Appendix G: Errata

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The following corrections pertain to LMES 1998, *Oak Ridge Reservation Annual Site Environmental Report for 1997,* ES/ESH-78, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Replace Table 4.3 on page 4-9 with the following:

Table 4.3. ETTP radionuclide air emission totals, 1997 (In curies)[a]

Radionuclide	TSCA incinerator	TVS	Minor
^{3}H	3.85E–01	–	2.01E–04
^{14}C	–	–	1.19E–04
^{40}K	5.52E–05	1.20E–07	1.67E–05
^{51}Cr	–	–	–
^{57}Co	–	–	8.33E–07
^{60}Co	–	1.96E–07	2.15E–06
^{85}Kr	–	–	2.18E–03
^{90}Sr	–	–	1.12E–06
^{99}Tc	3.98E–03	4.64E–06	1.43E–03
^{106}Ru	–	–	1.01E–07
^{109}Cd	–	–	7.52E–06
^{131}I	–	–	2.05E–05
^{137}Cs	5.40E–04	–	4.22E–06
^{143}Ce	–	–	4.06E–06
^{210}Pb	–	–	7.95E–06
^{203}Hg	–	–	9.00E–09
^{237}Np	3.60E–07	7.47E–10	5.48E–06
^{238}Pu	8.83E–07	–	8.59E–06
^{239}Pu	9.45E–08	–	2.10E–06
^{228}Th	1.27E–07	5.22E–09	5.75E–06
^{230}Th	5.28E–07	–	8.08E–05
^{232}Th	1.11E–07	4.71E–10	5.70E–06
^{234}Th	1.01E–02	–	2.05E–03
^{234m}Pa	1.62E–02	–	4.67E–03
^{233}U	–	–	9.48E–07
^{234}U	1.36E–04	4.33E–09	6.18E–04
^{235}U	2.14E–07	–	6.42E–05
^{236}U	–	–	8.07E–06
^{238}U	7.70E–04	–	1.09E–03
^{241}Am	–	–	2.53E–07
Totals	4.17E–01	4.97E–06	1.26E–02

[a]1 Ci = 3.75E+10 Bq.

Replace Table 4.4 with the following:

Table 4.4. Y-12 Plant nonradiological airborne emissions, 1997

Chemical	Quantity released		Major release source	Basis of estimate
	lb	kg		
SARA 313 chemicals[a]				
Hydrochloric acid	98,100	44,591	Steam Plant	Engineering calculation
Lead	10	5	Steam Plant	Engineering calculations
Methanol	32,405	14,730	Cleaning/cooling	Engineering calculation
Nitric acid	545	246	Chemical processing aid	Engineering calculation
Tetrachloroethene	0	0	Storage	Engineering calculation
Other large-inventory chemicals[b]				
Freon 11	890	405	Refrigerant	Quarterly report
Freon 12	248	113	Refrigerant	Quarterly report
Freon 22	3,358	1,526	Refrigerant	Quarterly report
Freon 13	1	0.5	Refrigerant	Quarterly report
Freon 502	3	1	Refrigerant	Quarterly report
Steam plant emissions (all calculated emissions)[c]				
Particulates	74,000	33,636	Stack emission	Engineering calculations based on emission facts
SO_x	5,714,000	2,597,273	Stack emission	Engineering calculations based on emission facts
Carbon monoxide	44,000	20,000	Stack emission	Engineering calculations based on emission facts
Volatile organic compounds	4,000	1,818	Stack emission	Engineering calculations based on emission facts
NO_x	2,816,000	1,280,000	Stack emission	Engineering calculations based on emission facts

[a]Superfund Amendments and Reauthorization Act, Title III, Section 313.
[b]Fugitive emissions.
[c]Point-source emissions.

Page D-4: Unit for Table D.2, column 1 under *Field measurements* (Chlorine) should be µ/L rather than mgL.

Replace Table 6.9 on p. 6-19 and Table 6.11 on p. 6-22 with the following:

Table 6.9. Chemical reference doses and slope factors used in drinking water and fish intake analysis (5/4/98, 5/29/98,10/15/99)

Chemical	Reference dose or slope factor[a]	Reference[b]
Acetone	1.0E–01	RfD
Aldrin	1.7E+01	SF
Aluminum	5.7E–03	SMCL
Antimony	4.0E-04	RfD
Aroclor-1016	7.0E-05	RfD
Aroclor-1254	2.0E-05	RfD
Aroclor-1260	1.4E-05	TNWQC
Arsenic	3.0E–04	RfD
Barium	7.0E–02	RfD
2-Butanone	6.0E–01	RfD
Chlordane (alpha, gamma)	5.0E–04	RfD
Chromium (VI)	5.0E–03	RfD
Copper	3.7E–02	MCL
4,4'-DDD	2.4E-01	SF
4,4′-DDE	3.4E–01	SF
4,4′-DDT	5.0E–04	RfD
Dieldrin	1.6E+01	SF
Endosulfan I, II	6.0E–03	RfD
Endrin	3.0E–04	RfD
Heptachlor	5.0E–04	RfD
Heptachlor epoxide	1.3E–05	RfD
Iron	8.6E–03	SMCL
Lead	4.0E–04	MCL
Manganese	4.7E–02	RfD
Mercury	5.7E–05	MCL
Methoxychlor	5.0E–03	RfD
Nickel (soluble salts)	2.0E–02	RfD
PCBs (mixed)	2.0E+00	SF
Selenium	5.0E–03	RfD
Strontium	6.0E–01	RfD
Thallium	8.0E–05	RfD
Toluene	2.0E–01	RfD
Toxaphene	1.1E+01	SF
Uranium (soluble salts)	3.0E–03	RfD
Vanadium	7.0E–03	RfD
Xylene	2.0E+00	RfD
Zinc	3.0E–01	RfD

[a]RfD: reference dose (mg kg^{-1} day^{-1}); SF: slope factor (risk per mg kg^{-1} day^{-1}).

[b]The maximum contaminant level (MCL), secondary maximum contaminant level (SMCL), and Tennessee Water Quality Criteria (TNWQC) for domestic water supply. To convert the concentration to an RfD (mg kg^{-1} day^{-1}), multiply by the consumption rate (2 L/day), and divide by the mass of a reference man, 70 kg.

Table 6.11. 1997 estimated hazard quotients (HQs) and dose/chronic daily intake (I/CDIs) for toxins and carcinogens in fish[a]

Parameters	Sunfish			Catfish		
	CRK 70[b]	CRK 32[e]	CRK 16[f]	CRK 70[b]	CRK 32[e]	CRK 16[f]
			HQs for metals			
Copper	7E-3	8E-3	5E-3	6E-3	1E-2	3E-3
Mercury	~6E-1	6E-1	2E+0	2E+0	3E+0	3E+0
Zinc	4E-2	4E-2	5E-2	4E-2	4E-2	3E-2
			HQs for aroclors			
Aroclor-1254			~3E+0			
Aroclor-1260	~4E-1	~3E-1	~4E-1	1E+1	2E+1	5E+0
			I/CDIs for carcinogens			
Aldrin			~3E+0			
Aroclor-1254 (mixed)			~4E+0			
Aroclor-1260 (mixed)	~2E+0	~1E+0	~2E+0	5E+1	9E+1	2E+1
4,4'-DDD			~8E-2		7E-1	
Dieldrin			~6E+0			
Toxaphene			~3E+0			

[a]A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.
[b]Melton Hill Reservoir, above Oak Ridge City input.
[c]Melton Hill Reservoir, Oak Ridge Marina, above ORNL.
[d]Melton Hill Reservoir, above the city of Oak Ridge intake.
[e]Clinch River, downstream of ORNL.
[f]Clinch River, downstream of all DOE inputs.

Replace section entitled "Fish Consumption" on p. 6-21 with the following:

Fish Consumption

Chemicals in water can be accumulated by aquatic organisms that may be eaten by humans. Sunfish and catfish collected from the Clinch River were analyzed for a number of metals, pesticides, and PCBs. Table 6.11 summarizes the HQ and I/CDI ratios calculated using average chemical concentrations in fish tissue from fish caught both upstream and downstream of the ORR. An HQ greater than 1 was estimated for mercury in sunfish collected at CRK 16, which is downstream from the ORR. Mercury concentrations in catfish tissue also resulted in HQs greater than 1. These catfish were collected both upstream and downstream of the ORR. For sunfish, an HQ greater than 1 was estimated for Aroclor-1254; however, the HQ was calculated using concentrations estimated at or below the analytical detection limit. The actual HQ value for Aroclor-1254 may be much lower because the actual concentration in tissue is below the detectable concentration.

For carcinogens, I/CDI ratios greater than 1 indicate a risk greater than 10^{-5}. In sunfish collected both upstream and downstream of the ORR, I/CDI values greater than 1 were calculated for Aroclor-1260. In catfish collected both upstream and downstream of ORR, I/CDI values were also greater than 1 for Aroclor-1260. The Tennessee Department of Environment and Conservation (TDEC) issued a fish advisory that states that catfish should not be consumed from Melton Hill Reservoir (in its entirety) because of PCB contamination and issued a precautionary fish consumption advisory for catfish in the Clinch River arm of Watts Bar Reservoir (TDEC 1993). In sunfish collected downstream of ORR (CRK 16), I/CDIs greater than 1 were estimated for aldrin, dieldrin, and toxaphene. However, these I/CDI values were calculated using concentrations estimated at or below the analytical detection limit. Because of analytical detection limitations, the actual fish tissue concentrations of these contaminants are unknown.

Replace the section entitled “Exposure Assessment” on p. B-5 of Appendix B with the following.

Exposure Assessment

To evaluate an individual’s exposure by way of a specific exposure pathway, the intake amount of the chemical must be determined. For example, chemical exposure by drinking water and eating fish from the Clinch River is assessed in the following way. It is assumed that individuals outside the ORR boundary are exposed to statistically significant concentrations of contaminants. It is also assumed that they drink 2 L (0.53 gal) of water per day directly from the river, which amounts to 730 L (193 gal) per year, and that they eat 0.06 kg of fish per day (21 kg per year). Estimated daily intakes or estimated doses to the public can be calculated by multiplying measured concentrations in water by 2 L or those in fish by 0.06 kg. This intake is first multiplied by the exposure duration (30 years) and exposure frequency (350 days/year), and then divided by an averaging time (30 years for noncarcinogens and 70 years for carcinogens). These assumptions are conservative, and in many cases they result in higher estimated intakes and doses than an actual individual would receive.