

**LONGHORN ARMY
AMMUNITION PLANT**

KARNACK, TEXAS

**ADMINISTRATIVE
RECORD**

VOLUME 7 of 7

Year - 2004

**Bate Stamp Numbers
034541 - 034850**

Prepared for:

**Department of the Army
Longhorn Army Ammunition Plant**

**LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD - CHRONOLOGICAL INDEX**

VOLUME 7 of 7

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Note: *Volume 7 of 7, Year 2004, Letter A, Bate Stamp Numbers Are Out of Date Sequence, due to receiving this report after the July 2004 update to the Admin. Record. (This report should have been inserted in Volume 1 of 1, Year 2003, between letters E & F.)*

- A: **Title:** **Final Report (continued)** - Baseline Human Health and Screening Ecological Risk Assessment: - Report for Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60, 67, Goose Prairie Creek, Sauder's Branch, Central Creek, and Caddo Lake – for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
 Author: Jacobs Engineering Group, Inc., Oak Ridge, Tennessee
 Recipient: U.S. Army Corps of Engineers (USACE), Tulsa District
 Date: June, 2003
 Bate Stamp: 034541 – 034711
- B: **Title:** **Meeting** – Monthly Managers Meeting on the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas – Meeting held by Teleconference
 Recipient: All Parties
 Date: 11 August 2004
 Bate Stamp: 034712 – 034720
- C: **Title:** **Letter** - Subject: Administrative Record Update for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
 Author: William R. Corrigan III, GWTP Manager, Complete Environmental Service (CES)
 Recipient: Rose M. Zeiler, Site Manager, LHAAP
 copied to: Cliff Murray, USACE, Tulsa District; Jeff Armstrong, AEC Program Manager; Chris Villarreal, EPA; James Sher, TCEQ; CES-File
 Date: 16 August 2004
 Bate Stamp: 034721
- D: **Title:** **Meeting** – Managers Meeting on the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas – Meeting held by Teleconference
 Recipient: All Parties
 Date: 18 August 2004
 Bate Stamp: 034722 – 034726

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- E: **Title:** Letter - Subject: Evaluation of the document titled 'Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data' (July 2004) regarding the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
 Author: Chris Villarreal, Remedial Project Manager, US Environmental Protection Agency
 Recipient: Rose M. Zeiler, Site Manager, LHAAP
 copied to: Cliff Murray, USACE, Tulsa District; James Sher, TCEQ; Barry Forsythe, US Fish and Wildlife Service; Bill Corrigan, Complete Environmental Service
 Date: 18 August 2004
 Bate Stamp: 034727 – 034728
- F: **Title:** Meeting – Performance Based Contracting (PBC) Meeting on the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas – Meeting held at the Groundwater Treatment Plant (GWTP) Army Office Trailer, Karnack, Texas
 Recipient: All Parties
 Date: 14 September 2004
 Bate Stamp: 034729 – 034730
- G: **Title:** Meeting – Technical Review Committee (TRC) Meeting on the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas – Meeting held at the Karnack Community Center, Karnack, Texas
 Recipient: All Parties
 Date: 14 September 2004
 Bate Stamp: 034731 – 034752
- H: **Title:** Meeting – Technical Project Planning (TPP) Meeting No. 2 on the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas – Meeting held at the Groundwater Treatment Plant (GWTP) Army Office Trailer, Karnack, Texas
 Recipient: All Parties
 Date: 15 September 2004
 Bate Stamp: 034753 – 034783
- I: **Title:** Letter - Subject: Notice of Public Meeting regarding the transfer of acreage for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
 Author: Rose M. Zeiler, Site Manager, LHAAP
 Recipient: The Public
 copied to: Chris Villarreal, EPA; James Sher, TCEQ; Paul Bruckwicki, FWS; Richard Smith, USACE, Tulsa District
 Date: 20 October 2004
 Bate Stamp: 034784 – 034786

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- J: Title: Meeting – Managers Meeting on the Longhorn Army Ammunition Plant (LHAAP),
 Karnack, Texas – Meeting held at Texas Commission of Environmental Quality
 (TCEQ) Austin Office
 Recipient: All Parties
 Date: 26 October 2004
 Bate Stamp: 034787 – 034794
- K: Title: Final Report - Final Environmental Condition of Property II (ECOP II) for the
 Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
 Author: Shaw Environmental & Infrastructure, Inc., Houston, Texas
 Recipient: U.S. Army Corps of Engineers (USACE), Tulsa District
 Date: November 2004
 Bate Stamp: 034795 – 034816
- L: Title: Meeting – Public Meeting on the Transfer of Property at the Longhorn Army
 Ammunition Plant (LHAAP), Karnack, Texas
 Recipient: All Parties
 Date: 04 November 2004
 Bate Stamp: 034817 – 034819
- M: Title: Meeting – Managers Meeting on the Longhorn Army Ammunition Plant (LHAAP),
 Karnack, Texas – Meeting held by Teleconference
 Recipient: All Parties
 Date: 17 November 2004
 Bate Stamp: 034820 – 034833
- N: Title: Meeting – Managers Meeting on the Longhorn Army Ammunition Plant (LHAAP),
 Karnack, Texas – Meeting held at the Groundwater Treatment Plant (GWTP) Army
 Office Trailer, Karnack, Texas
 Recipient: All Parties
 Date: 07 December 2004
 Bate Stamp: 034834 – 034835
- O: Title: Meeting – Restoration Advisory Board (RAB) Meeting for the Longhorn Army
 Ammunition Plant (LHAAP), Karnack, Texas (Held at the Karnack Community
 Center, Karnack, Texas)
 Recipient: All Parties
 Date: 07 December 2004
 Bate Stamp: 034836 – 034850

Appendix E

Aquatic Indicator Species Food Web Model

APPENDIX E
TABLE E1
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	22300	12000	4.6	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	6.01E+02	5.06E-01	0.00E+00	6.01E+02
Antimony	8.5			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Asenic	11.5	7.62		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	3.81E-01	0.00E+00	0.00E+00	3.81E-01
Bismuth	255	100		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.00E+00	0.00E+00	0.00E+00	5.00E+00
Cadmium	3.3			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Calcium	18000	1000		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.00E+01	0.00E+00	0.00E+00	5.00E+01
Chromium	47.6	18		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	9.00E-01	0.00E+00	0.00E+00	9.00E-01
Cobalt	19			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	829	10.6		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.30E-01	0.00E+00	0.00E+00	5.30E-01
Iron	43000	20000		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.00E+03	9.24E-01	0.00E+00	1.00E+03
Lead	359	18.7	0.004	1.8E-01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	9.35E-01	4.40E-04	0.00E+00	9.35E-01
Magnesium	3330	1000		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.00E+01	0.00E+00	0.00E+00	5.00E+01
Manganese	1030	180	0.252	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	9.00E+00	0.00E+00	0.00E+00	9.00E+00
Mercury	43.7			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	8			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potassium	1400	1500		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	7.50E+01	0.00E+00	0.00E+00	7.50E+01
Selenium	4.27	3.37		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.69E-01	0.00E+00	0.00E+00	1.69E-01
Silver	37			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium	66	36		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	2580	46	0.04	3.9E+01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.80E+00	4.40E-03	0.00E+00	1.80E+00
Zinc	0.2			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDD	0.049			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDE	0.045			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDT	1.3	0.095		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	4.75E-03	0.00E+00	0.00E+00	4.75E-03
Aroclor 1254	0.0086			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dieldrin	1.2			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Asenaphthene	0.27			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.6			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	2			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	3.1			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.7			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.3			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g)hioranthene	1.3			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	130			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	4.2			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.3			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Di-n-butyl phthalate	0.12			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.8			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	2.1			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	0.35			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	7.4			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	0.0054			0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene			5.2	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	5.72E-01	0.00E+00	5.72E-01
Sodium			0.0013	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	1.43E-04	0.00E+00	1.43E-04
Thallium			0.11	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	1.21E-02	0.00E+00	1.21E-02
Tin				0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value; Hazard Index = sum of HQs; values boxed exceed 1.0

APPENDIX E
TABLE E1 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	5.5E+00	4.6E-03	5.5E+00	41.09
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	2.5	0.0E+00	1.5E-01	NA	1.5E-01	1.14
Barium	20.8	0.0E+00	2.4E-01	NA	2.4E-01	1.80
Bismuth	1.45	0.0E+00	NA	NA	0.0E+00	0.00
Cadmium	NA	NA	NA	NA	NA	NA
Chromium	1	0.0E+00	9.0E-01	NA	9.0E-01	6.76
Cobalt	NA	NA	NA	NA	NA	NA
Copper	47	0.0E+00	1.1E-02	NA	1.1E-02	0.08
Iron	NA	NA	NA	NA	NA	NA
Lead	1.13	2.8E-01	8.3E-01	3.9E-04	1.1E+00	8.31
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	997	0.0E+00	9.0E-03	2.8E-05	9.1E-03	0.07
Mercury	0.006	0.0E+00	NA	NA	0.0E+00	0.00
Nickel	77.4	0.0E+00	NA	NA	0.0E+00	0.00
Potassium	NA	NA	NA	NA	NA	NA
Selenium	7.4	0.0E+00	4.2E-01	NA	4.2E-01	3.16
Silver	NA	NA	NA	NA	NA	NA
Strontium	11.4	0.0E+00	1.6E-01	NA	1.6E-01	1.19
Vanadium	14.5	4.7E+00	1.0E-01	3.0E-04	4.8E+00	36.19
Zinc	NA	NA	NA	NA	NA	NA
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	0.0E+00	NA	NA	0.0E+00	0.00
4,4'-DDT	0.003	0.0E+00	2.6E-02	NA	2.6E-02	0.20
Aroclor 1254	0.18	0.0E+00	NA	NA	0.0E+00	0.00
Dieldrin	0.077	0.0E+00	NA	NA	NA	NA
Acamphthene	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	1.1	0.0E+00	NA	NA	0.0E+00	0.00
Chrysene	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	0.11	0.0E+00	NA	NA	0.0E+00	0.00
Fluoranthene	NA	NA	NA	NA	NA	NA
Indene(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA
Tin	6.8	0.0E+00	NA	1.8E-03	1.8E-03	0.01

HI (sum) = 4.9E+00 8.4E+00 7.1E-03 13

APPENDIX E
TABLE E1 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish BAF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	4.6	NA	0		NA					100%			NA		(A+B+C+D+E)
Antimony	0								20						0.0E+00
Arsenic	0														0.0E+00
Barium	0														0.0E+00
Bismuth	0														0.0E+00
Calcium	0														0.0E+00
Chromium	0								283						0.0E+00
Chromium	0														0.0E+00
Cobalt	0								290						0.0E+00
Copper	8.4														0.0E+00
Iron	0.004								45		0.18				1.8E-01
Magnesium	0														0.0E+00
Manganese	0.252														0.0E+00
Mercury	0														0.0E+00
Nickel	0								307						0.0E+00
Potassium	0														0.0E+00
Selenium	0								129						0.0E+00
Silver	0														0.0E+00
Sroutium	0														0.0E+00
Vandium	0														0.0E+00
Zinc	0.04								966		38.84				3.8E+01
4,4'-DDD	0								430000						0.0E+00
4,4'-DDE	0								553000						0.0E+00
4,4'-DDT	0								430000						0.0E+00
Aroclor 1254	0														0.0E+00
Dieldrin	0														0.0E+00
Arenaphthene	0														0.0E+00
Benzo(a)anthracene	0														0.0E+00
Benzo(b)fluoranthene	0														0.0E+00
Benzo(g,h,i)perylene	0														0.0E+00
Benzo(k)fluoranthene	0								9950						0.0E+00
Bis(2-ethylhexyl)phthalate	0														0.0E+00
Chrysene	0														0.0E+00
Dibenz(a,h)anthracene	0														0.0E+00
Di-n-butyl phthalate	0														0.0E+00
Fluoranthene	0								15700						0.0E+00
Indeno(1,2,3-cd)pyrene	0														0.0E+00
Naphthalene	0														0.0E+00
Phenanthrene	0														0.0E+00
Pyrene	0														0.0E+00
Toluene	5.2								62.7						0.0E+00
Sodium	0.0013								1400		1.82				0.0E+00
Thallium	0.11														0.0E+00
Tin															0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E2
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	22300	12000	4.6	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	2.30E-01	0.00E+00	7.22E+01
Antimony	8.5			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	11.5	7.62		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	4.57E-02
Barium	355	100		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	6.00E+01
Bismuth	3.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	18000	1000		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	6.00E+00
Calcium	47.6	18		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	1.08E-01
Chromium	47.6	18		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	839	10.6		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	43000	20000	8.4	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	6.36E-02
Iron	359	18.7	0.004	1.8E-01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	4.20E-01	0.00E+00	1.20E+02
Lead	3330	1000		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	2.00E-04	0.00E+00	1.50E-01
Magnesium	43.7	180	0.252	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	1.26E-02	0.00E+00	6.00E+00
Manganese	43.7	180		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	1.09E+00
Nickel	4.7	1500		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potassium	1400	3.37		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	9.00E+00
Selenium	4.27			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	2.02E-02
Silver	1.6			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium	37	36		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	2.16E-01
Vanadium	280	46	0.04	3.9E+01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	2.00E-03	0.00E+00	8.11E+00
Zinc	0.2			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDT	0.049			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDE	0.045			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDT	1.3	0.095		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aroclor 1254	0.086			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dieldrin	1.2			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	0.27			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	1.6			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	3.1			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.7			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	1.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	130			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	4.2			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.12			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	3.8			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	2.1			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	0.35			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	1.2			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	7.4			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.0034		5.2	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	2.60E-01	0.00E+00	2.60E-01
Sodium			0.0013	1.8E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	6.90E-05	0.00E+00	3.82E-01
Thallium			0.11	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	5.90E-03	0.00E+00	5.90E-03
Tin				0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E2 (continued)
OSPREY - HQS
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	6.6E-01	2.1E-03	6.6E-01	41.12
Antimony	NA	---	---	---	---	---
Arsenic	2.5	0.0E+00	1.8E-02	---	1.8E-02	1.14
Barium	20.8	0.0E+00	2.9E-02	---	2.9E-02	1.80
Bismuth	14.5	0.0E+00	---	---	0.0E+00	0.00
Calcium	NA	---	---	---	---	---
Chromium	1	0.0E+00	1.1E-01	---	1.1E-01	6.74
Cobalt	NA	---	---	---	---	---
Copper	47	0.0E+00	1.4E-03	---	1.4E-03	0.08
Iron	NA	---	---	---	---	---
Lead	1.13	3.3E-02	9.9E-02	1.8E-04	1.3E-01	8.30
Magnesium	NA	---	---	---	---	---
Manganese	997	0.0E+00	1.1E-03	1.3E-05	1.1E-03	0.07
Mercury	0.006	0.0E+00	---	---	0.0E+00	0.00
Nickel	77.4	0.0E+00	---	---	0.0E+00	0.00
Potassium	NA	---	---	---	---	---
Selenium	0.4	0.0E+00	5.1E-02	---	5.1E-02	3.16
Silver	NA	---	---	---	---	---
Strontium	NA	---	---	---	---	---
Vanadium	11.4	0.0E+00	1.9E-02	---	1.9E-02	1.18
Zinc	14.5	5.6E-01	1.9E-02	1.4E-04	5.8E-01	36.15
4,4'-DDD	NA	---	---	---	---	---
4,4'-DDE	0.003	0.0E+00	---	---	0.0E+00	0.00
4,4'-DDT	0.18	0.0E+00	3.2E-03	---	3.2E-03	0.20
Aroclor 1254	0.077	0.0E+00	---	---	0.0E+00	0.00
Dieldrin	NA	---	---	---	---	---
Acenaphthene	NA	---	---	---	---	---
Anthracene	NA	---	---	---	---	---
Benzo(a)anthracene	NA	---	---	---	---	---
Benzo(b)pyrene	NA	---	---	---	---	---
Benzo(e)fluoranthene	NA	---	---	---	---	---
Benzo(g)hypsene	NA	---	---	---	---	---
Benzo(k)fluoranthene	NA	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	1.1	0.0E+00	---	---	0.0E+00	0.00
Chrysene	NA	---	---	---	---	---
Dibenz(a,h)anthracene	NA	---	---	---	---	---
D-n-butyl phthalate	0.11	0.0E+00	---	---	0.0E+00	0.00
Fluoranthene	NA	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	NA	---	---	---	---	---
Naphthalene	NA	---	---	---	---	---
Phenanthrene	NA	---	---	---	---	---
Pyrene	NA	---	---	---	---	---
Toluene	NA	---	---	---	---	---
Sodium	NA	---	---	---	---	---
Thallium	NA	---	---	---	---	---
Tin	6.8	0.0E+00	---	8.1E-04	8.1E-04	0.05

HI (sum) = 5.9E-01 1.0E+00 3.2E-03 1.6E+00

APPENDIX E
TABLE E2 (continued)
OSPREY - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (gr & slope) Intercept	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	4.6												0				0.0E+00
Antimony	0											20	0				0.0E+00
Aspic	0												0				0.0E+00
Barium	0												0				0.0E+00
Cadmium	0											283	0				0.0E+00
Calcium	0												0				0.0E+00
Chromium	0											290	0				0.0E+00
Cobalt	0												0				0.0E+00
Copper	8.4											45	0.18				1.8E-01
Iron	0.004												0				0.0E+00
Magnesium	0												0				0.0E+00
Manganese	0.252											307	0				0.0E+00
Mercury	0												0				0.0E+00
Nickel	0											129	0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0												0				0.0E+00
Silver	0												0				0.0E+00
Sroutium	0												0				0.0E+00
Vandrium	0.04											966	38.64				3.9E-01
Zinc	0											430000	0				0.0E+00
4,4'-DDD	0											553000	0				0.0E+00
4,4'-DDE	0											430000	0				0.0E+00
4,4'-DDT	0												0				0.0E+00
Aroclor 1254	0												0				0.0E+00
Dieldrin	0												0				0.0E+00
Acenaphthene	0												0				0.0E+00
Anthracene	0												0				0.0E+00
Benzo(a)anthracene	0												0				0.0E+00
Benzo(b)pyrene	0												0				0.0E+00
Benzo(k)fluoranthene	0												0				0.0E+00
Benzo(ghi)perylene	0											9950	0				0.0E+00
Benzo(a)fluoranthene	0												0				0.0E+00
Bis(2-ethylhexyl)phthalate	0												0				0.0E+00
Chrysene	0												0				0.0E+00
Dibenz(a,h)anthracene	0												0				0.0E+00
Di-n-butyl phthalate	0												0				0.0E+00
Fluoranthene	0												0				0.0E+00
Indeno(1,2,3-cd)pyrene	0											15700	0				0.0E+00
Naphthalene	0												0				0.0E+00
Phenanthrene	0												0				0.0E+00
Pyrene	0												0				0.0E+00
Toluene	0											62.7	0				0.0E+00
Sodium	5.2											1400	1.82				1.8E+00
Thallium	0.0013												0				0.0E+00
Tin	0.11												0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs; values boxed exceed 1.0

APPENDIX E
TABLE E3
RIVER OTTER - HQ3
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	22200	12000	4.6	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	3.68E-01	0.00E+00	3.68E-01
Antimony	8.5			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	11.5	7.62		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.65E-01	0.00E+00	0.00E+00	1.65E-01
Barium	255	100		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bismuth	3.3			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	18000	1000		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.16E+01	0.00E+00	0.00E+00	2.16E+01
Chromium	47.6	18		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	3.89E-01	0.00E+00	0.00E+00	3.89E-01
Cobalt	19			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	829	10.6		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.29E-01	0.00E+00	0.00E+00	2.29E-01
Iron	43000	20000	8.4	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	4.32E+02	6.72E-01	0.00E+00	4.33E+02
Lead	259	18.7	0.004	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.16E+01	3.20E-04	0.00E+00	4.32E-02
Magnesium	3330	1000		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	1030	180	0.252	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	3.89E+00	2.02E-02	0.00E+00	3.91E+00
Mercury	43.7			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	18	1500		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	3.24E+01	0.00E+00	0.00E+00	3.24E+01
Potassium	1400	3.37		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	7.28E-02	0.00E+00	0.00E+00	7.28E-02
Selenium	4.27			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver	1.6			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	37	36		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium	66			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	7.78E-01	0.00E+00	0.00E+00	7.78E-01
Zinc	2580	46	0.04	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	9.94E-01	3.20E-03	0.00E+00	1.03E+01
4,4'-DDD	0.2			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDE	0.049			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDT	0.045			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Endrin 1254	1.3	0.095		0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.05E-03	0.00E+00	0.00E+00	2.05E-03
Dieldrin	0.0986			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	1.2			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	0.27			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	1.6			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(b)pyrene	2			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	3.1			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.7			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)fluoranthene	1.3			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	130			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(e)pyrene	4.2			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	0.3			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.12			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Di-n-butyl phthalate	3.8			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.1			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	0.35			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.2			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	7.4			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyrene	0.0054			0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Quene			5.2	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	4.16E-01	0.00E+00	4.16E-01
Sodium			0.0013	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	1.04E-04	0.00E+00	4.37E-01
Thallium			0.11	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	8.80E-03	0.00E+00	8.80E-03
Tin				0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E3 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	-----	7.7E-01	7.7E-01	0.48
Antimony	0.031	0.0E+00	-----	-----	0.0E+00	0.00
Arsenic	0.031	0.0E+00	5.3E+00	-----	5.3E+00	3.28
Barium	2.5	0.0E+00	-----	-----	0.0E+00	0.00
Bismuth	0.441	0.0E+00	-----	-----	0.0E+00	0.00
Calcium	NA	0.0E+00	-----	-----	-----	-----
Chromium	1.5	0.0E+00	2.6E-01	-----	2.6E-01	0.16
Cobalt	NA	0.0E+00	-----	-----	-----	-----
Copper	7	0.0E+00	3.3E-02	-----	3.3E-02	0.02
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	1.2E-02	-----	8.7E-05	1.2E-02	0.01
Magnesium	NA	-----	-----	-----	-----	-----
Manganese	40	0.0E+00	9.7E-02	5.0E-04	9.8E-02	0.06
Mercury	0.009	0.0E+00	-----	-----	0.0E+00	0.00
Nickel	18.29	0.0E+00	-----	-----	0.0E+00	0.00
Potassium	NA	-----	-----	-----	-----	-----
Selenium	0.091	0.0E+00	8.0E-01	-----	8.0E-01	0.49
Silver	NA	-----	-----	-----	-----	-----
Strontium	120	0.0E+00	-----	-----	0.0E+00	0.00
Vanadium	0.089	0.0E+00	8.7E+00	-----	8.7E+00	5.40
Zinc	71.2	1.3E-01	1.4E-02	4.4E-05	1.4E-01	0.09
4,4'-DDDD	NA	-----	-----	-----	-----	-----
4,4'-DDT	0.37	0.0E+00	-----	-----	0.0E+00	0.00
Aroclor 1254	0.083	0.0E+00	2.5E-02	-----	2.5E-02	0.02
Dieldrin	0.009	0.0E+00	-----	-----	0.0E+00	0.00
Axaphenone	NA	-----	-----	-----	-----	-----
Anthracene	NA	-----	-----	-----	-----	-----
Benz(a)anthracene	0.25	0.0E+00	-----	-----	0.0E+00	0.00
Benz(b)pyrene	NA	-----	-----	-----	-----	-----
Benz(a)fluoranthene	NA	-----	-----	-----	-----	-----
Benz(a)perylene	NA	-----	-----	-----	-----	-----
Benz(b)fluoranthene	4.5	0.0E+00	-----	-----	0.0E+00	0.00
Benzo(e)pyrene	NA	-----	-----	-----	-----	-----
Chrysene	NA	-----	-----	-----	-----	-----
Dibenz(a,h)anthracene	136	0.0E+00	-----	-----	0.0E+00	0.00
Di-n-butyl phthalate	NA	-----	-----	-----	-----	-----
Fluoranthene	NA	-----	-----	-----	-----	-----
Indene(1,2,3-cd)pyrene	NA	-----	-----	-----	-----	-----
Naphthalene	NA	-----	-----	-----	-----	-----
Phenanthrene	NA	-----	-----	-----	-----	-----
Pyrene	6.4	0.0E+00	-----	-----	0.0E+00	0.00
Toxene	NA	-----	-----	-----	-----	-----
Sodium	0.003	1.5E+02	-----	3.5E-02	1.5E+02	90.00
Thallium	5.8	0.0E+00	-----	1.5E-01	1.5E-01	0.00
Tin	-----	-----	-----	-----	-----	-----

HI (sum)=

1.5E+02 1.5E+01 8.1E-01

1.8E+02

APPENDIX E
TABLE E3 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Invertebrat & slugs)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	4.6												0				0.0E+00
Antimony	0												0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0												0				0.0E+00
Bismuth	0												0				0.0E+00
Calcium	0												0				0.0E+00
Chromium	0												0				0.0E+00
Cobalt	0												0				0.0E+00
Copper	0												0				0.0E+00
Iron	8.4												0				0.0E+00
Lead	0.004												0.18				1.8E-01
Magnesium	0												0				0.0E+00
Manganese	0.252												0				0.0E+00
Mercury	0												0				0.0E+00
Nickel	0												0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0												0				0.0E+00
Silver	0												0				0.0E+00
Sroutium	0												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.04												38.64				3.8E+01
4,4'-DDD	0												0				0.0E+00
4,4'-DDE	0												0				0.0E+00
4,4'-DDT	0												0				0.0E+00
Aroclor 1254	0												0				0.0E+00
Acetophenone	0												0				0.0E+00
Anthrone	0												0				0.0E+00
Benzo(a)anthracene	0												0				0.0E+00
Benzo(a)pyrene	0												0				0.0E+00
Benzo(b)fluoranthene	0												0				0.0E+00
Benzo(e)pyrene	0												0				0.0E+00
Benzo(g)fluoranthene	0												0				0.0E+00
Bis(2-ethylhexyl)phthalate	0												0				0.0E+00
Chrysene	0												0				0.0E+00
Dibenz(a,h)anthracene	0												0				0.0E+00
Di-n-butyl phthalate	0												0				0.0E+00
Fluoranthene	0												0				0.0E+00
Indeno(1,2,3-cd)pyrene	0												0				0.0E+00
Naphthalene	0												0				0.0E+00
Naphthalene	0												0				0.0E+00
Phenanthrene	0												0				0.0E+00
Pyrene	0												0				0.0E+00
Stilbene	5.2												0				0.0E+00
Sodium	0.0013												0				0.0E+00
Thallium	0.11												1.82				1.8E+00
Tin													0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E4
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	22200	12000		4.6		0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.80E+00	3.68E-01	0.00E+00	5.17E+00
Antimony	8.5					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.05E-03	---	0.00E+00	0.00E+00
Arsenic	11.5	7.62				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.00E-02	---	0.00E+00	3.05E-03
Barium	255	100				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.00E-02	---	0.00E+00	4.00E-02
Cadmium	3.3					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.00E-01	---	0.00E+00	0.00E+00
Calcium	18000	1000				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	7.20E-03	---	0.00E+00	4.00E-01
Chromium	47.6	18				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.24E-03	---	0.00E+00	7.20E-03
Cobalt	19					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.24E-03	---	0.00E+00	0.00E+00
Copper	829	10.6				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	8.00E+00	6.72E-01	0.00E+00	4.24E-03
Iron	43000	20000		8.4		0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	7.48E-03	3.20E-04	0.00E+00	8.07E+00
Lead	259	18.7		0.04		0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.00E-01	---	0.00E+00	1.80E-03
Magnesium	3330	1000				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.00E-01	---	0.00E+00	9.00E-01
Manganese	1030			0.352		0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	7.20E-02	2.02E-02	0.00E+00	9.22E-02
Mercury	43.7	180				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Nickel	18					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Potassium	1400	1500				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	6.00E-01	---	0.00E+00	6.00E-01
Selenium	4.27	3.37				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.35E-03	---	0.00E+00	1.35E-03
Silver	1.6					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Sodium	37					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Vanadium	66	36				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.44E-02	---	0.00E+00	1.44E-02
Zinc	2580	46		0.04		3.9E+01	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.84E-02	3.20E-03	3.86E-01	4.08E-01
4,4'-DDD	0.2					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
4,4'-DDE	0.049					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
4,4'-DDT	0.045					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Aroclor 1254	1.3	0.095				0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.80E-05	---	0.00E+00	3.80E-05
Dieldrin	0.0086					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Acenaphthene	0.27					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Anthracene	1.6					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzo(a)anthracene	1.6					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzo(b)fluoranthene	3.1					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.7					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	1.3					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Chrysene	130					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.3					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Di-n-butyl phthalate	0.12					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Fluoranthene	3.8					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	2.1					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Naphthalene	0.35					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Phenanthrene	1.2					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Pyrene	7.4					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Toluene	0.0054					0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	---	---	0.00E+00	0.00E+00
Sodium				5.2		1.8E+00	0	4.00E+02	80000	10000	0.022	1	---	---	4.16E-01	0.00E+00	4.16E-01
Thallium				0.0013		0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	---	1.04E-04	0.00E+00	1.82E-02
Tin				0.11		0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	---	8.80E-03	0.00E+00	8.80E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E4 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	1.0E+01	7.7E-01	1.1E+01	81.15
Antimony	0.031	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Arsenic	0.031	0.0E+00	9.8E-02	9.8E-02	9.8E-02	0.74
Barium	2.5	0.0E+00	1.6E-02	1.6E-02	1.6E-02	0.12
Cadmium	0.441	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Calcium	NA	0.0E+00	4.8E-03	4.8E-03	4.8E-03	0.04
Chromium	1.5	0.0E+00	6.1E-04	6.1E-04	6.1E-04	0.00
Cobalt	NA	0.0E+00	2.0E-03	8.7E-05	2.6E-03	0.02
Copper	7	0.0E+00	1.8E-03	5.0E-04	2.3E-03	0.02
Lead	3.66	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Magnesium	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Manganese	40	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Mercury	0.009	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Nickel	18.29	0.0E+00	1.5E-02	1.5E-02	1.5E-02	0.11
Potassium	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Selenium	0.091	0.0E+00	1.6E-01	1.6E-01	1.6E-01	1.21
Silver	NA	0.0E+00	2.5E-04	4.4E-05	5.6E-03	0.04
Strontium	120	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Vanadium	0.089	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Zinc	73.2	5.3E-03	4.6E-04	4.6E-04	4.6E-04	0.00
4,4'-DDD	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
4,4'-DDE	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
4,4'-DDT	0.37	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Ancior 1254	0.083	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Dieldrin	0.009	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Acenaphthene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Anthracene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(a)anthracene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(e)pyrene	0.25	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(b)fluoranthene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(k)fluoranthene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(ghi)perylene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Benzo(a)pyrene	4.5	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Bis(2-ethylhexyl)phthalate	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Chrysene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Dibenz(a,h)anthracene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Di-n-butyl phthalate	136	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Fluoranthene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Indeno(1,2,3-cd)pyrene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Naphthalene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Phenanthrene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Pyrene	6.4	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Toluene	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Sodium	0.003	6.1E+00	3.5E-02	3.5E-02	6.1E+00	45.79
Thallium	5.8	0.0E+00	1.5E-03	1.5E-03	1.5E-03	0.01
Tin	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00

6.1E+00 1.0E+01 8.1E-01 1.7E+01

APPENDIX E
TABLE E4 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	4.6												0				0.0E+00
Antimony	0											20					0.0E+00
Arsenic	0																0.0E+00
Barium	0																0.0E+00
Bismuth	0																0.0E+00
Cadmium	0																0.0E+00
Calcium	0											283					0.0E+00
Chromium	0											290					0.0E+00
Cobalt	0																0.0E+00
Copper	8.4											45					0.0E+00
Iron	0.004												0.18				1.8E-01
Lead	0																0.0E+00
Magnesium	0.252																0.0E+00
Mercury	0											307					0.0E+00
Nickel	0											129					0.0E+00
Potassium	0																0.0E+00
Selenium	0																0.0E+00
Silver	0																0.0E+00
Strontium	0																0.0E+00
Tin	0																0.0E+00
Vanadium	0.04											986	38.64				3.8E+01
Zinc	0											430000					0.0E+00
4,4'-DDD	0											553000					0.0E+00
4,4'-DDE	0											430000					0.0E+00
4,4'-DDT	0																0.0E+00
Aroclor 1254	0																0.0E+00
Dieldrin	0																0.0E+00
Acenaphthene	0																0.0E+00
Anthracene	0																0.0E+00
Benzo(a)anthracene	0																0.0E+00
Benzo(b)fluoranthene	0																0.0E+00
Benzo(g,h,i)perylene	0											9950					0.0E+00
Benzo(k)fluoranthene	0																0.0E+00
Bis(2-ethylhexyl)phthalate	0																0.0E+00
Chrysene	0																0.0E+00
Dibenz(a,h)anthracene	0																0.0E+00
Di-n-butyl phthalate	0																0.0E+00
Fluoranthene	0											15700					0.0E+00
Indeno(1,2,3-cd)pyrene	0																0.0E+00
Naphthalene	0																0.0E+00
Phenanthrene	0																0.0E+00
Pyrene	0																0.0E+00
Toluene	0											62.7					0.0E+00
Sodium	5.2											1400					0.0E+00
Thallium	0.0013												1.82				1.8E+00
Tin	0.11												0				0.0E+00

APPENDIX E
TABLE E5
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	39200	16000	210	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	2.31E+01	0.00E+00	2.31E+02
Antimony	1.1	17.6	0.037	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	4.07E+03	0.00E+00	4.07E+03
Barium	16.8	17.6	0.066	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	6.40E+04	2.10E+01	1.09E+02
Beryllium	2060	290	3.3	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.45E+01	0.00E+00	1.45E+01
Cadmium	0.921	1.38	0.0119	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	7.37E+04	0.00E+00	7.37E+04
Calcium	26600	3200	58	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	6.38E+00	0.00E+00	1.66E+02
Chromium	131	49	0.23	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	2.53E+02	0.00E+00	1.14E+02
Cobalt	71.3	13	0.12	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.32E+02	0.00E+00	6.61E+01
Copper	275	51.8	0.106	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	2.42E+01	5.38E+01	5.64E+01
Iron	120000	43000	220	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	2.17E+03	0.00E+00	2.17E+03
Magnesium	5000	1100	37.3	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.21E+02	2.30E+01	2.44E+01
Manganese	3740	1100	1.3	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.87E+00	0.00E+00	1.87E+00
Mercury	0.06	649	11.8	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.35E+01	0.00E+00	3.35E+01
Nickel	21	0.11	0.11	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.30E+00	0.00E+00	0.00E+00
Potassium	2590	1500	17	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.21E+02	5.91E+01	5.91E+01
Selenium	2.91	7.79	0.008	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.87E+00	0.00E+00	1.87E+00
Silver	1.6	7	0.29	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.90E+01	0.00E+00	3.90E+01
Srionium	8360	7	0.48	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.19E+02	0.00E+00	3.19E+02
Vanadium	77	86	3.3	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	5.28E+02	0.00E+00	3.22E+01
Zinc	4180	760	0.48	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.63E+01	0.00E+00	4.35E+03
4,4'-DDD	0.028	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDE	0.03	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4,4'-DDT	0.012	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
alpha-BHC	0.01	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.0022	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.019	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,1,1'-Trichloroethane	0.008	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Buanoone	0.0144	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	0.0666	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	0.5	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetone	0.217	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Adrenone	0.43	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	2.1	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(b)fluoranthene	4.5	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(g)herylene	1.3	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(k)fluoranthene	1.2	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzoic acid	0.29	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bin(2-ethylhexyl)phthalate	2.349	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Butylbenzyl phthalate	0.0588	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	0.167	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	2.6	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.1	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenz(b,h)anthracene	0.12	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Di-n-butylphthalate	7.462	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Di-n-octylphthalate	0.298	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	2.7	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HMX	3	0.015	0.015	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Inden(1,2,3-c)pyrene	1.6	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylene chloride	0.027	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	0.98	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	2.8	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tetraclorobutane	0.005	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.0224	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	0.0997	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	9.6	2100	0.0036	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	1.06E+02	0.00E+00	1.06E+02
m-Nitrochlorobenzene	0.0036	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	3.96E+04	0.00E+00	3.96E+04
Thallium	0.0024	0.012	0.012	0.0E+00	0.0E+00	5.0E+04	1.0E+05	1750000	0.125	1	0.00E+00	2.64E+04	5.88E+00	5.88E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil + EDI sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E

Constituent	NOAA RT Priority (mg/kg-day)	Food Ingestion Quotient	Sediment Ingestion Quotient	Surface Water Ingestion Quotient	Total Ingestion Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	7.3E+00	2.1E+01	7.3E+00	1.39
Antimony	NA					
Arsenic	2.5	8.4E-02	3.8E-01	2.4E-01	4.4E-01	0.08
Beryllium	NA	0.0E+00	7.0E-01	1.7E-01	7.1E-01	0.13
Cadmium	1.45	0.0E+00		5.1E-04	5.1E-04	0.00
Calcium	NA					
Chromium	1	1.1E+02	2.3E+00	2.3E+02	1.2E+02	21.62
Cobalt	NA					
Copper	47	1.1E+00	5.5E-02	2.5E-04	1.2E+00	0.22
Iron	NA					
Lead	1.13	2.0E+01	1.7E+00	2.8E-01	2.2E+01	4.09
Magnesium	NA	0.0E+00	3.3E+02	1.3E-03	3.4E+02	0.01
Manganese	0.006	0.0E+00	0.0E+00		0.0E+00	0.00
Molybdenum	77.4	7.6E-01		1.6E-04	7.6E-01	0.14
Nickel	NA					
Potassium	NA	0.0E+00	9.7E-01		9.7E-01	0.18
Selenium	0.4	0.0E+00				
Silver	NA					
Strontium	NA					
Vanadium	11.4	0.0E+00	3.8E-01	4.6E-03	3.8E-01	0.07
Zinc	14.5	3.8E+02	2.6E+00	2.3E-01	3.9E+02	71.97
4,4'-DDT	NA					
4,4'-DDE	NA					
4,4'-DDT	0.003	0.0E+00	2.5E-01		2.5E-01	0.05
alpha BHC	0.56	0.0E+00			0.0E+00	0.00
Aroclor 1254	0.18	0.0E+00	1.9E-01		1.9E-01	0.04
Heptachlor	NA					
Heptachlor epoxide	NA					
Indene	2	0.0E+00			0.0E+00	0.00
1,1,1,1-Tetrachloroethane	NA					
1,1,1,2-Tetrachloroethane	NA					
4-Methylphenol	NA					
Acenaphthylene	NA					
Acetone	NA					
Anthracene	NA					
Benzo(a)anthracene	NA					
Benzo(b)pyrene	NA					
Benzo(b)fluoranthene	NA					
Benzo(a)pyrene	NA					
Benzo(b)fluoranthene	NA					
Benzo(e)pyrene	NA					
Benzo(g,h,i)perylene	NA					
Benzo(i)perylene	NA					
Benzo(j,k,l)perylene	NA					
Benzo(l)pyrene	NA					
Benzo(m)pyrene	NA					
Benzo(n)pyrene	NA					
Benzo(o)pyrene	NA					
Benzo(p)pyrene	NA					
Benzo(q,r,s)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s)perylene	NA					
Benzo(t,u,v)perylene	NA					
Benzo(v,w,x,y)perylene	NA					
Benzo(w,x,y,z)perylene	NA					
Benzo(x,y,z)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					
Benzo(p,q)perylene	NA					
Benzo(q,r)perylene	NA					
Benzo(r,s)perylene	NA					
Benzo(s,t)perylene	NA					
Benzo(t,u)perylene	NA					
Benzo(u,v)perylene	NA					
Benzo(v,w)perylene	NA					
Benzo(w,x)perylene	NA					
Benzo(x,y)perylene	NA					
Benzo(y,z)perylene	NA					
Benzo(z)perylene	NA					
Benzo(a,b)perylene	NA					
Benzo(b,c)perylene	NA					
Benzo(c,d)perylene	NA					
Benzo(d,e)perylene	NA					
Benzo(e,f)perylene	NA					
Benzo(f,g)perylene	NA					
Benzo(g,h)perylene	NA					
Benzo(h,i)perylene	NA					
Benzo(i,j)perylene	NA					
Benzo(j,k)perylene	NA					
Benzo(k,l)perylene	NA					
Benzo(l,m)perylene	NA					
Benzo(m,n)perylene	NA					
Benzo(n,o)perylene	NA					
Benzo(o,p)perylene	NA					

HI (sum)=	5.2E+02	1.7E+01	3.1E-01	538
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APPENDIX E
TABLE E5 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Contaminant	Max Conc. Surface Water (mg/L)	Plant UF - % Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF - % Diet	Est. Invert Conc. (mg/kg)	Fish UF - BAF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	210	NA	0		NA					100%	0		NA	0	(A+B+C+D+E) 0.0E+00
Antimony	0.037								20		0.42				0.0E+00
Arsenic	0.0005										0				1.2E-01
Beryllium	3.3										0				0.0E+00
Bismuth	0.0119										0				0.0E+00
Cadmium	0.0067										0				0.0E+00
Calcium	58								283		65.09				0.0E+00
Chromium	0.23										0				0.0E+00
Cobalt	0.12								290		30.74				6.5E+01
Copper	0.106										0				0.0E+00
Iron	220								45		13.14				3.1E+01
Lead	0.292										0				0.0E+00
Magnesium	13										0				1.3E+01
Manganese	11.8										0				0.0E+00
Mercury	0										0				0.0E+00
Nickel	0.11										0				0.0E+00
Phosphorus	17								307		33.77				0.0E+00
Selenium	0										0				3.4E+01
Silver	0								129		0				0.0E+00
Strontium	0.29										0				0.0E+00
Vanadium	0.48										0				0.0E+00
Zinc	3.3								966		3187.8				0.0E+00
4,4'-DDD	0								430000		0				0.0E+00
4,4'-DDE	0								553000		0				0.0E+00
4,4'-DDT	0								430000		0				0.0E+00
alpha BHC	0										0				0.0E+00
Aroclor 1254	0										0				0.0E+00
Heptachlor	0										0				0.0E+00
Heptachlor epoxide	0										0				0.0E+00
Lindane	0										0				0.0E+00
1,1,1-Trichloroethane	0										0				0.0E+00
2-Butanone	0										0				0.0E+00
4-Methylphenol	0										0				0.0E+00
Acenaphthylene	0										0				0.0E+00
Acetone	0										0				0.0E+00
Anthracene	0										0				0.0E+00
Benz(a)anthracene	0										0				0.0E+00
Benz(b)pyrene	0										0				0.0E+00
Benz(g)anthracene	0										0				0.0E+00
Benzophenylene	0										0				0.0E+00
Benzothiazole	0										0				0.0E+00
Benzotriazole	0										0				0.0E+00
Benzic acid	0										0				0.0E+00
Bis(2-ethylhexyl)phthalate	0										0				0.0E+00
Butylbenzyl phthalate	0										0				0.0E+00
Chlorobenzene	0										0				0.0E+00
Chloroform	0										0				0.0E+00
Chrysene	0										0				0.0E+00
Dibenz(a,h)anthracene	0										0				0.0E+00
Dibenz(b,h)anthracene	0										0				0.0E+00
Dibenz(k)anthracene	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzopyrene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0										0				0.0E+00
Dibenzofuran	0										0				0.0E+00
Dibenzophenylene	0										0				0.0E+00
Dibenzotriazole	0														

APPENDIX E
TABLE E6
OSPREY - HQ
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	30200	16000	2.0	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	9.60E+01	1.05E+01	0.00E+00	1.07E+02
Arsenic	20.1		0.037	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	1.83E-03	0.00E+00	1.83E-03
Baryum	16.8	17.6	0.006	1.2E-01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.04E-01	3.00E-03	2.52E-02	1.31E-01
Beryllium	2060	290	3.3	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.74E+00	1.63E-01	0.00E+00	1.91E+00
Calcium	0.921	1.38	0.0119	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.28E+03	5.93E-01	0.00E+00	8.88E+03
Cadmium	37.5		0.0067	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	3.35E-04	0.00E+00	3.35E-04
Chromium	26000	3200	38	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.93E+01	1.15E-01	1.37E+01	2.10E+01
Cobalt	131	49	0.233	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	7.44E+01	6.00E-03	0.00E+00	8.40E+01
Copper	275	51.8	0.12	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.11E+01	5.30E-03	6.46E+00	6.77E+00
Iron	120000	4000	0.308	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.98E+02	1.10E+01	0.00E+00	2.69E+02
Lead	10	37	0.06	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.24E-01	1.46E-02	0.00E+00	3.00E+00
Manganese	500	1100	13	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.89E+00	6.50E-01	0.00E+00	7.25E+00
Mercury	3740	640	11.8	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.00E+00	5.90E-01	0.00E+00	4.48E+00
Nickel	21		0.11	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	5.30E-03	0.00E+00	7.10E+00
Potassium	2590	1500	17	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	9.00E+00	8.50E-01	0.00E+00	9.83E+00
Selenium	2.91	7.79		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.67E+02	1.45E-02	0.00E+00	4.67E+02
Silver	8360	7	0.29	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	2.40E-02	0.00E+00	5.55E-02
Strontium	4180	86	0.48	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.58E+00	1.63E-01	6.69E+02	6.74E+02
Zinc	0.028	77	3.3	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
4,4'-DDD	0.012	0.015		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	9.00E-05	---	0.00E+00	9.00E-05
4,4'-DDE	0.01	0.69		0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
alpha BHC	0.54			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.14E-03	---	0.00E+00	4.14E-03
Aroclor 1254	0.0022			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Heptachlor epoxide	0.019			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Lindane	0.008			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
1,1,1-Trichloroethane	0.0144			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
2-Butoxane	0.0666			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
4-Methylphenol	0.18			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Acenaphthylene	0.27			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Acetone	0.41			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.1			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	4.5			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	1.3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	1.2			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.29			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.349			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.97			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.67			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.6			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.38			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.1			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.212			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	7.462			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.298			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.7			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	3			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	1.5			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.07			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.86			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.98			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2.8			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.005			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.0224			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.0997			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	2100			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	9.6			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.0036			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00
Benzofluoranthene	0.0024			0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	---	---	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E6 (continued)

HI (sum)=	6.3E+01	2.0E+00	1.4E-01	6.5E+01
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APPENDIX E

[illegible]

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

$$\text{Total EDI} = \text{EDI soil/sediment} + \text{EDI water} + \text{EDI food}$$

$\text{Total EDI} = \text{EDI}_{\text{soil}} + \text{EDI}_{\text{water}} + \text{EDI}_{\text{food}}$
 $\text{Hazard Quotient (HQ)} = \text{Total EDI} / \text{Reference Toxicity Value}$; sum of HQs, values boxed exceed 1.0

$\text{Total EDI} = \text{EDI}_{\text{soil}} + \text{EDI}_{\text{water}} + \text{EDI}_{\text{food}}$
 $\text{Hazard Quotient (HQ)} = \text{Total EDI} / \text{Reference Toxicity Value}$; sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E7
RIVER OTTER - HQ
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	39200	16000	210	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.68E+01	0.00E+00	1.68E+01
Antimony	20.1	0.037	0.006	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.96E+03	0.00E+00	2.96E+03
Arsenic	16.8	17.6	0.006	1.2E-01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.80E-01	2.46E+01	0.00E+00	2.46E+01
Barium	2060	290	3.3	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	9.32E+04	0.00E+00	9.32E+04
Beryllium	0.921	1.38	0.019	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	5.36E+04	0.00E+00	5.36E+04
Cadmium	37.5	3200	0.067	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	4.44E+00	0.00E+00	4.44E+00
Calcium	26000	3200	0.21	6.5E+01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.67E+01	0.00E+00	1.67E+01
Chromium	131	51.8	0.12	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.84E+02	0.00E+00	1.84E+02
Cobalt	275	13	0.106	3.1E+01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	9.60E-03	0.00E+00	9.60E-03
Copper	120000	43000	220	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.76E+01	0.00E+00	1.76E+01
Lead	210	37.3	0.292	1.3E+01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	3.18E+00	0.00E+00	3.18E+00
Magnesium	5080	1100	13	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	9.46E+02	0.00E+00	9.46E+02
Manganese	3740	649	11.8	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.34E+02	0.00E+00	2.34E+02
Mercury	0.56	0.11	0.11	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.04E+00	0.00E+00	1.04E+00
Nickel	21	1500	17	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	9.44E-01	0.00E+00	9.44E-01
Potassium	2590	7.79	0.086	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	8.80E-02	0.00E+00	8.80E-02
Selenium	2.91	7.79	0.086	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.35E+00	0.00E+00	1.35E+00
Silver	1.6	7	0.29	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.68E-01	0.00E+00	1.68E-01
Strontium	8360	86	0.48	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	4180	760	3.3	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	2.32E-02	0.00E+00	2.32E-02
Zinc	0.028	0.015	0.015	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	1.90E+01	0.00E+00	1.90E+01
4,4'-DDT	0.012	0.015	0.015	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	7.65E+02	0.00E+00	7.65E+02
4,4'-DDE	0.012	0.015	0.015	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
alpha BHC	0.01	0.69	0.69	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aroclor 1254	0.0022	0.019	0.019	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heptachlor epoxide	0.008	0.008	0.008	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lindane	0.0144	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,1,1-Trichloroethane	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Bromodibenzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaminophen	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetophenone	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthrone	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzofuran	0.0066	0.0066	0.0066	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.1					

APPENDIX E
TABLE E7 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	---	3.5E+01	3.5E+01	9.82
Antimony	0.031	0.0E+00	---	9.5E+02	9.5E+02	0.03
Arsenic	0.031	9.3E-01	1.2E+01	1.3E+02	1.3E+02	3.41
Barium	2.5	0.0E+00	---	1.1E+01	1.1E+01	0.03
Beryllium	NA	---	---	---	---	---
Bismuth	0.441	0.0E+00	---	1.2E+03	1.2E+03	0.00
Calcium	NA	---	---	---	---	---
Chromium	1.5	1.0E+01	7.1E-01	1.2E+02	1.1E+01	3.05
Cobalt	NA	---	---	---	---	---
Copper	7	1.1E+00	1.6E-01	1.2E+03	1.2E+00	0.33
Iron	NA	---	---	---	---	---
Lead	3.66	8.6E-01	---	6.4E+03	8.7E-01	0.24
Magnesium	NA	---	---	---	---	---
Manganese	40	0.0E+00	3.5E-01	2.4E+02	3.7E-01	0.10
Mercury	0.009	0.0E+00	---	---	0.0E+00	0.00
Nickel	18.29	4.4E-01	---	4.8E+04	4.4E-01	0.12
Potassium	NA	---	---	---	---	---
Selenium	0.091	0.0E+00	1.8E+00	---	1.8E+00	0.51
Silver	NA	---	---	---	---	---
Strontium	120	0.0E+00	1.3E-03	1.9E-04	1.5E-03	0.00
Vanadium	0.089	0.0E+00	2.1E+01	4.3E-01	2.1E+01	5.83
Zinc	73.2	1.0E+01	2.2E-01	3.6E+03	1.1E+01	2.92
4,4'-DDD	NA	---	---	---	---	---
4,4'-DDE	NA	0.0E+00	8.8E-04	---	8.8E-04	0.00
4,4'-DDT	0.37	0.0E+00	---	---	0.0E+00	0.00
alpha BHC	0.01	0.0E+00	1.8E-01	---	1.8E-01	0.05
Aroclor 1254	0.083	0.0E+00	---	---	0.0E+00	0.00
Heptachlor epoxide	0.059	0.0E+00	---	---	0.0E+00	0.00
Heptachlor	NA	0.0E+00	---	---	0.0E+00	0.00
1,1,1-Trichloroethane	257	0.0E+00	---	---	0.0E+00	0.00
2-Butoxene	NA	---	---	---	---	---
4-Methylphenol	NA	---	---	---	---	---
Acenaphthylene	NA	0.0E+00	---	0.0E+00	0.0E+00	0.00
Acetone	4.6	---	---	---	---	---
Anthracene	NA	---	---	---	---	---
Benzo(a)anthracene	NA	0.0E+00	---	0.0E+00	0.0E+00	0.00
Benzo(b)fluoranthene	0.25	---	---	---	---	---
Benzo(g)fluoranthene	NA	---	---	---	---	---
Benzo(k)fluoranthene	NA	---	---	---	---	---
Benzo(a)pyrene	NA	---	---	---	---	---
Benzo(e)pyrene	NA	---	---	---	---	---
Benzo(i)perylene	NA	---	---	---	---	---
Benzo(j)fluoranthene	NA	---	---	---	---	---
Benzo(l)anthracene	NA	---	---	---	---	---
Benzo(l)pyrene	NA	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	4.5	0.0E+00	---	0.0E+00	0.0E+00	0.00
Butylbenzyl phthalate	NA	---	---	---	---	---
Chlorobenzene	NA	---	---	---	---	---
Chloroform	6.9	0.0E+00	---	0.0E+00	0.0E+00	0.00
Chrysene	NA	---	---	---	---	---
Dibenz(a,h)anthracene	NA	---	---	---	---	---
Dichlorodihydrodithiane	NA	---	---	---	---	---
Diethylphthalate	11.94	0.0E+00	---	0.0E+00	0.0E+00	0.00
Di-n-butylphthalate	11.94	0.0E+00	---	0.0E+00	0.0E+00	0.00
Di-n-octylphthalate	NA	---	---	---	---	---
Fluoranthene	NA	---	---	---	---	---
HMX	NA	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	NA	---	---	---	---	---
Methylene chloride	2.7	0.0E+00	9.6E-05	---	9.6E-05	0.00
Naphthalene	NA	---	---	---	---	---
Phenanthrene	NA	---	---	---	---	---
Pyrene	NA	---	---	---	---	---
Tetrachloroethene	NA	---	---	---	---	---
Toluene	NA	0.0E+00	---	0.0E+00	0.0E+00	0.00
Triphenylamine	0.52	0.0E+00	---	0.0E+00	0.0E+00	0.00
Sodium	NA	---	---	---	---	---
m-Nitrotoluene	NA	---	---	---	---	---
Thallium	0.003	2.7E+02	---	6.4E-02	2.7E+02	73.57
HI (sum)=		2.9E+02	3.7E+01	3.6E+01	3.7E+02	

APPENDIX E

TABLE E7 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	NA																	(A+B+C+D+E)
	Max.Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF	% Diet	Est. Invert/ Conc (mg/kg)	100%	Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)		
Aluminum	310											0				0.0E+00		
Antimony	0.037											0				0.0E+00		
Arsenic	0.006										20	0.12				1.2E-01		
Boron	3.3											0				0.0E+00		
Cadmium	0.0119											0				0.0E+00		
Cadmium	0.0067											0				0.0E+00		
Cadmium	58										283	65.09				0.0E+00		
Chromium	0.23											0				0.0E+00		
Cobalt	0.12										290	30.74				3.0E-01		
Copper	0.106											0				0.0E+00		
Copper	220										45	13.14				1.3E+01		
Lead	0.292											0				0.0E+00		
Lead	1.3											0				0.0E+00		
Magnesium	11.8											0				0.0E+00		
Manganese	0											0				0.0E+00		
Mercury	0.11										307	33.77				3.4E+01		
Molybdenum	0.11											0				0.0E+00		
Potassium	17										129	0				0.0E+00		
Selenium	0											0				0.0E+00		
Silver	0											0				0.0E+00		
Strontium	0.29											0				0.0E+00		
Vanadium	0.48											0				0.0E+00		
Zinc	3.3										966	3187.8				3.4E+03		
4,4'-DDD	0										430000	0				0.0E+00		
4,4'-DDE	0										430000	0				0.0E+00		
4,4'-DDT	0										430000	0				0.0E+00		
Alpha BHC	0											0				0.0E+00		
Aroclor 1254	0											0				0.0E+00		
Heptachlor	0											0				0.0E+00		
Heptachlor epoxide	0											0				0.0E+00		
Lindane	0											0				0.0E+00		
2-Butanone	0											0				0.0E+00		
1,1,1-Trichloroethane	0											0				0.0E+00		
4-Methylphenol	0											0				0.0E+00		
Acetaminophylene	0											0				0.0E+00		
Acetone	0											0				0.0E+00		
Anthracene	0											0				0.0E+00		
Benzofluanthracene	0											0				0.0E+00		
Benzofluorene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00		
Benzofluoranthene	0											0				0.0E+00</		

$\text{Estimated Daily Intake (EDI)} = \text{Medium-specific concentration} \times \text{Ingestion Rate} \times \text{Fraction Ingested from contaminated source}$

$$\text{Total EDI} = \text{EDI soil/sediment} + \text{EDI water} + \text{EDI food}$$
$$\text{Total EDI} = \text{EDI soil} + \text{EDI water} + \text{EDI food}$$

$$\text{Hazard Quotient (HQ)} = \text{Total EDI} / \text{Reference Toxicity Value}$$

APPENDIX E
TABLE E8
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg)	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	39200	16000		210	0.037									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.40E+00	1.68E+01	0.00E+00	2.32E+01
Antimony	20.1	17.6		0.037	0.006									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	7.04E+03	2.96E+03	0.00E+00	2.96E+03
Arsenic	20.1	17.6		0.037	0.006									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	7.04E+03	2.96E+03	0.00E+00	2.96E+03
Barium	39200	16000		210	0.037									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.16E+01	4.80E+04	0.00E+00	8.72E+03
Bismuth	39200	16000		210	0.037									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	5.52E+04	9.52E+04	0.00E+00	1.90E+03
Boron	39200	16000		210	0.037									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.28E+00	5.36E+04	0.00E+00	5.36E+04
Calcium	20000	12000		38	0.23									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.96E+02	4.64E+00	0.00E+00	5.92E+00
Chromium	131	49		0.12	0.12									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	5.20E+03	1.84E+02	0.00E+00	6.89E+01
Cobalt	71.3	13		0.12	0.12									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.72E+01	8.48E+03	0.00E+00	3.37E+01
Copper	275	51.8		0.106	0.220									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.48E+02	1.76E+01	0.00E+00	3.47E+01
Iron	120000	43000		220	0.292									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	2.07E+02	9.60E+03	0.00E+00	1.48E+02
Lead	210	37.3		11.8	0.292									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.48E+02	1.76E+01	0.00E+00	3.47E+01
Manganese	39200	16000		210	0.037									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	1.48E+02	1.76E+01	0.00E+00	3.47E+01
Mercury	0.03	0.03		0.03	0.03									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	2.07E+02	9.60E+03	0.00E+00	1.48E+02
Nickel	21	649		0.11	0.11									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	2.07E+02	9.60E+03	0.00E+00	1.48E+02
Potassium	2590	1500		7.79	0.17									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+01	3.38E+01	0.00E+00	3.47E+01
Selenium	2.91	1.6		0.29	0.29									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	3.12E+03	0.00E+00	0.00E+00	1.96E+00
Silver	8360	7		0.48	0.48									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	2.80E+03	0.00E+00	0.00E+00	0.00E+00
Strontium	4180	760		3.3	3.3									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	3.44E+02	0.00E+00	0.00E+00	2.60E+02
Vanadium	0.0666	0.0666		0.18	0.18									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	3.44E+02	0.00E+00	0.00E+00	2.60E+02
4,4'-DDD	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDE	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDE	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.012	0.012		0.015	0.015									0	4.00E+02	80000	10000	10000	0.022	0.00E+00	6.00E+06	0.00E+00	0.00E+00	6.00E+06
4,4'-DDT	0.0																							

APPENDIX E

Constituent	KTY-Ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent Total (%)
Aluminum	0.478	0.0E+00	1.3E+01	3.5E+02	4.9E+01	77.99
Arsenic	0.031	0.0E+00		9.5E-02	9.5E-02	0.15
Boron	0.031	3.9E-02	2.3E-01	1.5E-02	2.8E-01	0.45
Cadmium	2.5	0.0E+00	4.6E-02	1.1E-01	1.5E-01	0.24
Peryllum	NA					
Adman	0.441	0.0E+00		1.2E-03	1.2E-03	0.00
Micrum	NA					
Chromium	1.5	4.3E-01	1.3E-02	1.3E-02	4.6E-01	0.74
Iron	NA					
Copper	7	4.4E-02	3.0E-03	1.2E-03	4.8E-02	0.08
Zinc	3.66	3.6E-02	4.1E-03	6.4E-03	4.6E-02	0.07
Magnesium	NA					
Manganese	40	0.0E+00	6.5E-03	2.4E-02	3.0E-02	0.05
Mercury	0.009	0.0E+00			0.0E+00	0.00
Nickel	18.29	1.8E-02		4.8E-04	1.9E-02	0.03
Potassium	0.091	0.0E+00	3.4E-02		3.4E-02	0.06
Silver	NA					
Strontium	120	0.0E+00	2.3E-05	1.9E-04	2.2E-04	0.00
Vanadium	0.089	4.0E-01	3.9E-01	8.2E-01	8.2E-01	1.31
Zinc	73.2	4.4E-01	4.2E-03	3.6E-03	4.4E-01	0.71
4,4'-DDD	NA					
4,4'-DDE	NA	0.0E+00	1.6E-05		1.6E-05	0.00
4,4'-DDT	0.017	0.0E+00			0.0E+00	0.00
Endrin	0.01	0.0E+00			0.0E+00	0.00
Heptachlor 1254	0.083	0.0E+00	3.3E-03		3.3E-03	0.01
Heptachlor epoxide	0.059	0.0E+00			0.0E+00	0.00
Indane	NA					
Lindane	3.66	0.0E+00			0.0E+00	0.00
1,1,1-Trichloroethane	257	0.0E+00			0.0E+00	0.00
n-Bitaneone	NA					
4-Methylphenol	NA					
p-Acetylphenol	NA					
Acetylphenyl fene	4.6	0.0E+00			0.0E+00	0.00
Anthrancene	NA					
Benzo(a)anthracene	NA					
Benzo(b)pyrene	0.25	0.0E+00			0.0E+00	0.00
Benzo(g,h,i)fluoranthene	NA					
Benzo(k)flurylene	NA					
Benzo(l)fluoranthene	NA					
Benzene acid	NA					
Benzo(e)pyrene	4.5	0.0E+00			0.0E+00	0.00
Butyleneglycol phthalate	NA					
Chlorobenzene	NA					
Chloroform	6.9	0.0E+00			0.0E+00	0.00
Chrysene	NA					
Dibenzodihydroanthracene	NA					
Dichlorodifluoromethane	NA					
Dioxyphthalate	1134	0.0E+00			0.0E+00	0.00
Dip-nonylphthalate	NA	0.0E+00			0.0E+00	0.00
Diphenylphthalate	NA					
Fluoranthene	NA					
HMX	NA					
Indanol(1,3-epipyrene	NA					
Methylene chloride	2.7	0.0E+00	1.8E-06		1.8E-06	0.00
Naphthalene	NA					
Phenanthrene	NA					
Pyrene	NA					
Tetrahydrofuran	NA					
Xylenes	6.4	0.0E+00			0.0E+00	0.00
Sodium	0.52	0.0E+00			0.0E+00	0.00
m-Nitroloene	NA					
Thallium	0.003	1.1E+01		6.4E+02	1.1E+01	18.10

1.2E+01	1.4E+01	3.6E+01	6.2E+01
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APPENDIX E

[illegible]

APPENDIX E
TABLE E9
BELTED KINGFISHER - HQ's
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11100	9200	11	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E+03	0.00E+00	4.61E+02
Arsenic	6.53	14.2	0.013	2.6E-01	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.43E-03	4.55E-01	1.17E+00
Barium	140	310	0.29	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	3.19E-02	0.00E+00	1.55E+01
Beryllium	0.566	2.66	0.0014	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.33E-01	0.00E+00	1.33E-01
Bismuth	4400	5500	15	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.65E+00	0.00E+00	2.77E+02
Chromium	38	59	0.01	2.8E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	2.95E+00	0.00E+00	7.90E+02
Cobalt	13	31	0.04	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.55E+00	0.00E+00	1.55E+00
Copper	11.4	24.2	0.044	1.3E+01	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E+00	2.23E+01	2.35E+01
Iron	35000	40000	12	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	2.00E+03	0.00E+00	2.00E+03
Lead	31.4	71.7	0.069	3.1E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	7.99E-03	5.43E+00	9.03E+00
Magnesium	990	5000	1.2	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	2.90E+02	0.00E+00	2.90E+02
Manganese	562	1120	0.029	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	5.06E+01	0.00E+00	5.06E+01
Nickel	10	37	0.0029	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.85E+00	0.00E+00	1.85E+00
Potassium	1000	2900	3.44	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.45E+02	0.00E+00	1.45E+02
Selenium	2.92	3.44	0.08	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.72E-01	0.00E+00	1.72E-01
Strontium	12	82	0.0073	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	4.10E+00	0.00E+00	4.11E+00
Vanadium	60	71	0.47	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	3.55E+00	0.00E+00	3.55E+00
Zinc	0.018	570	0.0027	4.5E+02	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	2.85E+01	7.95E+02	8.23E+02
4,4'-DDD	0.043	0.003	0.0029	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.35E-04	0.00E+00	1.35E-04
4,4'-DDE	0.041	0.003	0.0029	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.50E-04	0.00E+00	1.50E-04
4,4'-DDT	0.021	0.011	0.0073	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	5.80E-04	0.00E+00	5.80E-04
Acetone	0.0361	0.43	0.0073	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	8.03E-04	0.00E+00	8.03E-04
Perchlorate	0.388	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.32E-03	0.00E+00	1.32E-03
Benzoic acid	0.421	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	4.62E-02	0.00E+00	4.62E-02
Butylbenzyl phthalate	1.206	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Trichloroethylene	0.0059	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	9.90E-01	0.00E+00	9.90E-01
Cadmium	0.0059	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	3.63E-04	0.00E+00	3.63E-04
Cyanide	0.9479	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Sodium	900	0.115	0.0033	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	5.75E-03	0.00E+00	5.75E-03
cis-1,2-Dichloroethylene	0.0024	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Methyl ethyl ketone	0.0057	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Isobutylene chloride	0.014	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
p-cymene	0.014	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
2,6-dinitrotoluene	0.054	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Antimony	0.0017	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03
Thallium	0.0017	0.0033	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.00E+00	1.21E-03	0.00E+00	1.21E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs; values boxed exceed 1.0

APPENDIX E
TABLE E9 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Contaminant	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	4.2E+00	1.1E-02	4.2E+00	5.29
Arsenic	2.5	1.8E-01	2.8E-01	5.7E-04	4.7E-01	0.59
Boron	20.8	0.0E+00	7.5E-01	1.5E-03	7.5E-01	0.94
Beryllium	NA	---	---	---	---	---
Calcium	NA	---	---	---	---	---
Chromium	1	5.0E+00	3.0E+00	1.1E-03	7.9E+00	9.94
Cobalt	NA	---	---	---	---	---
Copper	47	4.8E-01	2.6E-02	1.0E-04	5.0E-01	0.63
Iron	1.13	4.8E+00	3.2E+00	6.7E-03	8.0E+00	10.05
Magnesium	NA	---	---	---	---	---
Manganese	997	0.0E+00	5.6E-02	1.3E-04	5.6E-02	0.07
Nickel	77.4	0.0E+00	2.4E-02	---	2.4E-02	0.03
Potassium	NA	---	---	---	---	---
Selenium	0.4	0.0E+00	4.3E-01	---	4.3E-01	0.54
Strontium	NA	---	---	---	---	---
Vanadium	11.4	0.0E+00	3.1E-01	---	3.1E-01	0.39
Zinc	14.5	5.5E+01	2.0E+00	3.6E-03	5.7E+01	71.42
4,4'-DDD	NA	---	---	---	---	---
4,4'-DDE	NA	---	---	---	---	---
4,4'-DDT	0.003	0.0E+00	5.0E-02	---	5.0E-02	0.06
Acetone	NA	---	---	---	---	---
Perchlorate	NA	---	---	---	---	---
Anchor 1254	0.18	0.0E+00	---	---	---	---
Benzoic acid	NA	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	1.1	0.0E+00	---	7.3E-04	7.3E-04	0.00
Bis(2-ethylhexyl)phthalate	NA	---	---	---	---	---
Trichloroethene	1.45	0.0E+00	3.2E-02	---	3.2E-02	0.04
Cadmium	NA	---	---	---	---	---
Cyanide	NA	---	---	---	---	---
Sodium	NA	---	---	---	---	---
cis-1,2-Dichloroethylene	NA	---	---	---	---	---
Methyl ethyl ketone	NA	---	---	---	---	---
methylene chloride	NA	---	---	---	---	---
p-xylene	NA	---	---	---	---	---
2,6-dinitrotoluene	NA	---	---	---	---	---
Antimony	NA	---	---	---	---	---
Thallium	NA	---	---	---	---	---

HI (sum) = 6.5E+01 1.4E+01 2.5E-02 79

APPENDIX E
TABLE E9 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (or intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish UF BAF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	11	NA	0		NA		NA			100%			NA		(A+B+C+D+E)
Arsenic	0.013								20		0.26				0.0E+00
Benzene	0.29										0				2.0E-01
Beryllium	0.0014										0				0.0E+00
Calcium	15								283		2.83				0.0E+00
Chromium	0.01										0				2.0E+00
Cobalt	0								290		12.76				0.0E+00
Copper	0.044								45		3.105				1.3E+01
Iron	12										0				0.0E+00
Lead	0.069										0				3.1E+00
Magnesium	0										0				0.0E+00
Manganese	1.2								307		0				0.0E+00
Nickel	0										0				0.0E+00
Potassium	0								129		0				0.0E+00
Selenium	0.08										0				0.0E+00
Strontium	0										0				0.0E+00
Vanadium	0										0				0.0E+00
Zinc	0.47								966		454.02				4.5E+02
4,4'-DDD	0								430000		0				0.0E+00
4,4'-DDE	0								553000		0				0.0E+00
4,4'-DDT	0								430000		0				0.0E+00
Acetone	0.0029								0.4		0.0016				1.2E-03
Perchlorate	0										0				0.0E+00
Anchlor 1254	0										0				0.0E+00
Benzoic acid	0										0				0.0E+00
Bis(2-ethylhexyl)phthalate	0.0073										0				0.0E+00
Butylbenzyl phthalate	0								41.6		0.4992				5.0E-01
Trichloroethene	0.012										0				0.0E+00
Cadmium	0										0				0.0E+00
Cyanide	0.011										0				0.0E+00
Sodium	9								18.9		0.06237				0.0E+00
cis-1,2-Dichloroethylene	0.0033										0				6.2E-02
Methyl ethyl ketone	0										0				0.0E+00
methylene chloride	0										0				0.0E+00
p-xylene	0										0				0.0E+00
2,6-dinitrotoluene	0.011								5.92		0.06512				6.5E-02
Antimony	0.054										0				0.0E+00
Thallium	0.0017								1400		2.36				2.4E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value - Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E10
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11,100	9200	11	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.50E-01	0.00E+00	5.50E-01
Arsenic	6.53	14.2	0.013	2.8E-01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.50E-02	0.00E+00	6.50E-02
Barium	140	310	0.29	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.45E-02	0.00E+00	1.45E-02
Beryllium	0.866	2.66	0.0014	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	7.00E-05	0.00E+00	7.00E-05
Chromium	4400	5500	15	2.8E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.30E-01	0.00E+00	3.30E-01
Chromium	38	59	0.01	2.8E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.00E-04	0.00E+00	5.00E-04
Cobalt	13	31	0.04	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.86E-01	0.00E+00	1.86E-01
Copper	11.4	24.2	0.044	1.3E+01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.20E-03	0.00E+00	2.20E-03
Lead	35600	40000	12	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.00E-01	0.00E+00	6.00E-01
Magnesium	990	5000	0.069	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.45E-03	0.00E+00	3.45E-03
Manganese	562	1120	1.2	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.00E-02	0.00E+00	6.00E-02
Nickel	10	37	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.72E+00	0.00E+00	6.72E+00
Potassium	1000	2900	0.08	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.00E+01	0.00E+00	3.00E+01
Selenium	2.92	3.44	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.22E-01	0.00E+00	2.22E-01
Selenium	12	82	0.08	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.06E-02	0.00E+00	2.06E-02
Selenium	60	71	0.47	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.26E-01	0.00E+00	4.26E-01
Zinc	38	570	0.0027	4.5E+02	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.42E+00	0.00E+00	3.42E+00
4,4-DDD	0.018	0.0027	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.62E-05	0.00E+00	1.62E-05
4,4-DDD	0.043	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.80E-05	0.00E+00	1.80E-05
4,4-DDT	0.041	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.45E-04	0.00E+00	1.45E-04
Acetone	0.021	0.011	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.60E-05	0.00E+00	6.60E-05
Perchlorate	0.0361	0.011	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzoic acid	0.43	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	0.421	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Butylbenzyl phthalate	1.206	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethene	0.0059	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cyanide	0.023	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sodium	0.9479	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dichloroethylene	0.115	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl ethyl ketone	0.0024	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylene chloride	0.0057	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
p-cymene	0.014	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,6-dinitrotoluene	0.011	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Anthracene	0.054	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	0.0017	0.003	0.0029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E10 (continued)
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	5.0E-01	5.0E-03	5.1E-01	5.32
Arsenic	2.5	2.2E-02	3.4E-02	2.6E-04	5.6E-02	0.59
Barium	20.8	0.0E+00	8.9E-02	7.0E-04	9.0E-02	0.94
Beryllium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	1	5.9E-01	3.5E-01	5.0E-04	9.5E-01	9.94
Cobalt	NA	NA	NA	NA	NA	NA
Copper	47	5.7E-02	3.1E-03	4.7E-05	6.0E-02	0.63
Iron	NA	NA	NA	NA	NA	NA
Lead	1.13	5.8E-01	3.8E-01	3.1E-03	9.6E-01	10.06
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	997	0.0E+00	6.7E-03	6.0E-05	6.8E-03	0.07
Nickel	77.4	0.0E+00	2.9E-03	NA	2.9E-03	0.03
Potassium	NA	NA	NA	NA	NA	NA
Selenium	0.4	0.0E+00	5.2E-02	NA	5.2E-02	0.54
Strontium	NA	NA	NA	NA	NA	NA
Vanadium	11.4	0.0E+00	3.7E-02	NA	3.7E-02	0.39
Zinc	14.5	6.6E+00	2.4E-01	1.6E-03	6.8E+00	71.37
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	0.003	0.0E+00	6.0E-03	NA	6.0E-03	0.06
Acetone	NA	NA	NA	NA	NA	NA
Perchlorate	NA	NA	NA	NA	NA	NA
Aroclor 1254	0.18	0.0E+00	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	1.1	0.0E+00	NA	3.3E-04	3.3E-04	0.00
Butylbenzyl phthalate	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA
Cadmium	1.45	0.0E+00	3.8E-03	NA	3.8E-03	0.04
Cyanide	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	NA	NA	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA
p-xylene	NA	NA	NA	NA	NA	NA
2,6-dinitrotoluene	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA

HI (sum) = 7.8E+00 1.7E+00 1.2E-02 9.5E+00

APPENDIX E
TABLE E10 (continued)
OSPREY - Uplake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
		NA	NA	(A)		NA	(B)	NA	NA	(C)	100%	(D)	(E)		NA	(F)	(A+B+C+D+E)
Aluminum	11																0.0E+00
Arsenic	0.013										20		0.28				2.8E-01
Barium	0.29												0				0.0E+00
Beryllium	0.0014												0				0.0E+00
Calcium	15										283		2.83				2.8E+00
Chromium	0.01												0				0.0E+00
Cobalt	0										290		12.76				1.3E+01
Copper	0.044										45		3.105				3.1E+00
Iron	12												0				0.0E+00
Lead	0.069												0				0.0E+00
Magnesium	1.2										307		0				0.0E+00
Manganese	0										129		0				0.0E+00
Nickel	0												0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0.08												0				0.0E+00
Strontium	0												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.47										966		454.02				4.5E+02
4,4'-DDD	0										430000		0				0.0E+00
4,4'-DDE	0										553000		0				0.0E+00
4,4'-DDT	0										430000		0				0.0E+00
Acetone	0.0029										0.4		0.00116				1.2E-03
Perchlorate	0												0				0.0E+00
Androl 1254	0												0				0.0E+00
Benzoic acid	0.0073												0				0.0E+00
But(2-ethylhexyl)phthalate	0												0				0.0E+00
Butylhexyl phthalate	0.012										41.6		0.4892				5.0E-01
Trichloroethene	0												0				0.0E+00
Cadmium	0.011												0				0.0E+00
Cyanide	0												0				0.0E+00
Sodium	0.0033										18.9		0.06237				6.2E-02
cis-1,2-Dichloroethylene	0												0				0.0E+00
Methyl ethyl ketone	0												0				0.0E+00
methylene chloride	0												0				0.0E+00
p-xylene	0												0				0.0E+00
2,6-Dinitrotoluene	0.011										5.92		0.06512				6.5E-02
Antimony	0.054										1400		2.38				2.4E+00
Thallium	0.0017												0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E11
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11100	9200	11	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	---	8.00E-01	0.0E+00	8.00E-01
Arsenic	6.53	14.2	0.013	2.6E-01	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	3.07E-01	1.04E-03	6.24E-02	3.70E-01
Barium	140	310	0.29	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	---	2.12E-02	0.0E+00	2.12E-02
Beryllium	0.966	2.66	0.0014	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	5.75E-02	1.12E-04	0.0E+00	5.76E-02
Calcium	4400	5500	15	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.19E+02	1.20E+00	0.0E+00	1.20E+02
Chromium	38	59	0.01	2.8E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.27E+00	8.00E-04	6.79E-01	1.95E+00
Cobalt	13	31	0.044	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	6.70E-01	3.32E-03	0.0E+00	6.70E-01
Copper	11.4	24.2	0.044	1.3E+01	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	5.23E-01	9.60E-01	3.06E+00	3.99E+00
Iron	35600	40000	12	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	8.64E+02	5.32E-03	0.0E+00	8.65E+02
Lead	31.4	71.7	0.069	3.1E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.08E+02	9.60E-02	0.0E+00	1.08E+02
Magnesium	990	5000	12	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	2.42E+01	0.0E+00	0.0E+00	2.43E+01
Manganese	1120	37	1.2	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	7.99E+01	0.0E+00	0.0E+00	7.99E+01
Nickel	1000	2900	0.0029	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	6.26E+01	0.0E+00	0.0E+00	6.26E+01
Potassium	2.92	3.44	0.08	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	7.43E-02	6.40E-03	0.0E+00	7.43E-02
Selenium	12	82	0.0029	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.77E+00	0.0E+00	0.0E+00	1.78E+00
Strontium	60	71	0.47	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.53E+00	0.0E+00	0.0E+00	1.53E+00
Zinc	38	570	0.017	4.5E+02	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.23E+01	3.76E-02	1.09E+02	1.21E+02
4,4'-DDD	0.018	0.0027	0.0029	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	5.83E-05	0.0E+00	0.0E+00	5.83E-05
4,4'-DDE	0.043	0.003	0.0029	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	6.48E-05	0.0E+00	0.0E+00	6.48E-05
4,4'-DDT	0.041	0.011	0.0029	1.2E-03	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	2.38E-04	2.32E-04	2.78E-04	7.48E-04
Aroclor 1248	0.0361	0.011	0.0029	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	2.38E-04	2.32E-04	2.78E-04	7.48E-04
Benzoic acid	0.43	0.0073	0.0073	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Bis(2-ethylhexyl)phthalate	0.388	0.421	0.0073	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	0.0E+00	5.14E-04	0.0E+00	5.14E-04
Bisphenol A	0.421	0.421	0.0073	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Bisphenol Z	1.206	0.0059	0.0059	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cadmium	0.0059	0.0033	0.0033	5.0E-01	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	7.13E-04	9.60E-04	1.20E-01	1.21E-01
Cyanide	0.923	0.9479	0.011	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.99E-02	0.0E+00	0.0E+00	1.99E-02
Sodium	900	0.115	0.0033	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	2.05E-02	8.80E-04	0.0E+00	2.14E-02
1,2-Dichloroethylene	0.115	0.0033	0.0033	6.2E-02	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	2.48E-03	2.64E-04	1.59E-02	1.77E-01
Methyl ethyl ketone	0.0034	0.0057	0.0033	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	5.18E-05	0.0E+00	0.0E+00	5.18E-05
Methylene chloride	0.0057	0.014	0.0033	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.23E-04	0.0E+00	0.0E+00	1.23E-04
p-xylene	0.014	0.014	0.0033	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	3.02E-04	0.0E+00	0.0E+00	3.02E-04
2,4-dinitrobenzene	0.054	0.0017	0.0017	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	1.56E-02	8.80E-04	1.56E-02	1.65E-02
Axiphenyl	0.0017	0.0017	0.0017	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	4.32E-03	0.0E+00	0.0E+00	4.32E-03
Thallium	0.0017	0.0017	0.0017	0.0E+00	0.0E+00	2.16E+04	8.00E+04	1	0.0E+00	5.71E-01	1.36E-04	5.71E-01	5.71E-01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil + sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E11 (continued)
RIVER OTTER - HOS
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	PTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	9.9E+00	1.8E+00	1.8E+00	0.81
Arsenic	0.031	2.0E+00	9.9E+00	3.4E+02	1.2E+01	5.25
Barium	2.5	0.0E+00	9.9E+00	9.3E+03	9.3E+03	0.00
Beryllium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	1.5	4.5E-01	8.5E-01	5.3E-04	1.3E+00	0.57
Cobalt	NA	NA	NA	NA	NA	NA
Copper	7	4.4E-01	7.5E-02	5.0E-04	5.1E-01	0.23
Iron	NA	NA	NA	NA	NA	NA
Lead	3.66	2.0E-01	NA	1.5E-03	2.1E-01	0.09
Magnesium	NA	0.0E+00	6.0E-01	2.4E-03	6.1E-01	0.27
Manganese	40	0.0E+00	4.4E-02	NA	4.4E-02	0.02
Nickel	18.29	0.0E+00	NA	NA	NA	NA
Potassium	NA	0.0E+00	8.2E-01	NA	8.2E-01	0.36
Selenium	0.091	0.0E+00	1.5E-02	5.3E-05	1.5E-02	0.01
Strontium	120	0.0E+00	1.7E+01	NA	1.7E+01	7.57
Vanadium	0.089	1.5E+00	1.7E-01	5.1E-04	1.7E+00	0.73
Zinc	73.2	NA	NA	NA	NA	NA
4,4'-DDD	NA	0.0E+00	NA	NA	NA	NA
4,4'-DDE	NA	0.0E+00	1.8E-04	1.8E-04	1.8E-04	0.00
4,4'-DDT	0.37	6.1E-05	5.2E-05	5.0E-05	1.6E-04	0.00
Acetone	4.6	NA	NA	NA	NA	NA
Perchlorate	0.083	0.0E+00	NA	NA	0.0E+00	0.00
Anchlor 1254	NA	0.0E+00	NA	1.3E-04	1.3E-04	0.00
Benzoic acid	4.5	0.0E+00	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA
Butylbenzyl phthalate	0.173	6.9E-01	4.1E-03	5.5E-03	7.0E-01	0.31
Trichloroethene	0.441	0.0E+00	4.5E-02	4.5E-02	4.5E-02	0.02
Cadmium	29.5	0.0E+00	6.9E-04	3.0E-05	7.2E-04	0.00
Cyanide	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethylene	NA	0.0E+00	6.4E-08	NA	6.4E-08	0.00
Methyl ethyl ketone	810	0.0E+00	4.6E-05	NA	4.6E-05	0.00
methylene chloride	2.7	0.0E+00	NA	NA	NA	NA
p-cymene	NA	NA	NA	NA	NA	NA
2,6-dinitrotoluene	0.031	0.0E+00	NA	1.4E-01	1.4E-01	0.06
Antimony	0.003	1.9E+02	NA	4.5E-02	1.9E+02	83.71
Thallium	NA	NA	NA	NA	NA	NA

HI (sum)= 2.0E+02 3.0E+01 2.1E+00 2.3E+02

APPENDIX E
TABLE E11 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc Surface Water (mg/L)	Plant UF % Diet	Est Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est Worm Conc (mg/kg)	Invert UF % Diet	Est Invert Conc (mg/kg)	Fish UF % Diet	Est Fish Conc (mg/kg)	Mammal UF % Diet	Est Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)	100%	(D)	NA	(E)	(A+B+C+D+E)
Aluminum	11								20	0			0.0E+00
Arsenic	0.013									0.28			2.8E-01
Barium	0.29									0			0.0E+00
Beryllium	0.0014									0			0.0E+00
Calcium	15								283	2.83			2.8E+00
Chromium	0.01									0			0.0E+00
Cobalt	0								290	12.76			1.3E+01
Copper	0.044								45	3.105			3.1E+00
Iron	12									0			0.0E+00
Lead	0.069									0			0.0E+00
Magnesium	1.2								307	0			0.0E+00
Manganese	0								129	0			0.0E+00
Nickel	0									0			0.0E+00
Potassium	0									0			0.0E+00
Selenium	0.08									0			0.0E+00
Strontium	0									0			0.0E+00
Vanadium	0									0			0.0E+00
Zinc	0.47								966	454.02			4.5E+02
4,4'-DDD	0								430000	0			0.0E+00
4,4'-DDE	0								553000	0			0.0E+00
4,4'-DDT	0								430000	0			0.0E+00
Acetone	0.0029								0.4	0.00116			1.2E-03
Perchlorate	0									0			0.0E+00
Aroclor 1254	0									0			0.0E+00
Benzoic acid	0									0			0.0E+00
Bis(2-ethylhexyl)phthalate	0.0073									0			0.0E+00
Butylbenzyl phthalate	0								41.6	0.4992			5.0E-01
Trichloroethene	0.012									0			0.0E+00
Cadmium	0									0			0.0E+00
Cyanide	0.011									0			0.0E+00
Sodium	9								18.9	0.06237			0.0E+00
cis-1,2-Dichloroethylene	0.0033									0			0.0E+00
Methyl ethyl ketone	0									0			0.0E+00
methylene chloride	0									0			0.0E+00
p-xylene	0									0			0.0E+00
2,6-dinitrotoluene	0.011								5.92	0.06512			6.5E-02
Antimony	0.054									0			0.0E+00
Thallium	0.0017								1400	2.38			2.4E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E12
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11100	9200	11	0.013	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.68E+00	8.80E-01	0.00E+00	4.56E+00
Arsenic	6.53	14.2	0.013	0.013	0.0E+01	0	4.00E+02	80000	10000	0.022	1	0.00E+00	5.68E-03	1.04E-03	2.60E-03	9.32E-03
Barium	140	310	0.29	0.029	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.24E-01	2.32E-02	0.00E+00	1.47E-01
Beryllium	0.966	2.66	0.0014	0.0014	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.06E-03	1.17E-04	0.00E+00	1.18E-03
Cadmium	4400	5500	15	0.015	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	2.20E+00	1.20E+00	0.00E+00	3.40E+00
Chromium	38	59	0.01	0.01	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	2.36E-02	8.00E-04	2.83E-02	5.27E-02
Cobalt	13	31	0.044	0.044	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.24E-02	3.52E-03	0.00E+00	1.24E-02
Copper	24.2	40000	12	0.012	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	9.68E-03	9.60E-01	0.00E+00	1.41E-01
Iron	35600	71.7	0.069	0.069	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.60E+01	5.52E-03	0.00E+00	1.70E+01
Lead	990	5000	1.2	0.012	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	2.00E+00	9.60E-02	0.00E+00	6.33E-02
Magnesium	1120	562	1.2	0.012	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.48E-01	9.60E-02	0.00E+00	5.44E-01
Manganese	10	37	0.0027	0.0027	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.16E+00	1.48E-02	0.00E+00	1.16E+00
Potassium	2900	3.44	0.08	0.008	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.38E-03	6.40E-03	0.00E+00	1.38E-03
Selenium	12	82	0.47	0.047	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.28E-02	3.76E-02	0.00E+00	3.92E-02
Strontium	60	71	0.0027	0.0027	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	2.84E-02	3.76E-02	0.00E+00	2.84E-02
Vanadium	38	570	0.0027	0.0027	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.08E-06	3.76E-02	0.00E+00	4.81E+00
Zinc	0.018	0.043	0.0029	0.0029	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.20E-06	2.32E-04	0.00E+00	1.20E-06
4,4'-DDD	0.043	0.043	0.0029	0.0029	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.20E-06	2.32E-04	0.00E+00	1.20E-06
4,4'-DDE	0.043	0.043	0.0029	0.0029	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.20E-06	2.32E-04	0.00E+00	1.20E-06
Acetone	0.0361	0.011	0.0073	0.0073	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	4.40E-06	5.84E-04	0.00E+00	0.00E+00
Benzoic acid	0.43	0.388	0.0073	0.0073	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.20E-06	5.84E-04	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	0.421	0.421	0.0073	0.0073	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.20E-06	5.84E-04	0.00E+00	0.00E+00
Trichloroethylene	1.206	0.0059	0.012	0.012	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	1.32E-05	9.60E-04	0.00E+00	0.00E+00
Cadmium	0.923	0.923	0.011	0.011	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	5.97E-03
Cyanide	900	900	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	3.69E-04
cis-1,2-Dichloroethylene	0.115	0.115	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
Methyl ethyl ketone	0.0024	0.0024	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
methylene chloride	0.0057	0.0057	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
p-cymene	0.014	0.014	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
2,6-dinitrotoluene	0.054	0.054	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
Antimony	0.0017	0.0017	0.0033	0.0033	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03
Thallium	2.4E+00	2.4E+00	0.0017	0.0017	0.0E+00	0	4.00E+02	80000	10000	0.022	1	0.00E+00	3.79E-04	8.80E-04	0.00E+00	1.26E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E12 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	7.7E+00	1.8E+00	9.5E+00	51.45
Arsenic	0.031	8.4E-02	1.8E-01	3.4E-02	3.0E-01	1.62
Barium	2.5	0.0E+00	5.0E-02	9.3E-03	5.9E-02	0.32
Beryllium	NA	NA	NA	NA	NA	NA
Calcium	NA	1.9E-02	1.6E-02	5.3E-04	3.5E-02	0.19
Chromium	1.5	1.8E-02	1.4E-03	5.0E-04	2.0E-02	0.11
Cobalt	7	8.5E-03	7.8E-03	1.5E-03	1.8E-02	0.10
Copper	NA	0.0E+00	1.1E-02	2.4E-03	1.4E-02	0.07
Iron	3.66	0.0E+00	8.1E-04	NA	8.1E-04	0.00
Magnesium	NA	0.0E+00	1.5E-02	NA	1.5E-02	0.08
Manganese	40	0.0E+00	2.7E-04	5.3E-05	3.3E-04	0.00
Nickel	18.29	0.0E+00	3.2E-01	3.2E-01	3.2E-01	1.72
Potassium	NA	6.2E-02	3.1E-03	5.1E-04	6.6E-02	0.35
Selenium	0.091	0.0E+00	NA	NA	NA	NA
Strontium	120	0.0E+00	3.2E-06	NA	3.2E-06	0.00
Vanadium	0.089	2.5E-06	9.6E-07	5.0E-05	5.4E-05	0.00
Zinc	73.2	0.0E+00	NA	NA	0.0E+00	0.00
4,4'-DDD	NA	0.0E+00	NA	1.3E-04	1.3E-04	0.00
4,4'-DDE	0.37	0.0E+00	3.2E-06	NA	3.2E-06	0.00
4,4'-DDT	4.6	2.5E-06	9.6E-07	5.0E-05	5.4E-05	0.00
Acetone	NA	0.0E+00	NA	NA	0.0E+00	0.00
Perchlorate	0.083	0.0E+00	NA	NA	0.0E+00	0.00
Anclor 1254	NA	0.0E+00	NA	1.3E-04	1.3E-04	0.00
Benzoic acid	4.5	0.0E+00	NA	NA	NA	NA
Big(2-ethylhexyl)phthalate	NA	2.9E-02	7.6E-05	5.5E-03	3.4E-02	0.19
Butylbenzyl phthalate	0.173	0.0E+00	8.4E-04	NA	8.4E-04	0.00
Trichloroethene	0.441	0.0E+00	1.3E-05	3.0E-05	4.3E-05	0.00
Cadmium	29.5	0.0E+00	NA	NA	NA	NA
Cyanide	NA	0.0E+00	NA	NA	NA	NA
Sodium	NA	0.0E+00	1.2E-09	NA	1.2E-09	0.00
cis-1,2-Dichloroethylene	8.10	0.0E+00	8.4E-07	NA	8.4E-07	0.00
Methyl isobutyl ketone	2.7	0.0E+00	NA	NA	NA	NA
methylene chloride	NA	0.0E+00	NA	NA	NA	NA
p-xylene	NA	0.0E+00	NA	NA	NA	NA
2,4-dinitrotoluene	0.031	0.0E+00	NA	1.4E-01	1.4E-01	0.75
Antimony	0.003	7.9E+00	NA	4.5E-02	8.0E+00	43.03
Thallium	NA	NA	NA	NA	NA	NA

8.2E+00 8.3E+00 2.1E+00 1.9E+01

APPENDIX E
TABLE E12 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant U/F % Diet	Est. Plant Conc. (mg/kg)	Worm U/F (or Intercept)	% Diet	Est. Worm Conc. (mg/kg)	Invert U/F % Diet	Est. Invert Conc. (mg/kg)	Fish U/F % Diet	Est. Fish Conc. (mg/kg)	Mammal U/F % Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)	100%	(D)	NA	(E)	(A+B+C+D+E)
Aluminum	11								20	0.28			0.0E+00
Arsenic	0.013									0			2.6E-01
Barium	0.29									0			0.0E+00
Beryllium	0.0014									0			0.0E+00
Calcium	15								283	2.83			0.0E+00
Chromium	0.01									0			2.8E+00
Cobalt	0								290	12.78			0.0E+00
Copper	0.044								45	3.105			1.3E+01
Iron	12									0			0.0E+00
Lead	0.069									0			3.1E+00
Magnesium	0									0			0.0E+00
Manganese	1.2								307	0			0.0E+00
Nickel	0									0			0.0E+00
Potassium	0								129	0			0.0E+00
Selenium	0.08									0			0.0E+00
Strontium	0									0			0.0E+00
Tantalum	0									0			0.0E+00
Zinc	0.47								986	454.02			4.5E+02
4,4'-DDD	0								430000	0			0.0E+00
4,4'-DDE	0								553000	0			0.0E+00
4,4'-DDT	0								430000	0			0.0E+00
Acetone	0.0029								0.4	0.00186			1.2E-03
Perchlorate	0									0			0.0E+00
Andor 1254	0									0			0.0E+00
Benzoic acid	0									0			0.0E+00
Bis(2-ethylhexyl)phthalate	0.0073									0			0.0E+00
Butylbenzyl phthalate	0								41.6	0.4992			5.0E-01
Trichloroethene	0.012									0			0.0E+00
Cadmium	0									0			0.0E+00
Cyanide	0.011									0			0.0E+00
Sodium	9								18.9	0.06237			0.0E+00
cis-1,2-Dichloroethylene	0.0033									0			6.2E-02
Methyl ethyl ketone	0									0			0.0E+00
methylene chloride	0									0			0.0E+00
p-cymene	0								5.92	0.06512			0.0E+00
2,6-dinitrotoluene	0.011									0			6.5E-02
Antimony	0.054									0			0.0E+00
Thallium	0.0017								1400	2.36			2.4E+00

APPENDIX E
TABLE E13
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sediment (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		11000	5.4	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	5.50E+02	5.94E-01	0.00E+00	5.51E+02
Antimony			0.069	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.91E-01	7.39E-03	0.00E+00	7.39E-03
Arsenic		310	0.017	3.4E-01	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	9.90E-01	1.91E-03	0.00E+00	9.90E-01
Barium		310	0.21	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	9.90E-01	2.31E-02	0.00E+00	9.90E-01
Beryllium		1.9	0.0007	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.15E+02	1.76E-05	0.00E+00	3.15E+02
Calcium		6300	16	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.15E+02	1.32E-03	0.00E+00	3.15E+02
Chromium		71	0.012	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.55E+00	5.94E-05	0.00E+00	5.94E-05
Cobalt		31	0.029	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.12E+00	3.19E-03	0.00E+00	3.19E-03
Copper		4000	29	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	4.86E+00	3.19E+00	0.00E+00	4.86E+00
Lead		97.2	0.052	2.3E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.80E+03	5.72E-03	0.00E+00	5.72E-03
Magnesium		6400	5.6	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	5.60E+01	6.16E-01	0.00E+00	5.60E+01
Manganese		1120	2.18	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.73E+02	2.40E-01	0.00E+00	2.73E+02
Mercury		0.35		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.43E+00	5.31E-01	0.00E+00	5.31E-01
Nickel		49	4.83	7.7E-01	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.45E+02	6.40E-04	0.00E+00	1.45E+02
Potassium		2900	5.08	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	4.10E+00	1.10E-03	0.00E+00	4.10E+00
Selenium		15	0.01	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.70E+00	5.83E-02	0.00E+00	2.70E+00
Silver		82	0.53	5.3E-02	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	7.00E+00	6.03E-02	0.00E+00	7.00E+00
Strontium		54		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	4.74E-02	1.13E+00	0.00E+00	4.74E-02
Zinc		140	0.55	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	4.74E-02	1.21E-03	0.00E+00	4.74E-02
Chloride		0.9479	0.03	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	2.29E-02	2.29E-02	0.00E+00	2.29E-02
Cyanide			0.008	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.90E+01	2.53E-03	0.00E+00	3.90E+01
Nitrate			0.023	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.90E+01	1.32E+00	0.00E+00	3.90E+01
Perchlorate			12	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.90E+01	3.52E+00	0.00E+00	3.52E+00
Phosphorus		780	32	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.60E-03	5.71E-01	0.00E+00	5.71E-01
Sulfate				0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	3.60E-03	5.71E-01	0.00E+00	5.71E-01
Thallium			0.0031	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	5.83E-02	5.83E-02	0.00E+00	5.83E-02
Acetone		0.072	5.34	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	5.28E-04	5.28E-04	0.00E+00	5.28E-04
Butyl-ethylphenylphthalate			0.0048	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Bromodichloromethane			0.0171	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Carbon Disulfide			0.014	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Chloroform			0.0096	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Dibromodichloromethane			0.0047	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Diethylphthalate			0.0014	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Heptachlorobenzene			0.0032	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Heptachlorobenzene			0.0022	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Toluene		0.0036	0.021	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Trichloroethene		0.0079	0.0075	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Vinyl chloride		0.0668	0.0147	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
2-Amino-4,6-Dinitroethane			0.011	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
4-Amino-2,6-Dinitroethane			0.011	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
2,4-Dinitroethane			0.013	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
2,6-Dinitroethane			0.0033	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
4-Nitroethane			0.0017	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
4-Nitroethane			0.0121	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
ROX			0.0412	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
2,4,6-Trinitroethane		0.039		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Aroclor 1254		0.0012		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
1,1-Dichloroethane		0.0412		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
4-Isopropylphenol		0.0085		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Naphthalene				0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03
Di-n-butyl phthalate		1.345		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1.750000	0.125	1	0.00E+00	1.88E-03	1.88E-03	0.00E+00	1.88E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil + EDI sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E13 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	5.0E+00	5.4E-03	5.0E+00	5.11
Antimony	NA	2.4E-01	1.2E-01	7.5E-04	3.6E-01	0.36
Arsenic	20.8	0.0E+00	7.5E-01	1.1E-03	7.5E-01	0.76
Barium	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA
Calcium	1	5.9E+00	3.6E+00	1.3E-03	9.5E+00	9.67
Chromium	47.4	3.1E-01	2.4E-02	6.8E-05	3.4E-01	0.34
Cobalt	NA	3.6E+00	4.3E+00	5.1E-03	7.9E+00	8.08
Copper	1.13	0.0E+00	5.6E-02	2.4E-04	5.6E-02	0.06
Lead	997	0.0E+00	4.6E+00	4.6E-02	4.6E+00	4.67
Magnesium	0.006	0.0E+00	3.2E-02	3.2E-02	3.2E-02	0.03
Manganese	77.4	0.0E+00	6.4E-01	1.7E-03	4.0E+00	4.10
Nickel	NA	NA	NA	NA	NA	NA
Potassium	0.4	0.0E+00	2.4E-01	2.4E-01	2.4E-01	0.24
Selenium	NA	6.4E-01	4.8E-01	4.2E-03	6.35E-01	65.86
Silver	NA	NA	NA	NA	NA	NA
Sodium	11.4	NA	NA	NA	NA	NA
Vanadium	14.5	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA
Acetone	NA	0.0E+00	5.3E-02	5.3E-02	5.3E-02	0.05
Bis(2-ethylhexyl)phthalate	1.1	NA	NA	NA	NA	NA
Bromochloromethane	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethane	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA
Dibutylphthalate	NA	NA	NA	NA	NA	NA
p-Isopropylphenol	NA	NA	NA	NA	NA	NA
Tetrachlorethene	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA
2-Amino-4,6-Dinitrophenol	NA	NA	NA	NA	NA	NA
4-Amino-2,6-Dinitrophenol	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA
2,6-Dinitrophenol	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrophenol	NA	NA	NA	NA	NA	NA
Anchor 1254	0.18	0.0E+00	1.1E-02	1.1E-02	1.1E-02	0.01
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA
4-Isopropylphenol	NA	NA	NA	NA	NA	NA
Naphthalene	NA	0.0E+00	7.0E-01	7.0E-01	7.0E-01	0.72
D,n-butyl phthalate	0.11	NA	NA	NA	NA	NA

HI (sum) = 7.8E+01 2.0E+01 7.3E-02 98

APPENDIX E
TABLE E13 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish BAF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	5.4		0												0.0E+00
Antimony	0.069														0.0E+00
Arsenic	0.017								20		0.34				0.0E+00
Barium	0.21														0.0E+00
Beryllium	0.0007														0.0E+00
Calcium	16								283		3.398				0.0E+00
Chromium	0.012														0.0E+00
Coal	0.029								290		8.41				0.0E+00
Copper	29								45		2.34				0.0E+00
Lead	0.052														0.0E+00
Manganese	5.6														0.0E+00
Mercury	2.18								307						0.0E+00
Nickel	0														0.0E+00
Potassium	4.83														0.0E+00
Selenium	0.006								129		0.774				0.0E+00
Silver	0.01														0.0E+00
Strontium	0.53														0.0E+00
Vanadium	0								966		531.3				0.0E+00
Zinc	0.55														0.0E+00
Chloride	0.13														0.0E+00
Cyanide	0.011														0.0E+00
Fluoride	0.208														0.0E+00
Perchlorate	0.023														0.0E+00
Sodium	12														0.0E+00
Sulfate	32														0.0E+00
Thallium	0.0031								1400		4.34				0.0E+00
Acetone	5.34								0.4		2.150				0.0E+00
But(2-ethyl)phthalate	0.53														0.0E+00
Bromodichloromethane	0.0048														0.0E+00
Carbon Disulfide	0.0171								19.5		0.33545				0.0E+00
Chloroform	0.004														0.0E+00
Di(1,2-Dichloroethane	0.012								18.9		0.2288				0.0E+00
Dibromomethane	0.0096														0.0E+00
Diethylphthalate	0.0047														0.0E+00
p-Isopropyltoluene	0.0014														0.0E+00
Tetrachloroethene	0.00032														0.0E+00
Toluene	0.0022														0.0E+00
Trichloroethene	0.0121														0.0E+00
Vinyl chloride	0.005														0.0E+00
2-Amino-4,6-Dinitroethene	0.0075								62.7		0.13784				0.0E+00
4-Amino-2,6-Dinitroethene	0.0075								4.15		0.0528				0.0E+00
2,4-Dinitroethene	0.0039								4.37		0.02185				0.0E+00
2,6-Dinitroethene	0.011														0.0E+00
HNX	0.0132														0.0E+00
2-Nitroethene	0.0003								5.92		0.023088				0.0E+00
4-Nitroethene	0.0017								5.92		0.06512				0.0E+00
RDX	0.0121														0.0E+00
2,4,6-Trinitroethene	0.0412								9.68		0.3986				0.0E+00
Aroclor 1254	0														0.0E+00
1,1-Dichloroethene	0														0.0E+00
4-Isopropyltoluene	0														0.0E+00
Naphthalene	0														0.0E+00
Di-n-butyl phthalate	0														0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs; values boxed exceed 1.0

APPENDIX E
TABLE E14
OSPREY - HQ
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg)	Max Conc. Soil (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11000		5.4	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.60E+01	2.70E+01	0.00E+00	6.63E+01
Antimony			0.069	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.45E+03	8.50E-04	0.00E+00	3.45E+03
Arsenic	5.86		0.017	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.52E+02	8.50E-04	0.00E+00	1.07E+01
Barium	310		0.007	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.86E+00	1.05E-02	0.00E+00	1.87E+00
Beryllium	6300		0.007	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.14E+02	3.50E-05	0.00E+00	1.14E+02
Bismuth	71		0.012	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.78E+01	8.00E-01	0.00E+00	3.86E+01
Boron	31		0.029	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.26E+01	6.00E-04	0.00E+00	1.14E+00
Cadmium	40000		0.052	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.86E+01	1.45E-03	0.00E+00	1.86E+01
Cobalt	6400		0.052	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.40E+02	1.45E-03	0.00E+00	1.90E+00
Copper	97.2		0.052	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.94E+01	2.80E-03	0.00E+00	2.41E+02
Iron	1120		2.18	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.94E+01	7.09E-01	0.00E+00	3.87E+01
Lead	0.55		0.006	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.90E+03	0.00E+00	0.00E+00	6.83E+00
Magnesium	49		4.83	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.94E+01	0.00E+00	0.00E+00	3.30E+03
Mercury	200		0.006	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.74E+01	2.42E-01	0.00E+00	2.94E+01
Nickel	5.08		0.01	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.05E+02	3.00E-04	0.00E+00	1.93E+01
Potassium	82		0.53	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.92E+01	5.00E-04	0.00E+00	9.05E+02
Selenium	54		0.55	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.24E+01	2.65E-02	0.00E+00	5.19E+01
Silver	140		0.11	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.40E+01	2.75E-02	0.00E+00	1.12E+02
Sulfur	0.9479		0.023	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.09E+03	5.15E-01	0.00E+00	5.15E+01
Titanium	780		0.0031	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.04E+03	1.04E-03	0.00E+00	1.04E+03
Vanadium	0.072		0.0031	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.68E+00	6.00E-01	0.00E+00	5.29E+00
Zinc	0.072		0.0031	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.32E+04	1.55E-04	0.00E+00	9.11E+01
Acetic Acid	0.0048		0.0048	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.67E+01	2.67E+01	0.00E+00	7.16E+01
Acrylonitrile	0.0171		0.0171	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.65E+02	2.65E+02	0.00E+00	2.65E+02
Bromodichloromethane	0.0164		0.0164	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.35E+04	2.40E+04	0.00E+00	2.40E+04
Carbon Disulfide	0.0096		0.0096	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.20E+04	8.20E+04	0.00E+00	8.20E+04
Chloroform	0.0047		0.0047	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.80E+05	4.80E+05	0.00E+00	4.80E+05
cis-1,2-Dichloroethane	0.0032		0.0032	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.35E+04	2.35E+04	0.00E+00	2.35E+04
Dibromochloromethane	0.0022		0.0022	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	7.00E+05	7.00E+05	0.00E+00	7.00E+05
Diethylphthalate	0.0021		0.0021	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.60E+05	1.60E+05	0.00E+00	1.60E+05
p-Isopropyltoluene	0.0075		0.0075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.91E+02	2.91E+02	0.00E+00	2.91E+02
Tetrahydrofuran	0.0079		0.0079	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.10E+04	1.10E+04	0.00E+00	1.10E+04
Toluene	0.0068		0.0068	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.05E+04	6.05E+04	0.00E+00	6.05E+04
2-Amino-2,6-Dinitrotoluene	0.0075		0.0075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.90E+03	4.90E+03	0.00E+00	4.90E+03
4-Amino-2,6-Dinitrotoluene	0.0075		0.0075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.75E+04	3.75E+04	0.00E+00	3.75E+04
2,4-Dinitrotoluene	0.0039		0.0039	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	7.35E+04	7.35E+04	0.00E+00	7.35E+04
2,6-Dinitrotoluene	0.011		0.011	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.50E+04	5.50E+04	0.00E+00	5.50E+04
HNX	0.0032		0.0032	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.00E+04	6.00E+04	0.00E+00	6.00E+04
2-Nitrotoluene	0.0075		0.0075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.50E+05	1.50E+05	0.00E+00	1.50E+05
4-Nitrotoluene	0.0075		0.0075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.50E+05	8.50E+05	0.00E+00	8.50E+05
2,4,6-Trinitrotoluene	0.0012		0.0012	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.05E+04	6.05E+04	0.00E+00	6.05E+04
1,1-Dichloroethane	0.0412		0.0412	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.38E+02	8.38E+02	0.00E+00	8.38E+02
1-Isopropyltoluene	0.0085		0.0085	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	0.0085		0.0085	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
N-m-butyl phthalate	0.0085		0.0085	0.0E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	9.77E+03	9.77E+03	0.00E+00	9.77E+03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E14 (continued)
OSPREY - HQ
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	NOAEL RT (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	6.0E-01	2.5E-03	6.0E-01	5.12
Antimony	NA	---	---	---	---	---
Arctic	2.5	2.9E-02	1.4E-02	3.4E-04	4.3E-02	0.36
Barium	20.8	0.0E+00	8.9E-02	5.0E-04	9.0E-02	0.76
Beryllium	NA	---	---	---	---	---
Bismuth	NA	---	---	---	---	---
Calcium	1	7.1E-01	4.3E-01	6.0E-04	1.1E+00	9.65
Chromium	NA	---	---	---	---	---
Cobalt	47	3.8E-02	2.8E-03	3.1E-05	4.0E-02	0.34
Copper	1.13	4.3E-01	5.2E-01	2.3E-03	9.5E-01	8.07
Lead	NA	---	---	---	---	---
Magnesium	997	0.0E+00	6.7E-03	1.1E-04	6.8E-03	0.06
Manganese	0.006	0.0E+00	5.5E-01	---	5.5E-01	4.66
Mercury	77.4	0.0E+00	3.8E-03	---	3.8E-03	0.03
Nickel	NA	---	---	---	---	---
Potassium	0.4	4.1E-01	7.6E-02	7.5E-04	4.8E-01	4.09
Selenium	NA	---	---	---	---	---
Silver	11.4	0.0E+00	2.8E-02	---	2.8E-02	0.24
Sulfur	14.5	7.7E-00	5.8E-02	1.9E-03	7.8E-00	65.68
Vanadium	NA	---	---	---	---	---
Zinc	NA	---	---	---	---	---
Chloride	NA	---	---	---	---	---
Cyanide	NA	---	---	---	---	---
Nitrate	NA	---	---	---	---	---
Perchlorate	NA	---	---	---	---	---
Sodium	NA	---	---	---	---	---
Sulfate	NA	---	---	---	---	---
Thallium	NA	---	---	---	---	---
Acetone	1.1	0.0E+00	---	2.4E-02	2.4E-02	0.20
Bis(2-ethylhexyl)phthalate	NA	---	---	---	---	---
Bromochloromethane	NA	---	---	---	---	---
Carbon Disulfide	NA	---	---	---	---	---
Chloroform	NA	---	---	---	---	---
cis-1,2-Dichloroethene	NA	---	---	---	---	---
Dibromochloromethane	NA	---	---	---	---	---
Diethylphthalate	NA	---	---	---	---	---
p-Isopropyltoluene	NA	---	---	---	---	---
Tetrachloroethene	NA	---	---	---	---	---
Toluene	NA	---	---	---	---	---
Trichloroethene	NA	---	---	---	---	---
Triphenyl chloride	NA	---	---	---	---	---
2-Amino-4,6-Dinitrotoluene	NA	---	---	---	---	---
4-Amino-2,6-Dinitrotoluene	NA	---	---	---	---	---
2,4-Dinitrotoluene	NA	---	---	---	---	---
2,6-Dinitrotoluene	NA	---	---	---	---	---
HMX	NA	---	---	---	---	---
2-Nitrotoluene	NA	---	---	---	---	---
4-Nitrotoluene	NA	---	---	---	---	---
RDX	NA	---	---	---	---	---
2,4,6-Trinitrotoluene	NA	---	---	---	---	---
1,3-Dichlorobenzene	0.18	0.0E+00	1.3E-03	---	1.3E-03	0.01
1,1-Dichloroethane	NA	---	---	---	---	---
4-Isopropyltoluene	NA	---	---	---	---	---
Naphthalene	NA	---	---	---	---	---
Di-n-butyl phthalate	0.11	0.0E+00	8.4E-02	---	8.4E-02	0.71

HI (sum) = 9.3E+00 2.5E+00 3.3E-02 1.2E+01

APPENDIX E
TABLE E14 (continued)
OSPREY - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max. Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (% & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish UF % Diet	Est. Fish Conc. (mg/kg)	Mammal UF % Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)	100%	(D)	NA	(E)	(A+B+C+D+E)
Aluminum	5.4												0.0E+00
Antimony	0.069								20	0.34			3.4E-01
Arsenic	0.017												0.0E+00
Barium	0.21												0.0E+00
Beryllium	0.0007												0.0E+00
Calcium	16								283	3.396			3.4E+00
Chromium	0.012												0.0E+00
Cobalt	0.029								290	8.41			8.4E+00
Copper	29								45	2.34			2.3E+00
Lead	0.052												0.0E+00
Magnesium	5.6												0.0E+00
Manganese	2.18												0.0E+00
Mercury	0								307	0			0.0E+00
Nickel	0												0.0E+00
Potassium	4.83								129	0.774			7.7E-01
Selenium	0.006												0.0E+00
Silver	0.011												0.0E+00
Sodium	0.53												0.0E+00
Strontium	0								966	531.3			5.3E+02
Tungsten	0.55												0.0E+00
Zinc	10.3												0.0E+00
Chloride	0.011												0.0E+00
Cyanide	0.208												0.0E+00
Nitrate	0.023												0.0E+00
Perchlorate	12												0.0E+00
Sulfate	32												0.0E+00
Thallium	0.0031								1400	4.34			4.3E+00
Acetone	5.34								0.4	2.136			2.1E+00
Bis(2-ethylhexyl)phthalate	0.0048												0.0E+00
Bromochloromethane	0.0171												0.0E+00
Chloroform	0.0164								19.5	0.33345			3.3E-01
Cis-1,2-Dichloroethene	0.012								18.9	0.2268			2.2E-01
Dibromochloromethane	0.00096												0.0E+00
Diethylphthalate	0.0047												0.0E+00
p-Isopropyltoluene	0.0014												0.0E+00
Tetrachloroethene	0.0002												0.0E+00
Toluene	0.022								62.7	0.13794			1.4E-01
Trichloroethene	0.021								41.6	0.50336			5.0E-01
Vinyl Chloride	0.055								4.37	0.02185			2.2E-02
4-Amino-2,6-Dinitroethane	0.0075												0.0E+00
4-Amino-2,4,6-Trinitroethane	0.0147								5.92	0.023098			2.3E-02
2,4-Dinitroethane	0.0039								5.92	0.06512			6.5E-02
2,6-Dinitroethane	0.011												0.0E+00
HNMX	0.0132												0.0E+00
2-Nitroethane	0.0003												0.0E+00
4-Nitrotoluene	0.0017								9.68	0.388616			4.0E-01
RDX	0.0121												0.0E+00
2,4,6-Trinitroethane	0.0412												0.0E+00
Aroclor 1254	0												0.0E+00
1,1-Dichloroethene	0												0.0E+00
Diisopropyltoluene	0												0.0E+00
Naphthalene	0												0.0E+00
Di-n-butyl phthalate	0												0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E15
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Fraction Ingested (unitless)	Body Weight (kg)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	11000	5.4	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	4.32E-01	0.00E+00	4.32E-01
Antimony	---	0.069	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	5.52E-03	0.00E+00	5.52E-03
Arsenic	5.86	0.017	3.4E-01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.27E-01	1.36E-02	8.16E-02	2.10E-01
Barium	310	0.21	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	5.68E-02	0.00E+00	1.68E-02
Bismuth	1.9	0.0007	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	4.10E-02	4.11E-02	0.00E+00	1.68E-02
Calcium	6300	16	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.30E-02	1.20E+00	0.00E+00	1.31E+00
Chromium	71	0.012	3.4E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.53E-02	9.60E-04	6.35E-03	2.35E-02
Cobalt	31	0.029	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	6.70E-01	2.32E-03	0.00E+00	6.70E-01
Copper	22.3	0.029	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	2.32E-03	2.32E-03	0.00E+00	2.32E-03
Iron	40000	29	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	4.48E-01	2.32E-03	0.00E+00	4.48E-01
Lead	97.2	0.052	2.3E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	4.16E-03	5.62E-01	5.62E-01	5.62E-01
Magnesium	6400	5.6	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	4.48E-01	1.39E-02	0.00E+00	1.39E-02
Mercury	0.35	2.18	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.74E-01	0.00E+00	0.00E+00	1.74E-01
Nickel	2900	4.83	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.38E-02	0.00E+00	0.00E+00	1.38E-02
Potassium	5108	0.006	7.7E-01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	2.42E-01	1.06E+00	0.00E+00	1.06E+00
Selenium	1.5	0.01	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.10E-01	6.26E-01	0.00E+00	6.26E-01
Silver	82	0.53	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	3.34E-01	1.06E+00	0.00E+00	1.06E+00
Sulfur	54	0.55	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.77E+00	4.24E-02	0.00E+00	1.77E+00
Vanadium	140	10.3	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	3.02E+00	4.40E-02	0.00E+00	3.02E+00
Zinc	0.9479	0.011	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	2.05E-02	8.24E-01	0.00E+00	8.24E-01
Chloride	---	0.008	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	8.80E-04	0.00E+00	8.80E-04
Cyanide	---	0.071	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.66E-02	0.00E+00	1.66E-02
Nitrate	---	0.012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.84E-03	0.00E+00	1.84E-03
Perchlorate	---	0.014	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	9.60E-01	0.00E+00	9.60E-01
Sodium	780	12	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.68E+01	2.56E+00	0.00E+00	2.56E+00
Sulfate	---	0.0031	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	2.48E-04	0.00E+00	2.48E-04
Thallium	0.072	5.34	4.3E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1.56E-03	4.27E-01	5.13E-01	9.41E-01
Acetone	---	0.53	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	4.24E-02	0.00E+00	4.24E-02
Bis(2-ethylhexyl)phthalate	---	0.0048	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	3.84E-04	0.00E+00	3.84E-04
Diethylhexylphthalate	---	0.0171	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.37E-03	0.00E+00	1.37E-03
Carbon Disulfide	---	0.0121	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.10E-02	0.00E+00	1.10E-02
Chloroform	0.012	0.012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	9.60E-02	5.54E-02	5.54E-02
cis-1,2-Dichloroethane	0.0096	0.0096	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	7.68E-05	0.00E+00	7.68E-05
Dibromochloromethane	0.0047	0.0047	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	3.76E-04	0.00E+00	3.76E-04
Diethylphthalate	0.0014	0.0014	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.12E-04	0.00E+00	1.12E-04
Diisobutylphthalate	0.0012	0.0012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	2.56E-05	0.00E+00	2.56E-05
p-Isopropylphenol	0.0022	0.0022	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.76E-04	0.00E+00	1.76E-04
Tetrachlorethene	0.0036	0.0036	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	9.68E-04	0.00E+00	9.68E-04
Toluene	0.0379	0.0379	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	4.00E-04	0.00E+00	4.00E-04
Trichloroethene	0.0075	0.0075	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	5.25E-03	0.00E+00	5.25E-03
2,4-Dinitrophenol	0.0039	0.0039	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	6.00E-04	0.00E+00	6.00E-04
2,4-Dinitrophenol	0.012	0.012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.10E-03	0.00E+00	1.10E-03
2,6-Dinitrophenol	0.0003	0.0003	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	8.80E-04	0.00E+00	8.80E-04
HNX	0.0017	0.0017	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.06E-03	0.00E+00	1.06E-03
2-Nitrophenol	0.0012	0.0012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	2.40E-05	0.00E+00	2.40E-05
4-Nitrophenol	0.0042	0.0042	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	1.36E-04	0.00E+00	1.36E-04
4-Nitrophenol	0.0085	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	9.68E-04	0.00E+00	9.68E-04
Di-n-butyl phthalate	1.545	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	3.30E-03	0.00E+00	3.30E-03
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	9.90E-02	0.00E+00	9.90E-02
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	8.42E-04	0.00E+00	8.42E-04
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	2.59E-05	0.00E+00	2.59E-05
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	8.90E-04	0.00E+00	8.90E-04
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	8.90E-04	0.00E+00	8.90E-04
Di-n-butyl phthalate	---	0.0085	0.0E+00	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	---	3.34E-02	0.00E+00	3.34E-02

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
 Total EDI = EDI soil sediment + EDI water + EDI food
 Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E15 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	-----	9.0E-01	9.0E-01	0.24
Antimony	0.031	0.0E+00	-----	1.8E-01	1.8E-01	0.05
Arsenic	0.031	2.6E+00	4.1E+00	4.4E-02	6.8E+00	1.79
Barium	2.5	0.0E+00	-----	6.7E-03	6.7E-03	0.00
Beryllium	NA	-----	-----	-----	-----	-----
Calcium	1.5	5.4E-01	1.0E+00	6.4E-04	1.6E+00	0.41
Chromium	NA	-----	-----	-----	-----	-----
Cobalt	7	2.9E-01	6.9E-02	3.3E-04	3.6E-01	0.09
Copper	NA	-----	-----	-----	-----	-----
Iron	3.66	1.5E-01	-----	1.1E-03	1.5E-01	0.04
Lead	NA	-----	-----	-----	-----	-----
Magnesium	40	0.0E+00	6.0E-01	4.4E-03	6.1E-01	0.16
Manganese	0.009	0.0E+00	1.3E+01	-----	1.3E+01	0.35
Mercury	18.29	0.0E+00	5.8E-02	-----	5.8E-02	0.02
Nickel	NA	-----	-----	-----	-----	-----
Potassium	0.091	2.0E+00	1.2E+00	5.3E-03	3.3E+00	0.86
Selenium	NA	-----	-----	-----	-----	-----
Silver	120	0.0E+00	1.5E-02	3.5E-04	1.5E-02	0.00
Strontium	0.089	0.0E+00	1.3E+01	-----	1.3E+01	3.46
Vanadium	73.2	1.7E+00	4.1E-02	6.0E-04	1.8E+00	0.47
Zinc	NA	-----	-----	-----	-----	-----
Chloride	29.5	0.0E+00	6.9E-04	3.0E-05	7.2E-04	0.00
Cyanide	290	0.0E+00	-----	5.7E-05	5.7E-05	0.00
Nitrate	NA	-----	-----	-----	-----	-----
Perchlorate	NA	-----	-----	-----	-----	-----
Sodium	NA	-----	-----	-----	-----	-----
Sulfate	NA	-----	-----	-----	-----	-----
Thallium	0.003	3.5E+02	-----	8.3E-02	3.5E+02	91.78
Arsenic	4.6	1.1E-01	3.4E-04	9.3E-02	2.0E-01	0.05
Bis(2-ethylhexyl)phthalate	NA	0.0E+00	-----	9.4E-03	9.4E-03	0.00
Bromochloromethane	NA	-----	-----	-----	-----	-----
Carbon Disulfide	NA	0.0E+00	-----	1.9E-04	1.9E-04	0.00
Chloroform	6.9	-----	-----	-----	-----	-----
cis-1,2-Dichloroethane	NA	-----	-----	-----	-----	-----
Dibromochloromethane	11.04	0.0E+00	-----	3.3E-07	3.3E-07	0.00
Diethylphthalate	NA	-----	-----	-----	-----	-----
p-Isopropyltoluene	NA	-----	-----	-----	-----	-----
Tetrachloroethene	6.4	5.2E-03	1.2E-05	2.8E-05	5.2E-03	0.00
Trichloroethene	0.173	7.0E-01	4.7E-03	5.6E-03	7.1E-01	0.19
Vinyl chloride	0.078	6.7E-02	1.8E-02	5.1E-03	9.1E-02	0.02
2-Amino-4,6-Dinitroethene	NA	-----	-----	-----	-----	-----
4-Amino-2,6-Dinitroethene	NA	-----	-----	-----	-----	-----
2,4-Dinitroethene	NA	-----	-----	-----	-----	-----
2,6-Dinitroethene	NA	-----	-----	-----	-----	-----
HMX	NA	-----	-----	-----	-----	-----
2-Nitroethene	NA	-----	-----	-----	-----	-----
4-Nitroethene	NA	-----	-----	-----	-----	-----
2,4,6-Trinitroethene	NA	-----	-----	-----	-----	-----
Aroclor 1254	0.083	0.0E+00	1.0E-02	-----	1.0E-02	0.00
1,1-Dichloroethane	2.6	0.0E+00	1.0E-05	-----	1.0E-05	0.00
4-Isopropyltoluene	NA	-----	-----	-----	-----	-----
Naphthalene	NA	-----	-----	-----	-----	-----
Di-n-butyl phthalate	1.36	0.0E+00	2.5E-04	-----	2.5E-04	0.00

HI (sum)=

3.8E+02 2.2E+01 1.3E+00 3.8E+02

APPENDIX E
TABLE E15 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF (a slope)	% Diet NA	Worm UF (a slope)	% Diet NA	Est. Worm Conc. (mg/kg)	Invert UF (a slope)	% Diet NA	Est. Invert Conc. (mg/kg)	Fish UF (a slope)	% Diet 100%	Est. Fish Conc. (mg/kg)	Mammal UF (a slope)	% Diet NA	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	5.4															0.0E+00
Antimony	0.069										20	0.34				0.0E+00
Arsenic	0.017															3.4E-01
Beryllium	0.21															0.0E+00
Bismuth	0.0007															0.0E+00
Calcium	16										283	3.398				0.0E+00
Chromium	0.012															3.4E+00
Cobalt	0										290	8.41				8.4E+00
Copper	0.029										45	2.34				0.0E+00
Iron	0.052															2.3E+00
Lead	5.6															0.0E+00
Manganese	2.18															0.0E+00
Mercury	0															0.0E+00
Nickel	0										307	0				0.0E+00
Potassium	4.83										129	0.774				7.7E-01
Selenium	0.006															0.0E+00
Silver	0.01															0.0E+00
Sodium	0.53										966	531.3				5.3E+02
Strontium	0															0.0E+00
Vanadium	0															0.0E+00
Zinc	6.55															0.0E+00
Chloride	10.3															0.0E+00
Cyanide	0.011															0.0E+00
Nitrate	0.208															0.0E+00
Perchlorate	0.023															0.0E+00
Sulfur	12															0.0E+00
Sodium	32															0.0E+00
Thallium	0.0031										1400	4.34				4.3E+00
Acetone	5.34										0.4	2.136				2.1E+00
Bis(2-ethylhexyl)phthalate	0.33															0.0E+00
Bromodichloromethane	0.0048															0.0E+00
Carbon Disulfide	0.0171										19.5	0.33345				3.3E-01
Chloroform	0.0164										18.9	0.2288				2.3E-01
cis-1,2-Dichloroethane	0.0096															0.0E+00
Dibromochloromethane	0.0047															0.0E+00
Diethylphthalate	0.0047															0.0E+00
p-Isopropyltoluene	0.0034															0.0E+00
Tetrachlorethane	0.0032															0.0E+00
Trichloroethene	0.0022															0.0E+00
Vinyl chloride	0.0121															0.0E+00
2-Amino-4,6-Dinitrobenzene	0.005										62.7	0.13794				1.4E-01
4-Amino-2,6-Dinitrobenzene	0.0075										41.6	0.50336				5.0E-01
2,4-Dinitroethene	0.0147										4.37	0.02185				2.2E-02
2,6-Dinitroethene	0.0039															0.0E+00
HMX	0.011										5.92	0.023098				2.3E-02
2-Nitrotoluene	0.0132										5.92	0.06512				6.5E-02
4-Nitrotoluene	0.0093															0.0E+00
2,4,6-Trinitrobenzene	0.0071															0.0E+00
2,4,6-Trinitroethene	0.0121															0.0E+00
Aroclor 1254	0.0412										9.68	0.398816				4.0E-01
1,1-Dichloroethene	0															0.0E+00
4-Isopropyltoluene	0															0.0E+00
Naphthalene	0															0.0E+00
Di-n-butyl phthalate	0															0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E16
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Ingestion Rate Soil (mg/kg-day)	Ingestion Rate Sed (mg/kg-day)	Ingestion Rate Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI - Total (mg/kg-day)
Aluminum	11000		5.4		0	4.00E+02	80000	10000	0.022	4.40E+00	4.40E+00	4.32E-03	0.00E+00	4.83E+00
Antimony			0.069		0	4.00E+02	80000	10000	0.022	2.34E-03	2.34E-03	5.52E-03	0.00E+00	7.10E-03
Arsenic			0.21		0	4.00E+02	80000	10000	0.022	1.24E-03	1.24E-03	1.68E-02	0.00E+00	1.41E-01
Barium			0.0007		0	4.00E+02	80000	10000	0.022	7.60E-04	7.60E-04	5.60E-03	0.00E+00	3.85E-03
Beryllium			16		0	4.00E+02	80000	10000	0.022	2.53E-04	2.53E-04	1.76E-03	0.00E+00	1.76E-03
Bismuth			0.012		0	4.00E+02	80000	10000	0.022	1.24E-03	1.24E-03	9.60E-04	0.00E+00	6.34E-03
Chromium			31		0	4.00E+02	80000	10000	0.022	8.92E-03	8.92E-03	2.32E-03	0.00E+00	9.53E-02
Cobalt			0.029		0	4.00E+02	80000	10000	0.022	1.60E-01	1.60E-01	2.32E-03	0.00E+00	1.83E-01
Copper			0.052		0	4.00E+02	80000	10000	0.022	2.56E-01	2.56E-01	4.16E-03	0.00E+00	6.64E-02
Lead			2.18		0	4.00E+02	80000	10000	0.022	2.20E-04	2.20E-04	1.74E-01	0.00E+00	3.01E+00
Manganese			5.6		0	4.00E+02	80000	10000	0.022	1.96E-02	1.96E-02	1.96E-02	0.00E+00	2.20E-04
Mercury			0.55		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Nickel			4.83		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Potassium			2900		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Selenium			5.08		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Silver			0.01		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Strontium			82		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Vanadium			54		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Zinc			140		0	4.00E+02	80000	10000	0.022	2.00E-04	2.00E-04	1.96E-02	0.00E+00	1.96E-02
Chloride			0.9479		0	4.00E+02	80000	10000	0.022	3.79E-04	3.79E-04	8.24E-01	0.00E+00	5.41E+00
Fluoride			0.011		0	4.00E+02	80000	10000	0.022	8.80E-04	8.80E-04	1.66E-02	0.00E+00	1.26E-03
Nitrate			0.023		0	4.00E+02	80000	10000	0.022	1.84E-03	1.84E-03	1.66E-02	0.00E+00	1.66E-02
Perchlorate			12		0	4.00E+02	80000	10000	0.022	3.12E-01	3.12E-01	9.60E-03	0.00E+00	1.27E+00
Sulfate			32		0	4.00E+02	80000	10000	0.022	2.48E-04	2.48E-04	2.48E-04	0.00E+00	2.48E-04
Thallium			0.0031		0	4.00E+02	80000	10000	0.022	2.88E-03	2.88E-03	4.27E-01	0.00E+00	4.49E-02
Bis(2-ethylhexyl)phthalate			0.012		0	4.00E+02	80000	10000	0.022	4.24E-02	4.24E-02	3.84E-04	0.00E+00	4.24E-02
Bromochloromethane			0.0096		0	4.00E+02	80000	10000	0.022	1.37E-03	1.37E-03	3.33E-03	0.00E+00	4.70E-03
Carbon Disulfide			0.0047		0	4.00E+02	80000	10000	0.022	9.60E-05	9.60E-05	3.27E-03	0.00E+00	3.27E-03
Diethylphthalate			0.0014		0	4.00E+02	80000	10000	0.022	7.68E-05	7.68E-05	9.60E-04	0.00E+00	7.68E-05
Dibromochloromethane			0.0032		0	4.00E+02	80000	10000	0.022	3.76E-04	3.76E-04	1.76E-04	0.00E+00	1.76E-04
p-Isopropyltoluene			0.0022		0	4.00E+02	80000	10000	0.022	1.76E-04	1.76E-04	9.68E-04	0.00E+00	9.68E-04
Tetraethelene			0.0121		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
Toluene			0.0075		0	4.00E+02	80000	10000	0.022	2.67E-05	2.67E-05	6.00E-04	0.00E+00	6.00E-04
Trichloroethene			0.0147		0	4.00E+02	80000	10000	0.022	1.18E-03	1.18E-03	3.12E-04	0.00E+00	1.18E-03
Vinyl chloride			0.0039		0	4.00E+02	80000	10000	0.022	8.80E-04	8.80E-04	6.51E-04	0.00E+00	1.53E-03
2-Amino-4,6-Dinitroethene			0.011		0	4.00E+02	80000	10000	0.022	2.40E-03	2.40E-03	2.40E-03	0.00E+00	2.40E-03
4-Amino-2,6-Dinitroethene			0.0132		0	4.00E+02	80000	10000	0.022	2.40E-03	2.40E-03	2.40E-03	0.00E+00	2.40E-03
2,4-Dinitroethene			0.0003		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
2-Nitroethene			0.0017		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
4-Nitroethene			0.0121		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
REDX			0.0412		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
2,4,6-Trinitroethene			0.039		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
Aroclor 1254			0.0012		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
1,1-Dichloroethene			0.0022		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
4-Isopropyltoluene			0.0045		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
Phthalate			0.0045		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03
Bis(2-ethylphthalate)			1.545		0	4.00E+02	80000	10000	0.022	1.56E-03	1.56E-03	3.03E-03	0.00E+00	3.03E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E16 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	RTV ingestion (mg/kg/day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.05+00	9.2E+00	9.0E-01	1.0E+01	39.15
Antimony	0.031	0.05+00	---	1.8E-01	1.8E-01	0.69
Arsenic	0.031	1.1E-01	7.6E-02	4.4E-02	2.3E-01	0.89
Barium	2.5	0.05+00	5.0E-02	6.7E-03	5.6E-02	0.22
Beryllium	NA	---	---	---	---	---
Bismuth	NA	---	---	---	---	---
Calcium	1.5	2.3E-02	1.9E-02	6.4E-04	4.2E-02	0.16
Chromium	NA	---	---	---	---	---
Cobalt	NA	1.2E-02	1.3E-03	3.3E-04	1.4E-02	0.05
Copper	NA	---	---	---	---	---
Iron	3.66	6.4E-03	1.1E-02	1.1E-02	1.8E-02	0.07
Magnesium	NA	---	---	---	---	---
Manganese	40	0.05+00	1.1E-02	4.4E-03	1.6E-02	0.06
Mercury	0.099	0.05+00	2.4E-02	---	2.4E-02	0.09
Nickel	18.29	0.05+00	1.1E-03	---	1.1E-03	0.00
Potassium	NA	---	---	---	---	---
Selenium	0.091	8.5E-02	2.2E-02	5.3E-03	1.1E-01	0.44
Silver	NA	---	---	---	---	---
Strontium	120	0.05+00	2.7E-04	3.5E-04	6.3E-04	0.00
Vanadium	0.099	0.05+00	2.4E-01	2.4E-01	2.4E-01	0.94
Zinc	73.2	7.3E-02	7.7E-04	6.0E-04	7.4E-02	0.29
Chloride	NA	---	---	---	---	---
Cyanide	29.5	0.05+00	1.3E-05	3.0E-05	4.3E-05	0.00
Nitrate	290	0.05+00	5.7E-05	5.7E-05	5.7E-05	0.00
Perchlorate	NA	---	---	---	---	---
Sodium	NA	---	---	---	---	---
Sulfate	NA	---	---	---	---	---
Thallium	0.003	1.4E+01	---	8.3E-02	1.5E+01	56.35
Acetone	4.6	4.6E-03	6.3E-06	9.4E-01	9.4E-01	0.38
Bis(2-ethylhexyl)phthalate	NA	---	---	---	---	---
Bromochloromethane	NA	---	---	---	---	---
Chloroform	NA	---	---	---	---	---
Chloroform	6.9	0.05+00	---	1.9E-04	1.9E-04	0.00
cis-1,2-Dichloroethane	NA	---	---	---	---	---
Dibromochloromethane	NA	---	---	---	---	---
Diethylphthalate	11.34	0.05+00	---	3.3E-07	3.3E-07	0.00
p-Isopropyltoluene	NA	---	---	---	---	---
Tetrachlorethene	NA	---	---	---	---	---
Toluene	6.4	2.2E-04	2.3E-07	2.8E-05	2.4E-04	0.00
Trichloroethene	0.173	2.9E-02	8.8E-05	5.1E-03	3.5E-02	0.13
2-Amino-2,6-Dinitroethane	0.078	2.8E-03	3.4E-04	5.1E-03	8.3E-03	0.03
2-Amino-2,6-Dinitrotoluene	NA	---	---	---	---	---
2,4-Dinitrotoluene	NA	---	---	---	---	---
2,6-Dinitrotoluene	NA	---	---	---	---	---
HMX	NA	---	---	---	---	---
2-Nitrotoluene	NA	---	---	---	---	---
4-Nitrotoluene	NA	---	---	---	---	---
RDX	NA	---	---	---	---	---
2,4,6-Trinitrotoluene	NA	---	---	---	---	---
Aroclor 1254	0.063	0.05+00	1.9E-04	1.9E-04	1.9E-04	0.00
1,1-Dichloroethane	NA	---	---	---	---	---
1,1-Dichloroethene	NA	---	---	---	---	---
1,1-Dichloroethane	NA	---	---	---	---	---
Di-n-butyl phthalate	1.36	0.05+00	4.5E-06	---	4.5E-06	0.00

1.5E+01 9.7E+00 1.3E+00 2.6E+01

APPENDIX E
TABLE E16 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (of & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish UF % Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)
Aluminum	5.4	NA	NA	NA	NA	NA	NA	NA	100%	0	0	NA	0.0E+00	0.0E+00
Antimony	0.069	NA	NA	NA	NA	NA	NA	NA	20	0.34	0	NA	3.4E-01	0.0E+00
Acetic	0.017	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Barium	0.21	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Beryllium	0.0007	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Calcium	16	NA	NA	NA	NA	NA	NA	NA	283	3.386	0	NA	3.4E+00	0.0E+00
Chromium	0.012	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Cobalt	0	NA	NA	NA	NA	NA	NA	NA	280	8.41	0	NA	8.4E+00	0.0E+00
Copper	0.029	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Iron	2.24	NA	NA	NA	NA	NA	NA	NA	45	2.34	0	NA	2.3E+00	0.0E+00
Lead	0.052	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Magnesium	5.6	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Manganese	2.18	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Mercury	0	NA	NA	NA	NA	NA	NA	NA	307	0	0	NA	0.0E+00	0.0E+00
Nickel	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Potassium	4.83	NA	NA	NA	NA	NA	NA	NA	129	0.774	0	NA	7.7E-01	0.0E+00
Selenium	0.006	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Silver	0.01	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Strontium	0.53	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Vanadium	0.35	NA	NA	NA	NA	NA	NA	NA	966	531.3	0	NA	5.3E+02	0.0E+00
Zinc	10.3	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Ammonia Chloride	0.011	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Ammonia Nitrate	0.208	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Perchlorate	0.023	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Sodium Sulfate	12	NA	NA	NA	NA	NA	NA	NA	1400	4.34	0	NA	4.3E+00	0.0E+00
Thallium	0.0021	NA	NA	NA	NA	NA	NA	NA	0.4	2.136	0	NA	2.1E+00	0.0E+00
Acetone	5.34	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
But(2-ethylhexyl)phthalate	0.53	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Bromodichloromethane	0.0016	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Carbon Disulfide	0.0171	NA	NA	NA	NA	NA	NA	NA	19.5	0.33345	0	NA	3.3E-01	0.0E+00
cis-1,2-Dichloroethane	0.0164	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Dibromochloromethane	0.00096	NA	NA	NA	NA	NA	NA	NA	18.9	0.2268	0	NA	2.3E-01	0.0E+00
Diethylphthalate	0.0047	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
p-Heptylchlorane	0.0014	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Tetrachloroethene	0.00032	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Toluene	0.0022	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Trichloroethene	0.0121	NA	NA	NA	NA	NA	NA	NA	62.7	0.13794	0	NA	1.4E-01	0.0E+00
Vinyl chloride	0.005	NA	NA	NA	NA	NA	NA	NA	0.13794	0.50336	0	NA	5.0E-01	0.0E+00
2-Amino-4,6-Dinitroethane	0.005	NA	NA	NA	NA	NA	NA	NA	41.6	0.02195	0	NA	2.2E-02	0.0E+00
2-Amino-2,6-Dinitroethane	0.0147	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
2,4-Dinitroethane	0.0039	NA	NA	NA	NA	NA	NA	NA	5.92	0.023088	0	NA	0.0E+00	0.0E+00
2,6-Dinitroethane	0.011	NA	NA	NA	NA	NA	NA	NA	5.92	0.06512	0	NA	6.5E-02	0.0E+00
HMX	0.0132	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
2-Nitroethane	0.0003	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
4-Nitroethane	0.0017	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
RDX	0.0121	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
2,4,6-Trinitroethane	0.0412	NA	NA	NA	NA	NA	NA	NA	9.68	0.398816	0	NA	4.0E-01	0.0E+00
Ancler 1254	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
1,1-Dichloroethene	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
4-Heptylchlorane	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
2,4-Dinitroethane	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00
Di-n-butyl phthalate	0	NA	NA	NA	NA	NA	NA	NA	0	0	0	NA	0.0E+00	0.0E+00

APPENDIX E
TABLE E17
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Settlement (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		5200	2.8	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	2.60E+02	3.08E-01	0.00E+00	2.60E+02
Antimony			0.027	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	2.97E-03	0.00E+00	2.97E-03
Arsenic		3.3	0.012	2.4E-01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.85E-01	1.32E-03	4.20E-01	5.86E-01
Barium		90	0.075	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	4.50E+00	8.25E-03	0.00E+00	4.51E+00
Beryllium		1.02		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.10E-02	0.00E+00	0.00E+00	5.10E-02
Cadmium		1300		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	7.30E+01	2.75E+00	0.00E+00	7.78E+01
Chromium		24	25	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.20E+00	0.00E+00	0.00E+00	1.20E+00
Cobalt		15		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	7.30E-01	0.00E+00	0.00E+00	7.30E-01
Copper		10.3	0.009	2.6E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	5.15E-01	9.90E-04	4.57E+00	5.08E+00
Iron		20000	8.4	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.00E+03	9.24E-01	0.00E+00	1.00E+03
Magnesium		13.6	0.01	4.5E-01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	6.80E-01	1.10E-03	7.88E-01	1.47E+00
Manganese		2200	19	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	2.12E+01	2.09E+00	0.00E+00	1.12E+02
Nickel		423	2.39	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.25E+00	2.63E-01	0.00E+00	1.25E+00
Potassium		960		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	4.80E+01	0.00E+00	0.00E+00	4.80E+01
Selenium		1.9	0.44	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	9.50E-02	0.00E+00	0.00E+00	9.50E-02
Strontium		27		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	1.35E+00	0.00E+00	0.00E+00	1.35E+00
Vanadium		49	0.04	3.9E+01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	2.45E+00	4.84E-02	0.00E+00	1.40E+00
Zinc			31.8	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	4.40E-03	0.00E+00	3.50E+00
Chloride			0.205	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	2.26E-02	0.00E+00	2.26E-02
Nitrate			24	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	2.64E+00	0.00E+00	2.64E+00
Sodium			110	0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	1.21E+01	0.00E+00	1.21E+01
Sulfate			0.01	4.0E-03	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	1.10E-03	0.00E+00	8.10E-03
Acetone			0.017	9.0E-02	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	1.87E-03	0.00E+00	1.60E-03
Methylene chloride				0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-01
Cadmium		6.27		0.0E+00	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	3.14E-01	0.00E+00	0.00E+00	3.14E-01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil, sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E17 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	2.4E+00	2.8E-03	2.4E+00	21.82
Antimony	NA	---	---	---	---	---
Arsenic	2.5	1.7E-01	6.6E-02	5.3E-04	2.3E-01	2.16
Barium	20.8	0.0E+00	2.2E-01	4.0E-04	2.2E-01	1.99
Beryllium	NA	---	---	---	---	---
Cadmium	NA	---	---	---	---	---
Chromium	1	0.0E+00	1.2E+00	---	1.2E+00	11.04
Cobalt	NA	---	---	---	---	---
Copper	47	9.7E-02	1.1E-02	2.1E-05	1.1E-01	0.99
Iron	NA	---	---	---	---	---
Lead	113	7.0E-01	6.0E-01	9.7E-04	1.3E+00	11.95
Magnesium	NA	---	---	---	---	---
Manganese	997	0.0E+00	2.1E-02	2.6E-04	2.1E-02	0.20
Nickel	77.4	0.0E+00	1.6E-02	---	1.6E-02	0.15
Potassium	NA	---	---	---	---	---
Selenium	0.4	0.0E+00	2.4E-01	---	2.4E-01	2.18
Strontium	NA	---	---	---	---	---
Titanium	11.4	0.0E+00	1.2E-01	---	1.2E-01	1.09
Vanadium	14.5	4.7E+00	1.7E-01	3.0E-04	4.8E+00	44.44
Zinc	NA	---	---	---	---	---
Chloride	NA	---	---	---	---	---
Nitrate	NA	---	---	---	---	---
Sodium	NA	---	---	---	---	---
Sulfate	NA	---	---	---	---	---
Acetone	NA	---	---	---	---	---
Methylene chloride	NA	---	---	---	---	---
Cadmium	1.45	0.0E+00	2.2E-01	---	2.2E-01	1.99

HI (sum) = 5.6E+00 5.2E+00 5.3E-03 11

APPENDIX E
TABLE E17 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF % Diet	Est. Invert Conc (mg/kg)	Fish UF BAF	% Diet	Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	2.8		0								0				0.0E+00
Antimony	0.027										0				0.0E+00
Arsenic	0.012										0.24				2.4E-01
Barium	0.075										0				0.0E+00
Beryllium	0										0				0.0E+00
Calcium	25										0				0.0E+00
Chromium	0										0				0.0E+00
Cobalt	0										0				0.0E+00
Copper	0.009										0				0.0E+00
Iron	8.4										0				0.0E+00
Lead	0.01										0				0.0E+00
Magnesium	19										2.61				2.6E+00
Manganese	2.39										0.45				0.0E+00
Nickel	0										0				4.5E-01
Potassium	0										0				0.0E+00
Selenium	0.44										0				0.0E+00
Strontium	0										0				0.0E+00
Vanadium	0										0				0.0E+00
Zinc	0.04										0				0.0E+00
Chloride	31.8										38.64				3.9E+01
Nitrate	0.205										0				0.0E+00
Sodium	24										0				0.0E+00
Sulfate	110										0				0.0E+00
Acetone	0.01										0.004				4.0E-03
Methylene chloride	0.017										0.0901				9.0E-02
Cadmium	0										0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E18
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - Central Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg) <i>0-5 ft</i>	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		5200	2.8	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	3.12E+01	1.40E-01	0.00E+00	3.12E+01
Antimony			0.027	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.35E-03	0.00E+00	0.00E+00	1.35E-03
Arsenic		3.3	0.012	2.4E-01	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.98E-02	6.00E-04	5.04E-02	7.08E-02
Barium		90	0.075	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	5.40E-01	3.75E-03	0.00E+00	5.44E-01
Beryllium		1.02		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	6.12E-03	0.00E+00	0.00E+00	6.12E-03
Calcium		1500		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	9.00E+00	1.25E+00	0.00E+00	1.03E+01
Chromium		24	25	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.44E-01	0.00E+00	0.00E+00	1.44E-01
Cobalt		15		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	9.00E-02	0.00E+00	0.00E+00	9.00E-02
Copper		10.3	0.009	2.8E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	6.18E-02	4.50E-04	5.48E-01	6.10E-01
Iron		20000	8.4	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.20E+02	4.20E-01	0.00E+00	1.20E+02
Lead		13.6	0.01	4.5E-01	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	8.16E-02	5.00E-04	9.45E-02	1.77E-01
Magnesium		2200	19	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.32E+01	9.50E-01	0.00E+00	1.42E+01
Manganese		423	2.39	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	2.54E+00	1.20E-01	0.00E+00	2.66E+00
Nickel		25		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.50E-01	0.00E+00	0.00E+00	1.50E-01
Potassium		900		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	5.78E+00	0.00E+00	0.00E+00	5.78E+00
Selenium		1.9	0.44	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.14E-02	2.20E-02	0.00E+00	1.14E-02
Strontium		27		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.62E-01	0.00E+00	0.00E+00	1.62E-01
Vanadium		49		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	2.94E-01	0.00E+00	0.00E+00	8.11E+00
Zinc			0.04	3.9E+01	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.59E+00	1.59E+00	0.00E+00	1.59E+00
Chloride			31.8	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.03E-02	1.03E-02	0.00E+00	1.03E-02
Nitrate			0.205	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.20E+00	1.20E+00	0.00E+00	1.20E+00
Sodium			24	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	5.50E+00	5.50E+00	0.00E+00	5.50E+00
Sulfate			110	0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	5.00E-04	5.00E-04	0.00E+00	1.34E-03
Acetone			0.01	4.0E-03	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	1.89E-02	8.50E-04	0.00E+00	1.89E-02
Methylene chloride			0.017	9.0E-02	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	3.76E-02	0.00E+00	0.00E+00	3.76E-02
Cadmium		6.27		0.0E+00	0.00E+00	6.00E+03	5.00E+04	1.2	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E18 (continued)
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	2.8E-01	1.3E-03	2.9E-01	21.86
Antimony	NA	---	---	---	---	---
Arsenic	2.5	2.0E-02	7.9E-03	2.4E-04	2.8E-02	2.17
Barium	20.8	0.0E+00	2.6E-02	1.8E-04	2.6E-02	2.00
Beryllium	NA	---	---	---	---	---
Bismuth	NA	---	---	---	---	---
Calcium	1	0.0E+00	1.4E-01	---	1.4E-01	11.02
Chromium	NA	---	---	---	---	---
Cobalt	47	1.2E-02	1.3E-03	9.6E-06	1.3E-02	0.99
Copper	NA	---	---	---	---	---
Iron	1.13	8.4E-02	7.2E-02	4.4E-04	1.6E-01	11.96
Lead	NA	---	---	---	---	---
Magnesium	997	0.0E+00	2.5E-03	1.2E-04	2.7E-03	0.20
Manganese	77.4	0.0E+00	1.9E-03	---	1.9E-03	0.15
Nickel	NA	---	---	---	---	---
Potassium	0.4	0.0E+00	2.9E-02	---	2.9E-02	2.18
Selenium	NA	---	---	---	---	---
Strontium	11.4	0.0E+00	1.4E-02	---	1.4E-02	1.09
Titanium	14.5	5.6E-01	2.0E-02	1.4E-04	5.8E-01	44.39
Zinc	NA	---	---	---	---	---
Chloride	NA	---	---	---	---	---
Sulfate	NA	---	---	---	---	---
Acetone	NA	---	---	---	---	---
Benzyne chloride	NA	---	---	---	---	---
Cadmium	1.45	0.0E+00	2.6E-02	---	2.6E-02	1.99

HI (sum) = 6.8E-01 6.3E-01 2.4E-03 1.3E+00

APPENDIX E
TABLE E18 (continued)
OSPREY - Uplake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc Surface Water (mg/L)	Plant UF	% Diet	Est Plant Conc (mg/kg)	Worm UF (Intercept & slope)	% Diet	Est Worm Conc (mg/kg)	Invert UF	% Diet	Est. Invert Conc (mg/kg)	Fish UF	% Diet	Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
				NA				NA				100%	(D)			(E)	(A+B+C+D+E)
Aluminum	3.8												0				0.0E+00
Antimony	0.027												0				0.0E+00
Arsonic	0.012												0.24				2.4E-01
Barium	0.075												0				0.0E+00
Beryllium	0												0				0.0E+00
Calcium	25												0				0.0E+00
Chromium	0												0				0.0E+00
Cobalt	0												0				0.0E+00
Copper	0.009												2.61				2.6E+00
Iron	8.4												0				0.0E+00
Lead	0.01												0.45				4.5E-01
Manganese	0.01												0				0.0E+00
Nickel	2.39												0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0.44												0				0.0E+00
Strontium	0.04												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	31.8												38.64				3.9E+01
Chloride	0.205												0				0.0E+00
Nitrate	24												0				0.0E+00
Sodium	110												0				0.0E+00
Sulfate	0.01												0.004				4.0E-03
Acetone	0.017												0.0901				9.0E-02
Methylene chloride	0												0				0.0E+00
Cadmium																	0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E19
RIVER OTTER - HQS
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg) 0-5 ft	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		5200	2.8	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	2.24E-01	0.00E+00	2.24E-01
Antimony			0.027	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	2.16E-03	0.00E+00	2.16E-03
Arsenic		3.3	0.012	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	7.13E-02	-----	9.60E-04	5.76E-02	1.30E-01
Barium		90	0.075	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	6.00E-03	0.00E+00	6.00E-03
Beryllium		1500		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.20E-02	-----	-----	0.00E+00	2.20E-02
Calcium		24	25	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	3.24E+01	-----	-----	0.00E+00	3.24E+01
Chromium		15		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	5.18E+01	-----	-----	0.00E+00	5.18E+01
Cobalt		10.3		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	3.24E+01	-----	-----	0.00E+00	3.24E+01
Copper		20000	0.009	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.22E-01	-----	7.20E-04	6.20E-01	8.30E-01
Iron		13.6	8.4	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	4.22E+02	-----	6.72E-01	0.00E+00	4.33E+02
Lead		2200	0.01	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	8.00E-04	1.08E-01	1.09E-01
Magnesium		423	19	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	4.75E+01	-----	1.52E+00	0.00E+00	9.33E+00
Manganese		25	2.39	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	9.14E+00	-----	1.91E-01	0.00E+00	5.49E-01
Nickel		960		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.07E+01	-----	-----	0.00E+00	2.07E+01
Potassium		1.9		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	4.10E+02	-----	-----	0.00E+00	4.10E+02
Selenium		27		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	5.83E-01	-----	3.52E-02	0.00E+00	5.83E-01
Strontium		27	0.44	0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.06E+00	-----	-----	0.00E+00	1.06E+00
Vanadium		49		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	3.20E-03	9.27E+00	1.01E+01
Zinc			0.04	3.9E+01	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	2.54E+00	0.00E+00	2.54E+00
Chloride		31.8		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	1.64E-02	0.00E+00	1.64E-02
Nitrate		0.205		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	1.92E+00	0.00E+00	1.92E+00
Sodium		24		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	8.80E+00	0.00E+00	8.80E+00
Sulfur		110		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	8.00E-04	9.60E-04	1.76E-03
Acetone		0.01		4.0E-03	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	1.36E-03	0.00E+00	2.30E-02
Methylene chloride			0.017	9.0E-02	0.00E+00	2.16E+04	8.00E+04	1.126	1	-----	-----	-----	0.00E+00	1.35E-01
Cadmium		6.27		0.0E+00	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.35E-01	-----	-----	0.00E+00	1.35E-01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E19 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	RTV ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	-----	4.7E-01	4.7E-01	3.62
Antimony	0.031	0.0E+00	-----	7.0E-02	7.0E-02	0.54
Arsenic	0.031	1.9E+00	2.3E+00	3.1E+00	4.2E+00	32.33
Barium	2.5	0.0E+00	-----	2.4E-03	2.4E-03	0.02
Beryllium	NA	-----	-----	-----	-----	-----
Calcium	NA	-----	-----	-----	-----	-----
Chromium	1.5	0.0E+00	3.5E-01	-----	3.5E-01	2.67
Cobalt	NA	-----	-----	-----	-----	-----
Copper	7	8.9E-02	3.2E-02	1.0E-04	1.2E-01	0.94
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	3.0E-02	-----	2.2E-04	3.0E-02	0.23
Magnesium	NA	-----	-----	-----	-----	-----
Manganese	40	0.0E+00	2.3E-01	4.8E-03	2.3E-01	1.80
Nickel	18.29	0.0E+00	3.0E-02	-----	3.0E-02	0.23
Potassium	NA	-----	-----	-----	-----	-----
Selenium	0.091	0.0E+00	4.5E-01	-----	4.5E-01	3.48
Strontium	120	0.0E+00	4.9E-03	2.9E-04	5.2E-03	0.04
Vanadium	0.089	0.0E+00	6.6E+00	-----	6.6E+00	50.58
Zinc	73.2	1.3E-01	1.4E-02	4.4E-05	1.4E-01	1.09
Chloride	NA	-----	-----	-----	-----	-----
Nitrate	290	0.0E+00	-----	5.7E-05	5.7E-05	0.00
Sulfate	NA	-----	-----	-----	-----	-----
Sodium	NA	-----	-----	-----	-----	-----
Acetone	4.6	2.1E-04	-----	1.7E-04	3.8E-04	0.00
Methylene chloride	2.7	8.0E-03	-----	5.0E-04	8.5E-03	0.07
Cadmium	0.441	0.0E+00	3.1E-01	-----	3.1E-01	2.37
HI (sum)=						
		2.1E+00	1.0E+01	5.8E+01	1.3E+01	

APPENDIX E
TABLE E19 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	2.8												0				0.0E+00
Antimony	0.027												0				0.0E+00
Arsenic	0.012											20	0.24				2.4E-01
Barium	0.075												0				0.0E+00
Beryllium	0												0				0.0E+00
Calcium	25											283	0				0.0E+00
Chromium	0												0				0.0E+00
Cobalt	0												0				0.0E+00
Copper	0.009											290	2.81				2.8E+00
Iron	8.4												0				0.0E+00
Lead	0.01											45	0.45				4.5E-01
Magnesium	19												0				0.0E+00
Manganese	2.39												0				0.0E+00
Nickel	0											307	0				0.0E+00
Potassium	0											129	0				0.0E+00
Selenium	0												0				0.0E+00
Strontium	0.44												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.04											966	38.64				3.9E+01
Chloride	31.8												0				0.0E+00
Nitrate	0.205												0				0.0E+00
Sodium	24												0				0.0E+00
Sulfate	110												0				0.0E+00
Acetone	0.01												0.004				4.0E-03
Methylene chloride	0.017												0.0801				8.0E-02
Cadmium	0												0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E20
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Sediment (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	5200		2.8		0.0E+00	0	4.00E+02	80000	10000	0.022	1	2.08E+00	2.24E+01	2.24E+01	0.00E+00	2.30E+00
Antimony			0.027		0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.32E+03	2.16E-03	2.16E-03	0.00E+00	2.16E-03
Arsenic	3.3		0.012		2.4E-01	0	4.00E+02	80000	10000	0.022	1	3.60E+02	9.60E-04	9.60E-04	2.40E-03	4.68E-03
Barium	90		0.075		0.0E+00	0	4.00E+02	80000	10000	0.022	1	4.08E-04	6.00E-03	6.00E-03	0.00E+00	4.20E-02
Beryllium	1500				0.0E+00	0	4.00E+02	80000	10000	0.022	1	6.00E-04	2.00E+00	2.00E+00	0.00E+00	2.60E+00
Calcium	24		25		0.0E+00	0	4.00E+02	80000	10000	0.022	1	6.00E-03	9.60E-03	9.60E-03	0.00E+00	2.60E+00
Chromium	15				0.0E+00	0	4.00E+02	80000	10000	0.022	1	6.00E-03	6.00E-03	6.00E-03	0.00E+00	6.00E-03
Cobalt	10.3		0.009		2.8E+00	0	4.00E+02	80000	10000	0.022	1	4.12E-03	7.20E-04	7.20E-04	2.61E-02	3.09E-02
Copper	20000		8.4		0.0E+00	0	4.00E+02	80000	10000	0.022	1	8.00E+00	6.72E-01	6.72E-01	0.00E+00	8.67E+00
Iron	13.6		0.01		4.5E-01	0	4.00E+02	80000	10000	0.022	1	8.00E-03	4.50E-04	4.50E-04	1.07E-02	1.07E-02
Lead	2200		19		0.0E+00	0	4.00E+02	80000	10000	0.022	1	8.00E-03	1.52E+00	1.52E+00	0.00E+00	2.40E+00
Manganese	423		2.39		0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.00E-02	1.91E-01	1.91E-01	0.00E+00	3.60E-01
Nickel	25				0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.00E-02	3.84E-04	3.84E-04	0.00E+00	1.00E-02
Potassium	960				0.0E+00	0	4.00E+02	80000	10000	0.022	1	7.60E-04	3.52E-02	3.52E-02	0.00E+00	7.60E-04
Selenium	1.9		0.44		0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.08E-02	1.08E-02	1.08E-02	0.00E+00	4.60E-02
Silver	27				0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.96E-02	3.20E-03	3.20E-03	7.84E-01	4.59E+00
Sodium	49		0.04		3.9E+01	0	4.00E+02	80000	10000	0.022	1	2.54E+00	2.54E+00	2.54E+00	0.00E+00	2.54E+00
Vanadium			31.8		0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.64E-03	1.64E-03	1.64E-03	0.00E+00	1.64E-03
Chloride			0.205		0.0E+00	0	4.00E+02	80000	10000	0.022	1	1.92E+00	1.92E+00	1.92E+00	0.00E+00	1.92E+00
Nitrate			24		0.0E+00	0	4.00E+02	80000	10000	0.022	1	8.00E+00	8.00E+00	8.00E+00	0.00E+00	8.00E+00
Sulfate			110		0.0E+00	0	4.00E+02	80000	10000	0.022	1	8.00E+00	8.00E+00	8.00E+00	0.00E+00	8.00E+00
Acetone			0.01		4.0E-03	0	4.00E+02	80000	10000	0.022	1	1.36E-03	1.36E-03	1.36E-03	0.00E+00	2.26E-03
Methylene chloride			0.017		9.0E-02	0	4.00E+02	80000	10000	0.022	1	2.51E-03	2.51E-03	2.51E-03	0.00E+00	2.51E-03
Cadmium	6.27				0.0E+00	0	4.00E+02	80000	10000	0.022	1	2.51E-03	2.51E-03	2.51E-03	0.00E+00	2.51E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E20 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	4.4E+00	4.7E-01	4.8E+00	92.28
Antimony	0.031	0.0E+00	0.0E+00	7.0E-02	7.0E-02	1.33
Arsenic	0.031	7.7E-02	4.3E-02	3.1E-02	1.5E-01	2.89
Barium	2.5	0.0E+00	1.4E-02	2.4E-03	1.7E-02	0.32
Beryllium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	1.5	0.0E+00	6.4E-03	NA	6.4E-03	0.12
Cobalt	NA	NA	NA	NA	NA	NA
Copper	7	3.7E-03	5.9E-04	1.0E-04	4.4E-03	0.08
Iron	NA	NA	NA	NA	NA	NA
Lead	3.66	1.2E-03	1.3E-03	2.2E-04	2.9E-03	0.06
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	40	0.0E+00	4.2E-03	4.8E-03	9.0E-03	0.17
Nickel	18.29	0.0E+00	5.3E-04	NA	5.3E-04	0.01
Potassium	NA	NA	NA	NA	NA	NA
Selenium	0.091	0.0E+00	8.4E-03	NA	8.4E-03	0.16
Strontium	120	0.0E+00	9.0E-05	2.9E-04	3.8E-04	0.01
Vanadium	0.089	0.0E+00	1.2E-01	NA	1.2E-01	2.32
Zinc	73.2	5.3E-03	2.7E-04	4.4E-05	5.6E-03	0.11
Chloride	NA	NA	NA	NA	NA	NA
Nitrate	290	0.0E+00	NA	5.7E-05	5.7E-05	0.00
Sodium	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA
Acetone	4.6	8.7E-06	NA	1.7E-04	1.8E-04	0.00
Methylene chloride	2.7	3.3E-04	NA	5.0E-04	8.4E-04	0.02
Cadmium	0.441	0.0E+00	5.7E-03	NA	5.7E-03	0.11

8.8E-02 4.6E+00 5.8E-01 5.2E+00

APPENDIX E
TABLE E20 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent													Total Food Conc. (mg/kg)					
	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF	% Diet	Est. Invert Conc (mg/kg)	Fish UF	% Diet		Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	(A+B+C+D+E)
Aluminum	2.8			NA	(A)			(B)		NA	(C)		100%	(D)				0.0E+00
Antimony	0.027												20		0			0.0E+00
Arsenic	0.012													0.24	0			2.4E-01
Barium	0.075														0			0.0E+00
Beryllium	0														0			0.0E+00
Bismuth	0														0			0.0E+00
Calcium	25														0			0.0E+00
Chromium	0														0			0.0E+00
Cobalt	0														0			0.0E+00
Copper	0.009														0			2.8E+00
Iron	8.4														0			0.0E+00
Lead	0.01														0			4.5E-01
Magnesium	19														0			0.0E+00
Manganese	2.39														0.45			0.0E+00
Nickel	0														0			0.0E+00
Phosphorus	0														0			0.0E+00
Selenium	0.44														0			0.0E+00
Strontium	0														0			0.0E+00
Vanadium	0														0			0.0E+00
Zinc	0.04														0			0.0E+00
Chloride	31.8														0			3.9E+01
Nitrate	0.205														0			0.0E+00
Sodium	24														0			0.0E+00
Sulfate	110														0			0.0E+00
Acetone	0.01														0			0.0E+00
Methylene chloride	0.017														0.004			4.0E-03
Cadmium	0														0.0901			9.0E-02
															0			0.0E+00

APPENDIX E
TABLE E21
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Contaminant	Max Conc. Soil (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	3500	1.6	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.75E+02	1.76E-01	0.0E+00	1.75E+02
Arsenic		0.018	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	0.0E+00	1.98E-03	0.0E+00	1.98E-03
Benzene	10.2		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	5.10E-01	---	0.0E+00	5.10E-01
Boron	147.6	0.42	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	7.38E+00	4.62E-02	0.0E+00	7.43E+00
Butyltin	1.19		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	5.95E-02	---	0.0E+00	5.95E-02
Cadmium		5.5	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	0.0E+00	6.05E-01	0.0E+00	6.05E-01
Chromium	40.2		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	2.01E+00	---	0.0E+00	2.01E+00
Copper	3.56		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.78E-01	---	0.0E+00	1.78E-01
Iron	146	1.4	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	8.00E+02	3.74E-01	0.0E+00	8.00E+02
Lead	16000	0.007	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.48E+00	7.70E-04	5.51E-01	2.03E+00
Manganese	29.6	0.259	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	7.33E+00	2.85E-02	0.0E+00	7.33E+00
Nickel	13.8		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	6.90E-01	---	0.0E+00	6.90E-01
Potassium	670	0.06	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	3.35E+01	---	0.0E+00	3.35E+01
Selenium	23		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.15E+00	6.60E-03	0.0E+00	6.60E-03
Vanadium	15	0.02	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	7.50E-01	2.20E-03	3.38E+01	1.15E+00
Zinc		12.2	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.34E+00	1.34E+00	0.0E+00	1.34E+00
Chloride		0.293	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	---	2.21E-02	0.0E+00	2.21E-02
Nitrate		9.6	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	---	1.06E+00	0.0E+00	1.06E+00
Sodium		8.9	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	---	9.79E-01	0.0E+00	9.79E-01
Sulfate		0.011	0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	2.75E-03	1.21E-03	7.70E-03	1.17E-02
Acetone	0.055		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	---	---	0.0E+00	---
Toluene	0.029		0.0E+00	0.0E+00	5.00E+04	1.0E+05	1750000	0.125	1	0.0E+00	1.45E-03	---	0.0E+00	1.45E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E21 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	1.6E+00	1.6E-03	1.6E+00	18.85
Antimony	NA	-----	-----	-----	-----	-----
Arsenic	2.5	0.0E+00	2.0E-01	-----	2.0E-01	2.41
Barium	20.8	0.0E+00	3.5E-01	2.2E-03	3.6E-01	4.21
Beryllium	NA	-----	-----	-----	-----	-----
Calcium	NA	-----	-----	-----	-----	-----
Chromium	1	0.0E+00	2.0E+00	-----	2.0E+00	23.73
Copper	47	0.0E+00	3.8E-03	-----	3.8E-03	0.04
Iron	NA	-----	-----	-----	-----	-----
Lead	113	4.9E-01	1.3E+00	6.8E-04	1.8E+00	21.23
Manganese	997	0.0E+00	7.3E-03	2.9E-05	7.4E-03	0.09
Nickel	77.4	0.0E+00	8.9E-03	-----	8.9E-03	0.11
Potassium	NA	-----	-----	-----	-----	-----
Strontium	NA	-----	-----	-----	-----	-----
Vanadium	11.4	0.0E+00	1.0E-01	-----	1.0E-01	1.19
Zinc	14.5	2.3E+00	5.2E-02	1.5E-04	2.4E+00	28.14
Chloride	NA	-----	-----	-----	-----	-----
Nitrate	NA	-----	-----	-----	-----	-----
Sodium	NA	-----	-----	-----	-----	-----
Sulfate	NA	-----	-----	-----	-----	-----
Acetone	NA	-----	-----	-----	-----	-----
Toluene	NA	-----	-----	-----	-----	-----

HI (sum) = 2.8E+00 5.6E+00 4.7E-03 8

APPENDIX E
TABLE E21 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF (mg/kg)	% Diet NA	Est. Plant Conc (mg/kg)	Worm UF (mg/kg)	% Diet NA	Est. Worm Conc (mg/kg)	Invert UF (mg/kg)	% Diet NA	Est. Invert Conc (mg/kg)	Fish BAF	% Diet 100%	Est. Fish Conc (mg/kg)	Mammal UF (mg/kg)	% Diet NA	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	1.6			0									0				0.0E+00
Antimony	0.018												0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0.42												0				0.0E+00
Beryllium	0												0				0.0E+00
Calcium	5.5												0				0.0E+00
Chromium	0												0				0.0E+00
Copper	0												0				0.0E+00
Iron	3.4												0				0.0E+00
Lead	0.007												0.315				3.2E-01
Manganese	0.239												0				0.0E+00
Nickel	0												0				0.0E+00
Potassium	0.06												0				0.0E+00
Strontium	0												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.02												0				0.0E+00
Chloride	12.2												19.32				1.9E+01
Nitrate	0.203												0				0.0E+00
Sodium	9.6												0				0.0E+00
Sulfate	8.9												0				0.0E+00
Acetone	0.011												0.0044				4.4E-03
Toluene	0												0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E22
OSPREY - HQS
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		3500	1.6	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	2.10E+01	8.00E-02	0.00E+00	2.11E+01
Antimony			0.018	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	6.12E-02	9.00E-04	0.00E+00	9.00E-04
Barium		10.2		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	8.86E-01	2.10E-02	0.00E+00	6.12E-02
Beryllium		147.6	0.42	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	7.14E-03	2.75E-01	0.00E+00	9.07E-01
Bismuth		1.19		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	7.14E-03	2.75E-01	0.00E+00	7.14E-03
Cadmium		5.5		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	2.41E-01	2.75E-01	0.00E+00	2.75E-01
Chromium		40.2		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	2.41E-01	2.75E-01	0.00E+00	2.41E-01
Copper		3.56		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	2.14E-02	1.70E-01	0.00E+00	2.14E-02
Lead		16000	3.4	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	9.60E-01	3.50E-04	0.00E+00	9.62E+01
Manganese		146	0.007	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	8.76E-01	1.30E-02	0.00E+00	8.89E-01
Nickel		13.8	0.259	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	8.28E-02	1.30E-02	0.00E+00	8.28E-02
Potassium		670		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	4.02E+00	3.00E-03	0.00E+00	4.02E+00
Selenium		23	0.06	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	1.38E-01	1.00E-01	0.00E+00	3.00E-03
Vanadium		15	0.02	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	9.00E-02	6.10E-01	0.00E+00	4.15E+00
Zinc			12.2	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	1.02E-02	1.02E-02	0.00E+00	6.10E-01
Chloride			0.203	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	4.80E-01	4.80E-01	0.00E+00	1.02E-02
Nitrate			9.6	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	4.45E-01	4.45E-01	0.00E+00	4.80E-01
Sulfate			8.9	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	3.30E-04	5.50E-04	0.00E+00	4.45E-01
Acetone		0.055	0.011	0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	1.74E-04	5.50E-04	0.00E+00	9.24E-04
Toluene		0.029		0.0E+00	0.00E+00	6.00E+03	5.00E+04	2.10E+01	1.2	1	0.00E+00	1.74E-04	5.50E-04	0.00E+00	1.80E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E22 (continued)
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	1.9E-01	7.3E-04	1.9E-01	18.88
Antimony	NA	---	---	---	---	---
Arsenic	2.5	0.0E+00	2.4E-02	---	2.4E-02	2.40
Boron	20.8	0.0E+00	4.3E-02	1.0E-03	4.4E-02	4.28
Beryllium	NA	---	---	---	---	---
Calcium	NA	---	---	---	---	---
Chromium	1	0.0E+00	2.4E-01	---	2.4E-01	21.69
Copper	47	0.0E+00	4.5E-04	---	4.5E-04	0.04
Iron	NA	---	---	---	---	---
Lead	1.13	5.9E-02	1.6E-01	3.1E-04	2.2E-01	21.22
Manganese	997	0.0E+00	8.8E-04	1.3E-05	8.9E-04	0.09
Nickel	77.4	0.0E+00	1.1E-03	---	1.1E-03	0.11
Potassium	NA	---	---	---	---	---
Selenium	NA	---	---	---	---	---
Strontium	11.4	0.0E+00	1.2E-02	---	1.2E-02	1.19
Vanadium	14.5	2.8E-01	6.2E-03	6.9E-05	2.9E-01	28.10
Zinc	NA	---	---	---	---	---
Chloride	NA	---	---	---	---	---
Nitrate	NA	---	---	---	---	---
Sulfate	NA	---	---	---	---	---
Acetone	NA	---	---	---	---	---
Toluene	NA	---	---	---	---	---

HI (sum)= 3.4E-01 6.8E-01 2.1E-03 1.0

APPENDIX E
TABLE E22 (continued)
OSPREY - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF % Diet	Est. Invert Conc. (mg/kg)	Fish UF % Diet	Est. Fish Conc. (mg/kg)	Mammal UF % Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)	100%	(D)	NA	(E)	(A+B+C+D+E)
Aluminum	1.6									0			0.0E+00
Antimony	0.018									0			0.0E+00
Arsenic	0								20	0			0.0E+00
Barium	0.42									0			0.0E+00
Beryllium	0									0			0.0E+00
Calcium	5.5								283	0			0.0E+00
Chromium	0								290	0			0.0E+00
Copper	0									0			0.0E+00
Iron	1.4								45	0.315			3.2E-01
Lead	0.007									0			0.0E+00
Manganese	0.259								307	0			0.0E+00
Nickel	0									0			0.0E+00
Plutonium	0.06									0			0.0E+00
Strontium	0									0			0.0E+00
Zinc	0.02								966	19.32			1.9E+01
Chloride	12.2									0			0.0E+00
Nitrate	0.203									0			0.0E+00
Sodium	9.6									0			0.0E+00
Sulfate	8.9									0			0.0E+00
Acetone	0.011								0.4	0.0044			4.4E-03
Toluene	0								62.7	0			0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E23

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

$$\text{Total EDI} = \text{EDI soil/sediment} + \text{EDI water} + \text{EDI food}$$
$$\text{Hazard Quotient (HQ)} = \text{Total EDI} / \text{Reference Toxicity Value}$$

HAZARD QUOTIENT (HQ) = TOXIC EDA / REFERENCE TOXICITY VALUE

APPENDIX E
TABLE E23 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	-----	2.7E-01	2.7E-01	1.94
Antimony	0.031	0.0E+00	-----	4.6E-02	4.6E-02	0.34
Arsenic	0.031	0.0E+00	7.1E+00	-----	7.1E+00	51.53
Barium	2.5	0.0E+00	-----	1.3E-02	1.3E-02	0.10
Beryllium	NA	-----	-----	-----	-----	-----
Calcium	NA	-----	-----	-----	-----	-----
Chromium	1.5	0.0E+00	5.8E-01	-----	5.8E-01	4.20
Copper	7	0.0E+00	1.1E-02	-----	1.1E-02	0.08
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	2.1E-02	-----	1.5E-04	2.1E-02	0.15
Manganese	40	0.0E+00	7.9E-02	5.2E-04	7.9E-02	0.58
Nickel	18.29	0.0E+00	1.6E-02	-----	1.6E-02	0.12
Phosphorus	NA	-----	-----	-----	-----	-----
Strontium	120	0.0E+00	-----	4.0E-05	4.0E-05	0.00
Vanadium	0.089	0.0E+00	5.6E+00	-----	5.6E+00	40.47
Zinc	73.2	6.3E-02	4.4E-03	2.2E-05	6.8E-02	0.49
Chloride	NA	-----	-----	-----	-----	-----
Nitrate	290	0.0E+00	-----	5.6E-05	5.6E-05	0.00
Sodium	NA	-----	-----	-----	-----	-----
Sulfate	NA	-----	-----	-----	-----	-----
Acetone	4.6	2.3E-04	2.6E-04	1.9E-04	6.8E-04	0.00
Toluene	6.4	0.0E+00	9.8E-05	-----	9.8E-05	0.00

HI (sum) = 8.4E-02 1.3E+01 3.3E-01 1.4E+01

APPENDIX E
TABLE E23 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
				NA		NA			NA			100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	1.6												0				0.0E+00
Antimony	0.018												0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0.42											20					0.0E+00
Beryllium	0												0				0.0E+00
Calcium	5.5												0				0.0E+00
Chromium	0											283					0.0E+00
Copper	0											290					0.0E+00
Iron	3.4											45					0.0E+00
Lead	0.007												0.315				3.2E-01
Manganese	0.259												0				0.0E+00
Nickel	0											307					0.0E+00
Potassium	0												0				0.0E+00
Strontium	0.06												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.02											966	19.32				1.9E+01
Chloride	12.2												0				0.0E+00
Nitrate	0.203												0				0.0E+00
Sodium	9.6												0				0.0E+00
Sulfate	8.9												0				0.0E+00
Acetone	0.011												0.0044				4.4E-03
Toluene	0											0.4	62.7				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E24
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	3500		1.6		0	4.00E+02	80000	0.022	1	1.40E+00	1.28E-01	1.44E-03	0.00E+00	1.53E+00
Antimony			0.018		0	4.00E+02	80000	0.022	1	4.08E-03	1.44E-03	4.08E-03	0.00E+00	1.44E-03
Arsenic	147.6		0.42		0	4.00E+02	80000	0.022	1	5.90E-02	3.36E-02	3.36E-02	0.00E+00	9.26E-02
Barium	1.19				0	4.00E+02	80000	0.022	1	4.76E-04	4.76E-04	4.76E-04	0.00E+00	4.76E-04
Beryllium			5.5		0	4.00E+02	80000	0.022	1	1.61E-02	4.40E-01	4.40E-01	0.00E+00	4.40E-01
Calcium	40.2				0	4.00E+02	80000	0.022	1	1.42E-03	1.42E-03	1.42E-03	0.00E+00	1.42E-03
Chromium	3.56		3.4		0	4.00E+02	80000	0.022	1	6.40E+00	2.72E-01	2.72E-01	0.00E+00	6.67E+00
Copper	16000		0.007		0	4.00E+02	80000	0.022	1	1.18E-02	5.60E-04	5.60E-04	0.00E+00	1.18E-02
Iron	29.6		0.259		0	4.00E+02	80000	0.022	1	5.84E-02	2.07E-02	2.07E-02	0.00E+00	5.84E-02
Lead	146				0	4.00E+02	80000	0.022	1	5.32E-03	2.68E-01	2.68E-01	0.00E+00	2.68E-01
Manganese	13.8		0.06		0	4.00E+02	80000	0.022	1	9.20E-03	4.80E-03	4.80E-03	0.00E+00	9.20E-03
Nickel	670				0	4.00E+02	80000	0.022	1	6.00E-03	1.60E-03	1.60E-03	0.00E+00	6.00E-03
Strontium	23		0.02		0	4.00E+02	80000	0.022	1	9.76E-01	9.76E-01	9.76E-01	0.00E+00	9.76E-01
Zinc	15		12.2		0	4.00E+02	80000	0.022	1	7.62E-02	7.62E-02	7.62E-02	0.00E+00	1.62E-01
Chloride			0.203		0	4.00E+02	80000	0.022	1	7.12E-01	7.12E-01	7.12E-01	0.00E+00	7.12E-01
Nitrate			9.6		0	4.00E+02	80000	0.022	1	8.80E-04	8.80E-04	8.80E-04	0.00E+00	8.80E-04
Sodium			0.011		0	4.00E+02	80000	0.022	1	2.20E-05	2.20E-05	2.20E-05	0.00E+00	2.20E-05
Sulfate	0.055				0	4.00E+02	80000	0.022	1	1.16E-05	1.16E-05	1.16E-05	0.00E+00	1.16E-05
Acetone	0.029				0	4.00E+02	80000	0.022	1				0.00E+00	
Toluene					0	4.00E+02	80000	0.022	1				0.00E+00	

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E24 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	2.9E+00	2.7E-01	3.2E+00	90.41
Antimony	0.031	0.0E+00	-----	4.6E-02	4.6E-02	1.31
Arsenic	0.031	0.0E+00	1.3E-01	-----	1.3E-01	3.72
Barium	2.5	0.0E+00	2.4E-02	1.3E-02	3.7E-02	1.05
Beryllium	NA	-----	-----	-----	-----	-----
Calcium	NA	-----	-----	-----	-----	-----
Chromium	1.5	0.0E+00	1.1E-02	-----	1.1E-02	0.30
Copper	7	0.0E+00	2.0E-04	-----	2.0E-04	0.01
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	8.6E-04	3.2E-03	1.5E-04	4.2E-03	0.12
Manganese	40	0.0E+00	1.5E-03	5.2E-04	2.0E-03	0.06
Nickel	18.29	0.0E+00	3.0E-04	-----	3.0E-04	0.01
Potassium	NA	-----	-----	-----	-----	-----
Strontium	120	0.0E+00	1.0E-01	4.0E-05	4.0E-05	0.00
Titanium	0.089	0.0E+00	-----	1.0E-01	1.0E-01	2.92
Zinc	73.2	2.6E-03	8.2E-05	2.2E-05	2.7E-05	0.08
Chloride	NA	-----	-----	-----	-----	-----
Nitrate	290	0.0E+00	-----	5.6E-05	5.6E-05	0.00
Sulfate	NA	-----	-----	-----	-----	-----
Sodium	NA	-----	-----	-----	-----	-----
Acetone	4.6	9.6E-06	4.8E-06	1.9E-04	2.1E-04	0.01
Toluene	6.4	0.0E+00	1.8E-06	-----	1.8E-06	0.00
		3.5E-03	3.2E+00	3.3E-01	3.5E+00	

APPENDIX E
TABLE E24 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc. (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc. (mg/kg)	Invert UF	% Diet	Est. Invert Conc. (mg/kg)	Fish UF	% Diet	Est. Fish Conc. (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc. (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)			(E)	(A+B+C+D+E)
Aluminum	1.6												0				0.0E+00
Antimony	0.018												0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0.42											20					0.0E+00
Beryllium	0												0				0.0E+00
Calcium	5.5												0				0.0E+00
Chromium	0												0				0.0E+00
Copper	0												0				0.0E+00
Iron	3.4												0				0.0E+00
Lead	0.007												0				0.0E+00
Manganese	0.259											45	0.315				3.2E-01
Nickel	0												0				0.0E+00
Potassium	0.06												0				0.0E+00
Strontium	0												0				0.0E+00
Vanadium	0.02												0				0.0E+00
Zinc	12.2												0				0.0E+00
Chloride	0.203											966	19.32				1.9E+01
Nitrate	9.6												0				0.0E+00
Sodium	8.9												0				0.0E+00
Sulfate	0.011												0				0.0E+00
Acetone	0												0.0044				4.4E-03
Toluene	0												0				0.0E+00

APPENDIX E
TABLE E25
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	30400			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.52E+03	0.00E+00	1.52E+03
Arsenic	9.15			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	4.58E-01	0.00E+00	4.58E-01
Barium	451			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.26E+01	0.00E+00	2.26E+01
Beryllium	2.01			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.01E-01	0.00E+00	1.01E-01
Cadmium	0.989			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	4.95E-02	0.00E+00	4.95E-02
Calcium	3400			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.70E+02	0.00E+00	1.70E+02
Chromium	59.1			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.96E+00	0.00E+00	2.96E+00
Cobalt	17.9			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	8.95E-01	0.00E+00	8.95E-01
Copper	38.7			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.94E+00	0.00E+00	1.94E+00
Iron	31400			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.57E+03	0.00E+00	1.57E+03
Lead	542			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.71E+01	0.00E+00	2.71E+01
Magnesium	1790			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	8.95E+01	0.00E+00	8.95E+01
Manganese	611			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	3.06E+01	0.00E+00	3.06E+01
Mercury	1.66			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	8.30E-02	0.00E+00	8.30E-02
Nickel	25.3			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.27E+00	0.00E+00	1.27E+00
Potassium	2100			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.05E+02	0.00E+00	1.05E+02
Selenium	2.31			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.16E-01	0.00E+00	1.16E-01
Silver	17.6			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	8.80E-01	0.00E+00	8.80E-01
Sodium	54.2			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.71E+00	0.00E+00	2.71E+00
Thallium	2.69			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.35E-01	0.00E+00	1.35E-01
Vanadium	43.1			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.16E+00	0.00E+00	2.16E+00
Zinc	201			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.01E+01	0.00E+00	1.01E+01
Perchlorate	0.0943		0.0096	0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	4.72E-03	1.06E-03	5.78E-03
Arenophenylsone	1.44			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	7.20E-02	0.00E+00	7.20E-02
Benzo(a)anthracene	2.98			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.49E-01	0.00E+00	1.49E-01
Benzo(b)pyrene	3.02			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.30E-01	0.00E+00	1.30E-01
Benzo(k)fluoranthene	2.72			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.51E-01	0.00E+00	1.51E-01
Benzo(a)fluoranthene	1.09			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.36E-01	0.00E+00	1.36E-01
Chrysene	2.87			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	5.45E-02	0.00E+00	5.45E-02
Dibenz(a,h)anthracene	0.885			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.44E-01	0.00E+00	1.44E-01
Fluorene	0.0781			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	4.43E-02	0.00E+00	4.43E-02
Fluoranthene	5.91			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	3.91E-03	0.00E+00	3.91E-03
Phenanthrene	0.453			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.97E-01	0.00E+00	2.97E-01
3-Methylphenol	0.0832			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.27E-02	0.00E+00	2.27E-02
4-Methylphenol	0.0832			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	4.16E-03	0.00E+00	4.16E-03
Phenol	0.0668			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	2.34E-01	0.00E+00	2.34E-01
Acetone	1.35			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	3.34E-03	0.00E+00	3.34E-03
Carbon Disulfide	0.177			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	6.75E-02	0.00E+00	6.75E-02
Ethylbenzene	0.00353			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	8.85E-03	0.00E+00	8.85E-03
Trichlorofluoromethane	0.0107			0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	1.77E-04	0.00E+00	1.77E-04
				0.0E+00	0.00E+00	5.00E+04	1.00E+05	1750000	0.125	0.00E+00	5.53E-04	0.00E+00	5.53E-04

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E25 (continued)
BELTED KINGFISHER - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	1.4E+01	1.4E+01	1.4E+01	24.23
Arsenic	2.5	0.0E+00	1.8E-01	1.8E-01	1.8E-01	0.32
Barium	20.8	0.0E+00	1.1E+00	1.1E+00	1.1E+00	1.90
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	1.45	0.0E+00	3.4E-02	3.4E-02	3.4E-02	0.06
Calcium	NA	NA	NA	NA	NA	NA
Chromium	1	0.0E+00	3.0E+00	3.0E+00	3.0E+00	5.17
Cobalt	NA	NA	NA	NA	NA	NA
Copper	47	0.0E+00	4.1E-02	4.1E-02	4.1E-02	0.07
Iron	NA	NA	NA	NA	NA	NA
Lead	1.13	0.0E+00	2.4E+01	2.4E+01	2.4E+01	41.94
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	997	0.0E+00	3.1E-02	3.1E-02	3.1E-02	0.05
Mercury	0.006	0.0E+00	1.4E+01	1.4E+01	1.4E+01	24.19
Nickel	77.4	0.0E+00	1.6E-02	1.6E-02	1.6E-02	0.03
Potassium	NA	NA	NA	NA	NA	NA
Selenium	0.4	0.0E+00	2.9E-01	2.9E-01	2.9E-01	0.50
Silver	NA	NA	NA	NA	NA	NA
Sroutium	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA
Vanadium	11.4	0.0E+00	1.9E-01	1.9E-01	1.9E-01	0.33
Zinc	14.5	0.0E+00	6.9E-01	6.9E-01	6.9E-01	1.21
Acenaphthylene	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA
1-Methylphenol	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA

HI (sum) = 0.0E+00 5.7E+01 0.0E+00 57

APPENDIX E
TABLE E25 (continued)
BELTED KINGFISHER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF (mg/kg)	% Diet NA	Est. Plant Conc (mg/kg)	Worm UF (mg/kg)	% Diet NA	Est. Worm Conc (mg/kg)	Invert UF (mg/kg)	% Diet NA	Est. Invert Conc (mg/kg)	Fish UF BAF	% Diet 100%	Est. Fish Conc (mg/kg)	Mammal UF (mg/kg)	% Diet NA	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
Aluminum	0	0		0													0.0E+00
Ammonia	0	0		0													0.0E+00
Barium	0	0		0													0.0E+00
Beryllium	0	0		0													0.0E+00
Cadmium	0	0		0													0.0E+00
Calcium	0	0		0													0.0E+00
Chromium	0	0		0													0.0E+00
Cobalt	0	0		0													0.0E+00
Copper	0	0		0													0.0E+00
Iron	0	0		0													0.0E+00
Lead	0	0		0													0.0E+00
Magnesium	0	0		0													0.0E+00
Manganese	0	0		0													0.0E+00
Mercury	0	0		0													0.0E+00
Nickel	0	0		0													0.0E+00
Potassium	0	0		0													0.0E+00
Selenium	0	0		0													0.0E+00
Silver	0	0		0													0.0E+00
Strontium	0	0		0													0.0E+00
Thallium	0	0		0													0.0E+00
Vanadium	0	0		0													0.0E+00
Zinc	0.0096	0		0													0.0E+00
Perchlorate	0	0		0													0.0E+00
Acenaphthylene	0	0		0													0.0E+00
Anthracene	0	0		0													0.0E+00
Benzo(a)anthracene	0	0		0													0.0E+00
Benzo(b)pyrene	0	0		0													0.0E+00
Benzo(b)fluoranthene	0	0		0													0.0E+00
Benzo(g,h)perylene	0	0		0													0.0E+00
Benzo(k)fluoranthene	0	0		0													0.0E+00
Chrysene	0	0		0													0.0E+00
Dibenz(a,h)anthracene	0	0		0													0.0E+00
Dibenzofuran	0	0		0													0.0E+00
Fluoranthene	0	0		0													0.0E+00
Fluorene	0	0		0													0.0E+00
3-Methylphenol	0	0		0													0.0E+00
4-Methylphenol	0	0		0													0.0E+00
Phenanthrene	0	0		0													0.0E+00
Phenol	0	0		0													0.0E+00
Acetone	0	0		0													0.0E+00
Carbon Disulfide	0	0		0													0.0E+00
Ethylbenzene	0	0		0													0.0E+00
Trichlorofluoromethane	0	0		0													0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E26
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	30400		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.82E+02	0.00E+00	1.82E+02
Arsenic	9.15		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.49E+02	0.00E+00	5.49E+02
Barium	451		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.71E+00	0.00E+00	2.71E+00
Beryllium	2.01		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.21E+02	0.00E+00	1.21E+02
Cadmium	0.989		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.91E+03	0.00E+00	5.91E+03
Calcium	3400		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.04E+01	0.00E+00	2.04E+01
Chromium	59.1		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.55E+01	0.00E+00	3.55E+01
Cobalt	17.9		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.07E+01	0.00E+00	1.07E+01
Copper	38.7		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.32E+01	0.00E+00	2.32E+01
Iron	31400		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.88E+02	0.00E+00	1.88E+02
Lead	542		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.35E+00	0.00E+00	3.35E+00
Magnesium	1790		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.07E+01	0.00E+00	1.07E+01
Manganese	611		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.07E+00	0.00E+00	3.07E+00
Mercury	1.66		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	9.96E+03	0.00E+00	9.96E+03
Nickel	25.3		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.52E+01	0.00E+00	1.52E+01
Potassium	2100		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.26E+01	0.00E+00	1.26E+01
Selenium	2.31		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.39E+02	0.00E+00	1.39E+02
Silver	17.6		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.06E+01	0.00E+00	1.06E+01
Sroutium	54.2		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.25E+01	0.00E+00	3.25E+01
Thallium	2.69		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.61E+02	0.00E+00	1.61E+02
Vanadium	43.1		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.59E+01	0.00E+00	2.59E+01
Zinc	201		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.21E+00	0.00E+00	1.21E+00
Perchlorate	0.0943	0.0096	0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.66E+04	0.00E+00	5.66E+04
Acenaphthylene	1.44		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.64E+03	0.00E+00	8.64E+03
Anthracene	2.98		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.79E+02	0.00E+00	1.79E+02
Benzo(a)anthracene	2.59		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.55E+02	0.00E+00	1.55E+02
Benzo(a)pyrene	3.02		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.81E+02	0.00E+00	1.81E+02
Benzo(b)fluoranthene	2.72		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.63E+02	0.00E+00	1.63E+02
Benzo(g,h,i)perylene	1.09		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.54E+03	0.00E+00	6.54E+03
Benzo(k)fluoranthene	2.87		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.72E+02	0.00E+00	1.72E+02
Chrysene	0.885		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	5.31E+03	0.00E+00	5.31E+03
Dibenz(a,h)anthracene	0.0781		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.69E+04	0.00E+00	4.69E+04
Dibenzofuran	5.93		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	3.56E+02	0.00E+00	3.56E+02
Fluorene	0.453		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.72E+03	0.00E+00	2.72E+03
3-Methylphenol	0.0832		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.99E+04	0.00E+00	4.99E+04
4-Methylphenol	0.0832		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.99E+04	0.00E+00	4.99E+04
Phenanthrene	4.67		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.80E+02	0.00E+00	2.80E+02
Phenol	0.0668		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	4.01E+04	0.00E+00	4.01E+04
Acetone	1.35		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	8.10E+03	0.00E+00	8.10E+03
Carbon Disulfide	0.177		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	1.06E+03	0.00E+00	1.06E+03
Bibenzene	0.00353		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	2.12E+05	0.00E+00	2.12E+05
Trichlorofluoromethane	0.0107		0.0E+00	0.0E+00	6.00E+03	5.00E+04	210000	1.2	1	0.00E+00	6.42E+05	0.00E+00	6.42E+05

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E26 (continued)
OSPREY - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	NOAEL RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	109.7	0.0E+00	1.7E+00	---	1.7E+00	24.23
Arsenic	2.5	0.0E+00	2.2E-02	---	2.2E-02	0.32
Barium	20.8	0.0E+00	1.3E-01	---	1.3E-01	1.90
Beryllium	NA	---	---	---	---	---
Cadmium	1.45	0.0E+00	4.1E-03	---	4.1E-03	0.06
Calcium	NA	---	---	---	---	---
Chromium	1	0.0E+00	3.5E-01	---	3.5E-01	5.17
Cobalt	NA	---	---	---	---	---
Copper	47	0.0E+00	4.9E-03	---	4.9E-03	0.07
Iron	NA	---	---	---	---	---
Lead	1.13	0.0E+00	2.9E+00	---	2.9E+00	41.94
Magnesium	NA	---	---	---	---	---
Manganese	997	0.0E+00	3.7E-03	---	3.7E-03	0.05
Mercury	0.006	0.0E+00	1.7E+00	---	1.7E+00	24.19
Nickel	77.4	0.0E+00	2.0E-03	---	2.0E-03	0.03
Potassium	NA	---	---	---	---	---
Selenium	0.4	0.0E+00	3.5E-02	---	3.5E-02	0.50
Silver	NA	---	---	---	---	---
Sroutium	NA	---	---	---	---	---
Thallium	NA	---	---	---	---	---
Vanadium	11.4	0.0E+00	2.3E-02	---	2.3E-02	0.33
Zinc	14.5	0.0E+00	8.3E-02	---	8.3E-02	1.21
Perchlorate	NA	---	---	---	---	---
Acenaphthylene	NA	---	---	---	---	---
Anthracene	NA	---	---	---	---	---
Benzo(a)anthracene	NA	---	---	---	---	---
Benzo(a)pyrene	NA	---	---	---	---	---
Benzo(b)fluoranthene	NA	---	---	---	---	---
Benzo(ghi)perylene	NA	---	---	---	---	---
Benzo(k)fluoranthene	NA	---	---	---	---	---
Chrysene	NA	---	---	---	---	---
Dibenzo(a,h)anthracene	NA	---	---	---	---	---
Dibenzofuran	NA	---	---	---	---	---
Fluoranthene	NA	---	---	---	---	---
Fluorene	NA	---	---	---	---	---
1-Methylphenol	NA	---	---	---	---	---
4-Methylphenol	NA	---	---	---	---	---
Phenanthrene	NA	---	---	---	---	---
Phenol	NA	---	---	---	---	---
Acetone	NA	---	---	---	---	---
Carbon Disulfide	NA	---	---	---	---	---
Ethylbenzene	NA	---	---	---	---	---
Trichlorofluoromethane	NA	---	---	---	---	---

HI (sum)=

0.0E+00

6.9E+00

0.0E+00

6.9E+00

APPENDIX E
TABLE E26 (continued)
OSPREY - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF % Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF % Diet	Est. Invert Conc (mg/kg)	Fish UF % Diet	Est. Fish Conc (mg/kg)	Mammal UF % Diet	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
		NA	(A)		NA	(B)	NA	(C)	100%	(D)	NA	(E)	(A+B+C+D+E)
Aluminum	0								20	0			0.0E+00
Arsenic	0									0			0.0E+00
Barium	0									0			0.0E+00
Beryllium	0									0			0.0E+00
Cadmium	0									0			0.0E+00
Calcium	0									0			0.0E+00
Chromium	0								283	0			0.0E+00
Cobalt	0								290	0			0.0E+00
Copper	0									0			0.0E+00
Iron	0								45	0			0.0E+00
Lead	0									0			0.0E+00
Magnesium	0									0			0.0E+00
Manganese	0									0			0.0E+00
Mercury	0									0			0.0E+00
Nickel	0								307	0			0.0E+00
Potassium	0									0			0.0E+00
Selenium	0								129	0			0.0E+00
Silver	0									0			0.0E+00
Strontium	0								1400	0			0.0E+00
Thallium	0									0			0.0E+00
Vanadium	0								966	0			0.0E+00
Zinc	0.0096									0			0.0E+00
Perchlorate	0									0			0.0E+00
Arenaphthylene	0									0			0.0E+00
Anthracene	0									0			0.0E+00
Benzo(a)anthracene	0									0			0.0E+00
Benzo(b)pyrene	0								9950	0			0.0E+00
Benzo(k)fluoranthene	0									0			0.0E+00
Benzo(g)fluoranthene	0									0			0.0E+00
Chrysene	0									0			0.0E+00
Dibenz(a,h)anthracene	0									0			0.0E+00
Dibenzofuran	0								15700	0			0.0E+00
Fluoranthene	0									0			0.0E+00
Fluorene	0									0			0.0E+00
1-Methylphenol	0									0			0.0E+00
4-Methylphenol	0									0			0.0E+00
Phenanthrene	0									0			0.0E+00
Phenol	0									0			0.0E+00
Acetone	0								0.4	0			0.0E+00
Carbon Disulfide	0								19.5	0			0.0E+00
Ethylbenzene	0									0			0.0E+00
Trichlorofluoromethane	0								49.4	0			0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values based exceed 1.0

APPENDIX E
TABLE E27
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - Food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum		10400		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1				0.00E+00	0.00E+00
Arsenic		9.15		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.98E-01		0.00E+00	1.98E-01
Barium		451		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1				0.00E+00	0.00E+00
Beryllium		2.01		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		4.34E-02		0.00E+00	4.34E-02
Bismuth		0.989		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		7.34E-01		0.00E+00	7.34E-01
Calcium		3400		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.28E+00		0.00E+00	1.28E+00
Chromium		59.1		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		3.87E-01		0.00E+00	3.87E-01
Cobalt		17.9		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		8.36E-01		0.00E+00	8.36E-01
Copper		38.7		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		6.78E-02		0.00E+00	6.78E-02
Iron		31400		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		3.87E+01		0.00E+00	3.87E+01
Lead		542		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.32E+01		0.00E+00	1.32E+01
Magnesium		1790		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		3.59E-02		0.00E+00	3.59E-02
Manganese		611		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		5.46E-01		0.00E+00	5.46E-01
Mercury		1.66		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		4.54E+01		0.00E+00	4.54E+01
Nickel		24.3		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		4.99E-02		0.00E+00	4.99E-02
Potassium		2100		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.17E+00		0.00E+00	1.17E+00
Selenium		2.31		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		9.31E-02		0.00E+00	9.31E-02
Silver		17.6		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		4.34E-00		0.00E+00	4.34E-00
Sodium		54.2		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		2.04E-03		0.00E+00	2.04E-03
Strontium		2.09		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		3.11E-02		0.00E+00	3.11E-02
Thallium		43.1		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		6.44E-02		0.00E+00	6.44E-02
Zinc		201	0.0096	0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		5.39E-02		0.00E+00	5.39E-02
Perchlorate		0.0943		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		6.32E-02		0.00E+00	6.32E-02
Arenophenylene		1.44		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		2.35E-02		0.00E+00	2.35E-02
Anthrane		2.98		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		6.20E-02		0.00E+00	6.20E-02
Benzo(a)anthracene		2.59		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.91E-02		0.00E+00	1.91E-02
Benzo(a)pyrene		3.02		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.89E-03		0.00E+00	1.89E-03
Benzo(b)fluoranthene		2.72		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.28E-01		0.00E+00	1.28E-01
Benzo(g,h,i)perylene		1.09		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Benzo(k)fluoranthene		2.87		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Chrysene		0.385		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Dibenz(a,h)anthracene		0.0781		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Dibenzofuran		5.93		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Fluoranthene		0.453		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Fluorene		0.0832		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
3-Methylphenol		0.0832		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
4-Methylphenol		4.67		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Phenanthrene		0.0668		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Phenol		1.35		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Acetone		0.177		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Carbon Disulfide		0.00353		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Ethylbenzene		0.0107		0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03
Trichlorofluoromethane				0.0E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1		1.80E-03		0.00E+00	1.80E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E27 (continued)
RIVER OTTER - HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total HI (%)
Aluminum	0.478	0.0E+00	-----	-----	0.0E+00	0.00
Arsenic	0.031	0.0E+00	6.4E+00	-----	6.4E+00	15.03
Barium	2.5	0.0E+00	-----	-----	0.0E+00	0.00
Beryllium	NA	-----	-----	-----	-----	-----
Cadmium	0.441	0.0E+00	4.8E+02	-----	4.8E+02	0.11
Chromium	NA	-----	-----	-----	-----	-----
Chromium	1.5	0.0E+00	8.5E+01	-----	8.5E+01	2.01
Cobalt	NA	-----	-----	-----	-----	-----
Copper	7	0.0E+00	1.2E+01	-----	1.2E+01	0.28
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	0.0E+00	-----	-----	0.0E+00	0.00
Magnesium	NA	-----	-----	-----	-----	-----
Manganese	40	0.0E+00	3.3E+01	-----	3.3E+01	0.78
Mercury	0.009	0.0E+00	4.0E+00	-----	4.0E+00	9.39
Nickel	18.29	0.0E+00	3.0E+02	-----	3.0E+02	0.07
Potassium	NA	-----	-----	-----	-----	-----
Selenium	0.091	0.0E+00	5.5E+01	-----	5.5E+01	1.29
Silver	NA	-----	-----	-----	-----	-----
Strontium	120	0.0E+00	9.8E+03	-----	9.8E+03	0.02
Thallium	0.003	0.0E+00	1.9E+01	-----	1.9E+01	45.66
Vanadium	0.089	0.0E+00	1.0E+01	-----	1.0E+01	24.66
Zinc	73.2	0.0E+00	5.9E+02	-----	5.9E+02	0.14
Pentachloroethane	NA	-----	-----	-----	-----	-----
Acenaphthylene	NA	-----	-----	-----	-----	-----
Anthracene	NA	-----	-----	-----	-----	-----
Benzo(a)anthracene	NA	-----	-----	-----	-----	-----
Benzo(a)pyrene	0.25	0.0E+00	2.2E+01	-----	2.2E+01	0.53
Benzo(b)fluoranthene	NA	-----	-----	-----	-----	-----
Benzo(k)fluoranthene	NA	-----	-----	-----	-----	-----
Benzo(e)pyrene	NA	-----	-----	-----	-----	-----
Chrysene	NA	-----	-----	-----	-----	-----
Dibenz(a,h)anthracene	NA	-----	-----	-----	-----	-----
Dibenzofuran	NA	-----	-----	-----	-----	-----
Fluoranthene	NA	-----	-----	-----	-----	-----
Fluorene	NA	-----	-----	-----	-----	-----
3-Methylphenol	NA	-----	-----	-----	-----	-----
4-Methylphenol	NA	-----	-----	-----	-----	-----
Phenanthrene	NA	-----	-----	-----	-----	-----
Phenol	NA	-----	-----	-----	-----	-----
Acetone	4.6	0.0E+00	6.3E+03	-----	6.3E+03	0.01
Carbon Disulfide	NA	-----	-----	-----	-----	-----
Ethylbenzene	NA	-----	-----	-----	-----	-----
Trichlorofluoromethane	NA	-----	-----	-----	-----	-----

HI (sum) = 0.0E+00 4.2E+01 0.0E+00 4.2E+01

APPENDIX E
TABLE E27 (continued)
RIVER OTTER - Uptake Factors and Food Concentrations
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF	% Diet	Est. Invert Conc (mg/kg)	Fish UF	% Diet	Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	Total Food Conc. (mg/kg)
			NA	(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	0												0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0												0				0.0E+00
Beryllium	0												0				0.0E+00
Cadmium	0												0				0.0E+00
Calcium	0												0				0.0E+00
Chromium	0												0				0.0E+00
Cobalt	0												0				0.0E+00
Copper	0												0				0.0E+00
Iron	0												0				0.0E+00
Lead	0												0				0.0E+00
Magnesium	0												0				0.0E+00
Manganese	0												0				0.0E+00
Mercury	0												0				0.0E+00
Nickel	0												0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0												0				0.0E+00
Silver	0												0				0.0E+00
Strontium	0												0				0.0E+00
Thallium	0												0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.009%												0				0.0E+00
Pentachloro													0				0.0E+00
Acenaphthylene													0				0.0E+00
Anthracene													0				0.0E+00
Benzo(a)anthracene													0				0.0E+00
Benzo(b)pyrene													0				0.0E+00
Benzo(b)fluoranthene													0				0.0E+00
Benzo(g,h,i)perylene													0				0.0E+00
Benzo(k)fluoranthene													0				0.0E+00
Chrysene													0				0.0E+00
Dibenz(a,h)anthracene													0				0.0E+00
Dibenzofuran													0				0.0E+00
Fluoranthene													0				0.0E+00
Fluorene													0				0.0E+00
3-Methylphenol													0				0.0E+00
4-Methylphenol													0				0.0E+00
Phenanthrene													0				0.0E+00
Phenol													0				0.0E+00
Acetone													0				0.0E+00
Carbon Disulfide													0				0.0E+00
Ethylbenzene													0				0.0E+00
Trichlorofluoromethane													0				0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI (soil/sediment + EDI water + EDI food)

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E2B
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg) <i>n=5 f</i>	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Food (mg/kg)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - soil (mg/kg-day)	EDI - sed. (mg/kg-day)	EDI - SW (mg/kg-day)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)
Aluminum	30400			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.22E+01	---	0.00E+00	1.22E+01
Arsenic	9.15			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.66E-03	---	0.00E+00	3.66E-03
Barium	451			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.80E-01	---	0.00E+00	1.80E-01
Beryllium	2.01			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	8.04E-04	---	0.00E+00	8.04E-04
Cadmium	0.969			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.96E-04	---	0.00E+00	3.96E-04
Calcium	3400			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.36E+00	---	0.00E+00	1.36E+00
Chromium	59.1			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.36E-02	---	0.00E+00	2.36E-02
Cobalt	17.9			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	7.16E-03	---	0.00E+00	7.16E-03
Copper	38.7			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.55E-02	---	0.00E+00	1.55E-02
Iron	31400			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.26E+01	---	0.00E+00	1.26E+01
Lead	542			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.17E-01	---	0.00E+00	2.17E-01
Magnesium	1790			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	7.16E-01	---	0.00E+00	7.16E-01
Manganese	611			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.44E-01	---	0.00E+00	2.44E-01
Mercury	1.66			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	6.64E-04	---	0.00E+00	6.64E-04
Nickel	25.3			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.01E-02	---	0.00E+00	1.01E-02
Potassium	2100			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	8.40E-01	---	0.00E+00	8.40E-01
Selenium	2.31			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	9.24E-04	---	0.00E+00	9.24E-04
Silver	17.6			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	7.04E-03	---	0.00E+00	7.04E-03
Sulfur	54.2			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.17E-02	---	0.00E+00	2.17E-02
Thallium	2.69			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.08E-03	---	0.00E+00	1.08E-03
Vanadium	43.1			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.72E-02	---	0.00E+00	1.72E-02
Zinc	201			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	8.04E-02	---	0.00E+00	8.04E-02
Pentachloroethane	0.0943		0.0096	0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.77E-05	7.68E-04	0.00E+00	3.77E-05
Acenaphthylene	1.44			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	5.76E-04	---	0.00E+00	5.76E-04
Anthracene	2.98			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.19E-03	---	0.00E+00	1.19E-03
Benzo(a)anthracene	2.59			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.04E-03	---	0.00E+00	1.04E-03
Benzo(b)fluoranthene	3.02			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.21E-03	---	0.00E+00	1.21E-03
Benzo(k)fluoranthene	2.72			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.09E-03	---	0.00E+00	1.09E-03
Benzo(a)pyrene	1.09			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	4.36E-04	---	0.00E+00	4.36E-04
Chrysene	2.87			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.15E-03	---	0.00E+00	1.15E-03
Dibenz(a,h)anthracene	0.885			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.54E-04	---	0.00E+00	3.54E-04
Dibenzofuran	0.0781			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.12E-05	---	0.00E+00	3.12E-05
Fluoranthene	0.453			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.37E-03	---	0.00E+00	2.37E-03
Indene	0.0832			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.81E-04	---	0.00E+00	1.81E-04
1-Methylphenol	0.0832			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.33E-05	---	0.00E+00	3.33E-05
4-Methylphenol	0.0832			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	3.33E-05	---	0.00E+00	3.33E-05
Phenanthrene	4.67			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.87E-03	---	0.00E+00	1.87E-03
Phenol	0.0668			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	2.67E-05	---	0.00E+00	2.67E-05
Acetone	1.35			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	5.40E-04	---	0.00E+00	5.40E-04
Carbon Disulfide	0.177			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	7.08E-05	---	0.00E+00	7.08E-05
Ethylbenzene	0.00353			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	1.41E-06	---	0.00E+00	1.41E-06
Trichloroethylene	0.0107			0.0E+00	0	4.00E+02	80000	10000	0.022	1	---	4.28E-06	---	0.00E+00	4.28E-06

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E28 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	RTV-ingestion (mg/kg-day)	Food Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient	Chemical Percent of Total III (%)
Aluminum	0.478	0.0E+00	2.5E+01	-----	2.5E+01	96.52
Arsenic	0.031	0.0E+00	1.2E-01	-----	1.2E-01	0.45
Barium	2.5	0.0E+00	7.2E-02	-----	7.2E-02	0.27
Beryllium	NA	-----	-----	-----	-----	-----
Cadmium	0.441	0.0E+00	9.0E-04	-----	9.0E-04	0.00
Calcium	NA	-----	-----	-----	-----	-----
Chromium	1.5	0.0E+00	1.6E-02	-----	1.6E-02	0.06
Cobalt	NA	-----	-----	-----	-----	-----
Copper	7	0.0E+00	2.2E-03	-----	2.2E-03	0.01
Iron	NA	-----	-----	-----	-----	-----
Lead	3.66	0.0E+00	5.9E-02	-----	5.9E-02	0.22
Magnesium	NA	-----	-----	-----	-----	-----
Manganese	40	0.0E+00	6.1E-03	-----	6.1E-03	0.02
Mercury	0.009	0.0E+00	7.4E-02	-----	7.4E-02	0.28
Nickel	18.29	0.0E+00	5.5E-04	-----	5.5E-04	0.00
Potassium	NA	-----	-----	-----	-----	-----
Selenium	0.091	0.0E+00	1.0E-02	-----	1.0E-02	0.04
Silver	NA	-----	-----	-----	-----	-----
Strontium	120	0.0E+00	1.8E-04	-----	1.8E-04	0.00
Thallium	0.003	0.0E+00	3.6E-01	-----	3.6E-01	1.36
Vanadium	0.089	0.0E+00	1.9E-01	-----	1.9E-01	0.73
Zinc	73.2	0.0E+00	1.1E-03	-----	1.1E-03	0.00
Perchlorate	NA	-----	-----	-----	-----	-----
Acenaphthylene	NA	-----	-----	-----	-----	-----
Anthracene	NA	-----	-----	-----	-----	-----
Benzo(a)anthracene	NA	-----	-----	-----	-----	-----
Benzo(a)pyrene	0.25	0.0E+00	4.1E-03	-----	4.1E-03	0.02
Benzo(b)fluoranthene	NA	-----	-----	-----	-----	-----
Benzo(g,h,i)perylene	NA	-----	-----	-----	-----	-----
Benzo(k)fluoranthene	NA	-----	-----	-----	-----	-----
Chrysene	NA	-----	-----	-----	-----	-----
Dibenzo(a,h)anthracene	NA	-----	-----	-----	-----	-----
Dibenzofuran	NA	-----	-----	-----	-----	-----
Fluoranthene	NA	-----	-----	-----	-----	-----
Fluorene	NA	-----	-----	-----	-----	-----
3-Methylphenol	NA	-----	-----	-----	-----	-----
4-Methylphenol	NA	-----	-----	-----	-----	-----
Phenanthrene	NA	-----	-----	-----	-----	-----
Phenol	NA	-----	-----	-----	-----	-----
Acetone	4.6	0.0E+00	1.2E-04	-----	1.2E-04	0.00
Carbon Disulfide	NA	-----	-----	-----	-----	-----
Ethylbenzene	NA	-----	-----	-----	-----	-----
Trichlorofluoromethane	NA	-----	-----	-----	-----	-----

0.0E+00 2.6E+01 0.0E+00 2.6E+01

APPENDIX E
TABLE E28 (continued)
ALLIGATOR SNAPPING TURTLE
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Surface Water (mg/L)	Plant UF	% Diet	Est. Plant Conc (mg/kg)	Worm UF (or Intercept & slope)	% Diet	Est. Worm Conc (mg/kg)	Invert UF	% Diet	Est. Invert Conc (mg/kg)	Fish UF	% Diet	Est. Fish Conc (mg/kg)	Mammal UF	% Diet	Est. Mammal Conc (mg/kg)	Total Food Conc (mg/kg)
		NA		(A)		NA	(B)		NA	(C)		100%	(D)		NA	(E)	(A+B+C+D+E)
Aluminum	0										20		0				0.0E+00
Arsenic	0												0				0.0E+00
Barium	0												0				0.0E+00
Beryllium	0												0				0.0E+00
Cadmium	0												0				0.0E+00
Calcium	0										283		0				0.0E+00
Chromium	0												0				0.0E+00
Cobalt	0										290		0				0.0E+00
Copper	0												0				0.0E+00
Iron	0										45		0				0.0E+00
Lead	0												0				0.0E+00
Magnesium	0												0				0.0E+00
Manganese	0												0				0.0E+00
Mercury	0										307		0				0.0E+00
Molybdenum	0												0				0.0E+00
Nickel	0										129		0				0.0E+00
Potassium	0												0				0.0E+00
Selenium	0												0				0.0E+00
Silver	0										1400		0				0.0E+00
Sodium	0												0				0.0E+00
Thallium	0										966		0				0.0E+00
Vanadium	0												0				0.0E+00
Zinc	0.009%												0				0.0E+00
Acetate	0												0				0.0E+00
Acetophenone	0												0				0.0E+00
Anthracene	0												0				0.0E+00
Benzo(a)anthracene	0												0				0.0E+00
Benzo(b)pyrene	0												0				0.0E+00
Benzo(k)fluoranthene	0												0				0.0E+00
Benzo(a)pyrene	0												0				0.0E+00
Benzo(b)fluoranthene	0												0				0.0E+00
Chrysene	0												0				0.0E+00
Dibenz(a,h)anthracene	0												0				0.0E+00
Dibenz(a,h)anthracene	0												0				0.0E+00
Fluoranthene	0												0				0.0E+00
Fluoranthene	0												0				0.0E+00
1-Methylphenol	0												0				0.0E+00
4-Methylphenol	0												0				0.0E+00
Phenanthrene	0												0				0.0E+00
Phenol	0												0				0.0E+00
Acetone	0												0				0.0E+00
Carbon Disulfide	0												0				0.0E+00
Ethylbenzene	0												0				0.0E+00
Trichlorofluoromethane	0												0				0.0E+00

APPENDIX E
TABLE E29
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate Soil (mg/kg-day)	Ingestion Rate Sed (mg/kg-day)	Ingestion Rate SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RfD-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	22200	12000	4.6	0.00E+00	5.00E-04	1.00E+05	0.125	1	2.10E+04	2.10E+04	109.7	1.9E+02	-----	-----	1.9E+02
Antimony	8.5	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Arsenic	11.5	7.62	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.33E+01	1.33E+01	2.5	5.3E+00	-----	-----	5.3E+00
Barium	255	100	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.75E+02	1.75E+02	20.8	8.4E+00	-----	-----	8.4E+00
Bismuth	3.3	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	1.45	-----	-----	-----	0.0E+00
Cadmium	18000	1000	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.75E+03	1.75E+03	NA	-----	-----	-----	-----
Chromium	47.6	18	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	3.15E+01	3.15E+01	1	3.2E+01	-----	-----	3.2E+01
Cobalt	19	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Copper	429	10.6	8.4	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.86E+01	1.86E+01	47	3.9E+01	-----	-----	3.9E+01
Lead	43000	20500	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	3.50E+04	3.50E+04	NA	-----	-----	-----	-----
Magnesium	259	18.7	0.004	0.00E+00	5.00E-04	1.00E+05	0.125	1	3.27E+01	3.27E+01	1.13	2.9E+01	-----	-----	2.9E+01
Manganese	3330	1000	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.75E+03	1.75E+03	NA	-----	-----	-----	-----
Mercury	1030	180	0.252	0.00E+00	5.00E-04	1.00E+05	0.125	1	3.15E+02	3.15E+02	0.006	3.2E+01	-----	-----	3.2E+01
Nickel	43.7	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	77.4	-----	-----	-----	0.0E+00
Potassium	18	1500	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	2.63E+03	2.63E+03	NA	-----	-----	-----	-----
Selenium	1400	3.37	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	5.90E+00	5.90E+00	0.4	1.5E+01	-----	-----	1.5E+01
Silver	4.27	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Sodium	1.6	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Strontium	37	36	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	6.30E+01	6.30E+01	11.4	5.5E+00	-----	-----	5.5E+00
Vanadium	66	46	0.04	0.00E+00	5.00E-04	1.00E+05	0.125	1	8.05E+01	8.05E+01	14.5	5.6E+00	-----	-----	5.6E+00
2,4'-DDD	0.2	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
4,4'-DDE	0.049	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
4,4'-DDT	0.045	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Chlordane	1.3	0.095	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	1.66E+01	1.66E+01	0.003	9.2E+01	-----	-----	9.2E+01
Endrin	0.0086	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	0.077	-----	-----	-----	0.0E+00
Acenaphthene	0.27	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Anthracene	1.2	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(a)anthracene	1.6	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(b)pyrene	2	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(k)fluoranthene	3.1	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(g)herylene	1.7	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(i)fluoranthene	1.3	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Benzo(e)pyrene	130	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	1.1	-----	-----	-----	0.0E+00
Bis(2-ethylhexyl)phthalate	4.2	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Chrysene	0.3	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Dibenz(a,h)anthracene	0.12	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	0.11	-----	-----	-----	0.0E+00
Di-n-butyl phthalate	3.8	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Fluoranthene	2.1	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Indeno(1,2,3-cd)pyrene	0.35	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Naphthalene	1.2	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Phenanthrene	7.4	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Pyrene	0.0054	-----	5.2	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Rebenc	-----	-----	0.0013	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	NA	-----	-----	-----	-----
Sodium	-----	-----	0.11	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	6.8	-----	-----	-----	0.0E+00
Thallium	-----	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	-----	-----	-----	-----	-----
Tin	-----	-----	-----	0.00E+00	5.00E-04	1.00E+05	0.125	1	-----	0.00E+00	-----	-----	-----	-----	-----

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E30
OSPREY - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	22200	12000	4.6		0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.52E+03	2.52E+03	109.7	2.3E+01			2.3E+01
Antimony	8.5				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Arsenic	11.5	7.62			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.60E+00	1.60E+00	2.5	6.4E-01			6.4E-01
Barium	255	100			0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.10E+01	2.10E+01	20.8	1.0E+00			1.0E+00
Cadmium	3.3				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	1.45	NA			0.0E+00
Calcium	18000	1000			0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.10E+02	2.10E+02	NA	3.8E+00			3.8E+00
Chromium	47.6	18			0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.78E+00	3.78E+00	1	NA			NA
Cobalt	19				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	4.7E-02			4.7E-02
Copper	829	10.6			0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.23E+00	2.23E+00	47	NA			NA
Iron	43000	20000	8.4		0.00E+00	6.00E+03	5.00E+04	210000	1.2	4.20E+03	4.20E+03	1.13	3.5E+00			3.5E+00
Lead	259	18.7	0.004		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.93E+00	3.93E+00	NA	NA			NA
Magnesium	3330	1000			0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.10E+02	2.10E+02	997	3.8E-02			3.8E-02
Manganese	1030	180	0.252		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.78E+01	3.78E+01	0.006	NA			0.0E+00
Mercury	43.7				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	77.4	1.8E+00			1.8E+00
Nickel	18				0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.15E+02	3.15E+02	NA	NA			NA
Potassium	1400	1500			0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.08E-01	7.08E-01	0.4	6.6E-01			6.6E-01
Selenium	4.27	3.37			0.00E+00	6.00E+03	5.00E+04	210000	1.2	9.66E+00	9.66E+00	14.5	6.7E-01			6.7E-01
Silver	1.6				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Strontium	37	36			0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.56E+00	7.56E+00	NA	NA			NA
Vanadium	66	46	0.04		0.00E+00	6.00E+03	5.00E+04	210000	1.2	9.66E+00	9.66E+00	14.5	6.7E-01			6.7E-01
Zinc	2580				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
4,4'-DDD	0.2				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.003	0.0E+00			0.0E+00
4,4'-DDE	0.049				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.18	1.1E-01			1.1E-01
4,4'-DDT	0.045				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.077	0.0E+00			0.0E+00
Anchor 1254	1.3	0.095			0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.00E-02	2.00E-02	NA	NA			NA
Dieldrin	0.0086				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Acephenanthrene	1.2				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Anthracene	0.27				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Benzo(a)anthracene	1.6				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Benzo(b)fluoranthene	2				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Benzo(k)fluoranthene	3.1				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Benzo(ghi)perylene	1.7				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Benzo(ghi)perylene	1.3				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Bis(2-ethylhexyl)phthalate	130				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	1.1	0.0E+00			0.0E+00
Chrysene	4.2				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Dibenz(a,h)anthracene	0.3				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Di-n-butyl phthalate	0.12				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	0.11	0.0E+00			0.0E+00
Fluoranthene	3.8				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Indeno(1,2,3-cd)pyrene	2.1				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Naphthalene	0.35				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Phenanthrene	1.2				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Pyrene	7.4				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Toluene	0.0054				0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA
Thallium			5.2		0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	6.8	0.0E+00			0.0E+00
Tin			0.11		0.00E+00	6.00E+03	5.00E+04	210000	1.2	0.00E+00	0.00E+00	NA	NA			NA

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E31
RIVER OTTER+AI86 - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	22200	12000	4.6	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.88E+03	2.88E+03	0.478	6.0E+03	6.0E+03	6.0E+03	6.0E+03
Antimony	8.5			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.81E+00	1.81E+00	0.031	5.9E+01	5.9E+01	5.9E+01	5.9E+01
Arsenic	11.5	7.62		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.40E+01	2.40E+01	2.5	9.6E+00	9.6E+00	9.6E+00	9.6E+00
Barium	255	100		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.40E+02	2.40E+02	0.441	NA	NA	NA	0.0E+00
Cadmium	3.3			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.32E+00	4.32E+00	1.5	2.9E+00	2.9E+00	2.9E+00	2.9E+00
Calcium	18000	1000		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.40E+00	2.40E+00	7	3.6E+01	3.6E+01	3.6E+01	3.6E+01
Chromium	47.6	18		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.00E+03	4.00E+03	3.66	1.2E+00	1.2E+00	1.2E+00	1.2E+00
Cobalt	19			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.90E+00	4.90E+00	4.0	1.1E+00	1.1E+00	1.1E+00	1.1E+00
Copper	829	10.6	8.4	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.32E+01	4.32E+01	0.099	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Iron	43000	20000	0.004	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.60E+02	3.60E+02	18.29	8.9E+00	8.9E+00	8.9E+00	8.9E+00
Lead	259	18.7	0.004	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	8.09E+01	8.09E+01	0.091	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Magnesium	3330	1000		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	8.64E+00	8.64E+00	120	9.7E+01	9.7E+01	9.7E+01	9.7E+01
Manganese	1030	180	0.252	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.10E+01	1.10E+01	77.2	1.5E+01	1.5E+01	1.5E+01	1.5E+01
Mercury	43.7			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.28E+02	2.28E+02	0.083	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	18			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.37	NA	NA	NA	0.0E+00
Potassium	1400	1500		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.009	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	4.27	3.37		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.089	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Silver	1.6			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Strontium	37	36	0.04	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Vanadium	280	46		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.009	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	0.2			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.37	NA	NA	NA	0.0E+00
4,4'-DDE	0.049			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.083	0.0E+00	0.0E+00	0.0E+00	0.0E+00
4,4'-DDT	0.045			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.089	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aroclor 1254	1.3	0.095		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.28E+02	2.28E+02	0.083	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Dieldrin	0.0086			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.009	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Arenophthene	1.2			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Anthrane	0.27			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Benzo(a)anthracene	1.6			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.23	NA	NA	NA	0.0E+00
Benzo(b)fluoranthene	2			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Benzo(k)fluoranthene	3.1			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Benzo(g)h)perylene	1.7			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Benzo(k)fluoranthene	1.3			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Bis(2-ethylhexyl)phthalate	130			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	4.5	NA	NA	NA	0.0E+00
Chrysene	4.2			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	136	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Dibenz(a,h)anthracene	0.3			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Di-n-butyl phthalate	0.12			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Fluoranthene	3.8			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	2.1			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Naphthalene	0.35			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Phenanthrene	1.2			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Pyrene	7.4			0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Toluene	0.0054		5.2	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	0.003	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sodium			0.0013	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	5.8	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Thallium			0.11	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00
Tin				0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	0.00E+00	0.00E+00	NA	NA	NA	NA	0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E32
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 35A
KARNACK, TEXAS

Constituent	Max. Conc. Soil (mg/kg)	Max. Conc. Sediment (mg/kg)	Max. Conc. ax. Co edime mg/kg	Max. Conc. ax. Co mg/L	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	22200	12000		4.6	0	4.00E+02	80000	10000	0.022	1	1.20E+02	1.20E+02	0.478	2.3E+02			2.3E+02
Antimony	8.5				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.031	2.3E+00			2.3E+00
Arsenic	11.5	7.62			0	4.00E+02	80000	10000	0.022	1	7.62E-02	7.62E-02	0.031	4.0E-01			4.0E-01
Barium	255	100			0	4.00E+02	80000	10000	0.022	1	1.00E+00	1.00E+00	2.5	0.0E+00			0.0E+00
Bismuth	3.3				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.441				0.441
Boron	18000	1000			0	4.00E+02	80000	10000	0.022	1	1.00E+01	1.00E+01	NA	1.2E-01			1.2E-01
Bromine	47.6	18			0	4.00E+02	80000	10000	0.022	1	1.80E-01	1.80E-01	1.5				1.5E-02
Calcium	19				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Chromium	829	10.6			0	4.00E+02	80000	10000	0.022	1	1.06E-01	1.06E-01	7	1.5E-02			1.5E-02
Copper	43000	20000		8.4	0	4.00E+02	80000	10000	0.022	1	2.00E+02	2.00E+02	NA				NA
Iron	259	18.7		0.004	0	4.00E+02	80000	10000	0.022	1	1.87E-01	1.87E-01	3.66	5.1E-02			5.1E-02
Magnesium	3100	1000			0	4.00E+02	80000	10000	0.022	1	1.00E+01	1.00E+01	NA				NA
Manganese	1010	180		0.252	0	4.00E+02	80000	10000	0.022	1	1.80E+00	1.80E+00	40	4.5E-02			4.5E-02
Mercury	43.7				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.009	0.0E+00			0.0E+00
Nickel	18				0	4.00E+02	80000	10000	0.022	1	1.50E+01	1.50E+01	18.29				1.5E-02
Potassium	1400	1500			0	4.00E+02	80000	10000	0.022	1	3.37E-02	3.37E-02	0.091	3.7E-01			3.7E-01
Selenium	4.27	3.37			0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Silver	1.6				0	4.00E+02	80000	10000	0.022	1		0.00E+00	120	0.0E+00			0.0E+00
Strontium	37	36			0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Sulfur	2580	66			0	4.00E+02	80000	10000	0.022	1	3.60E-01	3.60E-01	0.089	4.0E+00			4.0E+00
Tin	0.2	46		0.04	0	4.00E+02	80000	10000	0.022	1	4.60E-01	4.60E-01	73.2	6.3E-03			6.3E-03
Vanadium	0.049				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
4,4'-DDD	0.045				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
4,4'-DDE	0.045				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
4,4'-DDT	1.3	0.095			0	4.00E+02	80000	10000	0.022	1	9.50E-04	9.50E-04	0.083	1.1E-02			1.1E-02
Acenaphthene	0.0086				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.009				0.009
Acenaphthylene	1.2				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Anthracene	0.27				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Benzo(a)anthracene	1.6				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.37				0.37
Benzo(b)fluoranthene	3.1				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Benzo(k)fluoranthene	1.7				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Benzo(g,h,i)perylene	1.3				0	4.00E+02	80000	10000	0.022	1		0.00E+00	0.25				0.25
Benzo(a)pyrene	130				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Bis(2-ethylhexyl)phthalate	4.2				0	4.00E+02	80000	10000	0.022	1		0.00E+00	4.5				4.5
Chrysene	0.3				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Dibenz(a,h)anthracene	0.12				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Dibenz(a,i)anthracene	0.3				0	4.00E+02	80000	10000	0.022	1		0.00E+00	136				136
Di-n-butyl phthalate	3.8				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Fluoranthene	2.1				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Indeno(1,2,3-cd)pyrene	0.35				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Naphthalene	1.2				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Phenanthrene	7.4				0	4.00E+02	80000	10000	0.022	1		0.00E+00	6.4				6.4
Pyrene	0.0054				0	4.00E+02	80000	10000	0.022	1		0.00E+00	NA				NA
Solene				5.2									0.003				0.003
Sodium				0.0013									5.8				5.8
Thallium				0.11													
Tin					0	4.00E+02	80000	10000	0.022	1		0.00E+00					0.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration X Ingestion Rate X Fraction Ingested from contaminated source

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E53
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMUNITION PLANT - SITE 46
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg) 0-5 ft	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI IND SED (mg/kg-day)	EDI IND SW (mg/kg-day)	EDI IND FOD (mg/kg-day)	NOAEL RfD (mg/kg-day)	NOAEL RfD (mg/kg-day)	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	39200	16000	210	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-04	2.80E-04	2.80E-04	100.7	2.4E+02	7.1E-06	2.4E+02
Antimony	26.1	17.6	0.037	0.00E+00	5.00E-04	1.10E+05	0.125	1	3.00E-01	3.00E-01	3.00E-01	NA	1.3E+01	3.5E-01	1.3E+01
Arsenic	16.8	0.005	0.005	0.00E+00	5.00E-04	1.10E+05	0.125	1	5.00E+02	5.00E+02	5.00E+02	20.8	2.4E+01	7.0E-01	2.4E+01
Barium	6921	1.38	0.0119	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.4E+01	2.4E+01	2.4E+01	NA	2.4E+01	5.1E-04	5.1E-04
Beryllium	37.5	0.0067	0.0067	0.00E+00	5.00E-04	1.10E+05	0.125	1	5.60E+03	5.60E+03	5.60E+03	NA	8.6E+01	2.5E-02	8.6E+01
Bismuth	26690	3200	58	0.00E+00	5.00E-04	1.10E+05	0.125	1	5.60E+03	5.60E+03	5.60E+03	NA	8.6E+01	2.5E-02	8.6E+01
Calcium	131	49	0.23	0.00E+00	5.00E-04	1.10E+05	0.125	1	9.07E+01	9.07E+01	9.07E+01	NA	1.1E+02	3.3E-02	1.1E+02
Chromium	71.3	1.3	0.12	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Cobalt	120075	4300	220	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Copper	210	37.3	0.292	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Iron	5080	1100	13	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Magnesium	3740	649	11.8	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Manganese	0.35	0.11	0.11	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Mercury	21	1500	0.1	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Potassium	290	779	17	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Selenium	1.6	7	0.29	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Silver	8360	86	0.48	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Strontium	77	760	3.3	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Vanadium	4180	0.0022	0.015	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
Zinc	0.038	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDD	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125	1	2.80E-01	2.80E-01	2.80E-01	NA	1.1E+02	3.3E-02	1.1E+02
4,4'-DDE	0.01	0.015	0.69	0.00E+00	5.00E-04	1.10E+05	0.125								

APPENDIX E

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Injection Rate - Soil (mg/kg-day)	Injection Rate - Sed. (mg/kg-day)	Injection Rate - SW (mg/kg-day)	Ingestion Weight (kg)	Fraction Ingested (unitless)	EDI - INDO SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RfD-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	39200	16000	210	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Antimony	24.1	0.037	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Barium	16.8	17.6	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Beryllium	2060	3.3	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Bismuth	0.921	1.18	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Cadmium	26000	3200	58	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Chromium	131	49	0.23	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Cobalt	71.3	13	0.12	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Copper	275	51.8	0.106	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Copper	120000	43000	220	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Copper	510	100	13	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Lead	3740	649	11.8	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Magnesium	0.56	21	0.11	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Manganese	2390	1500	17	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Mercury	2.91	7.79	8	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Nickel	8360	77	0.29	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Silver	7	86	0.48	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Selenium	760	3.3	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
Selenium	4180	0.028	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDT	0.03	0.015	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.012	0.0015	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDD	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.36E+03	3.47E+03	190.7	3.1E+01	8.8E-01	9.6E-02	3.2E+01
4,4'-DDE	0.002	0.0002	0.00E+00	0.00E+00	6.00E+03	5.00E+0									

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Estimated Daily Intake (EDI) = Medium-specific concentration

$$\text{Total EDI} = \text{EDI soil/sediment} + \text{EDI water} + \text{EDI food}$$

$$\text{Hazard Quotient (HQ)} = \text{Total EDI} / \text{Reference Toxicity Value}$$

APPENDIX E
TABLE E35
RIVER OTTER - INDIRECT SEDIMENT HQ
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Contaminant	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV - ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	39200	16000	210	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.84E+03	3.84E+03	0.478	8.0E+03	---	3.5E+01	8.1E+03
Antimony	20.1	0.006	0.006	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	0.031	1.4E+02	1.2E+01	9.5E+02	9.5E+02
Arsenic	2860	290	0.006	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.22E+01	4.60E+01	0.031	1.4E+02	1.2E+01	1.5E+02	1.5E+02
Beryllium	0.921	1.38	0.0119	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	6.90E+01	6.90E+01	NA	2.8E+01	---	1.1E+01	1.1E+01
Cadmium	37.5	3.20	0.0067	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.31E+01	3.62E+01	NA	---	---	1.2E+03	1.2E+03
Chromium	26000	131	0.13	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	7.68E+02	8.42E+02	NA	---	---	---	---
Copper	131	49	0.13	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.10E+01	1.28E+01	NA	7.8E+00	7.1E+01	1.2E+02	8.6E+00
Cobalt	37.5	51.8	0.106	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.12E+00	3.41E+00	NA	1.8E+00	1.6E+01	1.2E+03	1.9E+00
Lead	210	37.3	0.292	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.03E+04	1.13E+04	NA	2.4E+00	---	6.4E+03	2.4E+00
Magnesium	5080	1100	13	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	8.93E+00	9.93E+00	NA	---	---	---	---
Manganese	3740	649	11.8	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.58E+02	1.71E+02	NA	1.9E+00	3.5E+01	2.4E+02	4.3E+00
Mercury	0.36	0.11	0.11	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	0.009	---	---	---	0.0E+00
Nickel	2590	1500	0.17	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.60E+02	3.94E+02	NA	---	---	4.8E+04	4.8E+04
Selenium	2.91	7.79	0.17	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.87E+00	2.04E+00	0.091	2.1E+01	1.8E+01	2.2E+01	2.2E+01
Silver	1.6	7	0.29	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.68E+00	1.85E+00	NA	---	---	---	---
Strontium	8360	7	0.48	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.06E+01	2.25E+01	0.089	1.4E+02	1.3E+03	1.9E+04	1.9E+04
Vanadium	77	86	0.48	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.82E+02	1.99E+02	73.2	2.3E+02	2.2E+01	4.3E+01	2.3E+02
Zinc	6180	760	3.3	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	2.7E+00
4,4'-DDT	0.012	0.015	0.015	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	---
alpha BHC	0.01	0.01	0.01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.06E+03	3.06E+03	0.37	9.7E+03	8.4E+04	1.1E+02	1.1E+02
Aroclor 1254	0.0022	0.0022	0.0022	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.65E+01	1.81E+01	0.083	2.8E+00	1.8E+01	0.0E+00	0.0E+00
Heptachlor epoxide	0.008	0.008	0.008	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	0.059	0.00E+00	---	0.0E+00	0.0E+00
1,1,1-Trichloroethane	0.0144	0.0144	0.0144	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
2-Bromine	0.0666	0.0666	0.0666	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
4-Methylphenol	0.18	0.18	0.18	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Acenaphthylene	0.5	0.5	0.5	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Acetone	0.217	0.217	0.217	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Anthracene	2.3	2.3	2.3	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(a)anthracene	2.1	2.1	2.1	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(a)pyrene	4.5	4.5	4.5	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(b)fluoranthene	1.3	1.3	1.3	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(g,h,i)perylene	1.2	1.2	1.2	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(k)fluoranthene	0.29	0.29	0.29	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Benzo(a)anthracene	2.1	2.1	2.1	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Bis(2-ethylhexyl)phthalate	0.97	0.97	0.97	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Bis(2-ethylhexyl)phthalate	0.0588	0.0588	0.0588	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Chlorobenzene	0.167	0.167	0.167	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Chrysene	2.6	2.6	2.6	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Dibenz(a,h)anthracene	0.38	0.38	0.38	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Dibenz(b,h)anthracene	0.21	0.21	0.21	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Dibenz(k,h)anthracene	0.212	0.212	0.212	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Di-n-butylphthalate	7.462	7.462	7.462	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Di-n-butylphthalate	0.298	0.298	0.298	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Fluoranthene	2.7	2.7	2.7	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Hexachlorobenzene	1	1	1	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Indeno(1,2,3-cd)pyrene	0.027	0.027	0.027	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.88E+03	3.14E+03	2.7	1.1E+03	9.6E+05	1.2E+03	1.2E+03
Methylene chloride	0.98	0.98	0.98	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Naphthalene	0.86	0.86	0.86	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Pyrene	2.8	2.8	2.8	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Tetrachloroethene	0.005	0.005	0.005	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Toluene	0.0224	0.0224	0.0224	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Xylenes	0.0997	0.0997	0.0997	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	5.04E+02	5.50E+02	0.52	0.00E+00	---	0.0E+00	0.0E+00
non-Substances	2100	2100	9.6	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	NA	---	---	---	0.0E+00
Thallium	0.0024	0.0024	0.0024	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	---	0.003	---	---	6.4E+02	6.4E+02

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E36
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 46
KARNACK, TEXAS

Contaminant	Max Conc. (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. soil (mg/kg)	Max Conc. a.c.u. (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI (mg/kg-day)	EDI IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	39200	16000		210	0	4.00E-02	80000	10000	0.022	1	1.60E-02	1.81E-02	0.478	3.3E-02	1.3E-01	1.3E-01	3.8E-02
Antimony	20.1	16.8		0.037	0	4.00E-02	80000	10000	0.022	1	1.70E-02	2.94E-03	0.011	5.7E-02	2.3E-01	9.3E-02	9.4E-02
Arsenic	2660	290		3.3	0	4.00E-02	80000	10000	0.022	1	2.00E-02	3.28E-03	2.5	1.3E-00	4.6E-02	1.1E-01	5.9E-00
Beryllium	0.971	1.38		0.0067	0	4.00E-02	80000	10000	0.022	1	1.8E-02	1.51E-02	NA	NA	NA	NA	1.3E-00
Cadmium	26000	3200		58	0	4.00E-02	80000	10000	0.022	1	3.20E-01	5.34E-04	0.441	NA	NA	1.2E-03	1.2E-03
Chromium	131	49		0.23	0	4.00E-02	80000	10000	0.022	1	4.90E-01	5.28E-01	1.3	3.3E-01	1.3E-02	3.3E-01	3.3E-01
Cobalt	71.3	13		0.12	0	4.00E-02	80000	10000	0.022	1	1.90E-01	5.47E-01	1.5	NA	NA	1.2E-02	7.4E-02
Copper	275	51.8		0.106	0	4.00E-02	80000	10000	0.022	1	4.30E-02	4.61E-02	7	7.4E-02	3.0E-03	1.2E-03	7.4E-02
Iron	120000	43000		220	0	4.00E-02	80000	10000	0.022	1	3.73E-01	4.11E-01	3.66	1.0E-01	4.1E-03	6.4E-03	1.1E-01
Lead	210	3.3		0.23	0	4.00E-02	80000	10000	0.022	1	6.49E-08	7.69E-09	NA	1.6E-01	6.5E-01	2.4E-02	1.9E-01
Manganese	575	1100		11.8	0	4.00E-02	80000	10000	0.022	1	1.50E-01	1.70E-01	0.099	NA	NA	4.8E-04	4.8E-04
Mercury	0.56	21		0.11	0	4.00E-02	80000	10000	0.022	1	7.79E-02	8.10E-02	0.091	8.6E-01	3.4E-02	8.6E-01	8.6E-01
Nickel	2390	2.91		17	0	4.00E-02	80000	10000	0.022	1	7.00E-02	9.68E-02	NA	5.8E-04	2.3E-05	1.9E-04	8.0E-04
Potassium	77	86		0.48	0	4.00E-02	80000	10000	0.022	1	6.00E-01	9.33E-01	0.089	9.7E-00	3.9E-01	4.3E-01	4.3E-01
Selenium	4180	760		3.3	0	4.00E-02	80000	10000	0.022	1	7.60E-06	8.17E-06	1.2	1.0E-01	4.2E-03	3.6E-03	1.1E-01
Silver	0.028	0.03		0.012	0	4.00E-02	80000	10000	0.022	1	1.50E-04	1.56E-04	0.17	4.1E-04	1.6E-05	4.2E-04	4.2E-04
Vanadium	0.0144	0.019		0.015	0	4.00E-02	80000	10000	0.022	1	6.90E-03	7.18E-03	0.083	8.3E-02	3.3E-03	8.6E-02	8.6E-02
Zinc	77	86		0.48	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	0.359	0.0E+00	0.0E+00	0.0E+00	0.0E+00
4,4'-DDD	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
4,4'-DDT	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
alpha-BHC	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
gamma-BHC	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Heptachlor epoxide	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Heptachlor	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
1,1,1-Trichloroethane	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
2-Bromine	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
4-Methylpyridine	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aroclor	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(a)anthracene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(b)pyrene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(a)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(e)pyrene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(g)heliophane	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(i)perylene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(j)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(l)perylene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(m)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(n)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(o)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(p)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(q)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(r)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(s)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(t)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(u)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(v)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(w)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(x)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(y)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(z)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(aa)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ab)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ac)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ad)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ae)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(af)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ag)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ah)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ai)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(aj)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(ak)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(al)fluoranthene	0.0022	0.015		0.69	0	4.00E-02	80000	10000	0.022	1	0.00E+00	0.00E+00	257	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(am)																	

APPENDIX E
TABLE E.37
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11100	9200		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.61E+04	1.66E+04	109.7	1.5E+02	4.2E+00	1.1E-02	1.5E+02
Arsenic	6.53	14.2	0.13	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.49E+01	2.56E+01	2.5	9.9E+00	2.8E-01	5.7E-04	1.0E+01
Barium	140	310	0.29	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.43E+02	5.58E+02	20.8	2.6E+01	7.5E-01	1.5E-03	2.7E+01
Beryllium	0.966	2.66	0.014	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	4.66E+00	4.79E+00	NA	NA	NA	NA	NA
Calcium	4400	5500	1.5	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	9.63E+03	9.90E+03	NA	1.0E+02	3.0E+00	1.1E-03	1.1E+02
Chromium	38	39	0.01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.03E+02	1.06E+02	1	1.0E+02	3.0E+00	1.1E-03	1.1E+02
Cobalt	13	31		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.43E+01	5.58E+01	NA	9.0E-01	2.6E-02	1.0E-04	9.3E-01
Copper	11.4	24.2	0.044	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	4.24E+01	4.36E+01	47	9.0E-01	2.6E-02	1.0E-04	9.3E-01
Iron	31.4	40000	12	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	7.00E+04	7.20E+04	NA	1.1E+02	3.2E+00	6.7E-03	1.1E+02
Lead	34.4	71.7	0.069	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.25E+02	1.29E+02	1.13	1.1E+02	3.2E+00	6.7E-03	1.1E+02
Magnesium	990	5000	1.2	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	8.75E+03	9.00E+03	997	2.0E+00	5.6E-02	1.3E-04	2.0E+00
Manganese	562	1120		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.96E+03	2.02E+03	77.4	8.4E-01	2.4E-02	8.6E-01	8.6E-01
Nickel	10	37		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	6.48E+01	6.66E+01	NA	1.5E+01	4.3E-01	1.5E+01	1.5E+01
Potassium	1000	2900		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	6.02E+00	6.19E+00	0.4	1.5E+01	4.3E-01	1.5E+01	1.5E+01
Selenium	2.92	3.44	0.08	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.44E+02	1.48E+02	NA	1.1E+01	3.1E-01	1.1E+01	1.1E+01
Strontium	12	82		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.24E+02	1.28E+02	11.4	6.9E+01	2.0E+00	3.6E-03	7.1E+01
Vanadium	60	71		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	9.98E+02	1.03E+03	14.5	6.9E+01	2.0E+00	3.6E-03	7.1E+01
Zinc	38	570	0.47	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	4.73E+03	4.86E+03	NA	1.8E+00	5.0E-02	1.8E+00	1.8E+00
4,4'-DDD	0.018	0.027		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.25E+03	5.40E+03	0.003	1.8E+00	5.0E-02	1.8E+00	1.8E+00
4,4'-DDE	0.043	0.093		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.93E+02	2.01E+02	NA	1.8E+00	5.0E-02	1.8E+00	1.8E+00
4,4'-DDT	0.041	0.091	0.0029	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.93E+02	2.01E+02	NA	1.8E+00	5.0E-02	1.8E+00	1.8E+00
Acetone	0.021	0.011		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.18	1.8E+00	5.0E-02	1.8E+00	1.8E+00
Perchlorate	0.0361	0.43		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.18	1.8E+00	5.0E-02	1.8E+00	1.8E+00
Benzoic acid	0.388	0.43		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.18	1.8E+00	5.0E-02	1.8E+00	1.8E+00
But(2-ethylhexyl)phthalate	0.421	0.43		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	0.00E+00	0.00E+00	0.18	1.8E+00	5.0E-02	1.8E+00	1.8E+00
Trichloroethene	1.206	0.0059	0.0073	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.78E+02	6.07E+02	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Cadmium	0.0059	0.0059	0.012	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.66E+00	1.66E+00	1.45	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Sodium	0.923	0.9479	0.011	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.66E+00	1.66E+00	1.45	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Cyanide	0.115	900	0.011	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.58E+03	1.62E+03	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
cis-1,2-Dichloroethylene	0.0024	0.0024	0.0033	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.01E+01	2.07E+01	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Methyl ethyl ketone	0.0057	0.0057	0.011	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	4.20E+03	4.32E+03	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
methylene chloride	0.014	0.014	0.011	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	9.98E+03	1.03E+04	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
p-xylene	0.014	0.014	0.011	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.45E+02	2.52E+02	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
2,6-dinitrotoluene	0.054	0.054	0.054	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.94E+03	6.07E+03	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Antimony	0.0017	0.0017	0.0017	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.87E+04	1.92E+04	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00
Thallium				0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.87E+04	1.92E+04	NA	1.1E+00	3.2E-02	1.1E+00	1.1E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil / sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E-38
OSPREY - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11100	9200	11	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.93E+03	1.99E+03	109.7	1.8E+01	5.0E-01	5.0E-03	1.8E+01
Arsenic	6.53	14.2	0.013	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.98E+00	3.07E+00	2.5	1.2E+00	3.4E-02	3.4E-02	1.2E+00
Barium	140	310	0.29	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.51E+01	6.70E+01	20.8	3.1E+00	8.9E-02	7.0E-04	3.2E+00
Beryllium	0.966	2.66	0.0014	0.00E+00	6.00E+03	5.00E+04	210000	1.2	5.59E-01	5.75E-01	NA	NA	NA	NA	NA
Bismuth	4400	5500	15	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.16E+03	1.19E+03	NA	NA	NA	NA	NA
Calcium	38	59	0.01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.24E+01	1.27E+01	1	1.2E+01	3.5E-01	5.0E-04	1.3E+01
Chromium	13	31	0.044	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.51E+00	6.70E+00	NA	NA	NA	NA	NA
Cobalt	11.4	24.2	0.044	0.00E+00	6.00E+03	5.00E+04	210000	1.2	8.08E+00	8.26E+00	47	1.1E-01	3.1E-03	4.7E-05	1.1E-01
Copper	35600	40000	12	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.51E+03	1.55E+03	NA	NA	NA	NA	NA
Lead	31.4	71.7	0.069	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.05E+03	1.08E+03	NA	NA	NA	NA	NA
Magnesium	990	5000	1.2	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.35E+02	2.42E+02	997	2.4E-01	6.7E-03	6.0E-05	2.4E-01
Manganese	562	1120	1.2	0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.77E+00	7.99E+00	77.4	1.0E-01	2.9E-03	1.0E-01	1.0E-01
Nickel	10	37	0.047	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.09E+02	6.26E+02	NA	NA	NA	NA	NA
Perchlorate	1000	2900	3.44	0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.22E-01	7.43E-01	0.4	1.8E+00	5.2E-02	1.8E+00	1.8E+00
Potassium	2.92	82	0.08	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.72E+01	1.77E+01	NA	NA	NA	NA	NA
Selenium	60	71	0.07	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.49E+01	1.53E+01	11.4	1.3E+00	3.7E-02	1.3E+00	1.3E+00
Silver	38	570	0.47	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.20E+02	1.23E+02	14.5	8.3E+00	2.4E-01	1.6E-03	8.3E+00
Zinc	0.018	0.027	0.0027	0.00E+00	6.00E+03	5.00E+04	210000	1.2	5.67E-04	5.83E-04	NA	NA	NA	NA	NA
Acetone	0.043	0.043	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Acetic acid	0.421	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.31E-03	2.32E-03	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(b)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(k)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(a)anthracene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(e)pyrene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(g)heliophenanthrene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(i)perylene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(j)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(l)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(m)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(n)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(o)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(p)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(q)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(r)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(s)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(t)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(u)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(v)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(w)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(x)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(y)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(z)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(a)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(b)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(c)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(d)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(e)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(f)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(g)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(h)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(i)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(j)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(k)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(l)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(m)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(n)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(o)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(p)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(q)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(r)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(s)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(t)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(u)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.30E-04	6.48E-04	0.003	2.1E-01	6.0E-03	2.1E-01	2.1E-01
Benzo(v)fluoranthene	0.061	0.011	0.0029	0.00E+00	6.00E+03	5.00E+04	210000	1.2							

APPENDIX E
TABLE E-39
RIVER OTTER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	HDI	IND SED Hazard Quotient	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	1100	9200	11	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.21E-03	4.6E+03	2.21E+03	0.478	4.6E+03	9.9E+00	1.9E+00	4.6E+03
Arsenic	6.53	14.2	0.013	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	3.41E+00	3.72E+00	3.72E+00	0.001	3.72E+00	3.4E+02	1.2E+02	3.72E+00
Barium	140	310	0.29	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	7.44E+01	7.44E+01	7.44E+01	2.5	7.44E+01	9.3E+03	3.0E+01	7.44E+01
Beryllium	0.966	2.66	0.0014	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	6.38E+01	6.38E+01	6.38E+01	NA	6.38E+01	NA	NA	6.38E+01
Calcium	4400	5500	15	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.32E+03	1.44E+03	1.44E+03	NA	1.44E+03	5.3E+04	1.0E+01	1.44E+03
Chromium	38	59	0.01	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.42E+01	1.54E+01	1.54E+01	1.5	1.54E+01	8.3E+01	5.0E+04	1.54E+01
Cobalt	13	31	0.044	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	7.44E+00	8.11E+00	8.11E+00	NA	8.11E+00	7.3E+02	9.0E+01	8.11E+00
Copper	11.4	24.2	0.069	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	5.81E+00	6.33E+00	6.33E+00	7	6.33E+00	5.0E+04	4.7E+00	6.33E+00
Iron	35600	40000	12	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	9.60E+03	1.03E+04	1.03E+04	3.66	1.03E+04	1.5E+03	7.3E+00	1.03E+04
Lead	31.4	71.7	0.069	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.20E+03	1.31E+03	1.31E+03	40	1.31E+03	4.9E+01	5.3E+01	1.31E+03
Magnesium	990	5000	1.2	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.69E+02	2.93E+02	2.93E+02	18.29	2.93E+02	6.0E+01	7.3E+00	2.93E+02
Manganese	562	1120	3.44	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	8.88E+00	9.68E+00	9.68E+00	NA	9.68E+00	2.4E+03	5.3E+01	9.68E+00
Nickel	10	37	0.08	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	6.96E+02	7.59E+02	7.59E+02	0.091	7.59E+02	8.2E+01	9.9E+00	7.59E+02
Potassium	1000	2900	0.47	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	8.26E+01	9.00E+01	9.00E+01	120	9.00E+01	5.3E+05	1.8E+01	9.00E+01
Selenium	2.92	82	0.08	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.97E+01	2.13E+01	2.13E+01	0.089	2.13E+01	1.7E+01	2.1E+02	2.13E+01
Strontium	60	71	0.47	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.70E+01	1.86E+01	1.86E+01	73.2	1.86E+01	1.7E+01	2.0E+00	1.86E+01
Titanium	38	570	0.018	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.37E+02	1.49E+02	1.49E+02	NA	1.49E+02	1.7E+01	5.1E+04	1.49E+02
Zinc	0.018	0.0027	0.0029	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	6.48E+04	7.06E+04	7.06E+04	NA	7.06E+04	1.3E+04	2.1E+03	7.06E+04
4,4'-DDD	0.043	0.003	0.0029	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	7.20E+04	7.85E+04	7.85E+04	0.37	7.85E+04	5.0E+05	6.8E+04	7.85E+04
4,4'-DDT	0.041	0.011	0.0029	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.64E+03	3.11E+03	3.11E+03	4.6	3.11E+03	5.2E+05	6.8E+04	3.11E+03
Aroclor 1254	0.0361	0.011	0.0029	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.0E+00	0.0E+00	0.00E+00
Benzoic acid	0.388	0.43	0.0073	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.083	0.00E+00	1.3E+04	1.3E+04	0.00E+00
Bis(2-ethylhexyl)phthalate	0.421	0.0059	0.0073	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	4.5	0.00E+00	1.3E+04	1.3E+04	0.00E+00
Butylbenzyl phthalate	1.206	0.0059	0.012	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	7.92E+03	9.39E+03	9.39E+03	0.173	9.39E+03	5.3E+03	5.3E+03	9.39E+03
Triethoxyethene	0.923	0.0059	0.011	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.22E+01	2.41E+01	2.41E+01	0.441	2.41E+01	4.3E+02	5.3E+01	2.41E+01
Cadmium	0.033	0.9479	0.011	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.27E+01	2.49E+01	2.49E+01	29.5	2.49E+01	6.9E+04	8.4E+03	2.49E+01
Cyanide	900	0.0024	0.0033	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.16E+02	2.17E+02	2.17E+02	NA	2.17E+02	3.0E+05	7.8E+07	2.17E+02
Sodium	9	900	0.011	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	2.76E+02	3.03E+02	3.03E+02	810	3.03E+02	6.4E+08	5.3E+04	3.03E+02
cis-1,2-Dichloroethylene	0.115	0.0024	0.0033	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	5.76E+04	6.28E+04	6.28E+04	2.7	6.28E+04	4.6E+05	5.3E+04	6.28E+04
Methyl ethyl ketone	0.0057	0.014	0.011	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	1.37E+03	1.49E+03	1.49E+03	NA	1.49E+03	NA	1.4E+01	1.49E+03
methylene chloride	0.014	0.014	0.054	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	3.36E+03	3.69E+03	3.69E+03	NA	3.69E+03	NA	1.4E+01	3.69E+03
p-cymene	0.011	0.014	0.054	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.031	0.00E+00	1.4E+01	1.4E+01	0.00E+00
2,6-dinitrotoluene	0.054	0.017	0.0017	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.003	0.00E+00	4.3E+02	4.3E+02	0.00E+00
Antimony	0.017	0.0017	0.0017	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.003	0.00E+00	4.3E+02	4.3E+02	0.00E+00
Thallium	0.0017	0.0017	0.0017	0.00E+00	2.16E+04	8.00E+04	2.40E+03	1.126	1	0.00E+00	0.00E+00	0.00E+00	0.003	0.00E+00	4.3E+02	4.3E+02	0.00E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E40
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - SITE 50
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. as Co edine (mg/kg)	Max Conc. as Cd Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11100	9200		11	0	4.00E+02	80000	10000	0.022	1	9.20E+01	9.66E+01	0.478	1.9E+02	7.7E+02	1.8E+00	2.0E+02
Arsenic	6.53	14.2		0.013	0	4.00E+02	80000	10000	0.022	1	1.42E-01	1.49E-01	0.031	4.6E+00	1.8E-01	3.4E-02	4.8E+00
Barium	140	310		0.29	0	4.00E+02	80000	10000	0.022	1	3.10E+00	3.25E+00	2.5	1.2E+00	5.0E-02	9.3E-03	1.3E+00
Beryllium	0.966	2.66		0.0014	0	4.00E+02	80000	10000	0.022	1	2.66E-02	2.78E-02	NA	NA	NA	NA	NA
Calcium	4400	5500		15	0	4.00E+02	80000	10000	0.022	1	5.50E+01	5.84E+01	NA	3.9E-01	1.6E-02	5.3E-04	4.1E-01
Chromium	38	59		0.01	0	4.00E+02	80000	10000	0.022	1	3.10E-01	3.22E-01	1.5	3.9E-01	1.6E-02	5.3E-04	4.1E-01
Cobalt	13	31		0.044	0	4.00E+02	80000	10000	0.022	1	2.42E-01	2.55E-01	7	3.5E-02	1.4E-03	5.0E-04	3.6E-02
Copper	11.4	24.2		0.089	0	4.00E+02	80000	10000	0.022	1	7.17E-01	7.51E-01	NA	2.0E-01	7.8E-03	1.5E-03	2.1E-01
Iron	35600	40000		12	0	4.00E+02	80000	10000	0.022	1	4.00E+02	4.17E+02	3.66	2.0E-01	1.1E-02	2.4E-03	2.9E-01
Lead	31.4	71.7		0.069	0	4.00E+02	80000	10000	0.022	1	1.12E-01	1.17E-01	40	2.8E-01	1.1E-02	2.4E-03	2.9E-01
Magnesium	990	5000		1.2	0	4.00E+02	80000	10000	0.022	1	3.70E-01	3.85E-01	18.29	2.0E-02	8.1E-04	2.1E-02	2.1E-02
Manganese	562	1120			0	4.00E+02	80000	10000	0.022	1	2.90E+01	3.02E+01	NA	NA	NA	NA	NA
Nickel	10	37			0	4.00E+02	80000	10000	0.022	1	3.44E-02	3.58E-02	0.091	3.8E-01	1.5E-02	NA	3.9E-01
Potassium	1000	2900			0	4.00E+02	80000	10000	0.022	1	8.20E-01	8.59E-01	120	6.8E-03	2.7E-04	5.3E-05	7.2E-03
Selenium	2.92	3.44		0.08	0	4.00E+02	80000	10000	0.022	1	7.10E-01	7.38E-01	0.089	8.0E+00	3.2E-01	8.3E+00	8.3E+00
Strontium	12	82			0	4.00E+02	80000	10000	0.022	1	5.70E+00	5.97E+00	73.2	7.8E-02	3.1E-03	5.1E-04	8.1E-02
Vanadium	60	71		0.47	0	4.00E+02	80000	10000	0.022	1	2.70E-05	2.81E-05	NA	NA	NA	NA	NA
Zinc	38	570			0	4.00E+02	80000	10000	0.022	1	3.00E-05	3.12E-05	NA	8.1E-05	3.2E-06	5.0E-05	8.4E-05
4,4'-DDD	0.018	0.027			0	4.00E+02	80000	10000	0.022	1	1.10E-04	1.16E-04	4.6	2.4E-05	9.6E-07	5.0E-05	7.5E-05
4,4'-DDE	0.043	0.053		0.0029	0	4.00E+02	80000	10000	0.022	1	NA	NA	0.083	NA	NA	NA	0.0E+00
4,4'-DDT	0.041	0.051			0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Acetone	0.021	0.11			0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Perchlorate	0.0361	0.43			0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Archlor 1254	0.43				0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	0.388				0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
4,4'-Dichlorobiphenyl	0.421				0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	1.206				0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA
Trichlorobenzene	0.0059			0.0073	0	4.00E+02	80000	10000	0.022	1	3.30E-04	3.46E-04	4.5	1.9E-03	7.6E-05	1.3E-04	1.3E-04
Cadmium	0.033	0.923		0.012	0	4.00E+02	80000	10000	0.022	1	9.23E-03	9.60E-03	0.173	1.9E-03	7.6E-05	5.5E-03	7.5E-03
Cyanide	0.9479	0.9479		0.011	0	4.00E+02	80000	10000	0.022	1	9.48E-03	1.07E-02	0.441	2.1E-02	8.4E-04	2.2E-02	2.2E-02
Sodium	900	0.115		0.0033	0	4.00E+02	80000	10000	0.022	1	9.00E+00	1.01E+01	29.5	3.2E-04	1.3E-05	3.0E-05	3.6E-04
cis-1,2-Dichloroethylene	0.0024	0.0024		9	0	4.00E+02	80000	10000	0.022	1	1.15E-03	1.46E-03	NA	1.0E-08	1.2E-09	NA	3.1E-08
Methyl ethyl ketone	0.0057	0.014		0.054	0	4.00E+02	80000	10000	0.022	1	2.40E-05	2.50E-05	810	2.1E-05	8.4E-07	NA	2.2E-05
p-cymene	0.014			0.011	0	4.00E+02	80000	10000	0.022	1	1.40E-04	1.46E-04	NA	NA	NA	NA	NA
2,6-Dinitrotoluene				0.017	0	4.00E+02	80000	10000	0.022	1	NA	NA	0.031	NA	NA	1.4E-01	1.4E-01
Antimony					0	4.00E+02	80000	10000	0.022	1	NA	NA	0.003	NA	NA	4.5E-02	4.5E-02
Thallium					0	4.00E+02	80000	10000	0.022	1	NA	NA	NA	NA	NA	NA	NA

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E41
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RfV-angeston (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11000		5.4	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.91E+04	1.98E+04	109.7	1.8E+02	5.0E+00	5.4E-03	1.8E+02
Antimony			0.069	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	7.59E-03	NA	---	---	---	---
Arsenic	5.86		0.017	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.03E+01	1.05E+01	2.5	4.1E+00	1.2E+01	7.5E-04	4.2E+00
Barium	310		0.21	0.001E+00	5.00E+04	1.10E+05	0.125	1	5.43E+02	5.38E+02	20.8	2.6E+01	7.5E+01	1.1E-03	2.7E+01
Beryllium	1.9		0.007	0.001E+00	5.00E+04	1.10E+05	0.125	1	3.33E+00	3.42E+00	NA	---	---	---	---
Calcium	6300		16	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.10E+04	1.13E+04	NA	---	---	---	---
Chromium	71		0.012	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.10E+04	1.13E+04	NA	---	---	---	---
Cobalt	31		0.029	0.001E+00	5.00E+04	1.10E+05	0.125	1	5.43E+01	5.38E+01	NA	---	---	---	---
Copper	22.3		0.029	0.001E+00	5.00E+04	1.10E+05	0.125	1	3.90E+01	4.01E+01	47	8.3E+01	2.4E+02	6.8E-03	8.5E+01
Iron	4000		5.6	0.001E+00	5.00E+04	1.10E+05	0.125	1	7.00E+04	7.20E+04	NA	---	---	---	---
Magnesium	97.2		5.6	0.001E+00	5.00E+04	1.10E+05	0.125	1	7.00E+04	7.20E+04	NA	---	---	---	---
Manganese	6400		2.18	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.2E+04	1.15E+04	1.13	1.5E+02	4.3E+00	5.1E-03	1.5E+02
Mercury	0.55		0.006	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.96E+01	2.02E+01	997	2.0E+00	5.6E+02	2.4E-04	2.0E+00
Nickel	49		4.83	0.001E+00	5.00E+04	1.10E+05	0.125	1	9.63E+01	9.90E+01	0.006	1.6E+02	4.6E+00	5.2E-02	1.1E+00
Potassium	2900		0.006	0.001E+00	5.00E+04	1.10E+05	0.125	1	8.58E+01	8.82E+01	NA	---	---	---	---
Selenium	5.08		0.01	0.001E+00	5.00E+04	1.10E+05	0.125	1	5.08E+03	5.22E+03	NA	---	---	---	---
Silver	15		0.53	0.001E+00	5.00E+04	1.10E+05	0.125	1	8.89E+00	9.14E+00	NA	---	---	---	---
Strontium	82		0.006	0.001E+00	5.00E+04	1.10E+05	0.125	1	9.45E+01	9.72E+01	11.4	8.3E+00	2.4E+01	4.2E-03	8.5E+00
Sulfur	54		0.55	0.001E+00	5.00E+04	1.10E+05	0.125	1	2.45E+02	2.52E+02	14.5	1.7E+01	4.8E+01	5.3E-02	1.7E+01
Zinc	140		10.3	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.66E+00	1.71E+00	NA	---	---	---	---
Chloride	0.9479		0.011	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.66E+00	1.71E+00	NA	---	---	---	---
Cadmium			0.208	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	2.29E+02	NA	---	---	---	---
Nitrate	0.023		0.023	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	2.53E+03	NA	---	---	---	---
Persulfate	12		32	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.37E+03	1.41E+03	NA	---	---	---	---
Sodium	780		0.001	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	3.52E+00	NA	---	---	---	---
Sulfate			0.0031	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	7.41E+04	NA	---	---	---	---
Acetone	0.072		5.34	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.26E+01	5.83E+02	1.1	---	---	5.3E-02	5.3E-02
Bis(2-ethylhexyl)phthalate			0.53	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	5.28E+04	NA	---	---	---	---
Bromodichloromethane			0.018	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.88E+03	NA	---	---	---	---
Carbon Disulfide			0.0164	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.88E+03	NA	---	---	---	---
Chloroethene			0.012	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.88E+03	NA	---	---	---	---
1,2-Dichloroethane	0.115		0.0096	0.001E+00	5.00E+04	1.10E+05	0.125	1	2.01E+01	2.08E+01	NA	---	---	---	---
Dibromochloromethane			0.0047	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.66E+04	NA	---	---	---	---
Diethylphthalate			0.0047	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	5.17E+04	NA	---	---	---	---
p-Isopropyltoluene			0.0014	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.54E+04	NA	---	---	---	---
Tetrachloroethene			0.00032	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	2.52E+03	NA	---	---	---	---
Toluene	0.0036		0.00022	0.001E+00	5.00E+04	1.10E+05	0.125	1	6.30E+03	6.36E+03	NA	---	---	---	---
Trichloroethene	0.0379		0.005	0.001E+00	5.00E+04	1.10E+05	0.125	1	6.36E+03	6.42E+03	NA	---	---	---	---
Vinyl chloride	0.0668		0.001	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.17E+01	1.21E+01	NA	---	---	---	---
2-Amino-4,6-Dinitrotoluene			0.0039	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	8.25E+04	NA	---	---	---	---
4-Amino-2,6-Dinitrotoluene			0.0132	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.62E+03	NA	---	---	---	---
2,6-Dinitrotoluene			0.0132	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	4.29E+04	NA	---	---	---	---
DMX			0.0132	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.21E+03	NA	---	---	---	---
2-Nitrotoluene			0.0003	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.45E+03	NA	---	---	---	---
4-Nitrotoluene			0.0017	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	3.00E+03	NA	---	---	---	---
RDX			0.0121	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	1.87E+04	NA	---	---	---	---
2,4,6-Trinitroethane			0.0412	0.001E+00	5.00E+04	1.10E+05	0.125	1	---	4.33E+03	NA	---	---	---	---
Aroclor 1254	0.039		0.0012	0.001E+00	5.00E+04	1.10E+05	0.125	1	6.83E+02	7.02E+02	0.18	3.8E+01	1.1E+02	---	3.9E+01
1,1-Dichloroethane	0.0012		0.0012	0.001E+00	5.00E+04	1.10E+05	0.125	1	2.10E+03	2.16E+03	NA	---	---	---	---
4-Isopropyltoluene	0.0012		0.0012	0.001E+00	5.00E+04	1.10E+05	0.125	1	7.21E+02	7.42E+02	NA	---	---	---	---
Aggravitane	0.0085		0.0085	0.001E+00	5.00E+04	1.10E+05	0.125	1	1.49E+02	1.53E+02	NA	---	---	---	---
Dry-n-oxy phthalate	1.545		1.545	0.001E+00	5.00E+04	1.10E+05	0.125	1	2.70E+00	2.78E+00	0.11	2.5E+01	7.0E+01	---	2.5E+01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/ sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E42
OSPREE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11000	5.4	0.00E+00	6.00E+03	210000	1.2	2.31E+03	2.31E+03	105.7	2.1E+01	6.0E-01	2.5E-03	2.2E+01
Antimony	586	0.009	0.00E+00	6.00E+03	210000	1.2	1.23E+00	1.23E+00	2.5	4.9E-01	1.4E-02	3.4E-04	5.1E-01
Arsenic	316	0.017	0.00E+00	6.00E+03	210000	1.2	6.31E+01	6.31E+01	20.8	3.1E+00	8.9E-02	5.0E-04	3.2E+00
Barium	19	0.007	0.00E+00	6.00E+03	210000	1.2	3.99E-01	4.10E-01	NA	NA	NA	NA	NA
Beryllium	6300	16	0.00E+00	6.00E+03	210000	1.2	1.32E+03	1.36E+03	NA	1.5E+01	4.3E-01	6.0E-04	1.5E+01
Bismuth	71	0.012	0.00E+00	6.00E+03	210000	1.2	1.49E+01	1.53E+01	NA	1.0E-01	2.8E-03	3.1E-05	1.0E-01
Chromium	22.3	0.029	0.00E+00	6.00E+03	210000	1.2	4.98E+00	4.82E+00	NA	1.8E+01	5.2E-01	2.3E-03	1.9E+01
Copper	40000	29	0.00E+00	6.00E+03	210000	1.2	8.40E+03	8.64E+03	NA	NA	NA	NA	NA
Lead	6400	0.052	0.00E+00	6.00E+03	210000	1.2	2.94E+01	2.10E+01	997	2.4E-01	6.7E-03	1.1E-04	2.4E-01
Magnesium	1120	5.6	0.00E+00	6.00E+03	210000	1.2	2.15E+02	2.42E+02	0.006	1.9E+01	5.5E-01	2.0E+01	2.0E+01
Manganese	0.35	2.18	0.00E+00	6.00E+03	210000	1.2	1.16E+01	1.19E+01	77.4	1.3E-01	3.8E-03	NA	1.4E-01
Nickel	2900	4.83	0.00E+00	6.00E+03	210000	1.2	1.09E+02	6.27E+02	NA	2.7E+00	7.6E-02	7.5E-04	2.7E+00
Selenium	508	0.006	0.00E+00	6.00E+03	210000	1.2	1.07E+00	1.10E+00	NA	NA	NA	NA	NA
Silver	15	0.01	0.00E+00	6.00E+03	210000	1.2	3.15E+00	3.24E+00	NA	NA	NA	NA	NA
Strontium	82	0.53	0.00E+00	6.00E+03	210000	1.2	1.72E+01	1.77E+01	NA	NA	NA	NA	NA
Vanadium	54	0.55	0.00E+00	6.00E+03	210000	1.2	1.72E+01	1.77E+01	14.5	9.9E-01	2.8E-02	1.9E-03	1.0E+00
Zinc	140	0.011	0.00E+00	6.00E+03	210000	1.2	2.94E+01	3.03E+01	NA	2.0E+00	5.8E-02	1.9E-03	2.1E+00
Chloride	0.9479	0.011	0.00E+00	6.00E+03	210000	1.2	1.99E-01	2.15E-01	NA	NA	NA	NA	NA
Cyanide	0.208	0.023	0.00E+00	6.00E+03	210000	1.2	1.04E-02	1.04E-02	NA	NA	NA	NA	NA
Nitrate	0.012	0.014	0.00E+00	6.00E+03	210000	1.2	1.64E-02	1.69E-02	NA	NA	NA	NA	NA
Perchlorate	780	32	0.00E+00	6.00E+03	210000	1.2	1.44E-02	1.55E-02	NA	NA	NA	NA	NA
Sulfate	0.0031	0.0031	0.00E+00	6.00E+03	210000	1.2	1.55E-04	1.55E-04	NA	NA	NA	NA	NA
Thion	0.072	5.34	0.00E+00	6.00E+03	210000	1.2	1.51E-02	2.83E-01	NA	NA	NA	2.4E-02	2.4E-02
Acetone	0.072	5.34	0.00E+00	6.00E+03	210000	1.2	1.51E-02	2.83E-01	NA	NA	NA	2.4E-02	2.4E-02
1,1,2,2-tetrachloroethane	0.0048	0.048	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Bromodichloromethane	0.0171	0.0171	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Carbon Disulfide	0.0164	0.0164	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Chloroform	0.115	0.00996	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.00996	0.00996	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Dibromochloromethane	0.0014	0.0014	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Dichlorophthalate	0.0014	0.0014	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
p-Isopropyltoluene	0.0036	0.0036	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Trichloroethene	0.0036	0.0036	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Vinyl chloride	0.0036	0.0036	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
2-Amino-4,6-Dinitrotoluene	0.0121	0.0121	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
4-Amino-2,6-Dinitrotoluene	0.0075	0.0075	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.0039	0.0039	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.011	0.011	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
HMX	0.0032	0.0032	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
2-Nitrotoluene	0.0017	0.0017	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
4-Nitrotoluene	0.0121	0.0121	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.0412	0.0412	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Aroclor 1254	0.039	0.039	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
1,1-Dichloroethene	0.0012	0.0012	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	0.18	4.6E-02	1.3E-03	NA	4.7E-02
4-Isopropyltoluene	0.0412	0.0412	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Naphthalene	0.0085	0.0085	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	NA	NA	NA	NA	NA
Di-n-butyl phthalate	1.545	1.545	0.00E+00	6.00E+03	210000	1.2	2.40E-04	2.40E-04	0.11	2.9E+00	8.4E-02	NA	3.0E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/ sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI/ Reference Toxicity Value

APPENDIX E
TABLE E43
RIVER OTTER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Consistent	Max Conc. Soil (mg/kg) 0-5 ft	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		11000	5.4	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.64E+03	2.64E+03	0.478	5.5E+03	---	9.0E-01	5.5E+03
Antimony			0.09	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	5.52E+03	0.031	---	---	---	1.8E-01
Arsenic		5.86	0.017	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.41E+00	1.41E+00	0.031	4.5E+01	4.1E+00	4.4E-02	4.9E+01
Beryllium		310	0.21	0.00E+00	2.16E+04	8.00E+04	1.126	1	7.44E+01	7.44E+01	2.5	3.0E+01	---	6.7E-03	3.0E+01
Bismuth		1.9	0.0007	0.00E+00	2.16E+04	8.00E+04	1.126	1	4.56E+01	4.56E+01	NA	---	---	---	---
Calcium		6300	16	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.51E+03	1.51E+03	NA	---	---	---	---
Chromium		71	0.012	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.70E+01	1.70E+01	1.5	1.1E+01	1.0E+00	6.4E-04	1.2E+01
Cobalt		31	0.029	0.00E+00	2.16E+04	8.00E+04	1.126	1	7.44E+00	7.44E+00	7	7.6E+01	6.9E+02	3.3E-04	8.3E+01
Copper		22.3	0.029	0.00E+00	2.16E+04	8.00E+04	1.126	1	9.0E+03	9.0E+03	NA	---	---	---	---
Iron		40000	29	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.33E+01	2.33E+01	3.66	6.4E+00	---	1.1E-03	6.4E+00
Lead		97.2	0.022	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.34E+02	1.34E+02	NA	---	---	---	---
Manganese		620	5.2	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.69E+02	2.69E+02	40	6.7E+00	6.0E-01	4.4E-03	7.3E+00
Molybdenum		120	2.18	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.32E-01	1.32E-01	0.009	1.5E+01	1.3E+00	---	1.6E+01
Nickel		0.55		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.18E+01	1.18E+01	18.29	6.4E-01	5.8E-02	---	7.0E-01
Potassium		2900	4.83	0.00E+00	2.16E+04	8.00E+04	1.126	1	6.96E+02	6.96E+02	NA	---	---	---	---
Selenium		5.08	0.006	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.22E+00	1.22E+00	0.091	1.3E+01	1.2E+00	---	1.5E+01
Silver		15	0.01	0.00E+00	2.16E+04	8.00E+04	1.126	1	3.0E+00	3.0E+00	NA	---	---	---	---
Strontium		82	0.53	0.00E+00	2.16E+04	8.00E+04	1.126	1	3.92E+00	3.92E+00	NA	---	---	---	---
Sulfur		54	0.55	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.70E+01	1.70E+01	0.009	1.8E+01	1.5E+02	3.5E-04	1.8E+01
Vanadium		140	0.012	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.41E+00	1.41E+00	71.2	4.4E-01	1.3E+01	1.6E+02	1.6E+02
Zinc		0.9479	0.011	0.00E+00	2.16E+04	8.00E+04	1.126	1	3.36E+01	3.36E+01	NA	---	---	---	---
Chloride			0.011	0.00E+00	2.16E+04	8.00E+04	1.126	1	8.24E-01	8.24E-01	29.5	7.7E-03	6.9E-04	3.0E-05	8.4E-03
Sulfate			0.028	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.49E-01	2.49E-01	290	1.6E-02	5.7E-05	5.7E-05	5.7E-05
Prophane		780	0.023	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.87E+02	1.87E+02	NA	---	---	---	---
Sulfate			12	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.56E+00	2.56E+00	NA	---	---	---	---
Thallium		0.072	0.0031	0.00E+00	2.16E+04	8.00E+04	1.126	1	4.46E+01	4.46E+01	4.6	3.8E-03	3.4E-04	8.3E-02	8.3E-02
Acetone			5.34	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.73E-02	1.73E-02	4.5	---	---	---	---
Bis(2-ethylhexyl)phthalate			0.0448	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Bromodichloromethane			0.0171	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Carbon Disulfide			0.012	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Chloroform			0.0096	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Diethylhexylphthalate		0.115	0.0096	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Diethylphthalate			0.0047	0.00E+00	2.16E+04	8.00E+04	1.126	1	2.76E-02	2.76E-02	6.9	---	---	---	---
p-Isopropylphenol			0.0014	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Tetrachloroethene			0.00032	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Toluene		0.0036	0.0022	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Trichloroethene		0.0379	0.0121	0.00E+00	2.16E+04	8.00E+04	1.126	1	8.64E-04	8.64E-04	6.4	1.4E-04	1.2E-05	2.8E-05	1.7E-04
Vinyl chloride		0.0668	0.005	0.00E+00	2.16E+04	8.00E+04	1.126	1	9.10E-03	9.10E-03	0.173	5.3E-02	4.9E-03	6.3E-03	6.3E-03
2-Amino-4,6-Dinitroethene			0.0075	0.00E+00	2.16E+04	8.00E+04	1.126	1	1.60E-02	1.60E-02	0.078	2.1E-01	1.8E-02	5.1E-03	2.3E-01
4-Amino-2,6-Dinitroethene			0.0079	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
2,4-Dinitroethene			0.011	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
4-Nitroethene			0.0132	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
4-Nitroethene			0.0003	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
4-Nitroethene			0.0017	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
RDX			0.0121	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
2,4,6-Trinitroethene			0.0412	0.00E+00	2.16E+04	8.00E+04	1.126	1	---	---	NA	---	---	---	---
Acetone 1254		0.039		0.00E+00	2.16E+04	8.00E+04	1.126	1	9.36E-03	9.36E-03	0.003	1.1E-01	1.0E-02	---	1.2E-01
1,1-Dichloroethene		0.012		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.98E-03	2.98E-03	0.6	1.1E-04	1.0E-05	---	1.2E-04
4-Isopropylphenol		0.0412		0.00E+00	2.16E+04	8.00E+04	1.126	1	9.88E-03	9.88E-03	0.003	---	---	---	---
Naphthalene		0.0045		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.04E-03	2.04E-03	NA	---	---	---	---
Di-4-butyl phthalate		1.345		0.00E+00	2.16E+04	8.00E+04	1.126	1	3.71E-01	3.71E-01	1.36	2.7E-03	2.5E-04	---	3.0E-03

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E44
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Goose Prairie Creek
KARNACK, TEXAS

Constituent	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Max Conc. Soil (mg/L)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	11000	5.4	0.069	80000	0	4.00E+02	10000	0.022	1.10E+02	1.15E+02	0.478	2.3E-02	9.2E+00	9.0E-01	2.4E+02
Antimony		0.017	0.007	80000	0	4.00E+02	10000	0.022	5.86E-02	5.32E-02	0.031	1.9E+00	7.6E-02	1.8E-01	1.8E-01
Arsenic	5.86	0.21	0.007	80000	0	4.00E+02	10000	0.022	3.10E-01	6.23E-02	0.031	1.2E+02	5.0E-02	4.4E-02	2.5E+00
Beryllium	1.9	0.007	0.007	80000	0	4.00E+02	10000	0.022	6.20E-01	6.68E-01	NA	NA	NA	NA	1.3E+00
Calcium	6300	0.012	0.012	80000	0	4.00E+02	10000	0.022	7.10E-01	7.39E-01	1.5	4.7E-01	1.9E-02	6.4E-04	4.9E-01
Chromium	31	0.029	0.029	80000	0	4.00E+02	10000	0.022	3.10E-01	3.22E-01	NA	NA	NA	NA	NA
Copper	22.3	0.029	0.029	80000	0	4.00E+02	10000	0.022	2.23E-01	2.34E-01	7	3.2E-02	1.3E-03	3.3E-04	3.3E-02
Lead	40000	0.032	0.032	80000	0	4.00E+02	10000	0.022	4.00E+02	4.18E+02	NA	NA	NA	NA	NA
Magnesium	97.2	0.052	0.052	80000	0	4.00E+02	10000	0.022	9.72E-01	1.02E+00	3.66	2.7E-01	1.1E-02	1.1E-03	2.8E-01
Manganese	6400	2.18	0.007	80000	0	4.00E+02	10000	0.022	6.40E+01	6.70E+01	NA	NA	NA	NA	NA
Mercury	1120	0.55	0.007	80000	0	4.00E+02	10000	0.022	1.12E+01	1.18E+01	0.089	2.8E-01	1.1E-02	4.4E-03	3.0E-01
Nickel	49	0.007	0.007	80000	0	4.00E+02	10000	0.022	5.30E-01	5.72E-01	0.089	2.4E-02	2.4E-02	2.4E-02	2.4E-02
Potassium	2900	0.007	0.007	80000	0	4.00E+02	10000	0.022	2.90E-01	3.05E-01	NA	5.6E-01	2.2E-02	5.3E-03	5.9E-01
Selenium	5.08	0.007	0.007	80000	0	4.00E+02	10000	0.022	1.50E-01	1.57E-01	NA	NA	NA	NA	NA
Silver	82	0.007	0.007	80000	0	4.00E+02	10000	0.022	8.20E-01	8.95E-01	1.20	6.8E-03	2.7E-04	3.5E-04	7.5E-03
Sulfur	54	0.55	0.007	80000	0	4.00E+02	10000	0.022	5.40E-01	5.62E-01	0.089	6.1E+00	2.4E-01	6.0E-04	2.0E-02
Zinc	140	0.011	0.011	80000	0	4.00E+02	10000	0.022	1.40E+00	1.50E+00	73.2	1.9E-02	7.7E-04	6.0E-04	2.0E-02
Chloride	0.9479	0.023	0.023	80000	0	4.00E+02	10000	0.022	9.48E-03	1.07E-02	29.5	3.2E-04	1.3E-05	3.0E-05	3.6E-04
Cyanide		12	0.007	80000	0	4.00E+02	10000	0.022	1.46E-02	1.46E-02	290	NA	NA	NA	NA
Nitrate	780	0.007	0.007	80000	0	4.00E+02	10000	0.022	7.80E+00	9.10E+00	NA	NA	NA	NA	NA
Perchlorate		0.007	0.007	80000	0	4.00E+02	10000	0.022	2.56E+00	2.56E+00	NA	NA	NA	NA	NA
Sulfate		0.007	0.007	80000	0	4.00E+02	10000	0.022	2.48E+04	2.48E+04	0.003	1.6E-04	6.3E-06	8.3E-02	8.3E-02
Thallium	0.072	0.534	0.007	80000	0	4.00E+02	10000	0.022	7.20E-04	4.28E-01	4.6	4.2E-02	9.1E-02	9.1E-02	9.1E-02
Acetone		0.53	0.007	80000	0	4.00E+02	10000	0.022	4.24E+02	4.24E+02	4.5	NA	NA	NA	NA
Acrylonitrile		0.0048	0.0048	80000	0	4.00E+02	10000	0.022	3.84E+04	3.84E+04	NA	NA	NA	NA	NA
Bromochloromethane		0.0171	0.0171	80000	0	4.00E+02	10000	0.022	1.37E+03	1.37E+03	NA	NA	NA	NA	NA
Carbon Disulfide		0.0164	0.0164	80000	0	4.00E+02	10000	0.022	1.31E+03	1.31E+03	6.9	NA	NA	NA	NA
Chloroform		0.012	0.012	80000	0	4.00E+02	10000	0.022	2.16E+03	2.16E+03	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene		0.0096	0.0096	80000	0	4.00E+02	10000	0.022	2.68E+05	2.68E+05	NA	NA	NA	NA	NA
Dibromochloromethane		0.0047	0.0047	80000	0	4.00E+02	10000	0.022	1.12E+04	1.12E+04	1.54	NA	NA	NA	NA
Diethylphthalate		0.0014	0.0014	80000	0	4.00E+02	10000	0.022	2.56E+05	2.56E+05	NA	NA	NA	NA	NA
Diisobutylphthalate		0.00032	0.00032	80000	0	4.00E+02	10000	0.022	3.60E+05	3.60E+05	6.4	5.6E-06	2.3E-07	2.8E-05	3.3E-05
Diisopropylphthalate		0.0014	0.0014	80000	0	4.00E+02	10000	0.022	3.79E+04	3.79E+04	0.173	8.8E-05	8.8E-05	8.8E-05	8.8E-05
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	6.48E-04	6.48E-04	0.078	8.6E-03	3.4E-04	5.1E-03	1.4E-02
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	1.18E+03	1.18E+03	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	3.12E+04	3.12E+04	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	8.80E-04	8.80E-04	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	1.06E+03	1.06E+03	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	1.36E+04	1.36E+04	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	9.68E-04	9.68E-04	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	3.30E+03	3.30E+03	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0011	0.0011	80000	0	4.00E+02	10000	0.022	3.90E-04	4.06E-04	0.083	4.7E-03	1.9E-04	4.7E-03	4.9E-03
Diisobutylphthalate		0.0012	0.0012	80000	0	4.00E+02	10000	0.022	1.20E-05	1.25E-05	2.6	4.6E-06	1.8E-07	4.6E-06	4.8E-06
Diisobutylphthalate		0.0012	0.0012	80000	0	4.00E+02	10000	0.022	4.12E-04	4.28E-04	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0012	0.0012	80000	0	4.00E+02	10000	0.022	8.50E-05	8.84E-05	NA	NA	NA	NA	NA
Diisobutylphthalate		0.0012	0.0012	80000	0	4.00E+02	10000	0.022	1.55E-02	1.61E-02	1.36	1.1E-04	4.5E-06	1.1E-04	1.2E-04

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source
Total EDI = EDI soil/ sediment + EDI water + EDI food
Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E45
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI - Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	6-5 ft			0.00E+00	5.00E+04	1.10E+05	1750000	0.125	9.10E+03	9.36E+03	109.7	8.3E+01	2.4E+00	2.8E-03	8.5E+01
Antimony		5200	2.8	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	2.97E+03	NA	---	---	---	---
Arsenic		3.3	0.072	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	5.78E+00	5.94E+00	2.5	2.3E+00	6.6E-02	5.3E-04	2.4E+00
Barium		90	0.075	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1.58E+02	1.62E+02	20.8	7.6E+00	2.2E-01	4.0E-04	7.8E+00
Beryllium		1.02		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1.79E+00	1.84E+00	NA	---	---	---	---
Calcium		1500	25	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	2.63E+03	2.70E+03	NA	---	---	---	---
Chromium		24		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	4.20E+01	4.32E+01	1	4.2E+01	1.2E+00	---	4.3E+01
Cobalt		15		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	2.63E+01	2.70E+01	NA	---	---	---	---
Copper		10.3	0.009	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1.80E+01	1.83E+01	47	3.8E-01	1.1E-02	2.1E-05	3.9E-01
Iron		20000	8.4	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	3.30E+04	3.60E+04	NA	---	---	---	---
Lead		13.6	0.01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	2.38E+01	2.45E+01	1.13	2.1E+01	6.0E-01	9.7E-04	2.2E+01
Magnesium		2200	19	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	3.85E+03	3.96E+03	NA	---	---	---	---
Manganese		423	2.39	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	7.40E+02	7.62E+02	997	7.4E-01	2.1E-02	2.6E-04	7.6E-01
Nickel		25		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	4.38E+01	4.50E+01	77.4	5.7E-01	1.6E-02	---	5.8E-01
Potassium		960		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1.68E+03	1.73E+03	0.4	---	---	---	---
Selenium		1.9	0.44	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	3.33E+00	3.42E+00	NA	---	---	---	---
Strontium		27		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	4.73E+01	4.86E+01	11.4	4.1E+00	1.2E-01	---	4.3E+00
Vanadium		27		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	8.58E+01	8.82E+01	14.5	5.9E+00	1.7E-01	3.0E-04	6.1E+00
Zinc		49		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	3.90E+00	NA	---	---	---	---
Chloride			0.04	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	2.64E+00	NA	---	---	---	---
Nitrate			0.205	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	1.21E+01	NA	---	---	---	---
Sodium			24	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	1.10E+03	NA	---	---	---	---
Sulfate			110	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	---	NA	---	---	---	---
Acetone			0.01	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	1.87E+03	NA	---	---	---	---
Methylene chloride			0.017	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1.10E+01	1.13E+01	1.45	7.6E+00	2.2E-01	---	7.8E+00
Cadmium		6.27		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	---	---	---	---	---	---	---

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index =sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E46
OSPREY - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		5200	2.8	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.09E+03	1.12E+03	109.7	1.0E+01	2.8E+01	1.3E+03	1.0E+01
Antimony		0.027	0.027	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.93E-01	1.35E-03	NA	2.8E-01	7.9E-03	2.4E-04	2.9E-01
Arsenic		3.3	0.012	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.89E+01	7.13E-01	2.5	9.1E-01	2.6E-02	1.8E-04	9.3E-01
Barium		90	0.075	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.14E-01	1.94E-01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Beryllium		1500	25	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.15E+02	3.23E+02	1	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Calcium		24		0.00E+00	6.00E+03	5.00E+04	210000	1.2	5.04E+00	5.18E+00	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Chromium		15		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.15E+00	3.44E+00	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Cobalt		10.3	0.009	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.16E+00	2.23E+00	47	4.6E-02	1.3E-03	9.6E-06	4.7E-02
Copper		20000	8.4	0.00E+00	6.00E+03	5.00E+04	210000	1.2	4.20E+03	4.22E+03	1.13	2.5E+00	7.2E-02	4.4E-04	2.6E+00
Iron		13.6	0.01	0.00E+00	6.00E+03	5.00E+04	210000	1.2	4.62E+02	4.76E+02	NA	8.9E-02	2.5E-03	1.2E-04	9.2E-02
Magnesium		2200	19	0.00E+00	6.00E+03	5.00E+04	210000	1.2	8.88E+01	9.15E+01	977	6.8E-02	1.9E-03	7.0E-02	7.0E-02
Manganese		423	2.39	0.00E+00	6.00E+03	5.00E+04	210000	1.2	5.25E+00	5.00E+00	77.4	1.0E+00	2.9E-02	1.0E+00	1.0E+00
Nickel		25		0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.02E+02	2.07E+02	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Potassium		960		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.99E-01	4.10E-01	0.4	1.0E+00	2.9E-02	1.0E+00	1.0E+00
Selenium		1.9	0.44	0.00E+00	6.00E+03	5.00E+04	210000	1.2	5.67E+00	5.55E+00	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Sroutium		27		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	11.4	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Vanadium		49		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.99E-01	1.99E-01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Zinc			0.04	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	14.5	7.1E-01	2.0E-02	1.4E-04	7.3E-01
Chloride		31.8		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Nitrate		0.205		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Sodium		24		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Sulfate		110		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Acetone		0.01		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Methylene chloride		0.017		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.03E+01	1.06E+01	NA	5.0E-01	1.4E-01	5.2E+00	5.2E+00
Cadmium		6.27		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.32E+00	1.35E+00	1.45	9.1E-01	2.6E-02	9.3E-01	9.3E-01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil / sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E47
RIVER OTTER-INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg) 0-5 ft	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		5200	2.8	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.25E+03	1.25E+03	0.478	2.6E+03	---	4.7E-01	2.6E+03
Antimony			0.027	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	2.16E+03	0.031	2.6E+03	---	7.0E-02	7.0E-02
Arsenic		3.3	0.012	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	7.92E-01	8.64E-01	0.031	2.6E+03	---	3.1E-02	2.8E+03
Barium		90	0.075	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.16E+01	2.16E+01	2.5	8.6E+00	---	2.4E-03	8.6E+00
Beryllium		1.02		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.45E-01	2.67E-01	NA	---	---	---	---
Calcium		1500	25	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.60E+02	3.94E+02	NA	3.8E+00	---	---	4.2E+00
Chromium		24		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	5.76E+00	6.28E+00	1.5	3.8E+00	---	---	4.2E+00
Cobalt		15		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.60E+00	3.92E+00	NA	---	---	---	---
Copper		10.3	0.009	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.47E+00	2.70E+00	NA	3.5E-01	---	1.0E-04	3.9E-01
Iron		20000	8.4	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.80E+03	5.23E+03	3.66	8.9E-01	---	2.2E-04	8.9E-01
Lead		13.6	0.01	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	3.28E+00	3.28E+00	NA	---	---	---	---
Magnesium		2200	19	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	5.28E+02	5.77E+02	NA	2.5E+00	---	4.8E-03	2.8E+00
Manganese		423	2.39	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.02E+02	1.11E+02	18.29	3.3E-01	---	---	3.6E-01
Nickel		25		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	6.00E+00	6.54E+00	NA	---	---	---	---
Potassium		960		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	2.30E+02	2.51E+02	NA	---	---	---	---
Selenium		1.9	0.44	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	4.56E-01	4.97E-01	0.091	5.0E+00	---	---	5.5E+00
Strontium		27		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	6.48E+00	7.10E+00	120	5.4E-02	---	2.9E-04	5.9E-02
Titanium		27		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.18E+01	1.28E+01	0.089	7.3E-01	---	---	7.9E-01
Vanadium		49		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.18E+01	1.28E+01	73.2	1.6E-01	---	4.4E-05	1.8E-01
Zinc			0.04	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	2.54E+00	NA	---	---	---	---
Chloride		31.8		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	1.64E-02	290	---	---	5.7E-05	5.7E-05
Nitrate		0.205		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	1.92E+00	NA	---	---	---	---
Sodium		24		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	8.80E+00	NA	---	---	---	---
Sulfate		110		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	8.00E+04	NA	---	---	---	---
Sulfate			110	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	8.00E+04	4.6	---	---	1.7E-04	1.7E-04
Acetone		0.01		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	1.36E-03	2.7	---	---	5.0E-04	5.0E-04
Methylene chloride			0.017	0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	---	1.36E-03	2.7	---	---	---	---
Cadmium		6.27		0.00E+00	2.16E+04	8.00E+04	2.40E+05	1.126	1	1.50E+00	1.64E+00	0.441	3.4E+00	3.1E-01	---	3.7E+00

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E48
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Central Creek
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	as Co mg/kg	Max Conc. Surface Water (mg/L)	as Cd mg/L	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-Ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		5300		2.8		0	4.00E+02	80000	10000	0.022	1	5.20E+01	5.43E+01	0.478	1.1E+02	4.4E+00	4.7E-01	1.1E+02
Antimony				0.027		0	4.00E+02	80000	10000	0.022	1	3.30E-02	2.16E-03	0.031	1.1E+00	4.3E-02	7.0E-02	7.0E-02
Arsenic		3.3		0.012		0	4.00E+02	80000	10000	0.022	1	9.00E-01	3.53E-02	0.031	1.1E+00	4.3E-02	3.1E-02	1.1E+00
Barium		90		0.075		0	4.00E+02	80000	10000	0.022	1	1.02E-02	9.42E-01	2.5	3.6E-01	1.4E-02	2.4E-03	3.8E-01
Beryllium		1.02				0	4.00E+02	80000	10000	0.022	1	1.30E+01	1.76E+01	NA	NA	NA	NA	NA
Calcium		1300		25		0	4.00E+02	80000	10000	0.022	1	2.40E+01	2.50E+01	1.5	1.6E-01	6.4E-03	NA	1.7E-01
Chromium		24				0	4.00E+02	80000	10000	0.022	1	1.03E-01	1.56E-01	NA	NA	NA	NA	NA
Cobalt		15				0	4.00E+02	80000	10000	0.022	1	1.03E-01	1.08E-01	7	1.5E-02	5.9E-04	1.0E-04	1.5E-02
Copper		10.3		0.009		0	4.00E+02	80000	10000	0.022	1	2.00E+02	2.09E+02	NA	NA	NA	NA	NA
Iron		20000		8.4		0	4.00E+02	80000	10000	0.022	1	1.36E-01	1.42E-01	3.66	3.7E-02	1.5E-03	2.2E-04	3.9E-02
Lead		13.6		0.01		0	4.00E+02	80000	10000	0.022	1	2.20E-01	2.44E-01	NA	NA	NA	NA	NA
Magnesium		423		19		0	4.00E+02	80000	10000	0.022	1	4.23E+00	4.59E+00	40	1.1E-01	4.2E-03	4.8E-03	1.1E-01
Manganese		2200		2.39		0	4.00E+02	80000	10000	0.022	1	2.50E-01	2.60E-01	18.29	1.4E-02	5.5E-04	NA	1.4E-02
Nickel		623				0	4.00E+02	80000	10000	0.022	1	9.60E+00	9.98E+00	NA	NA	NA	NA	NA
Potassium		960				0	4.00E+02	80000	10000	0.022	1	1.90E-02	1.98E-02	0.091	2.1E-01	8.4E-03	NA	2.1E-01
Selenium		1.9		0.44		0	4.00E+02	80000	10000	0.022	1	2.70E-01	3.16E-01	120	2.3E-03	9.0E-05	2.9E-04	2.6E-03
Strontium		27				0	4.00E+02	80000	10000	0.022	1	2.70E-01	2.81E-01	0.089	3.0E+00	1.2E-01	NA	3.2E+00
Titanium		27				0	4.00E+02	80000	10000	0.022	1	4.90E-01	5.13E-01	73.2	6.7E-03	2.7E-04	4.4E-05	7.0E-03
Vanadium		49				0	4.00E+02	80000	10000	0.022	1	NA	2.54E+00	NA	NA	NA	5.7E-05	5.7E-05
Zinc				0.04		0	4.00E+02	80000	10000	0.022	1	1.64E-02	1.92E-02	290	NA	NA	NA	NA
Chloride		31.8		0.205		0	4.00E+02	80000	10000	0.022	1	NA	8.80E+00	NA	NA	NA	NA	NA
Nitrate		27		24		0	4.00E+02	80000	10000	0.022	1	NA	8.80E+00	NA	NA	NA	NA	NA
Sodium		110				0	4.00E+02	80000	10000	0.022	1	NA	8.80E+00	NA	NA	NA	NA	NA
Sulfate		6.01				0	4.00E+02	80000	10000	0.022	1	NA	8.80E+00	NA	NA	NA	NA	NA
Acetone				0.017		0	4.00E+02	80000	10000	0.022	1	6.27E-02	6.52E-02	4.6	1.4E-01	5.7E-03	1.7E-04	5.0E-04
Methylene chloride						0	4.00E+02	80000	10000	0.022	1	NA	NA	2.7	NA	NA	NA	NA
Cadmium		6.27				0	4.00E+02	80000	10000	0.022	1	NA	NA	0.441	NA	NA	NA	1.5E-01

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E49
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
	0-3 ft															
Aluminum			1.6	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	6.13E+03	6.30E+03	109.7	5.6E+01	1.6E+00	1.6E-03	5.7E+01
Antimony		3500	0.018	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	1.98E-03	NA	---	---	---	---
Arsenic		10.2		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.79E+01	1.84E-01	2.5	7.1E+00	2.0E-01	---	7.3E+00
Boron		147.6	0.42	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.58E+02	2.66E+02	20.8	1.2E+01	3.5E-01	2.2E-03	1.3E+01
Barium		1.19		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.08E+00	2.14E+00	NA	---	---	---	---
Calcium			5.5	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	6.53E-01	NA	---	---	---	---
Chromium		40.2		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	7.04E+01	7.24E+01	1	7.0E+01	2.0E+00	---	7.2E+01
Copper		3.56		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	6.23E+00	6.41E+00	47	1.3E-01	3.8E-03	---	1.4E-01
Iron		16000	3.4	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.80E+04	2.88E+04	NA	---	---	---	---
Lead		29.6	0.007	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.18E+01	5.33E+01	1.13	4.6E+01	1.3E+00	6.8E-04	4.7E+01
Manganese		146	0.259	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.56E+02	2.63E+02	997	2.6E-01	7.3E-03	2.9E-05	2.6E-01
Nickel		13.8		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.42E+01	2.48E+01	77.4	3.1E-01	8.9E-03	---	3.2E-01
Potassium		670		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	1.17E+03	1.21E+03	NA	---	---	---	---
Selenium		23	0.06	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	6.00E-03	NA	---	---	---	---
Zinc		15		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	4.03E+01	4.14E+01	11.4	3.5E+00	1.0E-01	---	3.6E+00
Vanadium			0.02	0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	2.63E+01	2.70E+01	14.5	1.8E+00	5.2E-02	1.5E-04	1.9E+00
Chloride		12.2		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	1.34E+00	NA	---	---	---	---
Nitrate		0.203		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	2.23E-02	NA	---	---	---	---
Sulfate		9.6		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	1.06E+00	NA	---	---	---	---
Sodium		8.9		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	---	9.79E-01	NA	---	---	---	---
Acetone		0.055		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	9.63E-02	1.00E-01	NA	---	---	---	---
Toluene		0.029		0.00E+00	5.00E+04	1.10E+05	1750000	0.125	1	5.08E-02	5.22E-02	NA	---	---	---	---

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E50
OSPREY - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		3500	1.6	0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.35E+02	7.55E+02	109.7	6.7E+00	1.9E-01	7.3E-04	6.9E+00
Antimony			0.018	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.14E+00	9.90E-04	NA	8.6E-01	2.4E-02	-----	8.8E-01
Arsenic		10.2		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.10E+01	2.39E+00	20.8	1.5E+00	4.3E-02	1.0E-03	1.5E+00
Barium		147.6	0.42	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.50E+01	2.75E-01	NA	-----	-----	-----	-----
Beryllium		1.19		0.00E+00	6.00E+03	5.00E+04	210000	1.2	8.44E+00	8.68E+00	NA	8.4E+00	2.4E-01	-----	8.7E+00
Calcium		40.2	5.5	0.00E+00	6.00E+03	5.00E+04	210000	1.2	7.48E-01	7.69E-01	47	1.6E-02	4.5E-04	-----	1.6E-02
Chromium		3.56		0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.38E+03	3.46E+03	NA	5.5E+00	1.6E-01	3.1E-04	5.7E+00
Copper		16000	3.4	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.22E+00	6.39E+00	113	3.1E-02	8.8E-04	1.3E-05	3.2E-02
Iron		29.6	0.007	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.07E+01	3.13E+01	997	3.7E-02	1.1E-03	-----	3.9E-02
Lead		146	0.259	0.00E+00	6.00E+03	5.00E+04	210000	1.2	2.90E+00	2.98E+00	77.4	-----	-----	-----	-----
Manganese		13.8		0.00E+00	6.00E+03	5.00E+04	210000	1.2	1.41E+02	1.43E+02	NA	-----	-----	-----	-----
Nickel		670		0.00E+00	6.00E+03	5.00E+04	210000	1.2	4.83E+00	3.00E-03	NA	4.2E-01	1.2E-02	-----	4.4E-01
Potassium		23	0.06	0.00E+00	6.00E+03	5.00E+04	210000	1.2	3.15E+00	4.97E+00	11.4	2.2E-01	6.3E-03	6.9E-05	2.2E-01
Strontium		15	0.02	0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	6.10E-01	NA	-----	-----	-----	-----
Vanadium			12.2	0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	1.02E-02	NA	-----	-----	-----	-----
Zinc			0.203	0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	4.40E-01	NA	-----	-----	-----	-----
Chloride			9.6	0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	4.45E-01	NA	-----	-----	-----	-----
Nitrate			8.9	0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	1.16E-02	NA	-----	-----	-----	-----
Sodium			0.011	0.00E+00	6.00E+03	5.00E+04	210000	1.2	6.09E-03	6.26E-03	NA	-----	-----	-----	-----
Sulfate		0.055		0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	-----	-----	-----	-----	-----	-----
Acetone		0.029		0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	-----	-----	-----	-----	-----	-----
Toluene				0.00E+00	6.00E+03	5.00E+04	210000	1.2	-----	-----	-----	-----	-----	-----	-----

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E51
RIVER OTTER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		3500	1.6	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	8.40E+02	8.40E+02	0.478	1.8E+03	-----	2.7E-01	1.8E+03
Antimony			0.018	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	-----	1.44E+03	0.031	-----	-----	4.6E-02	4.6E-02
Arsenic		10.2	0.42	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	2.45E+00	2.45E+00	0.031	7.9E+01	7.1E+00	-----	8.6E+01
Barium		147.6		0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	3.54E+01	3.55E+01	2.5	1.4E+01	-----	1.3E-02	1.4E+01
Beryllium		1.19		0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	2.86E-01	3.11E-01	NA	-----	-----	-----	-----
Calcium		40.2	5.5	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	9.65E+00	1.05E+01	NA	6.4E+00	5.8E-01	-----	7.0E+00
Chromium		3.56		0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	8.54E-01	9.31E-01	7	1.2E-01	1.1E-02	-----	1.3E-01
Copper		16000	3.4	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	3.84E+03	4.19E+03	NA	1.9E+00	-----	-----	1.9E+00
Iron		29.6	0.007	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	7.10E+00	7.10E+00	3.66	8.8E-01	7.9E-02	1.5E-04	9.6E-01
Manganese		146	0.259	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	3.30E+01	3.32E+01	40	1.8E-01	1.6E-02	5.2E-04	2.0E-01
Nickel		13.8		0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	1.61E+02	1.75E+02	NA	-----	-----	-----	-----
Potassium		670	0.06	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	5.32E+00	4.80E+03	120	6.2E+01	5.6E+00	4.0E-05	4.0E-05
Strontium		23	0.02	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	3.60E+00	6.02E+00	0.889	4.9E-02	4.4E-03	2.2E-05	6.8E+01
Titanium		15	12.2	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	-----	3.91E+00	73.2	-----	-----	-----	5.4E-02
Zinc			0.203	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	-----	9.76E-01	290	-----	-----	5.6E-05	5.6E-05
Chloride			9.6	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	-----	1.62E+02	NA	-----	-----	-----	-----
Nitrate			8.9	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	-----	7.12E-01	NA	-----	-----	-----	-----
Sulfate		0.055	0.011	0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	1.32E+02	1.53E+02	4.6	2.9E-03	2.6E-04	1.9E-04	3.3E-03
Acetone		0.029		0.00E+00	2.15E+04	8.00E+04	2.40E+05	1.126	1	6.96E-03	7.39E-03	6.4	1.1E-03	9.8E-05	-----	1.2E-03
Toluene																

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E2
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Saunders Branch
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	ax.Co edime mg/kg	Max Conc. Surface Water (mg/L)	ax.Cd mg/L	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - food (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		3500		1.6		0	4.00E+02	80000	10000	0.022	1	3.50E+01	3.65E+01	0.478	7.3E+01	2.9E+00	2.7E+01	7.6E+01
Antimony				0.018		0	4.00E+02	80000	10000	0.022	1	---	1.44E-03	0.031	---	---	4.6E-02	4.6E-02
Arsenic		10.2				0	4.00E+02	80000	10000	0.022	1	1.02E-01	1.06E-01	0.031	3.3E+00	1.3E-01	---	3.4E+00
Barium		147.6		0.42		0	4.00E+02	80000	10000	0.022	1	1.48E+00	1.57E+00	2.5	5.9E-01	2.4E-02	1.3E-02	6.3E-01
Beryllium		1.19				0	4.00E+02	80000	10000	0.022	1	1.19E-02	1.24E-02	NA	---	---	---	---
Calcium				5.5		0	4.00E+02	80000	10000	0.022	1	---	4.40E-01	NA	---	---	---	---
Chromium		40.2				0	4.00E+02	80000	10000	0.022	1	4.02E-01	4.18E-01	1.5	2.7E-01	1.1E-02	---	2.8E-01
Copper		16000		3.4		0	4.00E+02	80000	10000	0.022	1	3.56E-02	3.70E-02	7	5.1E-03	2.0E-04	---	5.3E-03
Iron		29.6		0.007		0	4.00E+02	80000	10000	0.022	1	1.60E+02	1.67E+02	NA	---	---	---	---
Lead		3.56				0	4.00E+02	80000	10000	0.022	1	2.96E-01	3.08E-01	3.66	8.1E-02	3.2E-03	1.5E-04	8.4E-02
Manganese		146		0.259		0	4.00E+02	80000	10000	0.022	1	1.46E+00	1.54E+00	40	3.7E-02	1.5E-03	5.2E-04	3.8E-02
Nickel		13.8				0	4.00E+02	80000	10000	0.022	1	1.3E-01	1.44E-01	18.29	7.5E-03	3.0E-04	---	7.8E-03
Potassium		670				0	4.00E+02	80000	10000	0.022	1	6.70E+00	6.97E+00	NA	---	---	---	---
Strontium				0.06		0	4.00E+02	80000	10000	0.022	1	---	4.80E-03	120	---	---	4.0E-05	4.0E-05
Zinc		23		0.02		0	4.00E+02	80000	10000	0.022	1	2.30E-01	2.39E-01	0.889	2.6E+00	1.0E-01	---	2.7E+00
Chloride		15		12.2		0	4.00E+02	80000	10000	0.022	1	1.50E-01	1.58E-01	73.2	2.0E-03	8.2E-05	2.2E-05	2.2E-03
Nitrate				0.203		0	4.00E+02	80000	10000	0.022	1	---	9.76E-01	NA	---	---	---	---
Sodium				9.6		0	4.00E+02	80000	10000	0.022	1	---	1.62E-02	290	---	---	5.6E-05	5.6E-05
Sulfate				8.9		0	4.00E+02	80000	10000	0.022	1	---	7.68E-01	NA	---	---	---	---
Axene		0.055		0.011		0	4.00E+02	80000	10000	0.022	1	5.50E-04	7.12E-03	NA	1.2E-04	4.8E-06	1.9E-04	3.2E-04
Toluene		0.029				0	4.00E+02	80000	10000	0.022	1	2.90E-04	3.02E-04	6.4	4.5E-05	1.8E-06	---	4.7E-05

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E53
BELTED KINGFISHER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (ng/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI, IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	30400			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.32E+04	5.47E+04	109.7	4.9E+02	1.4E+01	-----	5.0E+02
Arsenic	9.15			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.60E+01	1.63E+01	2.5	6.4E+00	1.8E+01	-----	6.6E+00
Barium	451			0.00E+00	5.00E+04	1.10E+05	0.125	1	7.89E+02	8.1E+02	20.8	3.8E+01	1.1E+00	-----	3.9E+01
Beryllium	2.01			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.32E+00	3.3E+00	NA	-----	-----	-----	-----
Cadmium	0.989			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.73E+00	1.7E+00	1.45	1.2E+00	3.4E-02	-----	1.2E+00
Calcium	3400			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.93E+03	6.12E+03	NA	1.0E+02	-----	-----	1.1E+02
Chromium	59.1			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.03E+02	1.0E+02	NA	-----	-----	-----	-----
Cobalt	17.9			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.13E+01	3.22E+01	47	4.1E+02	-----	-----	4.1E+02
Copper	38.7			0.00E+00	5.00E+04	1.10E+05	0.125	1	6.77E+01	6.93E+01	NA	-----	-----	-----	-----
Iron	31400			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.30E+04	5.63E+04	NA	-----	-----	-----	-----
Lead	542			0.00E+00	5.00E+04	1.10E+05	0.125	1	9.49E+02	9.7E+02	NA	8.4E+02	2.4E+01	-----	8.6E+02
Magnesium	1790			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.13E+03	3.22E+03	NA	1.1E+00	3.1E+02	-----	1.1E+00
Manganese	611			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.07E+03	1.0E+03	997	4.8E+02	1.4E+01	-----	5.0E+02
Mercury	1.66			0.00E+00	5.00E+04	1.10E+05	0.125	1	2.91E+00	2.99E+00	0.006	-----	-----	-----	-----
Nickel	25.3			0.00E+00	5.00E+04	1.10E+05	0.125	1	4.43E+01	4.53E+01	77.4	5.7E+01	1.6E+02	-----	5.9E+01
Potassium	2100			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.68E+03	3.7E+03	NA	-----	-----	-----	-----
Selenium	2.31			0.00E+00	5.00E+04	1.10E+05	0.125	1	4.04E+00	4.1E+00	0.4	1.0E+01	-----	-----	1.0E+01
Silver	17.6			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.0E+01	3.17E+01	NA	-----	-----	-----	-----
Strontium	54.2			0.00E+00	5.00E+04	1.10E+05	0.125	1	9.49E+01	9.7E+01	NA	-----	-----	-----	-----
Thallium	2.69			0.00E+00	5.00E+04	1.10E+05	0.125	1	4.71E+00	4.84E+00	NA	6.6E+00	1.9E+01	-----	6.8E+00
Vanadium	43.1			0.00E+00	5.00E+04	1.10E+05	0.125	1	7.54E+01	7.7E+01	11.4	2.4E+01	6.9E+01	-----	2.5E+01
Zinc	201		0.0096	0.00E+00	5.00E+04	1.10E+05	0.125	1	3.32E+02	3.62E+02	14.5	-----	-----	-----	-----
Perchlorate	0.0943			0.00E+00	5.00E+04	1.10E+05	0.125	1	-----	1.0E+03	NA	-----	-----	-----	-----
Acenaphthylene	1.44			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.65E+01	1.7E+01	NA	-----	-----	-----	-----
Anthracene	2.98			0.00E+00	5.00E+04	1.10E+05	0.125	1	2.32E+00	2.39E+00	NA	-----	-----	-----	-----
Benzo(a)anthracene	2.59			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.22E+00	5.3E+00	NA	-----	-----	-----	-----
Benzo(e)pyrene	3.02			0.00E+00	5.00E+04	1.10E+05	0.125	1	4.53E+00	4.6E+00	NA	-----	-----	-----	-----
Benzo(b)fluoranthene	2.72			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.29E+00	5.44E+00	NA	-----	-----	-----	-----
Benzo(k)fluoranthene	1.09			0.00E+00	5.00E+04	1.10E+05	0.125	1	4.76E+00	4.9E+00	NA	-----	-----	-----	-----
Chrysene	2.87			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.91E+00	1.9E+00	NA	-----	-----	-----	-----
Dibenz(a,h)anthracene	0.885			0.00E+00	5.00E+04	1.10E+05	0.125	1	5.02E+00	5.17E+00	NA	-----	-----	-----	-----
Dibenzofuran	0.0781			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.55E+00	1.59E+00	NA	-----	-----	-----	-----
Fluoranthene	5.91			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.37E+01	1.41E+01	NA	-----	-----	-----	-----
Fluorene	0.453			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.04E+01	1.07E+01	NA	-----	-----	-----	-----
3-Methylphenol	0.0832			0.00E+00	5.00E+04	1.10E+05	0.125	1	7.93E+01	8.15E+01	NA	-----	-----	-----	-----
4-Methylphenol	0.0832			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.46E+01	1.50E+01	NA	-----	-----	-----	-----
Phenanthrene	4.67			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.46E+01	1.50E+01	NA	-----	-----	-----	-----
Phenol	0.0668			0.00E+00	5.00E+04	1.10E+05	0.125	1	8.17E+00	8.41E+00	NA	-----	-----	-----	-----
Acetone	1.35			0.00E+00	5.00E+04	1.10E+05	0.125	1	1.17E+01	1.20E+01	NA	-----	-----	-----	-----
Carbon Disulfide	0.177			0.00E+00	5.00E+04	1.10E+05	0.125	1	2.36E+00	2.43E+00	NA	-----	-----	-----	-----
Ethylbenzene	0.00353			0.00E+00	5.00E+04	1.10E+05	0.125	1	3.10E+01	3.19E+01	NA	-----	-----	-----	-----
Trichlorofluoromethane	0.0107			0.00E+00	5.00E+04	1.10E+05	0.125	1	6.18E+03	6.35E+03	NA	-----	-----	-----	-----
				0.00E+00	5.00E+04	1.10E+05	0.125	1	1.87E+02	1.93E+02	NA	-----	-----	-----	-----

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value ; Hazard Index = sum of HQs, values boxed exceed 1.0

APPENDIX E
TABLE E54
OSPREY - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. Soil (mg/kg)	Max Conc. Sediment (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	NOAEL RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	30400			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	6.38E+03	6.57E+03	109.7	5.8E+01	1.7E+00	-----	6.0E+01
Arsenic	9.15			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.92E+00	1.98E+00	2.5	7.7E-01	2.2E-02	-----	7.9E-01
Barium	451			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	9.47E+01	9.74E+01	20.8	4.6E+00	1.3E-01	-----	4.7E+00
Beryllium	2.01			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	4.22E-01	4.34E-01	NA	1.4E-01	4.1E-03	-----	1.5E-01
Cadmium	6989			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	7.14E+02	7.34E+02	NA	1.2E+01	3.5E-01	-----	1.3E+01
Calcium	2400			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.26E+00	1.28E+00	NA	1.7E-01	4.9E-03	-----	1.8E-01
Chromium	59.1			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	8.13E+00	8.36E+00	47	1.0E+02	2.9E+00	-----	1.0E+02
Cobalt	17.9			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	3.76E+02	3.87E+02	1.13	1.3E-01	3.7E-03	-----	1.3E-01
Copper	38.7			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.28E+02	1.32E+02	997	5.8E+01	1.7E+00	-----	6.0E+01
Iron	31400			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	5.31E+00	5.46E+00	0.006	6.9E-02	2.0E-03	-----	7.1E-02
Lead	502			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	4.41E+02	4.54E+02	77.4	1.2E+00	3.5E-02	-----	1.2E+00
Magnesium	1790			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	3.70E+00	3.80E+00	NA	NA	-----	-----	NA
Manganese	611			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.14E+01	1.17E+01	NA	NA	-----	-----	NA
Mercury	166			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	5.65E-01	5.81E-01	NA	NA	-----	-----	NA
Nickel	25.3			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	9.05E+00	9.31E+00	11.4	7.9E-01	2.3E-02	-----	8.2E-01
Potassium	2100			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	4.22E+01	4.34E+01	14.5	2.9E+00	8.3E-02	-----	3.0E+00
Selenium	1.31			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.98E-02	2.04E-02	NA	NA	-----	-----	NA
Silver	17.5			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	3.02E-01	3.11E-01	NA	NA	-----	-----	NA
Strontium	54.2			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	6.26E-01	6.44E-01	NA	NA	-----	-----	NA
Thallium	2.69			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	5.44E-01	5.59E-01	NA	NA	-----	-----	NA
Vanadium	45.1			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	6.34E-01	6.52E-01	NA	NA	-----	-----	NA
Zinc	201		0.0096	0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	5.71E-01	5.88E-01	NA	NA	-----	-----	NA
Perchlorate	0.0943			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	2.29E-01	2.35E-01	NA	NA	-----	-----	NA
Acenaphthylene	1.44			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	6.03E-01	6.20E-01	NA	NA	-----	-----	NA
Anthracene	2.98			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.86E-01	1.91E-01	NA	NA	-----	-----	NA
Benzo(a)anthracene	2.59			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.64E-02	1.69E-02	NA	NA	-----	-----	NA
Benzo(b)fluoranthene	3.02			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.25E+00	1.28E+00	NA	NA	-----	-----	NA
Benzo(g,h,i)perylene	2.72			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	9.51E-02	9.78E-02	NA	NA	-----	-----	NA
Benzo(k)fluoranthene	1.09			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.75E-02	1.80E-02	NA	NA	-----	-----	NA
Chrysene	2.87			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	9.81E-01	1.01E+00	NA	NA	-----	-----	NA
Dibenz(a,h)anthracene	0.885			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	1.40E-02	1.44E-02	NA	NA	-----	-----	NA
Dibenz(b,h)anthracene	0.0761			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	2.84E-01	2.92E-01	NA	NA	-----	-----	NA
Fluorene	5.93			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	3.72E-02	3.82E-02	NA	NA	-----	-----	NA
3-Methylphenol	0.453			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	7.41E-04	7.62E-04	NA	NA	-----	-----	NA
4-Methylphenol	0.0832			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	2.25E-03	2.31E-03	NA	NA	-----	-----	NA
Phenanthrene	4.67			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----
Phenol	0.066			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----
Acetone	1.35			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----
Carbon Disulfide	0.177			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----
Bibenzene	0.00353			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----
Trichlorofluoromethane	0.0107			0.00E+00	6.00E+03	5.00E+04	210000	1.2	1	-----	-----	-----	-----	-----	-----	-----

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E55
RIVER OTTER - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg) 0-5 ft	Max Conc. Soil (mg/kg)	Max Conc. Surface Water (mg/L)	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum		30400		0.00E+00	2.16E+04	8.00E+04	1.126	1	7.30E+03	7.30E+03	0.478	1.5E+04	6.4E+00	.....	1.5E+04
Arsenic		9.15		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.20E+00	2.39E+00	0.031	7.1E+01	.....	.....	7.1E+01
Barium		451		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.08E+02	1.08E+02	2.5	4.3E+01	.....	.....	4.3E+01
Beryllium		2.01		0.00E+00	2.16E+04	8.00E+04	1.126	1	4.82E-01	5.26E-01	NA	.....	.....	.....	.....
Cadmium		0.989		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.37E-01	2.59E-01	0.441	5.4E-01	4.8E-02	.....	5.9E-01
Calcium		3400		0.00E+00	2.16E+04	8.00E+04	1.126	1	8.16E+02	8.89E+02	NA	.....	.....	.....	.....
Chromium		59.1		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.42E+01	1.55E+01	1.5	9.5E+00	8.5E-01	.....	1.0E+01
Cobalt		17.9		0.00E+00	2.16E+04	8.00E+04	1.126	1	4.30E+00	4.68E+00	NA	.....	.....	.....	.....
Copper		38.7		0.00E+00	2.16E+04	8.00E+04	1.126	1	9.29E+00	1.01E+01	7	1.3E+00	1.2E-01	.....	1.4E+00
Iron		31400		0.00E+00	2.16E+04	8.00E+04	1.126	1	7.54E+03	8.21E+03	NA	.....	.....	.....	.....
Magnesium		1790		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.30E+02	1.30E+02	3.66	3.6E+01	.....	.....	3.6E+01
Manganese		611		0.00E+00	2.16E+04	8.00E+04	1.126	1	4.30E+02	4.68E+02	NA	.....	.....	.....	.....
Mercury		1.66		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.47E+02	1.60E+02	40	3.7E+00	3.3E-01	.....	4.0E+00
Nickel		25.3		0.00E+00	2.16E+04	8.00E+04	1.126	1	3.98E-01	4.34E-01	0.009	4.4E+01	4.0E+00	.....	4.8E+01
Potassium		2100		0.00E+00	2.16E+04	8.00E+04	1.126	1	6.07E+00	6.62E+00	18.29	3.3E-01	3.0E-02	.....	3.6E-01
Selenium		2.31		0.00E+00	2.16E+04	8.00E+04	1.126	1	5.04E+02	5.49E+02	NA	.....	.....	.....	.....
Silver		17.6		0.00E+00	2.16E+04	8.00E+04	1.126	1	5.54E-01	6.04E-01	0.091	6.1E+00	5.5E-01	.....	6.6E+00
Strontium		54.2		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.30E+01	1.42E+01	120	1.1E-01	9.8E-03	.....	1.2E-01
Thallium		2.69		0.00E+00	2.16E+04	8.00E+04	1.126	1	6.46E-01	7.04E-01	0.003	2.2E+02	1.9E+01	.....	2.3E+02
Vanadium		43.1		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.03E+01	1.13E+01	0.089	1.2E+02	1.0E+01	.....	1.3E+02
Zinc		201		0.00E+00	2.16E+04	8.00E+04	1.126	1	4.82E+01	5.26E+01	73.2	6.6E-01	5.9E-02	.....	7.2E-01
Pentachloroethane		0.0943		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.26E-02	2.47E-02	NA	.....	.....	.....	.....
Acenaphthylene		1.44		0.00E+00	2.16E+04	8.00E+04	1.126	1	3.46E-01	3.77E-01	NA	.....	.....	.....	.....
Anthracene		2.98		0.00E+00	2.16E+04	8.00E+04	1.126	1	7.15E-01	7.80E-01	NA	.....	.....	.....	.....
Benzo(a)anthracene		2.59		0.00E+00	2.16E+04	8.00E+04	1.126	1	6.22E-01	6.78E-01	0.25	2.5E+00	2.2E-01	.....	2.7E+00
Benzo(b)fluoranthene		3.02		0.00E+00	2.16E+04	8.00E+04	1.126	1	7.25E-01	7.90E-01	NA	.....	.....	.....	.....
Benzo(g)fluoranthene		2.72		0.00E+00	2.16E+04	8.00E+04	1.126	1	6.53E-01	7.12E-01	NA	.....	.....	.....	.....
Benzo(k)fluoranthene		1.09		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.62E-01	2.85E-01	NA	.....	.....	.....	.....
Chrysene		2.87		0.00E+00	2.16E+04	8.00E+04	1.126	1	6.89E-01	7.51E-01	NA	.....	.....	.....	.....
Dibenz(a,h)anthracene		0.885		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.12E-01	2.32E-01	NA	.....	.....	.....	.....
Dibenzofuran		0.0781		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.87E-02	2.04E-02	NA	.....	.....	.....	.....
Fluoranthene		5.93		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.42E+00	1.55E+00	NA	.....	.....	.....	.....
Fluorene		0.453		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.09E-01	1.09E-01	NA	.....	.....	.....	.....
3-Methylphenol		0.0832		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.00E-02	2.18E-02	NA	.....	.....	.....	.....
4-Methylphenol		0.0832		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.00E-02	2.18E-02	NA	.....	.....	.....	.....
Phenanthrene		4.67		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.12E+00	1.22E+00	NA	.....	.....	.....	.....
Phenol		0.0668		0.00E+00	2.16E+04	8.00E+04	1.126	1	1.60E-02	1.75E-02	NA	.....	.....	.....	.....
Acetone		1.35		0.00E+00	2.16E+04	8.00E+04	1.126	1	3.24E-01	3.53E-01	4.6	7.0E-02	6.3E-03	.....	7.7E-02
Carbon Disulfide		0.177		0.00E+00	2.16E+04	8.00E+04	1.126	1	4.25E-02	4.63E-02	NA	.....	.....	.....	.....
Bibenzene		0.00353		0.00E+00	2.16E+04	8.00E+04	1.126	1	8.47E-04	9.23E-04	NA	.....	.....	.....	.....
Trichlorofluoromethane		0.0107		0.00E+00	2.16E+04	8.00E+04	1.126	1	2.57E-03	2.80E-03	NA	.....	.....	.....	.....

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

APPENDIX E
TABLE E56
ALLIGATOR SNAPPING TURTLE - INDIRECT SEDIMENT HQs
LONGHORN ARMY AMMUNITION PLANT - Caddo Lake
KARNACK, TEXAS

Constituent	Max Conc. (mg/kg)	Max Conc. Sediment (mg/kg)	ax.Co mg/kg	Max Conc. ax.Co mg/L	Ingestion Rate - Soil (mg/kg-day)	Ingestion Rate - Sed. (mg/kg-day)	Ingestion Rate - SW (mg/kg-day)	Ingestion Rate - Food (mg/kg-day)	Body Weight (kg)	Fraction Ingested (unitless)	EDI - IND SED (mg/kg-day)	EDI Total (mg/kg-day)	RTV-ingestion (mg/kg-day)	IND SED Hazard Quotient	Sediment Hazard Quotient	Surface Water Hazard Quotient	Total Hazard Quotient
Aluminum	30400				0	4.00E+02	80000	10000	0.022	1	3.04E+02	3.16E+02	0.478	6.4E+02	2.5E+01	-----	6.6E+02
Arsenic	9.15				0	4.00E+02	80000	10000	0.022	1	9.15E+02	9.32E+02	0.031	3.0E+00	1.2E-01	-----	3.1E+00
Barium	451				0	4.00E+02	80000	10000	0.022	1	4.51E+00	4.69E+00	2.5	1.8E+00	7.2E-02	-----	1.9E+00
Beryllium	2.01				0	4.00E+02	80000	10000	0.022	1	2.01E+02	2.09E+02	NA	-----	-----	-----	-----
Cadmium	0.989				0	4.00E+02	80000	10000	0.022	1	9.89E+03	1.01E+02	0.441	2.2E+02	9.0E-04	-----	2.3E+02
Calcium	3400				0	4.00E+02	80000	10000	0.022	1	3.40E+01	3.54E+01	NA	-----	-----	-----	-----
Chromium	59.1				0	4.00E+02	80000	10000	0.022	1	5.91E+01	6.15E+01	1.5	3.9E+01	1.6E-02	-----	4.1E+01
Cobalt	17.9				0	4.00E+02	80000	10000	0.022	1	1.79E+01	1.86E+01	NA	-----	-----	-----	-----
Copper	38.7				0	4.00E+02	80000	10000	0.022	1	3.87E+01	4.02E+01	7	5.5E+02	2.2E-03	-----	5.7E+02
Iron	31400				0	4.00E+02	80000	10000	0.022	1	3.14E+02	3.27E+02	NA	-----	-----	-----	-----
Lead	542				0	4.00E+02	80000	10000	0.022	1	5.42E+00	5.64E+00	3.66	1.5E+00	5.9E-02	-----	1.5E+00
Magnesium	1790				0	4.00E+02	80000	10000	0.022	1	1.79E+01	1.86E+01	NA	-----	-----	-----	-----
Manganese	611				0	4.00E+02	80000	10000	0.022	1	6.11E+00	6.33E+00	40	1.5E+01	6.1E-03	-----	1.6E+01
Mercury	1.66				0	4.00E+02	80000	10000	0.022	1	1.66E+02	1.73E+02	0.009	1.8E+00	7.4E-02	-----	1.9E+00
Nickel	25.3				0	4.00E+02	80000	10000	0.022	1	2.53E+01	2.63E+01	18.29	1.4E+02	5.5E-04	-----	1.4E+02
Potassium	2100				0	4.00E+02	80000	10000	0.022	1	2.10E+01	2.18E+01	NA	-----	-----	-----	-----
Selenium	2.31				0	4.00E+02	80000	10000	0.022	1	2.31E+02	2.40E+02	0.091	2.5E+01	1.0E-02	-----	2.6E+01
Silver	17.6				0	4.00E+02	80000	10000	0.022	1	1.76E+01	1.83E+01	NA	-----	-----	-----	-----
Strontium	54.2				0	4.00E+02	80000	10000	0.022	1	5.42E+01	5.64E+01	120	4.5E+03	1.8E-04	-----	4.7E+03
Thallium	2.69				0	4.00E+02	80000	10000	0.022	1	2.69E+02	2.80E+02	0.003	9.0E+00	3.6E-01	-----	9.3E+00
Vanadium	43.1				0	4.00E+02	80000	10000	0.022	1	4.31E+01	4.48E+01	0.089	4.8E+00	1.9E-01	-----	5.0E+00
Zinc	201			0.0096	0	4.00E+02	80000	10000	0.022	1	2.01E+00	2.09E+00	71.2	2.7E+02	1.1E-03	-----	2.9E+02
Perchlorate	0.0943				0	4.00E+02	80000	10000	0.022	1	9.43E+04	9.81E+04	NA	-----	-----	-----	-----
Acenaphthylene	1.44				0	4.00E+02	80000	10000	0.022	1	1.44E+02	1.50E+02	NA	-----	-----	-----	-----
Anthracene	2.98				0	4.00E+02	80000	10000	0.022	1	2.98E+02	3.10E+02	NA	-----	-----	-----	-----
Benzo(a)anthracene	2.59				0	4.00E+02	80000	10000	0.022	1	2.59E+02	2.69E+02	0.25	1.0E+01	4.1E-03	-----	1.1E+01
Benzo(b)fluoranthene	3.02				0	4.00E+02	80000	10000	0.022	1	3.02E+02	3.14E+02	NA	-----	-----	-----	-----
Benzo(g)fluoranthene	2.72				0	4.00E+02	80000	10000	0.022	1	2.72E+02	2.83E+02	NA	-----	-----	-----	-----
Benzo(k)fluoranthene	1.09				0	4.00E+02	80000	10000	0.022	1	1.09E+02	1.15E+02	NA	-----	-----	-----	-----
Chrysene	2.87				0	4.00E+02	80000	10000	0.022	1	2.87E+02	2.98E+02	NA	-----	-----	-----	-----
Dibenz(a,h)anthracene	0.885				0	4.00E+02	80000	10000	0.022	1	8.85E+03	9.20E+03	NA	-----	-----	-----	-----
Dibenzofuran	0.0781				0	4.00E+02	80000	10000	0.022	1	7.81E+04	8.12E+04	NA	-----	-----	-----	-----
Fluoranthene	5.93				0	4.00E+02	80000	10000	0.022	1	5.93E+02	6.17E+02	NA	-----	-----	-----	-----
Fluorene	0.453				0	4.00E+02	80000	10000	0.022	1	4.53E+03	4.71E+03	NA	-----	-----	-----	-----
3-Methylphenol	0.0832				0	4.00E+02	80000	10000	0.022	1	8.32E+04	8.63E+04	NA	-----	-----	-----	-----
4-Methylphenol	0.0832				0	4.00E+02	80000	10000	0.022	1	8.32E+04	8.63E+04	NA	-----	-----	-----	-----
Phenanthrene	4.67				0	4.00E+02	80000	10000	0.022	1	4.67E+02	4.86E+02	NA	-----	-----	-----	-----
Phenol	0.0668				0	4.00E+02	80000	10000	0.022	1	6.68E+04	6.93E+04	NA	-----	-----	-----	-----
Acetone	1.35				0	4.00E+02	80000	10000	0.022	1	1.35E+02	1.40E+02	4.6	2.9E+03	1.2E+04	-----	3.1E+03
Carbon Disulfide	0.177				0	4.00E+02	80000	10000	0.022	1	1.77E+03	1.84E+03	NA	-----	-----	-----	-----
Ethylbenzene	0.00353				0	4.00E+02	80000	10000	0.022	1	3.53E+05	3.67E+05	NA	-----	-----	-----	-----
Trichlorofluoromethane	0.0107				0	4.00E+02	80000	10000	0.022	1	1.07E+04	1.11E+04	NA	-----	-----	-----	-----

Estimated Daily Intake (EDI) = Medium-specific concentration x Ingestion Rate x Fraction Ingested from contaminated source

Total EDI = EDI soil/ sediment + EDI water + EDI food

Hazard Quotient (HQ) = Total EDI / Reference Toxicity Value

Appendix F

Supplemental Toxicity Data

ES/ER/TM-86/R3

**Toxicological Benchmarks
for Wildlife:
1996 Revision**

B. E. Sample
D. M. Opresko
G. W. Suter II

Date Issued—June 1996

Prepared by the
Risk Assessment Program
Health Sciences Research Division
Oak Ridge, Tennessee 37831

Prepared for the
U.S. Department of Energy
Office of Environmental Management
under budget and reporting code EW 20

LOCKHEED MARTIN ENERGY SYSTEMS, INC.
managing the
Environmental Management Activities at the
Oak Ridge K-25 Site Paducah Gaseous Diffusion Plant
Oak Ridge Y-12 Plant Portsmouth Gaseous Diffusion Plant
Oak Ridge National Laboratory
under contract DE-AC05-84OR21400
for the
U.S. DEPARTMENT OF ENERGY

Table 12. NOAEL- and LOAEL-based toxicological benchmarks for selected avian and mammalian wildlife species

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks					LOAEL-Based Benchmarks				
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		
Acetone	n/a	10	50	Little Brown Bat	26.1	78.4	163.4	392.1	816.8	130.7	392.1	816.8			
Acetone	n/a	10	50	Short-tailed Shrew	22.0	36.6	99.9	183.2	499.5	109.9	183.2	499.5			
Acetone	n/a	10	50	White-footed Mouse	20.0	129.2	66.6	646.1	332.9	99.9	646.1	332.9			
Acetone	n/a	10	50	Meadow Vole	16.8	147.8	123.2	738.9	615.8	84.0	738.9	615.8			
Acetone	n/a	10	50	Mink	7.7	56.1	77.7	280.7	388.5	38.5	280.7	388.5	252.300		
Acetone	n/a	10	50	Cottontail Rabbit	7.3	37.2	76.0	186.0	380.1	36.7	186.0	380.1			
Acetone	n/a	10	50	Red Fox	5.3	52.8	62.5	264.0	312.7	26.4	264.0	312.7			
Acetone	n/a	10	50	River Otter	4.6	40.7	57.2	203.3	285.8	22.9	203.3	285.8	166.187		
Acetone	n/a	10	50	Whitetail Deer	2.8	91.1	42.8	455.5	214.2	14.0	455.5	214.2			
Aldrin	n/a	0.2	1	Little Brown Bat	0.523	1.568	3.267	7.841	16.335	2.614	7.841	16.335			
Aldrin	n/a	0.2	1	Short-tailed Shrew	0.440	0.733	1.998	3.663	9.990	2.198	3.663	9.990			
Aldrin	n/a	0.2	1	White-footed Mouse	0.399	2.585	1.331	12.923	6.657	1.997	12.923	6.657			
Aldrin	n/a	0.2	1	Meadow Vole	0.336	2.956	2.463	14.779	12.316	1.679	14.779	12.316			
Aldrin	n/a	0.2	1	Mink	0.154	1.123	1.554	5.614	7.769	0.769	5.614	7.769	8.013e-06		
Aldrin	n/a	0.2	1	Cottontail Rabbit	0.147	0.744	1.520	3.721	7.602	0.735	3.721	7.602			
Aldrin	n/a	0.2	1	Red Fox	0.106	1.056	1.251	5.281	6.254	0.528	5.281	6.254			
Aldrin	n/a	0.2	1	River Otter	0.091	0.813	1.143	4.065	5.717	0.457	4.065	5.717	5.802e-06		
Aldrin	n/a	0.2	1	Whitetail Deer	0.056	1.822	0.857	9.110	4.284	0.281	9.110	4.284			
Aluminum	AlCl ₃	1.93	19.3	Little Brown Bat	2.729	8.188	17.059	81.883	170.590	27.294	81.883	170.590			
Aluminum	AlCl ₃	1.93	19.3	Short-tailed Shrew	2.295	3.825	10.433	38.253	104.326	22.952	38.253	104.326			
Aluminum	AlCl ₃	1.93	19.3	White-footed Mouse	2.086	13.495	6.952	134.951	69.520	20.856	134.951	69.520			
Aluminum	AlCl ₃	1.93	19.3	Meadow Vole	1.754	15.433	12.861	154.332	128.610	17.538	154.332	128.610			
Aluminum	AlCl ₃	1.93	19.3	Mink	0.803	5.863	8.113	58.630	81.134	8.032	58.630	81.134	0.253		
Aluminum	AlCl ₃	1.93	19.3	Cottontail Rabbit	0.767	3.886	7.939	38.858	79.390	7.674	38.858	79.390			
Aluminum	AlCl ₃	1.93	19.3	Red Fox	0.551	5.515	6.531	55.149	65.308	5.515	55.149	65.308			

Table 12. (continued)

NOAEL-Based Benchmarks												LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife		NOAEL-Based Benchmarks			LOAEL-Based Benchmarks				
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		
Aluminum	AlCl ₃	mouse	1.93	19.3	River Otter	0.478	4.245	5.970	0.018	4.776	42.453	59.700	0.183		
Aluminum	AlCl ₃	mouse	1.93	19.3	Whitetail Deer	0.293	9.513	4.474		2.930	95.132	44.738			
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Rough-winged Swallow	109.7	145.4	471.4							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		American Robin	109.7	90.8	796.9							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Belted Kingfisher	109.7	216.5	1014.7	0.936						
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		American Woodcock	109.7	144.8	1086.0							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Cooper's Hawk	109.7	633.7	1416.4							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Barn Owl	109.7	409.0	1460.6							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Barred Owl	109.7	936.4	1673.5							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Red-tailed Hawk	109.7	1133.2	1930.0							
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Osprey	109.7	548.5	2137.0	2.372						
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Great Blue Heron	109.7	624.2	2478.1	2.699						
Aluminum	Al ₂ (SO ₄) ₃	ringed dove	109.7		Wild Turkey	109.7	3656.7	3348.7							
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Rough-winged Swallow					44.5	59.0	191.2			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	American Robin					44.5	36.8	323.3			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Belted Kingfisher					44.5	87.8	411.6	0.380		
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	American Woodcock					44.5	58.7	440.6			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Cooper's Hawk					44.5	257.0	574.6			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Barn Owl					44.5	165.9	592.5			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Barred Owl					44.5	379.8	678.9			
Aluminum	AlCl ₃	day-old white leghorn chicks		44.5	Red-tailed Hawk					44.5	459.7	782.9			

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks		LOAEL-Based Benchmarks						
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Aroclor 1016	n/a	mink	1.37	3.43	Red Fox	0.94	0.94	9.41	11.14		2.36	23.55	27.89	
Aroclor 1016	n/a	mink	1.37	3.43	River Otter	0.81	0.81	7.24	10.18	9.233e-05	2.04	18.13	25.49	2.312e-04
Aroclor 1016	n/a	mink	1.37	3.43	Whitetail Deer	0.50	0.50	16.23	7.63		1.25	40.62	19.10	
Aroclor 1242	n/a	mink	0.069	0.69	Little Brown Bat	0.234	0.234	0.703	1.465		2.345	7.034	14.654	
Aroclor 1242	n/a	mink	0.069	0.69	Short-tailed Shrew	0.197	0.197	0.329	0.896		1.972	3.286	8.962	
Aroclor 1242	n/a	mink	0.069	0.69	White-footed Mouse	0.179	0.179	1.159	0.597		1.792	11.593	5.972	
Aroclor 1242	n/a	mink	0.069	0.69	Meadow Vole	0.151	0.151	1.326	1.105		1.507	13.258	11.048	
Aroclor 1242	n/a	mink	0.069	0.69	Mink	0.069	0.069	0.504	0.697	6.685e-06	0.690	5.036	6.970	6.685e-05
Aroclor 1242	n/a	mink	0.069	0.69	Cottontail Rabbit	0.066	0.066	0.334	0.682		0.659	3.338	6.820	
Aroclor 1242	n/a	mink	0.069	0.69	Red Fox	0.047	0.047	0.474	0.561		0.474	4.737	5.610	
Aroclor 1242	n/a	mink	0.069	0.69	River Otter	0.041	0.041	0.365	0.513	4.650e-06	0.410	3.647	5.128	4.650e-05
Aroclor 1242	n/a	mink	0.069	0.69	Whitetail Deer	0.025	0.025	0.817	0.384		0.252	8.172	3.843	
Aroclor 1242	n/a	screech owl	0.41		Rough-winged Swallow	0.410	0.410	0.543	1.762					
Aroclor 1242	n/a	screech owl	0.41		American Robin	0.410	0.410	0.339	2.978					
Aroclor 1242	n/a	screech owl	0.41		Belted Kingfisher	0.410	0.410	0.809	3.793	1.074e-05				
Aroclor 1242	n/a	screech owl	0.41		American Woodcock	0.410	0.410	0.541	4.059					
Aroclor 1242	n/a	screech owl	0.41		Cooper's Hawk	0.410	0.410	2.368	5.294					
Aroclor 1242	n/a	screech owl	0.41		Barn Owl	0.410	0.410	1.528	5.459					
Aroclor 1242	n/a	screech owl	0.41		Barred Owl	0.410	0.410	3.500	6.255					
Aroclor 1242	n/a	screech owl	0.41		Red-tailed Hawk	0.410	0.410	4.235	7.213					
Aroclor 1242	n/a	screech owl	0.41		Osprey	0.410	0.410	2.050	7.987	2.721e-05				
Aroclor 1242	n/a	screech owl	0.41		Great Blue Heron	0.410	0.410	2.333	9.262	3.097e-05				
Aroclor 1242	n/a	screech owl	0.41		Wild Turkey	0.410	0.410	13.667	12.516					

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Little Brown Bat	0.051	0.152	0.318		0.508	1.524	3.176		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Short-tailed Shrew	0.043	0.071	0.194		0.427	0.712	1.942		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	White-footed Mouse	0.039	0.251	0.129		0.388	2.512	1.294		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Meadow Vole	0.033	0.287	0.239		0.326	2.873	2.394		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Mink	0.015	0.109	0.151	2.982e-07	0.150	1.091	1.510	2.982e-06	
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Cottontail Rabbit	0.014	0.072	0.148		0.143	0.723	1.478		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Red Fox	0.010	0.103	0.122		0.103	1.027	1.216		
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	River Otter	0.009	0.079	0.111	1.911e-07	0.089	0.790	1.111	1.911e-06	
Aroclor 1248	n/a	Rhesus monkey	0.01	0.1	Whitetail Deer	0.005	0.177	0.083		0.055	1.771	0.833		
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	Little Brown Bat	0.079	0.238	0.497		0.795	2.38	4.97		
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	Short-tailed Shrew	0.067	0.111	0.304		0.668	1.11	3.04		
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	White-footed Mouse	0.061	0.393	0.202		0.607	3.93	2.02		
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	Meadow Vole	0.051	0.449	0.375		0.511	4.49	3.75		
Aroclor 1254	n/a	mink	0.14	0.69	Mink	0.140	1.022	1.414	5.524e-07	0.690	5.04	6.97	2.722e-06	
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	Cottontail Rabbit	0.022	0.113	0.231		0.223	1.13	2.31		
Aroclor 1254	n/a	mink	0.14	0.69	Red Fox	0.096	0.961	1.138		0.474	4.74	5.61		
Aroclor 1254	n/a	mink	0.14	0.69	River Otter	0.083	0.740	1.041	2.716e-07	0.410	3.65	5.13	1.338e-06	
Aroclor 1254	n/a	oldfield mouse	0.068	0.68	Whitetail Deer	0.009	0.277	0.130		0.085	2.77	1.30		
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Rough-winged Swallow	0.180	0.239	0.774		1.800	2.39	7.74		
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	American Robin	0.180	0.149	1.308		1.800	1.49	13.08		
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Belted Kingfisher	0.180	0.355	1.665	1.920e-07	1.800	3.55	16.65	1.920e-06	
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	American Woodcock	0.180	0.238	1.782		1.800	2.38	17.82		

Table 12. (continued)

NOAEL-Based Benchmarks												LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		End point Species ^b	Estimated Wildlife		NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Cooper's Hawk	0.180	1.040	2.324		1.800	10.40	23.24			
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Barn Owl	0.180	0.671	2.397		1.800	6.71	23.97			
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Barred Owl	0.180	1.536	2.746		1.800	15.36	27.46			
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Red-tailed Hawk	0.180	1.859	3.167		1.800	18.59	31.67			
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Osprey	0.180	0.900	3.506	4.865e-07	1.800	9.00	35.06	4.865e-06		
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Great Blue Heron	0.180	1.024	4.066	5.537e-07	1.800	10.24	40.66	5.537e-06		
Aroclor 1254	n/a	ring-necked pheasant	0.18	1.8	Wild Turkey	0.180	6.000	5.495		1.800	60.00	54.95			
Arsenic	Arsenite	mouse	0.126	1.26	Little Brown Bat	0.178	0.535	1.114		1.782	5.346	11.137			
Arsenic	Arsenite	mouse	0.126	1.26	Short-tailed Shrew	0.150	0.250	0.681		1.498	2.497	6.811			
Arsenic	Arsenite	mouse	0.126	1.26	White-footed Mouse	0.136	0.881	0.454		1.362	8.810	4.539			
Arsenic	Arsenite	mouse	0.126	1.26	Meadow Vole	0.114	1.008	0.840		1.145	10.076	8.396			
Arsenic	Arsenite	mouse	0.126	1.26	Mink	0.052	0.383	0.530	0.022	0.524	3.828	5.297	0.216		
Arsenic	Arsenite	mouse	0.126	1.26	Cottontail Rabbit	0.050	0.254	0.518		0.501	2.537	5.183			
Arsenic	Arsenite	mouse	0.126	1.26	Red Fox	0.036	0.360	0.426		0.360	3.600	4.264			
Arsenic	Arsenite	mouse	0.126	1.26	River Otter	0.031	0.277	0.390	0.016	0.312	2.772	3.898	0.156		
Arsenic	Arsenite	mouse	0.126	1.26	Whitetail Deer	0.019	0.621	0.292		0.191	6.211	2.921			
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Rough-winged Swallow	5.1	6.8	22.1		12.8	17.0	55.2			
Arsenic	sodium arsenite	mallard duck	5.14	12.84	American Robin	5.1	4.3	37.3		12.8	10.6	93.3			
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Belted Kingfisher	5.1	10.1	47.5	0.589	12.8	25.3	118.8	1.472		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	American	5.1	6.8	50.9		12.8	16.9	127.1			

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Cooper's Hawk	5.1	29.7	66.4	12.8	74.2	165.8		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Barn Owl	5.1	19.2	68.4	12.8	47.9	171.0		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Barred Owl	5.1	43.9	78.4	12.8	109.6	195.9		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Red-tailed Hawk	5.1	53.1	90.4	12.8	132.6	225.9		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Osprey	5.1	25.7	100.1	1.489	64.2	250.1		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Great Blue Heron	5.1	29.2	116.1	1.695	73.1	290.1		
Arsenic	sodium arsenite	mallard duck	5.14	12.84	Wild Turkey	5.1	171.3	156.9	12.8	428.0	392.0		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Rough-winged Swallow	2.5	3.3	10.6	7.4	9.8	31.7		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	American Robin	2.5	2.0	17.9	7.4	6.1	53.6		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Belted King-fisher	2.5	4.9	22.8	0.282	7.4	14.6		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	American Woodcock	2.5	3.2	24.4	7.4	9.7	73.1		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Cooper's Hawk	2.5	14.2	31.8	7.4	42.6	95.3		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Barn Owl	2.5	9.2	32.8	7.4	27.5	98.3		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Barred Owl	2.5	21.0	37.5	7.4	63.0	112.6		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Red-tailed Hawk	2.5	25.4	43.3	7.4	76.2	129.8		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Osprey	2.5	12.3	47.9	0.713	36.9	143.8		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Great Blue Heron	2.5	14.0	55.6	0.811	42.0	166.7		
Arsenic	paris green (cop- per arsenite)	brown-headed cowbird	2.46	7.38	Wild Turkey	2.5	82.0	75.1	7.4	246.0	225.3		
Barium	barium chloride	rat	5.1		Little Brown Bat	14.1	42.2	88.0					

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	End point Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
						Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Barium	barium chloride	rat	5.1		Short-tailed Shrew	11.8	19.7	53.8					
Barium	barium chloride	rat	5.1		White-footed Mouse	10.8	69.6	35.8					
Barium	barium chloride	rat	5.1		Meadow Vole	9.0	79.6	66.3					
Barium	barium chloride	rat	5.1		Mink	4.1	30.2	41.8					
Barium	barium chloride	rat	5.1		Cottontail Rabbit	4.0	20.0	40.9					
Barium	barium chloride	rat	5.1		Red Fox	2.8	28.4	33.7					
Barium	barium chloride	rat	5.1		River Otter	2.5	21.9	30.8					
Barium	barium chloride	rat	5.1		Whitetail Deer	1.5	49.1	23.1					
Barium	barium hydroxide	rat			19.8 Little Brown Bat					51.8	155.3	323.4	
Barium	barium hydroxide	rat			19.8 Short-tailed Shrew					43.5	72.5	197.8	
Barium	barium hydroxide	rat			19.8 White-footed Mouse					39.5	255.9	131.8	
Barium	barium hydroxide	rat			19.8 Meadow Vole					33.3	292.6	243.8	
Barium	barium hydroxide	rat			19.8 Mink					15.2	111.2	153.8	
Barium	barium hydroxide	rat			19.8 Cottontail Rabbit					14.6	73.7	150.5	
Barium	barium hydroxide	rat			19.8 Red Fox					10.5	104.6	123.8	
Barium	barium hydroxide	rat			19.8 River Otter					9.1	80.5	113.2	
Barium	barium hydroxide	rat			19.8 Whitetail Deer					5.6	180.4	84.8	
Barium	barium hydroxide	1-day old chicks	20.8		41.7 Rough-winged Swallow	20.8	27.6	89.4		41.7	55.3	179.2	
Barium	barium hydroxide	1-day old chicks	20.8		41.7 American Robin	20.8	17.2	151.1		41.7	34.5	302.9	
Barium	barium hydroxide	1-day old chicks	20.8		41.7 Belted Kingfisher	20.8	41.0	192.4		41.7	82.3	385.7	
Barium	barium hydroxide	1-day old chicks	20.8		41.7 American Woodcock	20.8	27.5	205.9		41.7	55.0	412.8	
Barium	barium hydroxide	1-day old chicks	20.8		41.7 Cooper's Hawk	20.8	120.1	268.6		41.7	240.9	538.4	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		End point Species ^a	NOEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Barn Owl	20.8	77.5	276.9		41.7	155.5	555.2	
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Barred Owl	20.8	177.5	317.3		41.7	355.9	636.1	
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Red-tailed Hawk	20.8	214.9	366.0		41.7	430.8	733.7	
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Osprey	20.8	104.0	405.2		41.7	208.5	812.3	
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Great Blue Heron	20.8	118.4	469.9		41.7	237.3	942.0	
Barium	barium hydroxide	1-day old chicks	20.8	41.7	Wild Turkey	20.8	693.3	634.9		41.7	1390.0	1272.9	
Benzene	n/a	mouse	26.36	263.6	Little Brown Bat	37.3	111.8	233.0		372.8	1118.4	2329.9	
Benzene	n/a	mouse	26.36	263.6	Short-tailed Shrew	31.3	52.2	142.5		313.5	522.5	1424.9	
Benzene	n/a	mouse	26.36	263.6	White-footed Mouse	28.5	184.3	95.0		284.9	1843.2	949.5	
Benzene	n/a	mouse	26.36	263.6	Meadow Vole	24.0	210.8	175.7		239.5	2107.9	1756.6	
Benzene	n/a	mouse	26.36	263.6	Mink	11.0	80.1	110.8	3.162	109.7	800.8	1108.1	31.623
Benzene	n/a	mouse	26.36	263.6	Cottontail Rabbit	10.5	53.1	108.4		104.8	530.7	1084.3	
Benzene	n/a	mouse	26.36	263.6	Red Fox	7.5	75.3	89.2		75.3	753.2	892.0	
Benzene	n/a	mouse	26.36	263.6	River Otter	6.5	58.0	81.5	2.293	65.2	579.8	815.4	22.930
Benzene	n/a	mouse	26.36	263.6	Whitetail Deer	4.0	129.9	61.1		40.0	1299.3	611.0	
Beta-BHC	n/a	rat	0.4	2	Little Brown Bat	1.05	3.14	6.53		5.23	15.68	32.67	
Beta-BHC	n/a	rat	0.4	2	Short-tailed Shrew	0.88	1.47	4.00		4.40	7.33	19.98	
Beta-BHC	n/a	rat	0.4	2	White-footed Mouse	0.80	5.17	2.66		3.99	25.85	13.31	
Beta-BHC	n/a	rat	0.4	2	Meadow Vole	0.67	5.91	4.93		3.36	29.56	24.63	
Beta-BHC	n/a	rat	0.4	2	Mink	0.31	2.25	3.11	0.004	1.54	11.23	15.54	0.021
Beta-BHC	n/a	rat	0.4	2	Cottontail Rabbit	0.29	1.49	3.04		1.47	7.44	15.20	
Beta-BHC	n/a	rat	0.4	2	Red Fox	0.21	2.11	2.50		1.06	10.56	12.51	
Beta-BHC	n/a	rat	0.4	2	River Otter	0.18	1.63	2.29	0.003	0.91	8.13	11.43	0.015
Beta-BHC	n/a	rat	0.4	2	Whitetail Deer	0.11	3.64	1.71		0.56	18.22	8.57	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^a	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
BHC-mixed isomers	n/a	rat	1.6	3.2	Little Brown Bat	4.18	12.55	26.14		8.36	25.09	52.27	
BHC-mixed isomers	n/a	rat	1.6	3.2	Short-tailed Shrew	3.52	5.86	15.98		7.03	11.72	31.97	
BHC-mixed isomers	n/a	rat	1.6	3.2	White-footed Mouse	3.20	20.68	10.65		6.39	41.35	21.30	
BHC-mixed isomers	n/a	rat	1.6	3.2	Meadow Vole	2.69	23.65	19.70		5.37	47.29	39.41	
BHC-mixed isomers	n/a	mink	0.014	0.14	Mink	0.01	0.10	0.14	5.964e-07	0.14	1.02	1.41	5.964e-06
BHC-mixed isomers	n/a	rat	1.6	3.2	Cottontail Rabbit	1.18	5.95	12.16		2.35	11.91	24.33	
BHC-mixed isomers	n/a	mink	0.014	0.14	Red Fox	0.01	0.10	0.11		0.10	0.96	1.14	
BHC-mixed isomers	n/a	mink	0.014	0.14	River Otter	0.01	0.07	0.10	3.971e-07	0.08	0.74	1.04	3.971e-06
BHC-mixed isomers	n/a	rat	1.6	3.2	Whitetail Deer	0.45	14.58	6.85		0.90	29.15	13.71	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Rough-winged Swallow	0.56	0.74	2.41		2.25	2.98	9.67	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	American Robin	0.56	0.46	4.07		2.25	1.86	16.34	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Belted Kingfisher	0.56	1.11	5.18	6.449e-06	2.25	4.44	20.81	2.591e-05
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	American Woodcock	0.56	0.74	5.54		2.25	2.97	22.28	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Cooper's Hawk	0.56	3.23	7.23		2.25	13.00	29.05	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Barn Owl	0.56	2.09	7.46		2.25	8.39	29.96	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Barred Owl	0.56	4.78	8.54		2.25	19.21	34.32	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Red-tailed Hawk	0.56	5.78	9.85		2.25	23.24	39.59	
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Osprey	0.56	2.80	10.91	1.634e-05	2.25	11.25	43.83	6.565e-05
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Great Blue Heron	0.56	3.19	12.65	1.860e-05	2.25	12.80	50.83	7.472e-05
BHC-mixed isomers	n/a	Japanese quail	0.56	2.25	Wild Turkey	0.56	18.67	17.09		2.25	75.00	68.68	
Benzo(a)pyrene	n/a	mouse	1	10	Little Brown Bat	1.41	4.24	8.84		14.14	42.43	88.39	
Benzo(a)pyrene	n/a	mouse	1	10	Short-tailed Shrew	1.19	1.98	5.41		11.89	19.82	54.05	
Benzo(a)pyrene	n/a	mouse	1	10	White-footed	1.08	6.99	3.60		10.81	69.92	36.02	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks					
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		
Mouse															
Benzo(a)pyrene	n/a	mouse	1	10	Meadow Vole	0.91	8.00	6.66		9.09	79.96	66.64			
Benzo(a)pyrene	n/a	mouse	1	10	Mink	0.42	3.04	4.20	1.034e-05	4.16	30.38	42.04	1.034e-04		
Benzo(a)pyrene	n/a	mouse	1	10	Cottontail Rabbit	0.40	2.01	4.11		3.98	20.13	41.13			
Benzo(a)pyrene	n/a	mouse	1	10	Red Fox	0.29	2.86	3.38		2.86	28.57	33.84			
Benzo(a)pyrene	n/a	mouse	1	10	River Otter	0.25	2.20	3.09	6.722e-06	2.47	22.00	30.93	6.722e-05		
Benzo(a)pyrene	n/a	mouse	1	10	Whitetail Deer	0.15	4.93	2.32		1.52	49.29	23.18			
Beryllium	beryllium sulfate	rat	0.66		Little Brown Bat	1.73	5.18	10.78							
Beryllium	beryllium sulfate	rat	0.66		Short-tailed Shrew	1.45	2.42	6.59							
Beryllium	beryllium sulfate	rat	0.66		White-footed Mouse	1.32	8.53	4.39							
Beryllium	beryllium sulfate	rat	0.66		Meadow Vole	1.11	9.75	8.13							
Beryllium	beryllium sulfate	rat	0.66		Mink	0.51	3.71	5.13	0.188						
Beryllium	beryllium sulfate	rat	0.66		Cottontail Rabbit	0.49	2.46	5.02							
Beryllium	beryllium sulfate	rat	0.66		Red Fox	0.35	3.49	4.13							
Beryllium	beryllium sulfate	rat	0.66		River Otter	0.30	2.68	3.77	0.136						
Beryllium	beryllium sulfate	rat	0.66		Whitetail Deer	0.19	6.01	2.83							
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	Little Brown Bat	25.9	78	162		259	776	1618			
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	Short-tailed Shrew	21.8	36	99		218	363	989			
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	White-footed Mouse	19.8	128	66		198	1280	659			
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	Meadow Vole	16.6	146	122		166	1463	1219			
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	Mink	7.6	56	77	1.944e-05	76	556	769	1.944e-04		
Bis(2-ethylhexyl)phthalate	n/a	mouse	18.3	183	Cottontail Rabbit	7.3	37	75		73	368	753			

Table 12. (continued)

			NOAEL-Based Benchmarks							LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks			Estimated Wildlife LOAEL ^c (mg/kg/d)	LOAEL-Based Benchmarks		
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Bis(2-ethylhexyl)-phthalate	n/a	mouse	18.3	183	Red Fox	5.2	52	62		52	523	619	
Bis(2-ethylhexyl)-phthalate	n/a	mouse	18.3	183	River Otter	4.5	40	57	1.243e-05	45	403	566	1.243e-04
Bis(2-ethylhexyl)-phthalate	n/a	mouse	18.3	183	Whitetail Deer	2.8	90	42		28	902	424	
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Rough-winged Swallow	1.10	1.46	4.73					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		American Robin	1.10	0.91	7.99					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Belted Kingfisher	1.10	2.17	10.18	7.593e-07				
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		American Woodcock	1.10	1.45	10.89					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Cooper's Hawk	1.10	6.35	14.20					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Barn Owl	1.10	4.10	14.65					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Barred Owl	1.10	9.39	16.78					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Red-tailed Hawk	1.10	11.36	19.35					
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Osprey	1.10	5.50	21.43	1.924e-06				
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Great Blue Heron	1.10	6.26	24.85	2.189e-06				
Bis(2-ethylhexyl)-phthalate	n/a	ringed dove	1.1		Wild Turkey	1.10	36.67	33.58					
Boron	boric acid or borax	rat	28	93.6	Little Brown Bat	73.2	220	457		245	734	1529	
Boron	boric acid or borax	rat	28	93.6	Short-tailed Shrew	61.5	103	280		206	343	935	
Boron	boric acid or borax	rat	28	93.6	White-footed	55.9	362	186		187	1210	623	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		End point Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Boron	borax	rat	28	93.6	Meadow Vole	47.0	414	345		157	1383	1153	
Boron	boric acid or borax	rat	28	93.6	Mink	21.5	157	218		72	525	727	
Boron	borax	rat	28	93.6	Cottontail Rabbit	20.6	104	213		69	348	712	
Boron	boric acid or borax	rat	28	93.6	Red Fox	14.8	148	175		49	494	585	
Boron	boric acid or borax	rat	28	93.6	River Otter	12.8	114	160		43	381	535	
Boron	boric acid or borax	rat	28	93.6	Whitetail Deer	7.9	255	120		26	853	401	
Boron	boric acid	mallard duck	28.8	100	Rough-winged Swallow	28.8	38	124		100	133	430	
Boron	boric acid	mallard duck	28.8	100	American Robin	28.8	24	209		100	83	726	
Boron	boric acid	mallard duck	28.8	100	Belted Kingfisher	28.8	57	266		100	197	925	
Boron	boric acid	mallard duck	28.8	100	American Woodcock	28.8	38	285		100	132	990	
Boron	boric acid	mallard duck	28.8	100	Cooper's Hawk	28.8	166	372		100	578	1291	
Boron	boric acid	mallard duck	28.8	100	Barn Owl	28.8	107	383		100	373	1331	
Boron	boric acid	mallard duck	28.8	100	Barred Owl	28.8	246	439		100	854	1526	
Boron	boric acid	mallard duck	28.8	100	Red-tailed Hawk	28.8	298	507		100	1033	1759	
Boron	boric acid	mallard duck	28.8	100	Osprey	28.8	144	561		100	500	1948	
Boron	boric acid	mallard duck	28.8	100	Great Blue Heron	28.8	164	651		100	569	2259	
Boron	boric acid	mallard duck	28.8	100	Wild Turkey	28.8	960	879		100	3333	3053	
Cadmium	cadmium chloride	rat	1	10	Little Brown Bat	2.521	7.563	15.757		25.211	75.634	157.571	
Cadmium	cadmium chloride	rat	1	10	Short-tailed Shrew	2.120	3.533	9.636		21.200	35.333	96.364	
Cadmium	cadmium chloride	rat	1	10	White-footed	1.926	12.465	6.421		19.264	124.652	64.215	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species LOAEL ^a (mg/kg/d)	Test Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks					
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)			Estimated Wildlife NOAEL ^c (mg/kg/d)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife NOAEL ^c (mg/kg/d)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Cadmium	cadmium chloride	rat	1	10	10	Meadow Vole	1.620	1.620	14.255	11.880		16.199	142.554	118.795		
Cadmium	cadmium chloride	rat	1	10	10	Mink	0.742	0.742	5.416	7.494	4.367e-04	7.419	54.155	74.942	4.367e-03	
Cadmium	cadmium chloride	rat	1	10	10	Cottontail Rabbit	0.709	0.709	3.589	7.333		7.089	35.892	73.331		
Cadmium	cadmium chloride	rat	1	10	10	Red Fox	0.509	0.509	5.094	6.032		5.094	50.940	60.323		
Cadmium	cadmium chloride	rat	1	10	10	River Otter	0.441	0.441	3.921	5.514	3.162e-04	4.412	39.214	55.144	3.162e-03	
Cadmium	cadmium chloride	rat	1	10	10	Whitetail Deer	0.271	0.271	8.787	4.132		2.706	87.871	41.323		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Rough-winged Swallow	1.45	1.45	1.92	6.23		20.00	26.50	85.95		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	American Robin	1.45	1.45	1.20	10.53		20.00	16.56	145.28		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Belted Kingfisher	1.45	1.45	2.86	13.41	2.307e-04	20.00	39.47	185.00	3.183e-03	
Cadmium	cadmium chloride	mallard duck	1.45	20	20	American Woodcock	1.45	1.45	1.91	14.36		20.00	26.40	198.00		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Cooper's Hawk	1.45	1.45	8.38	18.72		20.00	115.53	258.24		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Barn Owl	1.45	1.45	5.41	19.31		20.00	74.56	266.29		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Barred Owl	1.45	1.45	12.38	22.12		20.00	170.71	305.11		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Red-tailed Hawk	1.45	1.45	14.98	25.51		20.00	206.61	351.88		
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Osprey	1.45	1.45	7.25	28.25	0.001	20.00	100.00	389.61	0.008	
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Great Blue Heron	1.45	1.45	8.25	32.76	0.001	20.00	113.81	451.80	0.009	
Cadmium	cadmium chloride	mallard duck	1.45	20	20	Wild Turkey	1.45	1.45	48.33	44.26		20.00	666.67	610.53		
Carbon Tetrachloride	n/a	rat	16			Little Brown Bat	41.8	41.8	125.5	261.4						
Carbon Tetrachloride	n/a	rat	16			Short-tailed Shrew	35.2	35.2	58.6	159.8						
Carbon Tetrachloride	n/a	rat	16			White-footed Mouse	32.0	32.0	206.8	106.5						
Carbon Tetrachloride	n/a	rat	16			Meadow Vole	26.9	26.9	236.5	197.0						
Carbon Tetrachloride	n/a	rat	16			Mink	12.3	12.3	89.8	124.3	1.259					
Carbon Tetrachloride	n/a	rat	16			Cottontail Rabbit	11.8	11.8	59.5	121.6						

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)				Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Carbon Tetrachloride	n/a	rat	16			Red Fox	8.4	84.5	100.1						
Carbon Tetrachloride	n/a	rat	16			River Otter	7.3	65.0	91.5	0.913					
Carbon Tetrachloride	n/a	rat	16			Whitetail Deer	4.5	145.8	68.5						
Chlordane	n/a	mouse	4.6		9.2	Little Brown Bat	6.5	19.5	40.7		13.0	39.0	81.3		
Chlordane	n/a	mouse	4.6		9.2	Short-tailed Shrew	5.5	9.1	24.9		10.9	18.2	49.7		
Chlordane	n/a	mouse	4.6		9.2	White-footed Mouse	5.0	32.2	16.6		9.9	64.3	33.1		
Chlordane	n/a	mouse	4.6		9.2	Meadow Vole	4.2	36.8	30.7		8.4	73.6	61.3		
Chlordane	n/a	mouse	4.6		9.2	Mink	1.9	14.0	19.3	2.942e-05	3.8	27.9	38.7	5.884e-05	
Chlordane	n/a	mouse	4.6		9.2	Cottontail Rabbit	1.8	9.3	18.9		3.7	18.5	37.8		
Chlordane	n/a	mouse	4.6		9.2	Red Fox	1.3	13.1	15.6		2.6	26.3	31.1		
Chlordane	n/a	mouse	4.6		9.2	River Otter	1.1	10.1	14.2	1.866e-05	2.3	20.2	28.5	3.732e-05	
Chlordane	n/a	mouse	4.6		9.2	Whitetail Deer	0.7	22.7	10.7		1.4	45.3	21.3		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Rough-winged Swallow	2.1	2.8	9.2		10.7	14.2	46.0		
Chlordane	n/a	redwinged black-bird	2.14		10.7	American Robin	2.1	1.8	15.5		10.7	8.9	77.7		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Belted Kingfisher	2.1	4.2	19.8	8.890e-06	10.7	21.1	99.0	4.445e-05	
Chlordane	n/a	redwinged black-bird	2.14		10.7	American Woodcock	2.1	2.8	21.2		10.7	14.1	105.9		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Cooper's Hawk	2.1	12.4	27.6		10.7	61.8	138.2		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Barn Owl	2.1	8.0	28.5		10.7	39.9	142.5		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Barred Owl	2.1	18.3	32.6		10.7	91.3	163.2		
Chlordane	n/a	redwinged black-bird	2.14		10.7	Red-tailed Hawk	2.1	22.1	37.7		10.7	110.5	188.3		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		End point Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Chlordane	n/a	redwinged black-bird	2.14	10.7	Osprey	2.1	10.7	41.7	2.253e-05	10.7	53.5	208.4	1.126e-04	
Chlordane	n/a	redwinged black-bird	2.14	10.7	Great Blue Heron	2.1	12.2	48.3	2.564e-05	10.7	60.9	241.7	1.282e-04	
Chlordane	n/a	redwinged black-bird	2.14	10.7	Wild Turkey	2.1	71.3	65.3		10.7	356.7	326.6		
Chlordecone (kepone)	n/a	rat	0.08	0.4	Little Brown Bat	0.209	0.627	1.307		1.045	3.136	6.534		
Chlordecone (kepone)	n/a	rat	0.08	0.4	Short-tailed Shrew	0.176	0.293	0.799		0.879	1.465	3.996		
Chlordecone (kepone)	n/a	rat	0.08	0.4	White-footed Mouse	0.160	1.034	0.533		0.799	5.169	2.663		
Chlordecone (kepone)	n/a	rat	0.08	0.4	Meadow Vole	0.134	1.182	0.985		0.672	5.911	4.926		
Chlordecone (kepone)	n/a	rat	0.08	0.4	Mink	0.062	0.449	0.622	1.489e-05	0.308	2.246	3.108	7.445e-05	
Chlordecone (kepone)	n/a	rat	0.08	0.4	Cottontail Rabbit	0.059	0.298	0.608		0.294	1.488	3.041		
Chlordecone (kepone)	n/a	rat	0.08	0.4	Red Fox	0.042	0.422	0.500		0.211	2.112	2.502		
Chlordecone (kepone)	n/a	rat	0.08	0.4	River Otter	0.037	0.325	0.457	1.081e-05	0.183	1.626	2.287	5.404e-05	
Chlordecone (kepone)	n/a	rat	0.08	0.4	Whitetail Deer	0.022	0.729	0.343		0.112	3.644	1.714		
Chloroform	n/a	rat	15	41	Little Brown Bat	39.2	118	245		107	321	670		
Chloroform	n/a	rat	15	41	Short-tailed Shrew	33.0	55	150		90	150	410		
Chloroform	n/a	rat	15	41	White-footed Mouse	30.0	194	100		82	530	273		
Chloroform	n/a	rat	15	41	Meadow Vole	25.2	222	185		69	606	505		
Chloroform	n/a	rat	15	41	Mink	11.5	84	117	4.741	32	230	319	12.959	
Chloroform	n/a	rat	15	41	Cottontail Rabbit	11.0	56	114		30	153	312		
Chloroform	n/a	rat	15	41	Red Fox	7.9	79	94		22	217	256		
Chloroform	n/a	rat	15	41	River Otter	6.9	61	86	3.439	19	167	234	9.399	
Chloroform	n/a	rat	15	41	Whitetail Deer	4.2	137	64		12	373	176		
Chromium	Cr ⁺³ as Cr ₂ O ₃	rat	2737		Little Brown Bat	7154	21461	44710						

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Short-tailed Shrew	6015	10026	27343						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		White-footed Mouse	5466	35370	18221						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Meadow Vole	4597	40449	33708						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Mink	2105	15366	21265						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Cottontail Rabbit	2011	10184	20807						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Red Fox	1445	14454	17117						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		River Otter	1252	11127	15647						
Chromium	Cr ³⁺ as Cr ₂ O ₃	rat	2737		Whitetail Deer	768	24933	11725						
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Rough-winged Swallow	1.00	1.33	4.30		5.00	6.63	21.49		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 American Robin	1.00	0.83	7.26		5.00	4.14	36.32		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Belted Kingfisher	1.00	1.97	9.25		5.00	9.87	46.25		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 American Woodcock	1.00	1.32	9.90		5.00	6.60	49.50		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Cooper's Hawk	1.00	5.78	12.91		5.00	28.88	64.56		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Barn Owl	1.00	3.73	13.31		5.00	18.64	66.57		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Banded Owl	1.00	8.54	15.26		5.00	42.68	76.28		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Red-tailed Hawk	1.00	10.33	17.59		5.00	51.65	87.97		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Osprey	1.00	5.00	19.48		5.00	25.00	97.40		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Great Blue Heron	1.00	5.69	22.59		5.00	28.45	112.95		
Chromium	Cr ³⁺ as CrK(SO ₄) ₂	black duck	1		5 Wild Turkey	1.00	33.33	30.53		5.00	166.67	152.63		
Chromium	Cr ⁶⁺	rat	3.28		13.14 Little Brown Bat	8.57	25.72	53.58		34.34	103.03	214.65		
Chromium	Cr ⁶⁺	rat	3.28		13.14 Short-tailed Shrew	7.21	12.01	32.77		28.88	48.13	131.27		
Chromium	Cr ⁶⁺	rat	3.28		13.14 White-footed Mouse	6.55	42.39	21.84		26.24	169.80	87.48		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks			LOAEL-Based Benchmarks				
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Chromium	Cr ⁶	rat	3.28	13.14	Meadow Vole	5.51	48.47	40.40		22.07	194.19	161.83	
Chromium	Cr ⁶	rat	3.28	13.14	Mink	2.52	18.41	25.48	4.947	10.11	73.77	102.09	19.817
Chromium	Cr ⁶	rat	3.28	13.14	Cottontail Rabbit	2.41	12.20	24.94		9.66	48.89	99.89	
Chromium	Cr ⁶	rat	3.28	13.14	Red Fox	1.73	17.32	20.51		6.94	69.39	82.17	
Chromium	Cr ⁶	rat	3.28	13.14	River Otter	1.50	13.33	18.75	3.593	6.01	53.42	75.12	14.394
Chromium	Cr ⁶	rat	3.28	13.14	Whitetail Deer	0.92	29.88	14.05		3.69	119.70	56.29	
Copper	copper sulfate	mink	11.7	15.4	Little Brown Bat	39.8	119.3	248.5		52.3	157.0	327.1	
Copper	copper sulfate	mink	11.7	15.4	Short-tailed Shrew	33.4	55.7	152.0		44.0	73.3	200.0	
Copper	copper sulfate	mink	11.7	15.4	White-footed Mouse	30.4	196.6	101.3		40.0	258.7	133.3	
Copper	copper sulfate	mink	11.7	15.4	Meadow Vole	25.5	224.8	187.3		33.6	295.9	246.6	
Copper	copper sulfate	mink	11.7	15.4	Mink	11.7	85.4	118.2	0.294	15.4	112.4	155.6	0.387
Copper	copper sulfate	mink	11.7	15.4	Cottontail Rabbit	11.2	56.6	115.6		14.7	74.5	152.2	
Copper	copper sulfate	mink	11.7	15.4	Red Fox	8.0	80.3	95.1		10.6	105.7	125.2	
Copper	copper sulfate	mink	11.7	15.4	River Otter	7.0	61.8	87.0	0.213	9.2	81.4	114.5	0.280
Copper	copper sulfate	mink	11.7	15.4	Whitetail Deer	4.3	138.6	65.2		5.6	182.4	85.8	
Copper	copper oxide	1 day old chicks	47	61.7	Rough-winged Swallow	47.0	62.3	202.0		61.7	81.8	265.1	
Copper	copper oxide	1 day old chicks	47	61.7	American Robin	47.0	38.9	341.4		61.7	51.1	448.2	
Copper	copper oxide	1 day old chicks	47	61.7	Belted Kingfisher	47.0	92.7	434.8	0.320	61.7	121.8	570.7	0.420
Copper	copper oxide	1 day old chicks	47	61.7	American Woodcock	47.0	62.0	465.3		61.7	81.4	610.8	
Copper	copper oxide	1 day old chicks	47	61.7	Cooper's Hawk	47.0	271.5	606.9		61.7	356.4	796.7	
Copper	copper oxide	1 day old chicks	47	61.7	Barn Owl	47.0	175.2	625.8		61.7	230.0	821.5	
Copper	copper oxide	1 day old chicks	47	61.7	Barred Owl	47.0	401.2	717.0		61.7	526.7	941.3	
Copper	copper oxide	1 day old chicks	47	61.7	Red-tailed Hawk	47.0	485.5	826.9		61.7	637.4	1085.5	
Copper	copper oxide	1 day old chicks	47	61.7	Osprey	47.0	235.0	915.6	0.810	61.7	308.5	1201.9	1.063

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	End point Species ^a	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
						Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Copper	copper oxide	1 day old chicks	47	61.7	Great Blue Heron	47.0	267.5	1061.7	0.921	61.7	351.1	1393.8	1.210
Copper	copper oxide	1 day old chicks	47	61.7	Wild Turkey	47.0	1566.7	1434.7		61.7	2056.7	1883.5	
o-Cresol	n/a	mink	219.2		Little Brown Bat	744.9	2234.6	4655.4					
o-Cresol	n/a	mink	219.2		Short-tailed Shrew	626.4	1043.9	2847.0					
o-Cresol	n/a	mink	219.2		White-footed Mouse	569.2	3682.8	1897.2					
o-Cresol	n/a	mink	219.2		Meadow Vole	478.6	4211.7	3509.8					
o-Cresol	n/a	mink	219.2		Mink	219.2	1600.0	2214.1	80.070				
o-Cresol	n/a	mink	219.2		Cottontail Rabbit	209.4	1060.4	2166.5					
o-Cresol	n/a	mink	219.2		Red Fox	150.5	1505.0	1782.2					
o-Cresol	n/a	mink	219.2		River Otter	130.3	1158.6	1629.2	58.070				
o-Cresol	n/a	mink	219.2		Whitetail Deer	80.0	2596.1	1220.9					
Cyanide	potassium cyanide	rat	68.7		Little Brown Bat	168.7	506.2	1054.7					
Cyanide	potassium cyanide	rat	68.7		Short-tailed Shrew	141.9	236.5	645.0					
Cyanide	potassium cyanide	rat	68.7		White-footed Mouse	128.9	834.3	429.8					
Cyanide	potassium cyanide	rat	68.7		Meadow Vole	108.4	954.2	795.1					
Cyanide	potassium cyanide	rat	68.7		Mink	49.7	362.5	501.6	501.605				
Cyanide	potassium cyanide	rat	68.7		Cottontail Rabbit	47.4	240.2	490.8					
Cyanide	potassium cyanide	rat	68.7		Red Fox	34.1	341.0	403.8					
Cyanide	potassium cyanide	rat	68.7		River Otter	29.5	262.5	369.1	369.092				
Cyanide	potassium cyanide	rat	68.7		Whitetail Deer	18.1	588.1	276.6					

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife		NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Wildlife	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
DDT and metabolites	inide														
	n/a	rat	0.8	4	Little Brown Bat	2.09		6.27	13.07		10.45	31.36	65.34		
DDT and metabolites	n/a	rat	0.8	4	Short-tailed Shrew	1.76		2.93	7.99		8.79	14.65	39.96		
DDT and metabolites	n/a	rat	0.8	4	White-footed Mouse	1.60		10.34	5.33		7.99	51.69	26.63		
DDT and metabolites	n/a	rat	0.8	4	Meadow Vole	1.34		11.82	9.85		6.72	59.11	49.26		
DDT and metabolites	n/a	rat	0.8	4	Mink	0.62		4.49	6.22	3.362e-06	3.08	22.46	31.08	1.681e-05	
DDT and metabolites	n/a	rat	0.8	4	Cottontail Rabbit	0.59		2.98	6.08		2.94	14.88	30.41		
DDT and metabolites	n/a	rat	0.8	4	Red Fox	0.42		4.22	5.00		2.11	21.12	25.02		
DDT and metabolites	n/a	rat	0.8	4	River Otter	0.37		3.25	4.57	1.797e-06	1.83	16.26	22.87	8.984e-06	
DDT and metabolites	n/a	rat	0.8	4	Whitetail Deer	0.22		7.29	3.43		1.12	36.44	17.14		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Rough-winged Swallow	0.003		0.004	0.012		0.028	0.037	0.120		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	American Robin	0.003		0.002	0.020		0.028	0.023	0.203		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Belted Kingfisher	0.003		0.006	0.026	4.136e-09	0.028	0.055	0.259	4.136e-08	
DDT and metabolites	n/a	brown pelican	0.0028	0.028	American Woodcock	0.003		0.004	0.028		0.028	0.037	0.277		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Cooper's Hawk	0.003		0.016	0.036		0.028	0.162	0.362		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Barn Owl	0.003		0.010	0.037		0.028	0.104	0.373		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Barred Owl	0.003		0.024	0.043		0.028	0.239	0.427		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Red-tailed Hawk	0.003		0.029	0.049		0.028	0.289	0.493		
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Osprey	0.003		0.014	0.055	1.048e-08	0.028	0.140	0.545	1.048e-07	
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Great Blue Heron	0.003		0.016	0.063	1.193e-08	0.028	0.159	0.633	1.193e-07	
DDT and metabolites	n/a	brown pelican	0.0028	0.028	Wild Turkey	0.003		0.093	0.085		0.028	0.933	0.855		
1,2-Dichloroethane	n/a	mouse	50		Little Brown Bat	73.5		220.5	459.3						
1,2-Dichloroethane	n/a	mouse	50		Short-tailed Shrew	61.8		103.0	280.9						

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
1,2-Dichloroethane	n/a	mouse	50		White-footed Mouse	56.2	363.3	187.2						
1,2-Dichloroethane	n/a	mouse	50		Meadow Vole	47.2	415.5	346.3						
1,2-Dichloroethane	n/a	mouse	50		Mink	21.6	157.9	218.4	18.720					
1,2-Dichloroethane	n/a	mouse	50		Cottontail Rabbit	20.7	104.6	213.8						
1,2-Dichloroethane	n/a	mouse	50		Red Fox	14.8	148.5	175.8						
1,2-Dichloroethane	n/a	mouse	50		River Otter	12.9	114.3	160.7	13.574					
1,2-Dichloroethane	n/a	mouse	50		Whitetail Deer	7.9	256.1	120.5						
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Rough-winged Swallow	17.2	22.8	73.9		34.4	45.6	147.8		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	American Robin	17.2	14.2	124.9		34.4	28.5	249.9		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Belted Kingfisher	17.2	33.9	159.1	4.284	34.4	67.9	318.2	8.567	
1,2-Dichloroethane	n/a	chicken	17.2	34.4	American Woodcock	17.2	22.7	170.3		34.4	45.4	340.6		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Cooper's Hawk	17.2	99.4	222.1		34.4	198.7	444.2		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Barn Owl	17.2	64.1	229.0		34.4	128.2	458.0		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Barred Owl	17.2	146.8	262.4		34.4	293.6	524.8		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Red-tailed Hawk	17.2	177.7	302.6		34.4	355.4	605.2		
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Osprey	17.2	86.0	335.1	10.795	34.4	172.0	670.1	21.590	
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Great Blue Heron	17.2	97.9	388.5	12.293	34.4	195.8	777.1	24.586	
1,2-Dichloroethane	n/a	chicken	17.2	34.4	Wild Turkey	17.2	573.3	525.1		34.4	1146.7	1050.1		
1,1-Dichloroethylene	n/a	rat	30		Little Brown Bat	78.4	235.2	490.1						
1,1-Dichloroethylene	n/a	rat	30		Short-tailed Shrew	65.9	109.9	299.7						
1,1-Dichloroethylene	n/a	rat	30		White-footed Mouse	59.9	387.7	199.7						
1,1-Dichloroethylene	n/a	rat	30		Meadow Vole	50.4	443.4	369.5						
1,1-Dichloroethylene	n/a	beagle dog	2.5		Mink	4.4	32.5	44.9	1.281					

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)
1,1-Dichloroethylene	n/a	rat	30		Cottontail Rabbit	22.0	111.6	228.1						
1,1-Dichloroethylene	n/a	beagle dog	2.5		Red Fox	3.1	30.5	36.1						
1,1-Dichloroethylene	n/a	beagle dog	2.5		River Otter	2.6	23.5	33.0	0.929					
1,1-Dichloroethylene	n/a	rat	30		Whitetail Deer	8.4	273.3	128.5						
1,2-Dichloroethylene	n/a	mouse	45.2		Little Brown Bat	63.9	191.8	399.5						
1,2-Dichloroethylene	n/a	mouse	45.2		Short-tailed Shrew	53.8	89.6	244.3						
1,2-Dichloroethylene	n/a	mouse	45.2		White-footed Mouse	48.8	316.1	162.8						
1,2-Dichloroethylene	n/a	mouse	45.2		Meadow Vole	41.1	361.4	301.2						
1,2-Dichloroethylene	n/a	mouse	45.2		Mink	18.8	137.3	190.0	8.543					
1,2-Dichloroethylene	n/a	mouse	45.2		Cottontail Rabbit	18.0	91.0	185.9						
1,2-Dichloroethylene	n/a	mouse	45.2		Red Fox	12.9	129.2	152.9						
1,2-Dichloroethylene	n/a	mouse	45.2		River Otter	11.2	99.4	139.8	6.197					
1,2-Dichloroethylene	n/a	mouse	45.2		Whitetail Deer	6.9	222.8	104.8						
Dieldrin	n/a	rat	0.02		0.2 Little Brown Bat	0.052	0.157	0.327		0.523	1.568	3.267		
Dieldrin	n/a	rat	0.02		0.2 Short-tailed Shrew	0.044	0.073	0.200		0.440	0.733	1.998		
Dieldrin	n/a	rat	0.02		0.2 White-footed Mouse	0.040	0.258	0.133		0.399	2.585	1.331		
Dieldrin	n/a	rat	0.02		Meadow Vole	0.034	0.296	0.246		0.336	2.956	2.463		
Dieldrin	n/a	rat	0.02		Mink	0.015	0.112	0.155	1.987e-06	0.154	1.123	1.554	1.987e-05	
Dieldrin	n/a	rat	0.02		0.2 Cottontail Rabbit	0.015	0.074	0.152		0.147	0.744	1.520		
Dieldrin	n/a	rat	0.02		0.2 Red Fox	0.011	0.106	0.125		0.106	1.056	1.251		
Dieldrin	n/a	rat	0.02		0.2 River Otter	0.009	0.081	0.114	1.362e-06	0.091	0.813	1.143	1.362e-05	
Dieldrin	n/a	rat	0.02		0.2 Whitetail Deer	0.006	0.182	0.086		0.056	1.822	0.857		
Dieldrin	n/a	barn owl	0.077		Rough-winged Swallow	0.077	0.102	0.331						

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Dieldrin	n/a	barn owl	0.077		American Robin	0.077	0.064	0.559						
Dieldrin	n/a	barn owl	0.077		Belted Kingfisher	0.077	0.152	0.712	2.688e-06					
Dieldrin	n/a	barn owl	0.077		American Woodcock	0.077	0.102	0.762						
Dieldrin	n/a	barn owl	0.077		Cooper's Hawk	0.077	0.445	0.994						
Dieldrin	n/a	barn owl	0.077		Barn Owl	0.077	0.287	1.025						
Dieldrin	n/a	barn owl	0.077		Barred Owl	0.077	0.657	1.175						
Dieldrin	n/a	barn owl	0.077		Red-tailed Hawk	0.077	0.795	1.355						
Dieldrin	n/a	barn owl	0.077		Osprey	0.077	0.385	1.500	6.811e-06					
Dieldrin	n/a	barn owl	0.077		Great Blue Heron	0.077	0.438	1.739	7.752e-06					
Dieldrin	n/a	barn owl	0.077		Wild Turkey	0.077	2.567	2.351						
Diethylphthalate	n/a	mouse	4583		Little Brown Bat	6481	19444	40508						
Diethylphthalate	n/a	mouse	4583		Short-tailed Shrew	5450	9084	24773						
Diethylphthalate	n/a	mouse	4583		White-footed Mouse	4953	32046	16508						
Diethylphthalate	n/a	mouse	4583		Meadow Vole	4165	36648	30540						
Diethylphthalate	n/a	mouse	4583		Mink	1907	13922	19266	290.273					
Diethylphthalate	n/a	mouse	4583		Cottontail Rabbit	1822	9227	18852						
Diethylphthalate	n/a	mouse	4583		Red Fox	1310	13096	15508						
Diethylphthalate	n/a	mouse	4583		River Otter	1134	10081	14176	210.561					
Diethylphthalate	n/a	mouse	4583		Whitetail Deer	696	22590	10623						
Di-N-burylphthalate	n/a	mouse	550		1833 Little Brown Bat	778	2333	4861		2592	7777		16202	
Di-N-burylphthalate	n/a	mouse	550		1833 Short-tailed Shrew	654	1090	2973		2180	3633		9908	
Di-N-burylphthalate	n/a	mouse	550		1833 White-footed Mouse	594	3846	1981		1981	12817		6603	
Di-N-burylphthalate	n/a	mouse	550		1833 Meadow Vole	500	4398	3665		1666	14658		12215	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks				
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Di-N-butylphthalate	n/a	mouse	550	1833	Mink	229	229	1671	2312	0.456	763	5568	7706	1.521
Di-N-butylphthalate	n/a	mouse	550	1833	Cottontail Rabbit	219	219	1107	2262		729	3690	7540	
Di-N-butylphthalate	n/a	mouse	550	1833	Red Fox	157	157	1572	1861		524	5238	6203	
Di-N-butylphthalate	n/a	mouse	550	1833	River Otter	136	136	1210	1701	0.348	454	4032	5670	1.160
Di-N-butylphthalate	n/a	mouse	550	1833	Whitetail Deer	83	83	2711	1275		278	9035	4249	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Rough-winged Swallow	0.11	0.11	0.15	0.47		1.10	1.46	4.73	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	American Robin	0.11	0.11	0.09	0.80		1.10	0.91	7.99	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Belted Kingfisher	0.11	0.11	0.22	1.02	0.000	1.10	2.17	10.18	0.001
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	American Woodcock	0.11	0.11	0.15	1.09		1.10	1.45	10.89	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Cooper's Hawk	0.11	0.11	0.64	1.42		1.10	6.35	14.20	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Barn Owl	0.11	0.11	0.41	1.46		1.10	4.10	14.65	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Barred Owl	0.11	0.11	0.94	1.68		1.10	9.39	16.78	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Red-tailed Hawk	0.11	0.11	1.14	1.94		1.10	11.36	19.35	
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Osprey	0.11	0.11	0.55	2.14	1.502e-04	1.10	5.50	21.43	1.502e-03
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Great Blue Heron	0.11	0.11	0.63	2.48	1.710e-04	1.10	6.26	24.85	1.710e-03
Di-N-butylphthalate	n/a	ringed dove	0.11	1.1	Wild Turkey	0.11	0.11	3.67	3.36		1.10	36.67	33.58	
Di-N-hexylphthalate	n/a	mouse	55	550	Little Brown Bat	77.8	77.8	233.3	486.1		777.8	2333.5	4861.4	
Di-N-hexylphthalate	n/a	mouse	55	550	Short-tailed Shrew	65.4	65.4	109.0	297.3		654.1	1090.1	2973.0	
Di-N-hexylphthalate	n/a	mouse	55	550	White-footed Mouse	59.4	59.4	384.6	198.1		594.3	3845.8	1981.1	
Di-N-hexylphthalate	n/a	mouse	55	550	Meadow Vole	50.0	50.0	439.8	366.5		499.8	4398.1	3665.1	
Di-N-hexylphthalate	n/a	mouse	55	550	Mink	22.9	22.9	167.1	231.2		228.9	1670.8	2312.1	
Di-N-hexylphthalate	n/a	mouse	55	550	Cottontail Rabbit	21.9	21.9	110.7	226.2		218.7	1107.3	2262.4	
Di-N-hexylphthalate	n/a	mouse	55	550	Red Fox	15.7	15.7	157.2	186.1		157.2	1571.6	1861.1	

Table 12. (continued)

NOAEL-Based Benchmarks							LOAEL-Based Benchmarks						
Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks			LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Di-N-hexylphthalate	n/a	mouse	55	550	River Otter	13.6	121.0	170.1		136.1	1209.8	1701.3	
Di-N-hexylphthalate	n/a	mouse	55	550	Whitetail Deer	8.3	271.1	127.5		83.5	2711.0	1274.9	
1,4-Dioxane	n/a	rat	0.5	1	Little Brown Bat	1.31	3.92	8.17		2.61	7.84	16.34	
1,4-Dioxane	n/a	rat	0.5	1	Short-tailed Shrew	1.10	1.83	5.00		2.20	3.66	9.99	
1,4-Dioxane	n/a	rat	0.5	1	White-footed Mouse	1.00	6.46	3.33		2.00	12.92	6.66	
1,4-Dioxane	n/a	rat	0.5	1	Meadow Vole	0.84	7.39	6.16		1.68	14.78	12.32	
1,4-Dioxane	n/a	rat	0.5	1	Mink	0.38	2.81	3.88		0.77	5.61	7.77	5.490
1,4-Dioxane	n/a	rat	0.5	1	Cottontail Rabbit	0.37	1.86	3.80		0.73	3.72	7.60	
1,4-Dioxane	n/a	rat	0.5	1	Red Fox	0.26	2.64	3.13		0.53	5.28	6.25	
1,4-Dioxane	n/a	rat	0.5	1	River Otter	0.23	2.03	2.86		2.010	4.07	5.72	4.021
1,4-Dioxane	n/a	rat	0.5	1	Whitetail Deer	0.14	4.55	2.14		0.28	9.11	4.28	
Endosulfan	n/a	rat	0.15		Little Brown Bat	0.39	1.18	2.45					
Endosulfan	n/a	rat	0.15		Short-tailed Shrew	0.33	0.55	1.50					
Endosulfan	n/a	rat	0.15		White-footed Mouse	0.30	1.94	1.00					
Endosulfan	n/a	rat	0.15		Meadow Vole	0.25	2.22	1.85					
Endosulfan	n/a	rat	0.15		Mink	0.12	0.84	1.17	0.001				
Endosulfan	n/a	rat	0.15		Cottontail Rabbit	0.11	0.56	1.14					
Endosulfan	n/a	rat	0.15		Red Fox	0.08	0.79	0.94					
Endosulfan	n/a	rat	0.15		River Otter	0.07	0.61	0.86	0.001				
Endosulfan	n/a	rat	0.15		Whitetail Deer	0.04	1.37	0.64					
Endosulfan	n/a	gray partridge	10		Rough-winged Swallow	10.0	13.3	43.0					
Endosulfan	n/a	gray partridge	10		American Robin	10.0	8.3	72.6					
Endosulfan	n/a	gray partridge	10		Belted Kingfisher	10.0	19.7	92.5	0.020				

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Endosulfan	n/a	gray partridge	10		American Woodcock	10.0	13.2	99.0						
Endosulfan	n/a	gray partridge	10		Cooper's Hawk	10.0	57.8	129.1						
Endosulfan	n/a	gray partridge	10		Barn Owl	10.0	37.3	133.1						
Endosulfan	n/a	gray partridge	10		Barred Owl	10.0	85.4	152.6						
Endosulfan	n/a	gray partridge	10		Red-tailed Hawk	10.0	103.3	175.9						
Endosulfan	n/a	gray partridge	10		Osprey	10.0	50.0	194.8	0.049					
Endosulfan	n/a	gray partridge	10		Great Blue Heron	10.0	56.9	225.9	0.056					
Endosulfan	n/a	gray partridge	10		Wild Turkey	10.0	333.3	305.3						
Endrin	n/a	mouse	0.092	0.92	Little Brown Bat	0.130	0.390	0.813		1.301	3.903	8.132		
Endrin	n/a	mouse	0.092	0.92	Short-tailed Shrew	0.109	0.182	0.497		1.094	1.823	4.973		
Endrin	n/a	mouse	0.092	0.92	White-footed Mouse	0.099	0.643	0.331		0.994	6.433	3.314		
Endrin	n/a	mouse	0.092	0.92	Meadow Vole	0.084	0.736	0.613		0.836	7.357	6.131		
Endrin	n/a	mouse	0.092	0.92	Mink	0.038	0.279	0.387	1.859e-05	0.383	2.795	3.868	1.859e-04	
Endrin	n/a	mouse	0.092	0.92	Cottontail Rabbit	0.037	0.185	0.378		0.366	1.852	3.784		
Endrin	n/a	mouse	0.092	0.92	Red Fox	0.026	0.263	0.311		0.263	2.629	3.113		
Endrin	n/a	mouse	0.092	0.92	River Otter	0.023	0.202	0.285	1.383e-05	0.228	2.024	2.846	1.383e-04	
Endrin	n/a	mouse	0.092	0.92	Whitetail Deer	0.014	0.453	0.213		0.140	4.535	2.133		
Endrin	n/a	screech owl	0.01	0.1	Rough-winged Swallow	0.010	0.013	0.043		0.100	0.133	0.430		
Endrin	n/a	screech owl	0.01	0.1	American Robin	0.010	0.008	0.073		0.100	0.083	0.726		
Endrin	n/a	screech owl	0.01	0.1	Belted Kingfisher	0.010	0.020	0.093	1.313e-06	0.100	0.197	0.925	1.313e-05	
Endrin	n/a	screech owl	0.01	0.1	American Woodcock	0.010	0.013	0.099		0.100	0.132	0.990		
Endrin	n/a	screech owl	0.01	0.1	Cooper's Hawk	0.010	0.058	0.129		0.100	0.578	1.291		
Endrin	n/a	screech owl	0.01	0.1	Barn Owl	0.010	0.037	0.133		0.100	0.373	1.331		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Endrin	n/a	screech owl	0.01	0.1	Barred Owl	0.010	0.085	0.153		0.100	0.854	1.526		
Endrin	n/a	screech owl	0.01	0.1	Red-tailed Hawk	0.010	0.103	0.176		0.100	1.033	1.759		
Endrin	n/a	screech owl	0.01	0.1	Osprey	0.010	0.050	0.195	3.326e-06	0.100	0.500	1.948	3.326e-05	
Endrin	n/a	screech owl	0.01	0.1	Great Blue Heron	0.010	0.057	0.226	3.785e-06	0.100	0.569	2.259	3.785e-05	
Endrin	n/a	screech owl	0.01	0.1	Wild Turkey	0.010	0.333	0.305		0.100	3.333	3.053		
Ethanol	n/a	rat	31.9	319	Little Brown Bat	83	250	521		834	2501	5211		
Ethanol	n/a	rat	31.9	319	Short-tailed Shrew	70	117	319		701	1169	3187		
Ethanol	n/a	rat	31.9	319	White-footed Mouse	64	412	212		637	4122	2124		
Ethanol	n/a	rat	31.9	319	Meadow Vole	54	471	393		536	4714	3929		
Ethanol	n/a	rat	31.9	319	Mink	25	179	248	168.541	245	1791	2478	1685.412	
Ethanol	n/a	rat	31.9	319	Cottontail Rabbit	23	119	243		234	1187	2425		
Ethanol	n/a	rat	31.9	319	Red Fox	17	168	199		168	1685	1995		
Ethanol	n/a	rat	31.9	319	River Otter	15	130	182	123.377	146	1297	1824	1233.770	
Ethanol	n/a	rat	31.9	319	Whitetail Deer	9	291	137		89	2906	1367		
Ethyl Acetate	n/a	rat	90	360	Little Brown Bat	235	706	1470		941	2823	5881		
Ethyl Acetate	n/a	rat	90	360	Short-tailed Shrew	198	330	899		791	1319	3596		
Ethyl Acetate	n/a	rat	90	360	White-footed Mouse	180	1163	599		719	4652	2397		
Ethyl Acetate	n/a	rat	90	360	Meadow Vole	151	1330	1108		605	5320	4434		
Ethyl Acetate	n/a	rat	90	360	Mink	69	505	699	187.656	277	2021	2797	750.624	
Ethyl Acetate	n/a	rat	90	360	Cottontail Rabbit	66	335	684		265	1340	2737		
Ethyl Acetate	n/a	rat	90	360	Red Fox	48	475	563		190	1901	2251		
Ethyl Acetate	n/a	rat	90	360	River Otter	41	366	515	136.465	165	1464	2058	545.858	
Ethyl Acetate	n/a	rat	90	360	Whitetail Deer	25	820	386		101	3279	1542		
Fluoride	NaF	mink	31.37	52.75	Little Brown Bat	106.6	319.8	666.2		179.2	537.7	1120.3		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife		NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Fluoride	NaF	mink	31.37	52.75	Short-tailed Shrew	89.6	89.6	149.4	407.4	150.7	251.2	685.1			
Fluoride	NaF	mink	31.37	52.75	White-footed Mouse	81.5	81.5	527.1	271.5	137.0	886.3	456.6			
Fluoride	NaF	mink	31.37	52.75	Meadow Vole	68.5	68.5	602.7	502.3	115.2	1013.5	844.6			
Fluoride	NaF	mink	31.37	52.75	Mink	31.4	31.4	229.0	316.9	52.8	385.0	532.8			
Fluoride	NaF	mink	31.37	52.75	Cottontail Rabbit	30.0	30.0	151.8	310.1	50.4	255.2	521.4			
Fluoride	NaF	mink	31.37	52.75	Red Fox	21.5	21.5	215.4	255.1	36.2	362.2	428.9			
Fluoride	NaF	mink	31.37	52.75	River Otter	18.7	18.7	165.8	233.2	31.4	278.8	392.1			
Fluoride	NaF	mink	31.37	52.75	Whitetail Deer	11.4	11.4	371.5	174.7	19.2	624.8	293.8			
Fluoride	NaF	screech owl	7.8	32	Rough-winged Swallow	7.8	7.8	10.3	33.5	32.0	42.4	137.5			
Fluoride	NaF	screech owl	7.8	32	American Robin	7.8	7.8	6.5	56.7	32.0	26.5	232.5			
Fluoride	NaF	screech owl	7.8	32	Belted Kingfisher	7.8	7.8	15.4	72.2	32.0	63.1	296.0			
Fluoride	NaF	screech owl	7.8	32	American Woodcock	7.8	7.8	10.3	77.2	32.0	42.2	316.8			
Fluoride	NaF	screech owl	7.8	32	Cooper's Hawk	7.8	7.8	45.1	100.7	32.0	184.8	413.2			
Fluoride	NaF	screech owl	7.8	32	Barn Owl	7.8	7.8	29.1	103.9	32.0	119.3	426.1			
Fluoride	NaF	screech owl	7.8	32	Barred Owl	7.8	7.8	66.6	119.0	32.0	273.1	488.2			
Fluoride	NaF	screech owl	7.8	32	Red-tailed Hawk	7.8	7.8	80.6	137.2	32.0	330.6	563.0			
Fluoride	NaF	screech owl	7.8	32	Osprey	7.8	7.8	39.0	151.9	32.0	160.0	623.4			
Fluoride	NaF	screech owl	7.8	32	Great Blue Heron	7.8	7.8	44.4	176.2	32.0	182.1	722.9			
Fluoride	NaF	screech owl	7.8	32	Wild Turkey	7.8	7.8	260.0	238.1	32.0	1066.7	976.8			
Formaldehyde	n/a	beagle dog	9.4		Little Brown Bat	59.5	59.5	178.4	371.6						
Formaldehyde	n/a	beagle dog	9.4		Short-tailed Shrew	50.0	50.0	83.3	227.2						
Formaldehyde	n/a	beagle dog	9.4		White-footed Mouse	45.4	45.4	293.9	151.4						

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Formaldehyde	n/a	beagle dog	9.4		Meadow Vole	38.2	336.2	280.1						
Formaldehyde	n/a	beagle dog	9.4		Mink	17.5	127.7	176.7	101.141					
Formaldehyde	n/a	beagle dog	9.4		Cottontail Rabbit	16.7	84.6	172.9						
Formaldehyde	n/a	beagle dog	9.4		Red Fox	12.0	120.1	142.2						
Formaldehyde	n/a	beagle dog	9.4		River Otter	10.4	92.5	130.0	73.910					
Formaldehyde	n/a	beagle dog	9.4		Whitetail Deer	6.4	207.2	97.4						
Heptachlor	n/a	mink	0.1		1 Little Brown Bat	0.340	1.019	2.124		3.398	10.194	21.238		
Heptachlor	n/a	mink	0.1		1 Short-tailed Shrew	0.286	0.476	1.299		2.857	4.762	12.988		
Heptachlor	n/a	mink	0.1		1 White-footed Mouse	0.260	1.680	0.866		2.597	16.801	8.655		
Heptachlor	n/a	mink	0.1		1 Meadow Vole	0.218	1.921	1.601		2.183	19.214	16.012		
Heptachlor	n/a	mink	0.1		1 Mink	0.100	0.730	1.010	1.707e-06	1.000	7.299	10.101	1.707e-05	
Heptachlor	n/a	mink	0.1		1 Cottontail Rabbit	0.096	0.484	0.988		0.955	4.838	9.884		
Heptachlor	n/a	mink	0.1		1 Red Fox	0.069	0.687	0.813		0.687	6.866	8.131		
Heptachlor	n/a	mink	0.1		1 River Otter	0.059	0.529	0.743	1.083e-06	0.595	5.285	7.433	1.083e-05	
Heptachlor	n/a	mink	0.1		1 Whitetail Deer	0.036	1.184	0.557		0.365	11.844	5.570		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Little Brown Bat	0.00042	0.00125	0.00261		0.00418	0.01255	0.02614		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Short-tailed Shrew	0.00035	0.00059	0.00160		0.00352	0.00586	0.01598		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 White-footed Mouse	0.00032	0.00207	0.00107		0.00320	0.02068	0.01065		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Meadow Vole	0.00027	0.00236	0.00197		0.00269	0.02365	0.01970		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Mink	0.00012	0.00090	0.00124		0.00123	0.00898	0.01243		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Cottontail Rabbit	0.00012	0.00060	0.00122		0.00118	0.00595	0.01216		
1,2,3,6,7,8-Hexachlorodibenzofuran	n/a	rat	0.00016	0.0016	1 Red Fox	0.00008	0.00084	0.00100		0.00084	0.00845	0.01001		

Table 12. (continued)

Analyte			Form	Test Species	Test Species		NOAEL-Based Benchmarks				LOAEL-Based Benchmarks				
					Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
chlorodibenzofuran			n/a	rat	0.00016	0.0016	0.0016	River Otter	0.00007	0.00065	0.00091	0.00073	0.00650	0.00915	
1,2,3,6,7,8-Hexachlorodibenzofuran			n/a	rat	0.00016	0.0016	0.0016	Whitetail Deer	0.00004	0.00146	0.00069	0.00045	0.01458	0.00685	
Lead	lead acetate	rat	8	80	Little Brown Bat	20.91	62.73	130.68	209.09	627.28	1306.84				
	lead acetate	rat	8	80	Short-tailed Shrew	17.58	29.30	79.92	175.83	293.04	799.21				
Lead	lead acetate	rat	8	80	White-footed Mouse	15.98	103.38	53.26	159.77	1033.82	532.57				
Lead	lead acetate	rat	8	80	Meadow Vole	13.44	118.23	98.52	134.35	1182.30	985.25				
Lead	lead acetate	rat	8	80	Mink	6.15	44.91	62.15	0.982	449.14	621.54	9.823			
Lead	lead acetate	rat	8	80	Cottontail Rabbit	5.88	29.77	60.82	58.79	297.68	608.18				
Lead	lead acetate	rat	8	80	Red Fox	4.22	42.25	50.03	42.25	422.48	500.30				
Lead	lead acetate	rat	8	80	River Otter	3.66	32.52	45.73	0.711	325.22	457.35	7.115			
Lead	lead acetate	rat	8	80	Whitetail Deer	2.24	72.88	34.27	22.44	728.78	342.72				
Lead	lead acetate	Japanese quail	1.13	11.3	Rough-winged Swallow	1.13	1.50	4.86	11.30	14.97	48.56				
Lead	lead acetate	Japanese quail	1.13	11.3	American Robin	1.13	0.94	8.21	11.30	9.36	82.08				
Lead	lead acetate	Japanese quail	1.13	11.3	Belted Kingfisher	1.13	2.23	10.45	0.049	22.30	104.53	0.493			
Lead	lead acetate	Japanese quail	1.13	11.3	American Woodcock	1.13	1.49	11.19	11.30	14.92	111.87				
Lead	lead acetate	Japanese quail	1.13	11.3	Cooper's Hawk	1.13	6.53	14.59	11.30	65.27	145.90				
Lead	lead acetate	Japanese quail	1.13	11.3	Barn Owl	1.13	4.21	15.05	11.30	42.13	150.45				
Lead	lead acetate	Japanese quail	1.13	11.3	Barred Owl	1.13	9.65	17.24	11.30	96.45	172.39				
Lead	lead acetate	Japanese quail	1.13	11.3	Red-tailed Hawk	1.13	11.67	19.88	11.30	116.73	198.81				
Lead	lead acetate	Japanese quail	1.13	11.3	Osprey	1.13	5.65	22.01	0.125	56.50	220.13	1.248			
Lead	lead acetate	Japanese quail	1.13	11.3	Great Blue Heron	1.13	6.43	25.53	0.142	64.30	255.26	1.421			

Table 12. (continued)

NOAEL-Based Benchmarks										LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks			Estimated Wildlife LOAEL ^e (mg/kg/d)	LOAEL-Based Benchmarks		
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Lead	lead acetate	Japanese quail	1.13	11.3	Wild Turkey	1.13	37.67	34.49		11.30	376.67		
Lead	metallic	American kestrel	3.85		Rough-winged Swallow	3.85	5.10	16.54					
Lead	metallic	American kestrel	3.85		American Robin	3.85	3.19	27.97					
Lead	metallic	American kestrel	3.85		Belted Kingfisher	3.85	7.60	35.61	0.168				
Lead	metallic	American kestrel	3.85		American Woodcock	3.85	5.08	38.12					
Lead	metallic	American kestrel	3.85		Cooper's Hawk	3.85	22.24	49.71					
Lead	metallic	American kestrel	3.85		Barn Owl	3.85	14.35	51.26					
Lead	metallic	American kestrel	3.85		Barred Owl	3.85	32.86	58.73					
Lead	metallic	American kestrel	3.85		Red-tailed Hawk	3.85	39.77	67.74					
Lead	metallic	American kestrel	3.85		Osprey	3.85	19.25	75.00	0.425				
Lead	metallic	American kestrel	3.85		Great Blue Heron	3.85	21.91	86.97	0.484				
Lead	metallic	American kestrel	3.85		Wild Turkey	3.85	128.33	117.53					
Lindane	Gamma-BHC	rat	8		Little Brown Bat	20.91	62.73	130.68					
Lindane	Gamma-BHC	rat	8		Short-tailed Shrew	17.58	29.30	79.92					
Lindane	Gamma-BHC	rat	8		White-footed Mouse	15.98	103.38	53.26					
Lindane	Gamma-BHC	rat	8		Meadow Vole	13.44	118.23	98.52					
Lindane	Gamma-BHC	rat	8		Mink	6.15	44.91	62.15	0.099				
Lindane	Gamma-BHC	rat	8		Cottontail Rabbit	5.88	29.77	60.82					
Lindane	Gamma-BHC	rat	8		Red Fox	4.22	42.25	50.03					
Lindane	Gamma-BHC	rat	8		River Otter	3.66	32.52	45.73	0.073				
Lindane	Gamma-BHC	rat	8		Whitetail Deer	2.24	72.88	34.27					
Lindane	Gamma-BHC	mallard duck	2	20	Rough-winged Swallow	2.00	2.65	8.59		20.00	26.50	85.95	
Lindane	Gamma-BHC	mallard duck	2	20	American Robin	2.00	1.66	14.53		20.00	16.56	145.28	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife		NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Lindane	Gamma-BHC	mallard duck	2	20	Belted Kingfisher	2.00	2.00	3.95	18.50	0.009	20.00	39.47	185.00	0.087	
Lindane	Gamma-BHC	mallard duck	2	20	American Woodcock	2.00	2.00	2.64	19.80		20.00	26.40	198.00		
Lindane	Gamma-BHC	mallard duck	2	20	Cooper's Hawk	2.00	2.00	11.55	25.82		20.00	115.53	258.24		
Lindane	Gamma-BHC	mallard duck	2	20	Barn Owl	2.00	2.00	7.46	26.63		20.00	74.56	266.29		
Lindane	Gamma-BHC	mallard duck	2	20	Barred Owl	2.00	2.00	17.07	30.51		20.00	170.71	305.11		
Lindane	Gamma-BHC	mallard duck	2	20	Red-tailed Hawk	2.00	2.00	20.66	35.19		20.00	206.61	351.88		
Lindane	Gamma-BHC	mallard duck	2	20	Osprey	2.00	2.00	10.00	38.96	0.022	20.00	100.00	389.61	0.220	
Lindane	Gamma-BHC	mallard duck	2	20	Great Blue Heron	2.00	2.00	11.38	45.18	0.025	20.00	113.81	451.80	0.251	
Lindane	Gamma-BHC	mallard duck	2	20	Wild Turkey	2.00	2.00	66.67	61.05		20.00	666.67	610.53		
Lithium	lithium carbonate	rat	9.4	18.8	Little Brown Bat	24.6	24.6	73.7	153.6		49.1	147.4	307.1		
Lithium	lithium carbonate	rat	9.4	18.8	Short-tailed Shrew	20.7	20.7	34.4	93.9		41.3	68.9	187.8		
Lithium	lithium carbonate	rat	9.4	18.8	White-footed Mouse	18.8	18.8	121.5	62.6		37.5	242.9	125.2		
Lithium	lithium carbonate	rat	9.4	18.8	Meadow Vole	15.8	15.8	138.9	115.8		31.6	277.8	231.5		
Lithium	lithium carbonate	rat	9.4	18.8	Mink	7.2	7.2	52.8	73.0		14.5	105.5	146.1		
Lithium	lithium carbonate	rat	9.4	18.8	Cottontail Rabbit	6.9	6.9	35.0	71.5		13.8	70.0	142.9		
Lithium	lithium carbonate	rat	9.4	18.8	Red Fox	5.0	5.0	49.6	58.8		9.9	99.3	117.6		
Lithium	lithium carbonate	rat	9.4	18.8	River Otter	4.3	4.3	38.2	53.7		8.6	76.4	107.5		
Lithium	lithium carbonate	rat	9.4	18.8	Whitetail Deer	2.6	2.6	85.6	40.3		5.3	171.3	80.5		
Manganese	Mn ₂ O ₄	rat	88	284	Little Brown Bat	230	230	690	1438		742	2227	4639		
Manganese	Mn ₂ O ₄	rat	88	284	Short-tailed Shrew	193	193	322	879		624	1040	2837		
Manganese	Mn ₂ O ₄	rat	88	284	White-footed Mouse	176	176	1137	586		567	3670	1891		
Manganese	Mn ₂ O ₄	rat	88	284	Meadow Vole	148	148	1301	1084		477	4197	3498		
Manganese	Mn ₂ O ₄	rat	88	284	Mink	68	68	494	684		218	1594	2206		

Table 12. (continued)

NOAEL-Based Benchmarks										LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks			Estimated Wildlife LOAEL ^c (mg/kg/d)	LOAEL-Based Benchmarks		
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Manganese	Mn ₂ O ₃	rat	88	284	Cottontail Rabbit	65	327	669	209	1057	2159		
Manganese	Mn ₂ O ₃	rat	88	284	Red Fox	46	465	550	150	1500	1776		
Manganese	Mn ₂ O ₃	rat	88	284	River Otter	40	358	503	130	1155	1624		
Manganese	Mn ₂ O ₃	rat	88	284	Whitetail Deer	25	802	377	80	2587	1217		
Manganese	Mn ₂ O ₃	Japanese quail	997		Rough-winged Swallow	997	1321	4284					
Manganese	Mn ₂ O ₃	Japanese quail	997		American Robin	997	825	7242					
Manganese	Mn ₂ O ₃	Japanese quail	997		Belted Kingfisher	997	1967	9222					
Manganese	Mn ₂ O ₃	Japanese quail	997		American Woodcock	997	1316	9870					
Manganese	Mn ₂ O ₃	Japanese quail	997		Cooper's Hawk	997	5759	12873					
Manganese	Mn ₂ O ₃	Japanese quail	997		Barn Owl	997	3717	13274					
Manganese	Mn ₂ O ₃	Japanese quail	997		Barred Owl	997	8510	15210					
Manganese	Mn ₂ O ₃	Japanese quail	997		Red-tailed Hawk	997	10299	17541					
Manganese	Mn ₂ O ₃	Japanese quail	997		Osprey	997	4985	19422					
Manganese	Mn ₂ O ₃	Japanese quail	997		Great Blue Heron	997	5673	22522					
Manganese	Mn ₂ O ₃	Japanese quail	997		Wild Turkey	997	33233	30435					
Mercury	mercuric chloride	mink	1		Little Brown Bat	3.40	10.19	21.24					
Mercury	mercuric chloride	mink	1		Short-tailed Shrew	2.86	4.76	12.99					
Mercury	mercuric chloride	mink	1		White-footed Mouse	2.60	16.80	8.66					
Mercury	mercuric chloride	mink	1		Meadow Vole	2.18	19.21	16.01					
Mercury	mercuric chloride	mink	1		Mink	1.00	7.30	10.10					
Mercury	mercuric chloride	mink	1		Cottontail Rabbit	0.96	4.84	9.88					
Mercury	mercuric chloride	mink	1		Red Fox	0.69	6.87	8.13					
Mercury	mercuric chloride	mink	1		River Otter	0.59	5.29	7.43					

Table 12. (continued)

Analyte	Form	Test Species	Test		Endpoint Species ^a	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Mercury	mercuric chloride	mink	1		Whitetail Deer	0.36		11.84	5.57					
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Rough-winged Swallow	0.45		0.60	1.93		0.90	1.19		3.87
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	American Robin	0.45		0.37	3.27		0.90	0.75		6.54
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Belted Kingfisher	0.45		0.89	4.16		0.90	1.78		8.33
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	American Woodcock	0.45		0.59	4.46		0.90	1.19		8.91
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Cooper's Hawk	0.45		2.60	5.81		0.90	5.20		11.62
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Barn Owl	0.45		1.68	5.99		0.90	3.36		11.98
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Barred Owl	0.45		3.84	6.86		0.90	7.68		13.73
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Red-tailed Hawk	0.45		4.65	7.92		0.90	9.30		15.83
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Osprey	0.45		2.25	8.77		0.90	4.50		17.53
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Great Blue Heron	0.45		2.56	10.17		0.90	5.12		20.33
Mercury	mercuric chloride	Japanese Quail	0.45	0.9	Wild Turkey	0.45		15.00	13.74		0.90	30.00		27.47
Mercury	mercuric sulfide	mouse	13.2		Little Brown Bat	18.67		56.00	116.67					
Mercury	mercuric sulfide	mouse	13.2		Short-tailed Shrew	15.70		26.16	71.35					
Mercury	mercuric sulfide	mouse	13.2		White-footed Mouse	14.26		92.30	47.55					
Mercury	mercuric sulfide	mouse	13.2		Meadow Vole	11.99		105.55	87.96					
Mercury	mercuric sulfide	mouse	13.2		Mink	5.49		40.10	55.49					
Mercury	mercuric sulfide	mouse	13.2		Cottontail Rabbit	5.25		26.58	54.30					
Mercury	mercuric sulfide	mouse	13.2		Red Fox	3.77		37.72	44.67					
Mercury	mercuric sulfide	mouse	13.2		River Otter	3.27		29.04	40.83					
Mercury	mercuric sulfide	mouse	13.2		Whitetail Deer	2.00		65.06	30.60					
Mercury	Methyl Mercury Chloride	rat	0.032	0.16	Little Brown Bat	0.084		0.251	0.523		0.418	1.255		2.614
Mercury	Methyl Mercury	rat	0.032	0.16	Short-tailed	0.070		0.117	0.320		0.352	0.586		1.598

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species	Test Species LOAEL ^a (mg/kg/d)	Test Species	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)				Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)
Mercury	Chloride	rat	0.032	0.16	White-footed Shrew	0.064	0.414	0.213	0.320	2.068	1.065				
Mercury	Chloride	rat	0.032	0.16	Meadow Vole	0.054	0.473	0.394	0.269	2.365	1.970				
Mercury	Chloride	mink	0.015	0.025	Mink	0.015	0.109	0.152	3.924e-06	0.182	0.253	6.540e-06			
Mercury	Chloride	rat	0.032	0.16	Cottontail Rabbit	0.024	0.119	0.243	0.118	0.595	1.216				
Mercury	Chloride	mink	0.015	0.025	Red Fox	0.010	0.103	0.122	0.017	0.172	0.203				
Mercury	Chloride	mink	0.015	0.025	River Otter	0.009	0.079	0.111	0.015	0.132	0.186	2.626e-06			
Mercury	Chloride	rat	0.032	0.16	Whitetail Deer	0.009	0.292	0.137	0.045	1.458	0.685				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Rough-winged Swallow	0.006	0.008	0.028	0.064	0.085	0.275				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	American Robin	0.006	0.005	0.046	0.064	0.053	0.465				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Belted Kingfisher	0.006	0.013	0.059	4.527e-07	0.126	0.592	4.527e-06			
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	American Woodcock	0.006	0.008	0.063	0.064	0.084	0.634				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Cooper's Hawk	0.006	0.037	0.083	0.064	0.370	0.826				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Barn Owl	0.006	0.024	0.085	0.064	0.239	0.852				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Barred Owl	0.006	0.055	0.098	0.064	0.546	0.976				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Red-tailed Hawk	0.006	0.066	0.113	0.064	0.661	1.126				
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Osprey	0.006	0.032	0.125	1.147e-06	0.320	1.247	1.147e-05			

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Mercury	Methyl Mercury	mallard duck	0.0064	0.064	Great Blue Heron	0.006	0.036	0.145	1.305e-06	0.064	0.364	1.446	1.305e-05	
Mercury	Dicyandiamide	mallard duck	0.0064	0.064	Wild Turkey	0.006	0.213	0.195		0.064	2.133	1.954		
Methanol	n/a	rat	50	250	Little Brown Bat	130.7	392.1	816.8		653.4	1960.3	4083.9		
Methanol	n/a	rat	50	250	Short-tailed Shrew	109.9	183.2	499.5		549.5	915.8	2497.5		
Methanol	n/a	rat	50	250	White-footed Mouse	99.9	646.1	332.9		499.3	3230.7	1664.3		
Methanol	n/a	rat	50	250	Meadow Vole	84.0	738.9	615.8		419.8	3694.7	3078.9		
Methanol	n/a	rat	50	250	Mink	38.5	280.7	388.5	314.482	192.3	1403.6	1942.3	1572.411	
Methanol	n/a	rat	50	250	Cottontail Rabbit	36.7	186.0	380.1		183.7	930.2	1900.6		
Methanol	n/a	rat	50	250	Red Fox	26.4	264.0	312.7		132.0	1320.2	1563.4		
Methanol	n/a	rat	50	250	River Otter	22.9	203.3	285.8	230.691	114.3	1016.3	1429.2	1153.457	
Methanol	n/a	rat	50	250	Whitetail Deer	14.0	455.5	214.2		70.1	2277.4	1071.0		
Methoxychlor	n/a	rat	4	8	Little Brown Bat	10.5	31.4	65.3		20.9	62.7	130.7		
Methoxychlor	n/a	rat	4	8	Short-tailed Shrew	8.8	14.7	40.0		17.6	29.3	79.9		
Methoxychlor	n/a	rat	4	8	White-footed Mouse	8.0	51.7	26.6		16.0	103.4	53.3		
Methoxychlor	n/a	rat	4	8	Meadow Vole	6.7	59.1	49.3		13.4	118.2	98.5		
Methoxychlor	n/a	rat	4	8	Mink	3.1	22.5	31.1	0.001	6.2	44.9	62.2	0.003	
Methoxychlor	n/a	rat	4	8	Cottontail Rabbit	2.9	14.9	30.4		5.9	29.8	60.8		
Methoxychlor	n/a	rat	4	8	Red Fox	2.1	21.1	25.0		4.2	42.2	50.0		
Methoxychlor	n/a	rat	4	8	River Otter	1.8	16.3	22.9	0.001	3.7	32.5	45.7	0.002	
Methoxychlor	n/a	rat	4	8	Whitetail Deer	1.1	36.4	17.1		2.2	72.9	34.3		
Methylene Chloride	n/a	rat	5.85	50	Little Brown Bat	15.3	45.9	95.6		130.7	392.1	816.8		
Methylene Chloride	n/a	rat	5.85	50	Short-tailed Shrew	12.9	21.4	58.4		109.9	183.2	499.5		

Table 12. (continued)

NOAEL-Based Benchmarks										LOAEL-Based Benchmarks				
Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife		NOAEL-Based Benchmarks			LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Methylene Chloride	n/a	rat	5.85	50	White-footed Mouse	11.7	11.7	75.6	38.9	332.9	99.9	646.1	332.9	
Methylene Chloride	n/a	rat	5.85	50	Meadow Vole	9.8	9.8	86.5	72.0	615.8	84.0	738.9	615.8	
Methylene Chloride	n/a	rat	5.85	50	Mink	4.5	4.5	32.8	45.5	388.5	38.5	280.7	388.5	47,000
Methylene Chloride	n/a	rat	5.85	50	Cottontail Rabbit	4.3	4.3	21.8	44.5	380.1	36.7	186.0	380.1	
Methylene Chloride	n/a	rat	5.85	50	Red Fox	3.1	3.1	30.9	36.6	312.7	26.4	264.0	312.7	
Methylene Chloride	n/a	rat	5.85	50	River Otter	2.7	2.7	23.8	33.4	285.8	22.9	203.3	285.8	34,098
Methylene Chloride	n/a	rat	5.85	50	Whitetail Deer	1.6	1.6	53.3	25.1	214.2	14.0	455.5	214.2	
Methyl Ethyl Ketone	n/a	rat	1771	4571	Little Brown Bat	4629	4629	13886	28930	74669	11947	35841	74669	
Methyl Ethyl Ketone	n/a	rat	1771	4571	Short-tailed Shrew	3892	3892	6487	17693	45665	10046	16744	45665	
Methyl Ethyl Ketone	n/a	rat	1771	4571	White-footed Mouse	3537	3537	22886	11790	30430	9129	59070	30430	
Methyl Ethyl Ketone	n/a	rat	1771	4571	Meadow Vole	2974	2974	26173	21811	56295	7677	67553	56295	
Methyl Ethyl Ketone	n/a	rat	1771	4571	Mink	1362	1362	9943	13759	15251.748	3516	25663	35513	15251.748
Methyl Ethyl Ketone	n/a	rat	1771	4571	Cottontail Rabbit	1301	1301	6590	13464	34750	3359	17008	34750	
Methyl Ethyl Ketone	n/a	rat	1771	4571	Red Fox	935	935	9353	11075	28586	2414	24139	28586	
Methyl Ethyl Ketone	n/a	rat	1771	4571	River Otter	810	810	7200	10124	26132	2091	18582	26132	11119.823
Methyl Ethyl Ketone	n/a	rat	1771	4571	Whitetail Deer	497	497	16133	7587	19582	1282	41640	19582	
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Little Brown Bat	65.3	65.3	196.0	408.4					
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Short-tailed Shrew	54.9	54.9	91.6	249.8					
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		White-footed Mouse	49.9	49.9	323.1	166.4					
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Meadow Vole	42.0	42.0	369.5	307.9					
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Mink	19.2	19.2	140.4	194.2	25,789				
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Cottontail Rabbit	18.4	18.4	93.0	190.1					

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
						Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Red Fox	13.2	132.0	156.3					
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		River Otter	11.4	101.6	142.9	18.713				
4-Methyl 2-Pentanone	methyl isobutyl ketone	rat	25		Whitetail Deer	7.0	227.7	107.1					
Molybdenum	MoO ₄	mouse	0.26	2.6	Little Brown Bat	0.37	1.10	2.30		3.68	11.03	22.98	
Molybdenum	MoO ₄	mouse	0.26	2.6	Short-tailed Shrew	0.31	0.52	1.41		3.09	5.15	14.05	
Molybdenum	MoO ₄	mouse	0.26	2.6	White-footed Mouse	0.28	1.82	0.94		2.81	18.18	9.37	
Molybdenum	MoO ₄	mouse	0.26	2.6	Meadow Vole	0.24	2.08	1.73		2.36	20.79	17.33	
Molybdenum	MoO ₄	mouse	0.26	2.6	Mink	0.11	0.79	1.09		1.08	7.90	10.93	
Molybdenum	MoO ₄	mouse	0.26	2.6	Cottontail Rabbit	0.10	0.52	1.07		1.03	5.23	10.70	
Molybdenum	MoO ₄	mouse	0.26	2.6	Red Fox	0.07	0.74	0.88		0.74	7.43	8.80	
Molybdenum	MoO ₄	mouse	0.26	2.6	River Otter	0.06	0.57	0.80		0.64	5.72	8.04	
Molybdenum	MoO ₄	mouse	0.26	2.6	Whitetail Deer	0.04	1.28	0.60		0.39	12.82	6.03	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Rough-winged Swallow	3.50	4.64	15.04		35.30	46.77	151.69	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	American Robin	3.50	2.90	25.42		35.30	29.23	256.42	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Belted Kingfisher	3.50	6.91	32.38		35.30	69.66	326.53	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	American Woodcock	3.50	4.62	34.65		35.30	46.60	349.47	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Cooper's Hawk	3.50	20.22	45.19		35.30	203.90	455.79	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Barn Owl	3.50	13.05	46.60		35.30	131.60	469.99	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Barred Owl	3.50	29.88	53.39		35.30	301.31	538.51	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Red-tailed Hawk	3.50	36.16	61.58		35.30	364.66	621.06	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Osprey	3.50	17.50	68.18		35.30	176.50	687.66	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Great Blue Heron	3.50	19.92	79.06		35.30	200.87	797.42	
Molybdenum	sodium molybdate (MoO ₄)	chicken	3.5	35.3	Wild Turkey	3.50	116.67	106.84		35.30	1176.67	1077.58	
Nickel	nickel sulfate hexahydrate	rat	40	80	Little Brown Bat	104.55	313.64	653.42		209.09	627.28	1306.84	
Nickel	nickel sulfate hexahydrate	rat	40	80	Short-tailed Shrew	87.91	146.52	399.61		175.83	293.04	799.21	
Nickel	nickel sulfate hexahydrate	rat	40	80	White-footed Mouse	79.89	516.91	266.29		159.77	1033.82	532.57	
Nickel	nickel sulfate hexahydrate	rat	40	80	Meadow Vole	67.18	591.15	492.62		134.35	1182.30	985.25	
Nickel	nickel sulfate hexahydrate	rat	40	80	Mink	30.77	224.57	310.77	2.104	61.53	449.14	621.54	4.209
Nickel	nickel sulfate hexahydrate	rat	40	80	Cottontail Rabbit	29.40	148.84	304.09		58.79	297.68	608.18	
Nickel	nickel sulfate hexahydrate	rat	40	80	Red Fox	21.12	211.24	250.15		42.25	422.48	500.30	
Nickel	nickel sulfate hexahydrate	rat	40	80	River Otter	18.29	162.61	228.67	1.524	36.59	325.22	457.35	3.048
Nickel	nickel sulfate hexahydrate	rat	40	80	Whitetail Deer	11.22	364.39	171.36		22.44	728.78	342.72	
Nickel	nickel sulfate	mallard duckling	77.4	107	Rough-winged Swallow	77.40	102.56	332.61		107.00	141.78	459.81	
Nickel	nickel sulfate	mallard duckling	77.4	107	American Robin	77.40	64.08	562.25		107.00	88.59	777.26	
Nickel	nickel sulfate	mallard duckling	77.4	107	Belted Kingfisher	77.40	152.74	715.95	1.438	107.00	211.15	989.75	1.988
Nickel	nickel sulfate	mallard duckling	77.4	107	American	77.40	102.17	766.26		107.00	141.24	1059.30	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species LOAEL ^a (mg/kg/d)	End point Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Nickel	nickel sulfate	mallard duckling	77.4	107	Cooper's Hawk	Woodcock	77.40	447.09	999.37		107.00	618.07	1381.56	
Nickel	nickel sulfate	mallard duckling	77.4	107	Barn Owl		77.40	288.55	1030.53		107.00	398.90	1424.63	
Nickel	nickel sulfate	mallard duckling	77.4	107	Barred Owl		77.40	660.66	1180.76		107.00	913.32	1632.32	
Nickel	nickel sulfate	mallard duckling	77.4	107	Red-tailed Hawk		77.40	799.56	1361.76		107.00	1105.34	1882.53	
Nickel	nickel sulfate	mallard duckling	77.4	107	Osprey		77.40	387.00	1507.79	3.642	107.00	535.00	2084.42	5.035
Nickel	nickel sulfate	mallard duckling	77.4	107	Great Blue Heron		77.40	440.44	1748.45	4.145	107.00	608.88	2417.11	5.731
Nickel	nickel sulfate	mallard duckling	77.4	107	Wild Turkey		77.40	2580.00	2362.74		107.00	3566.67	3266.32	
Niobium	sodium niobate	mouse	0.155	1.55	Little Brown Bat		0.219	0.658	1.370		2.192	6.576	13.700	
Niobium	sodium niobate	mouse	0.155	1.55	Short-tailed Shrew		0.184	0.307	0.838		1.843	3.072	8.379	
Niobium	sodium niobate	mouse	0.155	1.55	White-footed Mouse		0.167	1.084	0.558		1.675	10.838	5.583	
Niobium	sodium niobate	mouse	0.155	1.55	Meadow Vole		0.141	1.239	1.033		1.408	12.395	10.329	
Niobium	sodium niobate	mouse	0.155	1.55	Mink		0.065	0.471	0.652		0.645	4.709	6.516	
Niobium	sodium niobate	mouse	0.155	1.55	Cottontail Rabbit		0.062	0.312	0.638		0.616	3.121	6.376	
Niobium	sodium niobate	mouse	0.155	1.55	Red Fox		0.044	0.443	0.524		0.443	4.429	5.245	
Niobium	sodium niobate	mouse	0.155	1.55	River Otter		0.038	0.341	0.479		0.384	3.409	4.795	
Niobium	sodium niobate	mouse	0.155	1.55	Whitetail Deer		0.024	0.764	0.359		0.235	7.640	3.593	
Nitrate	potassium nitrate	guinea pig	507	1130	Little Brown Bat		1659	4977	10369		3698	11093	23111	
Nitrate	potassium nitrate	guinea pig	507	1130	Short-tailed Shrew		1395	2325	6341		3109	5182	14134	
Nitrate	potassium nitrate	guinea pig	507	1130	White-footed Mouse		1268	8203	4226		2826	18283	9418	
Nitrate	potassium nitrate	guinea pig	507	1130	Meadow Vole		1066	9381	7818		2376	20908	17424	
Nitrate	potassium nitrate	guinea pig	507	1130	Mink		488	3564	4932		1088	7943	10992	
Nitrate	potassium nitrate	guinea pig	507	1130	Cottontail Rabbit		466	2362	4826		1040	5264	10756	
Nitrate	potassium nitrate	guinea pig	507	1130	Red Fox		335	3352	3970		747	7471	8848	

Table 12. (continued)

NOAEL-Based Benchmarks											LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks			Estimated Wildlife LOAEL ^c (mg/kg/d)	LOAEL-Based Benchmarks			
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)		Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Nitrate	potassium nitrate	guinea pig	507	1130	River Otter	290	2581	3629		647	5751	8088		
Nitrate	potassium nitrate	guinea pig	507	1130	Whitetail Deer	178	5783	2719		397	12888	6061		
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Little Brown Bat	0.125	0.376	0.784						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Short-tailed Shrew	0.105	0.176	0.480						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		White-footed Mouse	0.096	0.620	0.320						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Meadow Vole	0.081	0.709	0.591						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Mink	0.037	0.269	0.373						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Cottontail Rabbit	0.035	0.179	0.365						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Red Fox	0.025	0.253	0.300						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		River Otter	0.022	0.195	0.274						
1,2,3,4,8-Penta-chlorodibenzofuran	n/a	rat	0.048		Whitetail Deer	0.013	0.437	0.206						
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Little Brown Bat	0.00042	0.00125	0.00261		0.00418	0.01255	0.02614		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Short-tailed Shrew	0.00035	0.00059	0.00160		0.00352	0.00586	0.01598		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	White-footed Mouse	0.00032	0.00207	0.00107		0.00320	0.02068	0.01065		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Meadow Vole	0.00027	0.00236	0.00197		0.00269	0.02365	0.01970		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Mink	0.00012	0.00090	0.00124		0.00123	0.00898	0.01243		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Cottontail Rabbit	0.00012	0.00060	0.00122		0.00118	0.00595	0.01216		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	Red Fox	0.000084	0.00084	0.00100		0.00084	0.00845	0.01001		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species LOAEL ^a (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)				Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
chlorodibenzofuran	n/a	rat	0.00016	0.0016	0.0016	River Otter	0.000073	0.00065	0.00091		0.00073	0.00650	0.00915		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.00016	0.0016	0.0016	Whitetail Deer	0.000045	0.00146	0.00069		0.00045	0.01458	0.00685		
1,2,3,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Little Brown Bat	0.000042	0.00013	0.00026		0.00042	0.00125	0.00261		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Short-tailed Shrew	0.000035	0.00006	0.00016		0.00035	0.00059	0.00160		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	White-footed Mouse	0.000032	0.00021	0.00011		0.00032	0.00207	0.00107		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Meadow Vole	0.000027	0.00024	0.00020		0.00027	0.00236	0.00197		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Mink	0.000012	0.00009	0.00012		0.00012	0.00090	0.00124		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Cottontail Rabbit	0.000012	0.00006	0.00012		0.00012	0.00060	0.00122		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Red Fox	0.000008	0.00008	0.00010		0.00008	0.00084	0.00100		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	River Otter	0.000007	0.00007	0.00009		0.00007	0.00065	0.00091		
2,3,4,7,8-Penta-chlorodibenzofuran	n/a	rat	0.000016	0.00016	0.00016	Whitetail Deer	0.000004	0.00015	0.00007		0.00004	0.00146	0.00069		
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	70.7	Rough-winged Swallow	7.070	9.368	30.382		70.700	93.678	303.819		
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	70.7	American Robin	7.070	5.854	51.358		70.700	58.537	513.575		
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	70.7	Belted Kingfisher	7.070	13.951	65.398	0.004	70.700	139.515	653.975	0.036	
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	70.7	American Woodcock	7.070	9.332	69.993		70.700	93.324	699.930		
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	70.7	Cooper's Hawk	7.070	40.839	91.286		70.700	408.386	912.862		

Table 12. (continued)

NOAEL-Based Benchmarks														LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^b	Estimated Wildlife		NOAEL-Based Benchmarks			LOAEL-Based Benchmarks						
			Species NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)				
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Barn Owl	7.070	26.357	94.132		70.700	263.570	941.320					
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Barred Owl	7.070	60.348	107.855		70.700	603.475	1078.551					
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Red-tailed Hawk	7.070	73.035	124.388		70.700	730.350	1243.878					
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Osprey	7.070	35.350	137.727	0.009	70.700	353.500	1377.273	0.092				
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Great Blue Heron	7.070	40.232	159.710	0.010	70.700	402.317	1597.098	0.104				
Pentachloronitrobenzene	n/a	chicken	7.07	70.7	Wild Turkey	7.070	235.667	215.821		70.700	2356.667	2158.211					
Pentachlorophenol	n/a	rat	0.24	2.4	Little Brown Bat	0.627	1.882	3.921		6.273	18.818	39.205					
Pentachlorophenol	n/a	rat	0.24	2.4	Short-tailed Shrew	0.527	0.879	2.398		5.275	8.791	23.976					
Pentachlorophenol	n/a	rat	0.24	2.4	White-footed Mouse	0.479	3.101	1.598		4.793	31.015	15.977					
Pentachlorophenol	n/a	rat	0.24	2.4	Meadow Vole	0.403	3.547	2.956		4.031	35.469	29.557					
Pentachlorophenol	n/a	rat	0.24	2.4	Mink	0.185	1.347	1.865	3.698e-04	1.846	13.474	18.646	3.698e-03				
Pentachlorophenol	n/a	rat	0.24	2.4	Cottontail Rabbit	0.176	0.893	1.825		1.764	8.930	18.246					
Pentachlorophenol	n/a	rat	0.24	2.4	Red Fox	0.127	1.267	1.501		1.267	12.674	15.009					
Pentachlorophenol	n/a	rat	0.24	2.4	River Otter	0.110	0.976	1.372	2.750e-04	1.098	9.757	13.720	2.750e-03				
Pentachlorophenol	n/a	rat	0.24	2.4	Whitetail Deer	0.067	2.186	1.028		0.673	21.863	10.282					
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Little Brown Bat	0.523	1.568	3.267		0.863	2.588	5.391					
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Short-tailed Shrew	0.440	0.733	1.998		0.725	1.209	3.297					
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	White-footed Mouse	0.399	2.585	1.331		0.659	4.265	2.197					
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Meadow Vole	0.336	2.956	2.463		0.554	4.877	4.064					
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Mink	0.154	1.123	1.554	4.318e-04	0.254	1.853	2.564	7.124e-04				
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Cottontail Rabbit	0.147	0.744	1.520		0.243	1.228	2.509					

Table 12. (continued)

NOAEL-Based Benchmarks													LOAEL-Based Benchmarks			
Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife		NOAEL-Based Benchmarks			LOAEL-Based Benchmarks					
			NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)			
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Red Fox	0.106	1.056	1.251		0.174	1.743	2.064				
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	River Otter	0.091	0.813	1.143	2.363e-04	0.151	1.342	1.887	3.899e-04			
Selenium	Selenate (SeO ₄)	rat	0.2	0.33	Whitetail Deer	0.056	1.822	0.857		0.093	3.006	1.414				
Selenium	sodium selenite	mallard duck	0.5	1	Rough-winged Swallow	0.500	0.663	2.149		1.000	1.325	4.297				
Selenium	sodium selenite	mallard duck	0.5	1	American Robin	0.500	0.414	3.632		1.000	0.828	7.264				
Selenium	sodium selenite	mallard duck	0.5	1	Belted Kingfisher	0.500	0.987	4.625	3.795e-04	1.000	1.973	9.250	7.589e-04			
Selenium	sodium selenite	mallard duck	0.5	1	American Woodcock	0.500	0.660	4.950		1.000	1.320	9.900				
Selenium	sodium selenite	mallard duck	0.5	1	Cooper's Hawk	0.500	2.888	6.456		1.000	5.776	12.912				
Selenium	sodium selenite	mallard duck	0.5	1	Barn Owl	0.500	1.864	6.657		1.000	3.728	13.314				
Selenium	sodium selenite	mallard duck	0.5	1	Barred Owl	0.500	4.268	7.628		1.000	8.536	15.255				
Selenium	sodium selenite	mallard duck	0.5	1	Red-tailed Hawk	0.500	5.165	8.797		1.000	10.330	17.594				
Selenium	sodium selenite	mallard duck	0.5	1	Osprey	0.500	2.500	9.740	9.614e-04	1.000	5.000	19.481	1.923e-03			
Selenium	sodium selenite	mallard duck	0.5	1	Great Blue Heron	0.500	2.845	11.295	1.094e-03	1.000	5.690	22.590	2.188e-03			
Selenium	sodium selenite	mallard duck	0.5	1	Wild Turkey	0.500	16.667	15.263		1.000	33.333	30.526				
Selenium	selenomethionine	mallard duck	0.4	0.8	Rough-winged Swallow	0.400	0.530	1.719		0.800	1.060	3.438				
Selenium	selenomethionine	mallard duck	0.4	0.8	American Robin	0.400	0.331	2.906		0.800	0.662	5.811				
Selenium	selenomethionine	mallard duck	0.4	0.8	Belted Kingfisher	0.400	0.789	3.700		0.800	1.579	7.400				
Selenium	selenomethionine	mallard duck	0.4	0.8	American Woodcock	0.400	0.528	3.960		0.800	1.056	7.920				
Selenium	selenomethionine	screech owl	0.44	1.5	Cooper's Hawk	0.440	2.542	5.681		1.500	8.664	19.368				
Selenium	selenomethionine	screech owl	0.44	1.5	Barn Owl	0.440	1.640	5.858		1.500	5.592	19.971				
Selenium	selenomethionine	screech owl	0.44	1.5	Barred Owl	0.440	3.756	6.712		1.500	12.804	22.883				

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Selenium	selanomethio-nine	screech owl	0.44	1.5	Red-tailed Hawk	0.440	4.545	7.741		1.500	15.495	26.391	
Selenium	selanomethio-nine	screech owl	0.44	1.5	Osprey	0.440	2.200	8.571		1.500	7.500	29.221	
Selenium	selanomethio-nine	mallard duck	0.4	0.8	Great Blue Heron	0.400	2.276	9.036		0.800	4.552	18.072	
Selenium	selanomethio-nine	mallard duck	0.4	0.8	Wild Turkey	0.400	13.333	12.211		0.800	26.667	24.421	
Selenium	selanomethio-nine	black-crowned night-heron	1.8		Belted Kingfisher	1.800	3.552	16.650					
Selenium	selanomethio-nine	black-crowned night-heron	1.8		Great Blue Heron	1.800	10.243	40.662					
Strontium	stable strontium chloride	rat	263		Little Brown Bat	687	2062	4296					
Strontium	stable strontium chloride	rat	263		Short-tailed Shrew	578	963	2627					
Strontium	stable strontium chloride	rat	263		White-footed Mouse	525	3399	1751					
Strontium	stable strontium chloride	rat	263		Meadow Vole	442	3887	3239					
Strontium	stable strontium chloride	rat	263		Mink	202	1477	2043					
Strontium	stable strontium chloride	rat	263		Cottontail Rabbit	193	979	1999					
Strontium	stable strontium chloride	rat	263		Red Fox	139	1389	1645					
Strontium	stable strontium chloride	rat	263		River Otter	120	1069	1504					
Strontium	stable strontium chloride	rat	263		Whitetail Deer	74	2396	1127					
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Little Brown Bat	0.0000001	0.0000003	0.0000007		0.0000011	0.0000032	0.0000067	
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Short-tailed	0.0000022	0.0000037	0.0000100		0.0000220	0.0000366	0.0000999	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		End point Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Shrew	0.0000020	0.0000129	0.0000067		0.0000200	0.0001292	0.0000666	
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	White-footed Mouse	0.0000017	0.0000148	0.0000123		0.0000168	0.0001478	0.0001232	
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Meadow Vole	0.0000008	0.0000056	0.0000078		0.0000077	0.0000561	0.0000777	3.262e-10
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Mink	0.0000007	0.0000037	0.0000076		0.0000073	0.0000372	0.0000760	
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Cottontail Rabbit	0.0000005	0.0000053	0.0000063		0.0000053	0.0000528	0.0000625	
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	Red Fox	0.0000005	0.0000041	0.0000057		0.0000046	0.0000407	0.0000572	2.134e-10
2,3,7,8-TCDD	n/a	rat	0.000001	0.00001	River Otter	0.0000003	0.0000091	0.0000043		0.0000028	0.0000911	0.0000428	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Whitetail Deer	0.0000140	0.0000186	0.0000602		0.0001400	0.0001855	0.0006016	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Rough-winged Swallow	0.0000140	0.0000116	0.0001017		0.0001400	0.0001159	0.0010170	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	American Robin	0.0000140	0.0000276	0.0001295		0.0001400	0.0002763	0.0012950	1.605e-09
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Belted Kingfisher	0.0000140	0.0000185	0.0001386		0.0001400	0.0001848	0.0013860	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	American Woodcock	0.0000140	0.0000809	0.0001808		0.0001400	0.0008087	0.0018076	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Cooper's Hawk	0.0000140	0.0000522	0.0001864		0.0001400	0.0005219	0.0018640	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Barn Owl	0.0000140	0.0001195	0.0002136		0.0001400	0.0011950	0.0021357	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Barred Owl	0.0000140	0.0001446	0.0002463		0.0001400	0.0014462	0.0024631	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Red-tailed Hawk	0.0000140	0.0000700	0.0002727		0.0001400	0.0007000	0.0027273	4.067e-09
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Osprey	0.0000140	0.0000797	0.0003163		0.0001400	0.0007967	0.0031626	4.629e-09
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Great Blue Heron	0.0000140	0.0004667	0.0004274		0.0001400	0.0046667	0.0042737	
2,3,7,8-TCDD	n/a	ring-necked pheasant	0.000014	0.00014	Wild Turkey	0.0000140				0.0001400			

Table 12. (continued)

				NOAEL-Based Benchmarks					LOAEL-Based Benchmarks				
Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Rough-winged Swallow	0.0000010	0.0000013	0.0000043		0.0000100	0.0000133	0.0000430	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	American Robin	0.0000010	0.0000008	0.0000073		0.0000100	0.0000083	0.0000726	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Belted Kingfisher	0.0000010	0.0000020	0.0000093		0.0000100	0.0000197	0.0000925	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	American Woodcock	0.0000010	0.0000013	0.0000099		0.0000100	0.0000132	0.0000990	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Cooper's Hawk	0.0000010	0.0000058	0.0000129		0.0000100	0.0000578	0.0001291	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Barn Owl	0.0000010	0.0000037	0.0000133		0.0000100	0.0000373	0.0001331	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Barred Owl	0.0000010	0.0000085	0.0000153		0.0000100	0.0000854	0.0001526	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Red-tailed Hawk	0.0000010	0.0000103	0.0000176		0.0000100	0.0001033	0.0001759	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Osprey	0.0000010	0.0000050	0.0000195		0.0000100	0.0000500	0.0001948	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Great Blue Heron	0.0000010	0.0000057	0.0000226		0.0000100	0.0000569	0.0002259	
2,3,7,8-Tetrachloro-dibenzofuran	n/a	1 day old chick	0.000001	0.000001	Wild Turkey	0.0000010	0.0000333	0.0000305		0.0000100	0.0003333	0.0003053	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	7 Little Brown Bat	1.98	5.94	12.37		9.90	29.70	61.87	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	Short-tailed Shrew	1.66	2.77	7.57		8.32	13.87	37.84	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	White-footed Mouse	1.51	9.79	5.04		7.56	48.95	25.21	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	Meadow Vole	1.27	11.20	9.33		6.36	55.98	46.65	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	Mink	0.58	4.25	5.89	0.066	2.91	21.26	29.43	0.331
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	1.4	Cottontail Rab-	0.56	2.82	5.76		2.78	14.09	28.79	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL* (mg/kg/d)	LOAEL* (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
ethylene					bit								
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	7	Red Fox	0.40	4.00	4.74		2.00	20.00	23.69	
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	7	River Otter	0.35	3.08	4.33	0.048	1.73	15.40	21.65	0.240
1,1,2,2-Tetrachloro-ethylene	n/a	mouse	1.4	7	Whitetail Deer	0.21	6.90	3.25		1.06	34.50	16.23	
Thallium	thallium sulfate	rat	0.0074	0.074	Little Brown Bat	0.020	0.059	0.122		0.195	0.586	1.222	
Thallium	thallium sulfate	rat	0.0074	0.074	Short-tailed Shrew	0.016	0.027	0.075		0.164	0.274	0.747	
Thallium	thallium sulfate	rat	0.0074	0.074	White-footed Mouse	0.015	0.097	0.050		0.149	0.966	0.498	
Thallium	thallium sulfate	rat	0.0074	0.074	Meadow Vole	0.013	0.111	0.092		0.126	1.105	0.921	
Thallium	thallium sulfate	rat	0.0074	0.074	Mink	0.006	0.042	0.058	0.001	0.058	0.420	0.581	0.012
Thallium	thallium sulfate	rat	0.0074	0.074	Cottontail Rabbit	0.005	0.028	0.057		0.055	0.278	0.569	
Thallium	thallium sulfate	rat	0.0074	0.074	Red Fox	0.004	0.039	0.047		0.039	0.395	0.468	
Thallium	thallium sulfate	rat	0.0074	0.074	River Otter	0.003	0.030	0.043	0.001	0.034	0.304	0.428	0.009
Thallium	thallium sulfate	rat	0.0074	0.074	Whitetail Deer	0.002	0.068	0.032		0.021	0.681	0.320	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Little Brown Bat	33.1	99.3	206.8		49.5	148.5	309.4	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Short-tailed Shrew	27.8	46.4	126.5		41.6	69.4	189.2	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	White-footed Mouse	25.3	163.6	84.3		37.8	244.7	126.1	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Meadow Vole	21.3	187.1	155.9		31.8	279.9	233.2	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Mink	9.7	71.1	98.4		14.6	106.3	147.1	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Cottontail Rabbit	9.3	47.1	96.3		13.9	70.5	144.0	
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	Red Fox	6.7	66.9	79.2		10.0	100.0	118.4	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Test Species	NOAEL-Based Benchmarks					LOAEL-Based Benchmarks				
			Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		End point Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Tin	oxide (TBTO)	mouse	23.4	35	35	River Otter	5.8	51.5	72.4	77.0	8.7	77.0	108.3		
Tin	bis(tributyltin)-oxide (TBTO)	mouse	23.4	35	35	Whitetail Deer	3.6	115.3	54.2	172.5	5.3	172.5	81.1		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Rough-winged Swallow	6.8	9.0	29.2	22.4	16.9	22.4	72.6		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	American Robin	6.8	5.6	49.4	14.0	16.9	14.0	122.8		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Belted Kingfisher	6.8	13.4	62.9	33.3	16.9	33.3	156.3		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	American Woodcock	6.8	9.0	67.3	22.3	16.9	22.3	167.3		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Cooper's Hawk	6.8	39.3	87.8	97.6	16.9	97.6	218.2		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Barn Owl	6.8	25.4	90.5	63.0	16.9	63.0	225.0		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Barred Owl	6.8	58.0	103.7	144.3	16.9	144.3	257.8		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Red-tailed Hawk	6.8	70.2	119.6	174.6	16.9	174.6	297.3		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Osprey	6.8	34.0	132.5	84.5	16.9	84.5	329.2		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Great Blue Heron	6.8	38.7	153.6	96.2	16.9	96.2	381.8		
Tin	bis(tributyltin)-oxide (TBTO)	Japanese quail	6.8	16.9	16.9	Wild Turkey	6.8	226.7	207.6	563.3	16.9	563.3	515.9		
Toluene	n/a	mouse	26	260	260	Little Brown Bat	36.8	110.3	229.8	1103.1	367.7	1103.1	2298.1		
Toluene	n/a	mouse	26	260	260	Short-tailed Shrew	30.9	51.5	140.5	515.3	309.2	515.3	1405.4		
Toluene	n/a	mouse	26	260	260	White-footed Mouse	28.1	181.8	93.7	1818.0	281.0	1818.0	936.5		
Toluene	n/a	mouse	26	260	260	Meadow Vole	23.6	207.9	173.3	2079.1	236.3	2079.1	1732.6		

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^a	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Species			Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Toluene	n/a	mouse	26	260	Mink	10.8	79.0	109.3	1,050	108.2	789.8	1093.0	10,504	
Toluene	n/a	mouse	26	260	Cottontail Rabbit	10.3	52.3	107.0		103.4	523.5	1069.5		
Toluene	n/a	mouse	26	260	Red Fox	7.4	74.3	88.0		74.3	742.9	879.8		
Toluene	n/a	mouse	26	260	River Otter	6.4	57.2	80.4	0.764	64.3	571.9	804.3	7,638	
Toluene	n/a	mouse	26	260	Whitetail Deer	3.9	128.2	60.3		39.5	1281.6	602.7		
Toxaphene	n/a	rat	8		Little Brown Bat	20.9	62.7	130.7						
Toxaphene	n/a	rat	8		Short-tailed Shrew	17.6	29.3	79.9						
Toxaphene	n/a	rat	8		White-footed Mouse	16.0	103.4	53.3						
Toxaphene	n/a	rat	8		Meadow Vole	13.4	118.2	98.5						
Toxaphene	n/a	rat	8		Mink	6.2	44.9	62.2	0.001					
Toxaphene	n/a	rat	8		Cottontail Rabbit	5.9	29.8	60.8						
Toxaphene	n/a	rat	8		Red Fox	4.2	42.2	50.0						
Toxaphene	n/a	rat	8		River Otter	3.7	32.5	45.7	0.001					
Toxaphene	n/a	rat	8		Whitetail Deer	2.2	72.9	34.3						
1,1,1-Trichloroethane	n/a	mouse	1000		Little Brown Bat	1470	4409	9186						
1,1,1-Trichloroethane	n/a	mouse	1000		Short-tailed Shrew	1236	2060	5618						
1,1,1-Trichloroethane	n/a	mouse	1000		White-footed Mouse	1123	7267	3744						
1,1,1-Trichloroethane	n/a	mouse	1000		Meadow Vole	944	8311	6926						
1,1,1-Trichloroethane	n/a	mouse	1000		Mink	433	3157	4369	68.126					
1,1,1-Trichloroethane	n/a	mouse	1000		Cottontail Rabbit	413	2092	4275						
1,1,1-Trichloroethane	n/a	mouse	1000		Red Fox	297	2970	3517						
1,1,1-Trichloroethane	n/a	mouse	1000		River Otter	257	2286	3215	49.419					
1,1,1-Trichloroethane	n/a	mouse	1000		Whitetail Deer	158	5123	2409						
Trichloroethylene	n/a	mouse	0.7		7 Little Brown Bat	0.990	2.970	6.187		9.899	29.698	61.872		

Table 12. (continued)

Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	Endpoint Species ^b	Estimated Wildlife NOAEL ^c (mg/kg/d)	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
							Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Trichloroethylene	n/a	mouse	0.7	7	Short-tailed Shrew	0.832	1.387	3.784		8.324	13.874	37.838		
Trichloroethylene	n/a	mouse	0.7	7	White-footed Mouse	0.756	4.895	2.521		7.564	48.946	25.215		
Trichloroethylene	n/a	mouse	0.7	7	Meadow Vole	0.636	5.598	4.665		6.361	55.975	46.646		
Trichloroethylene	n/a	mouse	0.7	7	Mink	0.291	2.126	2.943	0.031	2.913	21.265	29.427	0.308	
Trichloroethylene	n/a	mouse	0.7	7	Cottontail Rabbit	0.278	1.409	2.879		2.783	14.093	28.794		
Trichloroethylene	n/a	mouse	0.7	7	Red Fox	0.200	2.000	2.369		2.000	20.002	23.687		
Trichloroethylene	n/a	mouse	0.7	7	River Otter	0.173	1.540	2.165	0.022	1.732	15.398	21.653	0.224	
Trichloroethylene	n/a	mouse	0.7	7	Whitetail Deer	0.106	3.450	1.623		1.063	34.504	16.226		
Uranium	Uranyl acetate	mouse	3.07	6.13	Little Brown Bat	4.267	12.802	26.671		8.521	25.563	53.256		
Uranium	Uranyl acetate	mouse	3.07	6.13	Short-tailed Shrew	3.588	5.981	16.311		7.165	11.942	32.569		
Uranium	Uranyl acetate	mouse	3.07	6.13	White-footed Mouse	3.261	21.099	10.869		6.511	42.130	21.703		
Uranium	Uranyl acetate	mouse	3.07	6.13	Meadow Vole	2.742	24.129	20.108		5.475	48.180	40.150		
Uranium	Uranyl acetate	mouse	3.07	6.13	Mink	1.256	9.167	12.685		2.508	18.303	25.329		
Uranium	Uranyl acetate	mouse	3.07	6.13	Cottontail Rabbit	1.200	6.075	12.412		2.396	12.131	24.784		
Uranium	Uranyl acetate	mouse	3.07	6.13	Red Fox	0.862	8.622	10.211		1.722	17.217	20.388		
Uranium	Uranyl acetate	mouse	3.07	6.13	River Otter	0.747	6.637	9.334		1.491	13.253	18.637		
Uranium	Uranyl acetate	mouse	3.07	6.13	Whitetail Deer	0.458	14.874	6.995		0.915	29.699	13.966		
Uranium	depleted metallic U	black duck	16		Rough-winged Swallow	16.0	21.2	68.8						
Uranium	depleted metallic U	black duck	16		American Robin	16.0	13.2	116.2						
Uranium	depleted metallic U	black duck	16		Belted Kingfisher	16.0	31.6	148.0						
Uranium	depleted metallic U	black duck	16		American Woodcock	16.0	21.1	158.4						
Uranium	depleted metallic U	black duck	16		Cooper's Hawk	16.0	92.4	206.6						

Table 12. (continued)

Analyte	Form	Test Species	Test Species		End point Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Uranium	metallic U	black duck	16		Barn Owl	16.0	59.6	213.0					
Uranium	depleted metallic U	black duck	16		Barred Owl	16.0	136.6	244.1					
Uranium	depleted metallic U	black duck	16		Red-tailed Hawk	16.0	165.3	281.5					
Uranium	depleted metallic U	black duck	16		Osprey	16.0	80.0	311.7					
Uranium	depleted metallic U	black duck	16		Great Blue Heron	16.0	91.0	361.4					
Uranium	depleted metallic U	black duck	16		Wild Turkey	16.0	533.3	488.4					
Vanadium	depleted metallic U	black duck	16										
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Little Brown Bat	0.510	1.529	3.185		5.096	15.287	31.848	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Short-tailed Shrew	0.428	0.714	1.948		4.285	7.141	19.477	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	White-footed Mouse	0.389	2.519	1.298		3.894	25.194	12.979	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Meadow Vole	0.327	2.881	2.401		3.274	28.813	24.010	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Mink	0.150	1.095	1.515		1.500	10.946	15.147	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Cottontail Rabbit	0.143	0.725	1.482		1.433	7.254	14.821	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Red Fox	0.103	1.030	1.219		1.030	10.296	12.192	

Table 12. (continued)

Analyte	Form	Test Species	Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
			NOAEL ^a (mg/kg/d)	Species LOAEL ^a (mg/kg/d)		Estimated Wildlife NOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	River Otter	0.089	0.793	1.115		0.892	7.926	11.146	
Vanadium	sodium metavanadate (NaVO ₃)	rat	0.21	2.1	Whitetail Deer	0.055	1.776	0.835		0.547	17.760	8.352	
Vanadium	vanadyl sulfate	mallard duck	11.4		Rough-winged Swallow	11.400	15.105	48.989					
Vanadium	vanadyl sulfate	mallard duck	11.4		American Robin	11.400	9.439	82.811					
Vanadium	vanadyl sulfate	mallard duck	11.4		Belted Kingfisher	11.400	22.496	105.450					
Vanadium	vanadyl sulfate	mallard duck	11.4		American Woodcock	11.400	15.048	112.860					
Vanadium	vanadyl sulfate	mallard duck	11.4		Cooper's Hawk	11.400	65.850	147.194					
Vanadium	vanadyl sulfate	mallard duck	11.4		Barn Owl	11.400	42.499	151.783					
Vanadium	vanadyl sulfate	mallard duck	11.4		Barred Owl	11.400	97.307	173.911					
Vanadium	vanadyl sulfate	mallard duck	11.4		Red-tailed Hawk	11.400	117.765	200.569					
Vanadium	vanadyl sulfate	mallard duck	11.4		Osprey	11.400	57.000	222.078					
Vanadium	vanadyl sulfate	mallard duck	11.4		Great Blue Heron	11.400	64.871	257.524					
Vanadium	vanadyl sulfate	mallard duck	11.4		Wild Turkey	11.400	380.000	348.000					
Vinyl Chloride	n/a	rat	0.17	1.7	Little Brown Bat	0.444	1.333	2.777		4.443	13.330	27.770	
Vinyl Chloride	n/a	rat	0.17	1.7	Short-tailed Shrew	0.374	0.623	1.698		3.736	6.227	16.983	
Vinyl Chloride	n/a	rat	0.17	1.7	White-footed Mouse	0.340	2.197	1.132		3.395	21.969	11.317	
Vinyl Chloride	n/a	rat	0.17	1.7	Meadow Vole	0.285	2.512	2.094		2.855	25.124	20.937	
Vinyl Chloride	n/a	rat	0.17	1.7	Mink	0.131	0.954	1.321	0.108	1.308	9.544	13.208	1.078
Vinyl Chloride	n/a	rat	0.17	1.7	Cottontail Rabbit	0.125	0.633	1.292		1.249	6.326	12.924	
Vinyl Chloride	n/a	rat	0.17	1.7	Red Fox	0.090	0.898	1.063		0.898	8.978	10.631	
Vinyl Chloride	n/a	rat	0.17	1.7	River Otter	0.078	0.691	0.972	0.078	0.777	6.911	9.719	0.782

Table 12. (continued)

				NOAEL-Based Benchmarks					LOAEL-Based Benchmarks				
Analyte	Form	Test Species	Test Species NOAEL* (mg/kg/d)	Test Species LOAEL* (mg/kg/d)	End point Species*	Estimated Wildlife NOAEL* (mg/kg/d)	Food ^a (mg/kg)	Water ^c (mg/L)	Piscivore ^d (mg/L)	Estimated Wildlife LOAEL* (mg/kg/d)	Food ^a (mg/kg)	Water ^c (mg/L)	Piscivore ^d (mg/L)
Vinyl Chloride	n/a	rat	0.17	1.7	Whitetail Deer	0.048	1.549	0.728		0.477	15.486	7.283	
Xylene	mixed isomers	mouse	2.1	2.6	Little Brown Bat	2.970	8.910	18.562		3.677	11.031	22.981	
Xylene	mixed isomers	mouse	2.1	2.6	Short-tailed Shrew	2.497	4.162	11.352		3.092	5.153	14.054	
Xylene	mixed isomers	mouse	2.1	2.6	White-footed Mouse	2.269	14.684	7.564		2.810	18.180	9.365	
Xylene	mixed isomers	mouse	2.1	2.6	Meadow Vole	1.908	16.793	13.994		2.363	20.791	17.326	
Xylene	mixed isomers	mouse	2.1	2.6	Mink	0.874	6.379	8.828	0.038	1.082	7.898	10.930	0.047
Xylene	mixed isomers	mouse	2.1	2.6	Cottontail Rabbit	0.835	4.228	8.638		1.034	5.235	10.695	
Xylene	mixed isomers	mouse	2.1	2.6	Red Fox	0.600	6.001	7.106		0.743	7.429	8.798	
Xylene	mixed isomers	mouse	2.1	2.6	River Otter	0.520	4.619	6.496	0.028	0.643	5.719	8.043	0.035
Xylene	mixed isomers	mouse	2.1	2.6	Whitetail Deer	0.319	10.351	4.868		0.395	12.816	6.027	
Zinc	zinc oxide	rat	160	320	Little Brown Bat	418.2	1254.6	2613.7		836.4	2509.1	5227.4	
Zinc	zinc oxide	rat	160	320	Short-tailed Shrew	351.7	586.1	1598.4		703.3	1172.2	3196.8	
Zinc	zinc oxide	rat	160	320	White-footed Mouse	319.5	2067.6	1065.1		639.1	4135.3	2130.3	
Zinc	zinc oxide	rat	160	320	Meadow Vole	268.7	2364.6	1970.5		537.4	4729.2	3941.0	
Zinc	zinc oxide	rat	160	320	Mink	123.1	898.3	1243.1	0.929	246.1	1796.6	2486.2	1.858
Zinc	zinc oxide	rat	160	320	Cottontail Rabbit	117.6	595.4	1216.4		235.2	1190.7	2432.7	
Zinc	zinc oxide	rat	160	320	Red Fox	84.5	845.0	1000.6		169.0	1689.9	2001.2	
Zinc	zinc oxide	rat	160	320	River Otter	73.2	650.4	914.7	0.673	146.4	1300.9	1829.4	1.346
Zinc	zinc oxide	rat	160	320	Whitetail Deer	44.9	1457.6	685.4		89.8	2915.1	1370.9	
Zinc	zinc sulfate	white leghorn hen	14.5	131	Rough-winged Swallow	14.5	19.2	62.3		131.0	173.6	562.9	
Zinc	zinc sulfate	white leghorn hen	14.5	131	American Robin	14.5	12.0	105.3		131.0	108.5	951.6	
Zinc	zinc sulfate	white leghorn hen	14.5	131	Belted Kingfisher	14.5	28.6	134.1	0.030	131.0	258.5	1211.8	0.268
Zinc	zinc sulfate	white leghorn hen	14.5	131	American	14.5	19.1	143.6		131.0	172.9	1296.9	

Table 12. (continued)

Analyte	Test Species			Test Species		Endpoint Species ^b	NOAEL-Based Benchmarks				LOAEL-Based Benchmarks			
	Form	Test Species	Test Species NOAEL ^a (mg/kg/d)	Test Species LOAEL ^a (mg/kg/d)	Estimated Wildlife NOAEL ^c (mg/kg/d)		Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	Estimated Wildlife LOAEL ^c (mg/kg/d)	Food ^d (mg/kg)	Water ^e (mg/L)	Piscivore ^f (mg/L)	
Zinc	zinc sulfate	white leghorn hen	14.5	131	Cooper's Hawk	14.5	83.8	187.2		131.0	756.7	1691.4		
Zinc	zinc sulfate	white leghorn hen	14.5	131	Barn Owl	14.5	54.1	193.1		131.0	488.4	1744.2		
Zinc	zinc sulfate	white leghorn hen	14.5	131	Barred Owl	14.5	123.8	221.2		131.0	1118.2	1998.4		
Zinc	zinc sulfate	white leghorn hen	14.5	131	Red-tailed Hawk	14.5	149.8	255.1		131.0	1353.3	2304.8		
Zinc	zinc sulfate	white leghorn hen	14.5	131	Osprey	14.5	72.5	282.5	0.075	131.0	655.0	2551.9	0.678	
Zinc	zinc sulfate	white leghorn hen	14.5	131	Great Blue Heron	14.5	82.5	327.6	0.085	131.0	745.5	2959.3	0.771	
Zinc	zinc sulfate	white leghorn hen	14.5	131	Wild Turkey	14.5	483.3	442.6		131.0	4366.7	3998.9		
Zirconium	zirconium sulfate	mouse	1.74		Little Brown Bat	2.461	7.382	15.380						
Zirconium	zirconium sulfate	mouse	1.74		Short-tailed Shrew	2.069	3.449	9.406						
Zirconium	zirconium sulfate	mouse	1.74		White-footed Mouse	1.880	12.167	6.268						
Zirconium	zirconium sulfate	mouse	1.74		Meadow Vole	1.581	13.914	11.595						
Zirconium	zirconium sulfate	mouse	1.74		Mink	0.724	5.286	7.315						
Zirconium	zirconium sulfate	mouse	1.74		Cottontail Rabbit	0.692	3.503	7.157						
Zirconium	zirconium sulfate	mouse	1.74		Red Fox	0.497	4.972	5.888						
Zirconium	zirconium sulfate	mouse	1.74		River Otter	0.431	3.827	5.382						
Zirconium	zirconium sulfate	mouse	1.74		Whitetail Deer	0.264	8.577	4.033						

Notes:

^a See Appendix A for derivation, Study Duration, and study endpoint.^b See Appendix B for body weights, food and water consumption rates.^c Calculated using Eq. 4 or 6.^d Calculated using Eq. 10.^e Calculated using Eq. 22.^f Combined food and water benchmark for aquatic-feeding species. Calculated using Eq. 28.

END OF REPORT

Final BASELINE HUMAN HEALTH AND SCREENING ECOLOGICAL RISK ASSESSMENT

for the

GROUP 4 SITES

Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60, 67, Goose Prairie
Creek, Saunder's Branch, Central Creek, and Caddo Lake



**Longhorn Army Ammunition Plant
Karnack, Texas**

Submitted to
**U.S. Army Corps of Engineers
Tulsa District**
Contract No. DACA56-97-D-0001

June 2003

**Jacobs Engineering Group Inc.
Oak Ridge, Tennessee**

END OF REPORT

LONGHORN ARMY AMMUNITION PLANT,**Karnack, Texas****MANAGERS' MEETING****AGENDA**

DATE: Wednesday, 11 August 2004
TIME: 9:30 a.m.
LOCATION: **Teleconference** – At 9:30 a.m., please call the Shaw Environmental, Inc. toll free number, 1-877-929-8516, Passcode 670599.

09:30	WELCOME	RMZ
09:35	Review of Removal Action Approach at Site 29	RMZ
09:50	Document Status Summary	
	Transfer Documents Review Status	RMZ
	- Site 45	
	- Perchlorate Area	
	- WFIA	
	- ECOP II	
	Environmental Sites Documents Review Status	PS
	- Site 12, Feasibility Study Eco Screen Addendum	
	- Site 67, Draft Final Feasibility Study Review	
	- Site 32 Sampling Approach & Waste Characterization	
	- Site 50 Sampling Approach	
	- Additional Surface Water/Sediment Sampling – ECO	
10:30	Public Meeting and Administrative Record Update	CM
11:00	September 14, 2004	RMZ
	- TRC Meeting	
	- Public Meeting (TRC, Site 12 PP, ECOP II)	
	- MMRP Meeting	
	- PBC Scoping Meeting	
11:15	Schedules	
	Phase II Demolition	RMZ
	Field Work	CM
11:30	BERA	
12:00	Adjourn	

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
August 11, 2004**

034713

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
Documents Prepared by Shaw						
1	Final Feasibility Study, Site-12	On hold			On hold	Comments received from EPA on 5/14/04 and from TCEQ on 5/27/04 on the draft final. Document has been modified but the Final version has not been submitted due to pending ecological issues.
2	Final Background Soil Study Report	7/16/04			Submitted	
3	LHAAP-32 Revised Draft Final Feasibility Study Report	On hold			On hold	Document submittal to regulators is on hold until soil and groundwater sampling is performed. Shaw will begin sampling on August 16.
4	Draft Final Proposed Plan, LHAAP-12	7/30/04			Submitted. In review with regulators.	
5	Draft Final Feasibility Study, LHAAP-67	8/06/04	9/5/04		Submitted In review with regulators.	
6	Installation-wide Baseline Ecological Risk Assessment, Step 3 Technical Memorandum	7/02/04			Submitted. In review with the Army.	Step 3 preliminary results reported to the Army in a technical memo. Step 3 report is in preparation.
7	Installation-wide Baseline Ecological Risk Assessment, Draft Step 3 Results Report	8/30/04			In preparation	
8	Draft Final Evaluation of LHAAP-45 Analytical Data	7/9/04			Submitted. In review with regulators.	

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
August 11, 2004**

9	Draft Addendum I (Sampling at LHAAP-32 and LHAAP-50)	8/06/04			Submitted. In review with the Army.	
10	Draft Addendum II (SW/SD Data Gaps Sampling)	8/13/04			In preparation	
11	Draft Evaluation of Warehouse Area Analytical Data	8/18/04			In preparation	
12	Draft Background Surface Water and Sediment Report	8/30/04			In preparation	
Other Documents						
1	Draft Environmental Condition of Property II	7/29/04			Submitted. In review with regulators.	
2	Draft Evaluation of WFIA Analytical Data	7/29/04			Submitted. In review with regulators.	



Shaw Environmental & Infrastructure, Inc.

1430 Enclave Parkway
Houston, Texas 77077
Tel.: 281-368-4000

Technical Memorandum

Date: 7/30/04

To: Cliff Murray, Technical Manager, USACE - Tulsa

From: Prabal N. Amin, P.E. and Praveen Srivastav, Ph.D., P.G.

RE: Waste Classification of TNT-Contaminated Soil at LHAAP-32, Longhorn Army Ammunition Plant (LHAAP)

This memorandum addresses the waste classification of soil containing elevated concentrations of 2,4,6-trinitrotoluene (TNT) at LHAAP-32. The issue of soil waste classification, specifically as it pertains to supporting the development and evaluation of remedial alternatives (e.g., soil excavation and off-site disposal) for LHAAP-32, was discussed during the Monthly Managers Meeting held on July 21, 2004. During this meeting, Shaw Environmental, Inc. (Shaw) expressed its view that the TNT-contaminated soil at LHAAP-32 would not be classified as a listed RCRA hazardous waste should it be excavated. This memorandum provides a brief summary of Shaw's assessment, and the justification for a "non-listed" classification for the TNT-contaminated soil at LHAAP-32.

LHAAP-32, known as the former TNT Waste Disposal Plant, treated wastewater generated at the nearby TNT Production Area (LHAAP-29). The wastewater was transferred from LHAAP-29 to LHAAP-32 through a 6-inch wooden pipeline, known as the "red and yellow liquor" wastewater pipeline, and stored in holding tanks until treated. Based on available sampling data, the soil at LHAAP-32 has been identified as the medium of concern because it poses an unacceptable risk to human health, primarily due to the presence of TNT within an existing sediment pond near the head of the former "blue water" ditch. The maximum detected concentration of TNT within the sediment pond was found to be 57,000 mg/kg.

A regulatory consideration is whether or not the TNT-contaminated soil at LHAAP-32 could be classified as a listed RCRA hazardous waste carrying the EPA waste code K047, should the soil be excavated for treatment or off-site disposal. Pursuant to 40 CFR 261.33, K047 is pink/red water from TNT operations. Initially, it may appear that the TNT-impacted soil at LHAAP-32 would trigger the K047 waste code. However, the EPA only intended for K047 wastes to be regulated for their inherent reactive characteristic. The TNT-contaminated soil at LHAAP-32 is not anticipated to exhibit the characteristic of reactivity based on the observed maximum detected concentration of 57,000 mg/kg (5.7 %) in the soil. In general, if the concentration of TNT in soil does not exceed 10%, the soil would not likely exhibit the characteristic of

reactivity¹. Consequently, under the revised mixture and derived-from rules effective August 14, 2001 (as published in 66 Federal Register 27266, May 16, 2001), the TNT-contaminated soil would not have to be managed as a listed RCRA hazardous waste carrying waste code K047 since it is not anticipated to exhibit reactivity.

It is anticipated that soil waste will be analyzed for hazardous waste characteristics due to the potential presence of other contaminants, prior to excavating the TNT-contaminated soil at LHAAP-32. The waste characterization sampling and analysis, combined with existing investigative analytical data, would be used to fully characterize the soils for regulatory status and facilitate the selection of an appropriate off-site disposal facility should excavation and disposal be selected as the remedial alternative for LHAAP-32.

¹ Arthur D. Little, Inc., 1987, *Testing to Determine Relationship Between Explosive Contaminated Sludge Components and Reactivity*, Final, United States Army Toxic and Hazardous Materials Agency, January

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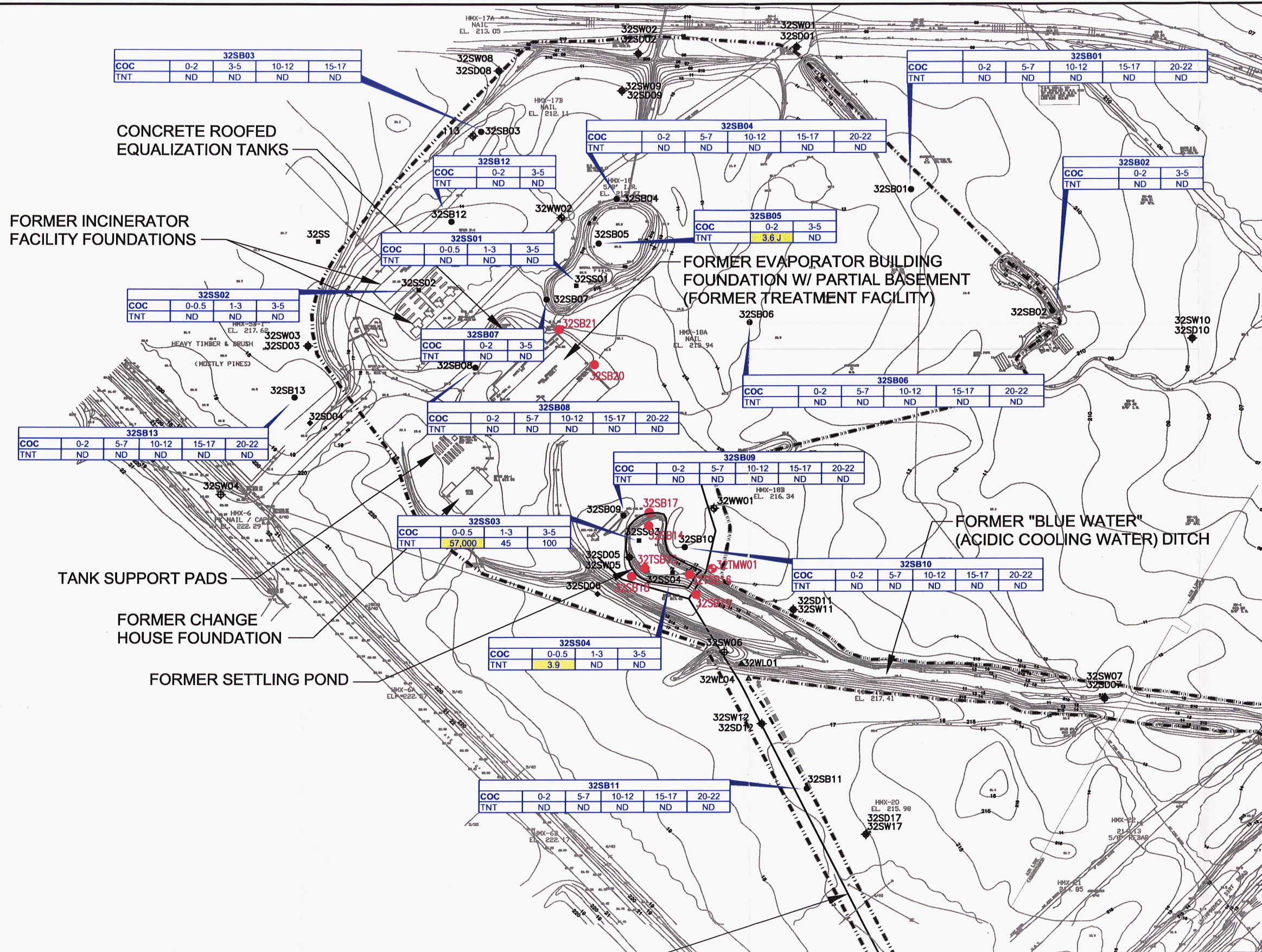
APPROVED BY P. SRIVASTAV 8/04/04

CHECKED BY A. WILMORE 8/02/04

DRAWN BY J. ROZ 2/09/04

OFFICE Houston, Texas

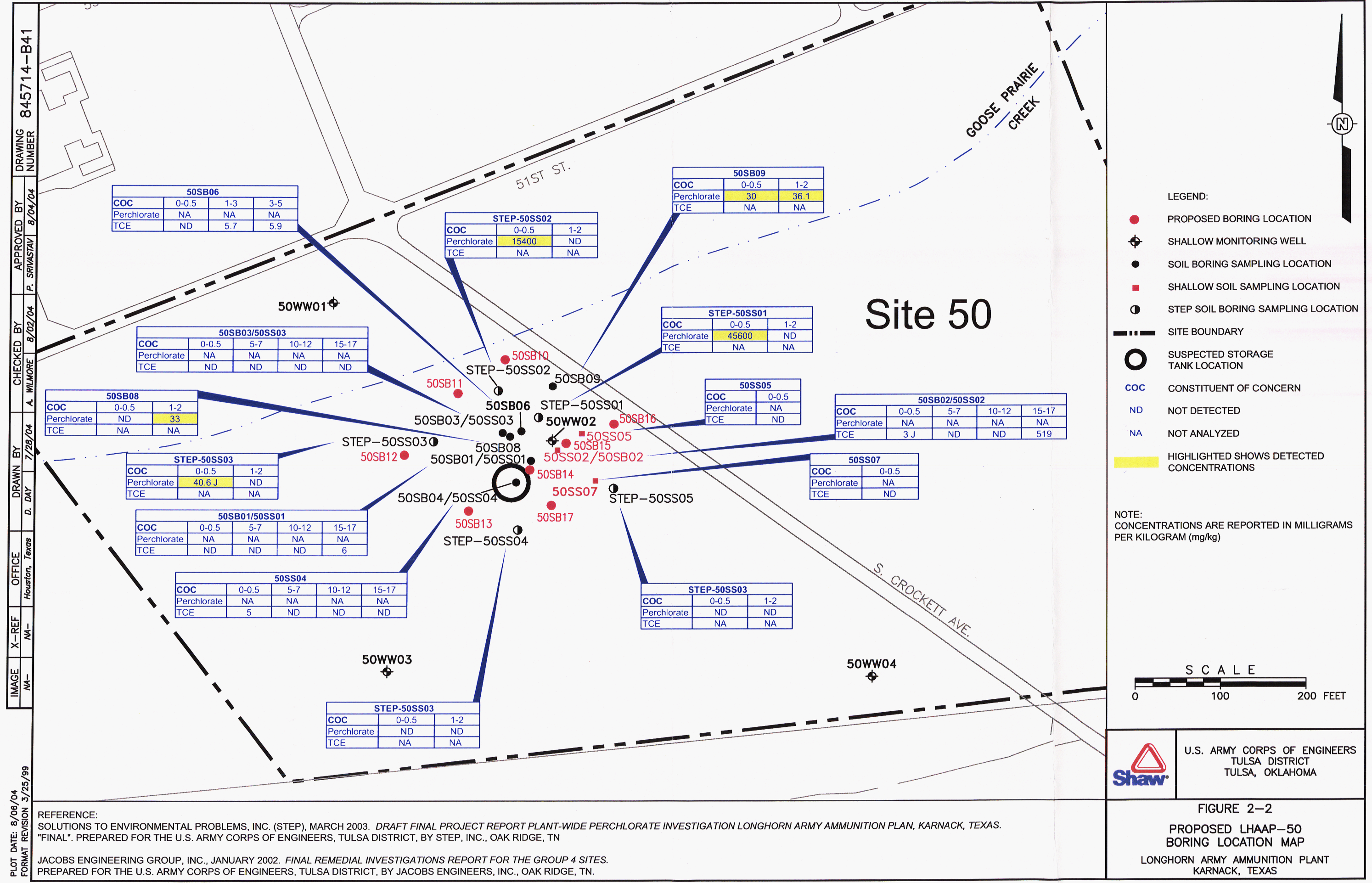
X-REF XHL032

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FORMAT REVISION 3/25/99

REFERENCE:
SOLUTIONS TO ENVIRONMENTAL PROBLEMS, INC. (STEP), MARCH 2003. DRAFT FINAL PROJECT REPORT PLANT-WIDE PERCHLORATE INVESTIGATION LONGHORN ARMY AMMUNITION PLAN, KARNACK, TEXAS.
"FINAL". PREPARED FOR THE U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT, BY STEP, INC., OAK RIDGE, TN

JACOBS ENGINEERING GROUP, INC., JANUARY 2002. FINAL REMEDIAL INVESTIGATIONS REPORT FOR THE GROUP 4 SITES
PREPARED FOR THE U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT, BY JACOBS ENGINEERS, INC., OAK RIDGE, TN.

FIGURE 2-1
PROPOSED LHAAP-32
BORING LOCATION MAP
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS





Subject: Draft Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)

Location of Meeting: Teleconference

Date of Meeting: Aug 11, 2004, 9:30 – 10:30 AM

Meeting Participants:

USAEC:	Jeff Armstrong (JA)
USACE-Tulsa:	Cliff Murray (CM)
Shaw Environmental:	Praveen Srivastav (PS), Kay Everett (KE), Frank Eidson (FE), Jon Lindberg (JL)-phone, Agnes Mayila (AM)-phone
USEPA Region 6:	Chris Villarreal (CV)
TCEQ:	Kristy Mauricio (KM), Tom Erny (TE)
USFWS:	Barry Forsythe (BF)

CM opened the meeting with the announcement that Rose Zeiler (RZ) is sick and will not be attending the meeting.

The discussion points during the meeting followed an agenda distributed prior to the meeting.

Review of Removal Action Approach at LHAAP-29

CM stated that the Army is in the planning stages of an approach for LHAAP-29 and is trying to determine whether or not an explosive safety submission would be required for remediation at LHAAP-29. He further mentioned that RZ was originally planning to present an approach to the team and may still do so in a follow up teleconference.

Document Status Summary

CM and PS discussed the preparation and review status of documents based on a Document Status Table distributed prior to the meeting. CM asked if there were any comments on the Site 12 ecological screening. JS indicated that TCEQ has a problem with the use of UTLs for background comparisons. JS further indicated that TCEQ will provide written comments soon. CM then mentioned that a work plan addendum for sampling at LHAAP-32 and LHAAP-50 was sent out earlier and that Shaw will be sampling next week based on that addendum. No comments were made on the addendum during the call. The work plan addendum for surface water and sediment data gap sampling is in preparation.

Public Meeting and Administrative Record Update

CM mentioned that a public meeting is being planned for ECOP II and the LHAAP-12 Proposed Plan on September 14. He also inquired if the regulators could include Bill Corrigan of CES on their distribution list for communications. CV replied that he does not see a problem with that. CM informed that the administrative record is currently being updated.

Plans for September 14, 2004

Several events are being planned for September 14-15, 2004. These include a TRC meeting, a public meeting for ECOP II and Site 12 Proposed Plan, an MMRP meeting, and a PBC scoping meeting.

Schedules

CM indicated that the demolition of buildings is scheduled to start during the week of August 9. Shaw is in the field since August 2 for installation and development of monitoring wells and for collection of soil and groundwater samples.

Miscellaneous

Following is a summary of other discussions that took place during the call:

- CV mentioned that a lot of activities are going on and he has several documents for review. He is not able to make any promises with respect to the Site 12 proposed plan and Site 67 feasibility study.
- JS suggested that the Army should make sure that the permit for the burning ground is still valid
- A follow up call was scheduled for August 19 at 1:00 PM to go over some issues with RZ
- JA provided an update on the status of PBC at Longhorn. He mentioned that Gaynor Dawson has made several visits to Longhorn and at this time AEC is looking at Sites 16, 17, 18/24, and 35 for PBC. He indicated that procurement may occur in the first quarter of FY05 and award in the second quarter of FY05. He also informed that AEC had planned 15 procurements for FY04 but 5 had to be postponed due to some federal regulation



Complete Environmental Service

Hwy. 134 @ Spur 449 - P.O. Box 170 - Karnack, Texas 75661
Ph 903-679-3448 Fax 903-679-3357 E-mail ces@shreve.net

WRC-04-GWTP05-CES-105
August 16, 2004

Rose M. Zeiler
LHAAP Site Manager
Department of the Army
Box 3, B1440
Fort Chaffee, AR 72905
Ph.# (479)484-2516
Fax# 479-484-2055
Email: rose.zeiler@monroe.army.mil

Reference: Contract No. DACA56-00-C-2014
Operation and Maintenance of the GroundWater Treatment Plant (GWTP)
Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas

Subject: LHAAP Administrative Record Update

Dear Mrs. Zeiler:

In accordance with Contract No. DACA56-00-C-2014, Complete Environmental Service (CES) has completed updating the Longhorn Army Ammunition Plant (LHAAP) Administrative Record. The record has been updated from June 2003 through July 2004. As a result of this update, 1,694 pages have been added to the record. The record has been scanned into electronic files and saved in Adobe PDF format. The Adobe PDF files have been copied onto compact discs (CD's) and digital versatile discs (DVD's). Each binder of the Administrative Record has been scanned and saved as an individual file. The index in each individual file has links, provided as shortcuts, that link directly from a document title to a specific document.

The entire Administrative Record fits on one DVD; however, when saved on CD's, it takes five to make a complete set. The CD's are organized as follows:

- CD No. 1 - Chronological File and years 1976 through 1993
- CD No. 2 - Chronological File and years 1994 through 1995
- CD No. 3 - Chronological File and years 1996 through 2001
- CD No. 4 - Chronological File and years 2002 through 2003
- CD No. 5 - Chronological File and year 2004 (Jan.-Jul. only)

CES is providing the administrative record to the following locations:

- BRAC, LHAAP Site Manager (Rose M. Zeiler) - One set on CD's
- USACE, Tulsa District, Attn: CESWT-EC-ER (Cliff Murray) - One set on DVD
- AEC, Program Manager (Jeff Armstrong) - One set on DVD
- Environmental Protection Agency (Chris Villarreal) - One set on CD's
- Texas Commission on Environmental Quality (James Sher) - One set on CD's
- Marshall Public Library - One paper copy and one set on CD's
- LHAAP Army Trailer - One paper copy and one set on CD's

A copy of the complete Administrative Record has also been stored on the server at the Groundwater Treatment Plant.

CES would appreciate any comments on possible improvements to the organization of the files on CD, prior to the next update of the Administrative Record. If you have any questions regarding this subject, please contact me at (903)679-3448.

Sincerely,

William R. Corrigan III, CHMM
GWTP Manager
Complete Environmental Service

cf: CESWT-EC-ER, Cliff Murray
AEC Program Manger, Jeff Armstrong
EPA, Chris Villarreal
TCEQ, James Sher
CES File - LHAAP

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

Follow-Up MANAGERS' MEETING

DATE: Wednesday, 18 August 2004

Teleconference

APPROACH TO REMEDIATION AT LHAAP-29

CERCLA and the NCP define a removal action as any one or all of the following:

- 1) **the cleanup or removal of released hazardous substances,**
- 2) actions to mitigate a threat or release of hazardous substances,
- 3) actions to monitor and evaluate release conditions,
- 4) disposal of removed material, and
- 5) actions to mitigate or prevent damage to public health, welfare, or the environment.

Why a removal action?

- Expedites cleanup
- Focused
- Streamlined - fewer documents (EE/CA, Action Memorandum vs. Feasibility Study, Proposed Plan, ROD)

Criteria for a non-time-critical removal action:

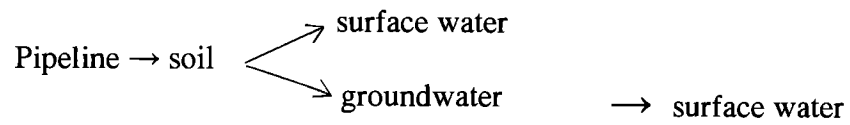
- **Actual or potential exposure to humans, animals, or the food chain**
- Actual or potential contamination of drinking water supplies or sensitive ecosystems
- Drums, barrels, tanks, or other bulk containers that may pose a threat of release
- **High contaminant concentration levels in soils largely at or near the surface that may migrate**
- Weather conditions that may cause migration or releases
- Threat of fire or explosion
- Availability of other federal or state response mechanisms to respond to the release
- Other factors or situations that may pose threats to public health or welfare or to the environment

Five steps to implement the removal action:

1. Evaluation of the site conditions where a removal action will be taken;
2. Assessment of the applicability of specific situations or "removal factors" that affect the level of risk at a removal site;
3. Determining the urgency of the situation;
4. Planning or scoping the removal action and documenting the decision of which action will be taken; and,
5. Taking the removal action and documenting the completion of the action.

Elements that make a removal action appropriate at LHAAP-29:

- Site already adequately characterized.
- Source of contamination identified and release ongoing.
- Approach to remediation straightforward and general consensus that the contamination must be removed.
- Pathways have been identified as follows:



- Removal of pipeline and surrounding contaminated soil will remove the source of groundwater contamination.
- Modeling demonstrates that the groundwater to surface water pathway is not complete.



**Subject: Draft Minutes, Follow up Meeting to August 11, 2004 Monthly Managers Meeting
Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Teleconference

Date of Meeting: Aug 18, 2004, 11:00 AM – 1:00 PM

Meeting Participants:

BRAC:	Rose Zeiler (RZ)
USACE-Tulsa:	Cliff Murray (CM), Susan Trussell (ST)
Shaw Environmental:	Praveen Srivastav (PS), Kay Everett (KE)
USEPA Region 6:	Chris Villarreal (CV)
TCEQ:	Jim Sher (JS)
USFWS:	Paul Bruckwicki (PB), Barry Forsythe (BF)

The discussion during the follow up teleconference focused on number of issues as summarized below.

Removal Action

RZ had e-mailed a document outlining advantages of performing a removal action at LHAAP-20. She briefly went through the main points of the document. RZ mentioned that the primary problem at LHAAP-29 is the TNT waste pipeline which can be removed expeditiously under a removal action. Some discussion occurred on the need for a ROD after the removal action. CV stated that he would find out whether or not a ROD would be required. JS expressed his support for the removal action, saying that this would show progress and may help achieve an NFA ROD later.

LHAAP-12 Ecological Issues

CV indicated that the ecological screening of LHAAP-12 data looks good except for a concern expressed by Susan Roddy about the lack of ecological screening value for perchlorate. JS indicated that TCEQ has a problem with the use of UTLs for ecological screening. He stated that TCEQ will provide written comments on the report. CV suggested that decisions on ecological risk should be left open until the installation-wide ERA is complete in the spring of 2005.

LHAAP-45 Soil Data Evaluation

JS indicated that the TCEQ has a problem with the use of two different data sets for the data evaluation. The USFWS data is random, while USACHPPM data is biased. TCEQ will provide written comments soon.

Property Transfer

RZ informed the team that site LHAAP-67 was inadvertently included in the property shown to be transferred to the USFWS and another area near LHAAP-67 was excluded instead. She stated that the Army will provide a corrected map along with a letter explaining the situation.

Agenda for September 13-15 Meeting

RZ had sent an agenda for meeting to be held on September 13-15 prior to the teleconference. JS suggested that the TRC meeting should be longer than the ½ hour allowed. It was decided that a combined TRC/Public Meeting will be held at 6:30-7:30 on September 14. RZ asked if regulators could attend the MMRP meeting on September 15. She indicated that Omaha Corps would like to get input from the regulators on their approach. CV and JS said that they would be able to attend the MMRP meeting.

Review Status of Documents

- RZ mentioned that the Army would like to receive EPA comments on ECOP II by August 20 or 24. CV replied that he would not be able to provide official comments by then.
- JS asked if the Army was planning to submit separate proposed plans for Sites 12, 32, and 67 or one for all three sites. RZ replied that at this time the Army is planning to submit separate proposed plans but may combine public meetings.
- JS asked if the Army would proceed with a public meeting for LHAAP-12 even if TCEQ does not agree with the ecological screening for the site. RZ replied that the public meeting will not be held if that was the case, however, the Army would like to get the comments as soon as possible.
- PS mentioned that the Final Feasibility Study for LHAAP-12 would have to be issued before the public meeting. The report has not been submitted because of pending ecological issues.
- RZ indicated that the Army may have to cancel the September 14 public meeting if regulatory comments on ECOP II and LHAAP-12 ecological screening are not received by the first week of September 2004.

LHAAP-32 Waste Characterization

PS asked if the regulators had any comments on the LHAAP-32 waste characterization memorandum submitted earlier. JS stated that TCEQ does not have any comments and would agree with the approach if the EPA does not have any objection. CV indicated that he has sent the memo to EPA's legal department. He will provide any comments as soon as he hears from the legal department.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

1445 ROSS AVENUE, SUITE 1200

DALLAS, TX 75202-2733

034727

August 18, 2004

Rose M. Zeiler, Ph. D.
Project Manager
Box 3, Building 1440
Fort Chaffee, Arkansas 72905

Re: Longhorn Army Ammunition Plant (LHAAP)
Evaluation of Site 45 Surface Soil Analytical Data

Dear Ms. Zeiler:

The U.S. Environmental Protection Agency (EPA) has completed our review of the information provided in the *Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data* (Shaw Environmental, Inc., July 2004). This document presents the evaluation of the surface soil samples collected at LHAAP-45 (i.e., Magazine Area used as a storage area for finished munitions) by the U.S. Fish and Wildlife Service (USFWS) and by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Concentrations of chemicals in the samples were compared to risk-based soil screening levels developed by the Texas Commission on Environmental Quality and by EPA Region 6 to be protective of human health and the environment. Samples exceeding the risk-based screening levels were compared to the LHAAP-specific background concentrations. Based on EPA's review of this information, the EPA concurs with the report's findings that:

- the concentrations of most organic and inorganic chemicals detected at LHAAP-45 are either below the regulatory human health and ecological screening criteria or are within the range of LHAAP soil background concentrations;
- a few chemicals detected at LHAAP-45 (i.e., cadmium, manganese, zinc, hexachloroethane, and pentachlorophenol) exceeded screening criteria and differed from background data set;
- chemical detections that exceeded the screening criteria and differed from background data set occurred only at isolated locations (i.e., for chemicals such as cadmium, manganese, and hexachloroethane); and,
- most of the chemicals that exceeded the screening criteria and differed from background data set (cadmium, manganese, zinc, and pentachlorophenol) are not associated with materials known to be stored at LHAAP-45.

Based on EPA's review of the *Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data*, the USFWS LHAAP-45 soil data, and the USACHPPM LHAAP-45 soil data, the EPA concurs with the recommendation that no further environmental investigation is necessary in this area.

Sincerely,



Chris G. Villarreal
Remedial Project Manager

cc: Cliff Murray, U.S. Army Corps of Engineers

James S. H. Sher, P.E., Texas Commission on Environmental Quality

Barry Forsythe, U.S. Fish and Wildlife Service

Bill Corrigan, Complete Environmental Services

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

PERFORMANCE BASED CONTRACTING (PBC) MEETING

DATE: Tuesday, 14 September 2004

Longhorn PBC Meeting

9/14/04

<u>Name</u>	<u>Organization</u>	<u>Phone</u>
Ken Kellbell	COE Tulsa	(918) 669-7240
Rose M. Zeiter	LHAAP	479-484-2816
GAYNOR DAWSON	CALIBRE /AEC	(89) 967-2347
Paul Bruckwiczki	USEWS	903.679.4536
CHRIS VILLARREAL	US EPA	(214) 665-6758
Cliff MURRAY	COE Tulsa	918-669-7573
James Sher	TCEQ	(512) 239-2444
JOE PEARSON	CALIBRE/AEC	215-692-4490
Praveen Srivastava	Shaw	281-368-4588
Robin Mills	HFO BRAC	757-788-5846
Rick Smith	COE Tulsa	918 669 4956
Barry Forsythe	USEWS	214-665-8467
CRIG SIGGEMAN	USEWS	817/277-1100
Jeff Armstrong	USAEC	410-436-1510

LONGHORN ARMY AMMUNITION PLANT,**Karnack, Texas*****TECHNICAL REVIEW COMMITTEE (TRC) MEETING*****AGENDA**

DATE: Tuesday, 14 September 2004
TIME: 6:30 p.m.
LOCATION: Karnack Community Center, Karnack, Texas

6:30	WELCOME AND INTRODUCTIONS	RMZ
6:35	RAB – Level of Interest	RMZ
6:50	Performance Based Contracting	JA
7:00	Environmental Program Update	CM/PS
	Status of Environmental Sites	
	Field Work	
	Eco Risk Assessment	
	Sediment & Surface Water	
	Step 3 Status	
7:20	Perimeter Well Monitoring	CM
7:25	GWTP Update	BC
7:35	Transfer Update	RMZ
	Site 45, Magazine Area	
	Perchlorate Area	
	ECOP II	
	Demolition Phase II	
	Environmental Baseline Report, Production Area	
7:45	Adjourn	

**Schedule of Meetings
Longhorn Army Ammunition Plant
Venue: LHAAP, GWTP Trailer
13-15 September, 2004**

Monday, 13 September

Anytime after 1:00

P Site Tour for PBC Group
M

Cliff Murray/Bill Corrigan**Tuesday, 14 September**

8:30 – 10:30

A Army PBC Scoping Meeting
M

Jeff Armstrong/Gaynor Dawson

10:30 – 12:30

A Stakeholders PBC Scoping
M Meeting

Jeff Armstrong/Gaynor Dawson

12:30 – 2:00

P Lunch
M

2:00 – 4:00

A Stakeholders PBC Scoping
M Meeting Continued

Jeff Armstrong/Gaynor Dawson

4:00 – 4:30

P Managers' Meeting
M

Rose M. Zeiler

4:30 – 6:30

P Dinner on your own
M

6:30 – 7:00

P TRC Meeting
M

Rose M. Zeiler

7:00 – 8:00

P Public Meeting for ECOP II and
M LHAAP-12 Proposed Plan

Rose M. Zeiler/Cliff Murray**Wednesday, 15 September**

8:00 – 9:00

A Army MMRP Pre-Meeting
M

Mark Albe

9:00 – 1:00

A MMRP Meeting
M

John Cataldo

1:00 – 2:00

P Electric Utilities Meeting
M Working Lunch

Jack Andres/Bill Corrigan

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting/TRC Meeting
September 14, 2004**

8	Draft Final Evaluation of LHAAP-45 Analytical Data	7/9/04	EPA - 8/18/04 TCEQ - 8/27/04	In progress	Review completed. Comment resolution in progress.	EPA concurrence received on 8/18/04. TCEQ comments received on 8/27/04.
9	Draft Final Addendum I (Sampling at LHAAP-32 and LHAAP-50)	8/13/04	9/12/04		Submitted. In review with the regulators.	Sampling has been completed as per this addendum.
10	Draft Addendum II (SW/SD Data Gaps Sampling)	9/14/04	9/28/04		In preparation	
11	Draft Evaluation of Warehouse Area Analytical Data	8/19/04	9/3/04		In preparation	
12	Draft Background Surface Water and Sediment Report	9/17/04			In preparation	
Other Documents						
1	Draft Environmental Condition of Property II	7/29/04			Submitted. In review with regulators.	
2	Draft Evaluation of WFIA Analytical Data	7/29/04	9/7/04 TCEQ reviewing	In progress	Submitted. EPA comments received. In review with TCEQ	

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting/TRC Meeting
September 14, 2004**

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/Regulators	Comment Resolution	Status	Remarks
Documents Prepared by Shaw						
1	Final Feasibility Study, Site-12	On hold			On hold	Comments received from EPA on 5/14/04 and from TCEQ on 5/27/04 on the draft final. Document has been modified but the Final version has not been submitted due to pending ecological issues.
2	Draft Modeling Report	9/30/04			In preparation	
3	LHAAP-32 Revised Draft Final Feasibility Study Report	On hold			On hold	Document submittal to regulators is on hold until soil and groundwater sampling is performed. Sampling is complete and results are expected in two weeks.
4	Draft Final Proposed Plan, LHAAP-12	7/30/04	9/14/04		Submitted. In review with regulators.	
5	Draft Final Feasibility Study, LHAAP-67	8/06/04	9/5/04		Submitted In review with regulators.	
6	Installation-wide Baseline Ecological Risk Assessment, Step 3 Technical Memorandum	7/02/04			Submitted. In review with the Army.	Step 3 preliminary results reported to the Army in a technical memo. Step 3 report is in preparation.
7	Installation-wide Baseline Ecological Risk Assessment, Draft Step 3 Results Report	10/30/04			In preparation	

034734

Rationale for Removing Hexachlorobenzene from Sampling Required by the Record of Decision (May 1995) for the Early Interim Remedial Action at Site 18/24, Longhorn Army Ammunition Plant, Karnack, TX

The Record of Decision (ROD) for Site 18/24 addresses an Early Interim Remedial Action to mitigate potential risks posed by the high concentrations of chlorinated solvents and heavy metals in shallow groundwater and buried source material at the site. Because of the selected response action to pump & treat groundwater, influent and effluent from the Groundwater Treatment Plant (GWTP) is sampled for Contaminants-of-Concern (COC's) in accordance with an approved sampling schedule.

Site 18 & 24

Contaminants-of-Concern at Site 18/24 include solvent residues and metallic cations. The COC's listed in Section B "Site History and Enforcement Activities" in the Site 18/24 ROD do not include Hexachlorobenzene as being managed in waste management units located on the site. Section E, "Summary of Site characteristics" does not list Hexachlorobenzene as being a primary source contributing to groundwater contamination.

Site 16

The GWTP treats groundwater from Site 16 in addition to the groundwater from Site 18/24. Section E "Summary of Site Characteristics" in the Site 16 ROD for the Early Interim Remedial Action at the Site 16 Landfill does not list Hexachlorobenzene as a contaminant of concern found in the groundwater.

Groundwater Treatment Plant Influent Analysis History

Table 2 "Effluent Limitations for the Discharge of Remediated Groundwater" of the Site 18/24 ROD includes monitoring for Hexachlorobenzene. Effluent limits for Hexachlorobenzene are currently 0.22 ug/L for the daily average and 0.47 ug/L for the daily maximum.

The influent and effluent at the GWTP were sampled monthly for Hexachlorobenzene until July 2000 when approval was received from EPA & the TCEQ to sample quarterly.

The table "LHAAP Groundwater Treatment Plant Hexachlorobenzene Influent Analysis Data" provides a summary of the influent samples collected from December 1996 to February 2004. Effluent samples that were collected concurrently on the same dates are not listed. To date, no Hexachlorobenzene has ever been detected in the influent or effluent from the site.

Hexachlorobenzene Information (From the Agency for Toxic Substances and Disease Registry)

Description: Hexachlorobenzene is a white crystalline solid that is not very soluble in water. It sticks strongly to soil. It does not occur naturally in the environment.

Use: Widely used as a pesticide to protect the seeds of onions and sorghum, wheat, and other grains against fungus until 1965. It was also used to make fireworks, ammunition, and synthetic rubber.

Synonyms: Perchlorobenzene; Anticarie; Bunt-cure; Bunt-no-more; Julin's carbon chloride.

Molecular Formula: C⁶C¹⁶

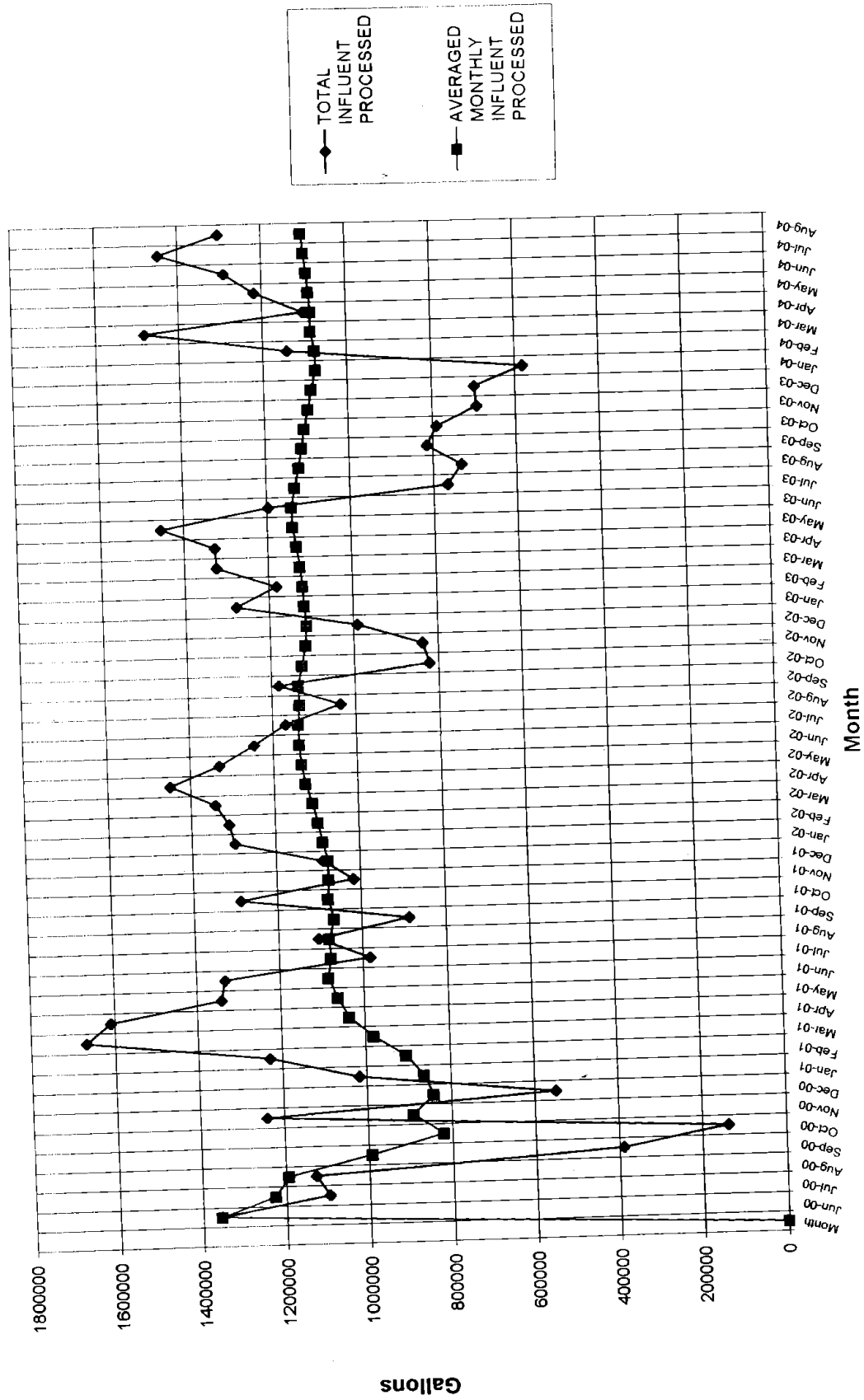
Information for Quarterly TRC Meeting

Longhorn Army Ammunition Plant Groundwater Treatment Plant Report

Site 18/24/16

September 14, 2004

Longhorn AAP Groundwater Treatment Plant
Water Treated June 2000 thru August 2004

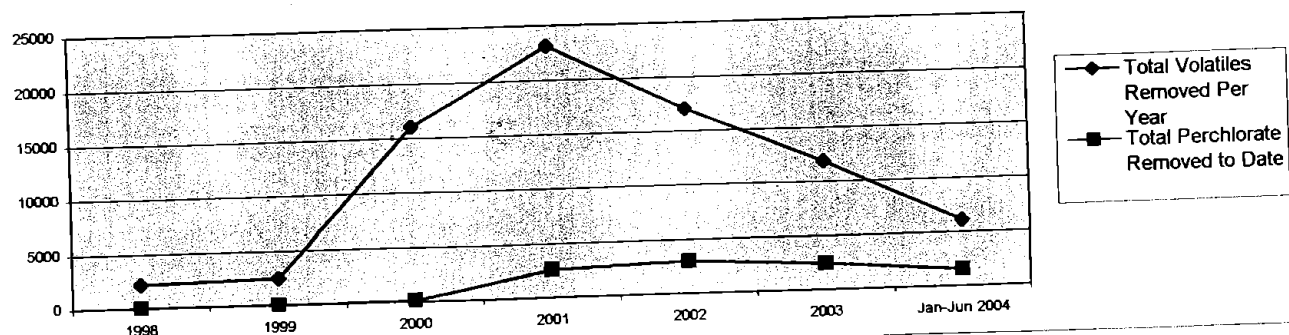


Longhorn AAP
Site 18/24

Contaminants	1998	1999	2000	2001	2002	2003	Jan-Jun 2004	Total Pounds Removed to Date
1, 1 Dichloroethene	0.00	0.00	0.17	14.24	7.87	0.11	1.03	23.42
1, 2 Dichloroethane	0.00	0.00	0.73	5.89	4.16	2.71	2.06	13.48
Acetone	0.00	192.54	227.93	0.92	0.09	0.00	0.00	421.47
Benzene	0.00	0.00	0.00	0.44	0.05	0.02	0.00	0.52
cis-1, 2- Dichloroethene	0.00	14.04	16.94	0.00	0.00	33.68	0.00	64.66
Toluene	0.00	0.00	0.00	0.44	0.06	0.03	0.01	0.53
trans-1,2- Dichloroethene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trichloroethene	134.03	213.19	1168.32	1788.98	1525.59	1429.62	773.41	6,259.72
Vinyl Chloride	0.00	0.00	5.34	8.57	11.61	5.35	4.23	30.87
1, 1, 2- Trichloroethane	0.00	0.00	0.01	0.53	0.03	0.02	0.00	0.59
1, 1- Dichloroethane	0.00	0.00	0.04	0.16	0.18	0.03	0.11	0.41
Chloroform	0.00	0.00	0.03	2.64	0.35	1.18	0.28	4.20
Methylene Chloride	2061.97	2042.18	14620.72	20584.32	14259.12	9969.13	4994.81	63,537.44
Tetrachloroethene	0.00	0.00	0.32	1.48	0.02	1.24	0.89	3.06
1, 2, 4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Carbon tetrachloride	0.00	0.00	0.00	0.20	0.26	0.07	0.00	0.54
Trichlorofluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Carbon disulfide	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Xylene	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.13
2-Butanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Phenyl Benzene	0.00	0.00	0.00	0.80	0.01	0.00	0.00	0.81
1,1-Trichloroethane	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.33
Freon-113	0.00	0.00	0.00	679.70	1221.26	417.54	292.04	2,318.50
Total Volatiles Removed Per Year	2196	2462	16041	23090	17031	11861	6069	72681
Total Perchlorate Removed to Date	0	0	103	2577	3027	2493	1564.00	9763

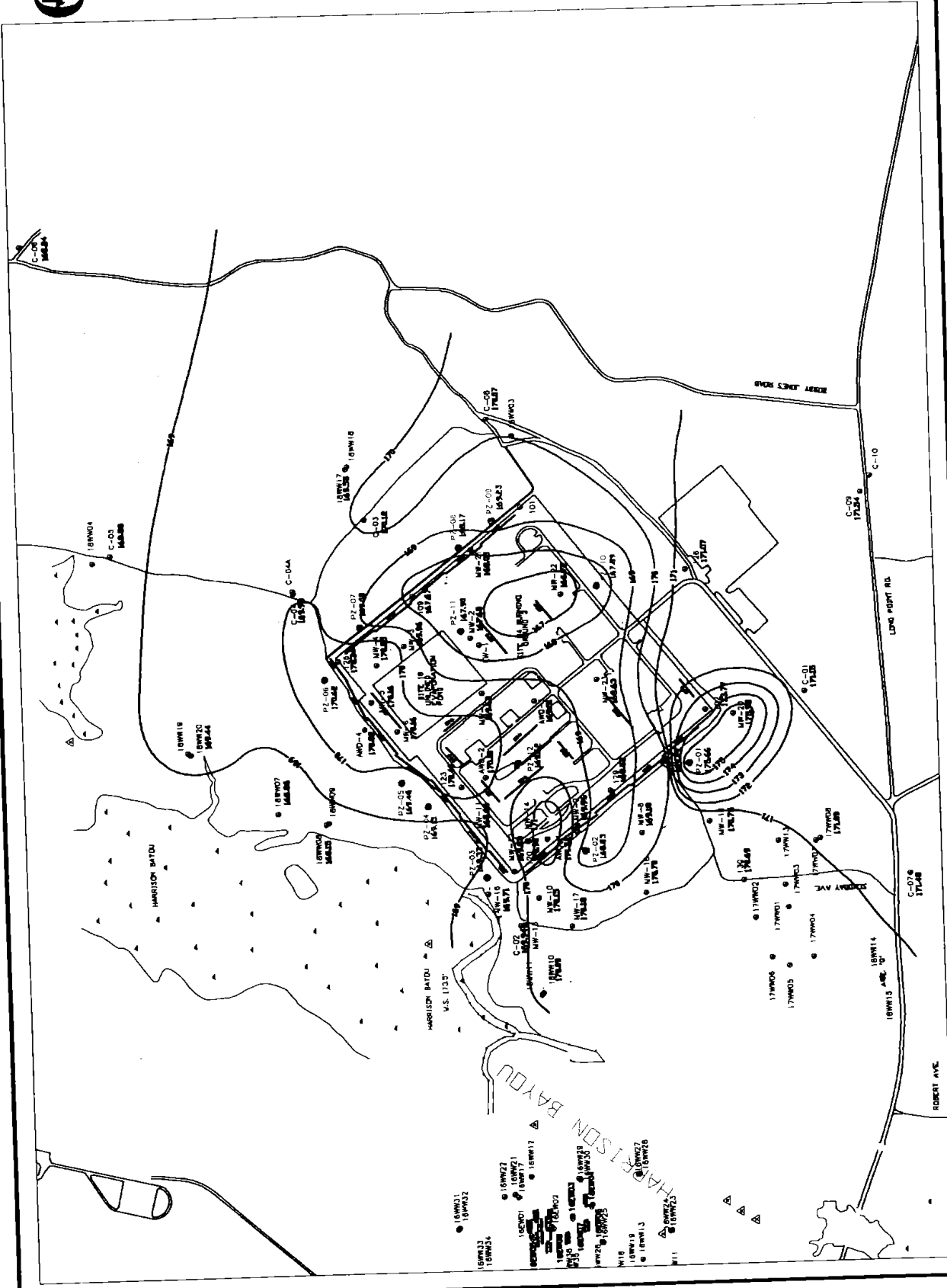
	1998	1999	2000	2001	2002	2003	Jan-Jun 2004	Total Quantity Removed to Date
Site 18/24 Groundwater Production	6,014,165	6,595,970	6,341,793	8,785,268	8,446,977	6,411,891	3,855,541	46,451,605

Total Volatiles and Total Perchlorate Removed Per Year (Pounds)



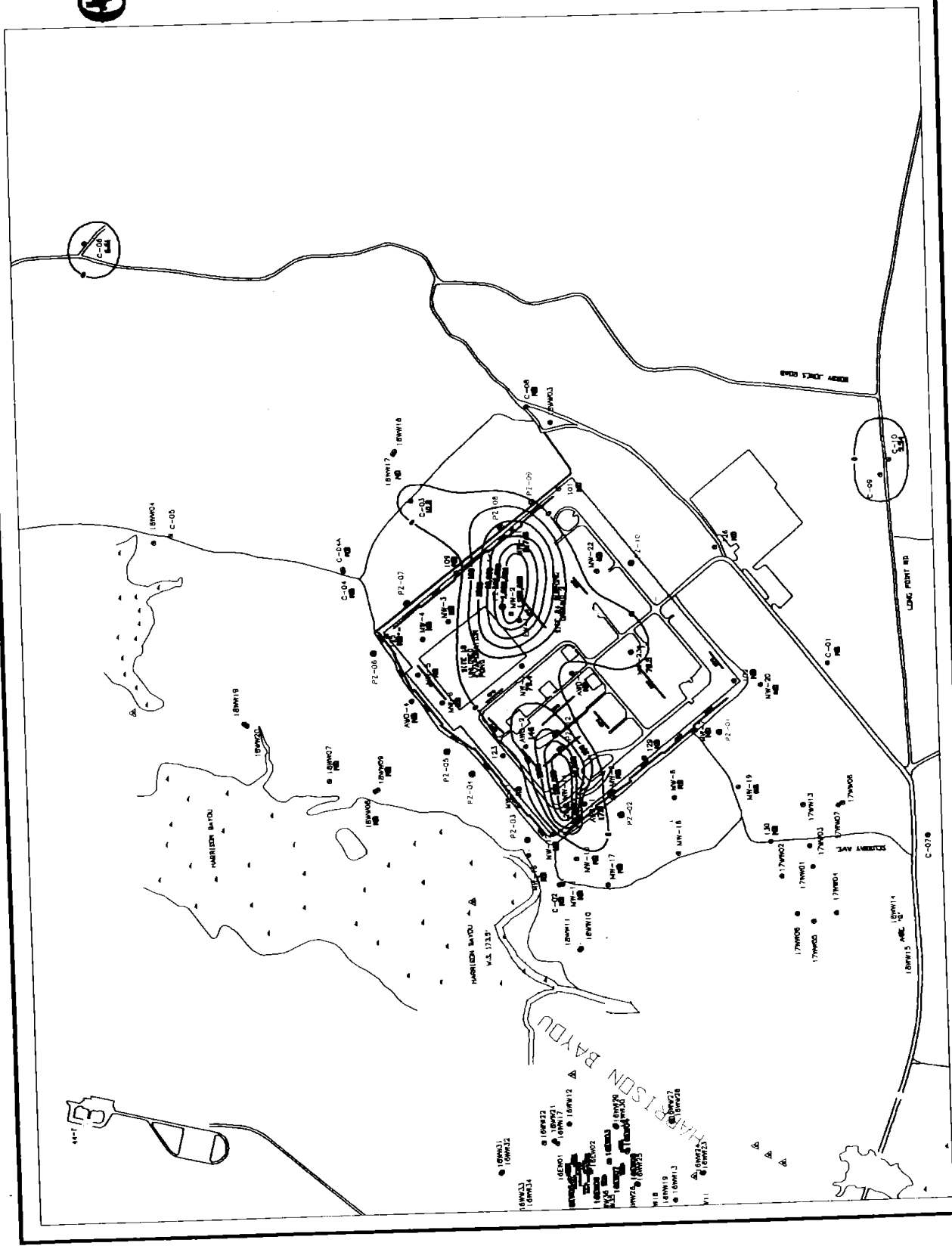


Complete Environmental Service
LHAAP Sites 18 & 24
DATE: Aug. 2, 2004
Groundwater Levels



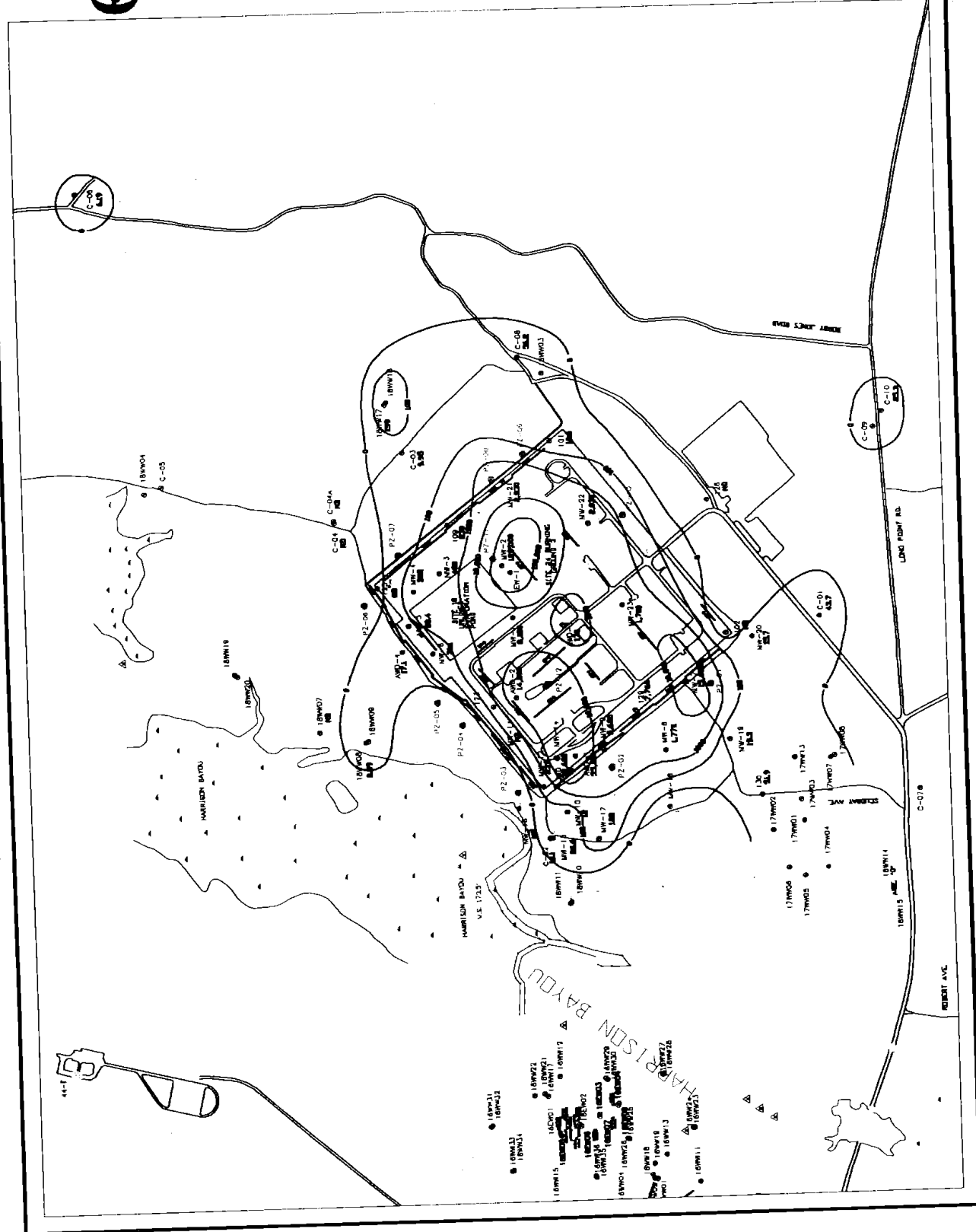


Complete Environmental Service
 LHAAP Sites 18 & 24
 DATE: May 2004
 Methylene Chloride



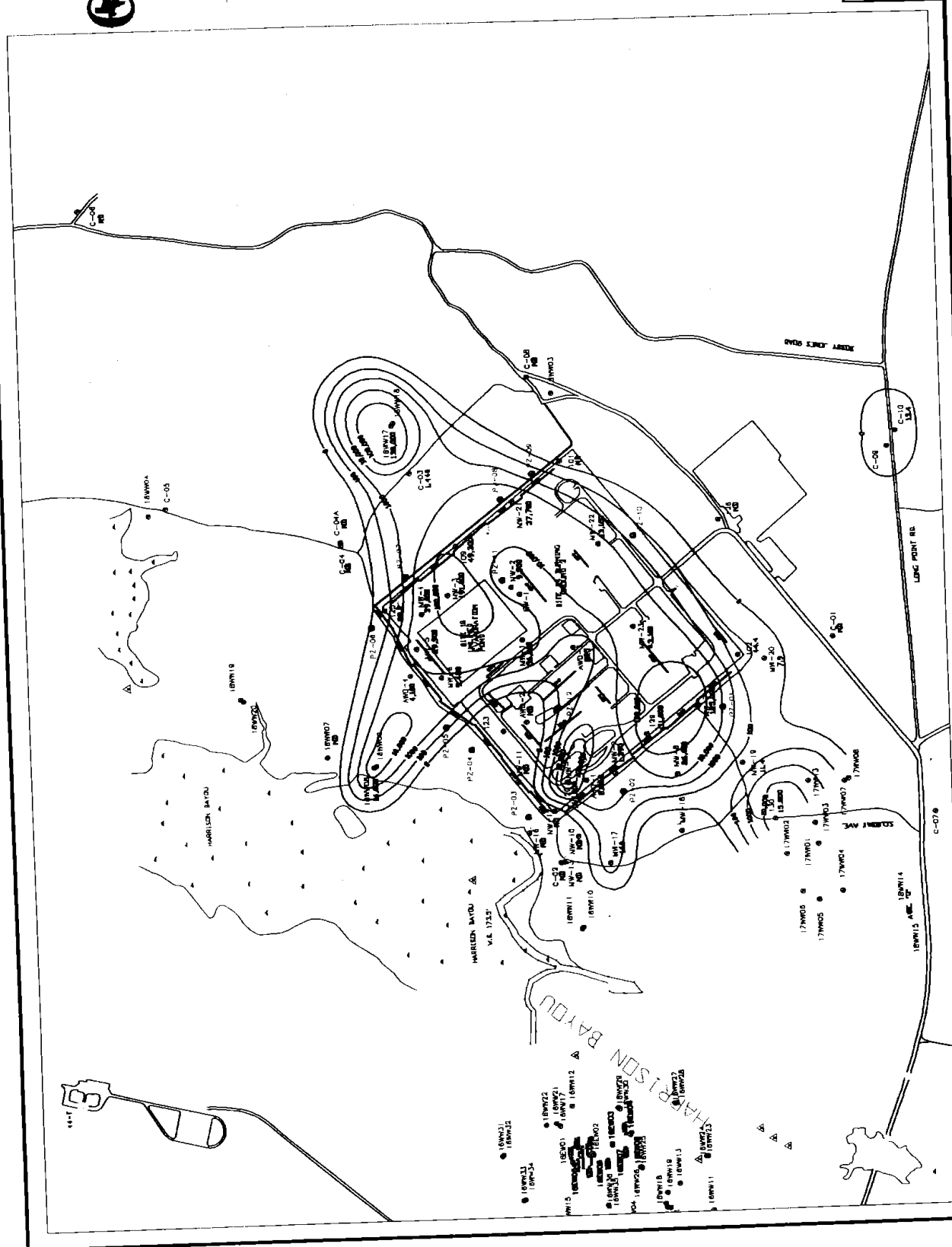


Complete Environmental Service
 LHAAP Sites 18 & 24
 DATE: May 2004
 Trichloroethene

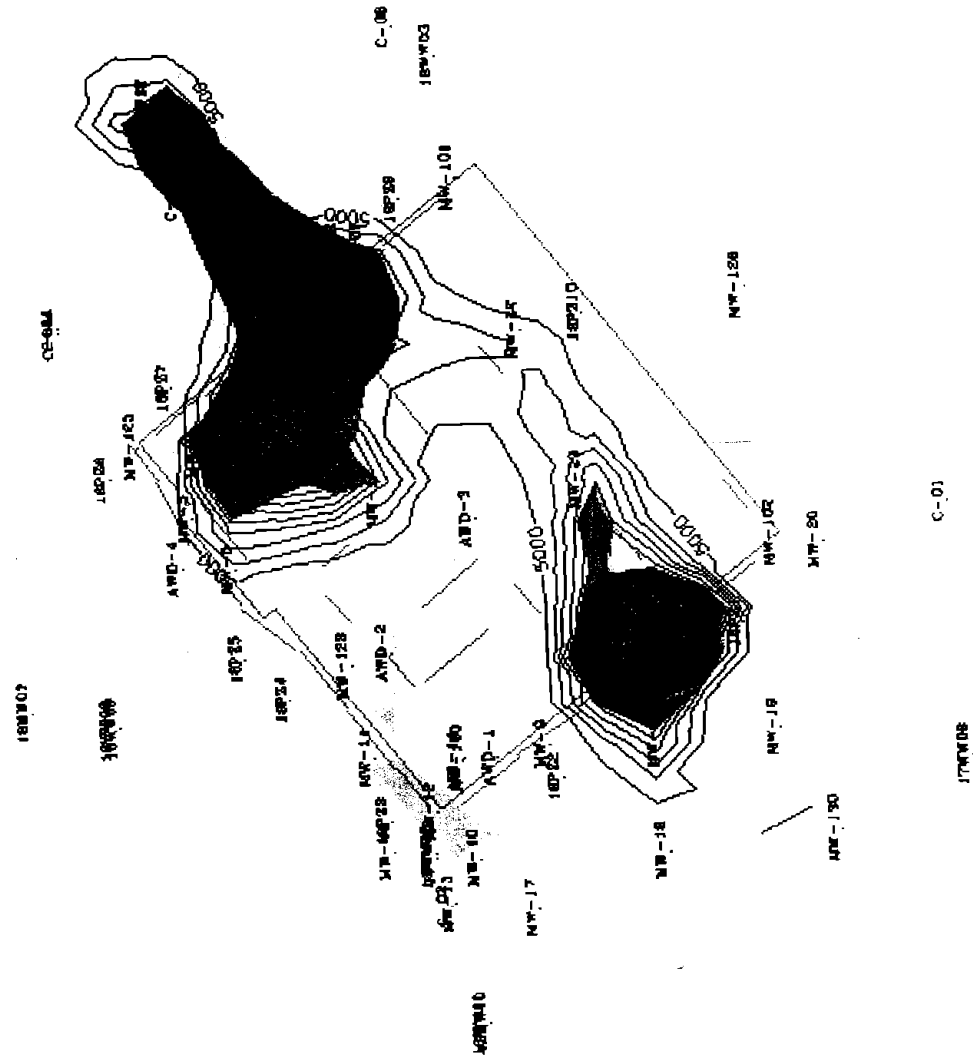




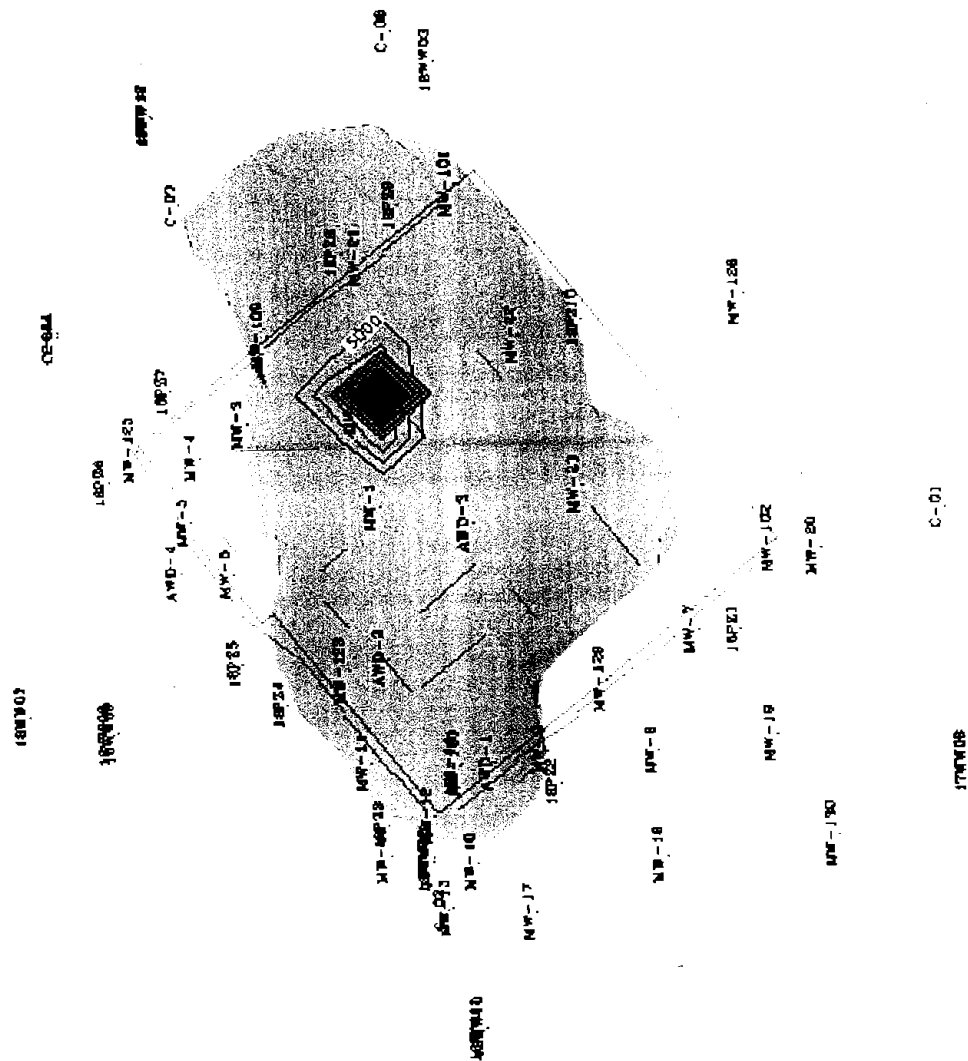
Complete Environmental Service
LHAAP Sites 18 & 24
DATE: May 2004
Perchlorate



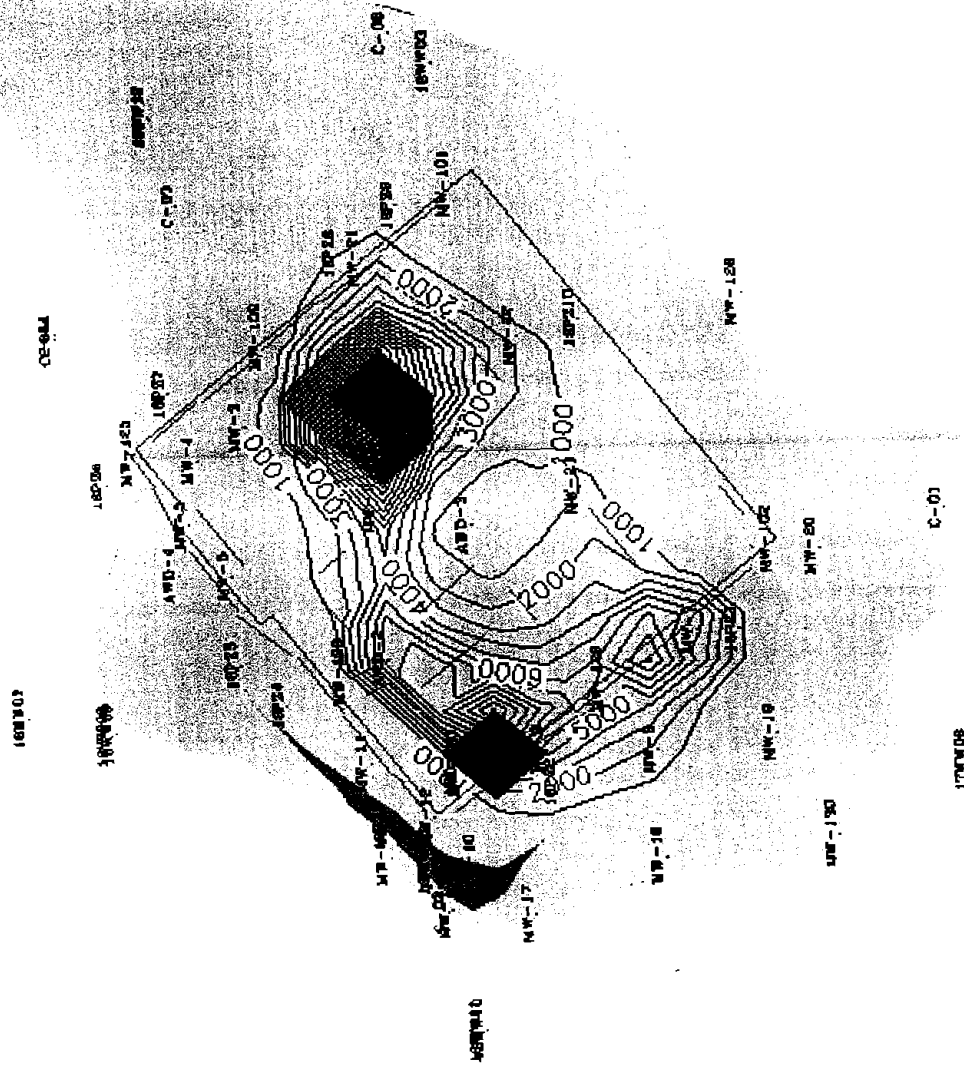
Site 18/24 Isosurface Values at 10, 25000 and 50000 ug/L
Perchlorate, May 2004



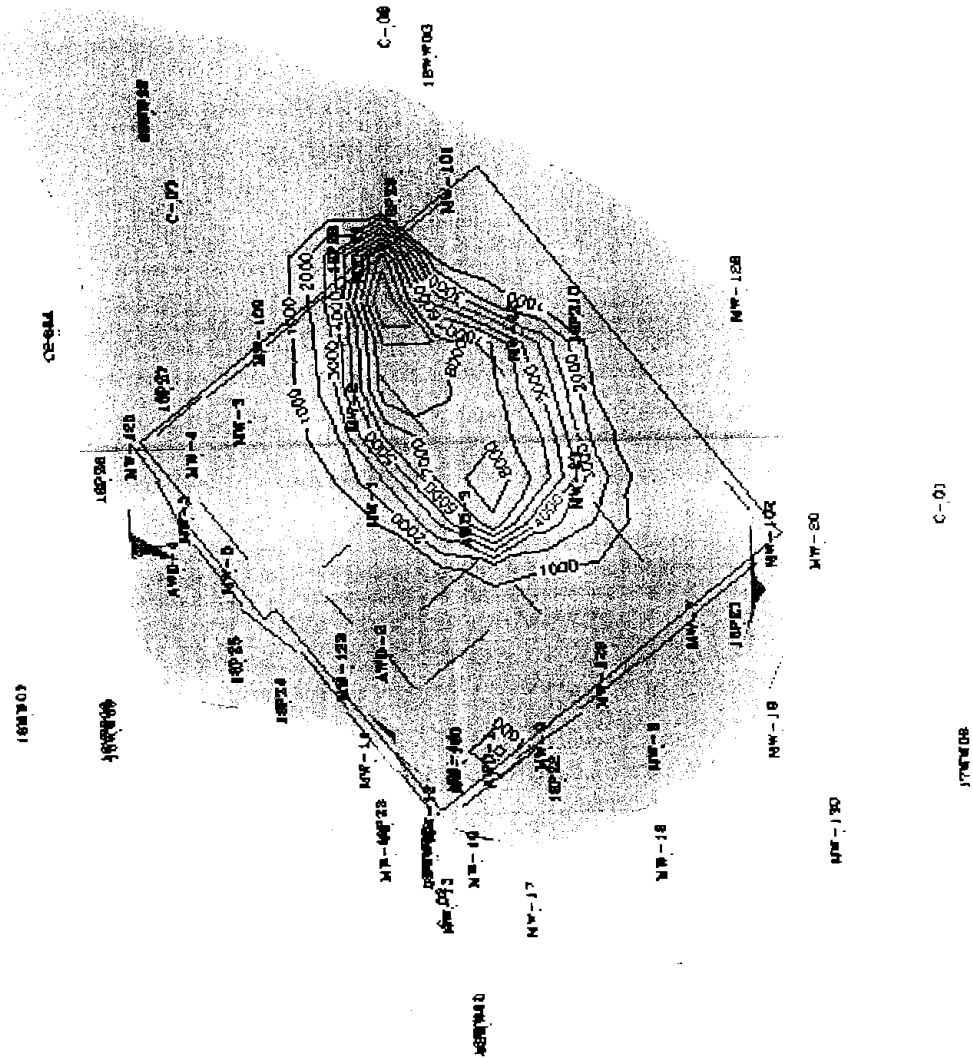
Site 18/24 Isosurface Values at 10, 25000 and 50000 ug/L
Methylene Chloride, May 2004



Site 18/24 Isosurface Values at 10, 25000 and 50000 ug/L
Trichloroethene, May 2004



Site 18/24 Isosurface Values at 10 and 15000 ug/L
Freon-113, May 2004



LHAAP Groundwater Treatment Plant
Hexachlorobenzene Influent Analysis Data

Sample Date	12/27/1996	1/3/1997	2/19/1997	3/13/1997	4/29/1997	5/6/1997	6/30/1997	7/19/1997	8/5/1997	9/3/1997	10/7/1997	11/11/1997
	LH18/24- SP140- 1001- OFF	LH18/24- SP140- 1003- OFF	LH18/24- SP140- 1010- OFF	LH18/24- SP140- 1014- OFF	LH18/24- SP140- 1024- OFF	LH18/24- SP140- 1026- OFF	LH18/24- SP140- 1040- OFF	LH18/24- SP140- 1052- OFF	LH18/24- SP140- 1068- OFF	LH18/24- SP140- 1090- OFF	LH18/24- SP140- 1111- OFF	LH18/24- SP140- 1336- OFF
Sample No.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sample Concentration												
Sample Date	12/10/1997	1/14/1998	3/17/1998	3/24/1998	4/2/1998	5/8/1998	6/3/1998	7/16/1998	8/4/1998	9/15/1998	12/16/1998	1/20/1999
	LH18/24- SP140- 1150- OFF	LH18/24- SP140- 1162- OFF	LH18/24- SP140- 1166- OFF	LH18/24- SP140- 1173- OFF	LH18/24- SP140- 1178- OFF	LH18/24- SP140- 1208- OFF	LH18/24- SP140- 1223- OFF	LH18/24- SP140- 1247- OFF	LH18/24- SP140- 1261- OFF	LH18/24- SP140- 1287- OFF	LH18/24- SP140- 1341- OFF	LH18/24- SP140- 1352- OFF
Sample No.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sample Concentration												
Sample Date	2/17/1999	3/3/1999	4/7/1999	5/10/1999	7/20/1999	8/17/1999	9/17/1999	10/5/1999	11/3/1999	12/1/1999	1/11/2000	2/14/2000
	LH18/24- SP140- 1368- OFF	LH18/24- SP140- 1378- OFF	LH18/24- SP140- 1397- OFF	LH18/24- SP140- 1399- OFF	LH18/24- SP140- 1406- OFF	LH18/24- SP140- 1410- OFF	LH18/24- SP140- 1411- OFF	LH18/24- SP140- 1417- OFF	LH18/24- SP140- 1420- OFF	LH18/24- SP140- 1423- OFF	LH18/24- SP140- 1428- OFF	LH18/24- SP140- 1431- OFF
Sample No.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sample Concentration												
Sample Date	3/13/2000	4/5/2000	5/10/2000	6/13/2000	7/11/2000	8/22/2000	9/5/2000	11/15/2000	1/15/2001	1/30/2001	4/24/2001	2/6/2001
	LH18/24- SP140- 1433- OFF	LH18/24- SP140- 1438- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF	LH18/24- SP140- 1443- OFF
Sample No.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sample Concentration												
Sample Date	5/15/2001	8/9/2001	11/20/2001	1/16/2002	5/21/2002	8/15/2002	11/19/2002	2/13/2003	5/22/2003	8/25/2003	12/01/03	2/23/04
	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF	LH18/24- SP140- 1449- OFF
Sample No.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sample Concentration												



Shaw® Shaw Environmental, Inc.

Longhorn Army Ammunition Plant Technical Review Committee Meeting

Location	LHAAP, TX
Date	14-Sep-2004

ATTENDEES

Name (printed)	Signature	Organization	Phone	E-mail
Praveen Srivastava	<i>Praveen Srivastava</i>	Shaw	981-368-4458	praveen.srivastava@shawgrp.com
Cliff Murray	<i>Cliff Murray</i>	U.S. Corps of Engineers	918-669-7573	Cliff.Murray@USACE.ARMY.MIL
George McArthur	<i>George McArthur</i>		903-935-7704	
Allen George	<i>Allen George</i>		903-668-3717	agorgeo@jisd-pssr.net
James Sher	<i>James Sher</i>	TCEQ	512-239-2444	sher@tceq.state.tx.us
Judith Johnson	<i>Judith Johnson</i>	RES CHDOO LK	903-679-3130	JUDITHJOHNSON@WISCONSIN
Doug Parker	<i>Doug Parker</i>	Resident	903-679-3650	parkerdc@shreve.net
Chris Villarejo	<i>Chris Villarejo</i>	US EPA	214-665-6753	villarejo.chris@epa.gov
David Eppler	<i>David Eppler</i>	US EPA	214-665-6529	eppler.david@epa.gov
Tom Erny	<i>Tom Erny</i>	TCEQ R-S	903-535-5142	tenyc@tceq.state.tx.us
Bud Jones	<i>Bud Jones</i>	DoD-TAPP	541-412-7224	bjones@nwtac.com
Jeff Armstrong	<i>Jeff Armstrong</i>	USARMC	410-436-1570	jeffrey.armstrong@us.army.mil
Dave Bockelmann	<i>Dave Bockelmann</i>	ALL	618-692-3861	dbockelmann@ALL-LLC.COM
Craig Giggles	<i>Craig Giggles</i>	USFWS	817-277-1100	craig-giggles@fws.gov
Mark Williams	<i>Mark Williams</i>	USFWS	903-407-0852	mark-williams@FWS.GOV
Paul Fortune	<i>Paul Fortune</i>	RESIDENT	903-679-3949	plfortune@hotmail.com
Paul Bruckwiczki	<i>Paul Bruckwiczki</i>	USFWS	903-679-4536	paul.bruckwiczki@fws.gov
Donna Selman	<i>Donna Selman</i>	Resident/Business owner	(903) 679-9090	dselman@shreve.net
Barry Forsythe	<i>Barry Forsythe</i>	USFWS	214-665-8467	forsythe.barry@epa.gov
William R. Corrigan	<i>William R. Corrigan</i>	CES	903-679-3448	corriganb@shreve.net
Richard P. Smith	<i>Richard P. Smith</i>	Corps of Engineers Tulsa	918-669-4956	richard.p.smith@SWTR3.usace.army.mil
Vigil R. Shivers	<i>Vigil R. Shivers</i>	Resident/ Land owner	903-679-4128	

[illegible]



Subject: Draft Minutes, TRC Meeting, Longhorn Army Ammunition Plant (LHAAP)

Location of Meeting: Shaw Office, Houston, Texas

Date of Meeting: September 14, 2004, 6:30 – 9:30 PM

Meeting Participants:

BRAC:	Rose M. Zeiler (RZ)
AEC:	Jeff Armstrong (JA)
USACE-Tulsa:	Cliff Murray (CM); Richard Smith (RS); Ken Kebbell (KK)
Shaw Environmental:	Praveen Srivastav (PS)
USEPA Region 6:	Chris Villarreal (CV), David Eppler (DE)
TCEQ:	James Sher (JS), Tom Erny (TE)
DOD-TAPP:	Bud Jones (BJ)
USFWS:	Craig Gigglesman (CG), Mark Williams (MW), Paul Bruckwicki (PB), Barry Forsythe (BF)
CES:	Bill Corrigan (BC)
Local Residents:	Larry McCathran (LM), Allen George (AG); Judith Johnson (JJ); Doug Parker (DP); David Bockelmann (DB); Paul Fortune (PF); Donna Selman (DS); Nigel Shivers (NS); Tom Walker (TW)

BRAC – Base Realignment and Closure; AEC – Army Environmental Center; USACE – U.S. Army Corps of Engineers; USEPA – U.S. Environmental Protection Agency; TCEQ – Texas Commission on Environmental Quality; USFWS – U.S. Fish and Wildlife Service; CES – Complete Environmental Service.

Welcome and Introductions-RZ

The following handouts were distributed before and during the meeting:

- Meeting Agenda
- Document Status Table
- Rationale for removing hexachlorobenzene from sampling at the Groundwater Treatment Plant

RAB Level of Interest

- RZ gave an introduction to the Restoration Advisory Board (RAB) program and how establishment of a RAB for Longhorn could be mutually beneficial to the public and the Army. She indicated that funds would be available for meetings and presentations if a RAB is formed by meeting the minimum public participation requirements.
- JS encouraged the local residents to be active in the document review process, in meetings, and to bring out any concerns
- RZ indicated that she would send a letter to the public explaining the purpose of RAB and to solicit participation

Performance Based Contracting

- JA explained that the Army is moving towards a new mechanism of contracting, called Performance Based Contracting, for environmental restoration at Longhorn.
- In response to a question by PF, JA replied that the current estimate to complete cleanup at Longhorn is approximately \$23 million but the actual cost could be more or less.
- PF asked if JA could give an estimate of the best and worst case scenario for the length of time for the presence of the Army at Longhorn. JA replied that remedy has to be in place by 2007 but activities at certain sites may continue for as long as 30 years.
- CV and RZ added that there is waste in the ground at certain sites and the monitoring at these sites will be performed by the Army forever.
- PF asked about public access to some of the land inside Longhorn AAP. MW (USFWS) stated plans to accommodate public access to certain areas of the base and restrict access to some areas by working with the Army
- LM inquired if any of the areas of the installation are currently open to the public. MW replied that the land is closed until USFWS is ready to open it for public. RZ mentioned that there is UXO hazard at some of the areas and access to these areas will have to be restricted.

Transfer Update

- RZ explained the purpose and contents of an ECOP. She indicated that the BRAC office signs the ECOP and seeks concurrence of the EPA. Once this process is complete, GSA transfers the ownership of the land.
- JS stated that a proposed plan and record of decision for Site 12 will be in review soon. This is the right time for public to get involved through at RAB.
- PF asked if there was a possibility of an industry coming to Longhorn. RZ replied that the USFWS will be consulted if transfer is made to an industrial entity.
- JJ indicated that the Hanger family has a cemetery inside the installation in the northwestern area. The Army had assured in meetings that the cemetery would be maintained, however, it fell through the cracks.
- There was a discussion on the location of the cemetery and it was pointed out by RZ that the cemetery is still in Army's control. RZ indicated that the Army will look into options to maintain the cemetery.

Environmental Program Update

- CM and PS provided an update of the environmental program at LHAAP. A copy of the document status table was distributed at the beginning of the meeting.
- PS stated that Shaw has been in the field since the beginning of August. The field work has included installation of monitoring wells and collection of soil, groundwater, surface water, and sediment samples.
- PF indicated that the public has a concern about water rights. They are concerned about another municipality coming to take ownership of the remaining water rights
- RZ indicated that the Army has transferred rights for 86% of the water. The Army is retaining the remaining rights in case a private party or industry come in to own a portion of Longhorn.

GWTP Update

- WC provided an update on the operation of the Groundwater Treatment Plant.
- JS stated that he had a concern about the extent of contamination east of well 18WW17. He did not think that the extent is defined in that direction.
- JS also expressed a concern that contamination may be discharging into Harrison Bayou because well 18WW09 has over 10,000 µg/L and there are no wells to the west of this well to show whether or not the concentrations decline to the west.
- WC also discussed the analysis of hexachlorobenzene at the GWTP. He stated that this chemical has never been detected in the influent or effluent of the GWTP. The Army would like to remove the chemical from the list of analytes.
- JS suggested that the Army send a letter to the regulators requesting removal of hexachlorobenzene from the list of GWTP analytes.

Other Issues

- It was decided that the next TRC meeting will be held on December 7 at Longhorn
- PF suggested that the Army attend and give a presentation at a Caddo Lake Institute's Clearinghouse meeting. This would help generate interest for the RAB.
- CM stated that the Army will look into doing that and may even offer a tour of the installation. He also thanked PF for the use of the Karnack Community Center for the TRC meeting.

Meeting was adjourned at 9:30 PM.

Action Items

- RZ to send a letter to public regarding RAB
- RZ to address maintenance of the cemetery
- Army to send a letter to regulators requesting removal of hexachlorobenzene from GWTP analyte list

034753

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

TECHNICAL PROJECT PLANNING (TPP) MEETING

DATE: Wednesday, 15 September 2004



US Army Corps
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Omaha District

Military Munitions Response Program Site Inspections (MMRP SI)

TPP Meeting No. 2
Longhorn Army Ammunition Plant (LHAAP)
Texas
15 September 2004



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Omaha District

Meeting Agenda

- ☐ Introductions
- ☐ Meeting Objectives
- ☐ MMRP SI Goals and Process
- ☐ Site Profiles
- ☐ Conceptual Site Model
- ☐ Data Gaps
- ☐ Recommendations
- ☐ Project Schedule





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Meeting Objective

- Present the findings for each MMRP site
- How to get to NFA as quickly as possible for MMRP sites
- Present Data Gaps needed to fill to achieve NFA
- Determine the next step



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MMRP SI Goals

- **Primary Goal**
 - Collect the appropriate amount of information necessary to decide if the following actions are warranted at the site:
 - No Further Action Determination.
 - Interim Remedial Action/Removal Action.
 - MMRP Remedial Investigation/Feasibility Study (RI/FS).
- **Secondary Goal**
 - Collect information to assist AEC in improving the Cost to Complete (CTC) estimate for the remediation of the MMRP site.





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MMRP SI Process

- ✓ Stakeholder Involvement
- ✓ Historic Records Review / Conceptual Site Model (CSM)
- * Project Planning and Work Plan Development
- Site Inspection
- Site Inspection Report



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Historic Records Data Collection

Purpose: Complete an appropriate records search to document historic and other known information about the installation.

- Draft Historic Records Review Report- 2 June 2004, USACE St. Louis District
- Interim Final Historic Records Review Report- 24 August 2004, USACE St. Louis District

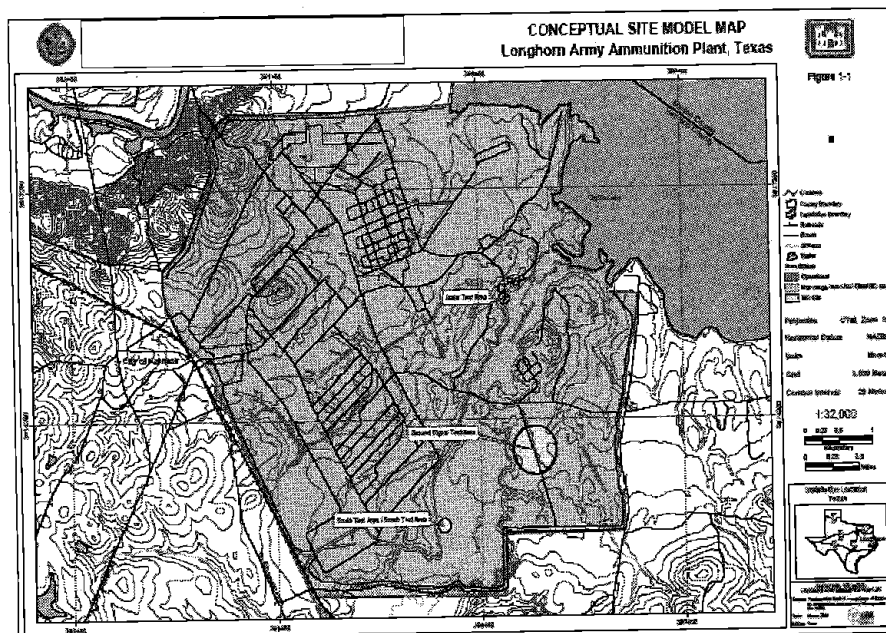




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Historic Records Data Collection

- During the US Army CTT Range/Site Inventory, which took place September 2002, three MR sites were identified at LHAAP.
- The three sites are the:
 - o Ground Signal Test Area (LHAAP-003R)
 - o South Test Area/Bomb Test Area (LHAAP-001-R)
 - o Static Test Area (LHAAP-002-R)



Ground Signal Test Area



Source: HRR-Photo from 1984 Survey Report



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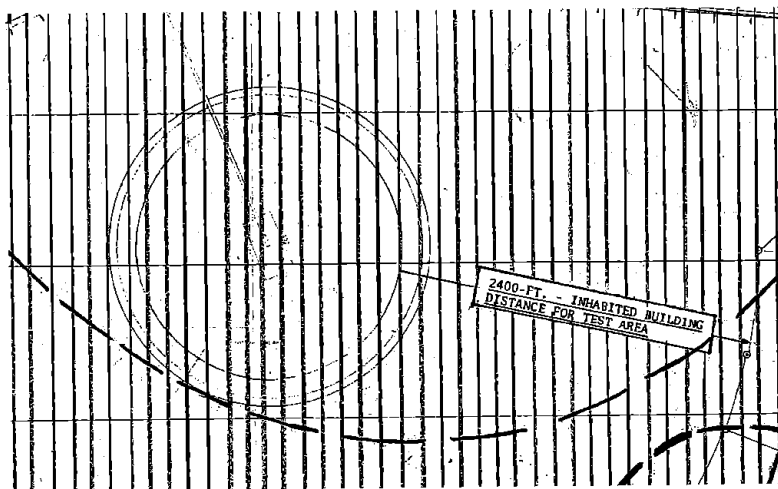
Site Profile: Ground Signal Test Area

History

- Used from approximately 1963-1991
- Aerial and on-ground testing and destruction of variety of devices including:
 - Pyrotechnic signal devices
 - Red phosphorus smoke wedges, infrared flares
 - 60 and 81 mm mortar shells
 - Illuminating 40 to 155 mm cartridges
 - Button bombs
 - Explosive simulators
 - Burn-out of rocket mortars from Nike-Hercules, Pershing and Sergeant missiles
 - Sergeant rocket motor exploded in an excavated pit near center of the site. Debris placed in the pit and backfilled.
- Consists of approximately 80 acres



Ground Signal Test Area



Source: HR- 1972 map accompanying the Installation Real Property Survey



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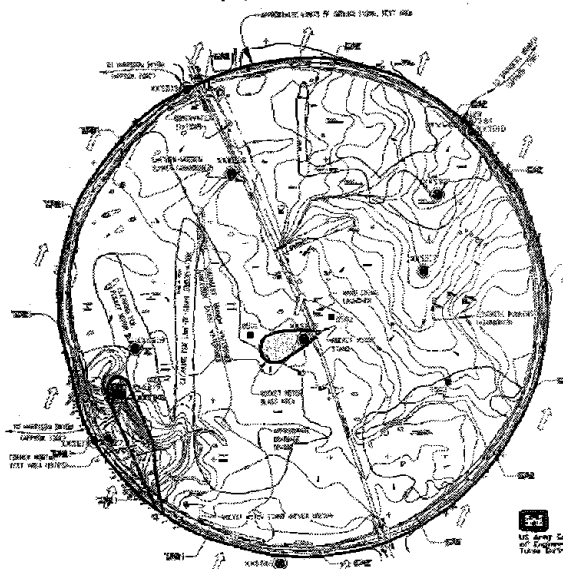
Site Profile: Ground Signal Test Area

Physical Profile

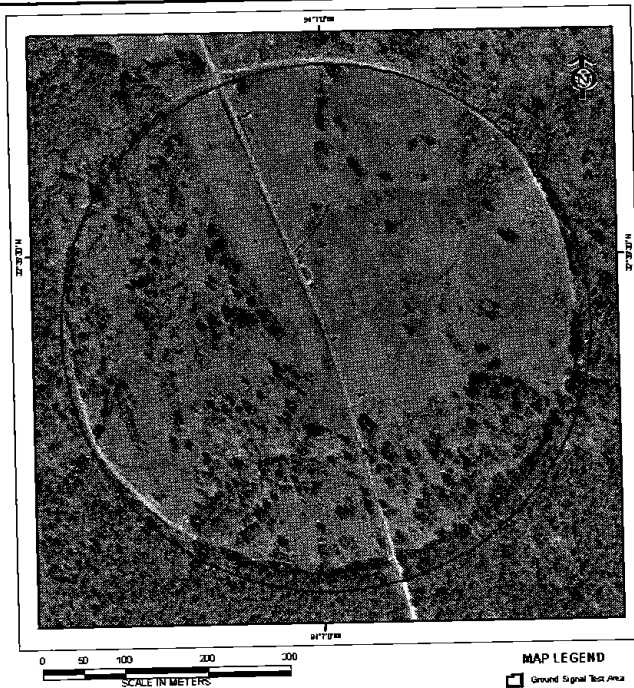
- The site is 2.0 to 2.0 miles from Caddo Lake (via Saunders Branch and Harrison Bayou).
- Groundwater averages about 15 feet bgs
- The regional groundwater flow direction is to the north-northeast towards Caddo Lake
- During periods of high precipitation the groundwater flow direction may divert to the northwest and Harrison Bayou.
- The soils consist of silty to clayey sands.

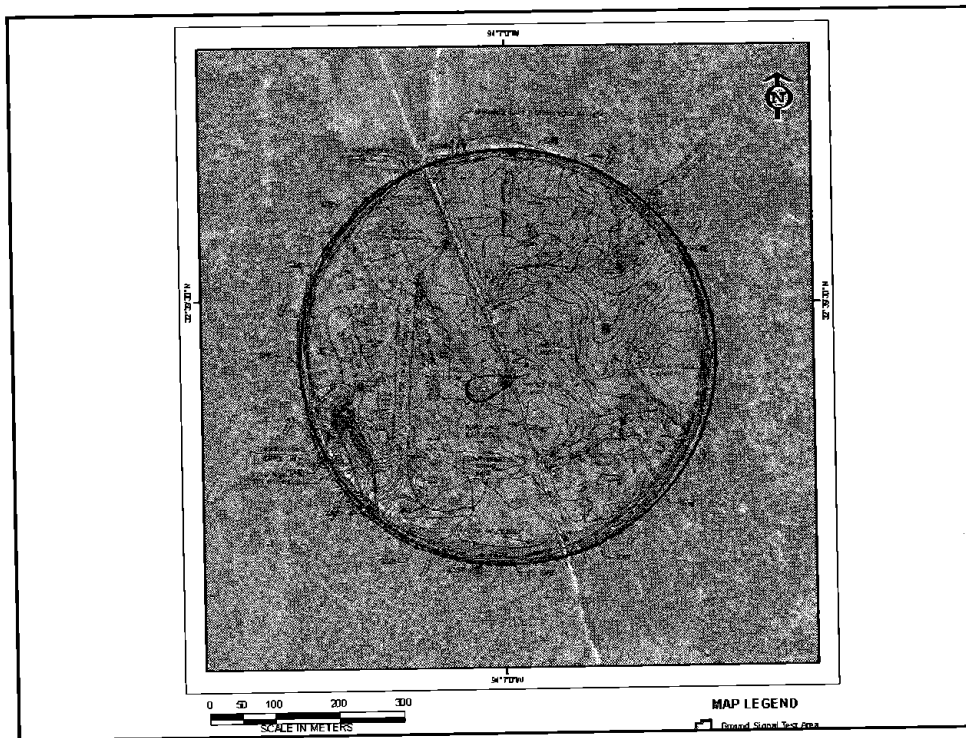


Ground Signal Test Area



Source: HRR-1994 Final Chemical Data Acquisition Plan Addendum for the Phase II Remedial Investigation Sites 11, 1, XX, 27 at LHAAP





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Site Profile: Ground Signal Test Area

Previous MEC Investigations

- According to the HRR, MEC associated with this site:
 - Red phosphorus smoke wedges
 - Infrared flares
 - Pyrotechnic signal devices
 - 60 mm illuminating mortars
 - 81 mm illuminating mortars
 - 4.2 inch illuminating mortars
 - Illuminating munitions ranging from 40 to 155 mm
 - **Leaking white phosphorus munitions**
 - XM40E5 Anti-intrusion Mines
 - Nike rocket motors
 - Sergeant rocket motors
 - Pershing missile rocket motors





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Site Profile: Ground Signal Test Area

Previous MEC Investigations

- No known previous investigations
- No certificates of ordnance clearance, decontamination or dedudding



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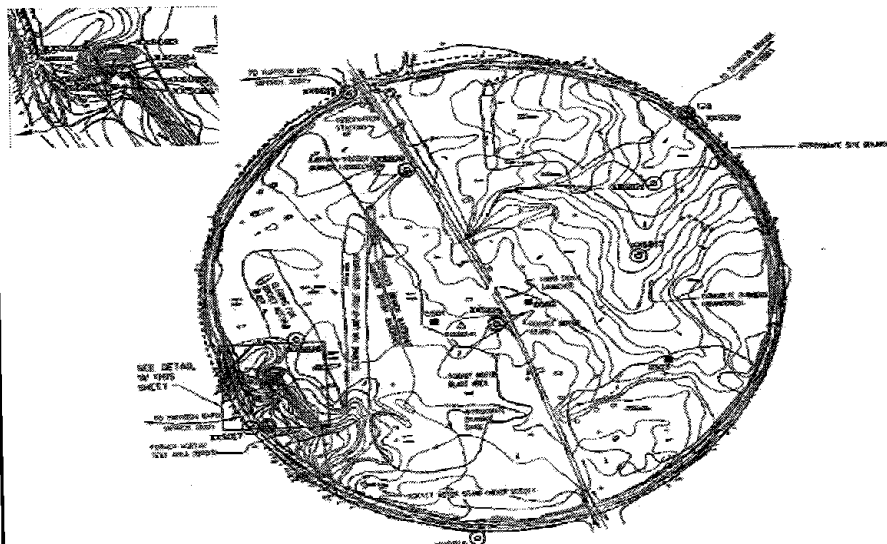
Site Profile: Ground Signal Test Area

Previous MC Investigations

- Sampling took place in 1982, 1993, 1994 and 1997
- Sediment, surface and subsurface soil and groundwater samples collected
- Analyzed for explosive compounds, anions, metals, VOCs, SVOCs, total organic halogens, total organic carbon, phenolics, acetone, pesticides, methylene chloride, and trichloroethene.



Ground Signal Test Area



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Site Profile:
Ground Signal Test Area

Previous MC Investigations (contd.)

- According to the Final RI Report for Group 1 Sites:
 - Limited occurrences of elevated metals concentrations in site soils were detected
 - The results of the laboratory analyses of all samples from previous investigations demonstrated no contamination by VOCs or SVOCs





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Site Profile: Ground Signal Test Area

Previous MC Investigations (contd.)

- **Final RI Report for Group 1 Sites conclusions:**

- Concluded metals detected in surface or subsurface were not excessively high
- Elevated concentrations did not indicate evidence of metals contamination in soils
- High concentrations of nickel and thallium detected in groundwater samples in 1982 were not confirmed in 1993 sampling event (results either below detection limits or at concentration order of magnitude lower)



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Site Profile: Ground Signal Test Area

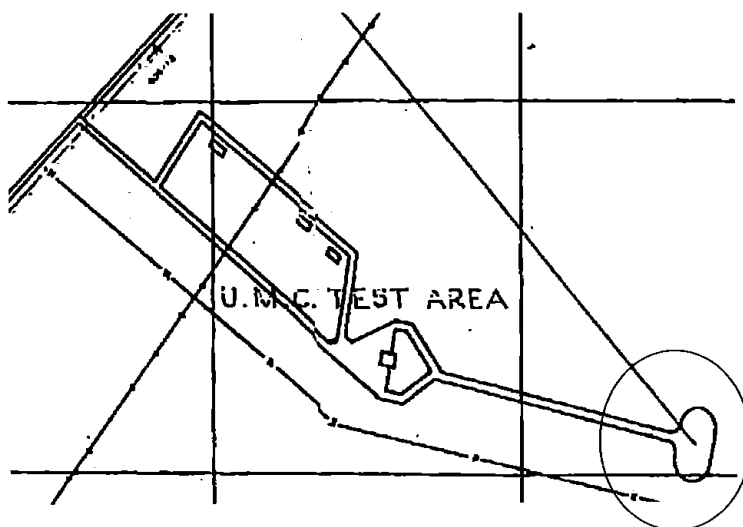
Previous MC Investigations (contd.)

- **Final RI Report for Group 1 Sites conclusions:**

- Explosives were not detected in any sample collected at this site from any sample medium
- RI concluded no evidence of groundwater contamination
- RI concluded no demonstrated contamination at the site and recommended No Further Action (NFA)
- NFA ROD for HTRW signed in 1998 (CERCLA)



South Test Area/Bomb Area



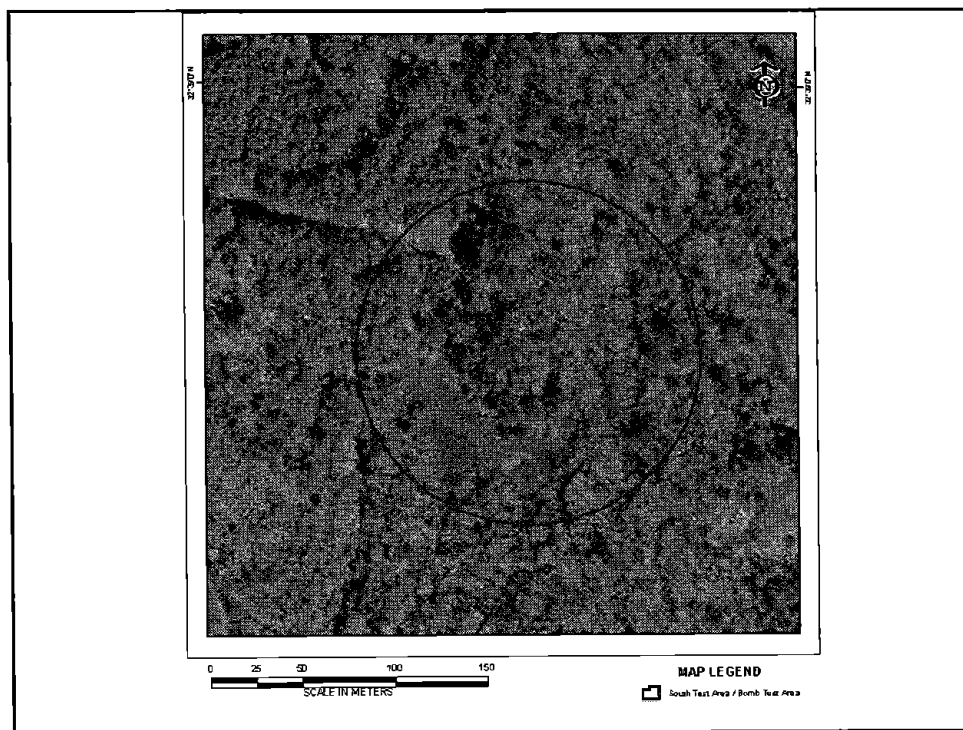
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Site Profile: South Test Area/Bomb Test Area

History

- Used from approximately 1954-1960's (however one report of activity in early 1980's)
- Testing M120A1 photoflash bombs, demilitarization of illuminating signal devices, button bombs, and photoflash cartridges within pits
- Reports state fragments from testing landed outside the installation boundary
- Disposal of leaking white phosphorus munitions





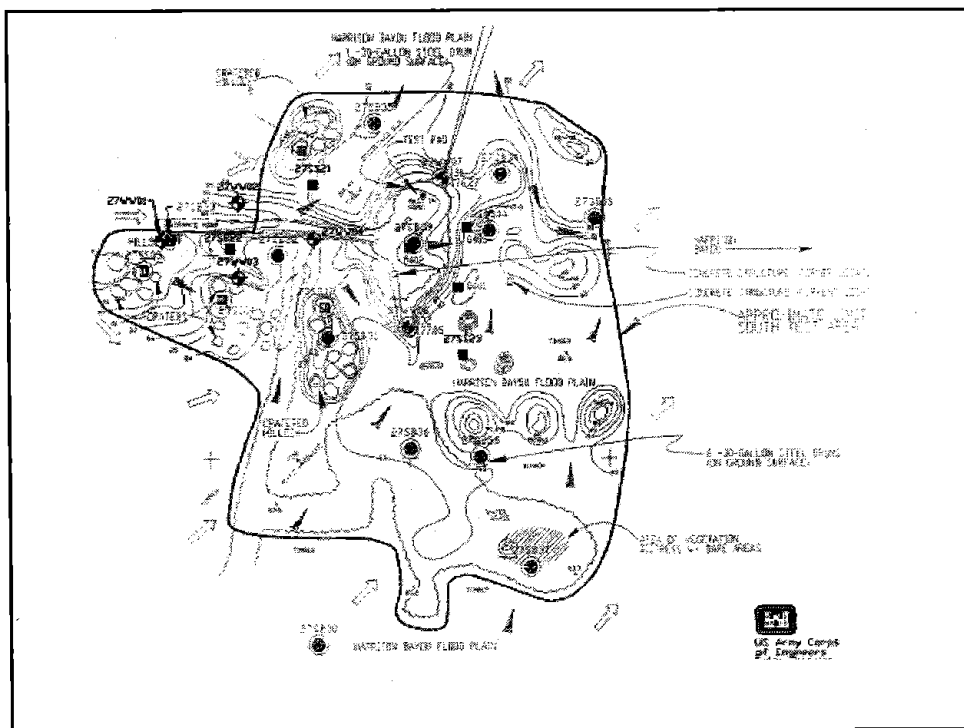
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Site Profile: South Test Area/Bomb Test Area

Physical Profile

- Consists of approximately 6.75 acres which includes an earthen test pad, concrete bunkers and an observation building
- 50 foot wide fire lane surrounds test pad
- Vegetation has encroached on many of the formerly cleared areas in vicinity of the test pad and alongside the access road.
- Test pad and access road are elevated up to six feet above the surrounding floodplain of Harrison Bayou. Cratered hillocks to the southwest and northwest of the test pad area.





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Site Profile: South Test Area/Bomb Area

Physical Profile (contd.)

- Surficial soils are silts to silty sands, with increasing sand content with depth
- Groundwater is approximately 7 to 9 feet bgs.
- The groundwater hydraulic gradient is expected to be towards the east (floodplain of Harrison Bayou).
- Surface water runoff is generally to the southeast and onto the floodplain.





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Site Profile: South Test Area

Previous MEC Investigations

- According to the HRR, MEC associated with this site:
 - M120A1 photoflash bombs
 - Pyrotechnic illuminating devices
 - XM 40E5 Anti-intrusion Mines
 - Photoflash cartridges (1/2 lb and 1 lb)
 - **Leaking white phosphorus munitions**



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Site Profile: South Test Area

Previous MEC Investigations

- No known previous investigations
- No certificates of ordnance clearance, decontamination or dedudding





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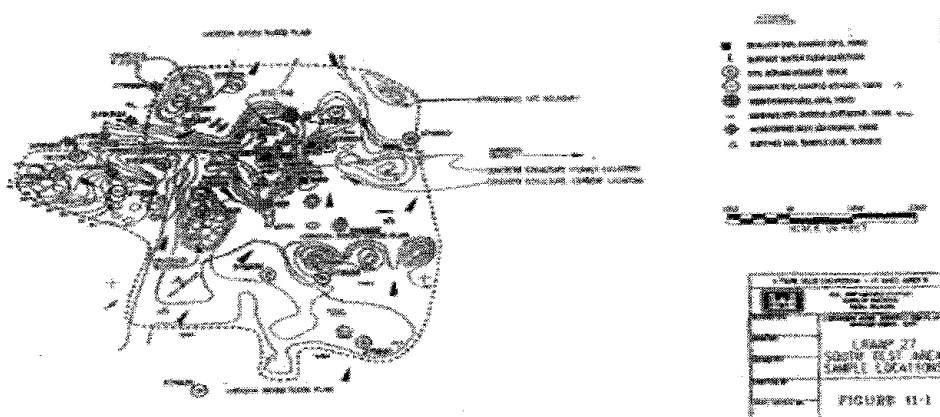
Site Profile: South Test Area/Bomb Test Area

Previous MC Investigations

- Sampling took place in 1982, 1993, and 1996
- Soil, sediment, surface water and groundwater samples have been collected
- Analyzed for explosive compounds, metals, anions, VOCs and SVOCs.



South Test Area/Bomb Area





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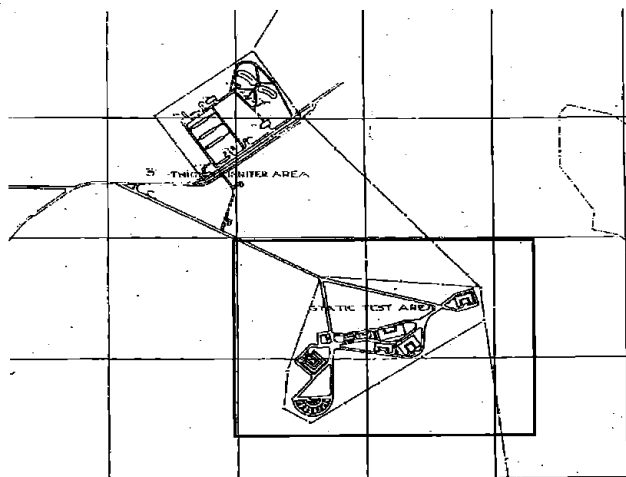
Site Profile: South Test Area/Bomb Test Area

Previous MC Investigations

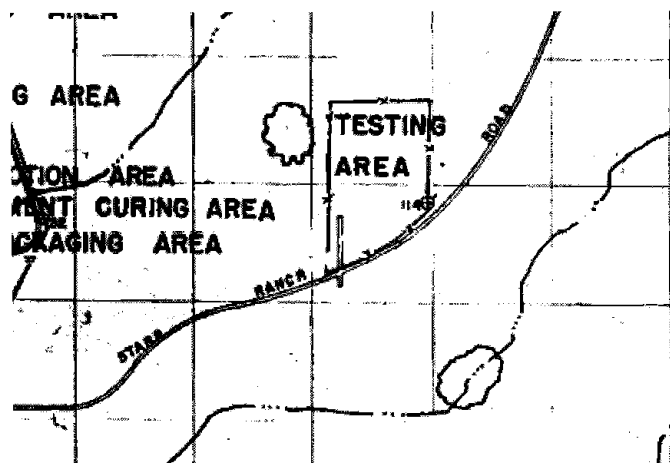
- The 1997 Final RI Report –Although explosive compounds were detected in one groundwater grab sample (27GG33) in 1993, explosives had not been detected in the any samples collected since then.
- Concluded that the presence of explosives was not confirmed
- Based on their conclusions the Final RI Report recommended NFA for Site 27.
- January 1998 NFA CERCLA ROD for HTRW was signed.



Static Test Area



Static Test Area



US Army Corps
of Engineers
Omaha District

Site Profile: Static Test Area

History

- Used from approximately 1953-1991
(however may have been active until 1991)
- Static test firing of rocket motors
- Red phosphorus smoke wedge testing
- Illuminating candle testing





US Army Corps
of Engineers
Omaha District

Site Profile: Static Test Area

Physical Profile

- Consists of approximately 26 acres
- Test tunnel and data acquisition system for flares
- Rocket motor test stands of earth and concrete
- Conditioning facilities for reproducing arctic and tropical temperatures



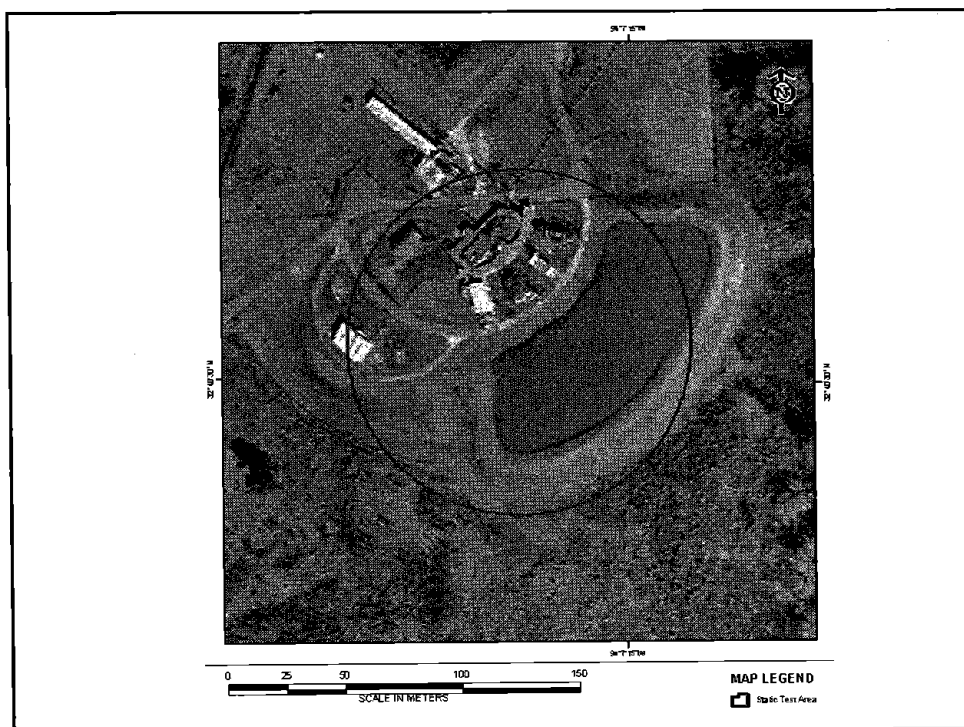
US Army Corps
of Engineers
Omaha District

Site Profile: Static Test Area

Physical Profile (contd.)

- Surficial soils are clays and silty clays to approximately 12 feet bgs
- The groundwater hydraulic gradient is expected to be towards the north
- Surface drainage flows towards Central Creek to the northwest and Harrison Bayou to the northeast





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of Engineers
Omaha District

Site Profile: Static Test Area

Previous MEC Investigations

- According to the HRR this area was an OB/OD type range that served as a test area for pyrotechnic munitions, test and demilitarization area for rocket motors and a demolition area.
- MEC associated with this site:
 - Illuminating candles
 - Red phosphorus smoke wedges
 - Nike rocket motors
 - Sergeant rocket motors
 - Pershing missile rocket motors
 - XM-10 Lacrosse rocket motors
 - M7A1 JATO rocket motors





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Omaha District

Site Profile: Static Test Area

Previous MEC Investigations (cont.)

- No known previous investigations
- No certificates of ordnance clearance, decontamination or dedudding



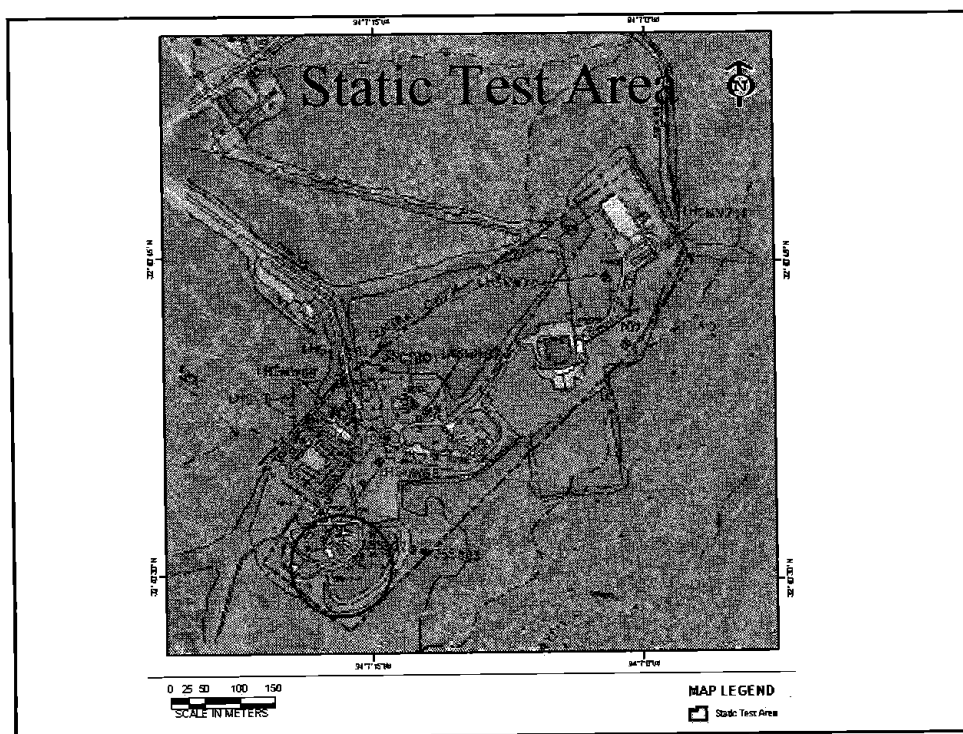
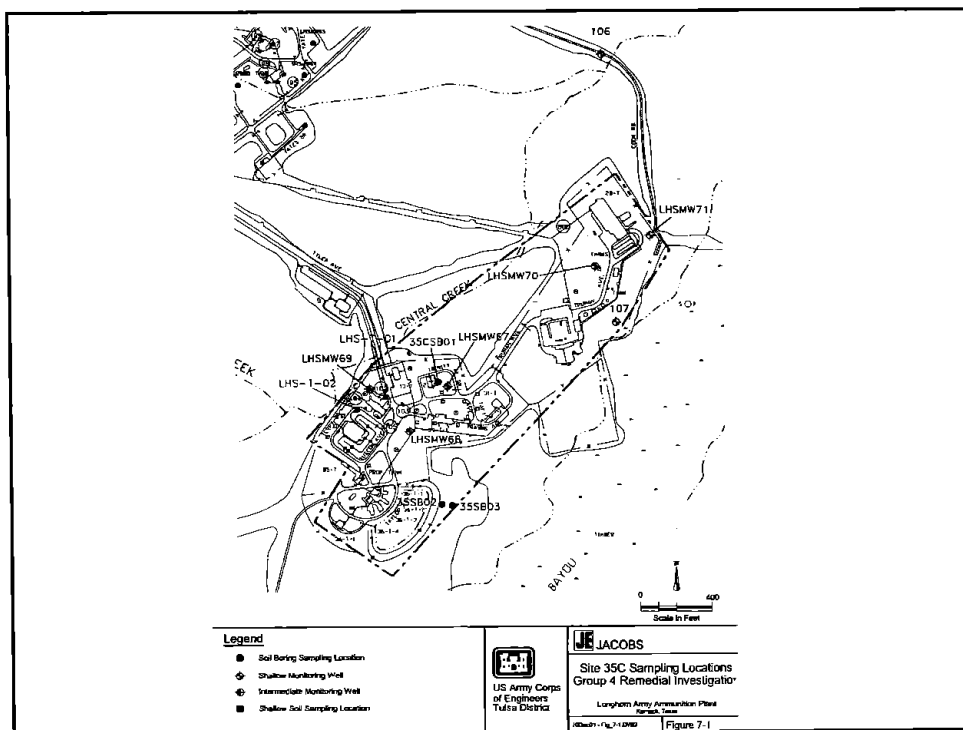
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of Engineers
Omaha District

Site Profile: Static Test Area

Previous MC Investigations

- Many site investigations have occurred since 1982
- 32 soil samples and 19 groundwater samples have been collected from numerous locations and analyzed for VOCs, SVOCs, explosive compounds and metals since 1982







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Site Profile: Static Test Area

Previous MC Investigations

- Perchlorate was detected at a concentration of 60.9 ug/kg in the surface soil sample from location 35CSB03.
- Perchlorate was detected in one groundwater sample at 2.8 ug/l.
- Explosive compounds detected in monitoring well LHSMW71 in 1996, but not in 1998.



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Omaha District

Site Profile: Static Test Area

Previous MC Investigations (cont.)

- Nine metals detected in surface soil samples at concentrations that exceeded the LHAAP background
- Ten metals detected in subsurface soil samples at concentrations that exceeded the LHAAP
- Twelve metals were detected in the groundwater monitoring wells at concentrations that exceed background
- Other COPCs also detected in groundwater





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Omaha District

Site Profile: Static Test Area

Previous MC Investigations (cont.)

- RI report concluded that the organic concentrations in the groundwater were very low, generally below levels of concern
- Report indicated that the metal of most interest in the groundwater is chromium
- The soil in the area of the well does not appear to be the source of chromium contamination.
- Concluded that because chromium levels have increased over time, a source may exist that has not yet been found.
- There is a Risk Assessment ongoing for Group 4 Sites.



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Omaha District

Conceptual Site Model (CSM)

- The CSM describes the MR site and the associated environmental setting. The previous sections described historical information, previous investigations and the physical profile of the each of the MR sites at LHAAP. The following sections discuss the analysis of this data and develop release profiles, land use/exposure profiles and ecological profiles; which are key components of the CSM.





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Omaha District

CSM: Pathway Analysis

- Analysis of the profile information should allow identification of all potential exposure pathways for the MR sites.
- An exposure pathway is the route a physical or chemical agent is carried to contact a receptor.
- For MEC, an exposure pathway must include a source, access, activity, and a receptor.
- For MC, an exposure pathway must include a source, an exposure medium, an exposure route, and a receptor.
- MC is derived from MEC and may be transported or leach into other mediums, such as from soil to groundwater.
- The MC pathway may also include a release mechanism such as volatilization, and transport medium such as air, if the point of exposure is not at the same location as the source.



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CSM: MEC and MC Sources

- Ground Signal Test Area – Possible source areas for MEC and MC are expected to be surface and subsurface soils. Exposure media for MC include surface and subsurface soils and groundwater.
- South Test Area – Possible sources areas for this site for MEC and MC are expected to be surface and subsurface soils. Exposure media for MC include surface and subsurface soils and groundwater.
- Static Test Area – Possible sources areas for this site for MEC and MC are expected to be surface and subsurface soils. Exposure media for MC include surface and subsurface soils and groundwater.





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Data Gaps

- Ground Signal Test Area
 - o MC sampling for white phosphorus has not been conducted
 - o Documented MEC investigations have not been conducted
- South Test Area/Bomb Test Area
 - o MC sampling for white phosphorus has not been conducted
 - o Documented MEC investigations have not been conducted
- Static Test Area
 - o Perchlorate has not been adequately characterized
 - o Documented MEC investigations have not been conducted



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Recommendations

- Ground Signal Test Area
 - Conduct an MEC investigation (geophysical survey and site walk) to determine if MEC is present.
 - If MEC is encountered, collect soil samples in area and recommend further investigation for MEC and possible localized MC contamination via RI.
 - Conduct soil sampling for white phosphorus in suspected disposal areas. If soil contamination is detected, recommend further investigation for soil and groundwater media.



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Recommendations

- South Test Area/Bomb Test Area
 - Conduct an MEC investigation (geophysical survey and site walk) to determine if MEC is present.
 - If MEC is encountered, collect soil samples in area and recommend further investigation for MEC and possible localized MC contamination via RI.
 - Conduct soil sampling for white phosphorus in suspected disposal areas. If soil contamination is detected, recommend further investigation for soil and groundwater media.



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Recommendations

- Static Test Area
 - Conduct an MEC investigation (geophysical survey and site walk) to determine if MEC is present.
 - If MEC is encountered, collect soil samples in area and recommend further investigation for MEC and possible localized MC contamination via RI.
 - Recommend further investigation to determine the extent of perchlorate contamination in soil and groundwater by initiation of a RI





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MMRP SI Implementation

Next Steps

Action items

- Incorporate comments on CSM
- Determine Data Quality Objectives
- Submit Draft Work Plan
- Schedule geophysical and field sampling



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MMRP SI Implementation

Next Steps: Today

Action items

- Determine what data needs to be collected in order to achieve NFA for MMRP sites
 - Discussion
 - Agreement





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MMRP SI Implementation

Next Steps: After Today

Action items

- Incorporate agreement into Draft Work Plan
- Distribute to stakeholders for agreement
- Start field work



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MMRP SI Project Schedule

- ✓ Kick off meeting – 3 March 2004
- ✓ Records Search – 26 April 2004
- ✓ Draft CSM – 20 August 2004
- ✓ Historic Records Report – 24 August 2004 (Interim Final)
- ✓ TPP 2 – 15 September 2004
- ✓ Final HRR – 27 September 2004
- Draft SI Work Plan – 30 Oct 2004
- Final SI Work Plan – 15 Dec 2004
- SI Field Work – Complete Jan 2005
- TPP 3 – 20 March 2005
- Draft SI Report – 19 May 2005
- Final SI Report – 16 Sept 2005



LHAAP

IPP-2 Meeting
~~15 September~~
~~15 August~~ 2004
 Sign-in Sheet

Name	Organization	Contact Information
Craig Vrabel	e2m	303.721.9219 cvrabel@e2m.net
Margaret Mathew	e2m	757.643.7886 mclark@e2m.net
Glen Turney	e2m	210.348.6000 gturney@e2m.net
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Jeff Armstrong	USAEC	410-436-1510 jeffrey.armstrong@us.army.mil
Rose M. Zeiler	LHAAP-BRAC	479-984-2516 rose.zeiler@monroe.army.mil
James Sher	TCEQ	512-239-2444 jsheer@TCEQ.state.tx.us
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Praveen Sivastar	Shaw	281-368-4588 praveen.sivastar@shawgroup.com
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CEAIG GIGGLEMAN	USFWS	817/277-1100; craig-giggelman@fws.gov
Barry Forsythe	USFWS	214-665-8467; forsythe.barry@epa.gov



DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
BOX 3, BUILDING 1440
FORT CHAFFEE, ARKANSAS 72905

034784

REPLY TO
ATTENTION OF
DAIM-BD-H-LO

October 20, 2004

Distribution (one copy each):

Jack W. Andres
4400 Sherman Drive
Marshall, TX 75672

Anne Dennis
44 Cherrywood Circle
Marshall, TX 75672

Paul Fortune
1037 Old Port Caddo Rd.
Karnack, TX 75661

Allen D. George
649 Stephens Rd.
Hallsville, TX 75650

Jack M. Sanders, D.V.M.
Mary Jane Sanders
2305 Karnack Hwy.
Marshall, TX 75672

Larry McCathram
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Marshall, TX 75672

Donna Selman
157 Moore St.
Karnack, TX 75661

Nigel R. Shivers
Shirley Shivers
Post Office Box 558
Karnack, TX 75661

Tom Walker
500 Private Rd 7222
Jefferson, TX 75657

Re: Longhorn Army Ammunition Plant
Public Meeting, ECOP II, Transfer
Of Acreage to US Fish and Wildlife

A public meeting will be held regarding the transfer of Longhorn acreage to U.S. Fish and Wildlife Service on November 4 at 6:30 pm in the Karnack Community Center.
Please spread the word.

Thank you.

Sincerely,

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

Enclosure

Cc: Mr. Chris Villarreal, USEPA Region 6

Mr. James Sher, TCEQ, Austin

Mr. Paul Bruckwicki, USFWS, CLNWR

Mr. Richard P. Smith, P.E., USACE, Tulsa

PUBLIC NOTICE

U.S. ARMY TRANSFER OF 126 ACRES TO U. S. FISH AND WILDLIFE SERVICE

**Public Information Forum
November 4, 2004**

The United States Army will host a public information forum during the ongoing public comment period to answer questions associated with the Environmental Condition of Property (ECOP) II document developed for the transfer of approximately 125 acres of land located on Longhorn Army Ammunition Plant. The property will be transferred to the U.S. Fish and Wildlife Service for incorporation into the Caddo Lake National Wildlife Refuge. The ECOP II describes the environmental condition of the property to be transferred. The public comment period began October 7 and concludes November 8, 2004. Copies of the ECOP II and supporting documentation are available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670, and the guard post at the front gate of Longhorn Army Ammunition Plant (Monday-Thursday).

The public information forum will be held on Thursday, November 4, 2004 from 6:30 -7:30 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661. The meeting will be an open house format with no set or formal presentations. Interested parties are invited to attend. For further information, contact: Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 170, Karnack, Texas, 75661 or e-mail to rose.zeiler@MONROE.ARMY.MIL.

LONGHORN ARMY AMMUNITION PLANT,**Karnack, Texas*****MANAGERS' MEETING*****AGENDA**

DATE: Tuesday, 26 October 2004
TIME: 9:00 a.m.
LOCATION: Building "D" Room 200-33, at TCEQ Austin Campus

09:00	WELCOME	RMZ
09:05	Transfer Status and Discussion - ECOP II – Perchlorate Area - West Further Investigation Area - East Further Investigation Area - ACLs and Groundwater Plumes - Production Area EBS/ESA - Warehouse Evaluation - Demolition	RMZ
9:45	PBC Status – AAR, PWS	AEC
10:00	Environmental Sites Update	Shaw
10:30	Environmental Sites Documents Review Schedule Concerns - Help	Tulsa
11:00	Ecological Risk Assessment	Tulsa/Shaw
11:20	RAB Update	RMZ
11:30	MMRP Sites	
11:45	Adjourn	

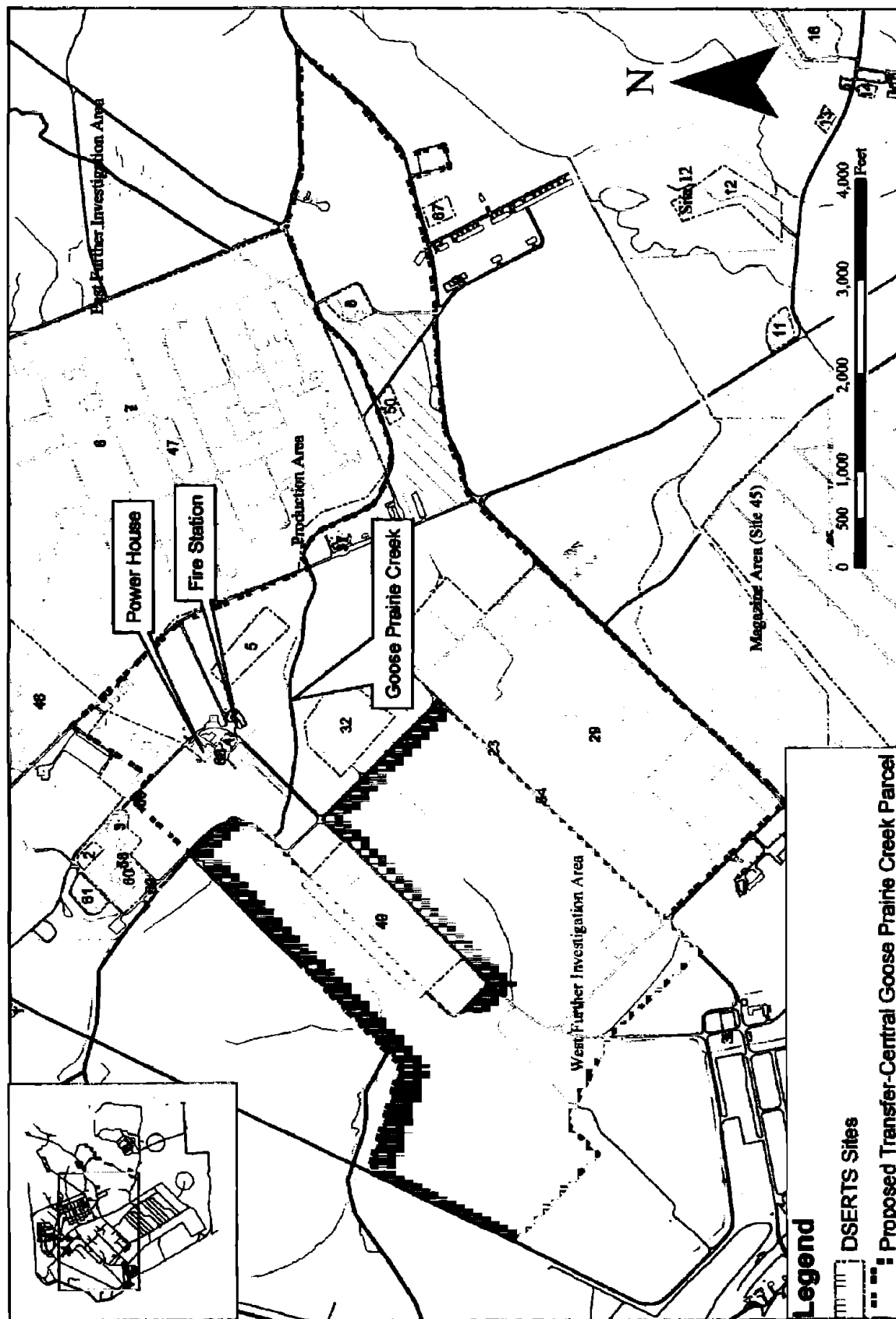
**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
October 26, 2004**

No.	Documents In Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
Documents Prepared by Shaw						
1	Final Feasibility Study, Site-12	On hold			On hold Revised ecological screening appendix in review with regulators.	Comments received from EPA on 5/14/04 and from TCEQ on 5/27/04 on the draft final. Document has been modified but the Final version has not been submitted due to pending ecological issues. Revised ecological screening appendix was submitted on 10/8/04
2	Draft Modeling Report	10/18/04			Submitted	In review with the Army
3	LHAAP-32 Revised Draft Final Feasibility Study Report	On hold			On hold	Document submittal to regulators is on hold until soil and groundwater sampling is performed. Results are in and being analyzed.
4	Draft Final Proposed Plan, LHAAP-12	7/30/04	9/14/04		Submitted	In review with regulators.
5	Draft Final Feasibility Study, LHAAP-67	8/06/04	9/5/04		Submitted	In review with regulators.
6	Draft Final Step 3 Results Report Installation-wide Baseline Ecological Risk Assessment	11/12/04			In preparation	
7	Final Evaluation of LHAAP-45 Analytical Data	9/28/04			Submitted	

Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
October 26, 2004

034789

No.	Documents In Progress	Submittal Date	Comments Due/Received from USACE/Regulators	Comment Resolution	Status	Remarks
8	Final Addendum I (Sampling at LHAAP-32 and LHAAP-50) and 2 (SW/SD Data Gaps Sampling)	10/1/04			Submitted.	
9	Draft Evaluation of Warehouse Area Analytical Data	8/19/04	10/19/04	Complete	Draft Final in preparation	
10	Draft Final Evaluation of Warehouse Area Analytical Data	11/8/04			In preparation	
11	Draft Background Surface Water and Sediment Report	9/17/04	10/20/04	Complete	Draft Final in preparation	
12	Draft Final Background Surface Water and Sediment Report	12/13/04			In preparation	
13	Draft Background Groundwater Study Report	11/30/04			In preparation	
14	Draft Feasibility Study Report, LHAAP-35B(37)	12/3/04			In preparation	
15	Draft Data Gaps Investigation Report	12/01/04			In preparation	
Other Documents						
1	Draft Environmental Condition of Property II	7/29/04			Submitted	In review with regulators. Public comment period is 10/7/04 to 11/8/04
2	Draft Evaluation of WFIA Analytical Data	7/29/04	EPA: 9/7/04	In progress	EPA comments received	



LONGHORN ARMY AMMUNITION PLANT
Proposed Transfer - Central Goose Prairie Creek Parcel

Date: October 26, 2004

[illegible]



Subject: Draft Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)

Location of Meeting: TCEQ Office, Austin, Texas

Date of Meeting: October 26, 2004, 9:00 AM – 1:00 PM

Meeting Participants:

BRAC:	Rose M. Zeiler (RMZ)
AEC:	Jeff Armstrong (JA), on phone
USACE-Tulsa:	Cliff Murray (CM)
Shaw Environmental:	Praveen Srivastav (PS)
USEPA Region 6:	Chris Villarreal (CV)
TCEQ:	James Sher (JS), Kristy Mauricio (KM), Vickie Reat (VR)
USFWS:	Paul Bruckwicki (PB)

BRAC – Base Realignment and Closure; AEC – Army Environmental Center; USACE – U.S. Army Corps of Engineers; USEPA – U.S. Environmental Protection Agency; TCEQ – Texas Commission on Environmental Quality; USFWS – U.S. Fish and Wildlife Service.

Welcome and Introductions-RMZ

The following handouts were distributed before and during the meeting:

- Meeting Agenda
- Document Status Table
- Quarterly perimeter well sampling results

Transfer Update

- RMZ indicated that ECOP II for transfer of the former perchlorate area is currently in review and a public meeting is scheduled for November 4 at Karnack Community Center
- EPA comments on the WFIA have been received and will be addressed with additional soil sampling
- The ACL modeling has been completed and shows that the plumes at any of the modeled sites would not impact the surface water in creeks. A report will soon be submitted by Shaw.

- The EBS/ESA report by Plexus has been submitted and is in review with the regulators
- The warehouse area evaluation report is in review with the regulators

Performance Based Contracting Update

- JA explained that the AEC is moving ahead with an FY05 second or third quarter PBC award.
- AEC is assuming a fence to fence award. If necessary, some of the sites may be excluded later.
- RMZ enquired about the status of funding request for LHAAP-29 and LHAAP-49. JA indicated that the funding request was approved and the USACE will be receiving the funds as soon as they are available at AEC.

RAB Update

- RMZ informed that there is enough interest for the establishment of a RAB. The Army will be proceeding with forming a RAB.

Environmental Program Update

- CM presented the results of September 04 quarterly perimeter well sampling. A discussion ensued on the detection of low levels of perchlorate in wells 133 and 134.
- JS indicated that TCEQ will sample these wells independently of the Army to confirm the detection
- PS provided a status of documents in preparation, those submitted for the Army review and those in regulatory review. The status is summarized in the Document Status Table distributed during the meeting.
- RMZ enquired if the Army could help in anyway by providing resources for the review of documents. It was decided that RMZ would work with CV in identifying the document review load for the next year or more, and look into the possibility of providing funding so that EPA staff currently dedicated to BRAC program can review LHAAP documents.
- VR stated that she would provide comments on the LHAAP-12 SLERA by November 18
- PS requested that the EPA and TCEQ forward their comments on the LHAAP-12 Proposed Plan. This would enable Shaw to submit the Final Proposed Plan as soon as the SLERA is approved and the Final FS is submitted.
- RMZ informed that Shaw is completing the preparation of the Installation-wide Step 3 ERA report and the Army is conducting an on-board review of the document on November 2-3. She briefly outlined the risk management approach being contemplated by the Army beyond Step 3.
- RMZ informed that the Army may proceed with removal actions at two MMRP sites, LHAAP-27 and LHAAP-54.

Meeting was adjourned at 1:00 PM.

Action Items

- Shaw and RMZ to provide a document review schedule to EPA and TCEQ

- RMZ to look into funding EPA BRAC staff for Longhorn
- EPA and TCEQ to provide comments on the LHAAP-12 Proposed Plan
- TCEQ to provide comments on the LHAAP-12 SLERA

FINAL
**ENVIRONMENTAL CONDITION OF PROPERTY II
(ECOP II)**



**LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS**

NOVEMBER 2004

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Figure 2	Location of Perchlorate Area and Environmental Sites

List of Attachments _____

Attachment 1	References
Attachment 2	Environmental Protection Provisions

Acronyms and Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLNWR	Caddo Lake National Wildlife Refuge
DOD	Department of Defense
DOI	Department of the Interior
EA	environmental assessment
EBS	environmental baseline survey
ECOP	Environmental Condition of Property
FFA	Federal Facility Agreement
LHAAP	Longhorn Army Ammunition Plant
MEC	munitions and explosives of concern
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
OE	ordnance and explosives
PCB	polychlorinated biphenyl
ppm	parts per million
TCEQ	Texas Commission on Environmental Quality
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

FINAL ENVIRONMENTAL CONDITION OF PROPERTY II (ECOP II)

**Longhorn Army Ammunition Plant, Karnack, Texas
November 2004**

1.0 Purpose

The purpose of this Environmental Condition of Property (ECOP) is to document the environmental condition of approximately 125 acres of land within the southern portion of the former Longhorn Army Ammunition Plant (herein after referred to as the Property). The Property will be transferred from Department of the Army control to another federal agency, the Department of the Interior (DOI), U.S. Fish and Wildlife Service (USFWS), consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §120(h), Army, and USFWS policy. Documents reviewed to support this ECOP are included in **Attachment 1**. In addition, the ECOP identifies provisions necessary to protect human health or the environment as specified in the attached Environmental Protection Provisions (**Attachment 2**).

2.0 Property Description

Longhorn Army Ammunition Plant (LHAAP) is located in central-east Texas in the northeastern corner of Harrison County, between State Highway 43 at Karnack, Texas and the western shore of Caddo Lake (**Figure 1**). The Property proposed for transfer consists of approximately 125 acres of land referred to as the Perchlorate Area as shown on **Figure 2**. This area is not considered an environmental site.

The U.S. Fish and Wildlife Service collected surface soil samples at LHAAP as part of a site-wide evaluation of the Caddo Lake National Wildlife Refuge Overlay Area. Sampling was conducted during March to April 2002 and April to May 2003. The surface soils were analyzed for metals, semivolatile organic compounds, organochlorine pesticides, polychlorinated biphenyls, dioxins/furans, and perchlorate. Based on the USFWS evaluation of analytical results, the USFWS requested that the Army perform further investigation of several areas and referred to these areas as Perchlorate Area, West Further Investigation Area, and East Further Investigation Area. This ECOP only addresses the Perchlorate Area. The Perchlorate Area is a 125-acre tract of land. Perchlorate was detected in two adjacent surface soil samples collected by USFWS. Perchlorate was detected in one sample during the 2002 sampling event; the second

perchlorate detection was reported at an adjacent location during 2003. Confirmation sampling to define the extent of perchlorate at these locations was performed jointly by the U.S. Army Corps of Engineers (USACE) and the USFWS during February 2004. Perchlorate delineation sampling summary, results, and a recommendation for no further environmental investigation are documented in a June 16, 2004 Department of Army Memorandum to EPA Region 6 and TCEQ. The presence of perchlorate contamination was not confirmed since perchlorate was not detected in any of samples obtained during February 2004. Also, the area investigated is remote to plant operations where perchlorate was utilized and the presence of perchlorate in soils would be unlikely.

3.0 Environmental Condition of the Property

A determination of the environmental condition of the property was made based on the review of existing environmental documents, aerial photographs, evaluation of analytical data from sampling performed in 2004, completion of the associated physical and visual inspection of the area and the properties immediately adjacent to the Property. Although this area is not considered an environmental site, this ECOP has been prepared to facilitate property transfer. Documents reviewed are listed in **Attachment 1**.

3.1 Environmental Condition of Property Categories

A summary of the Department of Defense (DOD) Environmental Condition of Property (ECOP) Categories is presented in Table I. The Property proposed for transfer is assigned as Category 1. This Community Environmental Response Facilitation Act (CERFA) category includes areas where no release or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas). The location of environmental sites at the former LHAAP in relation to the Perchlorate Area are shown on **Figure 2**.

3.2 Storage, Release, or Disposal of Petroleum Products

3.2.1 Storage, Release, or Disposal of Petroleum (not in underground storage tanks or above-ground storage tanks)

There is no evidence that any petroleum or petroleum products in excess of 55 gallons at one time were stored, released, or disposed on the Property.

3.2.2 Underground and Above-Ground Storage Tanks

Based on a review of documents, there is no evidence that petroleum or petroleum products were stored in underground storage tanks or aboveground storage tanks on the Property.

3.3 Polychlorinated Biphenyls

Between May 1995 and March 1996 transformers within the LHAAP were tested for polychlorinated biphenyl (PCB) contents. All transformers containing PCBs above the action level of 50 ppm were removed from LHAAP. Based on a review of existing records and available information, there are currently no PCB-contaminated transformers located on the Property and no evidence of releases from PCB equipment.

3.4 Asbestos

There are no existing buildings on the Property and therefore no potential for asbestos containing materials.

3.5 Lead-Based Paint

There are no existing buildings on the Property and therefore no potential for lead-based paint.

3.6 Radiological Materials

Based on a review of existing records and available information, there is no evidence that the U.S. Army generated, stored or disposed of radioactive materials or sources on the Property.

3.7 Radon

There are no existing buildings on the Property and therefore no potential for radon.

3.8 Munitions and Explosives of Concern

Munitions and Explosives of Concern (MEC), which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: (A) unexploded ordnance as defined in 10 U.S. Code 2710(e)(9); (B) discarded military munitions as defined in 10 U.S.C. 2710(e)(2); or (C) explosive munitions constituents (e.g., trinitrotoluene, cyclotrimethylene-trinitramine) present in high enough concentrations to pose an explosive hazard. Based on a review of existing records and available information, the Property is not known or suspected to contain ordnance and explosives (OE) (Engineering Environmental Management, 2002). However, MEC may be present on nearby property (LHAAP-27) (**Figure 2**). The Letter of Transfer will contain the notice for the potential presence of MEC provided in the Environmental Protection Provisions (**Attachment 2**).

3.9 Adjacent Hazardous Conditions

There are no environmental sites adjacent to the property.

4.0 Remediation

This area is not considered an environmental site and no remediation is necessary. The Longhorn Army Ammunitions Plant Federal Facilities Agreement (FFA), effective as of December 30, 1991, by and between the Longhorn Army Ammunition Plant, the Texas Water Commission (currently known as the Texas Commission on Environmental Quality), and the United States Environmental Protection Agency applies to the Property. Currently, there are no environmental remediation orders applicable to the Property. The Army reserves the right to conduct remediation activities.

5.0 Potential Wetlands

There are several areas at LHAAP that might be considered wetlands; however no official survey has been conducted. These are primarily low lying/floodplain areas associated with Goose Prairie Creek, Central Creek, Harrison Bayou and Saunders Branch. The streams, lakes and potential wetlands within the Property are shown on Figure 2.

6.0 Endangered or Threatened Species

No federal endangered or threatened species have been confirmed on the property proposed for transfer. However, LHAAP contains habitat identified as suitable for five (5) federal and/or state threatened species (CLI, 1995). Of the five (5) animal species that could potentially be present, information received from USFWS (January 2003) and Texas Department of Parks and Wildlife (February 2003) identified the species known or suspected to occur in the vicinity of LHAAP as summarized in **Table 2**.

7.0 Archaeological Properties

The Property proposed for transfer contains one known archaeological site 41HS752 that is potentially eligible for inclusion in the National Register of Historic Places (NRHP). All of the Perchlorate Area was surveyed for archeological properties as shown in the Archeological Survey 319 Hectares at the Longhorn Army Ammunition Plant (Gadus et. al, 1998). The USFWS will honor its responsibilities under the National Historic Preservation Act and will coordinate all activities in furtherance of its responsibilities with the Texas State Historic Preservation Office; appropriate federally recognized tribes, and other interested parties. The letter of transfer will include the archaeological properties covenant and notice provided in the Environmental Protection Provisions (**Attachment 2**).

8.0 Regulatory/Public Coordination

The USEPA Region 6, Texas Commission on Environmental Quality (TCEQ), U.S. Fish and Wildlife Service, and the public were provided copies of this ECOP. Additionally, Caddo Lake Institute was provided a courtesy copy. Public notice of the 30-day public comment period and the availability of the ECOP was published in the Shreveport Times newspaper on October 7, 2004 and the Marshall News Messenger newspaper on October 8, 2004. The comment period was between October 7, 2004 and November 8, 2004. Notice of the November 4, 2004 public information forum was published in both newspapers on October 24, 2004. The public information forum was held on November 4, 2004 from 6:30 to 7:30 p.m. at the Karnack Community Center.

The USEPA Region 6 provided concurrence with this ECOP and is documented in a letter dated October 25, 2004. Although TCEQ reviewed the document for informational purposes, they did not provide comments since the transfer property will remain under the control of the U.S. Government. All public comments received during the comment period were reviewed and incorporated into the Final ECOP where appropriate.

9.0 National Environmental Policy Act

The environmental impacts associated with the proposed transfer of the Property have been analyzed in accordance with the National Environmental Policy Act (NEPA). The results of this analysis have been documented in the Record of Environmental Consideration (U.S. Army, November 2004) which is in part supported by a Final Environmental Assessment (EA) for establishment of the Caddo Lake National Wildlife Refuge, prepared by the U.S. Fish and Wildlife Service on September 22, 2000.

10.0 Environmental Protection Provisions

On the basis of the above results from the EBS and other environmental studies and in consideration of the intended use of the Property, certain terms and conditions are required for the proposed transfer. These terms and conditions will be set forth in the Environmental Protection Provisions (**Attachment 2**) and will be included in the Letter of Transfer.

11.0 Conclusion

Based on the above, the Property is determined to be suitable for transfer to the USFWS. The U.S. Army remains responsible for the completion of the environmental program at LHAAP as provided in the Federal Facility Agreement.



Thomas E. Lederle
Director, Hampton Field Office
Army Base Realignment and Closure

23 Nov 2004
Date

Tables

Table 1
Community Environmental Response Facilitation Act Categories and Codes
Longhorn Army Ammunition Plant, Karnack, Texas

Category	Description
Category 1	Areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas)
Category 2	Areas where only release or disposal of petroleum products has occurred
Category 3	Areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response
Category 4	Areas where release, disposal, and or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken
Category 5	Areas where release, disposal, and or migration of hazardous substance has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
Category 6	Areas where release, disposal, and or migration of hazardous substance has occurred, but required actions have not yet been implemented
Category 7	Areas that are not evaluated or require additional evaluation

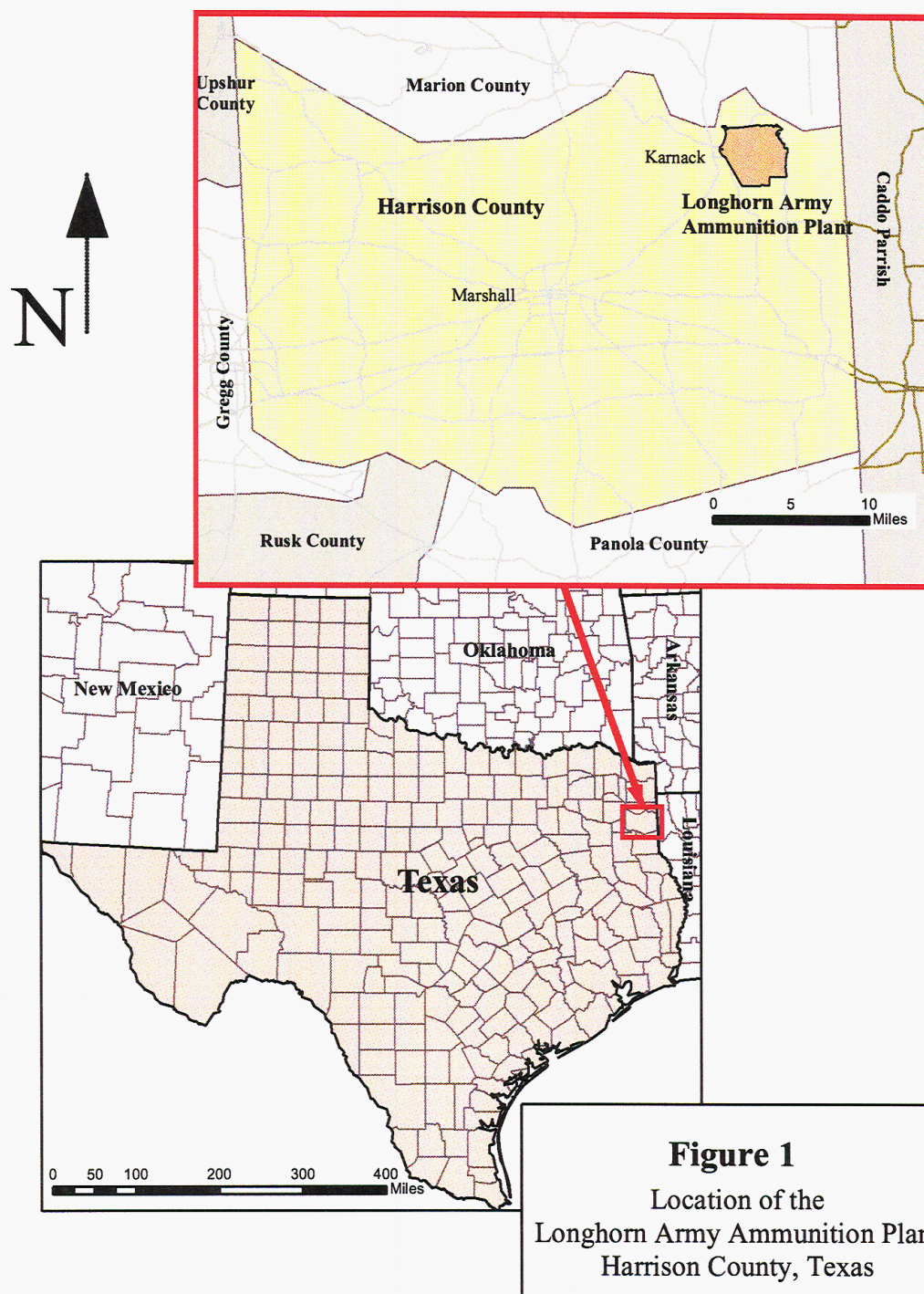
Table 2
Federal and State Listing of Threatened Species and State Species of Concern
In the Vicinity of Longhorn Army Ammunition Plant, Karnack, Texas

FEDERAL LISTED THREATENED SPECIES
Bald Eagle
Louisiana Black Bear
STATE LISTED THREATENED SPECIES
Louisiana Black Bear
Alligator Snapping Turtle
Bluehead Shiner
STATE SPECIES OF CONCERN
Southern Lady's Slipper
STATE SPECIAL FEATURE/NATURAL COMMUNITIES/MANAGED AREAS
Colonial Waterbird Rookeries
Bald Cypress-Water Tupelo Series
Shortleaf Pine-Oak Series
Water Oak-Willow Oak Series
Caddo Lake State Park

Notes:

Source: Caddo Lake Institute, 1995, Initial Species Inventory for Longhorn Army Ammunition Plant, Karnack, Texas, June

Figures



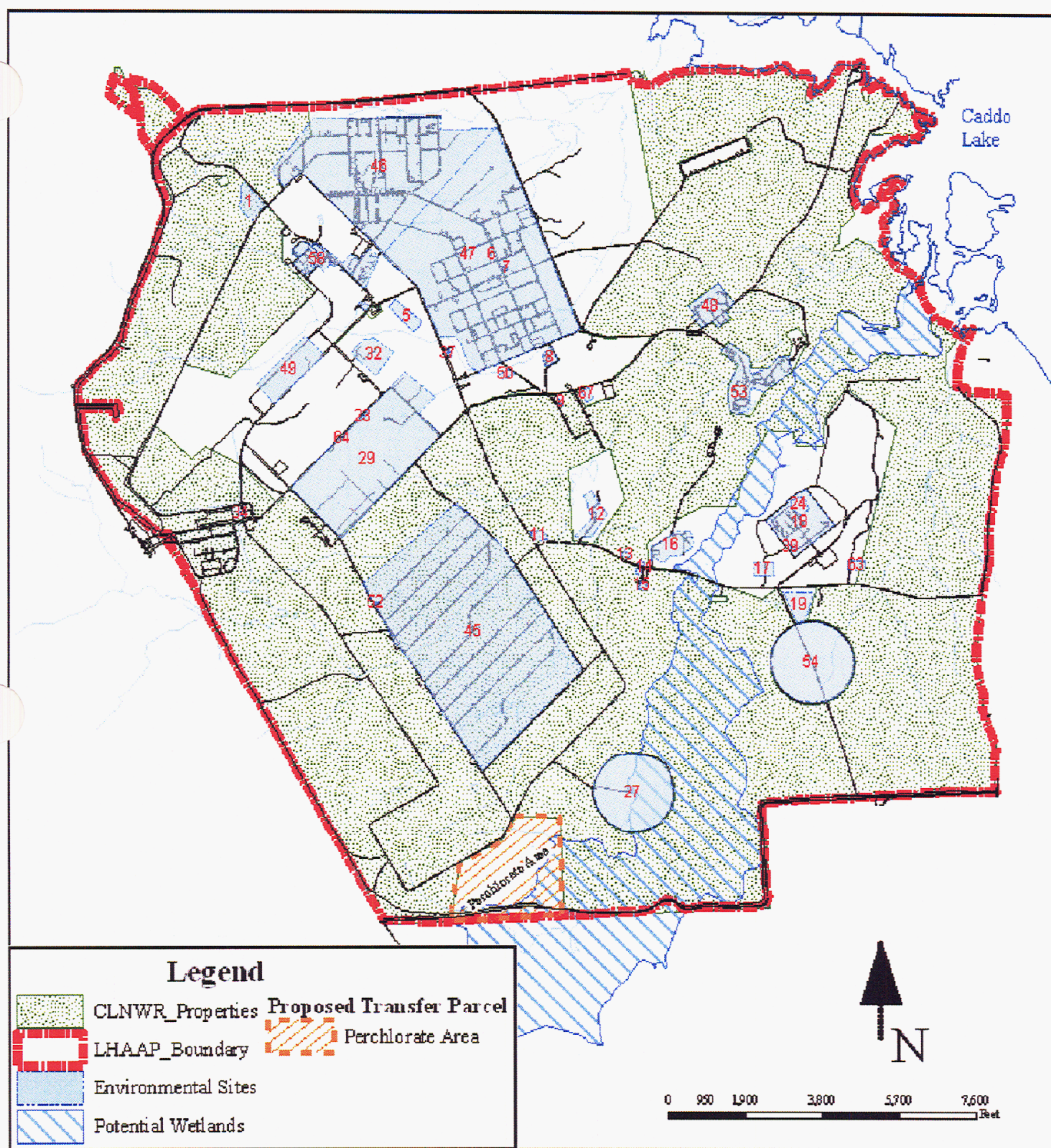


Figure 2
 Location of Perchlorate Area and Environmental Sites
 LONGHORN ARMY AMMUNITION PLANT
 Karnack, Texas

Attachment 1
References

References

Caddo Lake Institute (CLI), 1995, Initial Species Inventory for Longhorn Army Ammunition Plant, Karnack, Texas, June.

Engineering and Environmental Management, Inc., 2002, Final U.S. Army Closed, Transferring and Transferred Ranges / Site Inventory for Longhorn Army Ammunition Plant, Texas, September.

Gadus, E.F., Freeman, M.D., and Fields, R.C., 1998, Archaeological Survey of 319 Hectares at the Longhorn Army Ammunition Plant, Harrison County, Texas, June.

Sverdrup Environmental, Inc., 1998, Environmental Baseline Survey, Longhorn Army Ammunition Plant, Karnack, Texas, October.

Texas Department of Parks and Wildlife, 2003, Letter to Jacobs Engineering, Response to December 10, 2002 Information Request, February.

U.S. Army, 2004, Record of Environmental Consideration, Transfer of 125 acres to the U.S. Fish and Wildlife Service located in Refuge Overlay, November.

U.S. Army Corps of Engineers, 2004, Perchlorate Delineation Sampling, Longhorn Army Ammunition Plant, June.

U.S. Fish and Wildlife Services, 2000, Final Environmental Assessment for the Proposed Establishment of the Caddo Lake National Wildlife Refuge through Management Agreement of Transfer of Longhorn Army Ammunition Plant from the Department of the Army to the Department of Interior, USFWS, Harrison County, Texas, September.

U.S. Fish and Wildlife Service, 2003, Contaminants Investigation of Northern Central and Eastern Portions of Caddo Lake National Wildlife Refuge, Texas, November.

U.S. Fish and Wildlife Service, 2003, Letter to Jacobs Engineering, Response to December 10, 2002 Information Request, January.

U.S. Fish and Wildlife Service, 2002, Contaminants Investigation of Western Portions of Caddo Lake National Wildlife Refuge, Texas, December.

Attachment 2
Environmental Protection Provisions

ATTACHMENT 2

Environmental Protection Provisions

The following conditions, restrictions, and notifications will be incorporated by reference into the Letter of Transfer from the Department of the Army to the Department of Interior (DOI) to ensure the protection of human health and the environment and in furtherance of ongoing and completed remediation activities at Caddo Lake National Wildlife Refuge.

Inclusion of Provisions:

The federal agency to whom the property is transferred shall neither transfer the property, lease the property, nor grant any interest, privilege, or license whatsoever in connection with the property without the inclusion of the environmental protection provisions contained herein, and shall require the inclusion of such environmental protection provisions in all further deeds, transfers, leases, or grant of any interest, privilege, or license, unless there is a specific legal finding authorizing a change and specifically addressing any liabilities that will result from the change.

Federal Facilities Agreement:

The U.S. Army acknowledges that portions of Longhorn Army Ammunition Plant have been identified as National Priorities List (NPL) sites under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended. The USFWS acknowledges that the U.S. Army has provided it with a copy of the LHAAP Federal Facility Agreement (FFA) dated December 30, 1991 and will provide the USFWS with a copy of any amendments thereto. The USFWS, its successors and assigns, agrees that should any conflict arise between the terms of the FFA as they presently exist or may be amended, and the provisions of this property transfer, the terms of the FFA will take precedence. The USFWS, its successors and assigns, further agree that notwithstanding any other provisions of the transfer, the U.S. Army assumes no liability to the USFWS, its successors and assigns, should implementation of the FFA interfere with the use of the Property. The USFWS, its successors and assigns, shall have no claim on account of any such interference against the U.S. Army or any officer, agent, employee or contractor thereof.

No Liability for Non-Army Contamination:

The U.S. Army shall not incur liability for response action or corrective action found to be necessary after the date of transfer, in any case in which the federal agency to whom the property is transferred, or other non-Army person or entity is identified as the party responsible for contamination of the property.

CERCLA Access Notice:

The U.S. Army, U.S. Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ) and their officers, agents, employees, contractors, and subcontractors have the right, upon reasonable notice to the USFWS, to enter upon the Premises in any case in which a response action or corrective action is found to be necessary after the date of transfer of the property or such access is necessary to carry out a response action or corrective action on adjoining property, including, without limitation, the following purposes:

- a. To conduct investigations and surveys, including, where necessary, drilling, soil and water sampling, testing-pitting, test soil borings and other activities;
- b. To inspect field activities of the U.S. Army and its contractors and subcontractors;
- c. To conduct any test or survey related to the environmental conditions at the transferred Property or to verify any data submitted to the USEPA or TCEQ by the U.S. Army relating to such conditions;
- d. To construct, operate, maintain or undertake any other response or remedial actions as required or necessary including, but not limited to monitoring wells, pumping wells and treatment facilities.

Notice of the Potential for the Presence of Munitions and Explosives Concern, and Covenant:

Based upon a review of existing records and available information, none of the land proposed for transfer is known or suspected to contain munitions and explosive of concern (MEC). In the event that USFWS, its successors, or assign should discover any MEC, on the property, it shall not attempt to remove or destroy it. The Harrison County Sheriff's Department will be the point of contact (phone number: 903-923-4000). An alternate contact is the City of Marshall Fire Department (phone number: 903-938-6711). Local authorities must contact the U.S. Army's 705th Explosives Ordnance Detachment (EOD) at Fort Polk, LA (phone number: 337-531-5502; the 24-hour emergency phone number is 337-531-5505).

MEC may be present on adjacent property. The U.S. Army plans to perform MEC investigation on the nearby property (LHAAP-27) and retains the right to use exclusion zones. The investigation activities may have an impact on the Property through use of exclusion zones that intersect the Property. Due to the use of exclusion zones, temporary notices and restrictions may be issued to protect public safety, human health, and the environment. These temporary restrictions and notices may include but are not limited to, the removal of MEC on the adjacent property, temporary evacuation, limited closure of facilities, and environmental cleanup. In the unlikely event that evacuation is required; all action will be carried out as expeditiously as possible to minimize inconveniences to the USFWS, its successor, or assigns. Upon the

completion of all MEC work within the exclusion zones, all temporary notices and restrictions shall be removed.

Notice of Archaeological Property and Preservation Covenant:

In consideration of the conveyance of the real property that one archaeological property, 41HS752 located in the County of Harrison, Texas, the USFWS hereby covenants on behalf of itself, its heirs, successors, and assigns at all times to the Texas State Historic Preservation Officer, to maintain and preserve the archaeological properties. The USFWS will honor its responsibilities under the National Historic Preservation Act and will coordinate all activities in furtherance of its responsibilities with the Texas State Historic Preservation Office, appropriate federally recognized tribes and other interested parties.

Conditions, Restrictions, and Covenants Binding and Enforceable:

These restrictions and covenants are binding on the USFWS, its successors and assigns and shall be included in subsequent deeds; and shall run with the land; are forever enforceable; shall benefit the public in general and the territory surrounding the Property, including lands retained by the U.S. Army; and shall further the common environmental objectives of the U.S. Army and the State of Texas; and are therefore enforceable by the U.S. Army and the State of Texas.

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

***PUBLIC MEETING
ON THE TRANSFER OF PROPERTY***

DATE: Thursday, 04 November 2004

SIGN-IN SHEET
PUBLIC MEETING ON THE TRANSFER OF PROPERTY
LONGHORN AAP / CADDO LAKE NATIONAL WILDLIFE REFUGE
NOVEMBER 4, 2004

Name Address	Phone Number	E-mail Address
Tom Walker 500 Private Rd 7222 Jefferson, TX 75657-5272	903-665-8279	twalkercaddobkett@att.net
PAUL FORTUNE P.O. Box 16 KARNACK, TX. 75661	C. 903/930-5679 903/679-3949	p1fortune@hotmail.com
ROBERT Speight 2757 BLAIRS Landing KARNACK TX 75661	C. 903/930-1940 903/679-3875	r.speightjr@att.net
Shirley & Nigel Shivers PO Box 558 Karnack, TX 75661	903/679/4128	
CHRIS VILLARREAL USACE 1445 ROSS AVE. DALLAS, TX 75202-2733	214/665/6753	villarreal.chris@epa.gov
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JACK ANDRES 4400 Shamon Dr Marshall, TX 75672	9039388633	JWANDRES@AEP.com
Judith Johnson 1635 Dorrough Rd Karnack, TX 75661	903-679-3130	judithjohnson@webtv.net
Cliff MURRAY U.S. Army Corps of Engineers 4645 S 67 E Ave Tulsa, OK 74128	918 669-7573	Cliff.Murray@USACE.ARMY.MIL
Mary Jane Bandure PO Box 2007 Marshall, TX 75671		
Jack M. Bandure DVM P.O. Box 2007 Marshall, TX 75671		

Page 2 of 2

SIGN-IN SHEET
PUBLIC MEETING ON THE TRANSFER OF PROPERTY
LONGHORN AAP / CADDO LAKE NATIONAL WILDLIFE REFUGE
NOVEMBER 4, 2004

Name Address	Phone Number	E-mail Address
LANIS RIEGER 153 C.R. 1247 LINDEN, TX.	903-679-3180	riegeRL@osc. ARMY. mil
ANNE BLAND 293 Kings Road KARNACK, TX 75661	903-679-4658	abland02@aol.com

LONGHORN ARMY AMMUNITION PLANT,**Karnack, Texas*****MANAGERS' TELECONFERENCE MEETING*****AGENDA**

DATE: Wednesday, 17 November 2004
TIME: 9:00 a.m.
CALL-IN: Shaw's Tollfree Number 1-877-929-8516, Passcode 670599

09:00	WELCOME	RMZ
09:05	Review Priority and Status - Site 12 SLERA and Proposed Plan - EBS/ESA - Warehouse Area Evaluation - Site 67 Feasibility Study - Sediment and Surface Water Data Gaps Report	Tulsa
09:30	Upcoming Documents Table	RMZ
09:45	Additional Sampling Results, Manhole Pictures	Tulsa
10:00	Site 32 Data Evaluation	Shaw
10:15	Perimeter Well Sampling, Fish Sampling	RMZ
10:25	MMRP Update	RMZ
10:30	Adjourn	

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
November 17, 2004**

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
Shaw Documents						
1	Final Feasibility Study, Site-12	On hold			On hold Revised ecological screening appendix in review with regulators.	Comments received from EPA on 5/14/04 and from TCEQ on 5/27/04 on the draft final. Document has been modified but the Final version has not been submitted due to pending ecological issues. Revised ecological screening appendix was submitted on 10/8/04
2	Draft Modeling Report	10/18/04			Submitted	In review with the Army
3	LHAAP-32 Revised Draft Final Feasibility Study Report	1/30/04			In preparation	New data has been screened. The FS is scheduled for revision and submittal to regulators.
4	Draft Final Proposed Plan, LHAAP-12	7/30/04	9/14/04		Submitted	In review with regulators.
5	Draft Final Feasibility Study, LHAAP-67	8/06/04	9/5/04		Submitted	In review with regulators.
6	Draft Final Step 3 Results Report Installation-wide Baseline Ecological Risk Assessment,	11/17/04			In preparation	
7	Draft Final Evaluation of Warehouse Area Analytical Data	11/8/04			Submitted	In review with regulators
8	Draft Final Background Surface Water and Sediment Report	11/2/04			Submitted	In review with the regulators.

**Status of Technical Documents
Longhorn Army Ammunition Plant
Monthly Managers Meeting
November 17, 2004**

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
9	Draft Background Groundwater Study Report	11/30/04			In preparation	
10	Draft Feasibility Study Report, LHAAP-35B(37)	12/3/04			In preparation	
11	Draft Data Gaps Investigation Report	12/01/04			In preparation	
Other Documents						
1	Draft Environmental Condition of Property II	7/29/04			Submitted	In review with regulators. Public comment period is 10/7/04 to 11/8/04
2	Draft Evaluation of WFIA Analytical Data	7/29/04	EPA: 9/7/04	In progress	EPA comments received	



Shaw Environmental & Infrastructure, Inc.

1430 Enclave Parkway
Houston, Texas 77077-2023
281-368-4000
Fax: 281-368-4436

Memorandum

Date: November 11, 2004

To: Praveen Srivastav

CC:

From: Frank Eidson

RE: Comparison of LHAAP-32 Soil Concentrations to Site-specific Background Concentrations and Risk-Based Cleanup Levels

A Feasibility Study (FS) is being conducted for site LHAAP-32 at the Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. The LHAAP-32 study is being conducted for the U. S. Army Corps of Engineers Tulsa District under Total Environmental Restoration Contract DACA56-94-D-0020, Task Order 0109.

In support of the LHAAP-32 FS, soil samples were collected on August 16-17 and September 8, 2004 from 10 soil borings at locations 32SB14 through 32SB23. Samples were collected from three depths at each boring, a shallow sample (0-1 ft below ground surface (bgs)), an intermediate sample (at varying depths ranging from 3-6 ft bgs to 12-15 ft bgs) and a deep sample (ranging from 10-12 ft bgs to 27-28 ft bgs). One duplicate sample was collected at locations 32SB14, 32SB18 and 32SB21. The locations, sample numbers and sampling depths of the 33 samples are shown in **Tables 1 and 2**.

The soil samples were analyzed for metals and three explosives compounds associated with LHAAP operations, 2,4,6-trinitrotoluene (TNT), 2,4-dinitrotoluene (DNT) and 2-amino-4,6-dinitrotoluene. Calcium, iron, magnesium, potassium and sodium were analyzed in the samples but are considered to be essential nutrients and were not included in these comparisons.

Comparison to Background

Concentrations of chemicals in individual samples were compared with the upper tolerance limit (UTL) of the soil background concentration (Shaw, 2004a) and the upper prediction limit (UPL) of the soil background concentration (Shaw, 2004b). Because separate background concentrations were developed for surface soil (0-0.5 ft bgs) and subsurface soil (1.5 – 2.5 ft bgs), the lower of the surface and subsurface concentrations were used for comparisons (**Table 1**). This use of the lower concentration for background results in a more conservative comparison.

No explosives residues were detected except for sample number L0001-32SB22, which contained estimated (J-qualified) concentrations of TNT and 2-amino-4,6-dinitrotoluene in the 0-1 ft sample (**Table 1**). Because explosives residues are related to LHAAP processes, no comparison to background was made.

Chemicals having U-, B-, BJ-, or UJL- validation qualifiers are not considered detects; J-qualified and unqualified values are considered detects (Shaw, 2004a). All values reported are compared to UTL and UPL concentrations to allow a comparison of reporting limits to background concentrations (**Table 1**).

Concentrations of *aluminum, arsenic, chromium, selenium, and thallium* in all samples are below both the UTL and UPL concentrations (**Table 1**).

Antimony concentrations reported for 13 of 33 samples exceeded both the UTL and UPL; none were detects.

Barium concentrations reported for 15 of 33 samples exceeded both the UTL and UPL; 1 sample exceeded the UPL but not the UTL.

Beryllium concentrations reported for 5 of 33 samples exceeded both the UTL and UPL; 12 samples exceeded the UPL but not the UTL.

Cadmium concentrations reported for 2 of 33 samples exceeded both the UTL and UPL; none of the samples exceeded the UPL but not the UTL.

Cobalt concentrations reported for 15 of 33 samples exceeded both the UTL and UPL; 1 sample exceeded the UPL but not the UTL.

Copper concentrations reported for 24 of 33 samples exceeded both the UTL and UPL; 5 samples exceeded the UPL but not the UTL.

Lead concentrations reported for 5 of 33 samples exceeded both the UTL and UPL; 4 samples exceeded the UPL but not the UTL.

Manganese concentrations reported for none of the 33 samples exceeded both the UTL and UPL; 6 samples exceeded the UTL but not the UPL. (The UPL value is usually equal to or less than the UTL for the same data set. However, because the lower of UTL and UPL values from separate surface and subsurface soil data sets are applied in **Table 1** and the UTL or UPL often equals the maximum detected concentration (Shaw, 2004a,b), the UPL can exceed the UTL used in these comparisons).

Mercury concentrations reported for none of the 33 samples exceeded both the UTL and UPL; 6 samples exceeded the UPL but not the UTL.

Nickel concentrations reported for 22 of 33 samples exceeded both the UTL and UPL; 3 samples exceeded the UPL but not the UTL.

Silver concentrations reported for 31 of 33 samples exceeded both the UTL and UPL; none of the samples exceeded the UPL but not the UTL.

Vanadium concentrations reported for none of the 33 samples exceeded both the UTL and UPL; 2 samples exceeded the UPL but not the UTL.

Zinc concentrations reported for 21 of 33 samples exceeded both the UTL and UPL; 1 sample exceeded the UPL but not the UTL.

Comparison to Risk-based Screening Concentrations

Concentrations of chemicals in individual samples were compared with the risk-based soil concentrations that are protective of outdoor industrial workers from exposure by incidental ingestion, inhalation and direct dermal contact with chemicals in soil. The Medium Specific Screening Levels (MSSLs) provided in U. S. EPA (2004) guidance and TCEQ Soil and Air Inhalation Medium Specific Concentrations (SAI-Ind MSCs) provided in Title 30 of the Texas Administrative Code Chapter 335 (30TAC§335 and updates) were used in the comparisons.

All results were compared including samples collected below 15 ft bgs, which often are not considered available for exposure by these pathways. This consideration of all soil samples without regard to depth results in a more conservative evaluation.

Because all reporting limits for explosives in soil are below risk-based screening concentrations (**Table 2**), all samples having U-qualified concentrations are considered nondetects. The concentrations of TNT and 2-amino-4,6-dinitrotoluene detected in the 0-1 ft sample (L0001-32SB22) are below both the MSSL and SAI-Ind MSC values and are of no concern for human health effects.

Concentrations of *aluminum, antimony, barium, beryllium, cadmium, chromium, cobalt, copper, manganese, nickel, selenium, silver, thallium, vanadium, and zinc* in all samples are below both MSSL and MSC concentrations (**Table 2**) and are of little concern for human health effects.

Arsenic concentrations reported for 26 of 33 samples exceed the EPA Region 6 MSSL concentration; UTL and UPL; none of the samples exceed the TCEQ MSC value. Because all arsenic concentrations in these samples were below background concentrations (**Table 1**) arsenic is not of concern in these soil samples.

The Lead concentration reported for 1 of 33 samples exceeds both the EPA Region 6 MSSL and TCEQ MSC values (**Table 2**). This sample (1,630 mg/kg, L0002-32SB20) was taken from 3 – 6 ft bgs. Because only 1 of 33 samples (3%) contains lead above 1,000 mg/kg, lead is judged to be of little concern in these soils.

The Mercury concentration reported for 1 of 33 samples exceeds the TCEQ MSC value but not the EPA Region 6 MSSL. This sample (0.18 mg/kg, L0003-32SB21) was taken from 12 – 15 ft bgs. Because this single concentration exceeds only one of the risk-based screening criteria, a conclusion is equivocal. Because only 1 of 33 samples (3%) contains mercury above one of the two risk-based screening levels applied, mercury is judged to be of little concern in these soils.

References

Shaw Environmental and Infrastructure, Inc., (Shaw) 2004a, *Final Soil Study Background Report, Longhorn Army Ammunition Plant, Karnack, Texas, July*.

Shaw Environmental and Infrastructure, Inc., (Shaw), 2004b), *Draft Final Step 3 Report for the Installation-wide Ecological Risk Assessment*, November.

U.S. Environmental Protection Agency (USEPA), 2003, *EPA Region 6, Human Health, Medium-Specific Screening Levels*, Dallas, Texas, November, <http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm> (June 2004).

Table 1
Comparison of Chemical Concentrations in Soil from LHAAP-32 to Background Concentrations
Longhorn Army Ammunition Plant
Karnack, Texas

Location Code:												
Sample Number:												
Sample Date:												
Start Depth:												
End Depth:												
Sample Type:												
PARAMETER	UNITS	LHAAP BKG UTL	LHAAP BKG UPL	32SB14			32SB15			32SB16		
				L0001-32SB14 8/16/2004 0 1 REG	L0002-32SB14 8/16/2004 12 15 REG	L0003-32SB14 8/16/2004 27 28 REG	L0001-32SB15 8/16/2004 0 1 REG	L0002-32SB15 8/16/2004 9 12 REG	L0003-32SB16 8/16/2004 15 17 REG			
Explosives												
2,4,6-Trinitrobenzene	mg/kg	NC	NC	0.24	U	0.22	U	0.22	U	0.22	U	
2,4-Dinitrotoluene	mg/kg	NC	NC	0.24	U	0.22	U	0.22	U	0.22	U	
2-Amino-4,6-dinitrotoluene	mg/kg	NC	NC	0.24	U	0.22	U	0.24	U	0.22	U	
Metals												
Aluminum	mg/kg	1.63E+04	1.63E+04	10700	7750	6890	8260	6920	J	8540	J	
Antimony	mg/kg	9.40E-01	9.40E-01	1.1	U	1.1	U	0.32	BJ	0.25	BJ	
Arsenic	mg/kg	6.12E+00	4.81E+00	4.3	3.7	2.6	3.6	1.5	J	2.1	J	
Barium	mg/kg	9.89E+01	8.55E+01	84.5	130	45.3	J	59.5	J	55.8	J	
Beryllium	mg/kg	7.80E-01	8.45E-01	0.58	0.65	0.51	0.54	0.6	J	0.7	J	
Cadmium	mg/kg	4.00E-01	4.00E-01	0.023	J	0.13	J	0.36	U	0.034	J	
Chromium	mg/kg	3.67E+01	2.66E+01	16.3	12.2	14.5	15.4	11	J	15.5	J	
Cobalt	mg/kg	6.92E+00	5.61E+00	4.7	17.7	8.7	J	7.3	J	7.9	J	
Copper	mg/kg	7.47E+00	5.55E+00	7.9	16	14.2	16.6	8.8	J	14.9	J	
Lead	mg/kg	1.29E+01	1.14E+01	11.9	12.5	7.6	8.9	9.8	J	13.2	J	
Manganese	mg/kg	3.44E+02	1.25E+03	174	1010	127	J	435	J	217	J	
Mercury	mg/kg	3.10E-01	8.19E-02	0.058	B	0.059	B	0.013	J	0.023	J	
Nickel	mg/kg	8.87E+00	6.98E+00	4.7	14.3	16.8	17.8	8.4	J	23.9	J	
Selenium	mg/kg	4.58E+00	3.48E+00	1.4	J	0.38	B	1	J	1.5	U	
Silver	mg/kg	3.10E-01	3.10E-01	1.7	U	1.7	U	0.9	J	1.2	J	
Thallium	mg/kg	4.70E-01	4.70E-01	0.0791	J	0.192	0.171	0.159	J	0.16	0.212	
Vanadium	mg/kg	4.05E+01	3.21E+01	31.2	15.2	12	18.2	24.7	J	19.1	J	
Zinc	mg/kg	2.48E+01	2.02E+01	13.9	48.7	53.6	57.2	15.9	J	77.1	J	

Footnotes are shown on last page.

Table 1
Comparison of Chemical Concentrations in Soil from LHAAP-32 to Background Concentrations
Longhorn Army Ammunition Plant
Karnack, Texas

PARAMETER		UNITS	LHAAP		LHAAP		32SB16				32SB17				L0001-32SB18			
			BKG UTL	BKG UPL	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ		
Explosives																		
2,4,6-Trinitrobenzene		mg/kg	NC	NC	0.25	U	0.25	U	0.25	U	0.24	U	0.25	U	0.24	U	0.23	U
2,4-Dinitrobenzene		mg/kg	NC	NC	0.25	U	0.25	U	0.25	U	0.24	U	0.25	U	0.24	U	0.23	U
2-Amino-4,6-dinitrotoluene		mg/kg	NC	NC	0.25	U	0.25	U	0.28	U	0.24	U	0.25	U	0.24	U	0.23	U
Metals																		
Aluminum		mg/kg	1.63E+04	1.63E+04	9210	J	7780	J	7110	J	16000	J	3050	J	7680	J	7630	J
Antimony		mg/kg	9.40E-01	9.40E-01	1.2	U/L	0.35	BJ	0.16	BJ	1.2	U/L	1.2	U/L	0.13	U/L	0.13	BJ
Arsenic		mg/kg	6.12E+00	4.81E+00	3.6	J	3	J	2.6	J	2.7	J	0.87	J	2.7	J	1.7	J
Barium		mg/kg	9.89E+01	8.55E+01	52.8	J	108	J	228	J	117	J	9.2	J	314	J	67.5	J
Beryllium		mg/kg	7.80E-01	6.45E-01	0.65	J	0.73	J	0.85	J	0.54	J	0.92	J	0.61	J	0.45	J
Cadmium		mg/kg	4.00E-01	4.00E-01	0.04	J	0.37	U	0.36	U	0.36	U	0.054	J	0.52	J	0.29	U
Chromium		mg/kg	3.67E+01	2.66E+01	19.8	J	18.8	J	16.6	J	15.9	J	5	J	25.8	J	8.7	J
Cobalt		mg/kg	6.92E+00	5.61E+00	11.9	J	12.9	J	10.4	J	2.8	J	1.1	J	21.5	J	1.5	J
Copper		mg/kg	7.47E+00	5.56E+00	21.3	J	15.2	J	9.5	J	9.1	J	4.5	J	13.2	J	6.1	J
Lead		mg/kg	1.29E+01	1.14E+01	13	J	11.4	J	9.3	J	11	J	4.8	J	6.1	J	7.9	J
Manganese		mg/kg	3.44E+02	1.25E+03	253	J	326	J	241	J	34.9	J	39.6	J	985	J	34.2	J
Mercury		mg/kg	3.10E-01	6.19E-02	0.066	J	0.033	J	0.059	J	0.062	J	0.027	J	0.029	J	0.052	J
Nickel		mg/kg	8.87E+00	6.98E+00	34.8	J	31.4	J	27.2	J	9.1	J	3.3	J	36	J	3.8	J
Selenium		mg/kg	4.58E+00	3.48E+00	0.22	BJ	0.14	BJ	0.52	BJ	1.8	U	1.8	U	0.27	BJ	0.34	BJ
Silver		mg/kg	3.10E-01	3.10E-01	0.96	J	0.92	J	1	J	1.3	J	1.8	U	0.45	J	0.47	J
Thallium		mg/kg	4.70E-01	4.70E-01	0.114	J	0.214	J	0.186	J	0.0922	J	0.129	U	0.261	J	0.0623	J
Vanadium		mg/kg	4.06E+01	3.21E+01	21.2	J	20.6	J	16.5	J	29.7	J	4.5	J	20.4	J	15.9	J
Zinc		mg/kg	2.48E+01	2.02E+01	84.6	J	78.2	J	53.7	J	23.2	J	6.5	J	78.1	J	6.3	J

Footnotes are shown on last page.

Table 1

Location Codes:													
32S818				32S819				32S820					
Sample Number:		L0002-32S818		L0002-32S818QC		L0003-32S818		L0002-32S819		L0003-32S819		L0001-32S820	
Sample Date:		8/17/2004		8/17/2004		8/17/2004		8/17/2004		8/17/2004		8/17/2004	
Start Depth:		9		9		12		6		12		0	
End Depth:		12		12		15		9		15		1	
Sample Type:		REG		FD		REG		REG		REG		REG	
PARAMETER	UNITS	LHAAP BKG UTL	LHAAP BKG UPL	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Explosives													
2,4,6-Trinitrobenzene	mg/kg	NC	NC	0.25	U	0.23	U	0.24	U	0.21	U	0.24	U
2,4-Dinitrobenzene	mg/kg	NC	NC	0.25	U	0.23	U	0.24	U	0.21	U	0.24	U
2-Amino-4,6-dinitrobenzene	mg/kg	NC	NC	0.25	U	0.23	U	0.24	U	0.21	U	0.24	U
Metals													
Aluminum	mg/kg	1.63E+04	1.63E+04	8630	J	9860	J	7010	J	3200	J	10200	J
Antimony	mg/kg	9.40E-01	9.40E-01	0.19	BJ	1.2	U/L	0.21	BJ	0.21	BJ	1.2	U/L
Arsenic	mg/kg	6.12E+00	4.81E+00	2.1	J	2.1	J	2.4	J	1.1	J	3.9	J
Barium	mg/kg	9.89E+01	8.55E+01	66.1	J	366	J	40.7	J	28	J	235	J
Beryllium	mg/kg	7.80E-01	6.45E-01	0.66	J	0.63	J	0.51	J	0.18	J	2.2	J
Cadmium	mg/kg	4.00E-01	4.00E-01	0.38	U	0.36	U	0.02	J	0.3	U	0.35	U
Chromium	mg/kg	3.67E+01	2.66E+01	16.9	J	19.6	J	15.5	J	8.8	J	15.5	J
Cobalt	mg/kg	6.92E+00	5.61E+00	6.5	J	4.6	J	11.9	J	1.4	J	5.5	J
Copper	mg/kg	7.47E+00	5.55E+00	12.8	J	15	J	12.7	J	2.6	J	14.9	J
Lead	mg/kg	1.28E+01	1.14E+01	6.1	J	4.3	J	5.7	J	4.3	J	6.8	J
Manganese	mg/kg	3.44E+02	1.25E+03	124	J	95.9	J	219	J	95.6	J	406	J
Mercury	mg/kg	3.10E-01	8.19E-02	0.027	J	0.095	J	0.14	J	0.017	J	0.028	J
Nickel	mg/kg	8.87E+00	6.98E+00	26.7	J	27	J	28.9	J	1.9	J	40.5	J
Selenium	mg/kg	4.59E+00	3.48E+00	1.9	U	0.29	BJ	0.22	BJ	0.43	BJ	0.22	BJ
Silver	mg/kg	3.10E-01	3.10E-01	0.72	J	0.6	J	0.96	J	0.59	J	0.77	J
Thallium	mg/kg	4.70E-01	4.70E-01	0.14	J	0.144	J	0.178	J	0.102	U	0.189	U
Vanadium	mg/kg	4.06E+01	3.21E+01	17.2	J	14.3	J	17.9	J	13.9	J	25.6	J
Zinc	mg/kg	2.48E+01	2.02E+01	72.2	J	63.7	J	68.9	J	3.8	J	68.6	J

Footnotes are shown on last page.

Table 1
Comparison of Chemical Concentrations in Soil from LHAAP-32 to Background Concentrations
Longhorn Army Ammunition Plant
Karnack, Texas

Location Code: Sample Number: Sample Date: Start Depth: End Depth: Sample Type:		32SB20				32SB21				32SB21QC				32SB22			
		L0002-32SB20 8/17/2004 3 6 REG	L0003-32SB20 8/17/2004 12 15 REG	L0001-32SB21 8/17/2004 0 1 REG	L0001-32SB21QC 8/17/2004 0 1 FD	L0002-32SB21 8/17/2004 9 12 REG	L0003-32SB21 8/17/2004 12 15 REG	L0001-32SB22 9/8/2004 0 1 REG									
PARAMETER	UNITS	LHAAP BKG UTL	LHAAP BKG UPL	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ		
Explosives																	
2,4,6-Trinitrofluorene	mg/kg	NC	NC	0.23	U	0.24	U	0.21	U	0.22	U	0.24	U	4.8	J		
2,4-Dinitrofluorene	mg/kg	NC	NC	0.23	U	0.24	U	0.21	U	0.22	U	0.24	U	0.19	U		
2-Amino-4,6-dinitrofluorene	mg/kg	NC	NC	0.23	U	0.24	U	0.21	U	0.22	U	0.24	U	2.6	J		
Metals																	
Aluminum	mg/kg	1.63E+04	1.63E+04	4960	J	11300	J	7050	J	8160	J	8930	J	12300	10900		
Antimony	mg/kg	9.40E-01	9.40E-01	0.6	BJ	1	U/L	0.24	BJ	0.12	BJ	0.78	BJ	0.16	1		
Arsenic	mg/kg	6.12E+00	4.81E+00	4.6	J	4		2	J	1.8	J	2.4	J	2.8	4.3		
Barium	mg/kg	9.88E+01	8.55E+01	147	J	38.9	J	57.3	J	51.3	J	55	J	42.3	J		
Beryllium	mg/kg	7.80E-01	6.45E-01	0.71	J	0.72	J	0.36	J	0.35	J	0.89	J	0.82	J		
Cadmium	mg/kg	4.00E-01	4.00E-01	0.071	J	0.17	J	0.32	U	0.32	U	0.26	J	0.21	J		
Chromium	mg/kg	3.67E+01	2.66E+01	23.3	J	23.5	J	10.2	J	10.4	J	18.6	J	23.8	J		
Cobalt	mg/kg	6.92E+00	5.61E+00	5.6	J	13.1	J	2.1	J	1.3	J	12.8	J	11.3	J		
Copper	mg/kg	7.47E+00	5.55E+00	10.3	J	23.2	J	4.8	J	4.3	J	23.1	J	32.4	J		
Lead	mg/kg	1.29E+01	1.14E+01	1630	J	12.1	J	7.4	J	6.2	J	8.5	J	14.4	J		
Manganese	mg/kg	3.44E+02	1.25E+03	276	J	236	J	74.8	J	20.5	J	494	J	217	J		
Mercury	mg/kg	3.10E-01	8.19E-02	0.0098	J	0.084	BJ	0.014	J	0.02	J	0.039	J	0.18	J		
Nickel	mg/kg	8.87E+00	6.98E+00	11.8	J	37.2	J	4.4	J	4.2	J	41.7	J	37.3	J		
Selenium	mg/kg	4.58E+00	3.48E+00	0.23	BJ	2		0.46	BJ	0.28	BJ	1.8	U	2	U		
Silver	mg/kg	3.10E-01	3.10E-01	1.9	J	1.5	U	0.74	J	0.72	J	1.9	J	0.027	J		
Thallium	mg/kg	4.70E-01	4.70E-01	0.0874	J	0.19		0.0694	J	0.086	J	0.205	J	0.204	J		
Vanadium	mg/kg	4.06E+01	3.21E+01	35.3	J	22.9	J	20.5	J	20.9	J	25.5	J	30.7	J		
Zinc	mg/kg	2.48E+01	2.02E+01	188	J	98.7	J	10.1	J	9.1	J	90.6	J	108	J		

Footnotes are shown on last page.

Table 1
Comparison of Chemical Concentrations in Soil from LHAAP-32 to Background Concentrations
Longhorn Army Ammunition Plant
Karnack, Texas

Location Code: 1000									
---	--	--	--	--	--	--	--	--	--

NC-Not calculated

- Not available

B-Chemical concentration was less than 5 times the concentration detected in a blank concentration.

Concentrations having B or UJ qualifiers are not considered defects.

J-Reported value is an estimated concentration of the constituent.

L-Reported value has a low bias.

U-Not detected.

UJL-Concentrations with a UJL qualifier are not considered defects.

UPL-Upper prediction limit of the background concentration. Value shown is the lower of surface and subsurface soil concentrations.

UTL-45%, 80% upper tolerance limit of the background concentration. Value shown is the lower of surface and subsurface soil concentrations.

Bold-if value exceeds the EPA Region 8 MSLL value.

Highlight-if the value exceeds the TOEQ MSC S4-Lind value.



Subject: Draft Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)

Location of Meeting: via Teleconference

Date of Meeting: November 17, 2004, 9:00 AM – 12:00 PM

Meeting Participants:

BRAC:	Rose M. Zeiler (RMZ)
USACE-Tulsa:	Cliff Murray (CM), Susan Trussell (ST)
Shaw Environmental:	Praveen Srivastav (PS), Kay Everett (KE), Diane Meyer (DM), Frank Eidson (FE), Prabal Amin (PA), Agnes Mayila (AM)
USEPA Region 6:	Chris Villarreal (CV)
TCEQ:	James Sher (JS), Kristy Mauricio (KM)
USFWS:	Paul Bruckwicki (PB), Craig Giggelman (CG)

BRAC – Base Realignment and Closure; USACE – U.S. Army Corps of Engineers; USEPA – U.S. Environmental Protection Agency; TCEQ – Texas Commission on Environmental Quality; USFWS – U.S. Fish and Wildlife Service.

Welcome and Introductions-RMZ

The following documents were distributed via e-mail before and during the meeting:

- Meeting Agenda
- Document Status Table
- Summary of LHAAP-32 Data Evaluation
- Pictures of LHAAP-29

Review Priority

- RMZ stated that comments from Vickie Reat of TCEQ on the Site 12 ecological risk screening were received, however, some of the language is not quite clear.
- KM mentioned that she would clarify the comments with Vickie Reat
- Regarding the Site 12 Proposed Plan, CV mentioned that EPA will send comments. KM also stated that she will check on the TCEQ comments.

- Decision documentation – CM mentioned that Shaw needs EPA's help in obtaining information about some of the sites. He indicated that the Army would like Shaw to visit EPA's office to review documents. CV indicated that he would check to see what the procedure is regarding contractors accessing EPA's data base and library.
- ERA – RMZ stated that Shaw is working on some final text and will be issuing the Step 3 report by early December. She asked if a meeting could be scheduled for January 2005 to discuss the report. KM stated that Vickie Reat would need 45 days to review the report. CV indicated that Susan Roddy may need 60 days but she may not be reviewing the report due to other commitments. It was decided that a meeting would be held mid – to end – January, 2005.
- RMZ indicated that the priority for regulatory review would be the EBS/ESA, Warehouse Report, Site 67 FS and the Background Surface Water and Sediment Study Report, in that order. To a question from CV, RMZ stated the Warehouse report needs to be finalized by January 2005, therefore, it would be good to receive the comments by December 7. She also mentioned TCEQ is not expected to review the Warehouse report.
- KM mentioned that TCEQ comments on the Site 67 FS may be provided by end of November.
- RMZ asked if TCEQ needed help with review of documents. JS replied that they would see contractor help, if necessary.

Presentation of Pictures from site LHAAP-29

- CM showed pictures of manholes, locations of wooden pipeline sampling, and other features at LHAAP-29.

Results of Sampling at LHAAP-32

- PS discussed the screening of soil sampling results from LHAAP-32, which indicated that the site did not pose a risk to an industrial worker.
- JS suggested that the Army should produce a response complete documentation and close the site as soon as possible. He also suggested that land use controls can be specified in a separate document, possibly along with other sites such as LHAAP-12.
- It was suggested that an addendum to the BHHRA may be produced to present the results of the data evaluation, followed by a response complete documentation. An FS, proposed plan, and ROD are not required.
- A discussion ensued on a detection of elevated level of lead in a subsurface sample near the building. JS suggested that it may not be a problem if the detection is demonstrated to be not very significant using some statistical arguments.
- RMZ asked CV if the EPA had an opinion on the LHAAP-32 data evaluation. He replied that he needs to review the site data before commenting.
- It was decided to put the LHAAP-32 on the agenda for December 7 meeting

Other Discussions

- CM mentioned that the Army will sample public supply wells in conjunction with TCEQ in December.

- JS suggested that the Army say something about the detection of perchlorate in the perimeter wells at the TRC meeting
- JS also suggested that the Army needs to say something about the possible discharge of perchlorate to Harrison Bayou north-west of site LHAAP-18/24.
- It was decided that the Army will prepare a few slides on perchlorate in case there are questions on its health effects.
- MMRP sites – RMZ indicated that LHAAP-53 may have some issues that have to be dealt with before response is complete at this site.
- PS stated that a discussion may be needed on clean up goals for lead, mercury, and TNT to support the up coming removal actions. It was decided to put this on the agenda for December 7 meeting.

Meeting was adjourned at 12:00 PM.

Action Items

- EPA and TCEQ to provide comments on the LHAAP-12 Proposed Plan
- EPA to check into getting Shaw access to EPA's library and data base
- EPA to provide comments on the LHAAP-32 data evaluation
- Shaw to prepare a memorandum on proposed clean up goals for sites LHAAP-29 and -49

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

MANAGERS MEETING

DATE: Tuesday, 07 December 2004

Longhorn Army Ammunition Plant Manager's Meeting Sign-in Sheet

RESTORATION ADVISORY BOARD (RAB) MEETING**LONGHORN ARMY AMMUNITION PLANT,****Karnack, Texas****AGENDA**

DATE: Tuesday, 7 December 2004
TIME: 6:30 p.m.
LOCATION: Karnack Community Center, Karnack, Texas

6:30	WELCOME AND INTRODUCTIONS	RMZ
6:35	RAB – Draft Charter, LOGO and Discussion	RMZ
6:50	Election of RAB Community Co-Chair	JA
7:00	Environmental Program Update	CM/PS
	Status of Environmental Sites Field Work Eco Risk Assessment MMRP	
7:20	Perimeter Well Monitoring & Other Monitoring	CM
7:25	GWTP Update	BC
7:35	Transfer Update	RMZ
	Perchlorate Area Goose Prairie Creek Parcel ECOP II Demolition Phase II Environmental Baseline Report, Production Area	
7:45	Adjourn	



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**Status of Technical Documents
Longhorn Army Ammunition Plant
December 7, 2004**

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
Shaw Documents						
1	Final Feasibility Study, Site-12	01/07/05			In preparation	Comments received from EPA on 5/14/04 and from TCEQ on 5/27/04 on the draft final. Comments on the ecological screening are received.
2	Draft Modeling Report	11/30/04			Submitted	In review with the Army
3	LHAAP-32 Revised Draft Final Feasibility Study Report	NA			In preparation	New data has been screened. No industrial risk at the site. Decision pending on whether or not the FS is required.
4	Draft Final Proposed Plan, LHAAP-12	7/30/04	9/14/04 Rec'd: 12/2/04	In progress		Regulatory comments received.
5	Final Proposed Plan, LHAAP-12	1/14/05			In preparation	
6	Draft Land Use Control/ Remedial Design	1/07/04			In preparation	
7	Draft Final Feasibility Study, LHAAP-67	8/06/04	9/5/04		Submitted	In review with regulators.
8	Draft Final Step 3 Report for Installation-wide Baseline Ecological Risk Assessment,	11/29/04			Submitted	Submit ERA sans Section 11(reserve) and submit to regulators, to be followed with Section 11 complete next week.
9	Draft Final Evaluation of Warehouse Area Analytical Data	11/8/04			Submitted	In review with regulators

**Status of Technical Documents
Longhorn Army Ammunition Plant
December 7, 2004**

No.	Documents in Progress	Submittal Date	Comments Due/Received from USACE/ Regulators	Comment Resolution	Status	Remarks
10	Draft Final Background Surface Water and Sediment Report	11/2/04			Submitted	In review with the regulators.
11	Draft Background Groundwater Study Report	11/30/04			Submitted	In review with the Army
12	Draft Feasibility Study Report, LHAAP-35B(37)	12/03/04			Submitted	In review with the Army
13	Draft Data Gaps Investigation Report	1/18/04			In preparation	
14	Draft Record of Decision, LHAAP-12	1/07/04			In preparation	
Other Documents						
1	Draft Environmental Condition of Property II	7/29/04			Submitted	In review with regulators. Public comment period is 10/7/04 to 11/8/04
2	Draft Evaluation of WFIA Analytical Data	7/29/04	EPA: 9/7/04	In progress	EPA comments received	Additional sampling scheduled for site LHAAP-49
3	Draft Environmental Baseline Study/Environmental Site Assessment Phase I and II Report, Plexus	9/14/04			Submitted	In review with the regulators

**LONGHORN ARMY AMMUNITION PLANT
RESTORATION ADVISORY BOARD**

**DRAFT
GUIDELINES AND OPERATING PROCEDURES**

1. Mission Statement

The mission of the Longhorn Army Ammunition Plant Restoration Advisory Board, hereafter referred to as the RAB or Board, is to promote community awareness and obtain constructive community review and comments on environmental restoration activities at the Longhorn Army Ammunition Plant.

2. Purpose and Function

The purpose and function of the RAB is to:

- Act as a forum for the discussion and exchange of information between agencies and the community;
- Disseminate information to the community;
- Ensure opinions about environmental restoration reflect the diverse interests within the community; and
- Provide an opportunity for stakeholders to review the progress and participate in a dialogue with the decision makers.

The RAB is not a replacement for other types of community outreach and participation required by law, regulation, or policy. All recommendations provided by the RAB will be considered, including advice given that represents the minority view of members. Because the Department of Defense does not intend for Federal Advisory Committee Act (FACA) requirements to apply to RABs, consensus is not a prerequisite for RAB recommendations. Advice is provided by each individual rather than as a group.

3. Basis and Authority

The basis and authority for the RAB is the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), primarily Sections 120(a), 120(f), and 121(f) and 10 USC 2705 enacted by 211 of SARA. To the extent feasible, the activities of the RAB are to be conducted in accordance with the guidance stated in the U.S. Army Restoration Advisory Board and Technical Assistance for Public Participation Guidance issued by the U.S. Army Environmental Center, April 1998 and the Management Guidance for the Defense Environmental Restoration Program (DERP), September 2001.

4. Membership

4.1. Community Members

Community membership of the RAB is voluntary and shall adequately reflect the diverse community interests regarding the environmental restoration activities at Longhorn Army Ammunition Plant. Unless the RAB decides to change the balance and diversity of its initial membership (requires Board consensus), the RAB will consist of members who reside or who work in Harrison County and surrounding areas, and individuals and groups directly impacted and having a vested interest in the environmental restoration activities at Longhorn Army Ammunition Plant.

Community interests may include, but are not limited to:

- local residents
- business community
- homeowners associations
- local environmental group
- environmental justice groups (low income and minority groups)
- local officials
- health officials
- senior citizens associations
- civic groups

The RAB will maintain diversity and balance in regard to gender, age, race /ethnicity, type of employment, neighborhood, expertise, income, and education levels. Members are expected to attend and actively participate in regular meetings and be prepared to comment on documents and proposals.

4.2. Permanent Members

Permanent standing members of the RAB, not subject to rotation or term limits above, include representatives from the Army, U.S. EPA Region 6, and Texas Commission on Environmental Quality.

4.3 Appointment / Election of Board Officers

The RAB shall be co-chaired by the Longhorn Army Ammunition Plant (LHAAP) Site Manager, appointed by the Army, and a RAB community member. The Community Co-Chair shall be elected by a majority vote of the RAB community members. The Community Co-Chair may serve two or more terms, including consecutive terms, if approved by the Board community members. The Community Co-Chair may choose to resign his or her chair without affecting his or her RAB membership. If the Community Co-Chair is unable to attend a RAB meeting, he or she will designate another community member of the RAB to carry out the Community Co-Chairs duties at that meeting.

4.4 No Compensation

Members shall serve without compensation. All expenses incidental to travel and document review shall be borne by the respective members of their organizations.

4.5 Attendance

Members are expected to attend all RAB meetings or send an alternate. If a member fails to attend or send an alternate to two consecutive meetings, the RAB Co-Chairs may ask the member to resign.

4.6 Terms

Members of the initial RAB shall serve terms of one or two years, to be determined by the Board. Terms thereafter will be for two years which one-half of the Board being replaced with new members each year. This policy will be reviewed annually. The RAB community membership rotation schedule shall maintain the balance and diversity necessary for a successful RAB. Members of the RAB will fill any vacancies as they occur, seeking suggested candidates from others as needed. Vacancies should be filled within 60 days.

4.7 Resignation or Removal of Community Members

4.7.1. Any member who determines he or she is unable to continue to participate fully may submit a resignation in writing to either of the Board Co-Chairs. Resigning members may nominate new members to replace them. New membership must continue to reflect the diversity of community interests.

4.7.2. The Community Board members in attendance may, by a two-thirds majority vote, remove a community member prior to the expiration of his or her term, if that person is determined to be ineffective or detrimental to the progress of the Board. The vote to remove a community member shall be taken at the meeting following the one at which the removal was proposed.

5. STRUCURE AND OPERATING PROCEDURES

5.1 Meetings will be scheduled on a regular basis and will be open to the public. It is anticipated that meetings will be held on a quarterly basis or as needed. Each meeting will have a purpose and agenda. The agenda items will be compiled by the Co-Chairs. To encourage public attendance and RAB participation, meetings will be held at convenient times and locations. Meeting notice will be provided to the public.

5.2 The Longhorn Army Ammunition Plant Co-Chair will be responsible for notifying all members of scheduled meetings and providing logistical support.

5.3 The LHAAP Co-Chair will be responsible for preparing meeting minutes, including a list of attendees. Before the conclusion of the RAB meeting, the Co-Chairs will query members present for specific concerns and advisory comments. The

concerns and comments will be set forth in the meeting minutes to include the RAB's desired methodology for a response. The concerns will remain as open items at following RAB meetings until the issues are resolved. Meeting minutes shall summarize the topics discussed at the RAB meetings; these will be concise summaries rather than verbatim transcripts to facilitate effective communication.

5.4 The meeting minutes will be reviewed by the RAB members and at the next scheduled RAB meeting, the Co-Chair(s) shall call for any corrections. The RAB will approve the minutes with the corrections noted.

5.4 The RAB shall develop, maintain, and use a mailing list of names and addresses of interested parties, who wish to receive information on the cleanup process. Information will be provided to the interested parties in a timely manner.

5.5 Community members will be asked to review and comment on various environmental restoration documents. RAB members should submit written comments to the Community Co-Chair on the subject documents within the time frame specified. The Community Co-Chair shall consolidate comments from the RAB community members and provide them to the LHAAP Co-Chair. The LHAAP Co-Chair will ensure that a written response is provided to the RAB in a timely manner.

5.6 RAB members who desire to speak to the media should speak only on their own behalf. The official spokesperson(s) for the RAB are the Community and the LHAAP Co-Chairs.

5.7 Board members will not make personal attacks or derogatory remarks during the meetings. Repeated offenses will result in a recommendation for removal of the offending party from the RAB by the Co-Chairs.

6. RAB Adjournment

Appropriate circumstances for adjournment include program completion or inadequate sustained community interest. The LHAAP Co-Chair shall discuss potential adjournment and consider input from the Board and other stakeholders as appropriate prior to reaching a decision concerning RAB adjournment. If the RAB members decide they do not want to adjourn, the members may agree to decrease the frequency of RAB meetings rather than to adjourn. These guidelines shall expire without further action by the RAB or any other party upon the effective date of adjournment.

LONGHORN ARMY AMMUNITION PLAN STORAGE ADVISORY BOARD MEETING

DATE Dec. 7, 2004

NAME	STREET	CITY, STATE	ZIPCODE	TELEPHONE	EMAIL	SIGNATURE
Andres, Jack W.	4400 Sherman Drive	Marshall, TX	75672	903-838-8833	swandres@att.net	Jack Andres
Fortune, Paul L.	1037 Old Port Caddo Road	Karnack, TX	75661	903-879-3949	plfortune@hotmail.com	Paul Fortune
George, Allen D.	849 Stephens Road	Hallsville, TX	75650	903-888-3717		
McCathram, Larry	3024 Marshall-Leigh Road	Marshall, TX	75672	903-830-5735	larry.mccathram@att.net	Larry McCathram
Sanders, Dr. Jack M.	P.O. Box 2007 2305 Karnack Highway	Marshall, TX	75671 75672	903-835-9747	Sanders@shreve.net	Mary Sanders
Sanders, Mary Jane	P.O. Box 2007 2305 Karnack Highway	Marshall, TX	75671 75672	903-835-9747	Sanders@shreve.net	Mary Sanders
Selman, Donna	157 Moore Street	Karnack, TX	75661	903-879-3808		Donna Selman
Shivers, Nigel R.	Post Office Box 558	Karnack, TX	75661	903-879-4128		Nigel Shivers
Shivers, Shirley	Post Office Box 558	Karnack, TX	75661	903-879-4128		Shirley Shivers
Speight, Robert, Jr.	2757 Blairs Landing Road	Karnack, TX	75661	903-879-3875	rspeight@att.net	Robert Speight
Walker, Tom	500 Private Road 7222	Jefferson, TX	75657	903-885-8278	twalker@att.net	Tom Walker
Zeller, Rose M.	Box 3, B1440	Fort Chaffee, AR	72951	479-484-2516	rose.zeller@monroe.army.mil	Rose Zeller
Raveen Srinivasan	1430 Enclave Bakers	Houston, TX	77450	281-363-4583	praveen.srinivasan@att.net	Raveen Srinivasan

034843

LONGHORN ARMY AMMUNITION PLAN STORATION ADVISORY BOARD MEETING

DATE Dec. 7, 2004

NAME	STREET	CITY, STATE	ZIP CODE	TELEPHONE	EMAIL	SIGNATURE
Kay Everett	1430 Enclave Pkwy STAW	Houston, TX	77077	281 368 4421	Kay.evett@shawsp.com	Kay
Berry Forsythe	1445 Ross Ave. Suite 1200 : 685-11	Dallas, TX	75085	214 665-8467	forsoftheberry@epa.gov	Berry Forsythe
COAK GLENN	US FWS WILLIAM DR. 90252, ARLINGTON, TX 76011	ARLINGTON, TX	76011	817/377-1100	cmgig@glemm.com	GLENN
CHRIS VILLARREAL	1445 ROSS AVENUE DALLAS, TX 75202	DALLAS, TEXAS	75202	972/222-5457	villarreal.chris@epa.gov	Chris Villarreal
TONY NOVARIS	271 P.R. 2422 KARNACK, TEXAS	KARNACK, TEXAS	75661	903 679-4259	Goldrop@earthlink.net	Tony
PAUL FORTUNE	1037 Old Port Caddo P.O. Box 16 75661	Karnack TX.	75661	903/ 679-3949	pfortune@hotmail.com	Paul Fortune
ARNE BLAND	293 KINGS RD.	KARNACK, TX	75661	903-679- 4658	abland02@aol.com	Arne Bland
JUDITH JOHNSON	1635 DOROUGH RD KARNACK 75661			903 679 3130	judithjohnson@netnet	Judith Johnson
Anne Dennis	44 Cherrywood Circle	Marshall, Texas	75672	903. 938.7915	atdennis@hotmail.com	Anne Dennis
CLIFF MURRAY	U.S. Army Corps of Engineers 1645 S. 101 E Ave Ft	Tulsa, OK	74125	918 669-7573	cliff.murray@usace.army.mil	Cliff Murray
Kristy Mauricio		Austin, TX	78753	512-239-2493	KMAURIC1@ceq.state.tx.us	Kristy Mauricio
Mark Williams	P.O. Box 230	Karnack, TX	75661	903-679-9444	Mark-Williams@FWS.gov	Mark Williams
Rick S.M. Th	Corps of Engineers ADN: CESWT-PP 1645 S. 101 E Ave	Tulsa, OK	74128	(918) 665-4958 (918) 605-6759	richard.s.m.th@usace.army.mil	Rick S.M. Th

034844



**Subject: Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting,
Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Karnack Civic Center, Karnack, Texas

Date of Meeting: December 7, 2004, 6:30 – 8:45 PM

Meeting Participants:

Army BRAC:	Rose M. Zeiler (RMZ)
USACE-Tulsa:	Cliff Murray (CM), Rick Smith (RS)
USFWS:	Mark Williams (MW), Paul Bruckwicki (PB), Craig Gigglesman (CG); Barry Forsythe (BF)
Shaw Environmental:	Praveen Srivastav (PS), Kay Everett (KE)
USEPA Region 6:	Chris Villarreal (CV)
TCEQ:	Kristy Mauricio (KM)
Community Members:	Jack Andres, Paul Fortune, Larry McCathram, Jack Sanders, Mary Jane Sanders, Nigel Shivers, Shirley Shivers, Robert Speight, Tom Walker, Tony Novak, Anne Bland, Judith Johnson, Ann Dennis

RMZ Welcome and Introductions

RMZ explained the function of the Restoration Advisory Board (RAB) and passed out a mission statement to all attendees including the members of the RAB that were present.

Ann Dennis asked a question regarding the historical interpretation of the site and its features that are still in place, mentioning the Caddoan mounds.

RMZ said that these features are protected under the law and that it would be part of the U.S. Fish and Wildlife Service (USFWS) responsibilities. USFWS mentioned it would probably be in partner with Caddo Lake Institute and their Visitor's office would be involved with the public information. RMZ said the State Historical Preservation Office has some sites already designated and that information is not usually published.

RMZ stated that the Army wants to provide a forum by which the public can be informed of the environmental activities at Longhorn and provide input back to the Army on the restoration process.

RAB—DRAFT CHARTER, LOGO AND DISCUSSION

Copies of Draft Guidelines and Operating Procedures of the RAB were distributed. RMZ mentioned that if comments are received on draft guidelines, they will be considered. If no comments are received, the document will be considered final.

The minutes from the last meeting were distributed to attendees that included a summary of what was discussed.

RMZ mentioned that every RAB has a "logo". Some ideas were mentioned but the decision on the logo was postponed till the next meeting.

ELECTION OF RAB COMMUNITY CO-CHAIR

The Army Co-Chair is RMZ; the Community Co-Chair is elected by the RAB. It was decided to defer this election until next meeting. Tony Novak said that he wants to be involved. A question about the roster was also asked. RMZ said that a roster will be sent along with the minutes.

A question was asked regarding the chain of command for the work that is going on at Longhorn. On the first level is the site manager, RMZ. RMZ reports to Tom Lederle at BRAC's Hampton Field Office, who reports to the Pentagon.

Paul Fortune asked why the RAB now? It was never done before.

RMZ replied that BRAC took over management of Longhorn about a year ago. Army Material Command, which handled the site previously, has a different handling and management of sites. BRAC transfers property and thinks differently because of their mission to cleanup and transfer land.

To a question from Paul Fortune, RMZ replied that property transfer is just getting started and there are a lot of activities going on. She also mentioned that an ECOP is required for each transfer action. The Army will transfer land in parcels. Currently the Army is thinking of transferring a large parcel, informally called Goose Prairie Creek Parcel, when it is ready.

To a community concern that Congress may jeopardize the transfer because a lot of people want to drill for oil and cut down trees, MW replied that USFWS will issue licenses for drilling and logging under their guidelines. RMZ stated that a lot of work on the agreement between the USFWS and the Army has been conducted. The USFWS has first right of refusal and they have agreed to take all lands as long as they are cleaned up.

RMZ NOTE: In response to a question about water rights that required research: All of the water rights are held by the U.S. Government. However, 25% of water rights are retained by GSA on behalf of the Army, the other 75% were transferred to USFWS with the first 5000-acre transfer. This represents 1,757 acre-feet for municipal purposes per year, and 27,885 acre-feet for industrial purposes per year to USFWS.

Someone from the community asked if a flow chart of the CERCLA process and an acronym list could be provided. They also requested if the installation map could be color coded for various phases of the sites. RMZ replied that the Army will see what can be done about this request.

ENVIRONMENTAL PROGRAM UPDATE

CM/PS

Status of Environmental Sites

PS passed out a Status of Technical Documents to the attendees that described what stage each document is in.

Site 12 is a capped landfill. Shaw has produced the Feasibility Study indicating alternatives for remedy. The Final document is currently in preparation. The FS is followed by the Proposed Plan which selects one of the alternatives. Draft Record of Decision for Site 12 is a document which describes the selected remedy. Both these documents are in preparation.

The Draft Modeling Report looks at sites that had contamination in soil and groundwater. The modeling was used to see if there is a possibility of discharge of contamination to the creeks, and also used to determine effective remediation levels. This report is in review with the Army.

A Land Use Control (LUC) document lays out the measures to protect the remedy at Site 12. This document is in preparation.

An evaluation of several alternatives for groundwater remediation is presented in the Draft Final Site 67 Feasibility Study. This report is in regulatory review and will be followed by a Proposed Plan which will present the selected alternative.

Warehouse Area data available from USACHPPM and USFWS was compared to state and federal screening levels and to background values. The report is in regulatory review.

The Background surface water and sediment study report is in regulatory review and the background groundwater study report is in Army's review.

The Draft Site 35B(37) Feasibility Study of the old chemistry lab deals with groundwater contamination by solvents. This report is going through Army's review at present.

The Data Gaps Investigation Report is being prepared and will be submitted in January 2005.

Field Work

Shaw was tasked to conduct a data gaps investigation to install 12 monitoring wells, and to collect groundwater, surface water, sediment, and soil samples. This work was completed in April through September, 2004. The data gaps investigation report is scheduled to be submitted in January 2005.

Additional sampling was done at Site 32. Limited contamination of TNT was found and determined to not be a problem for an industrial worker; however, there was an elevated level of lead at one location. Further investigation is planned.

Ecological Risk Assessment

The Step 3 report for the installation-wide ecological risk assessment has been submitted and is currently in regulatory review.

MMRP

RMZ indicated that the Army has listed 3 Military Munitions Response Program (MMRP) sites with possible MEC (munitions explosive constituents) related issues. These 3 sites are undergoing site investigations. It is possible that a fourth site will be added to the MMRP list.

The MMRP sites are Ground Signal Test Area (Site 54, incendiary device explosives), South Test Area (Site 27, launch flares etc.), Static Test Area (Site 53, flares and incendiary devices) and a possible disposal location of off-spec material adjacent to Site 27.

PERIMETER WELL MONITORING

CM

CM showed perimeter well locations. Every 3 months the wells are sampled for metals, VOC, SVOC, explosives, anions and perchlorate (which is an oxidizer in rocket fuel and is a very stable material). There is perchlorate at Sites 18/24 and 16 and the south side of production area. Perchlorate is present in the soil and groundwater. In September 2004, results from perimeter wells 133 and 134 indicated perchlorate above a detection limit of 0.20 µg/L.

CV of EPA stated that detections of perchlorate in wells 133 and 134 are probably not a risk because the source of public water supply is much deeper. The wells that have perchlorate are shallow wells and are not a drinking water source. Some perchlorate is naturally occurring at some places. There is no risk to inhabitants around Longhorn at this time, but the EPA is monitoring it. CV provided additional information on the occurrence of perchlorate as summarized below under Perchlorate Update.

GWTP UPDATE

BC

No update because Bill Corrigan of CES was not present.

TRANSFER UPDATE**RMZ**

RMZ stated that transfer documents are prepared by Tulsa District Corps of Engineers. An ECOP is done after the ROD, and if there are no comments after 30 days (or easily resolved comments crop up), the property can be transferred. RMZ also mentioned that technical assistance can be provided by the Army to help the RAB with the review of documents. There used to be a TAG-funded through the EPA—Wilma Subra, but her contract has expired.

Perchlorate Update

CV stated that the National Academy of Science is completing a study on perchlorate. Detections of perchlorate in wells 133 and 134 are probably not a risk because the source of public water supply is much deeper. The wells that have perchlorate are shallow wells and are not a drinking water source. Some perchlorate is naturally occurring at some places. There is no risk to inhabitants around Longhorn at this time, but the EPA is monitoring it. EPA has sampled Caddo Lake and public water supply wells in the area but has never found perchlorate as part of unregulated compound monitoring. EPA may develop a risk number but not a standard. Several states have their own standards established.

CM indicated that the USACE has found some perchlorate in the surface water at Goose Prairie Creek, but it is not been detected farther downstream from some of the sites. Some perchlorate may be seen after a rain, but then it is diluted.

Tom Walker mentioned that perchlorate was also used in fertilizer and fireworks displays — so perchlorate could be from an off site source.

CV further stated that the EPA looks at more sensitive receptors (children, neonatal) because perchlorate can block the uptake of iodine in the thyroid. Some perchlorate is naturally occurring.

Paul Fortune stated that, in the 1970s, he used to see half a dozen flares burning. He asked if any abnormalities of wildlife had been observed.

CG replied that no abnormalities have been observed. Mercury is high in Clinton Lake; but any high metals in Caddo Lake were probably coming from air emissions (up to 60 years ago). Lone Star Steel was big in the area as was timber and other industrial activities including oil and gas. Also not confined to Caddo Lake. Found elevated levels at Toledo Bend, Sam Rayburn Lake.

RMZ added that the Army cannot clean up for perchlorate until a standard has been developed by the regulatory agencies.

Goose Prairie Creek Parcel

The Army may be able to transfer the Goose Prairie Creek Parcel by the end of fiscal year.

Other Concerns/Questions

Cemeteries within Longhorn boundary: RMZ stated that the Army has been under the wrong impression that the cemetery was in private hands. Deed title report said that Robert Hope et al owned that parcel. The next listing shows that the property (B-47) went from Hope to T.J. Taylor then to the U.S. government (Army). So it is still owned by the Army.

Judith Johnson indicated that she was concerned about the Hayner cemetery. Her concern is whether it will be properly maintained.

RMZ stated that there is a problem with transferring cemetery to private owners. Cemeteries will be transferred to USFWS.

MW said that USFWS could work out a lease agreement for 99 years with options . The installation is not open yet, but once it is open, USFWS will work with any non-profit cemetery association for lease. The other cemetery can also be managed by same sort of arrangement.

To a question from Paul Fortune as to how long the security will be maintained at Longhorn, RMZ replied that the security will remain as long as there are UXO issues. It may take up to 1-1/2 years.

Meeting Adjourned