.9E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.1E-01	1.1E-02
Arsenic	5.8E+00	mg/kg	7.5E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.6E-01	1.6E-02
Barium	1.4E+02	mg/kg	1.8E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.4E-03	1.1E-03
Cadmium	1.2E+00	mg/kg	1.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-03	1.6E-04
Chromium	1.4E+02	mg/kg	1.8E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.2E-04	1.2E-05
Cobalt	7.1E+00	mg/kg	9.1E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.2E-01	1.2E-02
Copper	1.2E+02	mg/kg	1.5E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.3E-02	1.0E
Cyanide	2.4E+00	mg/kg	3.1E-03	mg/kg-d	4.8E-01	4.8E+00	mg/kg-d	6.4E-03	6.4E
Lead	3.3E+02	mg/kg	4.2E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.3E-03	1.1E-03
Mercury	4.7E-01	mg/kg	6.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.9E-04	5.9E-05

TABLE N-8.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Mercury (methyl)	8.0E-04	mg/kg	1.0E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	6.9E-05	4.2E-05
Molybdenum	1.3E+01	mg/kg	1.7E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	8.9E-02	8.9E-03
Selenium	1.1E+00	mg/kg	1.4E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	6.8E-03	4.1E-03
Silver	2.8E+00	mg/kg	3.6E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	1.6E-04	1.6E-05
Thallium	6.8E+00	mg/kg	8.7E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	6.2E-02	6.2E-03
Zinc	3.5E+02	mg/kg	4.5E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.3E-03	1.2E-03
Toxicity Equivalency - Mammals	5.8E-03	mg/kg	7.4E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**7.4E+00**	7.4E-01
Toxicity Equivalency (PCB) - Mammals	1.1E-07	mg/kg	1.4E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.4E-04	1.4E-05
							HAZARD INDICES:	**8.3E+00**	8.4E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-8.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	3.7E-04	mg/kg	9.1E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.1E-05	2.3E-06
4,4'-DDE	3.2E-03	mg/kg	7.9E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	9.9E-05	2.0E-05
alpha-Chlordane	3.0E-04	mg/kg	7.4E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.6E-06	8.1E-07
Aroclor, Total	7.6E-02	mg/kg	1.9E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.3E-01	1.3E-02
Aroclor-1254	7.0E-02	mg/kg	1.7E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.2E-01	1.2E-02
Aroclor-1268	6.0E-03	mg/kg	1.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.8E-03	9.8E-04
Dieldrin	4.7E-04	mg/kg	1.2E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.7E-04	7.7E-05
Technical Chlordane	1.6E-02	mg/kg	4.1E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.9E-05	4.4E-05
Aluminum	1.6E+00	mg/kg	3.9E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	2.0E-02	2.0E-03
Antimony	1.7E-02	mg/kg	4.1E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.6E-02	1.6E-03
Barium	2.1E+01	mg/kg	5.2E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	6.9E-03	3.2E-03
Cadmium	9.2E-02	mg/kg	2.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-03	2.3E-04
Chromium	2.8E-01	mg/kg	7.0E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	4.7E-06	4.7E-07
Cobalt	1.7E-01	mg/kg	4.3E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	5.7E-02	5.7E-03
Copper	3.0E+01	mg/kg	7.5E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.4E-02	4.9E-02
Lead	5.9E-01	mg/kg	1.5E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.2E-04	3.9E-05
Manganese	7.2E+01	mg/kg	1.8E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.0E-02	6.2E-03
Mercury	2.5E-02	mg/kg	6.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.0E-04	6.0E-05
Mercury (methyl)	2.3E-02	mg/kg	5.6E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	3.7E-02	2.3E-02
Molybdenum	1.3E-01	mg/kg	3.2E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	1.7E-02	1.7E-03
Nickel	3.2E-01	mg/kg	7.8E-03	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	3.1E-04	1.2E-04
Selenium	1.3E-01	mg/kg	3.1E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.6E-02	9.4E-03
Silver	2.1E-01	mg/kg	5.2E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	2.3E-04	2.3E-05
Thallium	8.9E-03	mg/kg	2.2E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.6E-03	1.6E-04
Vanadium	2.2E-01	mg/kg	5.4E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.3E-02	2.6E-03
Zinc	2.1E+01	mg/kg	5.2E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.7E-03	1.3E-03
Toxicity Equivalency - Mammals	1.8E-04	mg/kg	4.4E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**4.4E+00**	4.4E-01
							HAZARD INDICES:	**5.0E+00**	5.8E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-8.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
1,1'-Biphenyl	9.9E-04	mg/kg	8.8E-07	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	1.8E-08	3.5E-09
2-Methylnaphthalene	3.8E-03	mg/kg	3.4E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.1E-07	1.1E-08
Acenaphthene	3.5E-03	mg/kg	3.1E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	8.9E-08	8.9E-09
Acenaphthylene	2.2E-03	mg/kg	1.9E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	5.5E-08	5.5E-09
Anthracene	2.7E-03	mg/kg	2.4E-06	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.2E-08	1.2E-09
Benzo(a)anthracene	1.3E-03	mg/kg	1.1E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-06	1.1E-07
Benzo(a)pyrene	9.5E-04	mg/kg	8.5E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.5E-07	8.5E-08
Benzo(b)fluoranthene	1.2E-03	mg/kg	1.1E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-06	1.1E-07
Benzo(g,h,i)perylene	6.3E-04	mg/kg	5.6E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.6E-07	5.6E-08
Benzo(k)fluoranthene	1.1E-03	mg/kg	9.4E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.4E-07	9.4E-08
Chrysene	1.9E-03	mg/kg	1.7E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.7E-06	1.7E-07
Dibenzo(a,h)anthracene	2.7E-04	mg/kg	2.4E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.4E-07	2.4E-08
Dibenzofuran	2.5E-03	mg/kg	2.2E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	8.8E-08	8.8E-09
Fluoranthene	8.3E-03	mg/kg	7.4E-06	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	5.9E-08	3.0E-08
Fluorene	4.1E-03	mg/kg	3.6E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.5E-07	1.5E-08
Indeno(1,2,3-cd)pyrene	7.9E-04	mg/kg	7.1E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.1E-07	7.1E-08
Naphthalene	2.8E-03	mg/kg	2.5E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	8.4E-08	8.4E-09
Phenanthrene	9.6E-03	mg/kg	8.6E-06	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	5.7E-07	5.7E-08
Pyrene	2.3E-03	mg/kg	2.0E-06	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	2.7E-08	1.6E-08
4,4'-DDD	1.3E-02	mg/kg	1.1E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.4E-05	2.8E-06
4,4'-DDE	2.9E-02	mg/kg	2.6E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.2E-05	6.4E-06
4,4'-DDT	6.9E-03	mg/kg	6.1E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.7E-06	1.5E-06
alpha-Chlordane	1.7E-02	mg/kg	1.5E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.3E-06	1.6E-06
Aroclor, Total	1.6E+00	mg/kg	1.4E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.6E-02	9.6E-03
Aroclor-1254	1.6E+00	mg/kg	1.4E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.4E-02	9.4E-03
Aroclor-1268	2.9E-02	mg/kg	2.6E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.8E-03	1.8E-04
Dieldrin	5.4E-03	mg/kg	4.8E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.2E-04	3.2E-05
gamma-BHC	1.9E-04	mg/kg	1.7E-07	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	1.3E-05	1.3E-06
gamma-Chlordane	8.9E-03	mg/kg	8.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.7E-06	8.7E-07
Heptachlor Epoxide	6.1E-04	mg/kg	5.4E-07	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	4.4E-06	3.1E-06
Technical Chlordane	3.5E-01	mg/kg	3.1E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.8E-05	3.4E-05
Aluminum	8.0E+00	mg/kg	7.2E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	3.7E-03	3.7E-04
Barium	7.4E-01	mg/kg	6.6E-04	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	8.9E-06	4.2E-06
Cadmium	2.4E-02	mg/kg	2.2E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-05	2.2E-06
Chromium	1.1E-01	mg/kg	1.0E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	6.8E-08	6.8E-09
Cobalt	8.9E-02	mg/kg	7.9E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.0E-03	1.0E-04
Copper	8.7E-01	mg/kg	7.8E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.7E-05	5.1E-05
Lead	1.6E-01	mg/kg	1.4E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.1E-06	3.7E-07
Manganese	6.8E+00	mg/kg	6.1E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.9E-05	2.1E-05
Mercury	1.4E-01	mg/kg	1.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-04	1.2E-05
Mercury (methyl)	1.5E-01	mg/kg	1.3E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	8.8E-03	5.3E-03
Molybdenum	9.4E-02	mg/kg	8.4E-05	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.4E-04	4.4E-05
Nickel	1.5E-01	mg/kg	1.3E-04	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	5.2E-06	2.1E-06
Selenium	2.8E-01	mg/kg	2.5E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.3E-03	7.7E-04
Vanadium	9.7E-02	mg/kg	8.6E-05	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	2.1E-04	4.1E-05
Zinc	2.1E+01	mg/kg	1.9E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	9.6E-05	4.8E-05

TABLE N-8.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Mammals	3.3E-04	mg/kg	3.0E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.0E-01	3.0E-02
Toxicity Equivalency (PCB) - Mammals	4.9E-05	mg/kg	4.3E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	4.3E-02	4.3E-03
							HAZARD INDICES:	5.5E-01	6.0E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-8.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.4E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	9.8E-03	7.4E+00	-	4.4E+00	3.0E-01	***1.2E+01***	***88%***
Aroclor, Total		1.3E-01	-	1.3E-01	9.6E-02	3.5E-01	3%
Aroclor-1254		1.3E-01	-	1.2E-01	9.4E-02	3.4E-01	2%
Cobalt	6.9E-05	1.2E-01	-	5.7E-02	1.0E-03	1.8E-01	1%
Arsenic		1.6E-01	-			1.6E-01	1%
Antimony		1.1E-01	-	1.6E-02		1.3E-01	1%
Molybdenum		8.9E-02	-	1.7E-02	4.4E-04	1.1E-01	1%
Copper	1.0E-05	1.3E-02	-	6.4E-02	6.7E-05	7.7E-02	1%
Thallium	2.3E-04	6.2E-02	-	1.6E-03		6.4E-02	0%
Mercury (methyl)		6.9E-05	-	3.7E-02	8.8E-03	4.6E-02	0%
Toxicity Equivalency (PCB) - Mammals		1.4E-04	-		4.3E-02	4.4E-02	0%
Aluminum	2.9E-03			2.0E-02	3.7E-03	2.7E-02	0%
Selenium	1.0E-04	6.8E-03	-	1.6E-02	1.3E-03	2.4E-02	0%
Manganese	4.0E-05			2.0E-02	6.9E-05	2.0E-02	0%
Aroclor-1268		6.8E-03	-	9.8E-03	1.8E-03	1.8E-02	0%
Aroclor-1260		1.7E-02	-			1.7E-02	0%
Vanadium				1.3E-02	2.1E-04	1.3E-02	0%
Aroclor-1248		1.2E-02	-			1.2E-02	0%
Barium		2.4E-03	-	6.9E-03	8.9E-06	9.3E-03	0%
Cyanide		6.4E-03	-			6.4E-03	0%
Zinc	2.9E-06	2.3E-03	-	2.7E-03	9.6E-05	5.1E-03	0%
Cadmium		1.6E-03	-	2.3E-03	2.2E-05	3.8E-03	0%
Chrysene		3.8E-03	-		1.7E-06	3.8E-03	0%
Benzo(b)fluoranthene		3.5E-03	-		1.1E-06	3.5E-03	0%
Lead	1.4E-06	3.3E-03	-	1.2E-04	1.1E-06	3.5E-03	0%
Benzo(k)fluoranthene		3.3E-03	-		9.4E-07	3.3E-03	0%
Benzo(a)pyrene		3.0E-03	-		8.5E-07	3.0E-03	0%
Benzo(a)anthracene		2.8E-03	-		1.1E-06	2.8E-03	0%
Benzo(g,h,i)perylene		2.6E-03	-		5.6E-07	2.6E-03	0%
Indeno(1,2,3-cd)pyrene		2.5E-03	-		7.1E-07	2.5E-03	0%
Dieldrin		7.7E-04	-	7.7E-04	3.2E-04	1.9E-03	0%
Dibenzo(a,h)anthracene		1.8E-03	-		2.4E-07	1.8E-03	0%
Mercury		5.9E-04	-	6.0E-04	1.2E-04	1.3E-03	0%
Silver	3.3E-07	1.6E-04	-	2.3E-04		3.9E-04	0%
Nickel	1.7E-06			3.1E-04	5.2E-06	3.2E-04	0%
Technical Chlordane		1.4E-04	-	8.9E-05	6.8E-05	3.0E-04	0%
Phenanthrene		2.5E-04	-		5.7E-07	2.5E-04	0%
Endrin		1.6E-04	-			1.6E-04	0%
bis(2-Ethylhexyl)phthalate	4.8E-07	1.6E-04	-			1.6E-04	0%
4,4'-DDE		2.6E-05	-	9.9E-05	3.2E-05	1.6E-04	0%
Chromium	3.1E-08	1.2E-04	-	4.7E-06	6.8E-08	1.3E-04	0%
Endosulfan II		8.4E-05	-			8.4E-05	0%
Pyrene		7.5E-05	-		2.7E-08	7.5E-05	0%
Fluoranthene		5.3E-05	-		5.9E-08	5.3E-05	0%
Fluorene		4.8E-05	-		1.5E-07	4.8E-05	0%

TABLE N-8.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.4E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Acenaphthene		4.4E-05	-		8.9E-08	4.4E-05	0%
Acenaphthylene		3.5E-05	-		5.5E-08	3.6E-05	0%
4,4'-DDD		9.6E-06	-	1.1E-05	1.4E-05	3.5E-05	0%
Dibenzofuran		3.3E-05	-		8.8E-08	3.3E-05	0%
Carbazole		1.9E-05	-			1.9E-05	0%
gamma-BHC					1.3E-05	1.3E-05	0%
alpha-Chlordane	1.3E-09	3.1E-06	-	1.6E-06	3.3E-06	8.0E-06	0%
Anthracene		7.9E-06	-		1.2E-08	7.9E-06	0%
Naphthalene		7.7E-06	-		8.4E-08	7.8E-06	0%
Di-n-Butylphthalate		7.8E-06	-			7.8E-06	0%
4,4'-DDT					7.7E-06	7.7E-06	0%
Endosulfan sulfate	9.1E-07	6.0E-06	-			6.9E-06	0%
2-Methylnaphthalene		5.8E-06	-		1.1E-07	5.9E-06	0%
gamma-Chlordane	4.8E-08	2.7E-06	-		1.7E-06	4.5E-06	0%
Heptachlor epoxide					4.4E-06	4.4E-06	0%
Methoxychlor		2.8E-06	-			2.8E-06	0%
Beryllium	3.6E-07					3.6E-07	0%
1,1'-Biphenyl					1.8E-08	1.8E-08	0%
Pentachlorophenol							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Heptachlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**1.3E-02**	**8.3E+00**	**-**	**5.0E+00**	**5.5E-01**	**1.4E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**60%**		**36%**	**4%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-8.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	9.8E-04	7.4E-01	-	4.4E-01	3.0E-02	***1.2E+00***	***82%***
Copper	7.7E-06	1.0E-02	-	4.9E-02	5.1E-05	6.0E-02	4%
Aroclor, Total		1.3E-02	-	1.3E-02	9.6E-03	3.5E-02	2%
Aroclor-1254		1.3E-02	-	1.2E-02	9.4E-03	3.4E-02	2%
Mercury (methyl)		4.2E-05	-	2.3E-02	5.3E-03	2.8E-02	2%
Cobalt	6.9E-06	1.2E-02	-	5.7E-03	1.0E-04	1.8E-02	1%
Arsenic		1.6E-02	-			1.6E-02	1%
Selenium	6.3E-05	4.1E-03	-	9.4E-03	7.7E-04	1.4E-02	1%
Antimony		1.1E-02	-	1.6E-03		1.3E-02	1%
Molybdenum		8.9E-03	-	1.7E-03	4.4E-05	1.1E-02	1%
Thallium	2.3E-05	6.2E-03	-	1.6E-04		6.4E-03	0%
Manganese	1.2E-05			6.2E-03	2.1E-05	6.3E-03	0%
Barium		1.1E-03	-	3.2E-03	4.2E-06	4.3E-03	0%
Toxicity Equivalency (PCB) - Mammals		1.4E-05	-		4.3E-03	4.4E-03	0%
Aluminum	2.9E-04			2.0E-03	3.7E-04	2.7E-03	0%
Vanadium				2.6E-03	4.1E-05	2.6E-03	0%
Zinc	1.5E-06	1.2E-03	-	1.3E-03	4.8E-05	2.5E-03	0%
Aroclor-1268		6.8E-04	-	9.8E-04	1.8E-04	1.8E-03	0%
Aroclor-1260		1.7E-03	-			1.7E-03	0%
Aroclor-1248		1.2E-03	-			1.2E-03	0%
Lead	4.8E-07	1.1E-03	-	3.9E-05	3.7E-07	1.2E-03	0%
Cyanide		6.4E-04	-			6.4E-04	0%
Cadmium		1.6E-04	-	2.3E-04	2.2E-06	3.8E-04	0%
Chrysene		3.8E-04	-		1.7E-07	3.8E-04	0%
Benzo(b)fluoranthene		3.5E-04	-		1.1E-07	3.5E-04	0%
Benzo(k)fluoranthene		3.3E-04	-		9.4E-08	3.3E-04	0%
Benzo(a)pyrene		3.0E-04	-		8.5E-08	3.0E-04	0%
Benzo(a)anthracene		2.8E-04	-		1.1E-07	2.8E-04	0%
Benzo(g,h,i)perylene		2.6E-04	-		5.6E-08	2.6E-04	0%
Indeno(1,2,3-cd)pyrene		2.5E-04	-		7.1E-08	2.5E-04	0%
Dieldrin		7.7E-05	-	7.7E-05	3.2E-05	1.9E-04	0%
Dibenzo(a,h)anthracene		1.8E-04	-		2.4E-08	1.8E-04	0%
Technical Chlordane		7.2E-05	-	4.4E-05	3.4E-05	1.5E-04	0%
Mercury		5.9E-05	-	6.0E-05	1.2E-05	1.3E-04	0%
Nickel	6.9E-07			1.2E-04	2.1E-06	1.3E-04	0%
Endrin		8.1E-05	-			8.1E-05	0%
Pyrene		4.5E-05	-		1.6E-08	4.5E-05	0%
Silver	3.3E-08	1.6E-05	-	2.3E-05		3.9E-05	0%
4,4'-DDE		5.1E-06	-	2.0E-05	6.4E-06	3.1E-05	0%
Fluoranthene		2.7E-05	-		3.0E-08	2.7E-05	0%
Endosulfan II		2.5E-05	-			2.5E-05	0%
Phenanthrene		2.5E-05	-		5.7E-08	2.5E-05	0%
bis(2-Ethylhexyl)phthalate	4.8E-08	1.6E-05	-			1.6E-05	0%
Chromium	3.1E-09	1.2E-05	-	4.7E-07	6.8E-09	1.3E-05	0%
4,4'-DDD		1.9E-06	-	2.3E-06	2.8E-06	7.0E-06	0%

TABLE N-8.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Fluorene		4.8E-06	-		1.5E-08	4.8E-06	0%
Acenaphthene		4.4E-06	-		8.9E-09	4.4E-06	0%
alpha-Chlordane	6.6E-10	1.6E-06	-	8.1E-07	1.6E-06	4.0E-06	0%
Acenaphthylene		3.5E-06	-		5.5E-09	3.6E-06	0%
Dibenzofuran		3.3E-06	-		8.8E-09	3.3E-06	0%
Heptachlor epoxide					3.1E-06	3.1E-06	0%
gamma-Chlordane	2.4E-08	1.4E-06	-		8.7E-07	2.2E-06	0%
Endosulfan sulfate	2.7E-07	1.8E-06	-			2.1E-06	0%
Di-n-Butylphthalate		2.0E-06	-			2.0E-06	0%
Carbazole		1.9E-06	-			1.9E-06	0%
4,4'-DDT					1.5E-06	1.5E-06	0%
gamma-BHC					1.3E-06	1.3E-06	0%
Anthracene		7.9E-07	-		1.2E-09	7.9E-07	0%
Naphthalene		7.7E-07	-		8.4E-09	7.8E-07	0%
2-Methylnaphthalene		5.8E-07	-		1.1E-08	5.9E-07	0%
Methoxychlor		3.9E-07	-			3.9E-07	0%
Beryllium	3.6E-08					3.6E-08	0%
1,1'-Biphenyl					3.5E-09	3.5E-09	0%
Pentachlorophenol							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Heptachlor							
Phenol							
4-Nitrophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Dimethylphthalate							
N-Nitroso-di-n-propylamine							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**1.4E-03**	**8.4E-01**	**-**	**5.8E-01**	**6.0E-02**	**1.5E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**57%**		**39%**	**4%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-9.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	1.5E-04	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	8.1E-06	8.1E-07
alpha-Chlordane	1.9E-05	mg/L	1.7E-07	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.6E-08	1.8E-08
Endosulfan Sulfate	3.2E-06	mg/L	2.8E-08	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	4.9E-08	1.5E-08
gamma-Chlordane	2.1E-05	mg/L	1.8E-07	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.0E-08	2.0E-08
Aluminum	1.8E-01	mg/L	1.6E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	8.1E-04	8.1E-05
Beryllium	2.0E-04	mg/L	1.7E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.5E-06	1.5E-07
Chromium	2.3E-03	mg/L	2.0E-05	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.3E-08	1.3E-09
Cobalt	4.2E-04	mg/L	3.7E-06	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	4.8E-05	4.8E-06
Copper	8.7E-03	mg/L	7.6E-05	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.5E-06	5.0E-06
Lead	4.4E-03	mg/L	3.9E-05	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.1E-07	1.0E-07
Manganese	1.3E-01	mg/L	1.1E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.3E-05	3.9E-06
Nickel	1.9E-03	mg/L	1.6E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	6.5E-07	2.6E-07
Silver	5.9E-04	mg/L	5.2E-06	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	2.3E-07	2.3E-08
Thallium	2.2E-03	mg/L	2.0E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.4E-04	1.4E-05
Zinc	2.8E-02	mg/L	2.4E-04	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.2E-06	6.2E-07
Nitrogen, Ammonia	1.4E-01	mg/L	1.2E-03	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.3E-07	mg/L	1.1E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.1E-03	1.1E-04
							HAZARD INDICES:	2.2E-03	2.2E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-9.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.0E-01	mg/kg	1.3E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	4.3E-06	4.3E-07
Acenaphthene	9.3E-01	mg/kg	1.2E-03	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	3.4E-05	3.4E-06
Acenaphthylene	4.3E-01	mg/kg	5.5E-04	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	1.6E-05	1.6E-06
Anthracene	7.9E-01	mg/kg	1.0E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	5.0E-06	5.0E-07
Benzo(a)anthracene	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-03	1.8E-04
Benzo(a)pyrene	1.4E+00	mg/kg	1.7E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.7E-03	1.7E-04
Benzo(b)fluoranthene	2.1E+00	mg/kg	2.7E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-03	2.7E-04
Benzo(g,h,i)perylene	1.3E+00	mg/kg	1.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-03	1.6E-04
Benzo(k)fluoranthene	1.1E+00	mg/kg	1.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-03	1.4E-04
bis(2-Ethylhexyl)phthalate	2.6E+00	mg/kg	3.3E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.8E-04	1.8E-05
Carbazole	8.0E-01	mg/kg	1.0E-03	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	1.0E-05	1.0E-06
Chrysene	1.7E+00	mg/kg	2.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.1E-03	2.1E-04
Dibenzo(a,h)anthracene	7.7E-01	mg/kg	9.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.9E-04	9.9E-05
Dibenzofuran	3.1E-01	mg/kg	4.0E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.6E-05	1.6E-06
Di-n-Butylphthalate	9.9E-01	mg/kg	1.3E-03	mg/kg-d	1.0E+02	4.0E+02	mg/kg-d	1.3E-05	3.2E
Fluoranthene	2.7E+00	mg/kg	3.5E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	2.8E-05	1.4E
Fluorene	6.7E-01	mg/kg	8.6E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	3.4E-05	3.4E-06
Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-03	1.6E-04
Naphthalene	1.9E-01	mg/kg	2.4E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	7.9E-06	7.9E-07
Phenanthrene	1.5E+00	mg/kg	2.0E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.3E-04	1.3E-05
Pyrene	2.4E+00	mg/kg	3.1E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	4.1E-05	2.5E-05
4,4'-DDD	9.3E-03	mg/kg	1.2E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.5E-05	3.0E-06
4,4'-DDE	8.3E-03	mg/kg	1.1E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.3E-05	2.6E-06
alpha-Chlordane	1.6E-02	mg/kg	2.0E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.3E-06	2.2E-06
Aroclor, Total	2.6E-01	mg/kg	3.4E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.2E-02	2.2E-03
Aroclor-1248	2.5E-02	mg/kg	3.2E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.1E-03	2.1E-04
Aroclor-1254	2.7E-01	mg/kg	3.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.3E-02	2.3E-03
Aroclor-1260	2.4E-02	mg/kg	3.1E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.1E-03	2.1E-04
Dieldrin	3.8E-03	mg/kg	4.9E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.3E-04	3.3E-05
Endosulfan II	3.8E-03	mg/kg	4.9E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	8.6E-06	2.6E-06
Endosulfan sulfate	2.9E-03	mg/kg	3.7E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	6.4E-06	1.9E-06
Endrin	2.6E-03	mg/kg	3.3E-06	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	1.3E-04	6.7E-05
Methoxychlor	5.3E-03	mg/kg	6.8E-06	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	1.4E-06	1.9E-07
Aroclor-1268	1.2E-01	mg/kg	1.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.9E-03	9.9E-04
gamma-Chlordane	8.9E-03	mg/kg	1.1E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.5E-06	1.2E-06
Technical Chlordane	1.3E+00	mg/kg	1.7E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.6E-04	1.8E-04
Antimony	1.3E+00	mg/kg	1.7E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	6.5E-02	6.5E-03
Arsenic	5.2E+00	mg/kg	6.7E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.4E-01	1.4E-02
Barium	1.3E+02	mg/kg	1.7E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.2E-03	1.0E-03
Cadmium	2.1E+00	mg/kg	2.7E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-03	2.7E-04
Chromium	9.9E+01	mg/kg	1.3E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	8.6E-05	8.6E-06
Cobalt	7.8E+00	mg/kg	1.0E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.3E-01	1.3E-02
Copper	1.1E+02	mg/kg	1.4E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.2E-02	9.5E-
Lead	2.4E+02	mg/kg	3.0E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.4E-03	8.0E-
Mercury	2.9E-01	mg/kg	3.7E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.7E-04	3.7E-05
Mercury (methyl)	2.1E-03	mg/kg	2.7E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	1.8E-04	1.1E-04

TABLE N-9.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Molybdenum	6.5E+00	mg/kg	8.3E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.3E-02	4.3E-03
Selenium	9.6E-01	mg/kg	1.2E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	6.1E-03	3.7E-03
Silver	2.9E+00	mg/kg	3.7E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	1.7E-04	1.7E-05
Thallium	5.8E-01	mg/kg	7.4E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	5.3E-03	5.3E-04
Zinc	3.9E+02	mg/kg	5.0E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.6E-03	1.3E-03
Toxicity Equivalency - Mammals	1.8E-03	mg/kg	2.3E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.3E+00**	2.3E-01
Toxicity Equivalency (PCB) - Mammals	3.3E-05	mg/kg	4.2E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	4.2E-02	4.2E-03
							HAZARD INDICES:	**2.8E+00**	3.0E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-9.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	2.7E-04	mg/kg	6.7E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.3E-06	1.7E-06
4,4'-DDE	4.0E-03	mg/kg	1.0E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.2E-04	2.5E-05
alpha-Chlordane	3.2E-04	mg/kg	8.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.7E-06	8.7E-07
Aroclor, Total	7.7E-02	mg/kg	1.9E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.3E-01	1.3E-02
Aroclor-1254	7.1E-02	mg/kg	1.8E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.2E-01	1.2E-02
Aroclor-1268	5.2E-03	mg/kg	1.3E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	8.6E-03	8.6E-04
Dieldrin	4.4E-04	mg/kg	1.1E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.3E-04	7.3E-05
Endosulfan Sulfate	5.5E-04	mg/kg	1.3E-05	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	2.4E-05	7.1E-06
gamma-Chlordane	3.6E-04	mg/kg	9.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.0E-06	9.8E-07
Heptachlor	2.2E-04	mg/kg	5.4E-06	mg/kg-d	1.0E-01	1.0E+00	mg/kg-d	5.4E-05	5.4E-06
Technical Chlordane	2.3E-02	mg/kg	5.6E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.2E-04	6.1E-05
Antimony	1.5E-02	mg/kg	3.6E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.4E-02	1.4E-03
Barium	2.8E+01	mg/kg	6.9E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	9.3E-03	4.3E-03
Cadmium	8.9E-02	mg/kg	2.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-03	2.2E-04
Chromium	2.4E-01	mg/kg	6.0E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	4.1E-06	4.1E[illegible]
Cobalt	2.6E-01	mg/kg	6.5E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	8.5E-02	8.5[illegible]
Copper	3.0E+01	mg/kg	7.4E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.3E-02	4.9E-02
Lead	8.6E-01	mg/kg	2.1E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.7E-04	5.6E-05
Manganese	1.3E+02	mg/kg	3.1E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.5E-02	1.1E-02
Mercury	2.0E-02	mg/kg	5.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.0E-04	5.0E-05
Mercury (methyl)	1.5E-02	mg/kg	3.8E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	2.5E-02	1.5E-02
Molybdenum	1.2E-01	mg/kg	3.1E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	1.6E-02	1.6E-03
Nickel	4.9E-01	mg/kg	1.2E-02	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	4.8E-04	1.9E-04
Selenium	1.4E-01	mg/kg	3.4E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.7E-02	1.0E-02
Silver	2.4E-01	mg/kg	6.0E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	2.7E-04	2.7E-05
Thallium	9.6E-03	mg/kg	2.4E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.7E-03	1.7E-04
Vanadium	2.7E-01	mg/kg	6.7E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.6E-02	3.2E-03
Zinc	2.6E+01	mg/kg	6.5E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	3.3E-03	1.7E-03
Toxicity Equivalency - Mammals	1.0E-04	mg/kg	2.6E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**2.6E+00**	2.6E-01
Toxicity Equivalency (PCB) - Mammals	2.6E-06	mg/kg	6.5E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	6.5E-02	6.5E-03
							HAZARD INDICES:	**3.2E+00**	3.9E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. *Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.*

TABLE N-9.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
1,1'-Biphenyl	1.2E-03	mg/kg	1.0E-06	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	2.1E-08	4.2E-09
2-Methylnaphthalene	4.2E-03	mg/kg	3.8E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.3E-07	1.3E-08
Acenaphthene	4.1E-03	mg/kg	3.6E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	1.0E-07	1.0E-08
Acenaphthylene	3.0E-03	mg/kg	2.7E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	7.6E-08	7.6E-09
Anthracene	3.5E-03	mg/kg	3.2E-06	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.6E-08	1.6E-09
Benzo(a)anthracene	4.5E-03	mg/kg	4.0E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.0E-06	4.0E-07
Benzo(a)pyrene	4.9E-03	mg/kg	4.4E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.4E-06	4.4E-07
Benzo(b)fluoranthene	6.7E-03	mg/kg	6.0E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.0E-06	6.0E-07
Benzo(g,h,i)perylene	3.8E-03	mg/kg	3.4E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.4E-06	3.4E-07
Benzo(k)fluoranthene	5.9E-03	mg/kg	5.3E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.3E-06	5.3E-07
Chrysene	8.1E-03	mg/kg	7.3E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.3E-06	7.3E-07
Dibenzo(a,h)anthracene	9.6E-04	mg/kg	8.6E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.6E-07	8.6E-08
Dibenzofuran	3.3E-03	mg/kg	2.9E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.2E-07	1.2E-08
Fluoranthene	2.2E-02	mg/kg	2.0E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	1.6E-07	7.9E-08
Fluorene	5.2E-03	mg/kg	4.6E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.8E-07	1.8E-08
Indeno(1,2,3-cd)pyrene	4.3E-03	mg/kg	3.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.9E-06	3.9E-07
Naphthalene	3.5E-03	mg/kg	3.1E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.0E-07	1.0E-08
Phenanthrene	1.5E-02	mg/kg	1.4E-05	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	9.2E-07	9.2E-08
Pyrene	1.1E-02	mg/kg	9.4E-06	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	1.3E-07	7.6E-08
4,4'-DDD	3.9E-02	mg/kg	3.5E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.3E-05	8.6E-06
4,4'-DDE	1.3E-01	mg/kg	1.2E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.5E-04	2.9E-05
4,4'-DDT	3.7E-03	mg/kg	3.3E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.2E-06	8.4E-07
alpha-Chlordane	4.0E-02	mg/kg	3.5E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.7E-06	3.9E-06
Aroclor, Total	4.2E+00	mg/kg	3.8E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.5E-01	2.5E-02
Aroclor-1254	4.2E+00	mg/kg	3.7E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.5E-01	2.5E-02
Aroclor-1268	3.6E-02	mg/kg	3.2E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.1E-03	2.1E-04
Dieldrin	5.6E-03	mg/kg	5.0E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.3E-04	3.3E-05
gamma-BHC	2.1E-04	mg/kg	1.8E-07	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	1.3E-05	1.3E-06
gamma-Chlordane	2.9E-02	mg/kg	2.6E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	5.7E-06	2.8E-06
Heptachlor Epoxide	1.4E-03	mg/kg	1.2E-06	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	9.7E-06	6.9E-06
Technical Chlordane	1.4E+00	mg/kg	1.2E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.7E-04	1.3E-04
Aluminum	4.9E+01	mg/kg	4.3E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	2.2E-02	2.2E-03
Antimony	1.0E-02	mg/kg	8.9E-06	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	3.4E-04	3.4E-05
Arsenic	2.8E-02	mg/kg	2.5E-05	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	5.1E-04	5.1E-05
Barium	1.1E+00	mg/kg	9.9E-04	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.3E-05	6.2E-06
Beryllium	5.8E-03	mg/kg	5.2E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	4.3E-06	4.3E-07
Cadmium	1.8E-02	mg/kg	1.6E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-05	1.6E-06
Chromium	2.7E-01	mg/kg	2.4E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.6E-07	1.6E-08
Cobalt	7.7E-02	mg/kg	6.9E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	9.1E-04	9.1E-05
Copper	8.4E-01	mg/kg	7.5E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.4E-05	5.0E-05
Lead	4.3E-01	mg/kg	3.8E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.0E-06	1.0E-06
Manganese	7.5E+00	mg/kg	6.7E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	7.6E-05	2.4E-05
Mercury	9.8E-02	mg/kg	8.8E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.7E-05	8.7E-06
Mercury (methyl)	9.3E-02	mg/kg	8.3E-05	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	5.5E-03	3.4E-03
Molybdenum	3.6E-02	mg/kg	3.2E-05	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	1.7E-04	1.7E-05
Nickel	1.5E-01	mg/kg	1.4E-04	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	5.5E-06	2.2E-06

TABLE N-9.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Selenium	2.1E-01	mg/kg	1.9E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	9.6E-04	5.8E-04
Silver	1.7E-02	mg/kg	1.5E-05	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	6.7E-07	6.7E-08
Vanadium	1.3E-01	mg/kg	1.1E-04	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	2.7E-04	5.4E-05
Zinc	2.1E+01	mg/kg	1.8E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	9.4E-05	4.7E-05
Toxicity Equivalency - Mammals	5.6E-04	mg/kg	5.0E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	5.0E-01	5.0E-02
Toxicity Equivalency (PCB) - Mammals	2.5E-04	mg/kg	2.2E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.2E-01	2.2E-02
							HAZARD INDICES:	1.3E+00	1.3E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-9.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 7.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	1.1E-03	2.3E+00	-	2.6E+00	5.0E-01	***5.4E+00***	***74%***
Aroclor, Total		2.2E-02	-	1.3E-01	2.5E-01	4.0E-01	6%
Aroclor-1254		2.3E-02	-	1.2E-01	2.5E-01	3.9E-01	5%
Toxicity Equivalency (PCB) - Mammals		4.2E-02	-	6.5E-02	2.2E-01	3.3E-01	5%
Cobalt	4.8E-05	1.3E-01	-	8.5E-02	9.1E-04	2.2E-01	3%
Arsenic		1.4E-01	-		5.1E-04	1.4E-01	2%
Antimony		6.5E-02	-	1.4E-02	3.4E-04	7.9E-02	1%
Copper	6.5E-06	1.2E-02	-	6.3E-02	6.4E-05	7.6E-02	1%
Molybdenum		4.3E-02	-	1.6E-02	1.7E-04	6.0E-02	1%
Manganese	1.3E-05			3.5E-02	7.6E-05	3.5E-02	0%
Mercury (methyl)		1.8E-04	-	2.5E-02	5.5E-03	3.1E-02	0%
Selenium		6.1E-03	-	1.7E-02	9.6E-04	2.4E-02	0%
Aluminum	8.1E-04				2.2E-02	2.3E-02	0%
Aroclor-1268		9.9E-03	-	8.6E-03	2.1E-03	2.1E-02	0%
Vanadium				1.6E-02	2.7E-04	1.6E-02	0%
Barium		2.2E-03	-	9.3E-03	1.3E-05	1.1E-02	0%
Thallium	1.4E-04	5.3E-03	-	1.7E-03		7.1E-03	0%
Zinc	1.2E-06	2.6E-03	-	3.3E-03	9.4E-05	6.0E-03	0%
Cadmium		2.7E-03	-	2.2E-03	1.6E-05	4.9E-03	0%
Benzo(b)fluoranthene		2.7E-03	-		6.0E-06	2.7E-03	0%
Lead	3.1E-07	2.4E-03	-	1.7E-04	3.0E-06	2.6E-03	0%
Chrysene		2.1E-03	-		7.3E-06	2.1E-03	0%
Aroclor-1248		2.1E-03	-			2.1E-03	0%
Aroclor-1260		2.1E-03	-			2.1E-03	0%
Benzo(a)anthracene		1.8E-03	-		4.0E-06	1.8E-03	0%
Benzo(a)pyrene		1.7E-03	-		4.4E-06	1.8E-03	0%
Indeno(1,2,3-cd)pyrene		1.6E-03	-		3.9E-06	1.6E-03	0%
Benzo(g,h,i)perylene		1.6E-03	-		3.4E-06	1.6E-03	0%
Benzo(k)fluoranthene		1.4E-03	-		5.3E-06	1.4E-03	0%
Dieldrin		3.3E-04	-	7.3E-04	3.3E-04	1.4E-03	0%
Dibenzo(a,h)anthracene		9.9E-04	-		8.6E-07	9.9E-04	0%
Mercury		3.7E-04	-	5.0E-04	8.7E-05	9.5E-04	0%
Technical Chlordane		3.6E-04	-	1.2E-04	2.7E-04	7.5E-04	0%
Nickel	6.5E-07			4.8E-04	5.5E-06	4.9E-04	0%
Silver	2.3E-07	1.7E-04	-	2.7E-04	6.7E-07	4.4E-04	0%
4,4'-DDE		1.3E-05	-	1.2E-04	1.5E-04	2.8E-04	0%
bis(2-Ethylhexyl)phthalate	8.1E-06	1.8E-04	-			1.9E-04	0%
Endrin		1.3E-04	-			1.3E-04	0%
Phenanthrene		1.3E-04	-		9.2E-07	1.3E-04	0%
Chromium	1.3E-08	8.6E-05	-	4.1E-06	1.6E-07	9.1E-05	0%
4,4'-DDD		1.5E-05	-	8.3E-06	4.3E-05	6.6E-05	0%
Heptachlor				5.4E-05		5.4E-05	0%
Pyrene		4.1E-05	-		1.3E-07	4.1E-05	0%
Fluorene		3.4E-05	-		1.8E-07	3.5E-05	0%
Acenaphthene		3.4E-05	-		1.0E-07	3.4E-05	0%

TABLE N-9.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: LYMAN MILL POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	7.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Endosulfan sulfate	4.9E-08	6.4E-06	-	2.4E-05		3.0E-05	0%
Fluoranthene		2.8E-05	-		1.6E-07	2.8E-05	0%
Dibenzofuran		1.6E-05	-		1.2E-07	1.6E-05	0%
Acenaphthylene		1.6E-05	-		7.6E-08	1.6E-05	0%
alpha-Chlordane	3.6E-08	4.3E-06	-	1.7E-06	7.7E-06	1.4E-05	0%
gamma-BHC					1.3E-05	1.3E-05	0%
Di-n-Butylphthalate		1.3E-05	-			1.3E-05	0%
Carbazole		1.0E-05	-			1.0E-05	0%
gamma-Chlordane	4.0E-08	2.5E-06	-	2.0E-06	5.7E-06	1.0E-05	0%
Heptachlor epoxide					9.7E-06	9.7E-06	0%
Endosulfan II		8.6E-06	-			8.6E-06	0%
Naphthalene		7.9E-06	-		1.0E-07	8.0E-06	0%
Beryllium	1.5E-06				4.3E-06	5.8E-06	0%
Anthracene		5.0E-06	-		1.6E-08	5.0E-06	0%
2-Methylnaphthalene		4.3E-06	-		1.3E-07	4.4E-06	0%
4,4'-DDT					4.2E-06	4.2E-06	0%
Methoxychlor		1.4E-06	-			1.4E-06	0%
1,1'-Biphenyl					2.1E-08	2.1E-08	0%
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
4-Nitrophenol							
Phenol							
Dimethylphthalate							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**2.2E-03**	**2.8E+00**	-	**3.2E+00**	**1.3E+00**	**7.3E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**39%**		**44%**	**17%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-9.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 8.2E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals	1.1E-04	2.3E-01	-	2.6E-01	5.0E-02	5.4E-01	***65%***
Copper	5.0E-06	9.5E-03	-	4.9E-02	5.0E-05	5.9E-02	7%
Aroclor, Total		2.2E-03	-	1.3E-02	2.5E-02	4.0E-02	5%
Aroclor-1254		2.3E-03	-	1.2E-02	2.5E-02	3.9E-02	5%
Toxicity Equivalency (PCB) - Mammals		4.2E-03	-	6.5E-03	2.2E-02	3.3E-02	4%
Cobalt	4.8E-06	1.3E-02	-	8.5E-03	9.1E-05	2.2E-02	3%
Mercury (methyl)		1.1E-04	-	1.5E-02	3.4E-03	1.9E-02	2%
Selenium		3.7E-03	-	1.0E-02	5.8E-04	1.5E-02	2%
Arsenic		1.4E-02	-		5.1E-05	1.4E-02	2%
Manganese	3.9E-06			1.1E-02	2.4E-05	1.1E-02	1%
Antimony		6.5E-03	-	1.4E-03	3.4E-05	7.9E-03	1%
Molybdenum		4.3E-03	-	1.6E-03	1.7E-05	6.0E-03	1%
Barium		1.0E-03	-	4.3E-03	6.2E-06	5.4E-03	1%
Vanadium				3.2E-03	5.4E-05	3.2E-03	0%
Zinc	6.2E-07	1.3E-03	-	1.7E-03	4.7E-05	3.0E-03	0%
Aluminum	8.1E-05				2.2E-03	2.3E-03	0%
Aroclor-1268		9.9E-04	-	8.6E-04	2.1E-04	2.1E-03	0%
Lead	1.0E-07	8.0E-04	-	5.6E-05	1.0E-06	8.6E-04	0%
Thallium	1.4E-05	5.3E-04	-	1.7E-04		7.1E-04	0%
Cadmium		2.7E-04	-	2.2E-04	1.6E-06	4.9E-04	0%
Technical Chlordane		1.8E-04	-	6.1E-05	1.3E-04	3.7E-04	0%
Benzo(b)fluoranthene		2.7E-04	-		6.0E-07	2.7E-04	0%
Chrysene		2.1E-04	-		7.3E-07	2.1E-04	0%
Aroclor-1248		2.1E-04	-			2.1E-04	0%
Aroclor-1260		2.1E-04	-			2.1E-04	0%
Nickel	2.6E-07			1.9E-04	2.2E-06	1.9E-04	0%
Benzo(a)anthracene		1.8E-04	-		4.0E-07	1.8E-04	0%
Benzo(a)pyrene		1.7E-04	-		4.4E-07	1.8E-04	0%
Indeno(1,2,3-cd)pyrene		1.6E-04	-		3.9E-07	1.6E-04	0%
Benzo(g,h,i)perylene		1.6E-04	-		3.4E-07	1.6E-04	0%
Benzo(k)fluoranthene		1.4E-04	-		5.3E-07	1.4E-04	0%
Dieldrin		3.3E-05	-	7.3E-05	3.3E-05	1.4E-04	0%
Dibenzo(a,h)anthracene		9.9E-05	-		8.6E-08	9.9E-05	0%
Mercury		3.7E-05	-	5.0E-05	8.7E-06	9.5E-05	0%
Endrin		6.7E-05	-			6.7E-05	0%
4,4'-DDE		2.6E-06	-	2.5E-05	2.9E-05	5.7E-05	0%
Silver	2.3E-08	1.7E-05	-	2.7E-05	6.7E-08	4.4E-05	0%
Pyrene		2.5E-05	-		7.6E-08	2.5E-05	0%
bis(2-Ethylhexyl)phthalate	8.1E-07	1.8E-05	-			1.9E-05	0%
Fluoranthene		1.4E-05	-		7.9E-08	1.4E-05	0%
4,4'-DDD		3.0E-06	-	1.7E-06	8.6E-06	1.3E-05	0%
Phenanthrene		1.3E-05	-		9.2E-08	1.3E-05	0%
Chromium	1.3E-09	8.6E-06	-	4.1E-07	1.6E-08	9.1E-06	0%
Endosulfan sulfate	1.5E-08	1.9E-06	-	7.1E-06		9.0E-06	0%
Heptachlor epoxide					6.9E-06	6.9E-06	0%

TABLE N-9.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 8.2E-01

Prepared:	**10-Apr-03**	**SJD**
Checked:	**16-Jul-03**	**RAR**

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
alpha-Chlordane	1.8E-08	2.2E-06	-	8.7E-07	3.9E-06	6.9E-06	0%
Heptachlor				5.4E-06		5.4E-06	0%
gamma-Chlordane	2.0E-08	1.2E-06	-	9.8E-07	2.8E-06	5.1E-06	0%
Fluorene		3.4E-06	-		1.8E-08	3.5E-06	0%
Acenaphthene		3.4E-06	-		1.0E-08	3.4E-06	0%
Di-n-Butylphthalate		3.2E-06	-			3.2E-06	0%
Endosulfan II		2.6E-06	-			2.6E-06	0%
Dibenzofuran		1.6E-06	-		1.2E-08	1.6E-06	0%
Acenaphthylene		1.6E-06	-		7.6E-09	1.6E-06	0%
gamma-BHC					1.3E-06	1.3E-06	0%
Carbazole		1.0E-06	-			1.0E-06	0%
4,4'-DDT					8.4E-07	8.4E-07	0%
Naphthalene		7.9E-07	-		1.0E-08	8.0E-07	0%
Beryllium	1.5E-07				4.3E-07	5.8E-07	0%
Anthracene		5.0E-07	-		1.6E-09	5.0E-07	0%
2-Methylnaphthalene		4.3E-07	-		1.3E-08	4.4E-07	0%
Methoxychlor		1.9E-07	-			1.9E-07	0%
1,1'-Biphenyl					4.2E-09	4.2E-09	0%
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
4-Chloro-3-methylphenol							
2-Chlorophenol							
Phenol							
4-Nitrophenol							
Dimethylphthalate							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
TOTAL MEDIUM-SPECIFIC RISK	**2.2E-04**	**3.0E-01**	-	**3.9E-01**	**1.3E-01**	**8.2E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**36%**		**48%**	**16%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-10.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Benzo(a)anthracene	1.5E-01	mg/kg	1.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-04	1.9E-05
Benzo(a)pyrene	1.8E-01	mg/kg	2.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-04	2.3E-05
Benzo(b)fluoranthene	3.1E-01	mg/kg	3.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.9E-04	3.9E-05
Benzo(g,h,i)perylene	1.1E-01	mg/kg	1.5E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-04	1.5E-05
Benzo(k)fluoranthene	1.8E-01	mg/kg	2.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-04	2.3E-05
bis(2-Ethylhexyl)phthalate	3.1E-01	mg/kg	3.9E-04	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	2.1E-05	2.1E-06
Carbazole	5.2E-02	mg/kg	6.7E-05	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	6.7E-07	6.7E-08
Chrysene	2.3E-01	mg/kg	2.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.9E-04	2.9E-05
Fluoranthene	3.9E-01	mg/kg	5.0E-04	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.0E-06	2.0E-06
Indeno(1,2,3-cd)pyrene	1.5E-01	mg/kg	1.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-04	1.9E-05
Phenanthrene	1.4E-01	mg/kg	1.8E-04	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.2E-05	1.2E-06
Pyrene	3.0E-01	mg/kg	3.8E-04	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	5.1E-06	3.0E-06
alpha-Chlordane	2.2E-03	mg/kg	2.8E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.1E-07	3.0E-07
Arsenic	7.7E-01	mg/kg	9.9E-04	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	2.1E-02	2.1E-03
Barium	2.4E+01	mg/kg	3.1E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	4.2E-04	2.0E-04
Cadmium	6.8E-01	mg/kg	8.8E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.8E-04	8.8E-05
Chromium	1.3E+01	mg/kg	1.7E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.2E-05	1.2E-06
Cobalt	2.3E+00	mg/kg	3.0E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	3.9E-02	3.9E-03
Copper	3.0E+01	mg/kg	3.8E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.2E-03	2.5E-03
gamma-Chlordane	2.5E-03	mg/kg	3.2E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.0E-07	3.5E-07
Lead	4.6E+01	mg/kg	5.9E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	4.7E-04	1.6E-04
Zinc	7.9E+01	mg/kg	1.0E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	5.2E-04	2.6E-04
Toxicity Equivalency - Mammals	4.3E-04	mg/kg	5.5E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	5.5E-01	5.5E-02
							HAZARD INDICES:	6.2E-01	6.5E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-10.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Mammals	2.9E-04	mg/kg	7.1E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**7.1E+00**	7.1E-01
Aluminum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	0.0E+00	0.0E+00
Antimony	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	0.0E+00	0.0E+00
Arsenic	3.2E-02	mg/kg	7.8E-04	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.6E-02	1.6E-03
Barium	5.3E+00	mg/kg	1.3E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.8E-03	8.3E-04
Beryllium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	0.0E+00	0.0E+00
Cadmium	1.4E-01	mg/kg	3.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.5E-03	3.5E-04
Chromium	4.5E-02	mg/kg	1.1E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	7.6E-07	7.6E-08
Cobalt	1.0E-01	mg/kg	2.5E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	3.3E-02	3.3E-03
Copper	1.9E+01	mg/kg	4.7E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	4.0E-02	3.1E-02
Lead	3.0E-01	mg/kg	7.3E-03	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	5.8E-05	1.9E-05
Manganese	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	0.0E+00	0.0E+00
Mercury	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	0.0E+00	0.0E+00
Mercury (methyl)	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	0.0E+00	0.0E+00
Molybdenum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E[illegible]
Nickel	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	0.0E+00	0.0E[illegible]
Selenium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	0.0E+00	0.0E+00
Silver	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	0.0E+00	0.0E+00
Thallium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	0.0E+00	0.0E+00
Vanadium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	0.0E+00	0.0E+00
Zinc	7.6E+00	mg/kg	1.9E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	9.7E-04	4.8E-04
alpha-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
Technical Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	0.0E+00	0.0E+00
beta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
delta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
gamma-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-01	1.0E+00	mg/kg-d	0.0E+00	0.0E+00
Aldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor Epoxide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	0.0E+00	0.0E+00
Endosulfan I	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
Dieldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDE	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	0.0E+00	0.0E+00
Endrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan II	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDD	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	0.0E+00	0.0E+00
Endosulfan Sulfate	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDT	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	0.0E+00	0.0E+00
Methoxychlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	0.0E+00	0.0E+00
Endrin Ketone	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endrin Aldehyde	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
alpha-Chlordane	2.8E-04	mg/kg	6.9E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.5E-06	7.5E-07
gamma-Chlordane	1.8E-03	mg/kg	4.5E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	9.8E-06	4.9E[illegible]
Toxaphene	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-02	8.0E-01	mg/kg-d	0.0E+00	0.0E[illegible]
Aroclor-1016	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.0E-01	3.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1221	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00

TABLE N-10.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aroclor-1232	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1242	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.9E-02	6.9E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1248	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1254	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1260	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1268	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor, Total	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	7.2E+00	7.5E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-10.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
1,1'-Biphenyl	2.8E-04	mg/kg	2.5E-07	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	5.0E-09	1.0E-09
2-Methylnaphthalene	4.6E-03	mg/kg	4.1E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.4E-07	1.4E-08
Acenaphthene	1.0E-03	mg/kg	9.1E-07	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	2.6E-08	2.6E-09
Acenaphthylene	6.7E-04	mg/kg	6.0E-07	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	1.7E-08	1.7E-09
Anthracene	9.1E-04	mg/kg	8.1E-07	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	4.1E-09	4.1E-10
Benzo(a)anthracene	1.0E-03	mg/kg	8.9E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.9E-07	8.9E-08
Benzo(a)pyrene	1.1E-03	mg/kg	1.0E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.0E-06	1.0E-07
Benzo(b)fluoranthene	1.6E-03	mg/kg	1.5E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-06	1.5E-07
Benzo(g,h,i)perylene	1.3E-03	mg/kg	1.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-06	1.2E-07
Benzo(k)fluoranthene	1.5E-03	mg/kg	1.3E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-06	1.3E-07
Chrysene	2.1E-03	mg/kg	1.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-06	1.9E-07
Dibenzo(a,h)anthracene	1.9E-04	mg/kg	1.7E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.7E-07	1.7E-08
Dibenzofuran	9.5E-04	mg/kg	8.5E-07	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	3.4E-08	3.4E-09
Fluoranthene	8.0E-03	mg/kg	7.1E-06	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	5.7E-08	2.9E-08
Fluorene	2.1E-03	mg/kg	1.9E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	7.6E-08	7.6E-09
Indeno(1,2,3-cd)pyrene	1.0E-03	mg/kg	9.3E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.3E-07	9.3E-0
Naphthalene	4.1E-03	mg/kg	3.7E-06	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.2E-07	1.2E-08
Phenanthrene	9.0E-03	mg/kg	8.1E-06	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	5.4E-07	5.4E-08
Pyrene	4.2E-03	mg/kg	3.8E-06	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	5.0E-08	3.0E-08
4,4'-DDD	6.2E-03	mg/kg	5.6E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.0E-06	1.4E-06
4,4'-DDE	5.5E-02	mg/kg	4.9E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.1E-05	1.2E-05
4,4'-DDT	2.2E-03	mg/kg	2.0E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.5E-06	5.0E-07
alpha-Chlordane	5.4E-03	mg/kg	4.8E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.0E-06	5.2E-07
Aroclor, Total	6.4E-01	mg/kg	5.7E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.8E-02	3.8E-03
Aroclor-1254	5.1E-01	mg/kg	4.6E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.1E-02	3.1E-03
Aroclor-1268	1.3E-01	mg/kg	1.1E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.5E-03	7.5E-04
Dieldrin	1.3E-03	mg/kg	1.2E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.7E-05	7.7E-06
gamma-Chlordane	1.9E-03	mg/kg	1.7E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.7E-07	1.8E-07
Heptachlor Epoxide	2.6E-04	mg/kg	2.4E-07	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	1.9E-06	1.3E-06
Technical Chlordane	1.4E-01	mg/kg	1.3E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.8E-05	1.4E-05
Aluminum	2.4E+01	mg/kg	2.1E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.1E-02	1.1E-03
Barium	2.3E+00	mg/kg	2.0E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.7E-05	1.3E-05
Cadmium	1.1E-02	mg/kg	9.7E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.7E-06	9.7E-07
Chromium	2.2E-01	mg/kg	1.9E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.3E-07	1.3E-08
Cobalt	3.4E-02	mg/kg	3.0E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	4.0E-04	4.0E-05
Copper	4.6E-01	mg/kg	4.1E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.5E-05	2.7E-05
Lead	1.5E-01	mg/kg	1.3E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.1E-06	3.6E-07
Manganese	4.9E+00	mg/kg	4.4E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	4.9E-05	1.5E-05
Mercury	1.5E-01	mg/kg	1.4E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-04	1.3E-05
Mercury (methyl)	1.2E-01	mg/kg	1.1E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	7.2E-03	4.4E-03
Molybdenum	2.3E-02	mg/kg	2.1E-05	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	1.1E-04	1.1E-05
Nickel	5.2E-02	mg/kg	4.6E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.9E-06	7.4E-07
Selenium	1.4E-01	mg/kg	1.3E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	6.3E-04	3.8E-04
Thallium	4.9E-03	mg/kg	4.4E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	3.1E-05	3.1E-0
Vanadium	5.6E-02	mg/kg	5.0E-05	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.2E-04	2.4E-05
Toxicity Equivalency - Mammals	8.7E-05	mg/kg	7.8E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	7.8E-02	7.8E-03

TABLE N-10.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
							HAZARD INDICES:	1.7E-01	2.1E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-10.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 8.0E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		5.5E-01	-	7.1E+00	7.8E-02	***7.8E+00***	***97%***
Cobalt		3.9E-02	-	3.3E-02	4.0E-04	7.3E-02	1%
Copper		3.2E-03	-	4.0E-02	3.5E-05	4.3E-02	1%
Aroclor, Total				-	3.8E-02	3.8E-02	0%
Arsenic		2.1E-02	-	1.6E-02		3.7E-02	0%
Aroclor-1254				-	3.1E-02	3.1E-02	0%
Aluminum				-	1.1E-02	1.1E-02	0%
Aroclor-1268				-	7.5E-03	7.5E-03	0%
Mercury (methyl)				-	7.2E-03	7.2E-03	0%
Cadmium		8.8E-04	-	3.5E-03	9.7E-06	4.4E-03	0%
Barium		4.2E-04	-	1.8E-03	2.7E-05	2.2E-03	0%
Zinc		5.2E-04	-	9.7E-04		1.5E-03	0%
Selenium				-	6.3E-04	6.3E-04	0%
Lead		4.7E-04	-	5.8E-05	1.1E-06	5.3E-04	0%
Benzo(b)fluoranthene		3.9E-04	-		1.5E-06	4.0E-04	0%
Chrysene		2.9E-04	-		1.9E-06	2.9E-04	0%
Benzo(a)pyrene		2.3E-04	-		1.0E-06	2.3E-04	0%
Benzo(k)fluoranthene		2.3E-04	-		1.3E-06	2.3E-04	0%
Indeno(1,2,3-cd)pyrene		1.9E-04	-		9.3E-07	1.9E-04	0%
Benzo(a)anthracene		1.9E-04	-		8.9E-07	1.9E-04	0%
Benzo(g,h,i)perylene		1.5E-04	-		1.2E-06	1.5E-04	0%
Mercury				-	1.3E-04	1.3E-04	0%
Vanadium				-	1.2E-04	1.2E-04	0%
Molybdenum				-	1.1E-04	1.1E-04	0%
Dieldrin				-	7.7E-05	7.7E-05	0%
4,4'-DDE				-	6.1E-05	6.1E-05	0%
Manganese				-	4.9E-05	4.9E-05	0%
Thallium				-	3.1E-05	3.1E-05	0%
Technical Chlordane				-	2.8E-05	2.8E-05	0%
bis(2-Ethylhexyl)phthalate		2.1E-05	-			2.1E-05	0%
Chromium		1.2E-05	-	7.6E-07	1.3E-07	1.3E-05	0%
Phenanthrene		1.2E-05	-		5.4E-07	1.3E-05	0%
gamma-Chlordane		7.0E-07	-	9.8E-06	3.7E-07	1.1E-05	0%
4,4'-DDD				-	7.0E-06	7.0E-06	0%
Pyrene		5.1E-06	-		5.0E-08	5.1E-06	0%
Fluoranthene		4.0E-06	-		5.7E-08	4.0E-06	0%
alpha-Chlordane		6.1E-07	-	1.5E-06	1.0E-06	3.2E-06	0%
4,4'-DDT				-	2.5E-06	2.5E-06	0%
Heptachlor epoxide				-	1.9E-06	1.9E-06	0%
Nickel				-	1.9E-06	1.9E-06	0%
Carbazole		6.7E-07	-			6.7E-07	0%
Dibenzo(a,h)anthracene					1.7E-07	1.7E-07	0%
2-Methylnaphthalene					1.4E-07	1.4E-07	0%
Naphthalene					1.2E-07	1.2E-07	0%
Fluorene					7.6E-08	7.6E-08	0%

TABLE N-10.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 8.0E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Dibenzofuran					3.4E-08	3.4E-08	0%
Acenaphthene					2.6E-08	2.6E-08	0%
Acenaphthylene					1.7E-08	1.7E-08	0%
1,1'-Biphenyl					5.0E-09	5.0E-09	0%
Anthracene					4.1E-09	4.1E-09	0%
Antimony				-			
Toxicity Equivalency (PCB) - Mammals				-			
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248				-			
Aroclor-1260				-			
gamma-BHC				-			
4-Chloro-3-methylphenol							
Beryllium				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Phenol							
Endosulfan II				-			
Endosulfan sulfate				-			
Heptachlor				-			
Dimethylphthalate							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	6.2E-01	-	7.2E+00	1.7E-01	8.0E+00	
PERCENTAGE OF TOTAL RISK		8%		90%	2%	100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-10.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: MANTON POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 8.4E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Toxicity Equivalency - Mammals		5.5E-02	-	7.1E-01	7.8E-03	7.8E-01	**93%**
Copper		2.5E-03	-	3.1E-02	2.7E-05	3.3E-02	4%
Cobalt		3.9E-03	-	3.3E-03	4.0E-05	7.3E-03	1%
Mercury (methyl)				-	4.4E-03	4.4E-03	1%
Aroclor, Total				-	3.8E-03	3.8E-03	0%
Arsenic		2.1E-03	-	1.6E-03		3.7E-03	0%
Aroclor-1254				-	3.1E-03	3.1E-03	0%
Aluminum				-	1.1E-03	1.1E-03	0%
Barium		2.0E-04	-	8.3E-04	1.3E-05	1.0E-03	0%
Aroclor-1268				-	7.5E-04	7.5E-04	0%
Zinc		2.6E-04	-	4.8E-04		7.4E-04	0%
Cadmium		8.8E-05	-	3.5E-04	9.7E-07	4.4E-04	0%
Selenium				-	3.8E-04	3.8E-04	0%
Lead		1.6E-04	-	1.9E-05	3.6E-07	1.8E-04	0%
Benzo(b)fluoranthene		3.9E-05	-		1.5E-07	4.0E-05	0%
Chrysene		2.9E-05	-		1.9E-07	2.9E-05	0%
Vanadium				-	2.4E-05	2.4E-05	0%
Benzo(a)pyrene		2.3E-05	-		1.0E-07	2.3E-05	0%
Benzo(k)fluoranthene		2.3E-05	-		1.3E-07	2.3E-05	0%
Indeno(1,2,3-cd)pyrene		1.9E-05	-		9.3E-08	1.9E-05	0%
Benzo(a)anthracene		1.9E-05	-		8.9E-08	1.9E-05	0%
Manganese				-	1.5E-05	1.5E-05	0%
Benzo(g,h,i)perylene		1.5E-05	-		1.2E-07	1.5E-05	0%
Technical Chlordane				-	1.4E-05	1.4E-05	0%
Mercury				-	1.3E-05	1.3E-05	0%
4,4'-DDE				-	1.2E-05	1.2E-05	0%
Molybdenum				-	1.1E-05	1.1E-05	0%
Dieldrin				-	7.7E-06	7.7E-06	0%
gamma-Chlordane		3.5E-07	-	4.9E-06	1.8E-07	5.4E-06	0%
Thallium				-	3.1E-06	3.1E-06	0%
Pyrene		3.0E-06	-		3.0E-08	3.1E-06	0%
bis(2-Ethylhexyl)phthalate		2.1E-06	-			2.1E-06	0%
Fluoranthene		2.0E-06	-		2.9E-08	2.0E-06	0%
alpha-Chlordane		3.0E-07	-	7.5E-07	5.2E-07	1.6E-06	0%
4,4'-DDD				-	1.4E-06	1.4E-06	0%
Heptachlor epoxide				-	1.3E-06	1.3E-06	0%
Chromium		1.2E-06	-	7.6E-08	1.3E-08	1.3E-06	0%
Phenanthrene		1.2E-06	-		5.4E-08	1.3E-06	0%
Nickel				-	7.4E-07	7.4E-07	0%
4,4'-DDT				-	5.0E-07	5.0E-07	0%
Carbazole		6.7E-08	-			6.7E-08	0%
Dibenzo(a,h)anthracene					1.7E-08	1.7E-08	0%
2-Methylnaphthalene					1.4E-08	1.4E-08	0%
Naphthalene					1.2E-08	1.2E-08	0%
Fluorene					7.6E-09	7.6E-09	0%

TABLE N-10.5

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: MANTON POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	8.4E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Dibenzofuran					3.4E-09	3.4E-09	0%
Acenaphthene					2.6E-09	2.6E-09	0%
Acenaphthylene					1.7E-09	1.7E-09	0%
1,1'-Biphenyl					1.0E-09	1.0E-09	0%
Anthracene					4.1E-10	4.1E-10	0%
Antimony				-			
Toxicity Equivalency (PCB) - Mammals				-			
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248				-			
Aroclor-1260				-			
gamma-BHC				-			
4-Chloro-3-methylphenol							
Beryllium				-			
2-Chlorophenol							
Endrin				-			
4-Nitrophenol							
Silver				-			
Phenol							
Endosulfan II				-			
Endosulfan sulfate				-			
Heptachlor				-			
Dimethylphthalate							
Methoxychlor				-			
Cyanide							
Aroclor-1242				-			
Endrin Ketone				-			
Endrin aldehyde				-			
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Di-n-Butylphthalate							
TOTAL MEDIUM-SPECIFIC RISK	-	6.5E-02	-	7.5E-01	2.1E-02	8.4E-01	
PERCENTAGE OF TOTAL RISK		8%		90%	3%	100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-11.1

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	3.1E-02	mg/kg	4.0E-05	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.3E-06	1.3E-07
Acenaphthene	1.4E-01	mg/kg	1.7E-04	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	5.0E-06	5.0E-07
Acenaphthylene	1.6E-01	mg/kg	2.0E-04	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	5.8E-06	5.8E-07
Anthracene	3.0E-01	mg/kg	3.8E-04	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.9E-06	1.9E-07
Benzo(a)anthracene	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-03	1.8E-04
Benzo(a)pyrene	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-03	1.8E-04
Benzo(b)fluoranthene	2.5E+00	mg/kg	3.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.2E-03	3.2E-04
Benzo(g,h,i)perylene	1.1E+00	mg/kg	1.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-03	1.4E-04
Benzo(k)fluoranthene	7.1E-01	mg/kg	9.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.0E-04	9.0E-05
bis(2-Ethylhexyl)phthalate	1.1E+00	mg/kg	1.4E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	7.7E-05	7.7E-06
Carbazole	2.2E-01	mg/kg	2.9E-04	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	2.9E-06	2.9E-07
Chrysene	1.5E+00	mg/kg	2.0E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.0E-03	2.0E-04
Dibenzo(a,h)anthracene	2.0E-01	mg/kg	2.6E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.6E-04	2.6E-05
Dibenzofuran	1.0E-01	mg/kg	1.3E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	5.1E-06	5.1E-07
Di-n-Butylphthalate	5.1E-02	mg/kg	6.5E-05	mg/kg-d	1.0E+02	4.0E+02	mg/kg-d	6.5E-07	1.6E-07
Fluoranthene	2.8E+00	mg/kg	3.6E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	2.9E-05	1.4E-05
Fluorene	1.2E-01	mg/kg	1.6E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	6.4E-06	6.4E-07
Indeno(1,2,3-cd)pyrene	1.4E+00	mg/kg	1.7E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.7E-03	1.7E-04
Naphthalene	6.4E-02	mg/kg	8.2E-05	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	2.7E-06	2.7E-07
Phenanthrene	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.2E-04	1.2E-05
Pyrene	2.4E+00	mg/kg	3.0E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	4.0E-05	2.4E-05
4,4'-DDD	5.8E-03	mg/kg	7.5E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	9.3E-06	1.9E-06
4,4'-DDE	3.9E-03	mg/kg	5.0E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.3E-06	1.3E-06
alpha-Chlordane	4.3E-03	mg/kg	5.5E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.2E-06	6.1E-07
Aroclor, Total	1.4E+00	mg/kg	1.8E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.2E-01	1.2E-02
Aroclor-1254	4.9E-01	mg/kg	6.3E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	4.2E-02	4.2E-03
Aroclor-1268	1.2E-01	mg/kg	1.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.0E-02	1.0E-03
Dieldrin	1.2E-02	mg/kg	1.5E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.8E-04	9.8E-05
Endosulfan sulfate	5.2E-03	mg/kg	6.6E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	1.2E-05	3.5E-06
Arsenic	2.1E+00	mg/kg	2.7E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	5.6E-02	5.6E-03
Barium	6.8E+01	mg/kg	8.7E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.2E-03	5.4E-04
Cadmium	1.7E+00	mg/kg	2.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.1E-03	2.1E-04
Chromium	1.6E+02	mg/kg	2.0E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.4E-04	1.4E-05
Cobalt	5.8E+00	mg/kg	7.5E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	9.9E-02	9.9E-03
Copper	9.0E+01	mg/kg	1.2E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	9.9E-03	7.7E-03
Lead	1.6E+02	mg/kg	2.0E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.6E-03	5.4E-04
Mercury	4.0E-01	mg/kg	5.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.0E-04	5.0E-05
Zinc	7.2E+02	mg/kg	9.2E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	4.7E-03	2.4E-03
Toxicity Equivalency - Mammals	8.3E-05	mg/kg	1.1E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.1E-01	1.1E-02
Toxicity Equivalency (PCB) - Mammals	2.5E-08	mg/kg	3.2E-11	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.2E-05	3.2E-06
							HAZARD INDICES:	4.7E-01	5.6E-02

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-11.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Mammals	6.6E-05	mg/kg	1.6E-06	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	**1.6E+00**	1.6E-01
Aluminum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	0.0E+00	0.0E+00
Antimony	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	0.0E+00	0.0E+00
Arsenic	1.0E-01	mg/kg	2.5E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	5.3E-02	5.3E-03
Barium	1.8E+01	mg/kg	4.4E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.9E-03	2.7E-03
Beryllium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	0.0E+00	0.0E+00
Cadmium	4.1E-01	mg/kg	1.0E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.0E-02	1.0E-03
Chromium	6.3E-01	mg/kg	1.6E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.1E-05	1.1E-06
Cobalt	3.0E-01	mg/kg	7.5E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	9.9E-02	9.9E-03
Copper	6.9E+01	mg/kg	1.7E+00	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.5E-01	1.1E-01
Lead	1.2E+00	mg/kg	3.0E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.4E-04	8.0E-05
Manganese	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	0.0E+00	0.0E+00
Mercury	1.9E-01	mg/kg	4.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.5E-03	4.5E-04
Mercury (methyl)	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	0.0E+00	0.0E+00
Molybdenum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E[illegible]
Nickel	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	0.0E+00	0.0[illegible]
Selenium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	0.0E+00	0.0E+00
Silver	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	0.0E+00	0.0E+00
Thallium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	0.0E+00	0.0E+00
Vanadium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	0.0E+00	0.0E+00
Zinc	8.4E+01	mg/kg	2.1E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.1E-02	5.3E-03
alpha-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	1.2E-08	mg/kg	2.9E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.9E-04	2.9E-05
Technical Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	0.0E+00	0.0E+00
beta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
delta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
gamma-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-01	1.0E+00	mg/kg-d	0.0E+00	0.0E+00
Aldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor Epoxide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	0.0E+00	0.0E+00
Endosulfan I	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
Dieldrin	4.1E-03	mg/kg	1.0E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	6.7E-03	6.7E-04
4,4'-DDE	6.4E-03	mg/kg	1.6E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.0E-04	3.9E-05
Endrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan II	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDD	2.8E-02	mg/kg	6.8E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.5E-04	1.7E-04
Endosulfan Sulfate	7.4E-03	mg/kg	1.8E-04	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	3.2E-04	9.6E-05
4,4'-DDT	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	0.0E+00	0.0E+00
Methoxychlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	0.0E+00	0.0E+00
Endrin Ketone	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endrin Aldehyde	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
alpha-Chlordane	6.7E-04	mg/kg	1.6E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.6E-06	1.8E-06
gamma-Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	0.0E+00	0.0E[illegible]
Toxaphene	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-02	8.0E-01	mg/kg-d	0.0E+00	0.0E[illegible]
Aroclor-1016	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.0E-01	3.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1221	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00

TABLE N-11.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aroclor-1232	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1242	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.9E-02	6.9E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1248	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1254	4.0E-01	mg/kg	9.9E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	6.6E-01	6.6E-02
Aroclor-1260	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1268	3.4E-02	mg/kg	8.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	5.7E-02	5.7E-03
Aroclor, Total	9.8E-01	mg/kg	2.4E-02	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	**1.6E+00**	1.6E-01
							HAZARD INDICES:	**4.3E+00**	5.3E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-11.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Toxicity Equivalency - Mammals	3.3E-05	mg/kg	3.0E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.0E-02	3.0E-03
Aluminum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	0.0E+00	0.0E+00
Antimony	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	0.0E+00	0.0E+00
Arsenic	4.4E-02	mg/kg	3.9E-05	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	8.2E-04	8.2E-05
Barium	1.6E+00	mg/kg	1.5E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.0E-05	9.2E-06
Beryllium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	0.0E+00	0.0E+00
Cadmium	1.5E-01	mg/kg	1.4E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-04	1.4E-05
Chromium	8.6E-01	mg/kg	7.7E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	5.2E-07	5.2E-08
Cobalt	2.2E-01	mg/kg	2.0E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.6E-03	2.6E-04
Copper	3.0E+00	mg/kg	2.7E-03	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	2.3E-04	1.8E-04
Iron	0.0E+00	mg/kg	0.0E+00	mg/kg-d					
Lead	4.4E-01	mg/kg	4.0E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.1E-06	1.0E-06
Manganese	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	0.0E+00	0.0E+00
Mercury	7.1E-01	mg/kg	6.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.3E-04	6.3E-05
Mercury (methyl)	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	0.0E+00	0.0E+0
Molybdenum	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+
Nickel	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	0.0E+00	0.0E+00
Selenium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	0.0E+00	0.0E+00
Silver	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	0.0E+00	0.0E+00
Thallium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	0.0E+00	0.0E+00
Vanadium	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	0.0E+00	0.0E+00
Zinc	1.6E+02	mg/kg	1.4E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	7.1E-04	3.6E-04
Naphthalene	3.4E-04	mg/kg	3.1E-07	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.0E-08	1.0E-09
2-Methylnaphthalene	2.6E-04	mg/kg	2.3E-07	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	7.7E-09	7.7E-10
Acenaphthylene	8.7E-04	mg/kg	7.7E-07	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	2.2E-08	2.2E-09
Acenaphthene	1.1E-03	mg/kg	1.0E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	2.8E-08	2.8E-09
Dibenzofuran	6.3E-04	mg/kg	5.6E-07	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	2.2E-08	2.2E-09
Fluorene	1.4E-03	mg/kg	1.2E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	4.8E-08	4.8E-09
Phenanthrene	2.0E-02	mg/kg	1.8E-05	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.2E-06	1.2E-07
Anthracene	2.1E-03	mg/kg	1.9E-06	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	9.4E-09	9.4E-10
Fluoranthene	2.4E-02	mg/kg	2.1E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	1.7E-07	8.4E-08
Pyrene	9.6E-03	mg/kg	8.5E-06	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	1.1E-07	6.8E-08
Benzo(a)anthracene	4.3E-03	mg/kg	3.8E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.8E-06	3.8E-07
Chrysene	7.0E-03	mg/kg	6.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.2E-06	6.2E-07
Benzo(b)fluoranthene	6.9E-03	mg/kg	6.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.2E-06	6.2E-07
Benzo(k)fluoranthene	3.1E-03	mg/kg	2.7E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-06	2.7E-07
Benzo(a)pyrene	4.0E-03	mg/kg	3.6E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.6E-06	3.6E-07
Indeno(1,2,3-cd)pyrene	4.3E-03	mg/kg	3.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.9E-06	3.9E-07
Dibenzo(a,h)anthracene	3.1E-04	mg/kg	2.8E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.8E-07	2.8E-08
Benzo(g,h,i)perylene	3.4E-03	mg/kg	3.0E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.0E-06	3.0E-07
1,1'-Biphenyl	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	0.0E+00	0.0E+00
alpha-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
oxicity Equivalency (PCB) - Mamma	8.5E-06	mg/kg	7.6E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	7.6E-03	7.6E-0
Technical Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	0.0E+00	0.0E+0
beta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
delta-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00

TABLE N-11.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
gamma-BHC	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.4E-02	1.4E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-01	1.0E+00	mg/kg-d	0.0E+00	0.0E+00
Aldrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Heptachlor Epoxide	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	0.0E+00	0.0E+00
Endosulfan I	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
Dieldrin	1.8E-02	mg/kg	1.6E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.1E-03	1.1E-04
4,4'-DDE	7.2E-02	mg/kg	6.5E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.1E-05	1.6E-05
Endrin	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endosulfan II	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	0.0E+00	0.0E+00
4,4'-DDD	3.0E-02	mg/kg	2.7E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.4E-05	6.7E-06
Endosulfan Sulfate	1.8E-03	mg/kg	1.6E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	2.9E-06	8.6E-07
4,4'-DDT	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	0.0E+00	0.0E+00
Methoxychlor	0.0E+00	mg/kg	0.0E+00	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	0.0E+00	0.0E+00
Endrin Ketone	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
Endrin Aldehyde	0.0E+00	mg/kg	0.0E+00	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	0.0E+00	0.0E+00
alpha-Chlordane	2.2E-02	mg/kg	1.9E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.2E-06	2.1E-06
gamma-Chlordane	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	0.0E+00	0.0E+00
Toxaphene	0.0E+00	mg/kg	0.0E+00	mg/kg-d	8.0E-02	8.0E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1016	0.0E+00	mg/kg	0.0E+00	mg/kg-d	4.0E-01	3.8E+00	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1221	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1232	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1242	0.0E+00	mg/kg	0.0E+00	mg/kg-d	6.9E-02	6.9E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1248	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1254	7.5E+00	mg/kg	6.7E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	4.5E-01	4.5E-02
Aroclor-1260	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	0.0E+00	0.0E+00
Aroclor-1268	1.6E-01	mg/kg	1.4E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.3E-03	9.3E-04
Aroclor, Total	1.9E+01	mg/kg	1.7E-02	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	**1.1E+00**	1.1E-01
							HAZARD INDICES:	**1.6E+00**	1.6E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-11.4
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 6.4E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor, Total		1.2E-01	-	1.6E+00	1.1E+00	***2.8E+00***	***45%***
Toxicity Equivalency - Mammals		1.1E-01	-	1.6E+00	3.0E-02	***1.8E+00***	***28%***
Aroclor-1254		4.2E-02	-	6.6E-01	4.5E-01	***1.1E+00***	***18%***
Cobalt		9.9E-02	-	9.9E-02	2.6E-03	2.0E-01	3%
Copper		9.9E-03	-	1.5E-01	2.3E-04	1.6E-01	2%
Arsenic		5.6E-02	-	5.3E-02	8.2E-04	1.1E-01	2%
Aroclor-1268		1.0E-02	-	5.7E-02	9.3E-03	7.6E-02	1%
Zinc		4.7E-03	-	1.1E-02	7.1E-04	1.6E-02	0%
Cadmium		2.1E-03	-	1.0E-02	1.4E-04	1.2E-02	0%
Dieldrin		9.8E-04	-	6.7E-03	1.1E-03	8.7E-03	0%
Toxicity Equivalency (PCB) - Mammals		3.2E-05	-	2.9E-04	7.6E-03	7.9E-03	0%
Barium		1.2E-03	-	5.9E-03	2.0E-05	7.0E-03	0%
Mercury		5.0E-04	-	4.5E-03	6.3E-04	5.7E-03	0%
Benzo(b)fluoranthene		3.2E-03	-		6.2E-06	3.2E-03	0%
Chrysene		2.0E-03	-		6.2E-06	2.0E-03	0%
Lead		1.6E-03	-	2.4E-04	3.1E-06	1.9E-03	0%
Benzo(a)anthracene		1.8E-03	-		3.8E-06	1.8E-03	0%
Benzo(a)pyrene		1.8E-03	-		3.6E-06	1.8E-03	0%
Indeno(1,2,3-cd)pyrene		1.7E-03	-		3.9E-06	1.7E-03	0%
Benzo(g,h,i)perylene		1.4E-03	-		3.0E-06	1.4E-03	0%
Benzo(k)fluoranthene		9.0E-04	-		2.7E-06	9.1E-04	0%
4,4'-DDD		9.3E-06	-	8.5E-04	3.4E-05	9.0E-04	0%
Endosulfan sulfate		1.2E-05	-	3.2E-04	2.9E-06	3.4E-04	0%
4,4'-DDE		6.3E-06	-	2.0E-04	8.1E-05	2.8E-04	0%
Dibenzo(a,h)anthracene		2.6E-04	-		2.8E-07	2.6E-04	0%
Chromium		1.4E-04	-	1.1E-05	5.2E-07	1.5E-04	0%
Phenanthrene		1.2E-04	-		1.2E-06	1.2E-04	0%
bis(2-Ethylhexyl)phthalate		7.7E-05	-			7.7E-05	0%
Pyrene		4.0E-05	-		1.1E-07	4.1E-05	0%
Fluoranthene		2.9E-05	-		1.7E-07	2.9E-05	0%
alpha-Chlordane		1.2E-06	-	3.6E-06	4.2E-06	9.0E-06	0%
Fluorene		6.4E-06	-		4.8E-08	6.4E-06	0%
Acenaphthylene		5.8E-06	-		2.2E-08	5.8E-06	0%
Dibenzofuran		5.1E-06	-		2.2E-08	5.1E-06	0%
Acenaphthene		5.0E-06	-		2.8E-08	5.0E-06	0%
Carbazole		2.9E-06	-			2.9E-06	0%
Naphthalene		2.7E-06	-		1.0E-08	2.7E-06	0%
Anthracene		1.9E-06	-		9.4E-09	1.9E-06	0%
2-Methylnaphthalene		1.3E-06	-		7.7E-09	1.3E-06	0%
Di-n-Butylphthalate		6.5E-07	-			6.5E-07	0%
Atrazine							
Mercury (methyl)				-	-		
Antimony				-	-		
Selenium				-	-		
Molybdenum				-	-		

TABLE N-11.4

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: DYERVILLE REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	6.4E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Vanadium				-	-		
Technical Chlordane				-	-		
N-Nitroso-di-n-propylamine							
Manganese				-	-		
Pentachlorophenol							
Aluminum				-	-		
Thallium				-	-		
2,4-Dinitrotoluene							
Aroclor-1248				-	-		
Aroclor-1260				-	-		
gamma-BHC				-	-		
Heptachlor epoxide				-	-		
Nickel				-	-		
4-Chloro-3-methylphenol							
Beryllium				-	-		
4,4'-DDT				-	-		
gamma-Chlordane				-	-		
2-Chlorophenol							
Endrin				-	-		
4-Nitrophenol							
Silver				-	-		
Phenol							
Endosulfan II				-	-		
Heptachlor				-	-		
Dimethylphthalate							
1,1'-Biphenyl					-		
Methoxychlor				-	-		
Cyanide							
Aroclor-1242				-	-		
Endrin Ketone				-	-		
Endrin aldehyde				-	-		
4-Methylphenol							
2,4,5-Trichlorophenol							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	-	4.7E-01	-	4.3E+00	1.6E+00	6.4E+00	
PERCENTAGE OF TOTAL RISK		7%		67%	25%	100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-11.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 7.5E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Aroclor, Total		1.2E-02	-	1.6E-01	1.1E-01	2.8E-01	***38%***
Toxicity Equivalency - Mammals		1.1E-02	-	1.6E-01	3.0E-03	1.8E-01	***24%***
Copper		7.7E-03	-	1.1E-01	1.8E-04	1.2E-01	***16%***
Aroclor-1254		4.2E-03	-	6.6E-02	4.5E-02	1.1E-01	***15%***
Cobalt		9.9E-03	-	9.9E-03	2.6E-04	2.0E-02	3%
Arsenic		5.6E-03	-	5.3E-03	8.2E-05	1.1E-02	1%
Zinc		2.4E-03	-	5.3E-03	3.6E-04	8.0E-03	1%
Aroclor-1268		1.0E-03	-	5.7E-03	9.3E-04	7.6E-03	1%
Barium		5.4E-04	-	2.7E-03	9.2E-06	3.3E-03	0%
Cadmium		2.1E-04	-	1.0E-03	1.4E-05	1.2E-03	0%
Dieldrin		9.8E-05	-	6.7E-04	1.1E-04	8.7E-04	0%
Toxicity Equivalency (PCB) - Mammals		3.2E-06	-	2.9E-05	7.6E-04	7.9E-04	0%
Lead		5.4E-04	-	8.0E-05	1.0E-06	6.2E-04	0%
Mercury		5.0E-05	-	4.5E-04	6.3E-05	5.7E-04	0%
Benzo(b)fluoranthene		3.2E-04	-		6.2E-07	3.2E-04	0%
Chrysene		2.0E-04	-		6.2E-07	2.0E-04	0%
Benzo(a)anthracene		1.8E-04	-		3.8E-07	1.8E-04	0%
Benzo(a)pyrene		1.8E-04	-		3.6E-07	1.8E-04	0%
4,4'-DDD		1.9E-06	-	1.7E-04	6.7E-06	1.8E-04	0%
Indeno(1,2,3-cd)pyrene		1.7E-04	-		3.9E-07	1.7E-04	0%
Benzo(g,h,i)perylene		1.4E-04	-		3.0E-07	1.4E-04	0%
Endosulfan sulfate		3.5E-06	-	9.6E-05	8.6E-07	1.0E-04	0%
Benzo(k)fluoranthene		9.0E-05	-		2.7E-07	9.1E-05	0%
4,4'-DDE		1.3E-06	-	3.9E-05	1.6E-05	5.7E-05	0%
Dibenzo(a,h)anthracene		2.6E-05	-		2.8E-08	2.6E-05	0%
Pyrene		2.4E-05	-		6.8E-08	2.4E-05	0%
Chromium		1.4E-05	-	1.1E-06	5.2E-08	1.5E-05	0%
Fluoranthene		1.4E-05	-		8.4E-08	1.4E-05	0%
Phenanthrene		1.2E-05	-		1.2E-07	1.2E-05	0%
bis(2-Ethylhexyl)phthalate		7.7E-06	-			7.7E-06	0%
alpha-Chlordane		6.1E-07	-	1.8E-06	2.1E-06	4.5E-06	0%
Fluorene		6.4E-07	-		4.8E-09	6.4E-07	0%
Acenaphthylene		5.8E-07	-		2.2E-09	5.8E-07	0%
Dibenzofuran		5.1E-07	-		2.2E-09	5.1E-07	0%
Acenaphthene		5.0E-07	-		2.8E-09	5.0E-07	0%
Carbazole		2.9E-07	-			2.9E-07	0%
Naphthalene		2.7E-07	-		1.0E-09	2.7E-07	0%
Anthracene		1.9E-07	-		9.4E-10	1.9E-07	0%
Di-n-Butylphthalate		1.6E-07	-			1.6E-07	0%
2-Methylnaphthalene		1.3E-07	-		7.7E-10	1.3E-07	0%
Atrazine							
Mercury (methyl)				-	-		
Antimony				-	-		
Selenium				-	-		
Molybdenum				-	-		

TABLE N-11.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: DYERVILLE REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 7.5E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Vanadium				-	-		
Technical Chlordane				-	-		
N-Nitroso-di-n-propylamine							
Manganese				-	-		
Pentachlorophenol							
Aluminum				-	-		
Thallium				-	-		
2,4-Dinitrotoluene							
Aroclor-1248				-	-		
Aroclor-1260				-	-		
gamma-BHC				-	-		
Heptachlor epoxide				-	-		
Nickel				-	-		
4-Chloro-3-methylphenol							
Beryllium				-	-		
4,4'-DDT				-	-		
gamma-Chlordane				-	-		
2-Chlorophenol							
Endrin				-	-		
4-Nitrophenol							
Silver				-	-		
Phenol							
Endosulfan II				-	-		
Heptachlor				-	-		
Dimethylphthalate							
1,1'-Biphenyl					-		
Methoxychlor				-	-		
Cyanide							
Aroclor-1242				-	-		
Endrin Ketone				-	-		
Endrin aldehyde				-	-		
4-Methylphenol							
2,4,5-Trichlorophenol							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	-	5.6E-02	-	5.3E-01	1.6E-01	7.5E-01	
PERCENTAGE OF TOTAL RISK		7%		71%	21%	100%	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. *Relative contribution of CPC to total risk associated with the ingestion exposure pathway.*

TABLE N-12.1
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	4.1E-05	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	2.3E-06	2.3E-07
Aluminum	1.6E-01	mg/L	6.4E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	3.3E-03	3.3E-04
Beryllium	4.9E-05	mg/L	2.0E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.7E-06	1.7E-07
Cobalt	1.1E-04	mg/L	4.7E-06	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.2E-05	6.2E-06
Copper	2.1E-03	mg/L	8.6E-05	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	7.3E-06	5.7E-06
Lead	3.7E-04	mg/L	1.5E-05	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.2E-07	4.0E-08
Manganese	1.4E-01	mg/L	5.6E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.3E-05	2.0E-05
Nickel	1.7E-03	mg/L	7.0E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	2.8E-06	1.1E-06
Selenium	8.2E-05	mg/L	3.4E-06	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.7E-05	1.0E-05
Thallium	5.1E-06	mg/L	2.1E-07	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.5E-06	1.5E-07
Zinc	3.4E-02	mg/L	1.4E-03	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	7.2E-06	3.6E-06
Nitrogen, Ammonia	1.1E-02	mg/L	4.5E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	5.3E-09	mg/L	2.2E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.2E-04	2.2E-05
							HAZARD INDICES:	3.7E-03	4.0E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-12.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
2-Methylnaphthalene	1.9E-02	mg/kg	1.1E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	3.7E-06	3.7E-07
Acenaphthene	3.4E-02	mg/kg	2.1E-04	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	5.9E-06	5.9E-07
Acenaphthylene	5.9E-02	mg/kg	3.6E-04	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	1.0E-05	1.0E-06
Anthracene	1.5E-01	mg/kg	8.9E-04	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	4.5E-06	4.5E-07
Benzo(a)anthracene	5.2E-01	mg/kg	3.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.1E-03	3.1E-04
Benzo(a)pyrene	5.3E-01	mg/kg	3.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.2E-03	3.2E-04
Benzo(b)fluoranthene	6.3E-01	mg/kg	3.8E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.8E-03	3.8E-04
Benzo(g,h,i)perylene	4.0E-01	mg/kg	2.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.4E-03	2.4E-04
Benzo(k)fluoranthene	4.1E-01	mg/kg	2.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.5E-03	2.5E-04
bis(2-Ethylhexyl)phthalate	4.7E-01	mg/kg	2.8E-03	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.6E-04	1.5E-05
Carbazole	8.9E-02	mg/kg	5.4E-04	mg/kg-d	1.0E+02	1.0E+03	mg/kg-d	5.4E-06	5.4E-07
Chrysene	6.8E-01	mg/kg	4.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.1E-03	4.1E-04
Dibenzo(a,h)anthracene	1.5E-01	mg/kg	9.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.0E-04	9.0E-05
Dibenzofuran	3.6E-02	mg/kg	2.2E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	8.7E-06	8.7E-07
Di-n-Butylphthalate	8.0E-02	mg/kg	4.8E-04	mg/kg-d	1.0E+02	4.0E+02	mg/kg-d	4.8E-06	1.2E-0[illegible]
Fluoranthene	1.1E+00	mg/kg	6.6E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	5.3E-05	2.6E-[illegible]
Fluorene	8.1E-02	mg/kg	4.9E-04	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.9E-05	1.9E-06
Indeno(1,2,3-cd)pyrene	4.3E-01	mg/kg	2.6E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.6E-03	2.6E-04
Naphthalene	1.9E-02	mg/kg	1.2E-04	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	3.8E-06	3.8E-07
Phenanthrene	5.4E-01	mg/kg	3.3E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.2E-04	2.2E-05
Pyrene	9.4E-01	mg/kg	5.7E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	7.6E-05	4.6E-05
4,4'-DDD	2.6E-03	mg/kg	1.6E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.0E-05	4.0E-06
4,4'-DDE	3.3E-03	mg/kg	2.0E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.5E-05	5.0E-06
alpha-Chlordane	1.3E-03	mg/kg	8.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.8E-06	8.8E-07
Aroclor, Total	5.8E-02	mg/kg	3.5E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.3E-02	2.3E-03
Aroclor-1254	3.2E-02	mg/kg	1.9E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.3E-02	1.3E-03
Aroclor-1268	2.3E-02	mg/kg	1.4E-04	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	9.3E-03	9.3E-04
Dieldrin	1.9E-03	mg/kg	1.2E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.7E-04	7.7E-05
gamma-Chlordane	6.5E-04	mg/kg	3.9E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.6E-07	4.3E-07
Technical Chlordane	1.1E-01	mg/kg	6.5E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.4E-04	7.1E-05
Arsenic	2.7E+00	mg/kg	1.6E-02	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	3.4E-01	3.4E-02
Barium	9.4E+01	mg/kg	5.7E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	7.5E-03	3.5E-03
Cadmium	3.7E-01	mg/kg	2.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-03	2.2E-04
Chromium	1.0E+01	mg/kg	6.3E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	4.3E-05	4.3E-06
Cobalt	6.2E+00	mg/kg	3.7E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	4.9E-01	4.9E-02
Copper	1.2E+01	mg/kg	7.1E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	6.1E-03	4.7E-03
Lead	4.1E+01	mg/kg	2.4E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.9E-03	6.5E-04
Mercury	5.1E-02	mg/kg	3.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.1E-04	3.1E-05
Mercury (methyl)	5.6E-04	mg/kg	3.4E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	2.3E-04	1.4E-04
Molybdenum	1.6E+00	mg/kg	9.5E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	5.0E-02	5.0E-03
Selenium	6.2E-01	mg/kg	3.8E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.9E-02	1.1E-02
Silver	1.6E+00	mg/kg	9.4E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	4.2E-04	4.2E-05
Thallium	3.5E-01	mg/kg	2.1E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.5E-02	1.5E-0[illegible]
Zinc	1.0E+02	mg/kg	6.1E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	3.1E-03	1.6E-0[illegible]
Toxicity Equivalency - Mammals	3.8E-06	mg/kg	2.3E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.3E-02	2.3E-03

TABLE N-12.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SEDIMENT (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SEDIMENT
EXPOSURE MEDIUM: SEDIMENT (0-2 feet)
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
							HAZARD INDICES:	1.0E+00	1.2E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-12.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : AQUATIC INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: AQUATIC INVERTEBRATES
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDE	3.6E-03	mg/kg	4.2E-04	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.3E-04	1.1E-04
Aroclor, Total	1.1E-02	mg/kg	1.3E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	8.6E-02	8.6E-03
Aroclor-1254	1.0E-02	mg/kg	1.2E-03	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	8.0E-02	8.0E-03
Aroclor-1268	6.9E-04	mg/kg	8.0E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	5.4E-03	5.4E-04
Heptachlor Epoxide	9.0E-05	mg/kg	1.0E-05	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	8.4E-05	6.0E-05
Technical Chlordane	8.8E-03	mg/kg	1.0E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.2E-04	1.1E-04
Barium	4.0E+01	mg/kg	4.6E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	6.2E-02	2.9E-02
Cadmium	8.2E-02	mg/kg	9.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.5E-03	9.5E-04
Cobalt	8.3E-02	mg/kg	9.7E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.3E-01	1.3E-02
Copper	1.5E+01	mg/kg	1.7E+00	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.5E-01	1.2E-01
Lead	1.4E-01	mg/kg	1.6E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.3E-04	4.3E-05
Manganese	1.1E+02	mg/kg	1.3E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.5E-01	4.6E-02
Mercury	3.9E-02	mg/kg	4.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.5E-03	4.5E-04
Mercury (methyl)	3.9E-02	mg/kg	4.5E-03	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	3.0E-01	1.8E-01
Molybdenum	4.3E-02	mg/kg	5.0E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	2.6E-02	2.6E-0[illegible]
Nickel	2.5E-01	mg/kg	2.9E-02	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.2E-03	4.6E-[illegible]
Selenium	1.3E-01	mg/kg	1.5E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	7.3E-02	4.4E-0[illegible]
Silver	2.2E-01	mg/kg	2.5E-02	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	1.1E-03	1.1E-04
Thallium	7.1E-03	mg/kg	8.3E-04	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	5.9E-03	5.9E-04
Zinc	2.3E+01	mg/kg	2.7E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.4E-02	6.8E-03
Toxicity Equivalency - Mammals	3.0E-06	mg/kg	3.5E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.5E-01	3.5E-02
							HAZARD INDICES:	1.4E+00	5.0E-01

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-12.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : FISH / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 3
EXPOSURE MEDIUM: FISH
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
1,1'-Biphenyl	6.4E-04	mg/kg	2.7E-06	mg/kg-d	5.0E+01	2.5E+02	mg/kg-d	5.4E-08	1.1E-08
2-Methylnaphthalene	1.7E-02	mg/kg	7.3E-05	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	2.4E-06	2.4E-07
Acenaphthene	4.1E-04	mg/kg	1.7E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	4.9E-08	4.9E-09
Acenaphthylene	9.1E-04	mg/kg	3.8E-06	mg/kg-d	3.5E+01	3.5E+02	mg/kg-d	1.1E-07	1.1E-08
Anthracene	7.9E-04	mg/kg	3.3E-06	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.7E-08	1.7E-09
Benzo(a)anthracene	3.3E-03	mg/kg	1.4E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-05	1.4E-06
Benzo(a)pyrene	3.3E-03	mg/kg	1.4E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-05	1.4E-06
Benzo(b)fluoranthene	4.2E-03	mg/kg	1.8E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-05	1.8E-06
Benzo(g,h,i)perylene	2.2E-03	mg/kg	9.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.2E-06	9.2E-07
Benzo(k)fluoranthene	3.6E-03	mg/kg	1.5E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-05	1.5E-06
Chrysene	4.5E-03	mg/kg	1.9E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-05	1.9E-06
Dibenzo(a,h)anthracene	1.1E-03	mg/kg	4.6E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.6E-06	4.6E-07
Dibenzofuran	5.5E-04	mg/kg	2.3E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	9.3E-08	9.3E-09
Fluoranthene	9.6E-03	mg/kg	4.0E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	3.2E-07	1.6E-07
Fluorene	9.0E-04	mg/kg	3.8E-06	mg/kg-d	2.5E+01	2.5E+02	mg/kg-d	1.5E-07	1.5E-08
Indeno(1,2,3-cd)pyrene	2.8E-03	mg/kg	1.2E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-05	1.2E-06
Naphthalene	7.7E-03	mg/kg	3.3E-05	mg/kg-d	3.0E+01	3.0E+02	mg/kg-d	1.1E-06	1.1E-07
Phenanthrene	7.1E-03	mg/kg	3.0E-05	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.0E-06	2.0E-07
Pyrene	5.9E-03	mg/kg	2.5E-05	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	3.3E-07	2.0E-07
4,4'-DDD	2.4E-03	mg/kg	1.0E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.2E-05	2.5E-06
4,4'-DDE	1.3E-02	mg/kg	5.4E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.7E-05	1.3E-05
alpha-Chlordane	1.7E-03	mg/kg	7.3E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.6E-06	8.0E-07
gamma-Chlordane	9.4E-04	mg/kg	4.0E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.7E-07	4.3E-07
Aluminum	9.9E+00	mg/kg	4.2E-02	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	2.2E-02	2.2E-03
Barium	9.2E-01	mg/kg	3.9E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.2E-05	2.4E-05
Beryllium	3.5E-04	mg/kg	1.5E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.2E-06	1.2E-07
Cadmium	1.5E-02	mg/kg	6.3E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.3E-05	6.3E-06
Chromium	9.1E-02	mg/kg	3.8E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.6E-07	2.6E-08
Cobalt	4.0E-02	mg/kg	1.7E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.2E-03	2.2E-04
Copper	5.8E-01	mg/kg	2.4E-03	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	2.1E-04	1.6E-04
Lead	8.9E-02	mg/kg	3.8E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.0E-06	1.0E-06
Manganese	4.3E+00	mg/kg	1.8E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.1E-04	6.4E-05
Mercury	7.7E-02	mg/kg	3.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.2E-04	3.2E-05
Mercury (methyl)	7.7E-02	mg/kg	3.3E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	2.2E-02	1.3E-02
Nickel	3.8E-02	mg/kg	1.6E-04	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	6.4E-06	2.6E-06
Selenium	1.9E-01	mg/kg	8.2E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	4.1E-03	2.5E-03
Silver	2.1E-02	mg/kg	8.9E-05	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	4.0E-06	4.0E-07
Thallium	3.2E-03	mg/kg	1.3E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	9.5E-05	9.5E-06
Vanadium	7.1E-02	mg/kg	3.0E-04	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	7.1E-04	1.4E-04
Zinc	9.8E+00	mg/kg	4.1E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.1E-04	1.1E-04
Toxicity Equivalency - Mammals	2.2E-06	mg/kg	9.1E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	9.1E-03	9.1E-04
							HAZARD INDICES:	6.1E-02	2.0E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-9.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-12.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 2.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Cobalt	6.2E-05	4.9E-01	-	1.3E-01	2.2E-03	6.2E-01	***25%***
Toxicity Equivalency - Mammals	2.2E-04	2.3E-02	-	3.5E-01	9.1E-03	3.8E-01	***15%***
Arsenic		3.4E-01	-			3.4E-01	***13%***
Mercury (methyl)		2.3E-04	-	3.0E-01	2.2E-02	3.2E-01	***13%***
Copper	7.3E-06	6.1E-03	-	1.5E-01	2.1E-04	1.6E-01	6%
Manganese	6.3E-05			1.5E-01	2.1E-04	1.5E-01	6%
Aroclor, Total		2.3E-02	-	8.6E-02		1.1E-01	4%
Selenium	1.7E-05	1.9E-02	-	7.3E-02	4.1E-03	9.6E-02	4%
Aroclor-1254		1.3E-02	-	8.0E-02		9.3E-02	4%
Molybdenum		5.0E-02	-	2.6E-02		7.6E-02	3%
Barium		7.5E-03	-	6.2E-02	5.2E-05	6.9E-02	3%
Aluminum	3.3E-03				2.2E-02	2.5E-02	1%
Thallium	1.5E-06	1.5E-02	-	5.9E-03	9.5E-05	2.1E-02	1%
Zinc	7.2E-06	3.1E-03	-	1.4E-02	2.1E-04	1.7E-02	1%
Aroclor-1268		9.3E-03	-	5.4E-03		1.5E-02	1%
Cadmium		2.2E-03	-	9.5E-03	6.3E-05	1.2E-02	0%
Mercury		3.1E-04	-	4.5E-03	3.2E-04	5.1E-03	0%
Chrysene		4.1E-03	-		1.9E-05	4.1E-03	0%
Benzo(b)fluoranthene		3.8E-03	-		1.8E-05	3.8E-03	0%
Benzo(a)pyrene		3.2E-03	-		1.4E-05	3.2E-03	0%
Benzo(a)anthracene		3.1E-03	-		1.4E-05	3.1E-03	0%
Indeno(1,2,3-cd)pyrene		2.6E-03	-		1.2E-05	2.6E-03	0%
Benzo(k)fluoranthene		2.5E-03	-		1.5E-05	2.5E-03	0%
Benzo(g,h,i)perylene		2.4E-03	-		9.2E-06	2.4E-03	0%
Lead	1.2E-07	1.9E-03	-	1.3E-04	3.0E-06	2.1E-03	0%
Silver		4.2E-04	-	1.1E-03	4.0E-06	1.6E-03	0%
Nickel	2.8E-06			1.2E-03	6.4E-06	1.2E-03	0%
Dibenzo(a,h)anthracene		9.0E-04	-		4.6E-06	9.0E-04	0%
Dieldrin		7.7E-04	-			7.7E-04	0%
Vanadium					7.1E-04	7.1E-04	0%
4,4'-DDE		2.5E-05	-	5.3E-04	6.7E-05	6.2E-04	0%
Technical Chlordane		1.4E-04	-	2.2E-04		3.7E-04	0%
Phenanthrene		2.2E-04	-		2.0E-06	2.2E-04	0%
bis(2-Ethylhexyl)phthalate	2.3E-06	1.6E-04	-			1.6E-04	0%
Heptachlor epoxide				8.4E-05		8.4E-05	0%
Pyrene		7.6E-05	-		3.3E-07	7.6E-05	0%
Fluoranthene		5.3E-05	-		3.2E-07	5.3E-05	0%
Chromium		4.3E-05	-		2.6E-07	4.3E-05	0%
4,4'-DDD		2.0E-05	-		1.2E-05	3.2E-05	0%
Fluorene		1.9E-05	-		1.5E-07	2.0E-05	0%
Acenaphthylene		1.0E-05	-		1.1E-07	1.0E-05	0%
Dibenzofuran		8.7E-06	-		9.3E-08	8.8E-06	0%
2-Methylnaphthalene		3.7E-06	-		2.4E-06	6.2E-06	0%
Acenaphthene		5.9E-06	-		4.9E-08	5.9E-06	0%
Carbazole		5.4E-06	-			5.4E-06	0%

TABLE N-12.5
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 2.5E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Naphthalene		3.8E-06	-		1.1E-06	4.9E-06	0%
Di-n-Butylphthalate		4.8E-06	-			4.8E-06	0%
Anthracene		4.5E-06	-		1.7E-08	4.5E-06	0%
alpha-Chlordane		1.8E-06	-		1.6E-06	3.4E-06	0%
Beryllium	1.7E-06				1.2E-06	2.9E-06	0%
gamma-Chlordane		8.6E-07	-		8.7E-07	1.7E-06	0%
1,1'-Biphenyl					5.4E-08	5.4E-08	0%
Antimony							
Toxicity Equivalency (PCB) - Mammals							
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor-1260							
gamma-BHC							
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
Endrin							
4-Nitrophenol							
Phenol							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dimethylphthalate							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**3.7E-03**	**1.0E+00**	**-**	**1.4E+00**	**6.1E-02**	**2.5E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**41%**		**57%**	**2%**	**100%**	

Footnotes:
a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.
b. Combined risk across all media exposures.
c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-12.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 6.4E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
Mercury (methyl)		1.4E-04	-	1.8E-01	1.3E-02	2.0E-01	***31%***
Copper	5.7E-06	4.7E-03	-	1.2E-01	1.6E-04	1.2E-01	***19%***
Cobalt	6.2E-06	4.9E-02	-	1.3E-02	2.2E-04	6.2E-02	10%
Selenium	1.0E-05	1.1E-02	-	4.4E-02	2.5E-03	5.8E-02	9%
Manganese	2.0E-05			4.6E-02	6.4E-05	4.6E-02	7%
Toxicity Equivalency - Mammals	2.2E-05	2.3E-03	-	3.5E-02	9.1E-04	3.8E-02	6%
Arsenic		3.4E-02	-			3.4E-02	5%
Barium		3.5E-03	-	2.9E-02	2.4E-05	3.2E-02	5%
Aroclor, Total		2.3E-03	-	8.6E-03		1.1E-02	2%
Aroclor-1254		1.3E-03	-	8.0E-03		9.3E-03	1%
Zinc	3.6E-06	1.6E-03	-	6.8E-03	1.1E-04	8.5E-03	1%
Molybdenum		5.0E-03	-	2.6E-03		7.6E-03	1%
Aluminum	3.3E-04				2.2E-03	2.5E-03	0%
Thallium	1.5E-07	1.5E-03	-	5.9E-04	9.5E-06	2.1E-03	0%
Aroclor-1268		9.3E-04	-	5.4E-04		1.5E-03	0%
Cadmium		2.2E-04	-	9.5E-04	6.3E-06	1.2E-03	0%
Lead	4.0E-08	6.5E-04	-	4.3E-05	1.0E-06	6.9E-04	0%
Mercury		3.1E-05	-	4.5E-04	3.2E-05	5.1E-04	0%
Nickel	1.1E-06			4.6E-04	2.6E-06	4.7E-04	0%
Chrysene		4.1E-04	-		1.9E-06	4.1E-04	0%
Benzo(b)fluoranthene		3.8E-04	-		1.8E-06	3.8E-04	0%
Benzo(a)pyrene		3.2E-04	-		1.4E-06	3.2E-04	0%
Benzo(a)anthracene		3.1E-04	-		1.4E-06	3.1E-04	0%
Indeno(1,2,3-cd)pyrene		2.6E-04	-		1.2E-06	2.6E-04	0%
Benzo(k)fluoranthene		2.5E-04	-		1.5E-06	2.5E-04	0%
Benzo(g,h,i)perylene		2.4E-04	-		9.2E-07	2.4E-04	0%
Technical Chlordane		7.1E-05	-	1.1E-04		1.8E-04	0%
Silver		4.2E-05	-	1.1E-04	4.0E-07	1.6E-04	0%
Vanadium					1.4E-04	1.4E-04	0%
4,4'-DDE		5.0E-06	-	1.1E-04	1.3E-05	1.2E-04	0%
Dibenzo(a,h)anthracene		9.0E-05	-		4.6E-07	9.0E-05	0%
Dieldrin		7.7E-05	-			7.7E-05	0%
Heptachlor epoxide				6.0E-05		6.0E-05	0%
Pyrene		4.6E-05	-		2.0E-07	4.6E-05	0%
Fluoranthene		2.6E-05	-		1.6E-07	2.6E-05	0%
Phenanthrene		2.2E-05	-		2.0E-07	2.2E-05	0%
bis(2-Ethylhexyl)phthalate	2.3E-07	1.5E-05	-			1.6E-05	0%
4,4'-DDD		4.0E-06	-		2.5E-06	6.5E-06	0%
Chromium		4.3E-06	-		2.6E-08	4.3E-06	0%
Fluorene		1.9E-06	-		1.5E-08	2.0E-06	0%
alpha-Chlordane		8.8E-07	-		8.0E-07	1.7E-06	0%
Di-n-Butylphthalate		1.2E-06	-			1.2E-06	0%
Acenaphthylene		1.0E-06	-		1.1E-08	1.0E-06	0%
Dibenzofuran		8.7E-07	-		9.3E-09	8.8E-07	0%
gamma-Chlordane		4.3E-07	-		4.3E-07	8.6E-07	0%

TABLE N-12.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ASSAPUMPSET POND - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 6.4E-01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]					Combined HQs[b]	Percent Contribution[c]
	Surface Water	Sediment	Aquatic Plants	Aquatic Invertebrates	Fish		
2-Methylnaphthalene		3.7E-07	-		2.4E-07	6.2E-07	0%
Acenaphthene		5.9E-07	-		4.9E-09	5.9E-07	0%
Carbazole		5.4E-07	-			5.4E-07	0%
Naphthalene		3.8E-07	-		1.1E-07	4.9E-07	0%
Anthracene		4.5E-07	-		1.7E-09	4.5E-07	0%
Beryllium	1.7E-07				1.2E-07	2.9E-07	0%
1,1'-Biphenyl					1.1E-08	1.1E-08	0%
Antimony							
Toxicity Equivalency (PCB) - Mammals							
N-Nitroso-di-n-propylamine							
Pentachlorophenol							
2,4-Dinitrotoluene							
Aroclor-1248							
Aroclor-1260							
gamma-BHC							
4-Chloro-3-methylphenol							
4,4'-DDT							
2-Chlorophenol							
Endrin							
4-Nitrophenol							
Phenol							
Endosulfan II							
Endosulfan sulfate							
Heptachlor							
Dimethylphthalate							
Methoxychlor							
Cyanide							
Aroclor-1242							
Endrin Ketone							
Endrin aldehyde							
4-Methylphenol							
2,4,5-Trichlorophenol							
Atrazine							
Iron							
Toxicity Equivalency (PCB) - Birds							
Toxicity Equivalency - Birds							
TOTAL MEDIUM-SPECIFIC RISK	**4.0E-04**	**1.2E-01**	**-**	**5.0E-01**	**2.0E-02**	**6.4E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**19%**		**78%**	**3%**	**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-13.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]				Estimated Tissue Concentration			
		Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	7.1E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**1.5E-02**	7.3E-01	3.0E-02	3.0E-02
Benzo(a)anthracene	3.1E+00	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**1.1E-02**	3.3E+00	2.7E+00	2.7E+00
Benzo(a)pyrene	3.1E+00	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**6.8E-03**	3.3E+00	6.3E+00	6.3E+00
Benzo(b)fluoranthene	3.5E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**1.2E-02**	3.7E+00	3.1E+00	3.1E+00
Benzo(g,h,i)perylene	2.3E+00	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**2.7E-03**	2.5E+00	1.5E+01	1.5E+01
Benzo(k)fluoranthene	3.2E+00	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**7.3E-03**	3.4E+00	6.2E+00	6.2E+00
Chrysene	3.8E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**1.3E-02**	4.1E+00	3.7E+00	3.7E+00
Dibenzo(a,h)anthracene	6.1E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**6.0E-04**	6.7E-01	5.2E+00	5.2E+00
Fluoranthene	7.0E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**5.7E-02**	7.4E+00	1.5E+00	1.5E+00
Indeno(1,2,3-cd)pyrene	2.5E+00	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**2.6E-03**	2.8E+00	1.9E+01	1.9E+01
Phenanthrene	4.0E+00	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**8.1E-02**	4.1E+00	1.7E-01	1.7E-01
Pyrene	5.8E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**6.8E-02**	6.1E+00	6.6E-01	6.6E-01
4,4'-DDD	8.2E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**2.0E-05**	8.8E-03	1.4E-02	1.4E-02
4,4'-DDE	1.3E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.3E-05**	1.5E-02	1.2E-01	1.2E-01
4,4'-DDT	8.5E-03	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**1.2E-05**	9.3E-03	3.6E-02	3.6E-02
Aroclor-1254	5.2E-01	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**7.0E-04**	5.6E-01	2.5E+00	2.5E+00
Aroclor-1268	8.4E-02	3.4E-04	1.1E+00	5.3E+01	5.3E+01	**2.8E-05**	9.4E-02	4.5E+00	4.5E+00
Dieldrin	6.3E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**4.2E-05**	6.6E-03	1.9E-03	1.9E-03
Technical Chlordane	4.3E-01	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**1.1E-03**	4.6E-01	6.5E-01	6.5E-01
Antimony	6.2E-01	2.0E-03	-	5.0E-02	5.0E-02	**1.3E-03**	0.0E+00	3.1E-02	3.1E-02
Arsenic	7.7E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**7.7E-02**	1.9E-01	8.6E-03	8.6E-03
Barium	2.3E+02	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**7.2E+00**	4.2E+00	1.6E+01	1.6E+01
Beryllium	3.1E+00	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**6.2E-03**	2.8E-02	1.5E-01	1.5E-01
Cadmium	1.6E+00	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**7.1E-02**	1.7E+00	6.8E-01	6.8E-01
Chromium	2.3E+02	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**1.9E+00**	1.4E+01	9.9E+00	9.9E+00
Cobalt	1.3E+01	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**2.0E-02**	3.2E-01	7.5E-02	7.5E-02
Copper	2.1E+02	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**2.0E+01**	4.0E+01	5.1E+01	5.1E+01
Lead	4.5E+02	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**8.7E+00**	4.6E+01	4.5E+01	4.5E+01
Manganese	1.8E+03	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**2.9E+01**	7.9E+01	7.5E+00	7.5E+00
Mercury	5.8E-01	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**1.5E-02**	2.7E-02	2.6E-05	2.6E-05
Molybdenum	5.4E+01	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**2.7E+00**	1.0E+01	1.6E+01	1.6E+01
Selenium	7.0E-01	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**9.1E-02**	7.1E-02	2.2E-02	2.2E-02
Thallium	4.6E-01	8.0E-04	-	2.2E-02	2.2E-02	**3.7E-04**	0.0E+00	1.0E-02	1.0E-02
Vanadium	8.2E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**8.0E-02**	6.9E-01	2.0E-01	2.0E-01
Zinc	2.9E+02	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**1.0E+02**	1.0E+03	6.1E+02	6.1E+02
Toxicity Equivalency - Mammals	5.5E-05					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	3.8E-05					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (I.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF.

TABLE N-13.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Aluminum	8.9E-02	mg/L	3.7E-03	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.9E-03	1.9E-04
Beryllium	5.5E-05	mg/L	2.3E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.9E-06	1.9E-07
Chromium	2.5E-03	mg/L	1.0E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	7.0E-08	7.0E-09
Cobalt	1.2E-04	mg/L	4.9E-06	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.5E-05	6.5E-06
Copper	5.4E-03	mg/L	2.2E-04	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.9E-05	1.5E-05
Lead	2.9E-03	mg/L	1.2E-04	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	9.4E-07	3.1E-07
Manganese	1.3E-01	mg/L	5.4E-03	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.1E-05	1.9E-05
Nickel	1.9E-03	mg/L	8.0E-05	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	3.2E-06	1.3E-06
Selenium	8.7E-05	mg/L	3.6E-06	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.8E-05	1.1E-05
Thallium	7.4E-06	mg/L	3.1E-07	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.2E-06	2.2E-07
Zinc	2.0E-02	mg/L	8.4E-04	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	4.3E-06	2.1E-06
Nitrogen, Ammonia	3.9E-01	mg/L	1.6E-02	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	5.6E-09	mg/L	2.3E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.3E-04	2.3E-05
							HAZARD INDICES:	2.3E-03	2.7E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-13.3

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	7.1E-01	mg/kg	5.0E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	2.5E-05	2.5E-06
Benzo(a)anthracene	3.1E+00	mg/kg	2.2E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-02	2.2E-03
Benzo(a)pyrene	3.1E+00	mg/kg	2.2E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-02	2.2E-03
Benzo(b)fluoranthene	3.5E+00	mg/kg	2.4E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.4E-02	2.4E-03
Benzo(g,h,i)perylene	2.3E+00	mg/kg	1.6E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-02	1.6E-03
Benzo(k)fluoranthene	3.2E+00	mg/kg	2.3E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.3E-02	2.3E-03
Chrysene	3.8E+00	mg/kg	2.7E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-02	2.7E-03
Dibenzo(a,h)anthracene	6.1E-01	mg/kg	4.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.3E-03	4.3E-04
Fluoranthene	7.0E+00	mg/kg	5.0E-02	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.0E-04	2.0E-04
Indeno(1,2,3-cd)pyrene	2.5E+00	mg/kg	1.8E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.8E-02	1.8E-03
Phenanthrene	4.0E+00	mg/kg	2.8E-02	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.9E-03	1.9E-04
Pyrene	5.8E+00	mg/kg	4.1E-02	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	5.5E-04	3.3E-04
4,4'-DDD	8.2E-03	mg/kg	5.8E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.3E-05	1.5E-05
4,4'-DDE	1.3E-02	mg/kg	9.4E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.2E-04	2.4E-05
4,4'-DDT	8.5E-03	mg/kg	6.0E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.5E-05	1.5E-05
Aroclor-1254	5.2E-01	mg/kg	3.7E-03	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	7.3E-01	1.8E-01
Aroclor-1268	8.4E-02	mg/kg	5.9E-04	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.2E-01	3.0E-02
Dieldrin	6.3E-03	mg/kg	4.4E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	3.0E-03	3.0E-04
Technical Chlordane	4.3E-01	mg/kg	3.0E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.6E-04	3.3E-04
Antimony	6.2E-01	mg/kg	4.4E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.7E-01	1.7E-02
Arsenic	7.7E+00	mg/kg	5.4E-02	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	**1.1E+00**	1.1E-01
Barium	2.3E+02	mg/kg	1.6E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	2.2E-02	1.0E-02
Beryllium	3.1E+00	mg/kg	2.2E-02	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.8E-02	1.8E-03
Cadmium	1.6E+00	mg/kg	1.1E-02	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-02	1.1E-03
Chromium	2.3E+02	mg/kg	1.6E+00	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.1E-03	1.1E-04
Cobalt	1.3E+01	mg/kg	9.3E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	**1.2E+00**	1.2E-01
Copper	2.1E+02	mg/kg	1.4E+00	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.2E-01	9.6E-02
Lead	4.5E+02	mg/kg	3.2E+00	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.5E-02	8.4E-03
Manganese	1.8E+03	mg/kg	1.3E+01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.5E-01	4.6E-02
Mercury	5.8E-01	mg/kg	4.1E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	1.6E-02	1.6E-03
Molybdenum	5.4E+01	mg/kg	3.8E-01	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**2.0E+00**	2.0E-01
Selenium	7.0E-01	mg/kg	5.0E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	2.5E-02	1.5E-02
Thallium	4.6E-01	mg/kg	3.2E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.3E-02	2.3E-03
Vanadium	8.2E+01	mg/kg	5.8E-01	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	**1.4E+00**	2.8E-01
Zinc	2.9E+02	mg/kg	2.0E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.0E-02	5.2E-03
Toxicity Equivalency - Mammals	5.5E-05	mg/kg	3.9E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.9E-01	3.9E-02
Toxicity Equivalency (PCB) - Mammals	3.8E-05	mg/kg	2.7E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.7E-01	2.7E-02
							HAZARD INDICES:	**8.0E+00**	**1.2E+00**

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-13.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.5E-02	mg/kg	1.5E-03	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	7.4E-06	7.4E-07
Benzo(a)anthracene	1.1E-02	mg/kg	1.1E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.1E-03	1.1E-04
Benzo(a)pyrene	6.8E-03	mg/kg	6.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.9E-04	6.9E-05
Benzo(b)fluoranthene	1.2E-02	mg/kg	1.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-03	1.2E-04
Benzo(g,h,i)perylene	2.7E-03	mg/kg	2.7E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-04	2.7E-05
Benzo(k)fluoranthene	7.3E-03	mg/kg	7.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.3E-04	7.3E-05
Chrysene	1.3E-02	mg/kg	1.3E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-03	1.3E-04
Dibenzo(a,h)anthracene	6.0E-04	mg/kg	6.0E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.0E-05	6.0E-06
Fluoranthene	5.7E-02	mg/kg	5.7E-03	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.6E-05	2.3E-05
Indeno(1,2,3-cd)pyrene	2.6E-03	mg/kg	2.6E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.6E-04	2.6E-05
Phenanthrene	8.1E-02	mg/kg	8.2E-03	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	5.4E-04	5.4E-05
Pyrene	6.8E-02	mg/kg	6.9E-03	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	9.1E-05	5.5E-05
4,4'-DDD	2.0E-05	mg/kg	2.0E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.5E-06	5.0E-07
4,4'-DDE	1.3E-05	mg/kg	1.3E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.6E-06	3.2E-07
4,4'-DDT	1.2E-05	mg/kg	1.2E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.6E-06	3.1E-[illegible]
Aroclor-1254	7.0E-04	mg/kg	7.1E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.4E-02	3.6[illegible]
Aroclor-1268	2.8E-05	mg/kg	2.8E-06	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	5.7E-04	1.4E-04
Dieldrin	4.2E-05	mg/kg	4.2E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.8E-04	2.8E-05
Technical Chlordane	1.1E-03	mg/kg	1.1E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.5E-05	1.2E-05
Antimony	1.3E-03	mg/kg	1.3E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	4.9E-03	4.9E-04
Arsenic	7.7E-02	mg/kg	7.8E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.6E-01	1.6E-02
Barium	7.2E+00	mg/kg	7.3E-01	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	9.7E-03	4.5E-03
Beryllium	6.2E-03	mg/kg	6.2E-04	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	5.2E-04	5.2E-05
Cadmium	7.1E-02	mg/kg	7.2E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.2E-03	7.2E-04
Chromium	1.9E+00	mg/kg	1.9E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.3E-04	1.3E-05
Cobalt	2.0E-02	mg/kg	2.0E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	2.6E-02	2.6E-03
Copper	2.0E+01	mg/kg	2.0E+00	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.7E-01	1.3E-01
Lead	8.7E+00	mg/kg	8.7E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	6.9E-03	2.3E-03
Manganese	2.9E+01	mg/kg	2.9E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.3E-02	1.0E-02
Mercury	1.5E-02	mg/kg	1.5E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	5.7E-03	5.7E-04
Molybdenum	2.7E+00	mg/kg	2.7E-01	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	**1.4E+00**	1.4E-01
Selenium	9.1E-02	mg/kg	9.2E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	4.6E-02	2.8E-02
Thallium	3.7E-04	mg/kg	3.7E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.7E-04	2.7E-05
Vanadium	8.0E-02	mg/kg	8.0E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.9E-02	3.8E-03
Zinc	1.0E+02	mg/kg	1.0E+01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	5.2E-02	2.6E-02
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	**2.0E+00**	3.8E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-13.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.3E-03	mg/kg	5.4E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	6.7E-05	1.3E-05
4,4'-DDE	1.7E-03	mg/kg	6.9E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.6E-05	1.7E-05
4,4'-DDT	9.6E-04	mg/kg	3.9E-05	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.8E-05	9.7E-06
alpha-Chlordane	1.4E-03	mg/kg	5.8E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.3E-05	6.3E-06
Aroclor, Total	5.0E-02	mg/kg	2.0E-03	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	4.1E-01	1.0E-01
Aroclor-1254	3.9E-02	mg/kg	1.6E-03	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	3.1E-01	7.8E-02
Aroclor-1268	1.1E-02	mg/kg	4.6E-04	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	9.2E-02	2.3E-02
Dieldrin	8.1E-04	mg/kg	3.3E-05	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.2E-03	2.2E-04
Endosulfan Sulfate	1.4E-03	mg/kg	5.5E-05	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	9.7E-05	2.9E-05
gamma-Chlordane	1.3E-03	mg/kg	5.2E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.1E-05	5.6E-06
Heptachlor Epoxide	3.1E-04	mg/kg	1.2E-05	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	1.0E-04	7.1E-05
Technical Chlordane	4.1E-02	mg/kg	1.6E-03	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.6E-04	1.8E-04
Antimony	2.2E-01	mg/kg	9.0E-03	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	3.4E-01	3.4E-02
Arsenic	6.0E-01	mg/kg	2.4E-02	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	5.0E-01	5.0E-02
Barium	3.6E+01	mg/kg	1.5E+00	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.9E-02	9.1E-03
Beryllium	2.5E-01	mg/kg	1.0E-02	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	8.5E-03	8.5E-04
Cadmium	3.0E+00	mg/kg	1.2E-01	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-01	1.2E-02
Chromium	9.5E+00	mg/kg	3.8E-01	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.6E-04	2.6E-05
Cobalt	1.2E+00	mg/kg	4.7E-02	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	6.2E-01	6.2E-02
Copper	1.4E+01	mg/kg	5.7E-01	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	4.8E-02	3.7E-02
Lead	2.8E+01	mg/kg	1.1E+00	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	9.1E-03	3.0E-03
Manganese	2.3E+02	mg/kg	9.1E+00	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.0E-01	3.2E-02
Mercury	4.8E-02	mg/kg	1.9E-03	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	7.3E-03	7.3E-04
Mercury (methyl)	4.0E-03	mg/kg	1.6E-04	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	1.1E-02	6.5E-03
Molybdenum	2.3E+00	mg/kg	9.2E-02	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	4.9E-01	4.9E-02
Nickel	5.0E+00	mg/kg	2.0E-01	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	8.1E-03	3.2E-03
Selenium	5.6E-01	mg/kg	2.3E-02	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.1E-01	6.9E-02
Silver	1.9E-01	mg/kg	7.5E-03	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	3.4E-04	3.4E-05
Thallium	5.5E-02	mg/kg	2.2E-03	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	1.6E-02	1.6E-03
Vanadium	4.0E+00	mg/kg	1.6E-01	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	3.9E-01	7.7E-02
Zinc	8.5E+01	mg/kg	3.4E+00	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.8E-02	8.8E-03
Toxicity Equivalency - Mammals	3.5E-06	mg/kg	1.4E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.4E-01	1.4E-02
Toxicity Equivalency (PCB) - Mammals	1.1E-05	mg/kg	4.4E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	4.4E-01	4.4E-02
							HAZARD INDICES:	4.2E+00	7.2E-01

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-13.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.4E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

	Exposure Medium[a]							
Analyte	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Combined HQs[b]	Percent Contribution[c]
Molybdenum		2.0E+00	1.4E+00	4.9E-01	-	-	***3.9E+00***	***28%***
Cobalt	6.5E-05	1.2E+00	2.6E-02	6.2E-01	-	-	***1.9E+00***	***13%***
Arsenic		1.1E+00	1.6E-01	5.0E-01	-	-	***1.8E+00***	***13%***
Vanadium		1.4E+00	1.9E-02	3.9E-01	-	-	***1.8E+00***	***13%***
Aroclor-1254		7.3E-01	1.4E-02	3.1E-01	-	-	***1.1E+00***	7%
Toxicity Equivalency (PCB) - Mammals		2.7E-01	-	4.4E-01	-	-	7.1E-01	5%
Toxicity Equivalency - Mammals	2.3E-04	3.9E-01	-	1.4E-01	-	-	5.3E-01	4%
Antimony		1.7E-01	4.9E-03	3.4E-01	-	-	5.2E-01	4%
Aroclor, Total				4.1E-01			4.1E-01	3%
Copper	1.9E-05	1.2E-01	1.7E-01	4.8E-02	-	-	3.4E-01	2%
Manganese	6.1E-05	1.5E-01	3.3E-02	1.0E-01	-	-	2.8E-01	2%
Aroclor-1268		1.2E-01	5.7E-04	9.2E-02	-	-	2.1E-01	1%
Selenium	1.8E-05	2.5E-02	4.6E-02	1.1E-01	-	-	1.8E-01	1%
Cadmium		1.1E-02	7.2E-03	1.2E-01	-	-	1.4E-01	1%
Zinc	4.3E-06	1.0E-02	5.2E-02	1.8E-02	-	-	8.0E-02	1%
Barium		2.2E-02	9.7E-03	1.9E-02	-	-	5.1E-02	0%
Lead	9.4E-07	2.5E-02	6.9E-03	9.1E-03	-	-	4.1E-02	0%
Thallium	2.2E-06	2.3E-02	2.7E-04	1.6E-02	-	-	3.9E-02	0%
Mercury		1.6E-02	5.7E-03	7.3E-03	-	-	2.9E-02	0%
Chrysene		2.7E-02	1.3E-03		-	-	2.8E-02	0%
Beryllium	1.9E-06	1.8E-02	5.2E-04	8.5E-03	-	-	2.7E-02	0%
Benzo(b)fluoranthene		2.4E-02	1.2E-03		-	-	2.6E-02	0%
Benzo(k)fluoranthene		2.3E-02	7.3E-04		-	-	2.3E-02	0%
Benzo(a)anthracene		2.2E-02	1.1E-03		-	-	2.3E-02	0%
Benzo(a)pyrene		2.2E-02	6.9E-04		-	-	2.2E-02	0%
Indeno(1,2,3-cd)pyrene		1.8E-02	2.6E-04		-	-	1.8E-02	0%
Benzo(g,h,i)perylene		1.6E-02	2.7E-04		-	-	1.7E-02	0%
Mercury (methyl)				1.1E-02			1.1E-02	0%
Nickel	3.2E-06			8.1E-03			8.1E-03	0%
Dieldrin		3.0E-03	2.8E-04	2.2E-03	-	-	5.4E-03	0%
Dibenzo(a,h)anthracene		4.3E-03	6.0E-05		-	-	4.4E-03	0%
Phenanthrene		1.9E-03	5.4E-04		-	-	2.4E-03	0%
Aluminum	1.9E-03						1.9E-03	0%
Chromium	7.0E-08	1.1E-03	1.3E-04	2.6E-04	-	-	1.5E-03	0%
Technical Chlordane		6.6E-04	2.5E-05	3.6E-04	-	-	1.0E-03	0%
Pyrene		5.5E-04	9.1E-05		-	-	6.4E-04	0%
Fluoranthene		4.0E-04	4.6E-05		-	-	4.4E-04	0%
Silver				3.4E-04			3.4E-04	0%
4,4'-DDE		1.2E-04	1.6E-06	8.6E-05	-	-	2.1E-04	0%
4,4'-DDD		7.3E-05	2.5E-06	6.7E-05	-	-	1.4E-04	0%
4,4'-DDT		7.5E-05	1.6E-06	4.8E-05	-	-	1.3E-04	0%
Heptachlor Epoxide				1.0E-04			1.0E-04	0%
Endosulfan Sulfate				9.7E-05			9.7E-05	0%
Anthracene		2.5E-05	7.4E-06		-	-	3.2E-05	0%
alpha-Chlordane				1.3E-05			1.3E-05	0%

TABLE N-13.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	1.4E+01

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
gamma-Chlordane				1.1E-05			1.1E-05	0%
bis(2-Ethylhexyl)phthalate								
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.3E-03**	**8.0E+00**	**2.0E+00**	**4.2E+00**	**-**	**-**	**1.4E+01**	
PERCENTAGE OF TOTAL RISK	**0%**	**56%**	**14%**	**30%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-13.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 2.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Molybdenum		2.0E-01	1.4E-01	4.9E-02	-	-	3.9E-01	***17%***
Vanadium		2.8E-01	3.8E-03	7.7E-02	-	-	3.6E-01	***15%***
Aroclor-1254		1.8E-01	3.6E-03	7.8E-02	-	-	2.7E-01	***12%***
Copper	1.5E-05	9.6E-02	1.3E-01	3.7E-02	-	-	2.6E-01	***11%***
Cobalt	6.5E-06	1.2E-01	2.6E-03	6.2E-02	-	-	1.9E-01	8%
Arsenic		1.1E-01	1.6E-02	5.0E-02	-	-	1.8E-01	8%
Selenium	1.1E-05	1.5E-02	2.8E-02	6.9E-02	-	-	1.1E-01	5%
Aroclor, Total				1.0E-01			1.0E-01	4%
Manganese	1.9E-05	4.6E-02	1.0E-02	3.2E-02	-	-	8.8E-02	4%
Toxicity Equivalency (PCB) - Mammals		2.7E-02	-	4.4E-02	-	-	7.1E-02	3%
Toxicity Equivalency - Mammals	2.3E-05	3.9E-02	-	1.4E-02	-	-	5.3E-02	2%
Aroclor-1268		3.0E-02	1.4E-04	2.3E-02	-	-	5.3E-02	2%
Antimony		1.7E-02	4.9E-04	3.4E-02	-	-	5.2E-02	2%
Zinc	2.1E-06	5.2E-03	2.6E-02	8.8E-03	-	-	4.0E-02	2%
Barium		1.0E-02	4.5E-03	9.1E-03	-	-	2.4E-02	1%
Cadmium		1.1E-03	7.2E-04	1.2E-02	-	-	1.4E-02	1%
Lead	3.1E-07	8.4E-03	2.3E-03	3.0E-03	-	-	1.4E-02	1%
Mercury (methyl)				6.5E-03			6.5E-03	0%
Thallium	2.2E-07	2.3E-03	2.7E-05	1.6E-03	-	-	3.9E-03	0%
Nickel	1.3E-06			3.2E-03			3.2E-03	0%
Mercury		1.6E-03	5.7E-04	7.3E-04	-	-	2.9E-03	0%
Chrysene		2.7E-03	1.3E-04		-	-	2.8E-03	0%
Beryllium	1.9E-07	1.8E-03	5.2E-05	8.5E-04	-	-	2.7E-03	0%
Benzo(b)fluoranthene		2.4E-03	1.2E-04		-	-	2.6E-03	0%
Benzo(k)fluoranthene		2.3E-03	7.3E-05		-	-	2.3E-03	0%
Benzo(a)anthracene		2.2E-03	1.1E-04		-	-	2.3E-03	0%
Benzo(a)pyrene		2.2E-03	6.9E-05		-	-	2.2E-03	0%
Indeno(1,2,3-cd)pyrene		1.8E-03	2.6E-05		-	-	1.8E-03	0%
Benzo(g,h,i)perylene		1.6E-03	2.7E-05		-	-	1.7E-03	0%
Dieldrin		3.0E-04	2.8E-05	2.2E-04	-	-	5.4E-04	0%
Technical Chlordane		3.3E-04	1.2E-05	1.8E-04	-	-	5.2E-04	0%
Dibenzo(a,h)anthracene		4.3E-04	6.0E-06		-	-	4.4E-04	0%
Pyrene		3.3E-04	5.5E-05		-	-	3.8E-04	0%
Phenanthrene		1.9E-04	5.4E-05		-	-	2.4E-04	0%
Fluoranthene		2.0E-04	2.3E-05		-	-	2.2E-04	0%
Aluminum	1.9E-04						1.9E-04	0%
Chromium	7.0E-09	1.1E-04	1.3E-05	2.6E-05	-	-	1.5E-04	0%
Heptachlor Epoxide				7.1E-05			7.1E-05	0%
4,4'-DDE		2.4E-05	3.2E-07	1.7E-05	-	-	4.1E-05	0%
Silver				3.4E-05			3.4E-05	0%
Endosulfan Sulfate				2.9E-05			2.9E-05	0%
4,4'-DDD		1.5E-05	5.0E-07	1.3E-05	-	-	2.9E-05	0%
4,4'-DDT		1.5E-05	3.1E-07	9.7E-06	-	-	2.5E-05	0%
alpha-Chlordane				6.3E-06			6.3E-06	0%
gamma-Chlordane				5.6E-06			5.6E-06	0%

TABLE N-13.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: GREYSTONE MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 2.3E+00

Prepared:	10-Apr-03	SJD
Checked:	16-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Anthracene		2.5E-06	7.4E-07		-	-	3.2E-06	0%
bis(2-Ethylhexyl)phthalate								
beta-BHC								
delta-BHC								
Methoxychlor								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.7E-04**	**1.2E+00**	**3.8E-01**	**7.2E-01**	**-**	**-**	**2.3E+00**	
PERCENTAGE OF TOTAL RISK	**0%**	**53%**	**16%**	**31%**			**100%**	

Footnotes:
a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.
b. Combined risk across all media exposures.
c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-14.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: ALLENDALE POND REACH - CT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]				Estimated Tissue Concentration			
		Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	5.0E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**1.0E-02**	5.1E-01	2.1E-02	2.1E-02
Benzo(a)anthracene	1.1E+00	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**3.9E-03**	1.1E+00	9.3E-01	9.3E-01
Benzo(a)pyrene	9.9E-01	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**2.2E-03**	1.1E+00	2.0E+00	2.0E+00
Benzo(b)fluoranthene	1.6E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**5.8E-03**	1.7E+00	1.5E+00	1.5E+00
Benzo(g,h,i)perylene	5.0E-01	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**5.7E-04**	5.4E-01	3.2E+00	3.2E+00
Benzo(k)fluoranthene	6.5E-01	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**1.5E-03**	7.0E-01	1.3E+00	1.3E+00
Chrysene	1.2E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**4.0E-03**	1.3E+00	1.1E+00	1.1E+00
Dibenzo(a,h)anthracene	3.5E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**3.4E-04**	3.8E-01	3.0E+00	3.0E+00
Fluoranthene	2.4E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**2.0E-02**	2.6E+00	5.3E-01	5.3E-01
Indeno(1,2,3-cd)pyrene	5.3E-01	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**5.5E-04**	5.7E-01	4.0E+00	4.0E+00
Phenanthrene	1.6E+00	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**3.3E-02**	1.7E+00	7.1E-02	7.1E-02
Pyrene	2.2E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**2.6E-02**	2.3E+00	2.6E-01	2.6E-01
4,4'-DDD	9.6E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**2.3E-05**	1.0E-02	1.7E-02	1.7E-02
4,4'-DDE	1.9E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.8E-05**	2.0E-02	1.6E-01	1.6E-01
4,4'-DDT	2.8E-02	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**4.0E-05**	3.0E-02	1.2E-01	1.2E-01
Aroclor-1248	5.7E-01	2.0E-03	1.1E+00	2.4E+00	2.4E+00	**1.1E-03**	6.1E-01	1.4E+00	1.4E+00
Aroclor-1254	2.1E+00	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**2.8E-03**	2.2E+00	9.9E+00	9.9E+00
beta-BHC	3.1E-03	5.1E-02	1.0E+00	9.1E-03	9.1E-03	**1.6E-04**	3.2E-03	2.8E-05	2.8E-05
Dieldrin	8.6E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**5.8E-05**	9.1E-03	2.6E-03	2.6E-03
Endrin	8.7E-03	7.6E-03	1.1E+00	2.4E-01	2.4E-01	**6.6E-05**	9.1E-03	2.1E-03	2.1E-03
Technical Chlordane	6.1E-03	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**1.6E-05**	6.5E-03	9.2E-03	9.2E-03
Antimony	5.9E-01	2.0E-03	-	5.0E-02	5.0E-02	**1.2E-03**	0.0E+00	3.0E-02	3.0E-02
Arsenic	2.3E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**2.3E-02**	5.7E-02	2.6E-03	2.6E-03
Barium	3.5E+01	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**1.1E+00**	6.4E-01	2.4E+00	2.4E+00
Beryllium	4.9E-01	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**9.9E-04**	4.4E-03	2.5E-02	2.5E-02
Cadmium	2.1E-01	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**9.3E-03**	2.2E-01	8.9E-02	8.9E-02
Chromium	1.2E+01	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**9.9E-02**	7.4E-01	5.2E-01	5.2E-01
Cobalt	5.3E+00	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**7.9E-03**	1.3E-01	3.1E-02	3.1E-02
Copper	1.7E+01	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**1.6E+00**	3.3E+00	4.2E+00	4.2E+00
Lead	5.2E+01	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**1.0E+00**	5.4E+00	5.2E+00	5.2E+00
Manganese	3.3E+02	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**5.2E+00**	1.4E+01	1.3E+00	1.3E+00
Mercury	6.8E-02	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**1.8E-03**	3.2E-03	3.1E-06	3.1E-06
Molybdenum	2.2E+00	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**1.1E-01**	4.3E-01	6.7E-01	6.7E-01
Selenium	1.4E+00	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**1.8E-01**	1.4E-01	4.4E-02	4.4E-02
Vanadium	1.7E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**1.7E-02**	1.4E-01	4.2E-02	4.2E-02
Zinc	6.1E+01	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**2.1E+01**	2.2E+02	1.3E+02	1.3E+02
Toxicity Equivalency - Mammals	8.3E-04					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (I.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF

TABLE N-14.2
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.0E-03	mg/L	1.5E-06	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	8.0E-08	7.9E-09
alpha-Chlordane	6.9E-07	mg/L	1.0E-09	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.2E-10	1.1E-10
Endosulfan Sulfate	5.9E-05	mg/L	8.6E-08	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	1.5E-07	4.5E-08
gamma-Chlordane	2.5E-05	mg/L	3.6E-08	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.9E-09	4.0E-09
Aluminum	6.5E-01	mg/L	9.4E-04	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	4.9E-04	4.9E-05
Beryllium	5.0E-05	mg/L	7.3E-08	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	6.1E-08	6.1E-09
Chromium	5.1E-03	mg/L	7.5E-06	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	5.1E-09	5.1E-10
Cobalt	6.0E-04	mg/L	8.7E-07	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.1E-05	1.1E-06
Copper	1.3E-02	mg/L	1.9E-05	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.7E-06	1.3E-06
Lead	2.1E-02	mg/L	3.0E-05	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.4E-07	8.0E-08
Manganese	4.0E-01	mg/L	5.8E-04	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	6.6E-06	2.0E-06
Nickel	4.9E-03	mg/L	7.2E-06	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	2.9E-07	1.1E-07
Selenium	2.4E-03	mg/L	3.5E-06	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.7E-05	1.1E-05
Silver	8.3E-04	mg/L	1.2E-06	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	5.4E-08	5.4E-09
Thallium	3.7E-03	mg/L	5.3E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	3.8E-05	3.8E-06
Zinc	6.5E-02	mg/L	9.4E-05	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	4.8E-07	2.4E-07
Nitrogen, Ammonia	2.4E-01	mg/L	3.5E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.1E-06	mg/L	1.6E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.6E-03	1.6E-04
							HAZARD INDICES:	2.2E-03	2.3E-04

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-14.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	5.0E-01	mg/kg	1.2E-04	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	6.2E-07	6.2E-08
Benzo(a)anthracene	1.1E+00	mg/kg	2.7E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.7E-04	2.7E-05
Benzo(a)pyrene	9.9E-01	mg/kg	2.5E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.5E-04	2.5E-05
Benzo(b)fluoranthene	1.6E+00	mg/kg	4.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.1E-04	4.1E-05
Benzo(g,h,i)perylene	5.0E-01	mg/kg	1.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-04	1.2E-05
Benzo(k)fluoranthene	6.5E-01	mg/kg	1.6E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.6E-04	1.6E-05
Chrysene	1.2E+00	mg/kg	2.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.9E-04	2.9E-05
Dibenzo(a,h)anthracene	3.5E-01	mg/kg	8.7E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.7E-05	8.7E-06
Fluoranthene	2.4E+00	mg/kg	6.0E-04	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.8E-06	2.4E-06
Indeno(1,2,3-cd)pyrene	5.3E-01	mg/kg	1.3E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.3E-04	1.3E-05
Phenanthrene	1.6E+00	mg/kg	4.1E-04	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	2.7E-05	2.7E-06
Pyrene	2.2E+00	mg/kg	5.6E-04	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	7.4E-06	4.4E-06
4,4'-DDD	9.6E-03	mg/kg	2.4E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.0E-06	5.9E-07
4,4'-DDE	1.9E-02	mg/kg	4.6E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.8E-06	1.2E-06
4,4'-DDT	2.8E-02	mg/kg	6.9E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	8.6E-06	1.7E-06
Aroclor-1248	5.7E-01	mg/kg	1.4E-04	mg/kg-d	1.0E-02	1.0E-01	mg/kg-d	1.4E-02	1.4E-03
Aroclor-1254	2.1E+00	mg/kg	5.1E-04	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.0E-01	2.6E-02
beta-BHC	3.1E-03	mg/kg	7.7E-07	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	4.8E-07	2.4E-07
Dieldrin	8.6E-03	mg/kg	2.1E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.4E-04	1.4E-05
Endrin	8.7E-03	mg/kg	2.2E-06	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	8.7E-05	4.3E-05
Technical Chlordane	6.1E-03	mg/kg	1.5E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	3.3E-07	1.7E-07
Antimony	5.9E-01	mg/kg	1.5E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	5.6E-03	5.6E-04
Arsenic	2.3E+00	mg/kg	5.8E-04	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.2E-02	1.2E-03
Barium	3.5E+01	mg/kg	8.7E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.2E-04	5.5E-05
Beryllium	4.9E-01	mg/kg	1.2E-04	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.0E-04	1.0E-05
Cadmium	2.1E-01	mg/kg	5.3E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.3E-05	5.3E-06
Chromium	1.2E+01	mg/kg	3.0E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.0E-06	2.0E-07
Cobalt	5.3E+00	mg/kg	1.3E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.7E-02	1.7E-03
Copper	1.7E+01	mg/kg	4.2E-03	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.6E-04	2.8E-04
Lead	5.2E+01	mg/kg	1.3E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	1.0E-04	3.4E-05
Manganese	3.3E+02	mg/kg	8.1E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	9.2E-04	2.9E-04
Mercury	6.8E-02	mg/kg	1.7E-05	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	6.4E-05	6.4E-06
Molybdenum	2.2E+00	mg/kg	5.6E-04	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	2.9E-03	2.9E-04
Selenium	1.4E+00	mg/kg	3.5E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.7E-03	1.1E-03
Vanadium	1.7E+01	mg/kg	4.3E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.0E-02	2.0E-03
Zinc	6.1E+01	mg/kg	1.5E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	7.7E-05	3.9E-05
Toxicity Equivalency - Mammals	8.3E-04	mg/kg	2.1E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.1E-01	2.1E-02
							HAZARD INDICES:	3.8E-01	5.6E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-14.4

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.0E-02	mg/kg	3.7E-05	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.8E-07	1.8E-08
Benzo(a)anthracene	3.9E-03	mg/kg	1.4E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-05	1.4E-06
Benzo(a)pyrene	2.2E-03	mg/kg	7.8E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.8E-06	7.8E-07
Benzo(b)fluoranthene	5.8E-03	mg/kg	2.0E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.0E-05	2.0E-06
Benzo(g,h,i)perylene	5.7E-04	mg/kg	2.0E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.0E-06	2.0E-07
Benzo(k)fluoranthene	1.5E-03	mg/kg	5.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	5.2E-06	5.2E-07
Chrysene	4.0E-03	mg/kg	1.4E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.4E-05	1.4E-06
Dibenzo(a,h)anthracene	3.4E-04	mg/kg	1.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.2E-06	1.2E-07
Fluoranthene	2.0E-02	mg/kg	7.0E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	5.6E-07	2.8E-07
Indeno(1,2,3-cd)pyrene	5.5E-04	mg/kg	1.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-06	1.9E-07
Phenanthrene	3.3E-02	mg/kg	1.2E-04	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	7.9E-06	7.9E-07
Pyrene	2.6E-02	mg/kg	9.3E-05	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	1.2E-06	7.4E-07
4,4'-DDD	2.3E-05	mg/kg	8.3E-08	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.0E-07	2.1E-08
4,4'-DDE	1.8E-05	mg/kg	6.3E-08	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.9E-08	1.6E-08
4,4'-DDT	4.0E-05	mg/kg	1.4E-07	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.8E-07	3.6E-08
Aroclor-1248	1.1E-03	mg/kg	4.1E-06	mg/kg-d	1.0E-02	1.0E-01	mg/kg-d	4.1E-04	4.1E-0
Aroclor-1254	2.8E-03	mg/kg	1.0E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	2.0E-03	5.0E-04
beta-BHC	1.6E-04	mg/kg	5.6E-07	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	3.5E-07	1.7E-07
Dieldrin	5.8E-05	mg/kg	2.0E-07	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	1.4E-05	1.4E-06
Endrin	6.6E-05	mg/kg	2.4E-07	mg/kg-d	2.5E-02	5.0E-02	mg/kg-d	9.4E-06	4.7E-06
Technical Chlordane	1.6E-05	mg/kg	5.7E-08	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.2E-08	6.2E-09
Antimony	1.2E-03	mg/kg	4.3E-06	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.6E-04	1.6E-05
Arsenic	2.3E-02	mg/kg	8.2E-05	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.7E-03	1.7E-04
Barium	1.1E+00	mg/kg	3.9E-03	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.2E-05	2.4E-05
Beryllium	9.9E-04	mg/kg	3.5E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	2.9E-06	2.9E-07
Cadmium	9.3E-03	mg/kg	3.3E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.3E-05	3.3E-06
Chromium	9.9E-02	mg/kg	3.5E-04	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.4E-07	2.4E-08
Cobalt	7.9E-03	mg/kg	2.8E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	3.7E-04	3.7E-05
Copper	1.6E+00	mg/kg	5.8E-03	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	5.0E-04	3.8E-04
Lead	1.0E+00	mg/kg	3.6E-03	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.8E-05	9.5E-06
Manganese	5.2E+00	mg/kg	1.8E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.1E-04	6.5E-05
Mercury	1.8E-03	mg/kg	6.3E-06	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	2.4E-05	2.4E-06
Molybdenum	1.1E-01	mg/kg	4.0E-04	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	2.1E-03	2.1E-04
Selenium	1.8E-01	mg/kg	6.4E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	3.2E-03	1.9E-03
Vanadium	1.7E-02	mg/kg	5.9E-05	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.4E-04	2.8E-05
Zinc	2.1E+01	mg/kg	7.5E-02	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	3.8E-04	1.9E-04
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	1.1E-02	3.6E-03

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-14.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	2.1E-03	mg/kg	3.0E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	3.7E-06	7.4E-07
4,4'-DDE	2.3E-03	mg/kg	3.3E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	4.1E-06	8.1E-07
alpha-Chlordane	2.6E-03	mg/kg	3.6E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	8.0E-07	4.0E-07
Aroclor, Total	8.8E-02	mg/kg	1.3E-04	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	2.5E-02	6.3E-03
Aroclor-1254	8.3E-02	mg/kg	1.2E-04	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	2.4E-02	5.9E-03
Aroclor-1268	5.2E-03	mg/kg	7.4E-06	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.5E-03	3.7E-04
delta-BHC	4.6E-04	mg/kg	6.5E-07	mg/kg-d	1.6E+00	3.2E+00	mg/kg-d	4.1E-07	2.0E-07
Dieldrin	2.9E-03	mg/kg	4.1E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	2.7E-04	2.7E-05
Endosulfan Sulfate	2.9E-03	mg/kg	4.1E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	7.1E-06	2.1E-06
gamma-Chlordane	3.6E-03	mg/kg	5.1E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.1E-06	5.6E-07
Heptachlor Epoxide	5.5E-04	mg/kg	7.8E-07	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	6.2E-06	4.4E-06
Methoxychlor	2.0E-03	mg/kg	2.8E-06	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	5.5E-07	7.8E-08
Technical Chlordane	9.4E-02	mg/kg	1.3E-04	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	2.9E-05	1.5E-05
Antimony	2.1E-01	mg/kg	3.0E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	1.1E-02	1.1E-03
Arsenic	5.7E-01	mg/kg	8.1E-04	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	1.7E-02	1.7E-03
Barium	4.4E+01	mg/kg	6.3E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	8.4E-04	3.9E-04
Beryllium	2.6E-01	mg/kg	3.6E-04	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	3.0E-04	3.0E-05
Cadmium	2.4E+00	mg/kg	3.4E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.4E-03	3.4E-04
Chromium	8.2E+00	mg/kg	1.2E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	7.9E-06	7.9E-07
Cobalt	9.6E-01	mg/kg	1.4E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.8E-02	1.8E-03
Copper	1.0E+01	mg/kg	1.5E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.3E-03	9.7E-04
Lead	2.8E+01	mg/kg	4.0E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	3.2E-04	1.1E-04
Manganese	1.6E+02	mg/kg	2.3E-01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.6E-03	7.9E-04
Mercury	4.5E-02	mg/kg	6.4E-05	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	2.4E-04	2.4E-05
Mercury (methyl)	3.3E-03	mg/kg	4.7E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	3.1E-04	1.9E-04
Molybdenum	1.3E+00	mg/kg	1.8E-03	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	9.4E-03	9.4E-04
Nickel	2.8E+00	mg/kg	4.0E-03	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.6E-04	6.3E-05
Selenium	3.2E-01	mg/kg	4.6E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	2.3E-03	1.4E-03
Silver	7.7E-02	mg/kg	1.1E-04	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	4.9E-06	4.9E-07
Thallium	6.8E-02	mg/kg	9.6E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	6.9E-04	6.9E-05
Vanadium	4.8E+00	mg/kg	6.9E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	1.6E-02	3.3E-03
Zinc	1.0E+02	mg/kg	1.4E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	7.4E-04	3.7E-04
Toxicity Equivalency - Mammals	1.7E-04	mg/kg	2.4E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	2.4E-01	2.4E-02
							HAZARD INDICES:	3.8E-01	5.0E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-14.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 7.7E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.6E-03	2.1E-01	-	2.4E-01	-	-	4.5E-01	***58%***
Aroclor-1254		1.0E-01	2.0E-03	2.4E-02	-	-	1.3E-01	***17%***
Cobalt	1.1E-05	1.7E-02	3.7E-04	1.8E-02	-	-	3.6E-02	5%
Arsenic		1.2E-02	1.7E-03	1.7E-02	-	-	3.0E-02	4%
Vanadium		1.0E-02	1.4E-04	1.6E-02	-	-	2.7E-02	3%
Aroclor, Total				2.5E-02			2.5E-02	3%
Antimony		5.6E-03	1.6E-04	1.1E-02	-	-	1.7E-02	2%
Aroclor-1248		1.4E-02	4.1E-04		-	-	1.5E-02	2%
Molybdenum		2.9E-03	2.1E-03	9.4E-03	-	-	1.4E-02	2%
Selenium	1.7E-05	1.7E-03	3.2E-03	2.3E-03	-	-	7.3E-03	1%
Manganese	6.6E-06	9.2E-04	2.1E-04	2.6E-03	-	-	3.7E-03	0%
Cadmium		5.3E-05	3.3E-05	3.4E-03	-	-	3.5E-03	0%
Copper	1.7E-06	3.6E-04	5.0E-04	1.3E-03	-	-	2.1E-03	0%
Aroclor-1268				1.5E-03			1.5E-03	0%
Zinc	4.8E-07	7.7E-05	3.8E-04	7.4E-04	-	-	1.2E-03	0%
Barium		1.2E-04	5.2E-05	8.4E-04	-	-	1.0E-03	0%
Thallium	3.8E-05			6.9E-04			7.3E-04	0%
Aluminum	4.9E-04						4.9E-04	0%
Lead	2.4E-07	1.0E-04	2.8E-05	3.2E-04	-	-	4.5E-04	0%
Dieldrin		1.4E-04	1.4E-05	2.7E-04	-	-	4.3E-04	0%
Benzo(b)fluoranthene		4.1E-04	2.0E-05		-	-	4.3E-04	0%
Beryllium	6.1E-08	1.0E-04	2.9E-06	3.0E-04	-	-	4.1E-04	0%
Mercury		6.4E-05	2.4E-05	2.4E-04	-	-	3.3E-04	0%
Mercury (methyl)				3.1E-04			3.1E-04	0%
Chrysene		2.9E-04	1.4E-05		-	-	3.1E-04	0%
Benzo(a)anthracene		2.7E-04	1.4E-05		-	-	2.8E-04	0%
Benzo(a)pyrene		2.5E-04	7.8E-06		-	-	2.5E-04	0%
Benzo(k)fluoranthene		1.6E-04	5.2E-06		-	-	1.7E-04	0%
Nickel	2.9E-07			1.6E-04			1.6E-04	0%
Indeno(1,2,3-cd)pyrene		1.3E-04	1.9E-06		-	-	1.3E-04	0%
Benzo(g,h,i)perylene		1.2E-04	2.0E-06		-	-	1.3E-04	0%
Endrin		8.7E-05	9.4E-06		-	-	9.6E-05	0%
Dibenzo(a,h)anthracene		8.7E-05	1.2E-06		-	-	8.8E-05	0%
Phenanthrene		2.7E-05	7.9E-06		-	-	3.5E-05	0%
Technical Chlordane		3.3E-07	1.2E-08	2.9E-05	-	-	3.0E-05	0%
Chromium	5.1E-09	2.0E-06	2.4E-07	7.9E-06	-	-	1.0E-05	0%
4,4'-DDE		5.8E-06	7.9E-08	4.1E-06	-	-	9.9E-06	0%
4,4'-DDT		8.6E-06	1.8E-07		-	-	8.8E-06	0%
Pyrene		7.4E-06	1.2E-06		-	-	8.6E-06	0%
Endosulfan Sulfate	1.5E-07			7.1E-06			7.3E-06	0%
4,4'-DDD		3.0E-06	1.0E-07	3.7E-06	-	-	6.8E-06	0%
Heptachlor Epoxide				6.2E-06			6.2E-06	0%
Fluoranthene		4.8E-06	5.6E-07		-	-	5.4E-06	0%
Silver	5.4E-08			4.9E-06			5.0E-06	0%
gamma-Chlordane	7.9E-09			1.1E-06			1.1E-06	0%

TABLE N-14.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ALLENDALE POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	7.7E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
beta-BHC		4.8E-07	3.5E-07		-	-	8.3E-07	0%
Anthracene		6.2E-07	1.8E-07		-	-	8.0E-07	0%
alpha-Chlordane	2.2E-10			8.0E-07			8.0E-07	0%
Methoxychlor				5.5E-07			5.5E-07	0%
delta-BHC				4.1E-07			4.1E-07	0%
bis(2-Ethylhexyl)phthalate	8.0E-08						8.0E-08	0%
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.2E-03**	**3.8E-01**	**1.1E-02**	**3.8E-01**	**-**	**-**	**7.7E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**49%**	**1%**	**49%**			**100%**	

Footnotes:
a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.
b. Combined risk across all media exposures.
c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-14.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: ALLENDALE POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 1.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.6E-04	2.1E-02	-	2.4E-02	-	-	4.5E-02	*41%*
Aroclor-1254		2.6E-02	5.0E-04	5.9E-03	-	-	3.2E-02	**29%**
Aroclor, Total				6.3E-03			6.3E-03	6%
Vanadium		2.0E-03	2.8E-05	3.3E-03	-	-	5.3E-03	5%
Selenium	1.1E-05	1.1E-03	1.9E-03	1.4E-03	-	-	4.4E-03	4%
Cobalt	1.1E-06	1.7E-03	3.7E-05	1.8E-03	-	-	3.6E-03	3%
Arsenic		1.2E-03	1.7E-04	1.7E-03	-	-	3.0E-03	3%
Antimony		5.6E-04	1.6E-05	1.1E-03	-	-	1.7E-03	2%
Copper	1.3E-06	2.8E-04	3.8E-04	9.7E-04	-	-	1.6E-03	1%
Aroclor-1248		1.4E-03	4.1E-05		-	-	1.5E-03	1%
Molybdenum		2.9E-04	2.1E-04	9.4E-04	-	-	1.4E-03	1%
Manganese	2.0E-06	2.9E-04	6.5E-05	7.9E-04	-	-	1.1E-03	1%
Zinc	2.4E-07	3.9E-05	1.9E-04	3.7E-04	-	-	6.0E-04	1%
Barium		5.5E-05	2.4E-05	3.9E-04	-	-	4.7E-04	0%
Aroclor-1268				3.7E-04			3.7E-04	0%
Cadmium		5.3E-06	3.3E-06	3.4E-04	-	-	3.5E-04	0%
Mercury (methyl)				1.9E-04			1.9E-04	0%
Lead	8.0E-08	3.4E-05	9.5E-06	1.1E-04	-	-	1.5E-04	0%
Thallium	3.8E-06			6.9E-05			7.3E-05	0%
Nickel	1.1E-07			6.3E-05			6.3E-05	0%
Aluminum	4.9E-05						4.9E-05	0%
Endrin		4.3E-05	4.7E-06		-	-	4.8E-05	0%
Dieldrin		1.4E-05	1.4E-06	2.7E-05	-	-	4.3E-05	0%
Benzo(b)fluoranthene		4.1E-05	2.0E-06		-	-	4.3E-05	0%
Beryllium	6.1E-09	1.0E-05	2.9E-07	3.0E-05	-	-	4.1E-05	0%
Mercury		6.4E-06	2.4E-06	2.4E-05	-	-	3.3E-05	0%
Chrysene		2.9E-05	1.4E-06		-	-	3.1E-05	0%
Benzo(a)anthracene		2.7E-05	1.4E-06		-	-	2.8E-05	0%
Benzo(a)pyrene		2.5E-05	7.8E-07		-	-	2.5E-05	0%
Benzo(k)fluoranthene		1.6E-05	5.2E-07		-	-	1.7E-05	0%
Technical Chlordane		1.7E-07	6.2E-09	1.5E-05	-	-	1.5E-05	0%
Indeno(1,2,3-cd)pyrene		1.3E-05	1.9E-07		-	-	1.3E-05	0%
Benzo(g,h,i)perylene		1.2E-05	2.0E-07		-	-	1.3E-05	0%
Dibenzo(a,h)anthracene		8.7E-06	1.2E-07		-	-	8.8E-06	0%
Pyrene		4.4E-06	7.4E-07		-	-	5.2E-06	0%
Heptachlor Epoxide				4.4E-06			4.4E-06	0%
Phenanthrene		2.7E-06	7.9E-07		-	-	3.5E-06	0%
Fluoranthene		2.4E-06	2.8E-07		-	-	2.7E-06	0%
Endosulfan Sulfate	4.5E-08			2.1E-06			2.2E-06	0%
4,4'-DDE		1.2E-06	1.6E-08	8.1E-07	-	-	2.0E-06	0%
4,4'-DDT		1.7E-06	3.6E-08		-	-	1.8E-06	0%
4,4'-DDD		5.9E-07	2.1E-08	7.4E-07	-	-	1.4E-06	0%
Chromium	5.1E-10	2.0E-07	2.4E-08	7.9E-07	-	-	1.0E-06	0%
gamma-Chlordane	4.0E-09			5.6E-07			5.6E-07	0%
Silver	5.4E-09			4.9E-07			5.0E-07	0%

TABLE N-14.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE	
EXPOSURE POINT: ALLENDALE POND REACH - CT	
RECEPTOR: RACCOON	
TOTAL RISK (HI):	1.1E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
beta-BHC		2.4E-07	1.7E-07		-	-	4.2E-07	0%
alpha-Chlordane	1.1E-10			4.0E-07			4.0E-07	0%
delta-BHC				2.0E-07			2.0E-07	0%
Anthracene		6.2E-08	1.8E-08		-	-	8.0E-08	0%
Methoxychlor				7.8E-08			7.8E-08	0%
bis(2-Ethylhexyl)phthalate	7.9E-09						7.9E-09	0%
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Mammals								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**2.3E-04**	**5.6E-02**	**3.6E-03**	**5.0E-02**	**-**	**-**	**1.1E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**51%**	**3%**	**46%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-15.1
ESTIMATED TERRESTRIAL PREY TISSUE CONCENTRATIONS DERIVED USING LITERATURE-BASED BAFs

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: TERRESTRIAL PREY
EXPOSURE POINT: LYMAN MILL POND REACH - CT

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC Value	Literature-based BAFs[a]				Estimated Tissue Concentration			
		Terrestial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Terrestial Plants[b]	Terrestrial Inverts[b]	Small Birds[c]	Small Mammals[d]
Anthracene	1.3E-01	2.1E-02	1.0E+00	4.2E-02	4.2E-02	**2.6E-03**	1.3E-01	5.3E-03	5.3E-03
Benzo(a)anthracene	7.6E-01	3.6E-03	1.1E+00	8.7E-01	8.7E-01	**2.8E-03**	8.1E-01	6.6E-01	6.6E-01
Benzo(a)pyrene	9.0E-01	2.2E-03	1.1E+00	2.0E+00	2.0E+00	**2.0E-03**	9.7E-01	1.8E+00	1.8E+00
Benzo(b)fluoranthene	1.2E+00	3.5E-03	1.1E+00	9.1E-01	9.1E-01	**4.2E-03**	1.3E+00	1.1E+00	1.1E+00
Benzo(g,h,i)perylene	8.3E-01	1.1E-03	1.1E+00	6.4E+00	6.4E+00	**9.5E-04**	9.0E-01	5.3E+00	5.3E+00
Benzo(k)fluoranthene	1.0E+00	2.3E-03	1.1E+00	1.9E+00	1.9E+00	**2.3E-03**	1.1E+00	2.0E+00	2.0E+00
Chrysene	1.2E+00	3.4E-03	1.1E+00	9.7E-01	9.7E-01	**4.1E-03**	1.3E+00	1.2E+00	1.2E+00
Dibenzo(a,h)anthracene	2.0E-01	9.7E-04	1.1E+00	8.5E+00	8.5E+00	**1.9E-04**	2.2E-01	1.7E+00	1.7E+00
Fluoranthene	2.1E+00	8.1E-03	1.1E+00	2.2E-01	2.2E-01	**1.7E-02**	2.2E+00	4.5E-01	4.5E-01
Indeno(1,2,3-cd)pyrene	8.9E-01	1.0E-03	1.1E+00	7.6E+00	7.6E+00	**9.3E-04**	9.8E-01	6.8E+00	6.8E+00
Phenanthrene	9.3E-01	2.0E-02	1.0E+00	4.3E-02	4.3E-02	**1.9E-02**	9.7E-01	4.1E-02	4.1E-02
Pyrene	1.7E+00	1.2E-02	1.0E+00	1.1E-01	1.1E-01	**1.9E-02**	1.7E+00	1.9E-01	1.9E-01
4,4'-DDD	6.9E-03	2.4E-03	1.1E+00	1.7E+00	1.7E+00	**1.7E-05**	7.4E-03	1.2E-02	1.2E-02
4,4'-DDE	1.7E-02	9.6E-04	1.1E+00	8.7E+00	8.7E+00	**1.6E-05**	1.8E-02	1.5E-01	1.5E-01
4,4'-DDT	1.8E-02	1.4E-03	1.1E+00	4.2E+00	4.2E+00	**2.6E-05**	2.0E-02	7.7E-02	7.7E-02
Aroclor-1254	1.5E-01	1.4E-03	1.1E+00	4.8E+00	4.8E+00	**2.1E-04**	1.7E-01	7.3E-01	7.3E-01
Aroclor-1268	2.4E-02	3.4E-04	1.1E+00	5.3E+01	5.3E+01	**7.9E-06**	2.6E-02	1.3E+00	1.3E+00
Dieldrin	2.8E-03	6.7E-03	1.1E+00	3.0E-01	3.0E-01	**1.9E-05**	2.9E-03	8.4E-04	8.4E-04
Technical Chlordane	2.1E-01	2.6E-03	1.1E+00	1.5E+00	1.5E+00	**5.5E-04**	2.2E-01	3.1E-01	3.1E-01
Antimony	3.2E-01	2.0E-03	-	5.0E-02	5.0E-02	**6.6E-04**	0.0E+00	1.6E-02	1.6E-02
Arsenic	5.5E+00	1.0E-02	2.5E-02	1.1E-03	1.1E-03	**5.5E-02**	1.4E-01	6.2E-03	6.2E-03
Barium	3.4E+02	3.1E-02	1.8E-02	6.8E-02	6.8E-02	**1.1E+01**	6.2E+00	2.3E+01	2.3E+01
Beryllium	8.0E-01	2.0E-03	9.0E-03	5.0E-02	5.0E-02	**1.6E-03**	7.2E-03	4.0E-02	4.0E-02
Cadmium	1.8E+00	4.4E-02	1.0E+00	4.2E-01	4.2E-01	**7.9E-02**	1.9E+00	7.5E-01	7.5E-01
Chromium	5.2E+01	8.2E-03	6.1E-02	4.3E-02	4.3E-02	**4.2E-01**	3.2E+00	2.2E+00	2.2E+00
Cobalt	5.8E+00	1.5E-03	2.4E-02	5.8E-03	5.8E-03	**8.7E-03**	1.4E-01	3.3E-02	3.3E-02
Copper	1.7E+02	9.7E-02	2.0E-01	2.5E-01	2.5E-01	**1.7E+01**	3.4E+01	4.3E+01	4.3E+01
Lead	4.4E+02	1.9E-02	1.0E-01	9.9E-02	9.9E-02	**8.4E+00**	4.5E+01	4.3E+01	4.3E+01
Manganese	5.1E+02	1.6E-02	4.3E-02	4.1E-03	4.1E-03	**8.0E+00**	2.2E+01	2.1E+00	2.1E+00
Mercury	2.0E-01	2.6E-02	4.7E-02	4.5E-05	4.5E-05	**5.3E-03**	9.6E-03	9.2E-06	9.2E-06
Molybdenum	2.5E+00	5.0E-02	1.9E-01	3.0E-01	3.0E-01	**1.3E-01**	4.8E-01	7.6E-01	7.6E-01
Selenium	4.3E-01	1.3E-01	1.0E-01	3.1E-02	3.1E-02	**5.6E-02**	4.3E-02	1.4E-02	1.4E-02
Thallium	3.8E-01	8.0E-04	-	2.2E-02	2.2E-02	**3.0E-04**	0.0E+00	8.6E-03	8.6E-03
Vanadium	3.8E+01	9.7E-04	8.4E-03	2.5E-03	2.5E-03	**3.6E-02**	3.2E-01	9.2E-02	9.2E-02
Zinc	4.9E+02	3.5E-01	3.6E+00	2.1E+00	2.1E+00	**1.7E+02**	1.8E+03	1.0E+03	1.0E+03
Toxicity Equivalency - Mammals	4.6E-04					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	6.1E-06					**0.0E+00**	0.0E+00	0.0E+00	0.0E+00

Footnotes:

a. Literature-derived BAFs are summarized in Table J-1.

b. Estimated plant and invertebrate concentrations calculated by multiplying the soil EPC concentration (mg/kg[dw] by the tissue-specific BAF (mg/kg[ww]). Estimated tissue concentrations reported in units of mg/kg [wet weight tissue].

c. Estimated small bird prey concentrations calculated by multiplying the estimated tissue concentration of soil invertebrates by the small bird BAF (i.e., assumes vermivorous species).

d. Estimated small mammal prey concentrations calculated assuming that plants and invertebrates each comprise 50% of the prey species diet (i.e., omnivore); the sum of 50% times the estimated tissue concentrations of plants and invertebrates was multiplied by the small mammal BAF.

TABLE N-15.2

CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE WATER / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SURFACE WATER
EXPOSURE MEDIUM: SURFACE WATER
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
bis(2-Ethylhexyl)phthalate	1.7E-02	mg/L	2.5E-05	mg/kg-d	1.8E+01	1.8E+02	mg/kg-d	1.3E-06	1.3E-07
alpha-Chlordane	1.9E-05	mg/L	2.8E-08	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.0E-09	3.0E-09
Endosulfan Sulfate	3.2E-06	mg/L	4.7E-09	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	8.2E-09	2.5E-09
gamma-Chlordane	2.1E-05	mg/L	3.1E-08	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	6.7E-09	3.3E-09
Aluminum	1.8E-01	mg/L	2.6E-04	mg/kg-d	1.9E+00	1.9E+01	mg/kg-d	1.3E-04	1.3E-05
Beryllium	2.0E-04	mg/L	2.9E-07	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	2.4E-07	2.4E-08
Chromium	2.3E-03	mg/L	3.3E-06	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	2.2E-09	2.2E-10
Cobalt	4.2E-04	mg/L	6.1E-07	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	8.0E-06	8.0E-07
Copper	8.7E-03	mg/L	1.3E-05	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	1.1E-06	8.4E-07
Lead	4.4E-03	mg/L	6.4E-06	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	5.1E-08	1.7E-08
Manganese	1.3E-01	mg/L	1.9E-04	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	2.1E-06	6.5E-07
Nickel	1.9E-03	mg/L	2.7E-06	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	1.1E-07	4.3E-08
Silver	5.9E-04	mg/L	8.6E-07	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	3.9E-08	3.9E-09
Thallium	2.2E-03	mg/L	3.3E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	2.3E-05	2.3E-06
Zinc	2.8E-02	mg/L	4.1E-05	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	2.1E-07	1.0E-07
Nitrogen, Ammonia	1.4E-01	mg/L	2.0E-04	mg/kg-d	#N/A	#N/A			
Toxicity Equivalency - Mammals	1.3E-07	mg/L	1.9E-10	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.9E-04	1.9E-05
							HAZARD INDICES:	3.6E-04	3.7E-05

Notes:

a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.

b. Reference Dose Values presented in Table D-4.

c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-15.3
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SURFACE SOIL (0-2 feet) / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: SOIL
EXPOSURE MEDIUM: SURFACE SOIL (0-2 feet)
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	1.3E-01	mg/kg	3.1E-05	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	1.6E-07	1.6E-08
Benzo(a)anthracene	7.6E-01	mg/kg	1.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.9E-04	1.9E-05
Benzo(a)pyrene	9.0E-01	mg/kg	2.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-04	2.2E-05
Benzo(b)fluoranthene	1.2E+00	mg/kg	2.9E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.9E-04	2.9E-05
Benzo(g,h,i)perylene	8.3E-01	mg/kg	2.1E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.1E-04	2.1E-05
Benzo(k)fluoranthene	1.0E+00	mg/kg	2.5E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.5E-04	2.5E-05
Chrysene	1.2E+00	mg/kg	3.0E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.0E-04	3.0E-05
Dibenzo(a,h)anthracene	2.0E-01	mg/kg	4.9E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.9E-05	4.9E-06
Fluoranthene	2.1E+00	mg/kg	5.2E-04	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.2E-06	2.1E-06
Indeno(1,2,3-cd)pyrene	8.9E-01	mg/kg	2.2E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.2E-04	2.2E-05
Phenanthrene	9.3E-01	mg/kg	2.3E-04	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	1.6E-05	1.6E-06
Pyrene	1.7E+00	mg/kg	4.1E-04	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	5.5E-06	3.3E-06
4,4'-DDD	6.9E-03	mg/kg	1.7E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.1E-06	4.3E-07
4,4'-DDE	1.7E-02	mg/kg	4.2E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.2E-06	1.0E-06
4,4'-DDT	1.8E-02	mg/kg	4.5E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.7E-06	1.1E-06
Aroclor-1254	1.5E-01	mg/kg	3.8E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	7.6E-03	1.9E-03
Aroclor-1268	2.4E-02	mg/kg	5.9E-06	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.2E-03	2.9E-04
Dieldrin	2.8E-03	mg/kg	6.9E-07	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	4.6E-05	4.6E-06
Technical Chlordane	2.1E-01	mg/kg	5.2E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.1E-05	5.6E-06
Antimony	3.2E-01	mg/kg	8.1E-05	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	3.1E-03	3.1E-04
Arsenic	5.5E+00	mg/kg	1.4E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	2.9E-02	2.9E-03
Barium	3.4E+02	mg/kg	8.5E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	1.1E-03	5.3E-04
Beryllium	8.0E-01	mg/kg	2.0E-04	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.7E-04	1.7E-05
Cadmium	1.8E+00	mg/kg	4.5E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	4.5E-04	4.5E-05
Chromium	5.2E+01	mg/kg	1.3E-02	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	8.7E-06	8.7E-07
Cobalt	5.8E+00	mg/kg	1.4E-03	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.9E-02	1.9E-03
Copper	1.7E+02	mg/kg	4.3E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	3.7E-03	2.8E-03
Lead	4.4E+02	mg/kg	1.1E-01	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	8.6E-04	2.9E-04
Manganese	5.1E+02	mg/kg	1.3E-01	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	1.4E-03	4.4E-04
Mercury	2.0E-01	mg/kg	5.1E-05	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	1.9E-04	1.9E-05
Molybdenum	2.5E+00	mg/kg	6.3E-04	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	3.3E-03	3.3E-04
Selenium	4.3E-01	mg/kg	1.1E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	5.4E-04	3.2E-04
Thallium	3.8E-01	mg/kg	9.5E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	6.8E-04	6.8E-05
Vanadium	3.8E+01	mg/kg	9.4E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	2.2E-02	4.5E-03
Zinc	4.9E+02	mg/kg	1.2E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	6.2E-04	3.1E-04
Toxicity Equivalency - Mammals	4.6E-04	mg/kg	1.1E-07	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.1E-01	1.1E-02
Toxicity Equivalency (PCB) - Mammals	6.1E-06	mg/kg	1.5E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	1.5E-03	1.5E-04
							HAZARD INDICES:	2.1E-01	2.9E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-15.4
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : TERRESTRIAL PLANTS / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 1
EXPOSURE MEDIUM: TERRESTRIAL PLANTS
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
Anthracene	2.6E-03	mg/kg	9.3E-06	mg/kg-d	2.0E+02	2.0E+03	mg/kg-d	4.6E-08	4.6E-09
Benzo(a)anthracene	2.8E-03	mg/kg	9.9E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	9.9E-06	9.9E-07
Benzo(a)pyrene	2.0E-03	mg/kg	7.1E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.1E-06	7.1E-07
Benzo(b)fluoranthene	4.2E-03	mg/kg	1.5E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-05	1.5E-06
Benzo(g,h,i)perylene	9.5E-04	mg/kg	3.4E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.4E-06	3.4E-07
Benzo(k)fluoranthene	2.3E-03	mg/kg	8.2E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	8.2E-06	8.2E-07
Chrysene	4.1E-03	mg/kg	1.5E-05	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	1.5E-05	1.5E-06
Dibenzo(a,h)anthracene	1.9E-04	mg/kg	6.9E-07	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	6.9E-07	6.9E-08
Fluoranthene	1.7E-02	mg/kg	6.0E-05	mg/kg-d	1.3E+02	2.5E+02	mg/kg-d	4.8E-07	2.4E-07
Indeno(1,2,3-cd)pyrene	9.3E-04	mg/kg	3.3E-06	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	3.3E-06	3.3E-07
Phenanthrene	1.9E-02	mg/kg	6.8E-05	mg/kg-d	1.5E+01	1.5E+02	mg/kg-d	4.5E-06	4.5E-07
Pyrene	1.9E-02	mg/kg	6.9E-05	mg/kg-d	7.5E+01	1.3E+02	mg/kg-d	9.2E-07	5.5E-07
4,4'-DDD	1.7E-05	mg/kg	6.0E-08	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.5E-08	1.5E-08
4,4'-DDE	1.6E-05	mg/kg	5.7E-08	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	7.2E-08	1.4E-08
4,4'-DDT	2.6E-05	mg/kg	9.4E-08	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	1.2E-07	2.3E[illegible]
Aroclor-1254	2.1E-04	mg/kg	7.4E-07	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.5E-04	3.7[illegible]
Aroclor-1268	7.9E-06	mg/kg	2.8E-08	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	5.6E-06	1.4E-06
Dieldrin	1.9E-05	mg/kg	6.6E-08	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	4.4E-06	4.4E-07
Technical Chlordane	5.5E-04	mg/kg	1.9E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.2E-07	2.1E-07
Antimony	6.6E-04	mg/kg	2.4E-06	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	9.0E-05	9.0E-06
Arsenic	5.5E-02	mg/kg	2.0E-04	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	4.1E-03	4.1E-04
Barium	1.1E+01	mg/kg	3.8E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.0E-04	2.4E-04
Beryllium	1.6E-03	mg/kg	5.7E-06	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	4.8E-06	4.8E-07
Cadmium	7.9E-02	mg/kg	2.8E-04	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	2.8E-04	2.8E-05
Chromium	4.2E-01	mg/kg	1.5E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	1.0E-06	1.0E-07
Cobalt	8.7E-03	mg/kg	3.1E-05	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	4.1E-04	4.1E-05
Copper	1.7E+01	mg/kg	6.0E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	5.1E-03	3.9E-03
Lead	8.4E+00	mg/kg	3.0E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	2.4E-04	7.9E-05
Manganese	8.0E+00	mg/kg	2.8E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	3.2E-04	1.0E-04
Mercury	5.3E-03	mg/kg	1.9E-05	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	7.1E-05	7.1E-06
Molybdenum	1.3E-01	mg/kg	4.5E-04	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	2.4E-03	2.4E-04
Selenium	5.6E-02	mg/kg	2.0E-04	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	9.9E-04	6.0E-04
Thallium	3.0E-04	mg/kg	1.1E-06	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	7.7E-06	7.7E-07
Vanadium	3.6E-02	mg/kg	1.3E-04	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	3.1E-04	6.2E-05
Zinc	1.7E+02	mg/kg	6.0E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	3.1E-03	1.5E-03
Toxicity Equivalency - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
Toxicity Equivalency (PCB) - Mammals	0.0E+00	mg/kg	0.0E+00	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	0.0E+00	0.0E+00
							HAZARD INDICES:	1.8E-02	7.3E-03

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-15.5
CALCULATION OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS : SOIL INVERTEBRATES / RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: BIOTA 2
EXPOSURE MEDIUM: SOIL INVERTEBRATES
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Medium EPC	Medium EPC Units	Estimated Daily Intake[a]	Daily Intake Units	Reference Dose (NOAEL)[b]	Reference Dose (LOAEL)[b]	Reference Dose Units	Hazard Quotient (NOAEL)[c]	Hazard Quotient (LOAEL)[c]
4,4'-DDD	1.2E-03	mg/kg	1.7E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	2.2E-06	4.3E-07
4,4'-DDE	3.2E-03	mg/kg	4.6E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.7E-06	1.1E-06
4,4'-DDT	2.8E-03	mg/kg	4.0E-06	mg/kg-d	8.0E-01	4.0E+00	mg/kg-d	5.0E-06	9.9E-07
alpha-Chlordane	2.4E-03	mg/kg	3.4E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	7.4E-07	3.7E-07
Aroclor, Total	4.2E-02	mg/kg	6.0E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	1.2E-02	3.0E-03
Aroclor-1254	3.5E-02	mg/kg	4.9E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	9.9E-03	2.5E-03
Aroclor-1268	7.3E-03	mg/kg	1.0E-05	mg/kg-d	5.0E-03	2.0E-02	mg/kg-d	2.1E-03	5.2E-04
Dieldrin	8.2E-04	mg/kg	1.2E-06	mg/kg-d	1.5E-02	1.5E-01	mg/kg-d	7.8E-05	7.8E-06
Endosulfan Sulfate	1.1E-03	mg/kg	1.6E-06	mg/kg-d	5.7E-01	1.9E+00	mg/kg-d	2.7E-06	8.2E-07
gamma-Chlordane	1.3E-03	mg/kg	1.9E-06	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	4.1E-07	2.0E-07
Heptachlor Epoxide	5.4E-04	mg/kg	7.6E-07	mg/kg-d	1.3E-01	1.8E-01	mg/kg-d	6.1E-06	4.4E-06
Methoxychlor	9.6E-04	mg/kg	1.4E-06	mg/kg-d	5.0E+00	3.6E+01	mg/kg-d	2.7E-07	3.8E-08
Technical Chlordane	4.2E-02	mg/kg	6.0E-05	mg/kg-d	4.6E+00	9.2E+00	mg/kg-d	1.3E-05	6.5E-06
Antimony	1.4E-01	mg/kg	2.0E-04	mg/kg-d	2.6E-02	2.6E-01	mg/kg-d	7.5E-03	7.5E-04
Arsenic	7.4E-01	mg/kg	1.1E-03	mg/kg-d	4.8E-02	4.8E-01	mg/kg-d	2.2E-02	2.2E-03
Barium	2.8E+01	mg/kg	3.9E-02	mg/kg-d	7.5E+01	1.6E+02	mg/kg-d	5.3E-04	2.5E-04
Beryllium	1.2E-01	mg/kg	1.7E-04	mg/kg-d	1.2E+00	1.2E+01	mg/kg-d	1.4E-04	1.4E-05
Cadmium	5.3E+00	mg/kg	7.5E-03	mg/kg-d	1.0E+00	1.0E+01	mg/kg-d	7.5E-03	7.5E-04
Chromium	3.1E+00	mg/kg	4.5E-03	mg/kg-d	1.5E+03	1.5E+04	mg/kg-d	3.0E-06	3.0E-07
Cobalt	6.3E-01	mg/kg	8.9E-04	mg/kg-d	7.6E-02	7.6E-01	mg/kg-d	1.2E-02	1.2E-03
Copper	7.4E+00	mg/kg	1.0E-02	mg/kg-d	1.2E+01	1.5E+01	mg/kg-d	9.0E-04	6.9E-04
Lead	6.4E+01	mg/kg	9.1E-02	mg/kg-d	1.3E+02	3.8E+02	mg/kg-d	7.2E-04	2.4E-04
Manganese	4.7E+01	mg/kg	6.7E-02	mg/kg-d	8.8E+01	2.8E+02	mg/kg-d	7.6E-04	2.4E-04
Mercury	7.2E-02	mg/kg	1.0E-04	mg/kg-d	2.6E-01	2.6E+00	mg/kg-d	3.9E-04	3.9E-05
Mercury (methyl)	1.1E-03	mg/kg	1.6E-06	mg/kg-d	1.5E-02	2.5E-02	mg/kg-d	1.1E-04	6.4E-05
Molybdenum	2.8E-01	mg/kg	4.0E-04	mg/kg-d	1.9E-01	1.9E+00	mg/kg-d	2.1E-03	2.1E-04
Nickel	1.3E+00	mg/kg	1.8E-03	mg/kg-d	2.5E+01	6.3E+01	mg/kg-d	7.1E-05	2.8E-05
Selenium	2.0E+00	mg/kg	2.8E-03	mg/kg-d	2.0E-01	3.3E-01	mg/kg-d	1.4E-02	8.6E-03
Silver	1.0E-01	mg/kg	1.5E-04	mg/kg-d	2.2E+01	2.2E+02	mg/kg-d	6.6E-06	6.6E-07
Thallium	5.6E-02	mg/kg	8.0E-05	mg/kg-d	1.4E-01	1.4E+00	mg/kg-d	5.7E-04	5.7E-05
Vanadium	2.6E+00	mg/kg	3.7E-03	mg/kg-d	4.2E-01	2.1E+00	mg/kg-d	8.9E-03	1.8E-03
Zinc	1.7E+02	mg/kg	2.5E-01	mg/kg-d	2.0E+02	3.9E+02	mg/kg-d	1.3E-03	6.3E-04
Toxicity Equivalency - Mammals	3.4E-05	mg/kg	4.8E-08	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	4.8E-02	4.8E-03
Toxicity Equivalency (PCB) - Mammals	2.5E-06	mg/kg	3.5E-09	mg/kg-d	1.0E-06	1.0E-05	mg/kg-d	3.5E-03	3.5E-04
							HAZARD INDICES:	1.6E-01	2.9E-02

Notes:
a. Estimated Daily Intake (EDI) calculated using parameters presented in Table I-10.
b. Reference Dose Values presented in Table D-4.
c. Hazard Quotients (HQs) calculated by dividing the Estimated Daily Intake dose by either the NOAEL- or LOAEL-based Reference Dose.

TABLE N-15.6
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 3.9E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

	Exposure Medium[a]							
Analyte	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals	Combined HQs[b]	Percent Contribution[c]
Toxicity Equivalency - Mammals	1.9E-04	1.1E-01	-	4.8E-02	-	-	1.6E-01	***42%***
Arsenic		2.9E-02	4.1E-03	2.2E-02	-	-	5.5E-02	***14%***
Vanadium		2.2E-02	3.1E-04	8.9E-03	-	-	3.1E-02	8%
Cobalt	8.0E-06	1.9E-02	4.1E-04	1.2E-02	-	-	3.1E-02	8%
Aroclor-1254		7.6E-03	1.5E-04	9.9E-03	-	-	1.8E-02	5%
Selenium		5.4E-04	9.9E-04	1.4E-02	-	-	1.6E-02	4%
Aroclor, Total				1.2E-02			1.2E-02	3%
Antimony		3.1E-03	9.0E-05	7.5E-03	-	-	1.1E-02	3%
Copper	1.1E-06	3.7E-03	5.1E-03	9.0E-04	-	-	9.7E-03	3%
Cadmium		4.5E-04	2.8E-04	7.5E-03	-	-	8.3E-03	2%
Molybdenum		3.3E-03	2.4E-03	2.1E-03	-	-	7.8E-03	2%
Toxicity Equivalency (PCB) - Mammals		1.5E-03	-	3.5E-03	-	-	5.0E-03	1%
Zinc	2.1E-07	6.2E-04	3.1E-03	1.3E-03	-	-	5.0E-03	1%
Aroclor-1268		1.2E-03	5.6E-06	2.1E-03	-	-	3.3E-03	1%
Manganese	2.1E-06	1.4E-03	3.2E-04	7.6E-04	-	-	2.5E-03	1%
Barium		1.1E-03	5.0E-04	5.3E-04	-	-	2.2E-03	1%
Lead	5.1E-08	8.6E-04	2.4E-04	7.2E-04	-	-	1.8E-03	0%
Thallium	2.3E-05	6.8E-04	7.7E-06	5.7E-04	-	-	1.3E-03	0%
Mercury		1.9E-04	7.1E-05	3.9E-04	-	-	6.5E-04	0%
Chrysene		3.0E-04	1.5E-05		-	-	3.1E-04	0%
Beryllium	2.4E-07	1.7E-04	4.8E-06	1.4E-04	-	-	3.1E-04	0%
Benzo(b)fluoranthene		2.9E-04	1.5E-05		-	-	3.1E-04	0%
Benzo(k)fluoranthene		2.5E-04	8.2E-06		-	-	2.6E-04	0%
Benzo(a)pyrene		2.2E-04	7.1E-06		-	-	2.3E-04	0%
Indeno(1,2,3-cd)pyrene		2.2E-04	3.3E-06		-	-	2.3E-04	0%
Benzo(g,h,i)perylene		2.1E-04	3.4E-06		-	-	2.1E-04	0%
Benzo(a)anthracene		1.9E-04	9.9E-06		-	-	2.0E-04	0%
Aluminum	1.3E-04						1.3E-04	0%
Dieldrin		4.6E-05	4.4E-06	7.8E-05	-	-	1.3E-04	0%
Mercury (methyl)				1.1E-04			1.1E-04	0%
Nickel	1.1E-07			7.1E-05			7.2E-05	0%
Dibenzo(a,h)anthracene		4.9E-05	6.9E-07		-	-	5.0E-05	0%
Technical Chlordane		1.1E-05	4.2E-07	1.3E-05	-	-	2.5E-05	0%
Phenanthrene		1.6E-05	4.5E-06		-	-	2.0E-05	0%
Chromium	2.2E-09	8.7E-06	1.0E-06	3.0E-06	-	-	1.3E-05	0%
4,4'-DDE		5.2E-06	7.2E-08	5.7E-06	-	-	1.1E-05	0%
4,4'-DDT		5.7E-06	1.2E-07	5.0E-06	-	-	1.1E-05	0%
Silver	3.9E-08			6.6E-06			6.7E-06	0%
Pyrene		5.5E-06	9.2E-07		-	-	6.4E-06	0%
Heptachlor Epoxide				6.1E-06			6.1E-06	0%
Fluoranthene		4.2E-06	4.8E-07		-	-	4.6E-06	0%
4,4'-DDD		2.1E-06	7.5E-08	2.2E-06	-	-	4.4E-06	0%
Endosulfan Sulfate	8.2E-09			2.7E-06			2.7E-06	0%
bis(2-Ethylhexyl)phthalate	1.3E-06						1.3E-06	0%
alpha-Chlordane	6.0E-09			7.4E-07			7.5E-07	0%

TABLE N-15.6

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING NOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 3.9E-01

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
gamma-Chlordane	6.7E-09			4.1E-07			4.1E-07	0%
Methoxychlor				2.7E-07			2.7E-07	0%
Anthracene		1.6E-07	4.6E-08		-	-	2.0E-07	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**3.6E-04**	**2.1E-01**	**1.8E-02**	**1.6E-01**	**-**	**-**	**3.9E-01**	
PERCENTAGE OF TOTAL RISK	**0%**	**55%**	**5%**	**40%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.

TABLE N-15.7
SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 6.5E-02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
Toxicity Equivalency - Mammals	1.9E-05	1.1E-02	-	4.8E-03	-	-	1.6E-02	***25%***
Selenium		3.2E-04	6.0E-04	8.6E-03	-	-	9.5E-03	***15%***
Copper	8.4E-07	2.8E-03	3.9E-03	6.9E-04	-	-	7.5E-03	***12%***
Vanadium		4.5E-03	6.2E-05	1.8E-03	-	-	6.3E-03	10%
Arsenic		2.9E-03	4.1E-04	2.2E-03	-	-	5.5E-03	8%
Aroclor-1254		1.9E-03	3.7E-05	2.5E-03	-	-	4.4E-03	7%
Cobalt	8.0E-07	1.9E-03	4.1E-05	1.2E-03	-	-	3.1E-03	5%
Aroclor, Total				3.0E-03			3.0E-03	5%
Zinc	1.0E-07	3.1E-04	1.5E-03	6.3E-04	-	-	2.5E-03	4%
Antimony		3.1E-04	9.0E-06	7.5E-04	-	-	1.1E-03	2%
Barium		5.3E-04	2.4E-04	2.5E-04	-	-	1.0E-03	2%
Cadmium		4.5E-05	2.8E-05	7.5E-04	-	-	8.3E-04	1%
Aroclor-1268		2.9E-04	1.4E-06	5.2E-04	-	-	8.1E-04	1%
Manganese	6.5E-07	4.4E-04	1.0E-04	2.4E-04	-	-	7.8E-04	1%
Molybdenum		3.3E-04	2.4E-04	2.1E-04	-	-	7.8E-04	1%
Lead	1.7E-08	2.9E-04	7.9E-05	2.4E-04	-	-	6.1E-04	1%
Toxicity Equivalency (PCB) - Mammals		1.5E-04	-	3.5E-04	-	-	5.0E-04	1%
Thallium	2.3E-06	6.8E-05	7.7E-07	5.7E-05	-	-	1.3E-04	0%
Mercury		1.9E-05	7.1E-06	3.9E-05	-	-	6.5E-05	0%
Mercury (methyl)				6.4E-05			6.4E-05	0%
Chrysene		3.0E-05	1.5E-06		-	-	3.1E-05	0%
Beryllium	2.4E-08	1.7E-05	4.8E-07	1.4E-05	-	-	3.1E-05	0%
Benzo(b)fluoranthene		2.9E-05	1.5E-06		-	-	3.1E-05	0%
Nickel	4.3E-08			2.8E-05			2.8E-05	0%
Benzo(k)fluoranthene		2.5E-05	8.2E-07		-	-	2.6E-05	0%
Benzo(a)pyrene		2.2E-05	7.1E-07		-	-	2.3E-05	0%
Indeno(1,2,3-cd)pyrene		2.2E-05	3.3E-07		-	-	2.3E-05	0%
Benzo(g,h,i)perylene		2.1E-05	3.4E-07		-	-	2.1E-05	0%
Benzo(a)anthracene		1.9E-05	9.9E-07		-	-	2.0E-05	0%
Aluminum	1.3E-05						1.3E-05	0%
Dieldrin		4.6E-06	4.4E-07	7.8E-06	-	-	1.3E-05	0%
Technical Chlordane		5.6E-06	2.1E-07	6.5E-06	-	-	1.2E-05	0%
Dibenzo(a,h)anthracene		4.9E-06	6.9E-08		-	-	5.0E-06	0%
Heptachlor Epoxide				4.4E-06			4.4E-06	0%
Pyrene		3.3E-06	5.5E-07		-	-	3.8E-06	0%
Fluoranthene		2.1E-06	2.4E-07		-	-	2.3E-06	0%
4,4'-DDE		1.0E-06	1.4E-08	1.1E-06	-	-	2.2E-06	0%
4,4'-DDT		1.1E-06	2.3E-08	9.9E-07	-	-	2.1E-06	0%
Phenanthrene		1.6E-06	4.5E-07		-	-	2.0E-06	0%
Chromium	2.2E-10	8.7E-07	1.0E-07	3.0E-07	-	-	1.3E-06	0%
4,4'-DDD		4.3E-07	1.5E-08	4.3E-07	-	-	8.8E-07	0%
Endosulfan Sulfate	2.5E-09			8.2E-07			8.2E-07	0%
Silver	3.9E-09			6.6E-07			6.7E-07	0%
alpha-Chlordane	3.0E-09			3.7E-07			3.7E-07	0%
gamma-Chlordane	3.3E-09			2.0E-07			2.1E-07	0%

TABLE N-15.7

SUMMARY OF EXPOSURE PATHWAY/MEDIUM-SPECIFIC HAZARD QUOTIENTS USING LOAEL-BASED RTVs : RACCOON

BASELINE ECOLOGICAL RISK ASSESSMENT - INTERIM FINAL
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

SCENARIO TIMEFRAME: CURRENT/FUTURE
EXPOSURE POINT: LYMAN MILL POND REACH - CT
RECEPTOR: RACCOON
TOTAL RISK (HI): 6.5E-02

Prepared:	9-Apr-03	SJD
Checked:	17-Jul-03	RAR

Analyte	Exposure Medium[a]						Combined HQs[b]	Percent Contribution[c]
	Surface Water	Soil	Terrestrial Plants	Terrestrial Inverts	Small Birds	Small Mammals		
bis(2-Ethylhexyl)phthalate	1.3E-07						1.3E-07	0%
Methoxychlor				3.8E-08			3.8E-08	0%
Anthracene		1.6E-08	4.6E-09		-	-	2.0E-08	0%
beta-BHC								
delta-BHC								
Endrin								
Aroclor-1248								
Aroclor-1242								
Iron								
Toxicity Equivalency - Birds								
Toxicity Equivalency (PCB) - Birds								
TOTAL MEDIUM-SPECIFIC RISK	**3.7E-05**	**2.9E-02**	**7.3E-03**	**2.9E-02**	**-**	**-**	**6.5E-02**	
PERCENTAGE OF TOTAL RISK	**0%**	**44%**	**11%**	**45%**			**100%**	

Footnotes:

a. Hazard Quotients presented by exposure medium; a blank cell indicates that the analyte was not a CPC for that medium; a dash entry indicates that there was no assumed exposure to that medium.

b. Combined risk across all media exposures.

c. Relative contribution of CPC to total risk associated with the ingestion exposure pathway.