APPENDIX J

LIFE-CYCLE INVENTORY TABLES

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APPENDIX J

LIFE-CYCLE INVENTORY TABLES

Table J-1. CRT primary materials (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
ABS resin	0	4.24E-01	0	0	4.24E-01	0.0649%
Aluminum (elemental)	0	3.60E-01	0	0	3.60E-01	0.0552%
Amyl acetate (mixed isomers)	0	1.20E-03	0	0	1.20E-03	0.0002%
Aquadag	0	2.06E-02	0	0	2.06E-02	0.0032%
Assembled CRT monitor	0	0	2.20E+01	0	2.20E+01	3.3765%
Audio cable assembly	0	9.45E-02	0	0	9.45E-02	0.0145%
Barium Carbonate	0	2.97E-01	0	0	2.97E-01	0.0455%
Bauxite (Al2O3, ore)	1.37E+00	0	0	0	1.37E+00	0.2096%
Blue Phosphor (ZnS)	0	3.84E-03	0	0	3.84E-03	0.0006%
Blue Phosphor (ZnS.Ag.Al)	0	1.67E-03	0	0	1.67E-03	0.0003%
Borax	0	8.00E-03	0	0	8.00E-03	0.0012%
Cables/wires	0	3.94E-01	0	0	3.94E-01	0.0604%
Cathode ray tube (CRT)	0	1.07E+01	0	0	1.07E+01	1.6381%
Coal, average (in ground)	3.57E+00	5.15E+00	1.79E+02	1.79E-02	1.88E+02	28.8170%
Connector	0	5.67E-02	0	0	5.67E-02	0.0087%
CRT glass, unspecified	0	9.76E+00	0	0	9.76E+00	1.4950%
CRT magnet assembly	0	7.56E-02	0	0	7.56E-02	0.0116%
CRT shield assembly - ASTM A366/CC#2	0	2.42E-01	0	0	2.42E-01	0.0370%
Deflection Yoke assembly	0	1.51E-01	0	0	1.51E-01	0.0232%
Demagnetic coil - PU coated paper	0	1.26E-01	0	0	1.26E-01	0.0193%
Electron gun	0	1.01E-01	0	0	1.01E-01	0.0154%
Ferrite	0	1.70E-01	0	0	1.70E-01	0.0261%
Frit	0	6.67E-02	0	0	6.67E-02	0.0102%
Fuel oil #4	0	0	0	-9.53E-02	-9.53E-02	-0.0146%
Glass, unspecified	0	4.91E-02	0	0	4.91E-02	0.0075%
Green Phosphor (ZnS)	0	3.34E-03	0	0	3.34E-03	0.0005%
Green Phosphor (ZnS.Cu.Al)	0	1.34E-03	0	0	1.34E-03	0.0002%
Iron (Fe, ore)	6.90E+00	0	0	0	6.90E+00	1.0567%
Iron ore	2.37E-01	0	0	0	2.37E-01	0.0363%
Iron scrap	9.46E-01	0	0	0	9.46E-01	0.1449%
Lead	0	4.94E-01	0	0	4.94E-01	0.0757%
Lead (Pb, ore)	4.96E-01	0	0	0	4.96E-01	0.0759%
Natural gas	0	1.47E+00	1.40E+01	-8.88E-02	1.54E+01	2.3551%
Natural gas (in ground)	8.41E-01	3.27E+00	0	-1.64E+00	2.47E+00	0.3786%
Nickel (Ni, ore)	9.80E-02	0	0	0	9.80E-02	0.0150%
Nickel Alloy (invar)	0	2.72E-01	0	0	2.72E-01	0.0417%
Petroleum (in ground)	1.32E+00	3.72E+02	3.80E+00	-1.52E+00	3.75E+02	57.5016%
Phosphate ester	0	8.31E-03	0	0	8.31E-03	0.0013%
Polycarbonate resin	0	9.23E-01	0	0	9.23E-01	0.1415%
Polystyrene (PS, high impact)	0	1.51E-01	0	0	1.51E-01	0.0232%
Potassium Carbonate	0	3.78E-01	0	0	3.78E-01	0.0579%
Power cord assembly	0	1.13E-01	0	0	1.13E-01	0.0174%
PPE	0	7.35E-01	0	0	7.35E-01	0.1126%
Printed wiring board (PWB)	0	8.47E-01	0	0	8.47E-01	0.1298%
PWB-laminate	0	8.47E-01	0	0	8.47E-01	0.1298%

Table J-1. CRT primary materials (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Recycled CRT Glass	0	2.06E+00	0	0	2.06E+00	0.3155%
Red Phosphor (Y2O2S)	0	4.65E-03	0	0	4.65E-03	0.0007%
Red Phosphor (Y2O2S.Eu)	0	1.33E-03	0	0	1.33E-03	0.0002%
Sand	0	2.40E+00	0	0	2.40E+00	0.3678%
Sand (in ground)	2.42E-05	0	0	0	2.42E-05	3.71E-08
Silica	0	5.33E-03	0	0	5.33E-03	0.0008%
Sodium Carbonate	0	4.88E-01	0	0	4.88E-01	0.0747%
Sodium chloride (NaCl, in ground or in sea)	3.17E-04	0	0	0	3.17E-04	4.85E-07
Solder (63% tin; 37% lead)	0	5.08E-02	0	0	5.08E-02	0.0078%
Solder, unspecified	0	2.67E-02	0	0	2.67E-02	0.0041%
Steel	2.48E-06	5.16E+00	0	0	5.16E+00	0.7907%
Strontium Carbonate	0	3.31E-01	0	0	3.31E-01	0.0508%
Styrene-butadiene copolymers	0	8.27E-01	0	0	8.27E-01	0.1268%
Sulfur	1.03E-05	0	0	0	1.03E-05	1.58E-08
Tricresyl phosphate	0	2.30E-02	0	0	2.30E-02	0.0035%
Triphenyl phosphate	0	5.29E-02	0	0	5.29E-02	0.0081%
Uranium, yellowcake	0	3.81E-04	4.85E-03	4.85E-07	5.23E-03	0.0008%
Video cable assembly	0	1.13E-01	0	0	1.13E-01	0.0174%
Zircon Sand	0	5.43E-02	0	0	5.43E-02	0.0083%
Total Primary Inputs	1.58E+01	4.21E+02	2.19E+02	-3.32E+00	6.53e+02	100.00%

Table J-2. CRT ancillary materials (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
2,2,4-trimethylpentane	0	1.50e-04	0	0	1.50e-04	7.59e-06
Acetone	0	3.17e-04	0	0	3.17e-04	1.60e-05
Acrylic Polymer, unspecified	0	9.13e-03	0	0	9.13e-03	4.61e-04
Alkali cleaning agent	0	7.72e-02	0	0	7.72e-02	3.90e-03
Alkali soda (to neutralize acid waste water)	0	5.45e-02	0	0	5.45e-02	2.75e-03
Aluminum Oxide	0	3.37e-02	0	0	3.37e-02	1.70e-03
Aluminum sulfate	7.41e-04	0	0	0	7.41e-04	3.74e-05
Ammonia	0	1.19e-04	0	0	1.19e-04	6.03e-06
Ammonium bifluoride	0	2.04e-03	0	0	2.04e-03	1.03e-04
Ammonium chloride	0	7.76e-02	0	0	7.76e-02	3.92e-03
Ammonium Dichromate	0	3.50e-05	0	0	3.50e-05	1.76e-06
Ammonium fluoride	0	8.91e-04	0	0	8.91e-04	4.50e-05
Ammonium hydroxide	0	7.90e-02	0	0	7.90e-02	3.99e-03
Ammonium Oxalate	0	8.92e-05	0	0	8.92e-05	4.50e-06
Ammonium Oxalate Monohydrate	0	3.16e-04	0	0	3.16e-04	1.60e-05
Barium sulfate	2.68e-03	0	0	0	2.68e-03	1.35e-04
Barium sulfate (BaSO4, in ground)	1.10e-03	0	0	0	1.10e-03	5.55e-05
Bauxite	6.31e-04	0	0	0	6.31e-04	3.18e-05
Bauxite (Al2O3, ore)	1.10e-03	4.47e-02	0	-1.14e-04	4.57e-02	2.31e-03
Bentonite (in ground)	2.48e-03	0	0	0	2.48e-03	1.25e-04
Borax	5.20e-07	0	0	0	5.20e-07	2.62e-08
Boric acid	0	4.73e-03	0	0	4.73e-03	2.39e-04
Calcium Chloride	0	1.27e-01	0	0	1.27e-01	6.42e-03
Calcium hydroxide	0	9.54e-02	0	0	9.54e-02	4.81e-03
Calcium sulfate	6.08e-05	0	0	0	6.08e-05	3.07e-06
Calcium sulfate (CaSO4, ore)	2.30e-05	0	0	0	2.30e-05	1.16e-06
Cerium Oxide	0	3.28e-03	0	0	3.28e-03	1.65e-04
Chlorine	0	4.03e-02	0	0	4.03e-02	2.04e-03
Chromium (VI)	0	7.63e-05	0	0	7.63e-05	3.85e-06
Chromium ore	1.09e-07	0	0	0	1.09e-07	5.51e-09
Chromium Oxide	0	5.62e-05	0	0	5.62e-05	2.83e-06
Clay (in ground)	4.49e-03	0	0	8.19e+00	8.19e+00	41.35%
Coal, average (in ground)	0	0	0	3.06e-03	3.06e-03	1.55e-04
Copper (Cu, ore)	8.67e-04	0	0	0	8.67e-04	4.37e-05
Cyclohexane	0	1.88e-04	0	0	1.88e-04	9.48e-06
Deoiling agent (unspecified)	1.33e-03	0	0	0	1.33e-03	6.72e-05
Dimethyl Formamide	0	4.36e-05	0	0	4.36e-05	2.20e-06
Dioctyl Sebacate	2.32e-04	0	0	0	2.32e-04	1.17e-05
Dolomite	1.43e-10	0	0	0	1.43e-10	7.24e-12
Dolomite (in ground)	1.60e-05	0	0	0	1.60e-05	8.05e-07
Etoxy Naphtol Sulphonic Acid (ENSA)	9.96e-05	0	0	0	9.96e-05	5.03e-06
Explosive (unspecified)	3.12e-04	0	0	0	3.12e-04	1.57e-05
Ferric chloride	0	1.37e-01	0	0	1.37e-01	6.93e-03
Fluorocarbon resin	0	3.75e-05	0	0	3.75e-05	1.89e-06
Fluorspar (CaF2, ore)	1.69e-06	0	0	0	1.69e-06	8.55e-08
Formaldehyde	0	6.60e-03	0	0	6.60e-03	3.33e-04
Glycol ethers	0	2.35e-02	0	0	2.35e-02	1.19e-03
Gravel/Sand	6.82e-03	0	0	0	6.82e-03	3.44e-04

Table J-2. CRT ancillary materials (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
HV Carbon (paste)	0	1.14e-05	0	0	1.14e-05	5.75e-07
Hydrochloric acid	0	2.36e-01	0	0	2.36e-01	1.19%
Hydrofluoric acid	0	8.65e-02	0	0	8.65e-02	4.36e-03
Hydrogen peroxide	0	8.45e-02	0	0	8.45e-02	4.26e-03
Iron (Fe, ore)	7.23e-02	0	0	3.41e-03	7.57e-02	3.82e-03
Iron ore	1.27e-04	0	0	0	1.27e-04	6.41e-06
Iron sulfate (FeSO4, ore)	2.56e-05	0	0	0	2.56e-05	1.29e-06
Isopentylacetate	0	1.74e-03	0	0	1.74e-03	8.80e-05
Isopropyl alcohol	0	1.94e-02	0	0	1.94e-02	9.80e-04
Lead (Pb, ore)	6.50e-05	0	0	0	6.50e-05	3.28e-06
Lime	0	3.04e-02	1.06e+00	1.06e-04	1.09e+00	5.49%
Limestone	0	6.91e-02	2.41e+00	2.41e-04	2.48e+00	12.51%
Limestone (CaCO3, in ground)	8.60e-01	1.08e+00	0	-2.39e-01	1.70e+00	8.58%
Lubricant (unspecified)	4.11e-02	0	0	0	4.11e-02	2.07e-03
Magnesium	5.08e-04	0	0	0	5.08e-04	2.56e-05
Maize	1.14e-04	0	0	0	1.14e-04	5.74e-06
Manganese (Mn, ore)	6.35e-08	0	0	0	6.35e-08	3.21e-09
Muratic Acid (drum)	0	1.87e-03	0	0	1.87e-03	9.41e-05
Natural gas (in ground)	0	0	0	4.52e-03	4.52e-03	2.28e-04
Nickel (Ni, ore)	2.45e-08	0	0	0	2.45e-08	1.24e-09
Nitric acid	0	1.44e-01	0	0	1.44e-01	7.26e-03
Nitrogen	0	4.57e-02	0	0	4.57e-02	2.31e-03
Oil (in ground)	0	0	0	3.35e-02	3.35e-02	1.69e-03
Olivine	1.08e-10	0	0	0	1.08e-10	5.43e-12
Olivine ore	1.24e-05	0	0	0	1.24e-05	6.27e-07
Oxalic acid	0	5.35e-05	0	0	5.35e-05	2.70e-06
Oxygen (Liquid)	0	7.57e-03	0	0	7.57e-03	3.82e-04
Periodic Acid	0	2.26e-04	0	0	2.26e-04	1.14e-05
Phenolsulphonic Acid	3.12e-03	0	0	0	3.12e-03	1.57e-04
Polyethylene glycol	0	5.04e-02	0	0	5.04e-02	2.55e-03
Polyvinyl alcohol	0	8.11e-03	0	0	8.11e-03	4.09e-04
Polyvinyl Pyrrolidone (PVP)	0	2.41e-02	0	0	2.41e-02	1.22e-03
Potassium chloride (KCl, as K2O, in ground)	1.92e-03	0	0	0	1.92e-03	9.69e-05
Potassium hydroxide	0	4.27e-02	0	0	4.27e-02	2.15e-03
Potassium permanganate	0	1.16e-03	0	0	1.16e-03	5.87e-05
Potassium peroxymonosulfate	0	7.06e-02	0	0	7.06e-02	3.56e-03
Potatoes	3.06e-05	0	0	0	3.06e-05	1.54e-06
Pumice	0	7.86e-02	0	0	7.86e-02	3.97e-03
PWB-solder mask solids	0	4.37e-02	0	0	4.37e-02	2.20e-03
Pyrite (FeS2, ore)	1.94e-01	0	0	0	1.94e-01	9.77e-03
Raw materials (unspecified)	8.16e-03	0	0	0	8.16e-03	4.12e-04
Sand (in ground)	5.85e-02	2.74e-02	0	2.71e+00	2.80e+00	14.13%
Silver (Ag, ore)	2.75e-09	0	0	0	2.75e-09	1.39e-10
Sodium Carbonate	0	3.22e-02	0	0	3.22e-02	1.63e-03
Sodium chloride	0	0	0	1.55e-04	1.55e-04	7.80e-06
Sodium chloride (NaCl, in ground or in sea)	7.61e-01	1.26e-02	0	-3.07e-05	7.73e-01	3.90%
Sodium Dichromate	2.63e-04	1.05e-04	0	0	3.68e-04	1.86e-05
Sodium Dichromate Dihydrate (VI)	0	3.10e-05	0	0	3.10e-05	1.56e-06

Table J-2. CRT ancillary materials (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Sodium hydroxide	0	1.98e-01	0	0	1.98e-01	9.97e-03
Sodium Hypochlorite	0	9.25e-05	0	0	9.25e-05	4.67e-06
Sodium Metabisulfite	0	4.67e-03	0	0	4.67e-03	2.36e-04
Sodium Persulfate	0	3.54e-04	0	0	3.54e-04	1.79e-05
Sulfur	3.28e-03	0	0	0	3.28e-03	1.66e-04
Sulfur (S, in ground)	5.39e-03	0	0	0	5.39e-03	2.72e-04
Sulfuric acid	0	2.38e-01	0	0	2.38e-01	1.20%
Sulfuric acid, aluminum salt	0	6.75e-02	0	0	6.75e-02	3.41e-03
Surfactant, unspecified	0	1.42e-04	0	0	1.42e-04	7.17e-06
Synthetic resin, unspecified	0	8.53e-04	0	0	8.53e-04	4.30e-05
Talcum (ore)	8.89e-03	0	0	0	8.89e-03	4.49e-04
Tin (Sn, ore)	2.43e-02	0	0	0	2.43e-02	1.23e-03
Toluene	0	4.80e-03	0	0	4.80e-03	2.42e-04
unspecified CRT process material	0	5.77e-03	0	0	5.77e-03	2.91e-04
Uranium (U, ore)	0	0	0	4.16e-08	4.16e-08	2.10e-09
Wastepaper	1.70e-03	0	0	0	1.70e-03	8.59e-05
Xylene (mixed isomers)	0	4.80e-04	0	0	4.80e-04	2.42e-05
Zinc (Zn, ore)	3.79e-02	0	0	0	3.79e-02	1.91e-03
Total ancillary materials	2.11e+00	3.54e+00	3.47e+00	1.07e+01	1.98e+01	100.00%

Table J-3. CRT utility inputs

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Fuels (kg/functional unit):						
Fuel Oil #2 (distillate)	0	1.16e+00	0	0	1.16e+00	0.27%
Fuel oil #4 (avg. of #2 + #6)	0	1.37e-01	0	-1.38e+00	-1.24e+00	-0.29%
Fuel oil #6 (residual)	0	3.68e+00	0	0	3.68e+00	0.85%
LNG	0	3.35e-01	0	0	3.35e-01	0.08%
LPG	0	3.51e+02	0	3.03e-03	3.51e+02	81.10%
Natural gas	0	2.44e+00	0	-1.30e+00	1.14e+00	0.26%
Coal, average (in ground)	2.25e+00	1.36e+01	0	-1.16e-02	1.58e+01	3.66%
Coal, lignite (in ground)	9.73e-01	0	0	0	9.73e-01	0.22%
Natural gas (in ground)	2.76e+00	4.56e+01	0	-2.09e-01	4.82e+01	11.14%
Petroleum (in ground)	2.02e+00	9.71e+00	0	-5.77e-02	1.17e+01	2.70%
Uranium (U, ore)	1.21e-04	2.29e-04	0	-1.99e-07	3.49e-04	8.06E-07
Total fuels	8.00e+00	4.28e+02	0	-2.95e+00	4.33e+02	100.00%
Electricity (MJ/functional unit):						
Electricity	7.32e+01	1.29e+02	2.29e+03	2.29e-01	2.49e+03	
Water (kg or L/functional unit):						
Water	5.54e+02	1.14e+04	1.14e+03	-2.73e+01	1.31e+04	
Total energy (fuels and electricity, MJ/functional unit):						
Energy	3.66e+02	1.83e+04	2.29e+03	-1.28e+02	2.08e+04	

Table J-4. CRT air pollutant emissions (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
1,1,1-Trichloroethane	0	2.31e-07	1.92e-06	-3.01e-08	2.12e-06	3.19e-09
1,2-Dichloroethane		3.74e-07	3.59e-06	-5.75e-08	3.90e-06	5.88e-09
1,2-Dichlorotetrafluoroethane	3.38e-07	0	0	0	3.38e-07	5.09e-10
1,4-Dichlorobenzene	0	3.06e-07	0	-2.26e-09	3.03e-07	4.57e-10
2,3,7,8-TCDD	0	3.73e-14	1.28e-12	1.28e-16	1.32e-12	1.99e-15
2,3,7,8-TCDF	0	1.31e-13	4.57e-12	4.58e-16	4.71e-12	7.09e-15
2,4-Dinitrotoluene	0	2.62e-09	2.51e-08	-4.22e-10	2.73e-08	4.11e-11
2-Chloroacetophenone	0	6.55e-08	6.28e-07	-1.46e-10	6.93e-07	1.04e-09
2-Methylnaphthalene	0	6.39e-09	2.67e-09	-5.37e-11	9.01e-09	1.36e-11
3-Methylcholanthrene	0	4.59e-10	0	-4.04e-12	4.54e-10	6.84e-13
5-Methyl chrysene	0	2.06e-10	1.97e-09	-3.32e-11	2.15e-09	3.23e-12
Acenaphthene	0	1.05e-08	5.68e-08	-7.77e-10	6.65e-08	1.00e-10
Acenaphthylene	0	2.86e-09	2.26e-08	-3.81e-10	2.50e-08	3.77e-11
Acetaldehyde	2.16e-06	5.33e-06	5.11e-05	-8.59e-07	5.78e-05	8.70e-08
Acetic acid	1.86e-05	0	0	0	1.86e-05	2.80e-08
Acetone	2.14e-06	0	0	0	2.14e-06	3.22e-09
Acetophenone	0	1.40e-07	1.35e-06	-2.26e-08	1.46e-06	2.20e-09
Acetylene	3.64e-05	0	0	0	3.64e-05	5.48e-08
Acrolein	2.38e-11	2.71e-06	2.60e-05	-4.37e-07	2.83e-05	4.26e-08
Adsorbable organic halides	1.14e-16	0	0	0	1.14e-16	1.71e-19
Alcohols	7.89e-06	0	0	0	7.89e-06	1.19e-08
Aldehydes	1.13e-04	1.52e-03	0	-1.63e-04	1.47e-03	2.21e-06
Alkane (unspecified)	3.37e-04	0	0	0	3.37e-04	5.07e-07
Alkenes	6.21e-05	0	0	0	6.21e-05	9.35e-08
Alkyne (unspecified)	4.10e-06	0	0	0	4.10e-06	6.18e-09
Aluminum (elemental)	3.35e-04	1.98e-05	0	-8.66e-08	3.55e-04	5.34e-07
Ammonia	4.36e-04	2.35e-03	0	-1.06e-04	2.68e-03	4.04e-06
Anthracene	0	2.88e-09	1.21e-10	-3.22e-10	2.68e-09	4.04e-12
Antimony	4.36e-07	1.66e-06	3.59e-06	-6.55e-08	5.61e-06	8.45e-09
Aromatic hydrocarbons	3.73e-04	5.29e-08	0	-1.37e-10	3.73e-04	5.61e-07
Arsenic	1.53e-04	1.54e-05	3.75e-05	-2.64e-06	2.03e-04	3.06e-07
Barium	5.18e-06	8.85e-07	2.06e-06	-2.45e-08	8.10e-06	1.22e-08
Benzaldehyde	1.26e-11	0	0	0	1.26e-11	1.90e-14
Benzene	6.17e-05	1.58e-02	1.17e-04	-7.31e-04	1.52e-02	2.29e-05
Benzo[a]anthracene	0	2.21e-09	9.27e-09	-1.25e-10	1.14e-08	1.71e-11
Benzo[a]pyrene	1.35e-06	7.92e-10	3.41e-09	-6.06e-11	1.35e-06	2.03e-09
Benzo[b,j,k]fluoranthene	0	1.30e-09	1.06e-08	-1.66e-10	1.18e-08	1.77e-11
Benzo[b]fluoranthene	0	5.07e-10	0	-4.23e-12	5.03e-10	7.58e-13
Benzo[g,h,i]perylene	0	1.05e-09	3.60e-09	-4.36e-11	4.61e-09	6.94e-12
Benzo[k]fluoranthene	0	5.07e-10	0	-4.23e-12	5.03e-10	7.58e-13
Benzyl chloride	0	6.55e-06	6.28e-05	-1.06e-06	6.83e-05	1.03e-07
Beryllium	7.37e-08	1.49e-06	1.91e-06	-3.06e-07	3.16e-06	4.76e-09
Biphenyl	0	1.59e-08	1.52e-07	-2.56e-09	1.66e-07	2.50e-10
Boron	7.51e-05	0	0	0	7.51e-05	1.13e-07
Bromine	3.80e-06	0	0	0	3.80e-06	5.72e-09
Bromium (Br)	7.09e-07	0	0	0	7.09e-07	1.07e-09
Bromoform	0	3.65e-07	3.50e-06	-5.88e-08	3.80e-06	5.73e-09
Bromomethane	0	1.50e-06	1.43e-05	-2.41e-07	1.56e-05	2.35e-08

Table J-4. CRT air pollutant emissions (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Butane	4.16e-05	5.35e-04	0	-4.72e-06	5.72e-04	8.61e-07
Butene	3.56e-07	0	0	0	3.56e-07	5.37e-10
Cadmium	6.60e-06	1.04e-06	4.82e-06	-6.37e-08	1.24e-05	1.87e-08
Calcium	3.01e-04	1.72e-05	0	-7.51e-08	3.18e-04	4.80e-07
Carbon	3.64e-07	0	0	0	3.64e-07	5.49e-10
Carbon dioxide	2.92e+01	1.79e+02	4.45e+02	2.59e+00	6.55e+02	98.68%
Carbon disulfide	0	1.22e-06	1.17e-05	-1.96e-07	1.27e-05	1.91e-08
Carbon monoxide	4.18e-02	4.58e-01	8.09e-02	-4.17e-03	5.76e-01	8.68e-04
Carbon tetrachloride	0	0	0	2.84e-09	2.84e-09	4.27e-12
CFC-13	5.04e-10	0	0	0	5.04e-10	7.58e-13
Chloride ions	3.06e-04	9.83e-05	1.82e-04	-2.54e-06	5.83e-04	8.78e-07
Chlorine	1.09e-06	5.84e-09	0	-2.72e-10	1.10e-06	1.65e-09
Chloroacetophenone	0	0	0	-1.04e-08	-1.04e-08	-1.57e-11
Chlorobenzene	0	2.06e-07	1.97e-06	-3.32e-08	2.15e-06	3.23e-09
Chloroform	0	5.52e-07	5.29e-06	-8.61e-08	5.76e-06	8.67e-09
Chromium	0	1.39e-07	0	0	1.39e-07	2.09e-10
Chromium (III)	7.72e-07	2.22e-05	2.45e-09	-2.14e-06	2.09e-05	3.14e-08
Chromium (VI)	7.72e-07	2.15e-05	7.21e-06	-2.14e-06	2.74e-05	4.12e-08
Chrysene	0	1.91e-09	1.02e-08	-1.55e-10	1.20e-08	1.80e-11
Cobalt	1.01e-06	3.92e-06	1.22e-05	-2.01e-07	1.69e-05	2.54e-08
Copper	4.71e-05	1.91e-06	9.96e-07	-2.54e-08	5.00e-05	7.52e-08
Cumene	0	4.35e-08	4.75e-07	-7.99e-09	5.11e-07	7.69e-10
Cumene hydroperoxide	0	6.06e-09	0	0	6.06e-09	9.12e-12
Cyanide (-1)	1.34e-07	2.34e-05	2.24e-04	-3.77e-06	2.44e-04	3.67e-07
Di(2-ethylhexyl)phthalate	0	6.83e-07	6.55e-06	-1.10e-07	7.12e-06	1.07e-08
Dibenzo[a,h]anthracene	0	6.71e-10	8.74e-10	-2.82e-12	1.54e-09	2.32e-12
Dichlorobenzene (mixed isomers)	0	0	0	-4.36e-10	-4.36e-10	-6.56e-13
Dichlorodifluoromethane	8.02e-10	0	0	0	8.02e-10	1.21e-12
Dichloromethane	0	2.71e-06	2.60e-05	-4.33e-07	2.83e-05	4.26e-08
Dimethyl Formamide	0	3.49e-05	0	0	3.49e-05	5.25e-08
Dimethyl sulfate	0	4.49e-07	4.30e-06	-7.24e-08	4.68e-06	7.05e-09
Dimethylbenzanthracene	0	3.82e-09	0	-3.39e-11	3.79e-09	5.70e-12
Dioxins, remaining unspeciated	2.79e-13	1.11e-10	5.84e-11	2.11e-10	3.81e-10	5.73e-13
Ethane	5.59e-04	7.90e-04		-6.97e-06	1.34e-03	2.02e-06
Ethanethiol	6.74e-07	0	0	0	6.74e-07	1.01e-09
Ethanol	9.49e-06	0	0	0	9.49e-06	1.43e-08
Ethyl Chloride	0	3.93e-07	3.77e-06	-6.33e-08	4.10e-06	6.17e-09
Ethylbenzene	2.25e-06	8.97e-07	8.46e-06	-1.32e-07	1.15e-05	1.73e-08
Ethylene	4.48e-04	0	0	0	4.48e-04	6.75e-07
Ethylene dibromide	0	1.12e-08	1.08e-07	-1.81e-09	1.17e-07	1.76e-10
Fluoranthene	0	8.56e-09	6.71e-08	-1.08e-09	7.46e-08	1.12e-10
Fluorene	0	1.02e-08	8.39e-08	-1.38e-09	9.28e-08	1.40e-10
Fluoride	2.12e-07	3.12e-07	1.95e-05	1.95e-09	2.01e-05	3.02e-08
Fluorides (F-)	6.70e-07	3.98e-05	0	-3.15e-07	4.01e-05	6.04e-08
Fluorine	8.94e-10	0	0	0	8.94e-10	1.35e-12
Formaldehyde	2.04e-05	1.24e-03	8.46e-05	-8.83e-06	1.33e-03	2.01e-06
Furans, remaining unspeciated	0	5.13e-10	9.32e-11	-1.14e-10	4.92e-10	7.41e-13
Halogenated hydrocarbons (unspecified)	2.27e-06	2.94e-13	0	-7.58e-16	2.27e-06	3.41e-09

Table J-4. CRT air pollutant emissions (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Halogenated matter (unspecified)	1.86e-11	0	0	0	1.86e-11	2.79e-14
HALON-1301	5.81e-07	5.11e-10	0	-1.33e-12	5.82e-07	8.76e-10
HCFC-22	2.66e-09	0	0	0	2.66e-09	4.01e-12
Heptane	1.54e-05	0	0	0	1.54e-05	2.33e-08
Hexane	6.97e-06	4.59e-04	6.01e-06	-4.15e-06	4.68e-04	7.05e-07
HFC-125	4.54e-09	0	0	0	4.54e-09	6.84e-12
Hydrocarbons, remaining unspeciated	1.28e-02	1.58e-01	0	-6.12e-04	1.70e-01	2.57e-04
Hydrochloric acid	2.39e-03	1.12e-02	1.08e-01	-1.04e-03	1.20e-01	1.81e-04
Hydrofluoric acid	5.54e-04	1.40e-03	1.35e-02	-2.26e-04	1.52e-02	2.29e-05
Hydrogen	2.96e-04	0	0	0	2.96e-04	4.46e-07
Hydrogen cyanide	1.54e-10	0	0	0	1.54e-10	2.32e-13
Hydrogen sulfide	4.49e-05	3.11e-03	0	-1.31e-05	3.14e-03	4.73e-06
Indeno(1,2,3-cd)pyrene	0	1.50e-09	6.59e-09	-9.62e-11	7.99e-09	1.20e-11
Iodine	9.41e-07	0	0	0	9.41e-07	1.42e-09
Iron	2.36e-04	3.83e-05	0	-1.67e-07	2.74e-04	4.13e-07
Isophorone	0	5.43e-06	5.20e-05	-8.74e-07	5.66e-05	8.52e-08
Isopropylpropionate	4.01e-10	0	0	0	4.01e-10	6.04e-13
Lanthanum	8.40e-08	0	0	0	8.40e-08	1.27e-10
Lead	1.66e-03	1.30e-05	1.27e-05	1.42e-05	1.70e-03	2.55e-06
Lead (Pb, ore)	0	4.41e-07	0	0	4.41e-07	6.64e-10
Magnesium	1.57e-04	1.03e-04	9.86e-04	-1.66e-05	1.23e-03	1.85e-06
Manganese	1.96e-06	2.33e-05	4.56e-05	-4.99e-06	6.59e-05	9.93e-08
Manganese (Mn, ore)	0	1.09e-06	0	0	1.09e-06	1.64e-09
Mercaptans	2.07e-07	0	0	0	2.07e-07	3.12e-10
Mercury	3.00e-06	1.12e-06	7.51e-06	-1.15e-07	1.15e-05	1.73e-08
Metals, remaining unspeciated	1.21e-04	3.16e-07	0	-1.08e-09	1.22e-04	1.83e-07
Methane	6.40e-02	9.08e-01	6.45e-01	-4.30e-02	1.57e+00	2.37e-03
Methanol	6.73e-06	0	0	0	6.73e-06	1.01e-08
Methyl chloride	0	4.96e-06	4.75e-05	-7.99e-07	5.17e-05	7.78e-08
Methyl ethyl ketone	0	3.65e-06	3.50e-05	-5.88e-07	3.80e-05	5.73e-08
Methyl hydrazine	0	1.59e-06	1.52e-05	-2.56e-07	1.66e-05	2.50e-08
Methyl methacrylate	0	1.87e-07	1.79e-06	-3.02e-08	1.95e-06	2.94e-09
Methyl tert-butyl ether	0	3.27e-07	3.14e-06	-5.28e-08	3.41e-06	5.14e-09
Molybdenum	4.61e-07	2.13e-06	5.84e-07	-2.06e-08	3.15e-06	4.75e-09
Naphthalene	1.49e-08	6.04e-07	1.83e-06	-2.92e-08	2.42e-06	3.64e-09
Nickel	4.13e-05	1.39e-04	6.85e-05	-4.59e-06	2.45e-04	3.68e-07
Nitrogen dioxide	5.76e-02	0	0	1.85e-03	5.95e-02	8.96e-05
Nitrogen oxides	6.99e-03	6.95e-01	1.18e+00	-1.90e-02	1.86e+00	2.80e-03
Nitrous oxide	9.47e-04	1.66e-02	3.40e-03	-1.11e-03	1.98e-02	2.99e-05
Nonmethane hydrocarbons, remaining unspeciated	9.97e-02	1.10e-01	0	-1.91e-03	2.08e-01	3.13e-04
n-Propane	1.50e-04	1.69e-06	0	-3.70e-07	1.51e-04	2.27e-07
Other organics	5.60e-04	7.83e-02	0	-3.65e-03	7.52e-02	1.13e-04
o-xylene	0	1.13e-06	5.71e-08	-3.79e-08	1.15e-06	1.73e-09
Pentachlorobenzene	1.93e-15	0	0	0	1.93e-15	2.91e-18
Pentachlorophenol	3.12e-16	0	0	0	3.12e-16	4.71e-19
Pentane	3.47e-05	6.62e-04	0	-5.84e-06	6.91e-04	1.04e-06
Perfluoroethane	1.44e-05	0	0	0	1.44e-05	2.17e-08
Perfluoromethane	1.30e-04	0	0	0	1.30e-04	1.95e-07

Table J-4. CRT air pollutant emissions (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Phenanthrene	0	3.22e-08	2.51e-07	-4.11e-09	2.79e-07	4.20e-10
Phenol	2.93e-06	1.50e-07	1.43e-06	-2.41e-08	4.49e-06	6.77e-09
Phosphorus (yellow or white)	1.91e-06	1.26e-05	4.95e-06	-1.20e-07	1.94e-05	2.92e-08
Phosphorus pentoxide	8.18e-10	0	0	0	8.18e-10	1.23e-12
PM	1.28e-01	1.31e-01	0	-1.88e-02	2.40e-01	3.62e-04
PM-10	0	3.15e-03	5.78e-02	4.78e-06	6.09e-02	9.17e-05
Polycyclic aromatic hydrocarbons	1.87e-05	5.87e-11	0	-1.52e-13	1.87e-05	2.82e-08
Potassium	4.90e-05	0	0	0	4.90e-05	7.37e-08
Propionaldehyde	4.61e-13	3.55e-06	3.41e-05	-5.73e-07	3.71e-05	5.58e-08
Propionic acid	2.03e-10	0	0	0	2.03e-10	3.06e-13
Propylene	3.77e-05	0	0	0	3.77e-05	5.68e-08
Pyrene	0	5.44e-09	3.33e-08	-5.09e-10	3.82e-08	5.76e-11
Scandium	2.04e-08	0	0	0	2.04e-08	3.08e-11
Selenium	4.69e-07	1.29e-05	1.17e-04	-1.96e-06	1.28e-04	1.93e-07
Silicon	1.06e-03	1.72e-05	0	-7.51e-08	1.08e-03	1.62e-06
Sodium	2.88e-05	1.02e-04	0	-4.45e-07	1.30e-04	1.96e-07
Strontium	5.83e-06	0	0	0	5.83e-06	8.78e-09
Styrene	0	2.34e-07	2.24e-06	-3.77e-08	2.44e-06	3.67e-09
Sulfur dioxide	3.37e-01	1.26e-01	2.49e+00	8.30e-04	2.96e+00	4.45e-03
Sulfur oxides	5.71e-03	8.20e-01	0	-2.97e-02	7.96e-01	1.20e-03
Sulfuric acid	8.81e-07	0	0	0	8.81e-07	1.33e-09
Tars (unspecified)	9.87e-13	0	0	0	9.87e-13	1.49e-15
Tetrachloroethylene	0	4.02e-07	3.86e-06	-6.20e-08	4.20e-06	6.32e-09
Thallium	1.39e-08	0	0	0	1.39e-08	2.10e-11
Thorium	4.51e-08	0	0	0	4.51e-08	6.79e-11
Tin	2.62e-08	0	0	0	2.62e-08	3.94e-11
Titanium	1.00e-05	0	0	0	1.00e-05	1.51e-08
TOCs, remaining unspeciated	0	2.89e-04	5.76e-03	5.76e-07	6.05e-03	9.11e-06
Toluene	2.17e-05	3.84e-03	2.54e-05	-3.87e-07	3.89e-03	5.86e-06
Trichloroethylene	0	0	0	2.84e-09	2.84e-09	4.27e-12
Trichlorofluoromethane	8.27e-09	0	0	0	8.27e-09	1.25e-11
Uranium	4.43e-08	0	0	0	4.43e-08	6.67e-11
Vanadium	6.77e-05	2.74e-04	1.76e-05	-1.39e-06	3.57e-04	5.38e-07
Vinyl acetate	0	7.11e-08	6.82e-07	-1.15e-08	7.41e-07	1.12e-09
Vinyl chloride	0	0	0	5.67e-09	5.67e-09	8.54e-12
VOCs, remaining unspeciated	1.10e-03	0	0	0	1.10e-03	1.65e-06
Waste metals, unspecified	1.45e-05	0	0	0	1.45e-05	2.18e-08
Xylene (mixed isomers)	3.65e-05	3.84e-04	3.32e-06	-6.94e-09	4.24e-04	6.38e-07
Zinc (elemental)	5.84e-04	1.56e-05	1.52e-05	-2.78e-07	6.15e-04	9.26e-07
Zirconium	2.14e-08	0	0	0	2.14e-08	3.23e-11
Total air pollutants	3.00e+01	1.83e+02	4.49e+02	2.47e+00	6.64e+02	100.00%

Table J-5. CRT water outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
WASTEWATER STREAMS							
Wastewater stream	surface water	1.70e+01	1.41e+03	0	-3.65e+00	1.42e+03	93.76%
Wastewater stream	treatment	0	9.48e+01	0	0	9.48e+01	6.24%
Total wastewater streams		1.70e+01	1.51e+03	0.00e+00	-3.65e+00	1.52e+03	100.00%
WATER POLLUTANTS							
1,1,1-Trichloroethane	surface water	1.70e-13	0	0	0	1.70e-13	8.15e-15
1,2-Dichloroethane	surface water	0	0	0	8.41e-11	8.41e-11	4.03e-12
Acetic acid	surface water	1.49e-09	0	0	0	1.49e-09	7.16e-11
Acids (H+)	surface water	1.52e-04	1.03e-07	0	-4.78e-09	1.53e-04	7.30e-06
Adsorbable organic halides	surface water	1.04e-05	3.76e-10	0	-9.75e-13	1.04e-05	4.97e-07
Alcohols	surface water	1.19e-07	0	0	0	1.19e-07	5.71e-09
Aldehydes	surface water	3.10e-09	0	0	0	3.10e-09	1.48e-10
Alkane (unspecified)	surface water	6.77e-06	0	0	0	6.77e-06	3.24e-07
Alkenes	surface water	5.27e-07	0	0	0	5.27e-07	2.52e-08
Aluminum (+3)	surface water	2.74e-03	1.43e-04	0	-3.70e-07	2.89e-03	1.38e-04
Aluminum hydroxide	surface water	1.39e-09	0	0	0	1.39e-09	6.65e-11
Ammonia	surface water	1.86e-04	0	0	-4.05e-06	1.81e-04	8.69e-06
Ammonia ions	surface water	3.54e-06	2.76e-02	0	-6.63e-05	2.75e-02	1.32e-03
Aromatic hydrocarbons	surface water	3.00e-05	8.81e-08	0	-2.28e-10	3.01e-05	1.44e-06
Arsenic cmpds	surface water	5.47e-06	0	0	1.35e-08	5.48e-06	2.63e-07
Barium cmpds	surface water	3.53e-04	2.82e-07	0	4.03e-07	3.53e-04	1.69e-05
Barium sulfate	surface water	6.71e-04	0	0	0	6.71e-04	3.21e-05
Benzene	surface water	7.40e-06	0	0	8.41e-11	7.40e-06	3.54e-07
BOD	surface water	3.93e-04	1.95e-01	0	-4.65e-04	1.95e-01	9.34e-03
Boric acid	surface water	1.77e-06	0	0	0	1.77e-06	8.49e-08
Boron (B III)	surface water	1.75e-06	0	0	0	1.75e-06	8.39e-08
Cadmium cmpds	surface water	5.59e-07	2.94e-10	0	8.03e-10	5.60e-07	2.68e-08
Calcium (+2)	surface water	4.96e-03	0	0	0	4.96e-03	2.38e-04
Carbon tetrachloride	surface water	0	0	0	8.41e-11	8.41e-11	4.03e-12
Carbonate ion	surface water	4.83e-03	0	0	0	4.83e-03	2.31e-04
Cesium (+2)	surface water	1.93e-08	0	0	0	1.93e-08	9.24e-10
Chloride ions	surface water	4.29e-01	6.48e+00	0	-2.39e-02	6.88e+00	32.95%
Chlorine	surface water	8.94e-07	0	0	0	8.94e-07	4.28e-08
Chloroform	surface water	1.75e-11	0	0	8.41e-11	1.02e-10	4.87e-12
Chromium	surface water	8.20e-08	0	0	0	8.20e-08	3.93e-09
Chromium (III)	surface water	2.73e-05	3.77e-08	0	1.32e-08	2.74e-05	1.31e-06
Chromium (VI)	surface water	4.68e-07	3.77e-08	0	1.32e-08	5.19e-07	2.49e-08
Chromium ore	surface water	0	1.02e-05	0	0	1.02e-05	4.90e-07
Chromium ore	treatment	0	1.03e-06	0	0	1.03e-06	4.95e-08
Cobalt (Co I, Co II, Co III)	surface water	2.45e-06	0	0	0	2.45e-06	1.17e-07
COD	surface water	1.00e-02	1.60e+00	0	-3.94e-03	1.61e+00	7.71%
COD	treatment	0	8.33e-03	0	0	8.33e-03	3.99e-04
Copper	surface water	0	1.80e-06	0	0	1.80e-06	8.63e-08
Copper (+1 & +2)	surface water	1.61e-05	5.87e-09	0	-1.52e-11	1.61e-05	7.70e-07
Copper (+1 & +2)	treatment	0	9.71e-05	0	0	9.71e-05	4.65e-06
Cyanide (-1)	surface water	1.85e-06	6.06e-07	0	-1.07e-12	2.46e-06	1.18e-07
Dichloromethane	surface water	5.02e-08	0	0	1.35e-10	5.03e-08	2.41e-09
Dissolved organic matter (chlorinated)	surface water	2.27e-06	0	0	0	2.27e-06	1.08e-07
Dissolved organics	surface water	5.54e-04	2.71e-07	0	-1.26e-08	5.55e-04	2.66e-05

Table J-5. CRT water outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Dissolved solids	surface water	5.30e-03	3.62e+00	0	-8.77e-05	3.62e+00	17.36%
Dissolved solids	treatment	0	8.01e-02	0	0	8.01e-02	3.84e-03
Edetic acid (EDTA)	surface water	3.01e-09	0	0	0	3.01e-09	1.44e-10
Ethylbenzene	surface water	6.70e-07	0	0	3.04e-10	6.71e-07	3.21e-08
Fluoride	surface water	1.89e-05	3.45e-03	0	0	3.47e-03	1.66e-04
Fluoride	treatment	0	3.51e-04	0	0	3.51e-04	1.68e-05
Fluorides (F-)	surface water	9.63e-05	2.97e-03	0	-7.72e-06	3.06e-03	1.46e-04
Formaldehyde	surface water	2.20e-13	0	0	0	2.20e-13	1.05e-14
Halogenated matter (organic)	surface water	2.71e-10	1.17e-10	0	-3.05e-13	3.88e-10	1.86e-11
Hexachloroethane	surface water	3.09e-17	0	0	0	3.09e-17	1.48e-18
Hydrazine	surface water	1.38e-09	0	0	0	1.38e-09	6.62e-11
Hydrocarbons, remaining unspeciated	surface water	1.58e-04	3.52e-04	0	-4.25e-07	5.09e-04	2.44e-05
Hypochlorite	surface water	5.26e-09	0	0	0	5.26e-09	2.52e-10
Hypochlorous acid	surface water	5.26e-09	0	0	0	5.26e-09	2.52e-10
Iodide (-1)	surface water	3.23e-06	0	0	0	3.23e-06	1.54e-07
Iron	surface water	0	2.93e-03	0	0	2.93e-03	1.40e-04
Iron (+2 & +3)	surface water	1.76e-03	3.55e-07	0	-1.57e-08	1.76e-03	8.42e-05
Lead	surface water	0	4.64e-05	0	0	4.64e-05	2.22e-06
Lead	treatment	0	1.03e-06	0	0	1.03e-06	4.95e-08
Lead cmpds	surface water	1.59e-05	1.17e-09	0	1.60e-09	1.59e-05	7.59e-07
Lead cmpds	treatment	0	1.62e-05	0	0	1.62e-05	7.75e-07
Lithium salts	surface water	1.55e-10	0	0	0	1.55e-10	7.40e-12
Magnesium (+2)	surface water	2.68e-03	0	0	0	2.68e-03	1.28e-04
Manganese	surface water	0	3.60e-06	0	0	3.60e-06	1.73e-07
Manganese cmpds	surface water	1.02e-04	0	0	0	1.02e-04	4.88e-06
Mercury compounds	surface water	9.68e-07	1.35e-12	0	4.33e-11	9.68e-07	4.63e-08
Metals, remaining unspeciated	surface water	6.74e-04	9.75e-03	0	-3.42e-05	1.04e-02	4.98e-04
Molybdenum	surface water	0	1.20e-07	0	0	1.20e-07	5.77e-09
Molybdenum (Mo II, Mo III, Mo IV, Mo V, Mo VI)	surface water	8.27e-06	0	0	0	8.27e-06	3.96e-07
Morpholine	surface water	1.46e-08	0	0	0	1.46e-08	7.01e-10
Nickel	surface water	0	7.94e-05	0	0	7.94e-05	3.80e-06
Nickel (+2)	surface water	6.69e-07	0	0	0	6.69e-07	3.20e-08
Nickel cmpds	surface water	1.75e-05	5.87e-10	0	-1.52e-12	1.75e-05	8.38e-07
Nitrate	surface water	9.24e-05	6.10e-05	0	-1.96e-06	1.51e-04	7.25e-06
Nitrates/nitrites	surface water	2.29e-05	3.95e-06	0	0	2.69e-05	1.29e-06
Nitrites	surface water	1.91e-06	0	0	0	1.91e-06	9.15e-08
Nitrogen	surface water	4.46e-05	7.18e-03	0	0	7.23e-03	3.46e-04
Nitrogen dioxide	surface water	6.20e-04	0	0	0	6.20e-04	2.97e-05
Oil & grease	surface water	0	7.46e-03	0	0	7.46e-03	3.57e-04
Other nitrogen	surface water	5.28e-04	1.59e-08	0	-4.11e-11	5.28e-04	2.53e-05
Other organics	surface water	3.98e-05	0	0	0	3.98e-05	1.90e-06
Oxalic acid	surface water	6.02e-09	0	0	0	6.02e-09	2.88e-10
o-xylene	surface water	0	0	0	7.84e-10	7.84e-10	3.76e-11
Phenol	surface water	6.25e-05	3.63e-03	0	-9.41e-06	3.68e-03	1.76e-04
Phosphate (PO43-)	surface water	1.75e-04	0	0	0	1.75e-04	8.39e-06
Phosphate as P2O5	surface water	0	1.21e-06	0	0	1.21e-06	5.80e-08
Phosphates	surface water	3.36e-05	5.85e-07	0	6.93e-09	3.42e-05	1.64e-06
Phosphorus (yellow or white)	surface water	3.94e-06	5.05e-05	0	0	5.44e-05	2.61e-06

Table J-5. CRT water outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Phosphorus pentoxide	surface water	2.45e-08	0	0	0	2.45e-08	1.18e-09
Polycyclic aromatic hydrocarbons	surface water	7.88e-06	1.41e-09	0	-3.66e-12	7.88e-06	3.77e-07
Potassium (+1)	surface water	1.12e-03	0	0	0	1.12e-03	5.38e-05
Rubidium ion (Rb+)	surface water	1.93e-07	0	0	0	1.93e-07	9.26e-09
Salts (unspecified)	surface water	1.71e-03	1.62e-03	0	-4.21e-06	3.33e-03	1.59e-04
Sand	surface water	1.80e-08	0	0	0	1.80e-08	8.62e-10
Saponifiable oils and fats	surface water	2.38e-04	0	0	0	2.38e-04	1.14e-05
Selenium	surface water	1.34e-05	0	0	8.15e-11	1.34e-05	6.44e-07
Silver compounds	surface water	1.16e-08	0	0	2.55e-09	1.41e-08	6.78e-10
Sodium	surface water	9.07e-05	0	0	0	9.07e-05	4.34e-06
Sodium (+1)	surface water	2.90e-01	7.04e+00	0	-3.08e-02	7.30e+00	34.94%
Strontium (Sr II)	surface water	3.73e-04	0	0	0	3.73e-04	1.79e-05
Sulfate ion (-4)	surface water	3.75e-02	9.61e-04	0	-1.85e-06	3.84e-02	1.84e-03
Sulfate ion (-4)	treatment	0	1.09e-03	6.84e-02	6.84e-06	6.95e-02	3.33e-03
Sulfide	surface water	3.99e-06	5.97e-08	0	-2.64e-09	4.05e-06	1.94e-07
Sulfites	surface water	1.73e-06	0	0	0	1.73e-06	8.27e-08
Sulfur	surface water	3.32e-11	0	0	0	3.32e-11	1.59e-12
Suspended solids	surface water	7.72e-03	8.69e-01	0	-2.11e-03	8.74e-01	4.19%
Suspended solids	treatment	0	1.29e-03	1.78e-03	1.78e-07	3.07e-03	1.47e-04
Tars (unspecified)	surface water	1.53e-14	0	0	0	1.53e-14	7.34e-16
Tetrachloroethylene	surface water	7.61e-14	0	0	8.41e-11	8.42e-11	4.03e-12
Tin (Sn++, Sn4+)	surface water	1.35e-04	0	0	0	1.35e-04	6.45e-06
Titanium tetrachloride	surface water	1.59e-04	0	0	0	1.59e-04	7.60e-06
TOCs	surface water	2.85e-03	8.81e-07	0	-2.28e-09	2.86e-03	1.37e-04
Toluene	surface water	8.52e-06	1.29e-08	0	2.90e-09	8.54e-06	4.09e-07
Trichloroethylene	surface water	4.68e-12	0	0	8.41e-11	8.88e-11	4.25e-12
Triethylene glycol	surface water	1.00e-05	0	0	0	1.00e-05	4.81e-07
Vanadium (V3+, V5+)	surface water	1.42e-05	0	0	0	1.42e-05	6.78e-07
Vinyl chloride	surface water	0	0	0	1.69e-10	1.69e-10	8.07e-12
VOCs, remaining unspeciated	surface water	6.75e-06	0	0	0	6.75e-06	3.23e-07
Waste metals, unspecified	surface water	2.14e-04	0	0	0	2.14e-04	1.03e-05
Waste oil	surface water	3.65e-03	1.01e-01	0	-3.13e-04	1.04e-01	4.98e-03
Xylene (mixed isomers)	surface water	2.17e-05	0	0	7.31e-10	2.17e-05	1.04e-06
Zinc (+2)	surface water	6.66e-05	1.23e-08	0	-3.17e-10	6.66e-05	3.19e-06
Zinc (elemental)	surface water	0	1.39e-05	0	0	1.39e-05	6.64e-07
Zinc (elemental)	treatment	0	1.03e-06	0	0	1.03e-06	4.95e-08
Total water pollutants		8.12e-01	2.01e+01	7.02e-02	-6.18e-02	2.09e+01	100.00%

Table J-6. CRT hazardous waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Barium debris (D008 waste)	landfill	0	2.14E-04	0	0	2.14E-04	2.26E-05
Broken CRT glass	landfill	0	1.88E-03	0	0	1.88E-03	1.99E-04
Carbon and filmer waste	landfill	0	1.03E-03	0	0	1.03E-03	1.09E-04
Chrome debris (D007 waste)	treatment	0	1.47E-04	0	0	1.47E-04	1.56E-05
Chrome liquid waste (D007 waste)	recycling/reuse	0	9.80E-03	0	0	9.80E-03	1.04E-03
cinders from CRT glass mfg (70% PbO)	landfill	0	8.26E-03	0	0	8.26E-03	8.73E-04
CRT glass faceplate EP dust (Pb) (D008 waste)	landfill	0	1.03E-03	0	0	1.03E-03	1.09E-04
CRT glass funnel EP dust (Pb) (D008 waste)	recycling/reuse	0	5.01E-03	0	0	5.01E-03	5.30E-04
CRT glass, cullet	recycling/reuse	0	0	0	4.84E-01	4.84E-01	5.12%
CRT glass, funnel	recycling/reuse	0	0	0	2.29E-01	2.29E-01	2.42%
EOL CRT Monitor, landfilled	landfill	0	0	0	7.20E+00	7.20E+00	76.11%
Frit	landfill	0	2.99E-03	0	0	2.99E-03	3.16E-04
General Hazardous Waste	landfill	4.85E-02	0	0	-9.61E-05	4.84E-02	5.12E-03
General Hazardous Waste	treatment	0	1.24E-01	0	0	1.24E-01	1.31E-02
Hazardous sludge (Pb) (D008)	landfill	0	1.52E-03	0	0	1.52E-03	1.60E-04
Hazardous waste	landfill	3.85E-04	6.15E-01	0	-1.50E-03	6.14E-01	6.49%
Hydrofluoric acid	landfill	0	1.78E-03	0	0	1.78E-03	1.88E-04
Lead contaminated grit (D008 waste)	landfill	0	3.46E-05	0	0	3.46E-05	3.65E-06
Lead debris (D008 waste)	landfill	0	2.14E-04	0	0	2.14E-04	2.26E-05
Lead sulfate cake	landfill	0	2.67E-05	0	0	2.67E-05	2.82E-06
Printed wiring board (PWB)	recycling/reuse	0	0	0	1.46E-01	1.46E-01	1.54E-02
PWB-Decontaminating debris	treatment	0	1.55E-02	0	0	1.55E-02	1.64E-03
PWB-Lead contaminated waste oil	treatment	0	1.16E-02	0	0	1.16E-02	1.23E-03
PWB-Route dust	recycling/reuse	0	1.20E-02	0	0	1.20E-02	1.27E-03
PWB-Solder dross	recycling/reuse	0	6.70E-02	0	0	6.70E-02	7.09E-03
PWB-Waste cupric etchant	recycling/reuse	0	2.25E-01	0	0	2.25E-01	2.38%
Silica coat waste	treatment	0	2.86E-04	0	0	2.86E-04	3.02E-05
Slag and ash	landfill	0	2.47E-03	0	0	2.47E-03	2.61E-04
sludge from CRT glass mfg (1% PbO)	landfill	0	8.77E-04	0	0	8.77E-04	9.28E-05
Slurry scrap (chromium-based)	landfill	0	8.62E-04	0	0	8.62E-04	9.12E-05
Spent solvent, unspecified	treatment	0	2.75E-04	0	0	2.75E-04	2.90E-05
Transformer	recycling/reuse	0	0	0	2.28E-01	2.28E-01	2.41%
Unspecified sludge	landfill	0	5.22E-03	0	0	5.22E-03	5.52E-04
Unspecified sludge	recycling/reuse	0	5.56E-03	0	0	5.56E-03	5.88E-04
Waste acid (mostly 3% HCl solution)	recycling/reuse	0	3.93E-03	0	0	3.93E-03	4.16E-04
Waste Batch (Ba, Pb) (D008 waste)	landfill	0	1.41E-03	0	0	1.41E-03	1.50E-04
Waste finishing sludge (Pb) (D008 waste)	landfill	0	2.56E-04	0	0	2.56E-04	2.70E-05
Waste oxygenated solvents	treatment	0	9.48E-05	0	0	9.48E-05	1.00E-05
Waste water treatment (WWT) filters	landfill	0	3.40E-04	0	0	3.40E-04	3.60E-05
Total hazardous waste		4.89E-02	1.13E+00	0.00E+00	8.28E+00	9.46E+00	100.00%

Table J-7. CRT solid waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
abrasive sludge	recycling/reuse	0	4.21E-02	0	0	4.21E-02	2.44E-04
acid absorbent	landfill	0	8.13E-05	0	0	8.13E-05	4.72E-07
Aluminum (elemental)	landfill	5.68E-05	0	0	0	5.68E-05	3.29E-07
Aluminum scrap	recycling/reuse	0	1.82E-04	0	1.10E-01	1.10E-01	6.37E-04
Aluminum scrap, Wabash 319	recycling/reuse	0	5.08E-07	0	0	5.08E-07	2.95E-09
Arsenic	landfill	2.27E-08	0	0	0	2.27E-08	1.32E-10
Bauxite residues	landfill	0	1.21E-02	0	-2.96E-05	1.21E-02	7.03E-05
blasting media	landfill	0	3.66E-04	0	0	3.66E-04	2.12E-06
Broken CRT glass	recycling/reuse	0	1.08E+00	0	0	1.08E+00	0.62%
Cables/wires	recycling/reuse	0	8.86E-03	0	0	8.86E-03	5.14E-05
Cadmium	landfill	1.65E-09	0	0	0	1.65E-09	9.59E-12
Calcium	landfill	2.27E-04	0	0	0	2.27E-04	1.32E-06
Carbon	landfill	1.75E-04	0	0	0	1.75E-04	1.01E-06
Carbon Steel Scrap	recycling/reuse	0	0	0	4.10E-01	4.10E-01	0.24%
Cardboard	recycling/reuse	9.81E-05	0	0	0	9.81E-05	5.69E-07
Chromium (III)	landfill	1.42E-07	0	0	0	1.42E-07	8.23E-10
Chromium (VI)	landfill	1.42E-07	0	0	0	1.42E-07	8.23E-10
Coal waste	landfill	0	1.46E+00	5.09E+01	5.09E-03	5.23E+01	30.37%
Cobalt	landfill	1.00E-09	0	0	0	1.00E-09	5.81E-12
Cobalt nitrate	treatment	0	6.10E-05	0	0	6.10E-05	3.54E-07
Copper	landfill	5.01E-09	0	0	0	5.01E-09	2.91E-11
Copper scrap	recycling/reuse	0	0	0	6.67E-02	6.67E-02	3.87E-04
CRT glass, faceplate	landfill	0	2.43E-02	0	0	2.43E-02	1.41E-04
CRT glass, faceplate	recycling/reuse	0	0	0	3.54E-01	3.54E-01	0.21%
Diesel fuel	treatment	0	4.07E-05	0	0	4.07E-05	2.36E-07
Dust	treatment	0	3.43E-03	0	0	3.43E-03	1.99E-05
Dust/sludge	landfill	0	5.64E-01	1.97E+01	1.97E-03	2.02E+01	11.75%
EOL CRT Monitor, incinerated	treatment	0	0	0	3.31E+00	3.31E+00	1.92%
EOL CRT Monitor, landfilled	landfill	0	0	0	3.91E+00	3.91E+00	2.27%
EOL CRT Monitor, recycled	recycling/reuse	0	0	0	2.42E+00	2.42E+00	1.40%
EOL CRT Monitor, remanufactured	recycling/reuse	0	0	0	6.60E-01	6.60E-01	0.38%
Ferric chloride	recycling/reuse	0	3.69E-01	0	0	3.69E-01	0.21%
FGD sludge	landfill	0	2.14E-01	0	-9.24E-04	2.14E-01	0.12%
flame retardant high-impact polystyrene (HIPS)	recycling/reuse	0	0	0	4.03E-01	4.03E-01	0.23%
Fly/bottom ash	landfill	0	3.65E-01	1.27E+01	1.27E-03	1.31E+01	7.59%
Iron	landfill	1.14E-04	0	0	0	1.14E-04	6.59E-07
Iron scrap	recycling/reuse	3.43E-01	0	0	2.50E+00	2.85E+00	1.65%
Lead	landfill	2.29E-08	0	0	0	2.29E-08	1.33E-10
Manganese	landfill	2.27E-06	0	0	0	2.27E-06	1.32E-08
Mercury	landfill	1.42E-10	0	0	0	1.42E-10	8.21E-13
Mineral waste	landfill	4.42E-01	2.61E-03	0	-6.76E-06	4.44E-01	0.26%
Mining waste	landfill	4.48E-01	0	0	-1.90E-06	4.48E-01	0.26%
Mixed industrial (waste)	landfill	4.87E-02	1.00E+00	0	-5.12E-04	1.05E+00	0.61%
Nickel	landfill	7.50E-09	0	0	0	7.50E-09	4.35E-11
Nickel nitrate	treatment	0	6.10E-05	0	0	6.10E-05	3.54E-07
Nitrogen	landfill	4.23E-08	0	0	0	4.23E-08	2.45E-10
Non mineral waste (inert)	landfill	2.95E-05	0	0	0	2.95E-05	1.71E-07
Non toxic chemical waste (unspecified)	landfill	4.07E-03	6.11E-04	0	-1.58E-06	4.68E-03	2.71E-05

Table J-7. CRT solid waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Oily rags & filter media	landfill	0	3.25E-04	0	0	3.25E-04	1.89E-06
Oily rags & filter media	recycling/reuse	0	4.07E-05	0	0	4.07E-05	2.36E-07
parts cleaner solvent	recycling/reuse	0	8.13E-05	0	0	8.13E-05	4.72E-07
Phosphorus (yellow or white)	landfill	2.90E-06	0	0	0	2.90E-06	1.68E-08
Plating process sludge	landfill	0	3.28E-04	0	0	3.28E-04	1.90E-06
PM	landfill	0	5.33E-04	0	0	5.33E-04	3.09E-06
Potassium Carbonate	landfill	0	3.30E-03	0	0	3.30E-03	1.91E-05
Printed wiring board (PWB)	recycling/reuse	0	3.70E-02	0	0	3.70E-02	2.15E-04
PWB-Drill dust	landfill	0	1.49E-02	0	0	1.49E-02	8.67E-05
Sewage sludge (unspecified)	landfill	6.64E-05	0	0	0	6.64E-05	3.85E-07
Slag and ash	landfill	9.65E-02	6.66E+01	0	-1.49E+01	5.18E+01	30.06%
Slag and ash	recycling/reuse	0	6.85E-01	0	-3.01E-03	6.82E-01	0.40%
Sludge (aquadag)	landfill	0	2.22E-03	0	0	2.22E-03	1.29E-05
sludge (calcium fluoride, CaF2)	recycling/reuse	0	1.75E-02	0	0	1.75E-02	1.02E-04
Sludge (phosphor)	landfill	0	4.31E-03	0	0	4.31E-03	2.50E-05
Sodium Carbonate	landfill	0	3.29E-03	0	0	3.29E-03	1.91E-05
Spent solvents (toluene,xylene,dimethyl formamide,isopropyl alcohol)	recycling/reuse	0	4.17E-02	0	0	4.17E-02	2.42E-04
Stannous sludge	recycling/reuse	6.64E-04	0	0	0	6.64E-04	3.85E-06
Steel scrap (tinplated)	recycling/reuse	1.58E-01	0	0	0	1.58E-01	9.15E-04
Sulfur	landfill	2.55E-05	0	0	0	2.55E-05	1.48E-07
Unspecified sludge	landfill	0	7.69E-03	0	0	7.69E-03	4.46E-05
Unspecified sludge	recycling/reuse	0	1.26E-01	0	0	1.26E-01	7.29E-04
Unspecified solid waste	landfill	4.94E+00	0	0	-7.86E-01	4.15E+00	2.41%
Unspecified solid waste	recycling/reuse	3.07E+00	4.33E-01	0	0	3.50E+00	2.03%
Unspecified solid waste	treatment	0	3.66E+00	0	0	3.66E+00	2.12%
Unspecified solid waste (incinerated)	treatment	4.24E-03	1.33E-02	0	-5.82E-05	1.75E-02	1.01E-04
Unspecified waste	landfill	0	3.38E+00	0	-1.49E-02	3.36E+00	1.95%
Unspecified waste	recycling/reuse	0	0	0	-8.90E-02	-8.90E-02	-5.17E-04
Waste alkali (cleaning caustic and alkali soda effluent)	recycling/reuse	0	2.12E-02	0	0	2.12E-02	1.23E-04
Waste alkali, unspecified	treatment	0	4.21E-05	0	0	4.21E-05	2.44E-07
Waste metals, unspecified	recycling/reuse	0	8.79E-02	0	0	8.79E-02	5.10E-04
Waste oil	landfill	8.15E-05	0	0	0	8.15E-05	4.73E-07
Waste oil	recycling/reuse	0	1.43E-03	0	0	1.43E-03	8.29E-06
Waste oil	treatment	0	9.09E-03	0	0	9.09E-03	5.28E-05
Waste Plastic (packing material)	treatment	0	3.01E-02	0	0	3.01E-02	1.75E-04
Waste Plastic (styrene foam)	recycling/reuse	0	3.77E-03	0	0	3.77E-03	2.19E-05
Waste plastics from CRT monitor	recycling/reuse	0	8.09E-02	0	0	8.09E-02	4.70E-04
Waste refractory	landfill	0	2.44E-03	0	0	2.44E-03	1.42E-05
Waste water treatment (WWT) sludge	landfill	0	3.43E-01	0	0	3.43E-01	0.20%
Waste water treatment (WWT) sludge	recycling/reuse	0	3.72E-01	0	0	3.72E-01	0.22%
Wastepaper	recycling/reuse	0	8.34E-03	0	0	8.34E-03	4.84E-05
Wood, average	landfill	0	4.94E-03	0	0	4.94E-03	2.87E-05
Zinc (elemental)	landfill	9.01E-07	0	0	0	9.01E-07	5.23E-09
Total solid waste		9.55E+00	8.12E+01	8.33E+01	-1.66E+00	1.72E+02	100.00%

Table J-8. CRT radioactive waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Highly radioactive waste (Class C)	landfill	8.65e-06	0	0	0	8.65e-06	2.98e-03
Low-level radioactive waste	landfill	4.11e-04	1.38e-04	1.76e-03	1.76e-07	2.31e-03	79.47%
Radioactive waste (unspecified)	landfill	1.88e-05	0	0	0	1.88e-05	6.46e-03
Uranium, depleted	landfill	0	4.15e-05	5.27e-04	5.27e-08	5.69e-04	19.59%
Total radioactive waste		4.39e-04	1.80e-04	2.28e-03	2.29e-07	2.90e-03	100.00%

Table J-9. CRT radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Americium-241 (isotope)	landfill	3.00e+02	0	0	0	3.00e+02	3.34e-06
Americium-243 (isotope)	landfill	6.53e+00	0	0	0	6.53e+00	7.26e-08
Antimony-124 (isotope)	surface water	6.75e-02	0	0	0	6.75e-02	7.52e-10
Antimony-124 (isotope)	treatment	0	6.21e-01	7.89e+00	7.89e-04	8.51e+00	9.47e-08
Antimony-125 (isotope)	treatment	0	2.47e+00	3.14e+01	3.14e-03	3.39e+01	3.77e-07
Argon-41 (isotope)	air	0	1.26e+03	1.60e+04	1.60e+00	1.72e+04	1.92e-04
Barium-140 (isotope)	treatment	0	4.60e-02	5.85e-01	5.85e-05	6.31e-01	7.02e-09
Bromine-89 (isotope)	air	0	1.45e-04	1.85e-03	1.85e-07	1.99e-03	2.22e-11
Bromine-90 (isotope)	air	0	5.91e-05	7.51e-04	7.52e-08	8.10e-04	9.02e-12
Carbon-14 (isotope)	air	2.97e+01	0	0	0	2.97e+01	3.31e-07
Cesium-134 (isotope)	air	1.14e-03	3.99e-03	5.07e-02	5.07e-06	5.58e-02	6.22e-10
Cesium-134 (isotope)	surface water	5.94e-02	0	0	0	5.94e-02	6.61e-10
Cesium-134 (isotope)	treatment	0	1.66e+00	2.11e+01	2.11e-03	2.28e+01	2.53e-07
Cesium-135 (isotope)	landfill	1.46e+05	0	0	0	1.46e+05	1.63e-03
Cesium-136 (isotope)	treatment	0	1.44e-02	9.03e-01	9.04e-05	9.18e-01	1.02e-08
Cesium-137 (isotope)	air	1.14e-03	3.01e-02	3.83e-01	3.83e-05	4.14e-01	4.61e-09
Cesium-137 (isotope)	landfill	4.09e-01	0	0	0	4.09e-01	4.55e-09
Cesium-137 (isotope)	surface water	8.71e-02	0	0	0	8.71e-02	9.69e-10
Cesium-137 (isotope)	treatment	0	2.49e+00	3.17e+01	3.17e-03	3.42e+01	3.80e-07
Chromium-51 (isotope)	air	0	7.89e-02	1.00e+00	1.00e-04	1.08e+00	1.20e-08
Chromium-51 (isotope)	treatment	0	2.99e+00	3.80e+01	3.80e-03	4.10e+01	4.56e-07
Cobalt-57 (isotope)	air	0	2.12e-04	2.69e-03	2.69e-07	2.90e-03	3.23e-11
Cobalt-57 (isotope)	treatment	0	7.25e-02	9.20e-01	9.21e-05	9.93e-01	1.11e-08
Cobalt-58 (isotope)	air	1.14e-03	5.49e+01	3.44e+03	3.44e-01	3.49e+03	3.89e-05
Cobalt-58 (isotope)	surface water	1.95e-01	0	0	0	1.95e-01	2.17e-09
Cobalt-58 (isotope)	treatment	0	2.95e+01	3.74e+02	3.75e-02	4.04e+02	4.50e-06
Cobalt-60 (isotope)	air	1.14e-03	2.04e-02	2.59e-01	2.59e-05	2.80e-01	3.12e-09
Cobalt-60 (isotope)	surface water	1.22e-01	0	0	0	1.22e-01	1.36e-09
Cobalt-80 (isotope)	treatment	0	7.74e+00	9.83e+01	9.83e-03	1.06e+02	1.18e-06
Curium-244 (isotope)	landfill	6.08e+02	0	0	0	6.08e+02	6.77e-06
Curium-245 (isotope)	landfill	6.78e-02	0	0	0	6.78e-02	7.55e-10
Iodine-129 (isotope)	landfill	9.58e-03	0	0	0	9.58e-03	1.07e-10
Iodine-131 (isotope)	air	6.67e-03	9.51e-02	1.21e+00	1.21e-04	1.31e+00	1.46e-08
Iodine-131 (isotope)	surface water	7.40e-03	0	0	0	7.40e-03	8.24e-11
Iodine-131 (isotope)	treatment	0	1.38e+00	1.75e+01	1.75e-03	1.89e+01	2.10e-07
Iodine-132 (isotope)	air	0	1.93e-02	2.45e-01	2.46e-05	2.65e-01	2.95e-09
Iodine-132 (isotope)	treatment	0	5.22e-01	6.64e+00	6.64e-04	7.16e+00	7.97e-08
Iodine-133 (isotope)	air	1.30e-02	8.82e+01	1.12e+03	1.12e-01	1.21e+03	1.35e-05
Iodine-133 (isotope)	treatment	0	5.91e-01	7.51e+00	7.52e-04	8.10e+00	9.02e-08
Iodine-134 (isotope)	air	0	1.00e-01	1.27e+00	1.27e-04	1.37e+00	1.53e-08
Iodine-135 (isotope)	air	0	5.03e-03	6.39e-02	6.39e-06	6.89e-02	7.67e-10
Iodine-135 (isotope)	treatment	0	4.24e-01	5.39e+00	5.39e-04	5.82e+00	6.47e-08
Iron-55 (isotope)	treatment	0	7.05e+00	8.95e+01	8.96e-03	9.66e+01	1.07e-06
Iron-59 (isotope)	treatment	0	3.62e-01	4.60e+00	4.60e-04	4.96e+00	5.52e-08
Krypton-85 (isotope)	air	1.73e+02	2.08e+03	2.65e+04	2.65e+00	2.87e+04	3.20e-04
Krypton-85M (isotope)	air	0	1.01e+02	1.28e+03	1.28e-01	1.38e+03	1.54e-05
Krypton-85M (isotope)	treatment	0	1.86e+00	2.37e+01	2.37e-03	2.55e+01	2.84e-07

Table J-9. CRT radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Krypton-87 (isotope)	air	0	3.76e+01	4.78e+02	4.78e-02	5.15e+02	5.74e-06
Krypton-88 (isotope)	air	0	1.76e+02	2.24e+03	2.24e-01	2.42e+03	2.69e-05
Lanthanum-140 (isotope)	treatment	0	4.93e-02	6.26e-01	6.26e-05	6.75e-01	7.52e-09
Lead-210 (isotope)	air	1.02e+00	0	0	0	1.02e+00	1.14e-08
Manganese-54 (isotope)	air	0	1.12e-03	1.42e-02	1.42e-06	1.53e-02	1.71e-10
Manganese-54 (isotope)	surface water	9.76e-03	0	0	0	9.76e-03	1.09e-10
Manganese-54 (isotope)	treatment	0	1.97e+00	2.50e+01	2.51e-03	2.70e+01	3.01e-07
Molybdenum-99 (isotope)	treatment	0	3.72e+06	4.73e+07	4.73e+03	5.10e+07	56.75%
Neptunium-237 (isotope)	landfill	9.39e+01	0	0	0	9.39e+01	1.05e-06
Niobium-95 (isotope)	air	0	4.45e-05	5.65e-04	5.65e-08	6.09e-04	6.78e-12
Niobium-95 (isotope)	treatment	0	5.08e-01	6.45e+00	6.45e-04	6.96e+00	7.74e-08
Palladium-107 (isotope)	landfill	3.30e-02	0	0	0	3.30e-02	3.67e-10
Plutonium-239 (isotope)	landfill	1.14e+05	0	0	0	1.14e+05	1.26e-03
Plutonium-240 (isotope)	landfill	1.62e+05	0	0	0	1.62e+05	1.80e-03
Plutonium-241 (isotope)	landfill	3.74e+07	0	0	0	3.74e+07	41.67%
Plutonium-242 (isotope)	landfill	6.10e+02	0	0	0	6.10e+02	6.79e-06
Polonium-210 (isotope)	air	1.76e+00	0	0	0	1.76e+00	1.96e-08
Potassium-40 (isotope)	air	2.73e-01	0	0	0	2.73e-01	3.04e-09
Protactinium-234 (isotope)	air	1.61e-02	0	0	0	1.61e-02	1.79e-10
Protactinium-234 (isotope)	surface water	2.98e-01	0	0	0	2.98e-01	3.32e-09
Radioactive aerosols and halogenes (unspecified)	air	8.95e-02	0	0	0	8.95e-02	9.96e-10
radioactive gas (unspecified)	air	2.86e+03	0	0	0	2.86e+03	3.18e-05
Radioactive substance (unspecified)	air	8.69e+02	9.19e+02	0	-2.38e+00	1.79e+03	1.99e-05
Radioactive substance (unspecified)	surface water	1.61e+01	8.52e+00	0	-2.21e-02	2.46e+01	2.73e-07
Radium-222 (isotope)	air	1.04e+01	0	0	0	1.04e+01	1.16e-07
Radium-224 (isotope)	surface water	9.67e-01	0	0	0	9.67e-01	1.08e-08
Radium-226 (isotope)	air	1.37e+00	0	0	0	1.37e+00	1.53e-08
Radium-226 (isotope)	landfill	6.35e+02	0	0	0	6.35e+02	7.07e-06
Radium-226 (isotope)	surface water	5.73e+02	0	0	0	5.73e+02	6.38e-06
Radium-228 (isotope)	air	1.35e-01	0	0	0	1.35e-01	1.50e-09
Radium-228 (isotope)	surface water	1.93e+00	0	0	0	1.93e+00	2.15e-08
Radon-220 (isotope)	air	3.17e+00	0	0	0	3.17e+00	3.53e-08
Radon-222 (isotope)	air	1.37e+05	0	0	0	1.37e+05	1.52e-03
Rubidium-88 (isotope)	air	0	4.13e-01	5.25e+00	5.25e-04	5.66e+00	6.30e-08
Ruthenium-103 (isotope)	treatment	0	6.21e-02	7.89e-01	7.89e-05	8.51e-01	9.47e-09
Samarium-151 (isotope)	landfill	1.35e+02	0	0	0	1.35e+02	1.50e-06
Selenium-79 (isotope)	landfill	1.05e-01	0	0	0	1.05e-01	1.17e-09
Silver-110M (isotope)	air	0	1.33e-06	1.68e-05	1.68e-09	1.82e-05	2.02e-13
Silver-110M (isotope)	surface water	2.93e-01	0	0	0	2.93e-01	3.26e-09
Silver-110M (isotope)	treatment	0	7.25e-01	9.20e+00	9.21e-04	9.93e+00	1.11e-07
Sodium-24 (isotope)	treatment	0	1.10e-01	1.40e+00	1.40e-04	1.51e+00	1.68e-08
Strontium-89 (isotope)	treatment	0	1.19e-01	1.52e+00	1.52e-04	1.63e+00	1.82e-08
Strontium-90 (isotope)	landfill	2.18e+04	0	0	0	2.18e+04	2.43e-04
Strontium-90 (isotope)	treatment	0	2.80e-02	3.56e-01	3.56e-05	3.84e-01	4.28e-09
Strontium-95 (isotope)	treatment	0	3.09e-01	3.93e+00	3.93e-04	4.23e+00	4.71e-08
Sulfur-136 (isotope)	treatment	0	6.65e-02	8.45e-01	8.46e-05	9.12e-01	1.01e-08

Table J-9. CRT radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Technetium-99M (isotope)	air	0	5.96e-06	7.57e-05	7.58e-09	8.17e-05	9.10e-13
Technetium-99M (isotope)	landfill	4.46e+00	0	0	0	4.46e+00	4.97e-08
Technetium-99M (isotope)	treatment	0	4.33e-02	5.50e-01	5.50e-05	5.93e-01	6.60e-09
Thorium-228 (isotope)	air	1.14e-01	0	0	0	1.14e-01	1.27e-09
Thorium-228 (isotope)	surface water	3.87e+00	0	0	0	3.87e+00	4.30e-08
Thorium-230 (isotope)	air	2.33e-01	0	0	0	2.33e-01	2.59e-09
Thorium-230 (isotope)	landfill	6.35e+02	0	0	0	6.35e+02	7.07e-06
Thorium-230 (isotope)	surface water	2.79e+01	0	0	0	2.79e+01	3.10e-07
Thorium-232 (isotope)	air	7.28e-02	0	0	0	7.28e-02	8.10e-10
Thorium-234 (isotope)	air	1.61e-02	0	0	0	1.61e-02	1.79e-10
Thorium-234 (isotope)	surface water	2.98e-01	0	0	0	2.98e-01	3.32e-09
Tin-113 (isotope)	treatment	0	6.85e-02	8.70e-01	8.71e-05	9.39e-01	1.04e-08
Tin-126 (isotope)	landfill	1.84e-01	0	0	0	1.84e-01	2.05e-09
Tritium-3 (isotope)	air	3.47e+02	2.95e+03	3.74e+04	3.75e+00	4.07e+04	4.53e-04
Tritium-3 (isotope)	surface water	3.56e+03	0	0	0	3.56e+03	3.96e-05
Tritium-3 (isotope)	treatment	0	2.20e+04	2.80e+05	2.80e+01	3.02e+05	3.36e-03
Uranium-234 (isotope)	air	4.07e-01	0	0	0	4.07e-01	4.53e-09
Uranium-234 (isotope)	landfill	4.82e+02	0	0	0	4.82e+02	5.36e-06
Uranium-234 (isotope)	surface water	9.84e+00	0	0	0	9.84e+00	1.10e-07
Uranium-235 (isotope)	air	3.04e-03	0			3.04e-03	3.38e-11
Uranium-235 (isotope)	landfill	8.69e+00	0	0	0	8.69e+00	9.67e-08
Uranium-235 (isotope)	surface water	4.27e-01	0	0	0	4.27e-01	4.75e-09
Uranium-238 (isotope)	air	6.69e-01	0	0	0	6.69e-01	7.44e-09
Uranium-238 (isotope)	landfill	1.35e+02	0	0	0	1.35e+02	1.50e-06
Uranium-238 (isotope)	surface water	9.23e+00	0	0	0	9.23e+00	1.03e-07
Xenon-131M (isotope)	air	0	1.70e+02	2.16e+03	2.16e-01	2.33e+03	2.59e-05
Xenon-131M (isotope)	treatment	0	2.27e+01	2.88e+02	2.88e-02	3.11e+02	3.46e-06
Xenon-133 (isotope)	air	2.43e+03	6.28e+03	3.12e+05	3.12e+01	3.21e+05	3.57e-03
Xenon-133 (isotope)	treatment	0	3.48e+03	4.43e+04	4.43e+00	4.78e+04	5.31e-04
Xenon-133M (isotope)	air	0	1.99e+04	2.07e+04	2.07e+00	4.06e+04	4.52e-04
Xenon-133M (isotope)	treatment	0	2.85e+01	3.62e+02	3.63e-02	3.91e+02	4.35e-06
Xenon-135 (isotope)	air	0	9.27e+02	1.18e+04	1.18e+00	1.27e+04	1.41e-04
Xenon-135 (isotope)	treatment	0	2.60e+01	3.30e+02	3.30e-02	3.56e+02	3.96e-06
Xenon-135M (isotope)	air	0	1.77e+01	2.25e+02	2.25e-02	2.42e+02	2.70e-06
Xenon-138 (isotope)	air	0	5.87e+01	7.45e+02	7.45e-02	8.04e+02	8.95e-06
Zinc-85 (isotope)	treatment	0	3.33e-02	4.23e-01	4.23e-05	4.56e-01	5.07e-09
Zirconium-93 (isotope)	landfill	5.87e-01	0	0	0	5.87e-01	6.53e-09
Zirconium-95 (isotope)	air	0	1.15e-04	1.46e-03	1.46e-07	1.57e-03	1.75e-11
Total radioactivity outputs		3.80e+07	3.78e+06	4.80e+07	4.80e+03	8.98e+07	100.00%

Table J-10. LCD primary material inputs (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
1,4-butanolide	0	4.06e-04	0	0	4.06E-04	1.12E-06
15" LCD light guide	0	3.74e-01	0	0	3.74E-01	1.03E-03
1-methyl-2-pyrrolidinone	0	4.06e-04	0	0	4.06E-04	1.12E-06
2-(2-butoxyethoxy)-ethanol acetate	0	8.08e-06	0	0	8.08E-06	2.23E-08
3,4,5-trifluorobromobenzene	0	2.64e-04	0	0	2.64E-04	7.29E-07
3,4-difluorobromobenzene	0	3.65e-04	0	0	3.65E-04	1.01E-06
4-4(-propylcyclohexyl)cyclohexanone	0	2.18e-04	0	0	2.18E-04	6.00E-07
4-bromophenol	0	3.27e-04	0	0	3.27E-04	9.00E-07
4-ethylphenol	0	7.00e-05	0	0	7.00E-05	1.93E-07
4-pentylphenol	0	3.42e-04	0	0	3.42E-04	9.43E-07
4-propionylphenol	0	1.94e-04	0	0	1.94E-04	5.36E-07
AlNd	0	2.97e-05	0	0	2.97E-05	8.18E-08
Aluminum (elemental)	0	1.34e-01	0	0	1.34E-01	3.70E-04
Argon	0	3.53e-05	0	0	3.53E-05	9.74E-08
Assembled 15" LCD backlight unit	0	1.48e+00	0	0	1.48E+00	4.07E-03
Assembled LCD monitor	0	0	6.50E+00	0	6.50E+00	1.79%
Backlight lamp (CCFL)	0	1.94e-03	0	0	1.94E-03	5.34E-06
Barium Carbonate	0	1.37e-02	0	0	1.37E-02	3.79E-05
Bauxite (Al2O3, ore)	0	5.09e-01	0	0	5.09E-01	1.40E-03
Cables/wires	0	2.34e-01	0	0	2.34E-01	6.45E-04
Coal, average (in ground)	1.72E+00	8.03E+00	6.69E+01	1.27E-02	7.67E+01	21.15%
Fuel oil #4	0	0	0	-6.18E-02	-6.18E-02	-1.70E-04
Glass, unspecified	0	4.37E-02	0	0	4.37E-02	1.20E-04
Glycol ethers	0	4.06E-04	0	0	4.06E-04	1.12E-06
Indium tin oxide	0	5.26E-04	0	0	5.26E-04	1.45E-06
Iron (Fe, ore)	3.26E+00	0	0	0	3.26E+00	8.98E-03
Iron scrap	4.63E-01	0	0	0	4.63E-01	1.28E-03
LCD front glass (with color filters)	0	1.78E-01	0	0	1.78E-01	4.92E-04
LCD glass	0	4.52E-01	0	0	4.52E-01	1.25E-03
LCD material (confidential)	0	3.11E-04	0	0	3.11E-04	8.56E-07
LCD module	0	1.18E+00	0	0	1.18E+00	3.26E-03
LCD spacers, unspecified	0	1.69E-05	0	0	1.69E-05	4.66E-08
Liquid crystals, for 15" LCD	0	1.24E-03	0	0	1.24E-03	3.43E-06
Mercury	0	3.99E-06	0	0	3.99E-06	1.10E-08
Metals, remaining unspeciated	0	6.81E-04	0	0	6.81E-04	1.88E-06
Mild fiber	0	7.34E-07	0	0	7.34E-07	2.02E-09
Molybdenum	0	1.78E-04	0	0	1.78E-04	4.92E-07
MoW	0	9.09E-04	0	0	9.09E-04	2.51E-06
Natural gas	0	4.22E+00	5.22E+00	-5.75E-02	9.39E+00	2.59%
Natural gas (in ground)	2.29E+02	5.16E+00	0	-1.08E+00	2.33E+02	64.25%
Neon	0	6.31E-05	0	0	6.31E-05	1.74E-07
Petroleum (in ground)	7.09E-01	2.23E+01	1.42E+00	-1.00E+00	2.34E+01	6.45%
Pigment color resist, unspecified	0	3.72E-02	0	0	3.72E-02	1.03E-04
Polarizer	0	4.07E-02	0	0	4.07E-02	1.12E-04
Poly(methyl methacrylate)	0	3.83E-01	0	0	3.83E-01	1.06E-03
Polycarbonate resin	0	5.16E-01	0	0	5.16E-01	1.42E-03
Polyester adhesive	0	6.25E-04	0	0	6.25E-04	1.72E-06
Polyethylene terephthalate	0	5.88E-02	0	0	5.88E-02	1.62E-04

Table J-10. LCD primary material inputs (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Polyimide alignment layer, unspecified	0	4.86E-04	0	0	4.86E-04	1.34E-06
Polyvinyl alcohol	0	8.61E-03	0	0	8.61E-03	2.37E-05
Potassium Carbonate	0	1.75E-02	0	0	1.75E-02	4.83E-05
PPE	0	3.00E-01	0	0	3.00E-01	8.27E-04
Printed wiring board (PWB)	0	3.74E-01	0	0	3.74E-01	1.03E-03
PWB-laminate	0	3.74E-01	0	0	3.74E-01	1.03E-03
Recycled LCD glass	0	9.54E-02	0	0	9.54E-02	2.63E-04
Rubber, unspecified	0	6.01E-04	0	0	6.01E-04	1.66E-06
Sand	0	1.11E-01	0	0	1.11E-01	3.07E-04
Sodium Carbonate	0	2.26E-02	0	0	2.26E-02	6.23E-05
Solder (60% tin, 40% lead)	0	3.81E-02	0	0	3.81E-02	1.05E-04
Solder (63% tin; 37% lead)	0	2.24E-02	0	0	2.24E-02	6.18E-05
Steel	0	2.53E+00	0	0	2.53E+00	6.97E-03
Strontium Carbonate	0	1.53E-02	0	0	1.53E-02	4.23E-05
Styrene-butadiene copolymers	0	3.62E-01	0	0	3.62E-01	9.97E-04
Titanium	0	1.33E-04	0	0	1.33E-04	3.67E-07
Triallyl isocyanurate	0	1.54E-05	0	0	1.54E-05	4.26E-08
Triphenyl phosphate	0	9.25E-02	0	0	9.25E-02	2.55E-04
Unspecified LCD material	0	1.19E-04	0	0	1.19E-04	3.29E-07
Uranium, yellowcake	0	1.03E-03	1.81E-03	3.4352E-07	2.84E-03	7.84E-06
Zircon Sand	0	1.31E-03	0	0	1.31E-03	3.62E-06
Total primary inputs	2.35E+02	4.97E+01	8.01E+01	-2.19E+00	3.63E+02	100.00%

Table J-11. LCD ancillary material inputs (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
1,4-butanolide	0	4.04e-05	0	0	4.04e-05	1.94e-07
1-Methoxy-2-propanol	0	1.10e-02	0	0	1.10e-02	5.27e-05
2-(2-butoxyethoxy)-ethanol	0	3.04e-02	0	0	3.04e-02	1.46e-04
2,2,4-trimethylpentane	0	1.52e-05	0	0	1.52e-05	7.32e-08
2-ethoxyl ethylacetate	0	1.78e-03	0	0	1.78e-03	8.53e-06
Acetic acid	0	6.40e-03	0	0	6.40e-03	3.07e-05
Acetone	0	1.56e-01	0	0	1.56e-01	7.50e-04
Al-etchant, unspecified	0	5.88e-03	0	0	5.88e-03	2.83e-05
Aluminum Oxide	0	1.56e-03	0	0	1.56e-03	7.50e-06
Aluminum sulfate	3.63e-04	1.05e-01	0	0	1.05e-01	5.04e-04
Ammonia	0	1.55e-02	0	0	1.55e-02	7.46e-05
Ammonium bifluoride	0	2.36e-03	0	0	2.36e-03	1.13e-05
Ammonium chloride	0	3.42e-02	0	0	3.42e-02	1.64e-04
Ammonium fluoride	0	1.14e-02	0	0	1.14e-02	5.48e-05
Ammonium hydroxide	0	3.42e-02	0	0	3.42e-02	1.64e-04
Argon	0	7.87e-03	0	0	7.87e-03	3.78e-05
Barium sulfate	9.64e-04	0	0	0	9.64e-04	4.63e-06
Bauxite	2.10e-04	0	0	0	2.10e-04	1.01e-06
Bauxite (Al2O3, ore)	5.59e-04	2.16e-03	0	-7.63e-05	2.64e-03	1.27e-05
Bentonite (in ground)	1.00e-03	0	0	0	1.00e-03	4.82e-06
Borax	0	9.13e-05	0	0	9.13e-05	4.39e-07
Calcium hydroxide	0	1.39e-01	0	0	1.39e-01	6.67e-04
Calcium sulfate	7.37e-06	0	0	0	7.37e-06	3.54e-08
Calcium sulfate (CaSO4, ore)	9.75e-06	0	0	0	9.75e-06	4.68e-08
Carbon dioxide	0	4.86e-03	0	0	4.86e-03	2.33e-05
Cerium Oxide	0	1.52e-04	0	0	1.52e-04	7.29e-07
Chlorine	0	1.55e-02	0	0	1.55e-02	7.46e-05
Chromium ore	1.79e-08	0	0	0	1.79e-08	8.59e-11
Chromium Oxide	0	2.60e-06	0	0	2.60e-06	1.25e-08
Clay (in ground)	1.30e-03	0	0	1.69e+00	1.69e+00	8.12e-03
Cleaner, unspecified	0	1.47e-04	0	0	1.47e-04	7.05e-07
Coal, average (in ground)	0	0	0	7.38e-04	7.38e-04	3.54e-06
Copper (Cu, ore)	2.63e-04	0	0	0	2.63e-04	1.26e-06
Cresol-formaldehyde resin	0	8.29e-04	0	0	8.29e-04	3.98e-06
Cr-etchant, unspecified	0	1.77e-02	0	0	1.77e-02	8.49e-05
Cyclohexane	0	3.91e-03	0	0	3.91e-03	1.88e-05
Deoiling agent (unspecified)	6.53e-04	0	0	0	6.53e-04	3.14e-06
Developing solution, unspecified	0	4.00e-02	0	0	4.00e-02	1.92e-04
Diethyl ether	0	9.28e-05	0	0	9.28e-05	4.46e-07
Diluent, unspecified	0	8.27e-03	0	0	8.27e-03	3.97e-05
Dimethylsulfoxide	0	6.63e-02	0	0	6.63e-02	3.18e-04
Dioctyl Sebacate	1.14e-04	0	0	0	1.14e-04	5.47e-07
Dolomite (in ground)	2.08e-03	0	0	0	2.08e-03	9.98e-06
Ethanol	0	2.53e-02	0	0	2.53e-02	1.21e-04
Ethanol amine	0	7.85e-02	0	0	7.85e-02	3.77e-04
Ethylacetate	0	9.68e-04	0	0	9.68e-04	4.65e-06
Etoxy Naphtol Sulphonic Acid (ENSA)	4.88e-05	0	0	0	4.88e-05	2.34e-07
Exfoliation liquid, unspecified	0	1.43e-02	0	0	1.43e-02	6.86e-05
Explosive (unspecified)	9.77e-05	0	0	0	9.77e-05	4.69e-07

Table J-11. LCD ancillary material inputs (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Ferric chloride	0	8.92e-03	0	0	8.92e-03	4.28e-05
Ferromanganese (Fe, Mn, C)	3.83e-07	0	0	0	3.83e-07	1.84e-09
Fluorocarbon resin	0	3.38e-06	0	0	3.38e-06	1.63e-08
Fluorspar (CaF2, ore)	5.37e-06	0	0	0	5.37e-06	2.58e-08
Flux, unspecified	0	7.35e-05	0	0	7.35e-05	3.53e-07
Formaldehyde	0	2.91e-03	0	0	2.91e-03	1.40e-05
Glycol ethers	0	3.16e-02	0	0	3.16e-02	1.52e-04
Gravel	9.08e-08	0	0	0	9.08e-08	4.36e-10
Gravel/Sand	1.01e-03	0	0	0	1.01e-03	4.85e-06
HCFC-225ca	0	1.37e-04	0	0	1.37e-04	6.57e-07
HCFC-225cb	0	1.37e-04	0	0	1.37e-04	6.57e-07
Helium	0	6.18e-04	0	0	6.18e-04	2.97e-06
Heptane	0	1.03e-02	0	0	1.03e-02	4.93e-05
Hexamethyldisilizane	0	2.58e-04	0	0	2.58e-04	1.24e-06
Hydrochloric acid	0	1.29e-01	0	0	1.29e-01	6.21e-04
Hydrofluoric acid	0	4.58e-02	0	0	4.58e-02	2.20e-04
Hydrogen	0	4.44e-01	0	0	4.44e-01	2.13e-03
Hydrogen peroxide	0	1.38e-02	0	0	1.38e-02	6.65e-05
Iron (Fe, ore)	7.65e-03	0	0	7.04e-04	8.35e-03	4.01e-05
Iron sulfate (FeSO4, ore)	7.99e-06	0	0	0	7.99e-06	3.84e-08
Isopropyl alcohol	0	3.49e-01	0	0	3.49e-01	1.67e-03
ITO etchant, unspecified	0	2.94e-03	0	0	2.94e-03	1.41e-05
Krypton	0	2.58e-05	0	0	2.58e-05	1.24e-07
Lead (Pb, ore)	2.47e-05	0	0	0	2.47e-05	1.19e-07
Lime	0	4.74e-02	3.95e-01	7.49e-05	4.42e-01	2.12e-03
Limestone	0	1.08e-01	8.99e-01	1.71e-04	1.01e+00	4.84e-03
Limestone (CaCO3, in ground)	5.07e-01	5.49e-02	0	-1.55e-01	4.06e-01	1.95e-03
LNG	0	1.94e+02	0	0	1.94e+02	9.32e-01
Lubricant (unspecified)	2.02e-02	0	0	0	2.02e-02	9.68e-05
Manganese (Mn, ore)	1.04e-08	0	0	0	1.04e-08	5.00e-11
Methyl ethyl ketone	0	4.91e-04	0	0	4.91e-04	2.36e-06
Monosilane	0	1.12e-03	0	0	1.12e-03	5.40e-06
Natural gas (in ground)	0	0	0	1.09e-03	1.09e-03	5.22e-06
N-Butylacetate	0	3.83e-02	0	0	3.83e-02	1.84e-04
Nickel (Ni, ore)	6.05e-09	0	0	0	6.05e-09	2.91e-11
Nitric acid	0	7.23e-02	0	0	7.23e-02	3.47e-04
Nitric acid second cerium ammonium	0	1.13e-02	0	0	1.13e-02	5.43e-05
Nitrogen	0	6.02e+00	0	0	6.02e+00	2.89e-02
Nitrogen fluoride	0	1.08e-01	0	0	1.08e-01	5.19e-04
Nitrous oxide	0	1.36e-03	0	0	1.36e-03	6.51e-06
Oil (in ground)	0	0	0	8.06e-03	8.06e-03	3.87e-05
Olivine	2.72e-07	0	0	0	2.72e-07	1.31e-09
Olivine ore	7.92e-06	0	0	0	7.92e-06	3.80e-08
Orthoboric acid	0	7.30e-04	0	0	7.30e-04	3.51e-06
Oxygen	0	7.75e-03	0	0	7.75e-03	3.72e-05
Perchloric acid	0	3.82e-03	0	0	3.82e-03	1.84e-05
Perfluoromethane	0	1.29e-03	0	0	1.29e-03	6.18e-06
Phenolsulphonic Acid	1.53e-03	0	0	0	1.53e-03	7.34e-06
Phosphine	0	2.69e-02	0	0	2.69e-02	1.29e-04

Table J-11. LCD ancillary material inputs (kg/functional unit)

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Phosphoric acid	0	3.95e-02	0	0	3.95e-02	1.90e-04
Photoresist, unspecified	0	1.68e-02	0	0	1.68e-02	8.05e-05
Polyaluminum chloride	0	6.40e-03	0	0	6.40e-03	3.07e-05
Polyethylene glycol	0	2.23e-02	0	0	2.23e-02	1.07e-04
Polyethylene mono(nonylphenyl) ether glycol	0	3.40e-04	0	0	3.40e-04	1.63e-06
Polyethylene terephthalate	0	3.20e-02	0	0	3.20e-02	1.53e-04
Polyimide, unspecified	0	2.94e-05	0	0	2.94e-05	1.41e-07
Potassium chloride (KCl, as K2O, in ground)	3.03e-05	0	0	0	3.03e-05	1.45e-07
Potassium hydroxide	0	1.88e-02	0	0	1.88e-02	9.04e-05
Potassium permanganate	0	5.14e-04	0	0	5.14e-04	2.47e-06
Potassium peroxymonosulfate	0	3.12e-02	0	0	3.12e-02	1.50e-04
Process material for backlight assembly	0	7.03e-05	0	0	7.03e-05	3.37e-07
Propylene glycol	0	4.46e-03	0	0	4.46e-03	2.14e-05
Propylene glycol monomethyl ether acetate	0	1.56e-02	0	0	1.56e-02	7.50e-05
Pumice	0	3.64e-03	0	0	3.64e-03	1.75e-05
PWB-solder mask solids	0	1.93e-02	0	0	1.93e-02	9.25e-05
Pyrite (FeS2, ore)	3.77e-02	0	0	0	3.77e-02	1.81e-04
Raw materials (unspecified)	4.06e-03	0	0	0	4.06e-03	1.95e-05
Rinse, unspecified	0	5.27e-02	0	0	5.27e-02	2.53e-04
Sand (in ground)	9.55e-03	1.32e-03	0	5.60e-01	5.71e-01	2.74e-03
Silver (Ag, ore)	4.51e-10	0	0	0	4.51e-10	2.17e-12
Sodium Carbonate	0	1.42e-02	0	0	1.42e-02	6.82e-05
Sodium chloride (NaCl, in ground or in sea)	4.37e-01	6.08e-04	0	1.08e-05	4.38e-01	2.10e-03
Sodium Dichromate	1.29e-04	0	0	0	1.29e-04	6.19e-07
Sodium dihydrogen phosphate dihydrate	0	4.06e-06	0	0	4.06e-06	1.95e-08
Sodium hydroxide	0	4.45e-01	0	0	4.45e-01	2.14e-03
Solder, unspecified	0	7.35e-05	0	0	7.35e-05	3.53e-07
Sulfur (S, in ground)	1.53e-02	0	0	0	1.53e-02	7.34e-05
Sulfur hexafluoride	0	1.62e-02	0	0	1.62e-02	7.79e-05
Sulfuric acid	0	3.25e-01	0	0	3.25e-01	1.56e-03
Surfactant, unspecified	0	1.09e-04	0	0	1.09e-04	5.25e-07
Synthetic resin, unspecified	0	6.57e-04	0	0	6.57e-04	3.16e-06
Tetrahydrofuran	0	3.82e-03	0	0	3.82e-03	1.84e-05
Tetramethyl ammonium hydroxide	0	1.29e-01	0	0	1.29e-01	6.18e-04
Tin (Sn, ore)	1.19e-02	0	0	0	1.19e-02	5.72e-05
Toluene	0	2.75e-02	0	0	2.75e-02	1.32e-04
Unspecified ancillary material	0	4.19e-04	0	0	4.19e-04	2.01e-06
Unspecified LCD process material	0	2.57e-02	0	0	2.57e-02	1.23e-04
Unspecified LCD process material ("Natural Sweeper")	0	1.09e-04	0	0	1.09e-04	5.23e-07
Uranium (U, ore)	0	0	0	1.00e-08	1.00e-08	4.81e-11
Water	0	6.88e-02	0	0	6.88e-02	3.30e-04
Xylene (mixed isomers)	0	1.57e-03	0	0	1.57e-03	7.54e-06
Zinc (Zn, ore)	6.61e-10	0	0	0	6.61e-10	3.18e-12
Total ancillary inputs	1.06e+00	2.04e+02	1.29e+00	2.11e+00	2.08e+02	100.00%

Table J-12. LCD utility inputs

Material	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Fuels (kg/functional unit):						
Fuel Oil #2 (distillate)	0	5.42E-02	0	0	5.42E-02	0.14%
Fuel oil #4 (avg. of #2 + #6)	0	2.11E-01	0	-9.09E-01	-6.99E-01	-1.81%
Fuel oil #6 (residual)	0	1.25E-01	0	0	1.25E-01	0.33%
Kerosene	0	4.65E-01	0	0	4.65E-01	1.21%
LNG	0	3.22E+00	0	0	3.22E+00	8.34%
LPG	0	1.68E+01	0	1.38E-03	1.68E+01	43.63%
Natural gas	0	1.16E+00	0	-8.61E-01	3.01E-01	0.78%
Steam	0	1.45E-01	0	0	1.45E-01	0.37%
Coal, average (in ground)	2.49E+00	6.86E-01	0	-7.66E-03	3.17E+00	8.21%
Coal, lignite (in ground)	4.10E-01	0	0	0	4.10E-01	1.06%
Natural gas (in ground)	1.03E+01	2.41E+00	0	-1.38E-01	1.26E+01	32.66%
Petroleum (in ground)	1.52E+00	4.84E-01	0	-3.81E-02	1.96E+00	5.08%
Uranium (U, ore)	7.86E-05	1.15E-05	0	-1.32E-07	9.01E-05	2.33E-06
Total fuels	1.47E+01	2.58E+01	0	-1.95E+00	3.86E+01	100.00%
Electricity (MJ/functional unit):						
Electricity	3.46E+01	3.16E+02	8.53E+02	1.62E-01	1.20E+03	
Water (kg or L/functional unit):						
Water	2.63E+02	2.15E+03	4.25E+02	-1.80E+01	2.82E+03	
Total energy (fuels and electricity, MJ/functional unit):						
Energy	6.33E+02	1.44E+03	8.53E+02	-8.44E+01	2.84E+03	

Table J-13. LCD air emissions (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	Fraction of Total
1,1,1-Trichloroethane	Air	1.62e-08	2.28e-07	7.16e-07	-1.95e-08	9.40e-07	2.72e-09
1,2-Dichloroethane	Air	3.24e-08	1.75e-07	1.34e-06	-3.85e-08	1.51e-06	4.36e-09
1,2-Dichlorotetrafluoroethane	Air	8.90e-08	0	0	0	8.90e-08	2.57e-10
1,4-Dichlorobenzene	Air	1.89e-07	1.89e-08	0	-1.49e-09	2.06e-07	5.96e-10
2,3,7,8-TCDD	Air	0	5.90e-14	4.79e-13	9.08e-17	5.38e-13	1.55e-15
2,3,7,8-TCDF	Air	0	2.05e-13	1.71e-12	3.24e-16	1.91e-12	5.53e-15
2,4-Dinitrotoluene	Air	2.27e-10	1.22e-09	9.37e-09	-2.74e-10	1.05e-08	3.05e-11
2-Chloroacetophenone	Air	5.67e-09	3.06e-08	2.34e-07	-9.35e-11	2.70e-07	7.82e-10
2-Methylnaphthalene	Air	3.78e-09	1.18e-09	9.95e-10	-3.53e-11	5.92e-09	1.71e-11
3-Methylcholanthrene	Air	2.83e-10	2.84e-11	0	-2.66e-12	3.09e-10	8.94e-13
5-Methyl chrysene	Air	1.78e-11	9.60e-11	7.36e-10	-2.15e-11	8.29e-10	2.40e-12
Acenaphthene	Air	9.25e-10	1.49e-08	2.12e-08	-5.04e-10	3.65e-08	1.06e-10
Acenaphthylene	Air	4.89e-10	1.27e-09	8.42e-09	-2.47e-10	9.93e-09	2.87e-11
Acetaldehyde	Air	7.90e-07	2.49e-06	1.91e-05	-5.57e-07	2.18e-05	6.30e-08
Acetic acid	Air	4.22e-06	1.36e-03	0	0	1.36e-03	3.93e-06
Acetone	Air	3.26e-07	1.86e-04	0	0	1.86e-04	5.39e-07
Acetophenone	Air	1.22e-08	6.55e-08	5.02e-07	-1.47e-08	5.65e-07	1.63e-09
Acetylene	Air	1.14e-05	0	0	0	1.14e-05	3.30e-08
Acrolein	Air	2.35e-07	1.27e-06	9.71e-06	-2.83e-07	1.09e-05	3.16e-08
Adsorbable organic halides	Air	3.56e-17	0	0	0	3.56e-17	1.03e-19
Alcohols	Air	2.85e-06	0	0	0	2.85e-06	8.23e-09
Aldehydes	Air	8.53e-04	8.98e-05	0	-1.05e-04	8.37e-04	2.42e-06
Al-etchant, unspecified	Air	0	1.37e-02	0	0	1.37e-02	3.97e-05
Alkane (unspecified)	Air	1.07e-04	0	0	0	1.07e-04	3.10e-07
Alkenes	Air	1.79e-05	0	0	0	1.79e-05	5.18e-08
Alkyne (unspecified)	Air	5.46e-08	0	0	0	5.46e-08	1.58e-10
Aluminum (elemental)	Air	8.09e-05	9.59e-07	0	-5.72e-08	8.18e-05	2.36e-07
Ammonia	Air	1.12e-02	6.26e-02	0	-6.95e-05	7.37e-02	2.13e-04
Anthracene	Air	5.61e-10	1.68e-09	7.27e-09	-2.09e-10	9.30e-09	2.69e-11
Antimony	Air	2.28e-07	3.24e-06	1.63e-06	-4.25e-08	5.05e-06	1.46e-08
Argon	Air	0	5.80e-03	0	0	5.80e-03	1.68e-05
Aromatic hydrocarbons	Air	7.67e-05	2.55e-09	0	-9.05e-11	7.67e-05	2.22e-07
Arsenic	Air	1.63e-06	3.14e-06	1.40e-05	-1.72e-06	1.70e-05	4.93e-08
Barium	Air	1.39e-06	1.76e-06	7.67e-07	-1.65e-08	3.91e-06	1.13e-08
Benzaldehyde	Air	2.78e-14	0	0	0	2.78e-14	8.04e-17
Benzene	Air	8.85e-02	2.70e-03	4.36e-05	-4.82e-04	9.07e-02	2.62e-04
Benzo[a]anthracene	Air	3.92e-10	2.78e-09	3.46e-09	-8.13e-11	6.55e-09	1.89e-11
Benzo[a]pyrene	Air	4.40e-08	1.91e-10	1.27e-09	-3.93e-11	4.54e-08	1.31e-10
Benzo[b,j,k]fluoranthene	Air	8.92e-11	1.37e-09	3.97e-09	-1.07e-10	5.32e-09	1.54e-11
Benzo[b]fluoranthene	Air	2.91e-10	3.09e-11	0	-2.79e-12	3.19e-10	9.24e-13
Benzo[g,h,i]perylene	Air	2.23e-10	1.48e-09	1.35e-09	-2.83e-11	3.02e-09	8.74e-12
Benzo[k]fluoranthene	Air	2.91e-10	3.09e-11	0	-2.79e-12	3.19e-10	9.24e-13
Benzyl chloride	Air	5.67e-07	3.05e-06	2.34e-05	-6.84e-07	2.64e-05	7.62e-08
Beryllium	Air	2.19e-07	1.86e-07	7.12e-07	-1.99e-07	9.18e-07	2.65e-09
Biphenyl	Air	1.38e-09	7.42e-09	5.69e-08	-1.66e-09	6.40e-08	1.85e-10
Boron	Air	1.79e-05	0	0	0	1.79e-05	5.16e-08
Bromine	Air	9.94e-07	0	0	0	9.94e-07	2.87e-09
Bromoform	Air	3.16e-08	1.70e-07	1.31e-06	-3.81e-08	1.47e-06	4.25e-09
Bromomethane	Air	1.30e-07	6.98e-07	5.36e-06	-1.56e-07	6.03e-06	1.74e-08

Table J-13. LCD air emissions (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	Fraction of Total
Butane	Air	3.42e-04	3.31e-05	0	-3.11e-06	3.72e-04	1.07e-06
Butene	Air	1.09e-07	0	0	0	1.09e-07	3.15e-10
Cadmium	Air	2.93e-07	5.25e-07	1.80e-06	-6.58e-08	2.55e-06	7.37e-09
Calcium	Air	8.74e-05	8.31e-07	0	-4.96e-08	8.82e-05	2.55e-07
Carbon dioxide	Air	1.07e+02	6.22e+01	1.66e+02	1.39e+00	3.36e+02	9.72e-01
Carbon disulfide	Air	1.05e-07	5.67e-07	4.35e-06	-1.27e-07	4.90e-06	1.42e-08
Carbon monoxide	Air	3.74e-01	3.85e-02	3.02e-02	-3.45e-03	4.39e-01	1.27e-03
Carbon tetrachloride	Air	0	0	0	5.85e-10	5.85e-10	1.69e-12
Chloride ions	Air	1.77e-04	2.09e-04	6.78e-05	-1.64e-06	4.52e-04	1.31e-06
Chlorine	Air	6.64e-07	1.01e-09	0	-1.80e-10	6.65e-07	1.92e-09
Chloroacetophenone	Air	0	0	0	-6.74e-09	-6.74e-09	-1.95e-11
Chlorobenzene	Air	1.78e-08	9.60e-08	7.36e-07	-2.15e-08	8.29e-07	2.40e-09
Chloroform	Air	4.78e-08	2.57e-07	1.97e-06	-5.70e-08	2.22e-06	6.43e-09
Chromium	Air	6.40e-09	0	0	0	6.40e-09	1.85e-11
Chromium (III)	Air	1.50e-06	2.96e-06	9.07e-06	-1.43e-06	1.21e-05	3.50e-08
Chromium (VI)	Air	1.50e-06	1.52e-06	2.69e-06	-1.43e-06	4.29e-06	1.24e-08
Chrysene	Air	3.77e-10	1.89e-09	3.81e-09	-1.00e-10	5.98e-09	1.73e-11
Cobalt	Air	5.36e-07	4.13e-06	4.54e-06	-1.30e-07	9.07e-06	2.62e-08
Copper	Air	8.26e-07	1.15e-06	3.72e-07	-1.65e-08	2.33e-06	6.75e-09
Cr-etchant, unspecified	Air	0	4.12e-02	0	0	4.12e-02	1.19e-04
Cumene	Air	4.30e-09	2.75e-09	1.77e-07	-5.18e-09	1.79e-07	5.18e-10
Cumene hydroperoxide	Air	0	2.04e-08	0	0	2.04e-08	5.89e-11
Cyanide (-1)	Air	2.04e-06	1.09e-05	8.37e-05	-2.44e-06	9.42e-05	2.72e-07
Cyclohexane	Air	0	4.85e-05	0	0	4.85e-05	1.40e-07
Di(2-ethylhexyl)phthalate	Air	5.92e-08	3.19e-07	2.44e-06	-7.13e-08	2.75e-06	7.95e-09
Dibenzo[a,h]anthracene	Air	1.98e-10	1.02e-09	3.26e-10	-1.85e-12	1.54e-09	4.46e-12
Dichlorobenzene (mixed isomers)	Air	0	0	0	-2.82e-10	-2.82e-10	-8.16e-13
Dichloromethane	Air	2.35e-07	1.27e-06	9.71e-06	-2.82e-07	1.09e-05	3.16e-08
Diethyl ether	Air	0	9.26e-05	0	0	9.26e-05	2.68e-07
Diethylene glycol	Air	0	9.69e-05	0	0	9.69e-05	2.80e-07
Dimethyl sulfate	Air	3.89e-08	2.09e-07	1.61e-06	-4.69e-08	1.81e-06	5.23e-09
Dimethylbenzanthracene	Air	2.36e-09	2.36e-10	0	-2.23e-11	2.58e-09	7.45e-12
Dioxins, remaining unspeciated	Air	1.32e-11	8.22e-12	2.18e-11	1.33e-10	1.76e-10	5.08e-13
Ethane	Air	6.08e-04	4.88e-05	0	-4.59e-06	6.53e-04	1.89e-06
Ethanethiol	Air	4.50e-07	0	0	0	4.50e-07	1.30e-09
Ethanol	Air	6.51e-07	4.63e-05	0	0	4.69e-05	1.36e-07
Ethyl Chloride	Air	3.40e-08	1.83e-07	1.41e-06	-4.10e-08	1.58e-06	4.57e-09
Ethylacetate	Air	0	1.22e-07	0	0	1.22e-07	3.53e-10
Ethylacetate	Treatment	0	2.32e-06	0	0	2.32e-06	6.70e-09
Ethylbenzene	Air	2.28e-07	4.48e-07	3.16e-06	-9.00e-08	3.75e-06	1.08e-08
Ethylene	Air	1.02e-04	0	0	0	1.02e-04	2.94e-07
Ethylene dibromide	Air	9.73e-10	5.24e-09	4.02e-08	-1.17e-09	4.52e-08	1.31e-10
Fluoranthene	Air	1.07e-09	6.31e-09	2.50e-08	-6.98e-10	3.17e-08	9.17e-11
Fluorene	Air	1.20e-09	6.68e-09	3.13e-08	-8.93e-10	3.83e-08	1.11e-10
Fluoride	Air	0	3.78e-08	7.29e-06	1.38e-09	7.33e-06	2.12e-08
Fluorides (F-)	Air	9.48e-07	2.24e-05	0	-2.05e-07	2.32e-05	6.69e-08
Fluorine	Air	2.83e-07	0	0	0	2.83e-07	8.18e-10
Formaldehyde	Air	1.87e-05	1.09e-04	3.16e-05	-5.78e-06	1.54e-04	4.45e-07
Furans, remaining unspeciated	Air	6.10e-11	3.02e-11	3.48e-11	-7.40e-11	5.20e-11	1.50e-13

Table J-13. LCD air emissions (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	Fraction of Total
Halogenated hydrocarbons (unspecified)	Air	1.12e-06	1.42e-14	0	-4.93e-16	1.12e-06	3.24e-09
Halogenated matter (unspecified)	Air	4.67e-19	0	0	0	4.67e-19	1.35e-21
HALON-1301	Air	7.95e-08	2.47e-11	0	-8.75e-13	7.95e-08	2.30e-10
HCFC-225ca	Air	0	1.40e-04	0	0	1.40e-04	4.05e-07
HCFC-225cb	Air	0	1.40e-04	0	0	1.40e-04	4.05e-07
Heptane	Air	1.09e-06	7.77e-05	0	0	7.88e-05	2.28e-07
Hexamethyldisilizane	Air	0	1.37e-06	0	0	1.37e-06	3.97e-09
Hexane	Air	2.86e-04	2.86e-05	2.24e-06	-2.73e-06	3.14e-04	9.07e-07
Hydrocarbons, remaining unspeciated	Air	9.30e-03	7.75e-03	0	-6.51e-04	1.64e-02	4.74e-05
Hydrochloric acid	Air	1.50e-03	6.58e-02	4.02e-02	-6.88e-04	1.07e-01	3.09e-04
Hydrofluoric acid	Air	2.27e-04	5.27e-02	5.02e-03	-1.47e-04	5.78e-02	1.67e-04
Hydrogen	Air	2.99e-04	1.33e-04	0	0	4.32e-04	1.25e-06
Hydrogen cyanide	Air	3.83e-06	0	0	0	3.83e-06	1.11e-08
Hydrogen sulfide	Air	1.55e-05	1.51e-04	0	-8.88e-06	1.57e-04	4.55e-07
Indeno(1,2,3-cd)pyrene	Air	3.44e-10	1.57e-09	2.46e-09	-6.23e-11	4.31e-09	1.25e-11
Iodine	Air	2.95e-07	0	0	0	2.95e-07	8.52e-10
Iron	Air	4.76e-05	1.85e-06	0	-1.11e-07	4.94e-05	1.43e-07
Isophorone	Air	4.70e-07	2.53e-06	1.94e-05	-5.67e-07	2.18e-05	6.32e-08
Isopropyl alcohol	Air	0	1.78e-02	0	0	1.78e-02	5.13e-05
Isopropylpropionate	Air	9.91e-11	0	0	0	9.91e-11	2.87e-13
ITO etchant, unspecified	Air	0	6.86e-03	0	0	6.86e-03	1.98e-05
Lanthanum	Air	2.63e-08	0	0	0	2.63e-08	7.61e-11
Lead	Air	3.13e-06	6.63e-07	4.76e-06	4.76e-06	1.33e-05	3.85e-08
Lead (Pb, ore)	Air	1.48e-06	0	0	0	1.48e-06	4.29e-09
Magnesium	Air	4.06e-05	4.80e-05	3.68e-04	-1.07e-05	4.46e-04	1.29e-06
Manganese	Air	2.94e-06	1.24e-06	1.70e-05	-3.23e-06	1.80e-05	5.19e-08
Manganese (Mn, ore)	Air	0	3.67e-06	0	0	3.67e-06	1.06e-08
Mercaptans	Air	1.81e-07	0	0	0	1.81e-07	5.24e-10
Mercury	Air	8.53e-07	4.57e-07	2.80e-06	-8.64e-08	4.03e-06	1.16e-08
Metals, remaining unspeciated	Air	2.64e-05	1.60e-08	0	-7.10e-10	2.64e-05	7.63e-08
Methane	Air	3.54e+00	1.22e-01	2.41e-01	-2.82e-02	3.87e+00	1.12e-02
Methanol	Air	1.11e-06	0	0	0	1.11e-06	3.20e-09
Methyl chloride	Air	4.30e-07	2.31e-06	1.77e-05	-5.18e-07	2.00e-05	5.77e-08
Methyl ethyl ketone	Air	3.16e-07	2.43e-06	1.31e-05	-3.81e-07	1.54e-05	4.46e-08
Methyl ethyl ketone	Treatment	0	1.34e-04	0	0	1.34e-04	3.88e-07
Methyl hydrazine	Air	1.38e-07	7.42e-07	5.69e-06	-1.66e-07	6.40e-06	1.85e-08
Methyl methacrylate	Air	1.62e-08	8.73e-08	6.69e-07	-1.95e-08	7.53e-07	2.18e-09
Methyl tert-butyl ether	Air	2.84e-08	1.52e-07	1.17e-06	-3.81e-07	9.71e-07	2.81e-09
Molybdenum	Air	2.98e-07	6.21e-07	2.18e-07	-1.35e-08	1.12e-06	3.25e-09
Monosilane	Air	0	1.54e-03	0	0	1.54e-03	4.44e-06
Naphthalene	Air	1.30e-07	7.67e-07	6.82e-07	-1.90e-08	1.56e-06	4.51e-09
N-bromoacetamide	Air	0	9.18e-03	0	0	9.18e-03	2.65e-05
Nickel	Air	8.06e-06	5.57e-05	2.56e-05	-2.98e-06	8.64e-05	2.50e-07
Nitric acid	Air	0	2.69e-04	0	0	2.69e-04	7.76e-07
Nitrogen dioxide	Air	3.08e-02	0	0	4.46e-04	3.12e-02	9.03e-05
Nitrogen fluoride	Air	0	2.45e-01	0	0	2.45e-01	7.09e-04
Nitrogen oxides	Air	6.56e-01	7.62e-01	4.39e-01	-1.36e-02	1.84e+00	5.33e-03
Nitrous oxide	Air	1.24e-03	1.20e-03	1.27e-03	-7.19e-04	2.98e-03	8.63e-06

Table J-13. LCD air emissions (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	Fraction of Total
Nonmethane hydrocarbons, remaining unspeciated	Air	2.07e-01	8.87e-03	0	-1.26e-03	2.15e-01	6.22e-04
n-Propane	Air	4.49e-05	8.67e-08	0	-2.40e-07	4.48e-05	1.29e-07
Other organics	Air	4.45e-01	1.35e-02	0	-2.41e-03	4.56e-01	1.32e-03
o-xylene	Air	4.83e-06	2.24e-07	2.13e-08	-2.50e-08	5.05e-06	1.46e-08
Pentane	Air	4.18e-04	4.10e-05	0	-3.85e-06	4.55e-04	1.31e-06
Perfluoroethane	Air	5.36e-06	0	0	0	5.36e-06	1.55e-08
Perfluoromethane	Air	4.83e-05	0	0	0	4.83e-05	1.40e-07
Phenanthrene	Air	4.92e-09	1.92e-08	9.35e-08	-2.66e-09	1.15e-07	3.33e-10
Phenol	Air	9.34e-07	6.98e-08	5.36e-07	-1.56e-08	1.52e-06	4.41e-09
Phosphine	Air	0	6.26e-02	0	0	6.26e-02	1.81e-04
Phosphoric acid	Air	0	4.85e-05	0	0	4.85e-05	1.40e-07
Phosphorus (yellow or white)	Air	7.54e-07	6.20e-07	1.85e-06	-7.84e-08	3.14e-06	9.09e-09
Phosphorus pentoxide	Air	2.56e-10	0	0	0	2.56e-10	7.40e-13
PM	Air	9.16e-02	6.99e-03	0	-1.24e-02	8.62e-02	2.49e-04
PM-10	Air	3.45e-07	6.85e-03	2.16e-02	3.43e-06	2.84e-02	8.21e-05
Polycyclic aromatic hydrocarbons	Air	6.77e-06	2.84e-12	0	-1.01e-13	6.77e-06	1.96e-08
Polyimide, unspecified	Air	0	1.40e-04	0	0	1.40e-04	4.04e-07
Potassium	Air	1.10e-05	0	0	0	1.10e-05	3.19e-08
Process material for backlight assembly	Air	0	7.03e-05	0	0	7.03e-05	2.03e-07
Propionaldehyde	Air	3.08e-07	1.66e-06	1.27e-05	-3.71e-07	1.43e-05	4.14e-08
Propylene	Air	1.18e-05	0	0	0	1.18e-05	3.42e-08
Pyrene	Air	1.08e-09	4.51e-09	1.24e-08	-3.30e-10	1.77e-08	5.11e-11
Scandium	Air	6.40e-09	0	0	0	6.40e-09	1.85e-11
Selenium	Air	1.21e-06	6.11e-06	4.36e-05	-1.27e-06	4.97e-05	1.44e-07
Silicon	Air	2.89e-04	8.31e-07	0	-4.96e-08	2.90e-04	8.37e-07
Sodium	Air	7.73e-06	4.92e-06	0	-2.93e-07	1.24e-05	3.57e-08
Strontium	Air	1.65e-06	0	0	0	1.65e-06	4.78e-09
Styrene	Air	2.03e-08	1.09e-07	8.37e-07	-2.44e-08	9.42e-07	2.72e-09
Sulfur dioxide	Air	4.63e-02	2.95e-01	9.30e-01	2.96e-04	1.27e+00	3.68e-03
Sulfur hexafluoride	Air	0	7.30e-03	0	0	7.30e-03	2.11e-05
Sulfur oxides	Air	2.57e-02	4.07e-02	0	-1.93e-02	4.71e-02	1.36e-04
Sulfuric acid	Air	6.31e-07	0	0	0	6.31e-07	1.82e-09
Tars (unspecified)	Air	3.09e-13	0	0	0	3.09e-13	8.92e-16
Tetrachloroethylene	Air	3.49e-08	1.88e-07	1.44e-06	-4.14e-08	1.62e-06	4.68e-09
Tetramethyl ammonium hydroxide	Air	0	6.43e-01	0	0	6.43e-01	1.86e-03
Thallium	Air	4.36e-09	0	0	0	4.36e-09	1.26e-11
Thorium	Air	1.41e-08	0	0	0	1.41e-08	4.09e-11
Tin	Air	8.21e-09	0	0	0	8.21e-09	2.37e-11
Titanium	Air	2.85e-06	0	0	0	2.85e-06	8.24e-09
TOCs, remaining unspeciated	Air	0	6.74e-04	2.15e-03	4.08e-07	2.82e-03	8.16e-06
Toluene	Air	1.05e-05	5.95e-05	9.49e-06	-2.95e-07	7.92e-05	2.29e-07
Trichloroethylene	Air	0	0	0	5.85e-10	5.85e-10	1.69e-12
Unspecified LCD process material	Air	0	4.49e-02	0	0	4.49e-02	1.30e-04
Uranium	Air	1.39e-08	0	0	0	1.39e-08	4.01e-11
Vanadium	Air	1.77e-05	3.22e-05	6.57e-06	-9.16e-07	5.56e-05	1.61e-07
Vinyl acetate	Air	6.16e-09	3.31e-08	2.54e-07	-7.42e-09	2.86e-07	8.28e-10
Vinyl chloride	Air	0	0	0	1.17e-09	1.17e-09	3.38e-12
Waste metals, unspecified	Air	6.33e-06	0	0	0	6.33e-06	1.83e-08

Table J-13. LCD air emissions (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	Fraction of Total
Xylene (mixed isomers)	Air	9.57e-06	1.49e-07	1.24e-06	-2.71e-08	1.09e-05	3.16e-08
Zinc (elemental)	Air	6.60e-06	1.80e-05	5.69e-06	-1.81e-07	3.01e-05	8.69e-08
Zirconium	Air	6.71e-09	0	0	0	6.71e-09	1.94e-11
Total air emissions		1.12e+02	6.48e+01	1.68e+02	1.30e+00	3.46e+02	1.00e+00

Table J-14. LCD water outputs (wastewater and water pollutants) (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
WASTEWATER STREAM							
Wastewater stream	surface water	8.57e+00	2.52e+03	0	-2.41e+00	2.53e+03	80.91%
Wastewater stream	treatment	0	5.97e+02	0	0	5.97e+02	19.09%
Total wastewater streams		8.57e+00	3.12e+03	0	-2.41e+00	3.13e+03	100.00%
WATER POLLUTANTS							
1,1,1-Trichloroethane	surface water	2.78e-14	2.29e-08	0	0	2.29e-08	1.36E-08
1,2-Dichloroethane	surface water	0	0	0	1.74e-11	1.74e-11	1.03E-11
Acids (H+)	surface water	1.34e-04	1.76e-08	0	-3.15e-09	1.34e-04	0.0080%
Adsorbable organic halides	surface water	5.26e-08	1.82e-11	0	-6.44e-13	5.26e-08	3.14E-08
Alcohols	surface water	3.75e-08	0	0	0	3.75e-08	2.23E-08
Aldehydes	surface water	5.08e-10	0	0	0	5.08e-10	3.03E-10
Alkane (unspecified)	surface water	1.92e-06	0	0	0	1.92e-06	0.0001%
Alkenes	surface water	1.77e-07	0	0	0	1.77e-07	1.06E-07
Aluminum (+3)	surface water	6.00e-04	6.88e-06	0	-2.44e-07	6.07e-04	0.0361%
Aluminum hydroxide	surface water	4.36e-10	0	0	0	4.36e-10	2.60E-10
Ammonia	surface water	6.23e-04	0	0	-3.91e-06	6.19e-04	0.0369%
Ammonia ions	surface water	2.51e-05	1.33e-03	0	-4.38e-05	1.31e-03	0.0782%
Antimony	surface water	0	1.14e-07	0	0	1.14e-07	6.80E-08
Aromatic hydrocarbons	surface water	8.45e-06	4.25e-09	0	-1.51e-10	8.46e-06	0.0005%
Arsenic	surface water	0	1.14e-07	0	0	1.14e-07	6.80E-08
Arsenic cmpds	surface water	1.24e-06	0	0	5.34e-09	1.24e-06	0.0001%
Barium cmpds	surface water	8.36e-05	1.36e-08	0	7.51e-08	8.37e-05	0.0050%
Barium sulfate	surface water	1.86e-04	0	0	0	1.86e-04	0.0111%
Benzene	surface water	1.93e-06	0	0	1.74e-11	1.93e-06	0.0001%
BOD	surface water	7.72e-04	2.79e-02	0	-3.18e-04	2.83e-02	1.6873%
BOD	treatment	0	5.74e-02	0	0	5.74e-02	3.4201%
Borax	treatment	0	1.31e-06	0	0	1.31e-06	0.0001%
Boric acid	surface water	5.57e-07	0	0	0	5.57e-07	3.32E-07
Boron	surface water	0	4.58e-06	0	0	4.58e-06	0.0003%
Boron (B III)	surface water	9.79e-08	0	0	0	9.79e-08	5.83E-08
Cadmium	surface water	0	1.14e-07	0	0	1.14e-07	6.80E-08
Cadmium cmpds	surface water	1.89e-07	1.42e-11	0	2.85e-10	1.89e-07	1.13E-07
Calcium (+2)	surface water	1.37e-03	0	0	0	1.37e-03	0.0816%
Carbon tetrachloride	surface water	0	0	0	1.74e-11	1.74e-11	1.03E-11
Carbonate ion	surface water	2.69e-03	0	0	0	2.69e-03	0.1601%
Cesium (+2)	surface water	5.92e-09	0	0	0	5.92e-09	3.53E-09
Chloride ions	surface water	2.33e-01	3.12e-01	0	-1.58e-02	5.29e-01	31.5275%
Chlorine	surface water	6.36e-07	0	0	0	6.36e-07	3.79E-07
Chloroform	surface water	2.87e-12	0	0	1.74e-11	2.02e-11	1.21E-11
Chromium	surface water	0	8.84e-06	0	0	8.84e-06	0.0005%
Chromium (III)	surface water	6.23e-06	3.49e-09	0	1.80e-09	6.23e-06	0.0004%
Chromium (VI)	surface water	2.94e-07	2.33e-07	0	1.80e-09	5.29e-07	3.15E-07
Cobalt (Co I, Co II, Co III)	surface water	7.70e-10	0	0	0	7.70e-10	4.59E-10
COD	surface water	7.67e-03	8.20e-02	0	-2.69e-03	8.70e-02	5.1827%
COD	treatment	0	3.90e-02	0	0	3.90e-02	2.3251%
Colon bacillus (bacteria in large intestine)	surface water	0	3.89e-03	0	0	3.89e-03	0.2320%
Copper	surface water	0	9.18e-07	0	0	9.18e-07	0.0001%
Copper (+1 & +2)	surface water	3.80e-06	2.84e-10	0	-1.01e-11	3.80e-06	0.0002%

Table J-14. LCD water outputs (wastewater and water pollutants) (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Copper (+1 & +2)	treatment	0	4.28e-05	0	0	4.28e-05	0.0026%
Cyanide (-1)	surface water	4.49e-06	3.66e-06	0	-7.04e-13	8.15e-06	0.0005%
Cyanide (-1)	treatment	0	6.67e-07	0	0	6.67e-07	3.97E-07
Dichloromethane	surface water	8.22e-09	0	0	2.78e-11	8.25e-09	4.91E-09
Dissolved organic matter (chlorinated)	surface water	1.31e-06	0	0	0	1.31e-06	0.0001%
Dissolved organics	surface water	1.20e-03	4.67e-08	0	-8.34e-09	1.20e-03	0.0716%
Dissolved solids	surface water	3.21e-03	1.75e-01	0	-5.69e-05	1.78e-01	10.6251%
Edetic acid (EDTA)	surface water	9.46e-10	0	0	0	9.46e-10	5.63E-10
Ethylbenzene	surface water	1.43e-07	0	0	6.28e-11	1.43e-07	8.50E-08
Fluoride	surface water	3.39e-06	0	0	0	3.39e-06	0.0002%
Fluorides (F-)	surface water	5.14e-05	1.29e-02	0	-5.01e-06	1.30e-02	0.7724%
Fluorides (F-)	treatment	0	2.40e-04	0	0	2.40e-04	0.0143%
Formaldehyde	surface water	3.54e-14	0	0	0	3.54e-14	2.11E-14
Halogenated matter (organic)	surface water	1.65e-13	5.67e-12	0	-2.01e-13	5.64e-12	3.36E-12
Hexachloroethane	surface water	5.06e-18	0	0	0	5.06e-18	3.01E-18
Hexane	surface water	0	5.88e-04	0	0	5.88e-04	0.0351%
Hydrazine	surface water	4.35e-10	0	0	0	4.35e-10	2.59E-10
Hydrocarbons, remaining unspeciated	surface water	8.97e-05	1.70e-05	0	-7.87e-07	1.06e-04	0.0063%
Hydrochloric acid	treatment	0	3.29e-06	0	0	3.29e-06	0.0002%
Hypochlorite	surface water	8.62e-10	0	0	0	8.62e-10	5.14E-10
Hypochlorous acid	surface water	8.62e-10	0	0	0	8.62e-10	5.14E-10
Iodide (-1)	surface water	5.93e-07	0	0	0	5.93e-07	3.53E-07
Iron	surface water	0	1.31e-04	0	0	1.31e-04	0.0078%
Iron	treatment	0	8.33e-05	0	0	8.33e-05	0.0050%
Iron (+2 & +3)	surface water	3.71e-04	1.73e-08	0	-1.02e-08	3.71e-04	0.0221%
Lead	surface water	0	8.18e-06	0	0	8.18e-06	0.0005%
Lead	treatment	0	8.33e-07	0	0	8.33e-07	4.96E-07
Lead cmpds	surface water	3.68e-06	5.67e-11	0	4.98e-10	3.68e-06	0.0002%
Lead cmpds	treatment	0	7.14e-06	0	0	7.14e-06	0.0004%
Lithium salts	surface water	4.86e-11	0	0	0	4.86e-11	2.89E-11
Magnesium (+2)	surface water	5.13e-04	0	0	0	5.13e-04	0.0305%
Manganese	surface water	0	2.29e-07	0	0	2.29e-07	1.36E-07
Manganese cmpds	surface water	1.48e-05	0	0	0	1.48e-05	0.0009%
Mercury	treatment	0	8.33e-08	0	0	8.33e-08	4.96E-08
Mercury	surface water	9.08e-08	9.69e-08	0	0	1.88e-07	1.12E-07
Mercury compounds	surface water	5.82e-07	6.52e-14	0	1.62e-11	5.82e-07	3.47E-07
Metals, remaining unspeciated	surface water	3.55e-04	4.72e-04	0	-2.45e-05	8.03e-04	0.0478%
Molybdenum (Mo II, Mo III, Mo IV, Mo V, Mo VI)	surface water	1.88e-06	0	0	0	1.88e-06	0.0001%
Morpholine	surface water	4.60e-09	0	0	0	4.60e-09	2.74E-09
Nickel	surface water	0	2.33e-07	0	0	2.33e-07	1.39E-07
Nickel	treatment	0	3.33e-06	0	0	3.33e-06	0.0002%
Nickel (+2)	surface water	4.39e-07	0	0	0	4.39e-07	2.62E-07
Nickel cmpds	surface water	3.29e-06	2.84e-11	0	-1.01e-12	3.29e-06	0.0002%
Nitrate	surface water	1.97e-05	3.15e-06	0	-1.27e-06	2.15e-05	0.0013%
Nitrates/nitrites	surface water	8.00e-05	0	0	0	8.00e-05	0.0048%
Nitrites	surface water	4.23e-07	0	0	0	4.23e-07	2.52E-07
Nitrogen	surface water	1.44e-05	7.98e-02	0	0	7.98e-02	4.7566%

Table J-14. LCD water outputs (wastewater and water pollutants) (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Nitrogen	treatment	0	1.26e-02	0	0	1.26e-02	0.7494%
Nitrogen dioxide	surface water	3.04e-04	0	0	0	3.04e-04	0.0181%
Oil & grease	surface water	2.18e-06	5.36e-04	0	0	5.38e-04	0.0321%
Oil & grease	treatment	0	3.61e-03	0	0	3.61e-03	0.2150%
Organic phosphorus, unspecified	surface water	0	2.29e-07	0	0	2.29e-07	1.36E-07
Orthoboric acid	treatment	0	1.31e-06	0	0	1.31e-06	0.0001%
Other nitrogen	surface water	2.25e-04	7.66e-10	0	-2.72e-11	2.25e-04	0.0134%
Other organics	surface water	2.12e-05	0	0	0	2.12e-05	0.0013%
Oxalic acid	surface water	1.89e-09	0	0	0	1.89e-09	1.13E-09
o-xylene	surface water	0	0	0	1.37e-10	1.37e-10	8.14E-11
Phenol	surface water	4.50e-05	1.76e-04	0	-6.22e-06	2.14e-04	0.0128%
Phosphate (PO43-)	surface water	1.11e-04	0	0	0	1.11e-04	0.0066%
Phosphates	surface water	2.23e-07	2.83e-08	0	7.27e-10	2.52e-07	1.50E-07
Phosphorus (yellow or white)	surface water	1.92e-06	4.33e-03	0	0	4.33e-03	0.2581%
Phosphorus (yellow or white)	treatment	0	6.91e-03	0	0	6.91e-03	0.4114%
Phosphorus pentoxide	surface water	7.63e-09	0	0	0	7.63e-09	4.54E-09
Polychlorinated biphenyls	surface water	0	1.14e-08	0	0	1.14e-08	6.80E-09
Polycyclic aromatic hydrocarbons	surface water	2.87e-06	6.81e-11	0	-2.41e-12	2.87e-06	0.0002%
Potassium (+1)	surface water	2.46e-04	0	0	0	2.46e-04	0.0146%
Rubidium ion (Rb+)	surface water	5.93e-08	0	0	0	5.93e-08	3.53E-08
Salts (unspecified)	surface water	2.54e-04	7.84e-05	0	-2.78e-06	3.29e-04	0.0196%
Sand	surface water	2.95e-09	0	0	0	2.95e-09	1.76E-09
Saponifiable oils and fats	surface water	7.30e-05	0	0	0	7.30e-05	0.0044%
Selenium	surface water	2.99e-06	0	0	2.88e-11	2.99e-06	0.0002%
Silver compounds	surface water	3.56e-09	0	0	5.26e-10	4.09e-09	2.43E-09
Sodium (+1)	surface water	1.73e-01	3.41e-01	0	-2.03e-02	4.94e-01	29.4192%
Strontium (Sr II)	surface water	9.60e-05	0	0	0	9.60e-05	0.0057%
Sulfate ion (-4)	surface water	2.40e-02	2.94e-03	0	-1.20e-06	2.69e-02	1.6033%
Sulfate ion (-4)	treatment	0	1.32e-04	2.55e-02	4.84e-06	2.57e-02	1.5285%
Sulfide	surface water	2.20e-06	9.86e-09	0	-1.74e-09	2.20e-06	0.0001%
Sulfites	surface water	4.80e-07	0	0	0	4.80e-07	2.86E-07
Sulfur	surface water	1.04e-11	0	0	0	1.04e-11	6.18E-12
Suspended solids	surface water	4.98e-03	5.80e-02	0	-1.44e-03	6.15e-02	3.6643%
Suspended solids	treatment	0	5.60e-03	6.65e-04	1.26e-07	6.26e-03	0.3732%
Tars (unspecified)	surface water	5.06e-15	0	0	0	5.06e-15	3.01E-15
Tetrachloroethylene	surface water	1.26e-14	2.29e-08	0	1.74e-11	2.29e-08	1.37E-08
Tin	surface water	0	4.58e-07	0	0	4.58e-07	2.73E-07
Tin (Sn++, Sn4+)	surface water	5.11e-05	0	0	0	5.11e-05	0.0030%
Titanium tetrachloride	surface water	3.52e-05	0	0	0	3.52e-05	0.0021%
TOCs	surface water	8.96e-04	4.25e-08	0	-1.51e-09	8.96e-04	0.0534%
Toluene	surface water	1.60e-06	6.24e-10	0	5.83e-10	1.60e-06	0.0001%
Trichloroethylene	surface water	7.66e-13	2.29e-08	0	1.74e-11	2.29e-08	1.37E-08
Triethylene glycol	surface water	1.86e-06	0	0	0	1.86e-06	0.0001%
Vanadium (V3+, V5+)	surface water	3.18e-06	0	0	0	3.18e-06	0.0002%
Vinyl chloride	surface water	0	0	0	3.48e-11	3.48e-11	2.07E-11
VOCs, remaining unspeciated	surface water	2.07e-06	0	0	0	2.07e-06	0.0001%
Waste metals, unspecified	surface water	9.37e-05	0	0	0	9.37e-05	0.0056%
Waste oil	surface water	1.75e-03	4.87e-03	0	-2.06e-04	6.41e-03	0.3817%
Xylene (mixed isomers)	surface water	6.41e-06	0	0	1.76e-10	6.41e-06	0.0004%
Zinc (+2)	surface water	7.41e-06	1.40e-09	0	-2.09e-10	7.41e-06	0.0004%
Zinc (elemental)	surface water	0	2.63e-06	0	0	2.63e-06	0.0002%
Total water pollutants		4.60e-01	1.23e+00	2.62e-02	-4.09e-02	1.68e+00	100.00%

Table J-15. LCD hazardous waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Acetic acid	landfill	0	4.46E-03	0	0	4.46E-03	7.09E-04
Acetone	treatment	0	2.77E-02	0	0	2.77E-02	4.40E-03
Acid waste (D002 waste)	treatment	0	1.19E-03	0	0	1.19E-03	1.89E-04
Barium debris (D008 waste)	landfill	0	9.91E-06	0	0	9.91E-06	1.57E-06
Chrome debris (D007 waste)	treatment	0	6.83E-06	0	0	6.83E-06	1.08E-06
Chrome liquid waste (D007 waste)	recycling/reuse	0	4.54E-04	0	0	4.54E-04	7.22E-05
Chromium	landfill	0	1.52E-06	0	0	1.52E-06	2.41E-07
EOL LCD Monitor, landfilled	landfill	0	0	0	1.64E+00	1.64E+00	26.13%
Ferric chloride	recycling/reuse	0	1.37E-02	0	0	1.37E-02	2.18E-03
Flammable liquids (F003 waste)	treatment	0	9.13E-04	0	0	9.13E-04	1.45E-04
Hazardous waste, unspecified	landfill	6.72E-03	2.97E-02	0	-1.05E-03	3.54E-02	5.62E-03
Hazardous waste, unspecified	recycling/reuse	0	1.42E-02	0	0	1.42E-02	2.26E-03
Hazardous waste, unspecified	treatment	0	6.16E-02	0	0	6.16E-02	9.78E-03
HCFC-225ca	recycling/reuse	0	3.11E-05	0	0	3.11E-05	4.94E-06
HCFC-225cb	recycling/reuse	0	3.11E-05	0	0	3.11E-05	4.94E-06
Hydrofluoric acid	landfill	0	8.24E-05	0	0	8.24E-05	1.31E-05
Isopropyl alcohol	recycling/reuse	0	1.69E-01	0	0	1.69E-01	2.69%
Isopropyl alcohol	treatment	0	1.91E+00	0	0	1.91E+00	30.41%
Mercury	recycling/reuse	0	2.00E-06	0	0	2.00E-06	3.18E-07
Nitric acid	landfill	0	3.43E-04	0	0	3.43E-04	5.45E-05
Phosphoric acid	landfill	0	1.44E-02	0	0	1.44E-02	2.29E-03
PWB-Decontaminating debris	treatment	0	6.85E-03	0	0	6.85E-03	1.09E-03
PWB-Lead contaminated waste oil	treatment	0	5.14E-03	0	0	5.14E-03	8.16E-04
PWB-Route dust	recycling/reuse	0	5.31E-03	0	0	5.31E-03	8.43E-04
PWB-Solder dross	recycling/reuse	0	2.96E-02	0	0	2.96E-02	4.70E-03
PWB-Waste cupric etchant	recycling/reuse	0	9.93E-02	0	0	9.93E-02	1.58%
Remover, unspecified	recycling/reuse	0	8.84E-02	0	0	8.84E-02	1.40%
Remover, unspecified	treatment	0	3.03E-01	0	0	3.03E-01	4.81%
Rinse, unspecified	recycling/reuse	0	4.67E-02	0	0	4.67E-02	7.42E-03
Silver	landfill	0	2.72E-09	0	0	2.72E-09	4.33E-10
Sodium sulfate	recycling/reuse	0	2.44E-01	0	0	2.44E-01	3.89%
Spent solvent (non-halogenated)	treatment	0	4.66E-02	0	0	4.66E-02	7.41E-03
Spent solvent (with halogenated materials)	treatment	0	1.55E-02	0	0	1.55E-02	2.47E-03
Spent solvents (F003 waste)	treatment	0	2.74E-04	0	0	2.74E-04	4.35E-05
Tetramethyl ammonium hydroxide	recycling/reuse	0	1.42E-01	0	0	1.42E-01	2.26%
Thinner, unspecified	treatment	0	5.40E-01	0	0	5.40E-01	8.57%
Unspecified sludge	land (other than	0	3.09E-02	0	0	3.09E-02	4.91E-03
Waste acid (chrome mixed acid)	recycling/reuse	0	7.18E-03	0	0	7.18E-03	1.14E-03
Waste acid (mainly HF)	recycling/reuse	0	5.69E-01	0	0	5.69E-01	9.04%
Waste acid (mainly HF)	treatment	0	1.36E-01	0	0	1.36E-01	2.15%
Waste acid (mostly 3% HCl solution)	recycling/reuse	0	1.82E-04	0	0	1.82E-04	2.89E-05
Waste acids, unspecified	recycling/reuse	0	3.24E-02	0	0	3.24E-02	5.15E-03
Waste Batch (Ba, Pb) (D008 waste)	landfill	0	6.55E-05	0	0	6.55E-05	1.04E-05
Waste CCFL, with lead	treatment	0	8.17E-08	0	0	8.17E-08	1.30E-08
Waste CCFL, with mercury	treatment	0	8.17E-10	0	0	8.17E-10	1.30E-10
Waste glass, with mercury	landfill	0	1.05E-10	0	0	1.05E-10	1.67E-11
Waste metals, unspecified	recycling/reuse	0	1.17E-03	0	0	1.17E-03	1.85E-04
Waste solvent (photoresist)	recycling/reuse	0	2.05E-02	0	0	2.05E-02	3.26E-03
Waste solvent (photoresist)	treatment	0	2.17E-02	0	0	2.17E-02	3.45E-03
Total hazardous waste		6.72E-03	4.64E+00	0.00E+00	1.64E+00	6.29E+00	100.00%

Table J-16. LCD solid waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
abrasive sludge	recycling/reuse	0	1.95E-03	0	0	1.95E-03	3.73E-05
acid absorbent	landfill	0	3.77E-06	0	0	3.77E-06	7.20E-08
Aluminum (elemental)	landfill	1.23E-05	0	0	0	1.23E-05	2.35E-07
Aluminum scrap	recycling/reuse	2.55E-07	8.77E-06	0	9.52E-03	9.53E-03	1.82E-04
Aluminum scrap, Wabash 319	recycling/reuse	0	2.37E-08	0	0	2.37E-08	4.53E-10
Arsenic	landfill	4.91E-09	0	0	0	4.91E-09	9.38E-11
Bauxite residues	landfill	1.70E-05	5.87E-04	0	-1.96E-05	5.84E-04	1.12E-05
blasting media	landfill	0	1.70E-05	0	0	1.70E-05	3.24E-07
Broken CCFL	landfill	0	2.69E-07	0	0	2.69E-07	5.14E-09
Cadmium	landfill	4.92E-10	0	0	0	4.92E-10	9.40E-12
Calcium	landfill	4.91E-05	0	0	0	4.91E-05	9.38E-07
Carbon	landfill	3.79E-05	0	0	0	3.79E-05	7.24E-07
CARBON STEEL SCRAP	recycling/reuse	0	0	0	4.58E-01	4.58E-01	8.75E-03
Cardboard	treatment	0	1.82E-05	0	0	1.82E-05	3.47E-07
Chromium (III)	landfill	3.07E-08	0	0	0	3.07E-08	5.87E-10
Chromium (VI)	landfill	3.07E-08	0	0	0	3.07E-08	5.87E-10
Cinders from LCD glass mfg	landfill	0	3.83E-04	0	0	3.83E-04	7.31E-06
Coal waste	landfill	0	2.28E+00	1.90E+01	3.60E-03	2.13E+01	40.64%
Cobalt	landfill	2.36E-10	0	0	0	2.36E-10	4.51E-12
Cobalt nitrate	treatment	0	2.83E-06	0	0	2.83E-06	5.40E-08
Copper	landfill	1.18E-09	0	0	0	1.18E-09	2.26E-11
Diesel fuel	treatment	0	1.88E-06	0	0	1.88E-06	3.60E-08
Dust	treatment	0	1.59E-04	0	0	1.59E-04	3.03E-06
Dust/sludge	landfill	0	8.80E-01	7.34E+00	1.39E-03	8.23E+00	15.72%
EOL LCD Monitor, incinerated	treatment	0	0	0	9.75E-01	9.75E-01	1.86%
EOL LCD Monitor, landfilled	landfill	0	0	0	8.94E-01	8.94E-01	1.71%
EOL LCD Monitor, recycled	recycling/reuse	0	0	0	9.75E-01	9.75E-01	1.86%
EOL LCD Monitor, remanufactured	recycling/reuse	0	0	0	9.75E-01	9.75E-01	1.86%
FGD sludge	landfill	2.45E-02	1.09E-02	0	-6.11E-04	3.48E-02	6.64E-04
Fly/bottom ash	landfill	0	5.70E-01	4.75E+00	9.01E-04	5.32E+00	10.16%
Iron	landfill	2.46E-05	0	0	0	2.46E-05	4.70E-07
Iron scrap	recycling/reuse	1.67E-01	0	0	1.10E+00	1.27E+00	2.42%
Isopropyl alcohol	recycling/reuse	0	2.53E-02	0	0	2.53E-02	4.84E-04
Isopropyl alcohol	treatment	0	1.03E-02	0	0	1.03E-02	1.97E-04
LCD glass	recycling/reuse	0	0	0	8.77E-02	8.77E-02	1.68E-03
LCD glass EP dust	landfill	0	4.77E-05	0	0	4.77E-05	9.12E-07
LCD glass EP dust	recycling/reuse	0	2.32E-04	0	0	2.32E-04	4.43E-06
LCD glass, unspecified	landfill	0	1.13E-03	0	0	1.13E-03	2.15E-05
LCD panel waste	landfill	0	2.43E-02	0	0	2.43E-02	4.64E-04
Lead	landfill	5.42E-09	0	0	0	5.42E-09	1.04E-10
Manganese	landfill	4.91E-07	0	0	0	4.91E-07	9.38E-09
Mercury	landfill	3.33E-11	0	0	0	3.33E-11	6.36E-13
Mineral waste	landfill	2.20E-01	1.26E-04	0	-4.46E-06	2.21E-01	4.21E-03
Mining waste	landfill	1.41E-01	0	0	-1.23E-06	1.41E-01	2.69E-03
Mixed industrial (waste)	landfill	4.34E-02	4.83E-02	0	-1.35E-03	9.04E-02	1.73E-03
Nickel	landfill	1.77E-09	0	0	0	1.77E-09	3.38E-11
Nickel nitrate	treatment	0	2.83E-06	0	0	2.83E-06	5.40E-08
Nitrogen	landfill	9.83E-09	0	0	0	9.83E-09	1.88E-10
Non mineral waste (inert)	landfill	9.80E-06	0	0	0	9.80E-06	1.87E-07
Non toxic chemical waste (unspecified)	landfill	5.72E-03	2.95E-05	0	-1.05E-06	5.75E-03	1.10E-04
Oily rags & filter media	landfill	0	1.51E-05	0	0	1.51E-05	2.88E-07
Oily rags & filter media	recycling/reuse	0	1.88E-06	0	0	1.88E-06	3.60E-08

Table J-16. LCD solid waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
parts cleaner solvent	recycling/reuse	0	3.77E-06	0	0	3.77E-06	7.20E-08
Phosphorus (yellow or white)	landfill	6.29E-07	0	0	0	6.29E-07	1.20E-08
Plating process sludge	landfill	0	1.52E-05	0	0	1.52E-05	2.90E-07
Polycarbonate	recycling/reuse	0	0	0	3.90E-01	3.90E-01	7.46E-03
Polyester resin	recycling/reuse	0	3.20E-02	0	0	3.20E-02	6.11E-04
Polyethylene, foamed	treatment	0	9.99E-04	0	0	9.99E-04	1.91E-05
Polyethylene/polypropylene waste	treatment	0	2.72E-03	0	0	2.72E-03	5.20E-05
Potassium Carbonate	landfill	0	1.53E-04	0	0	1.53E-04	2.91E-06
Printed wiring board (PWB)	landfill	0	7.50E-03	0	0	7.50E-03	1.43E-04
PWB-Drill dust	landfill	0	6.59E-03	0	0	6.59E-03	1.26E-04
Remover, unspecified	treatment	0	3.09E-02	0	0	3.09E-02	5.90E-04
Sewage sludge (unspecified)	landfill	3.25E-05	0	0	0	3.25E-05	6.22E-07
Slag and ash	recycling/reuse	8.02E+00	3.40E+00	0	-9.67E+00	1.75E+00	3.35%
Slag and ash	landfill	8.19E-02	3.49E-02	0	-1.99E-03	1.15E-01	2.19E-03
sludge (calcium fluoride, CaF2)	recycling/reuse	0	8.13E-04	0	0	8.13E-04	1.55E-05
Sludge from LCD glass mfg	landfill	0	4.06E-05	0	0	4.06E-05	7.77E-07
Sodium Carbonate	landfill	0	1.53E-04	0	0	1.53E-04	2.91E-06
Stannous sludge	recycling/reuse	3.25E-04	0	0	0	3.25E-04	6.22E-06
Steel scrap (tinplated)	recycling/reuse	7.73E-02	0	0	0	7.73E-02	1.48E-03
Sulfur	landfill	7.37E-06	0	0	0	7.37E-06	1.41E-07
Unspecified nonhazardous waste	recycling/reuse	0	1.26E-04	0	0	1.26E-04	2.40E-06
Unspecified sludge	landfill	0	3.56E-04	0	0	3.56E-04	6.80E-06
Unspecified sludge	recycling/reuse	0	8.46E-01	0	0	8.46E-01	1.62%
Unspecified sludge	treatment	0	5.73E-02	0	0	5.73E-02	1.09E-03
Unspecified solid waste	landfill	2.40E+00	0	0	-5.10E-01	1.89E+00	3.62%
Unspecified solid waste	recycling/reuse	1.50E+00	2.11E-01	0	0	1.71E+00	3.27%
Unspecified solid waste	treatment	0	1.63E+00	0	0	1.63E+00	3.11%
Unspecified solid waste (incinerated)	treatment	4.61E-04	6.44E-04	0	-3.84E-05	1.07E-03	2.04E-05
Unspecified waste	recycling/reuse	4.05E-01	1.72E-01	0	-9.83E-03	5.67E-01	1.08E-02
Unspecified waste	landfill	0	0	0	-9.74E-02	-9.74E-02	-1.86E-03
Used silica gel	landfill	0	6.22E-04	0	0	6.22E-04	1.19E-05
Waste acid (containing F and detergents)	landfill	0	2.70E-01	0	0	2.70E-01	5.16E-03
Waste acids, unspecified	treatment	0	1.05E-01	0	0	1.05E-01	2.00E-03
Waste alkali (color filter developer,	recycling/reuse	0	8.91E-02	0	0	8.91E-02	1.70E-03
Waste alkali, unspecified	recycling/reuse	0	3.23E-01	0	0	3.23E-01	6.18E-03
Waste alkali, unspecified	treatment	0	1.95E-06	0	0	1.95E-06	3.73E-08
Waste backlight casing (PC)	landfill	0	1.46E-05	0	0	1.46E-05	2.79E-07
Waste backlight light guide (PMMA)	landfill	0	1.52E-03	0	0	1.52E-03	2.90E-05
Waste LCD glass	landfill	0	2.63E-01	0	0	2.63E-01	5.03E-03
Waste LCD glass	recycling/reuse	0	7.20E-01	0	0	7.20E-01	1.38%
Waste metals, unspecified	recycling/reuse	0	2.93E-03	0	0	2.93E-03	5.61E-05
Waste oil	treatment	0	1.64E-02	0	0	1.64E-02	3.14E-04
Waste oil	landfill	3.17E-05	0	0	0	3.17E-05	6.05E-07
Waste plastic from LCD modules	recycling/reuse	0	7.40E-02	0	0	7.40E-02	1.41E-03
Waste plastic from LCD modules	treatment	0	4.03E-01	0	0	4.03E-01	7.70E-03
Waste plastics from LCD monitor	landfill	0	4.05E-02	0	0	4.05E-02	7.75E-04
Waste refractory	landfill	0	1.13E-04	0	0	1.13E-04	2.16E-06
Zinc (elemental)	landfill	1.96E-07	0	0	0	1.96E-07	3.75E-09
Total solid waste		1.31E+01	1.26E+01	3.11E+01	-4.42E+00	5.23E+01	100.00%

Table J-17. LCD radioactive waste outputs (kg/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% of Total
Highly radioactive waste (Class C)	landfill	2.72e-06	0	0	0	2.72e-06	0.18%
Low-level radioactive waste	landfill	1.28e-04	3.74e-04	6.56e-04	1.24e-07	1.16e-03	78.49%
Radioactive waste (unspecified)	landfill	5.77e-06	0	0	0	5.77e-06	0.39%
Uranium, depleted	landfill	0	1.12e-04	1.97e-04	3.73e-08	3.09e-04	20.93%
Total radioactive waste		1.37e-04	4.87e-04	8.52e-04	1.62e-07	1.48e-03	100.00%

Table J-18. LCD radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Americium-241 (isotope)	landfill	9.42e+01	0	0	0	9.42e+01	0.0002%
Americium-243 (isotope)	landfill	2.05e+00	0	0	0	2.05e+00	5.11E-08
Antimony-124 (isotope)	surface water	2.12e-02	0	0	0	2.12e-02	5.29E-10
Antimony-124 (isotope)	treatment	0	1.68e+00	2.94e+00	5.59e-04	4.63e+00	1.15E-07
Antimony-125 (isotope)	treatment	0	6.70e+00	1.17e+01	2.23e-03	1.84e+01	4.59E-07
Argon-41 (isotope)	air	0	3.40e+03	5.96e+03	1.13e+00	9.36e+03	0.0233%
Barium-140 (isotope)	treatment	0	1.25e-01	2.18e-01	4.14e-05	3.43e-01	8.55E-09
Bromine-89 (isotope)	air	0	3.93e-04	6.89e-04	1.31e-07	1.08e-03	2.70E-11
Bromine-90 (isotope)	air	0	1.60e-04	2.80e-04	5.32e-08	4.40e-04	1.10E-11
Carbon-14 (isotope)	air	9.35e+00	0	0	0	9.35e+00	2.33E-07
Cesium-134 (isotope)	air	3.58e-04	1.08e-02	1.89e-02	3.59e-06	3.01e-02	7.50E-10
Cesium-134 (isotope)	surface water	1.87e-02	0	0	0	1.87e-02	4.65E-10
Cesium-134 (isotope)	treatment	0	4.49e+00	7.87e+00	1.49e-03	1.24e+01	3.08E-07
Cesium-135 (isotope)	landfill	4.59e+04	0	0	0	4.59e+04	0.1145%
Cesium-136 (isotope)	treatment	0	1.75e-03	3.37e-01	6.40e-05	3.39e-01	8.45E-09
Cesium-137 (isotope)	air	3.58e-04	8.15e-02	1.43e-01	2.71e-05	2.25e-01	5.60E-09
Cesium-137 (isotope)	landfill	1.28e-01	0	0	0	1.28e-01	3.20E-09
Cesium-137 (isotope)	surface water	2.74e-02	0	0	0	2.74e-02	6.82E-10
Cesium-137 (isotope)	treatment	0	6.75e+00	1.18e+01	2.24e-03	1.86e+01	4.63E-07
Chromium-51 (isotope)	air	0	2.13e-01	3.74e-01	7.09e-05	5.87e-01	1.46E-08
Chromium-51 (isotope)	treatment	0	8.10e+00	1.42e+01	2.69e-03	2.23e+01	0.0001%
Cobalt-57 (isotope)	air	0	5.74e-04	1.00e-03	1.91e-07	1.58e-03	3.94E-11
Cobalt-57 (isotope)	treatment	0	1.96e-01	3.43e-01	6.52e-05	5.40e-01	1.35E-08
Cobalt-58 (isotope)	air	3.58e-04	6.66e+00	1.28e+03	2.43e-01	1.29e+03	0.0032%
Cobalt-58 (isotope)	surface water	6.14e-02	0	0	0	6.14e-02	1.53E-09
Cobalt-58 (isotope)	treatment	0	7.98e+01	1.40e+02	2.65e-02	2.20e+02	0.0005%
Cobalt-60 (isotope)	air	3.58e-04	5.51e-02	9.65e-02	1.83e-05	1.52e-01	3.79E-09
Cobalt-60 (isotope)	surface water	3.84e-02	0	0	0	3.84e-02	9.56E-10
Cobalt-80 (isotope)	treatment	0	2.09e+01	3.67e+01	6.96e-03	5.76e+01	0.0001%
Curium-244 (isotope)	landfill	1.91e+02	0	0	0	1.91e+02	0.0005%
Curium-245 (isotope)	landfill	2.13e-02	0	0	0	2.13e-02	5.31E-10
Iodine-129 (isotope)	landfill	3.01e-03	0	0	0	3.01e-03	7.50E-11
Iodine-131 (isotope)	air	2.10e-03	2.57e-01	4.51e-01	8.56e-05	7.11e-01	1.77E-08
Iodine-131 (isotope)	surface water	2.33e-03	0	0	0	2.33e-03	5.80E-11
Iodine-131 (isotope)	treatment	0	3.73e+00	6.54e+00	1.24e-03	1.03e+01	2.56E-07
Iodine-132 (isotope)	air	0	5.23e-02	9.16e-02	1.74e-05	1.44e-01	3.59E-09
Iodine-132 (isotope)	treatment	0	1.41e+00	2.48e+00	4.70e-04	3.89e+00	9.70E-08
Iodine-133 (isotope)	air	4.09e-03	2.39e+02	4.18e+02	7.94e-02	6.57e+02	0.0016%
Iodine-133 (isotope)	treatment	0	1.60e+00	2.80e+00	5.32e-04	4.40e+00	1.10E-07
Iodine-134 (isotope)	air	0	2.71e-01	4.74e-01	9.00e-05	7.45e-01	1.86E-08
Iodine-135 (isotope)	air	0	1.36e-02	2.38e-02	4.52e-06	3.74e-02	9.33E-10
Iodine-135 (isotope)	treatment	0	1.15e+00	2.01e+00	3.82e-04	3.16e+00	7.88E-08
Iron-55 (isotope)	treatment	0	1.91e+01	3.34e+01	6.34e-03	5.25e+01	0.0001%
Iron-59 (isotope)	treatment	0	9.79e-01	1.72e+00	3.25e-04	2.69e+00	6.72E-08
Krypton-85 (isotope)	air	5.45e+01	5.64e+03	9.88e+03	1.88e+00	1.56e+04	0.0388%
Krypton-85M (isotope)	air	0	2.73e+02	4.79e+02	9.09e-02	7.53e+02	0.0019%
Krypton-85M (isotope)	treatment	0	5.04e+00	8.83e+00	1.68e-03	1.39e+01	3.46E-07
Krypton-87 (isotope)	air	0	1.02e+02	1.78e+02	3.38e-02	2.80e+02	0.0007%
Krypton-88 (isotope)	air	0	4.77e+02	8.37e+02	1.59e-01	1.31e+03	0.0033%
Lanthanum-140 (isotope)	treatment	0	1.33e-01	2.34e-01	4.43e-05	3.67e-01	9.15E-09
Lead-210 (isotope)	air	3.21e-01	0	0	0	3.21e-01	7.99E-09

Table J-18. LCD radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Manganese-54 (isotope)	air	0	3.03e-03	5.30e-03	1.01e-06	8.33e-03	2.08E-10
Manganese-54 (isotope)	surface water	3.07e-03	0	0	0	3.07e-03	7.65E-11
Manganese-54 (isotope)	treatment	0	5.34e+00	9.35e+00	1.77e-03	1.47e+01	3.66E-07
Molybdenum-99 (isotope)	treatment	0	1.01e+07	1.76e+07	3.35e+03	2.77e+07	69.0936%
Neptunium-237 (isotope)	landfill	2.95e+01	0	0	0	2.95e+01	0.0001%
Niobium-95 (isotope)	air	0	1.20e-04	2.11e-04	4.00e-08	3.31e-04	8.25E-12
Niobium-95 (isotope)	treatment	0	1.37e+00	2.41e+00	4.57e-04	3.78e+00	9.43E-08
Palladium-107 (isotope)	landfill	1.04e-02	0	0	0	1.04e-02	2.58E-10
Plutonium-239 (isotope)	landfill	3.57e+04	0	0	0	3.57e+04	0.0890%
Plutonium-240 (isotope)	landfill	5.08e+04	0	0	0	5.08e+04	0.1267%
Plutonium-241 (isotope)	landfill	1.18e+07	0	0	0	1.18e+07	29.3291%
Plutonium-242 (isotope)	landfill	1.92e+02	0	0	0	1.92e+02	0.0005%
Polonium-210 (isotope)	air	5.52e-01	0	0	0	5.52e-01	1.38E-08
Potassium-40 (isotope)	air	8.57e-02	0	0	0	8.57e-02	2.14E-09
Protactinium-234 (isotope)	air	5.06e-03	0	0	0	5.06e-03	1.26E-10
Protactinium-234 (isotope)	surface water	9.36e-02	0	0	0	9.36e-02	2.33E-09
Radioactive aerosols and halogenes (unspecified)	air	2.81e-02	0	0	0	2.81e-02	7.01E-10
radioactive gas (unspecified)	air	8.98e+02	0	0	0	8.98e+02	0.0022%
Radioactive substance (unspecified)	air	1.29e+00	4.44e+01	0	-1.57e+00	4.41e+01	0.0001%
Radioactive substance (unspecified)	surface water	1.20e-02	4.11e-01		-1.46e-02	4.09e-01	1.02E-08
Radium-222 (isotope)	air	3.26e+00	0	0	0	3.26e+00	8.13E-08
Radium-224 (isotope)	surface water	2.97e-01	0	0	0	2.97e-01	7.40E-09
Radium-226 (isotope)	air	4.31e-01	0	0	0	4.31e-01	1.07E-08
Radium-226 (isotope)	landfill	2.44e+02	0	0	0	2.44e+02	0.0006%
Radium-226 (isotope)	surface water	1.80e+02	0	0	0	1.80e+02	0.0004%
Radium-228 (isotope)	air	4.23e-02	0	0	0	4.23e-02	1.05E-09
Radium-228 (isotope)	surface water	5.93e-01	0	0	0	5.93e-01	1.48E-08
Radon-220 (isotope)	air	9.93e-01	0	0	0	9.93e-01	2.47E-08
Radon-222 (isotope)	air	4.30e+04	0	0	0	4.30e+04	0.1072%
Rubidium-88 (isotope)	air	0	1.12e+00	1.96e+00	3.72e-04	3.08e+00	7.67E-08
Ruthenium-103 (isotope)	treatment	0	1.68e-01	2.94e-01	5.59e-05	4.63e-01	1.15E-08
Samarium-151 (isotope)	landfill	4.25e+01	0	0	0	4.25e+01	0.0001%
Selenium-79 (isotope)	landfill	3.31e-02	0	0	0	3.31e-02	8.25E-10
Silver-110M (isotope)	air	0	3.59e-06	6.29e-06	1.19e-09	9.88e-06	2.46E-13
Silver-110M (isotope)	surface water	9.21e-02	0	0	0	9.21e-02	2.29E-09
Silver-110M (isotope)	treatment	0	1.96e+00	3.43e+00	6.52e-04	5.40e+00	1.35E-07
Sodium-24 (isotope)	treatment	0	2.99e-01	5.23e-01	9.93e-05	8.22e-01	2.05E-08
Strontium-89 (isotope)	treatment	0	3.23e-01	5.65e-01	1.07e-04	8.88e-01	2.21E-08
Strontium-90 (isotope)	landfill	6.86e+03	0	0	0	6.86e+03	0.0171%
Strontium-90 (isotope)	treatment	0	7.59e-02	1.33e-01	2.52e-05	2.09e-01	5.21E-09
Strontium-95 (isotope)	treatment	0	8.36e-01	1.47e+00	2.78e-04	2.30e+00	5.74E-08
Sulfur-136 (isotope)	treatment	0	1.80e-01	3.15e-01	5.99e-05	4.96e-01	1.24E-08
Technetium-99M (isotope)	air	0	1.61e-05	2.83e-05	5.36e-09	4.44e-05	1.11E-12
Technetium-99M (isotope)	landfill	1.40e+00	0	0	0	1.40e+00	3.50E-08
Technetium-99M (isotope)	treatment	0	1.17e-01	2.05e-01	3.89e-05	3.22e-01	8.03E-09
Thorium-228 (isotope)	air	3.57e-02	0	0	0	3.57e-02	8.89E-10
Thorium-228 (isotope)	surface water	1.19e+00	0	0	0	1.19e+00	2.96E-08
Thorium-230 (isotope)	air	7.31e-02	0	0	0	7.31e-02	1.82E-09
Thorium-230 (isotope)	landfill	2.44e+02	0	0	0	2.44e+02	0.0006%
Thorium-230 (isotope)	surface water	8.76e+00	0	0	0	8.76e+00	2.18E-07
Thorium-232 (isotope)	air	2.28e-02	0	0	0	2.28e-02	5.68E-10

Table J-18. LCD radioactivity outputs (Bq/functional unit)

Material	Disposition	Upstream	Mfg	Use	EOL	Total	% or Fraction of Total
Thorium-234 (isotope)	air	5.06e-03	0	0	0	5.06e-03	1.26E-10
Thorium-234 (isotope)	surface water	9.36e-02	0	0	0	9.36e-02	2.33E-09
Tin-113 (isotope)	treatment	0	1.85e-01	3.25e-01	6.16e-05	5.10e-01	1.27E-08
Tin-126 (isotope)	landfill	5.79e-02	0	0	0	5.79e-02	1.44E-09
Tritium-3 (isotope)	air	1.09e+02	7.98e+03	1.40e+04	2.65e+00	2.21e+04	0.0550%
Tritium-3 (isotope)	surface water	1.12e+03	0	0	0	1.12e+03	0.0028%
Tritium-3 (isotope)	treatment	0	5.96e+04	1.04e+05	1.98e+01	1.64e+05	0.4091%
Uranium-234 (isotope)	air	1.28e-01	0	0	0	1.28e-01	3.19E-09
Uranium-234 (isotope)	landfill	1.51e+02	0	0	0	1.51e+02	0.0004%
Uranium-234 (isotope)	surface water	3.09e+00	0	0	0	3.09e+00	7.71E-08
Uranium-235 (isotope)	air	9.55e-04	0	0	0	9.55e-04	2.38E-11
Uranium-235 (isotope)	landfill	2.73e+00	0	0	0	2.73e+00	6.81E-08
Uranium-235 (isotope)	surface water	1.34e-01	0	0	0	1.34e-01	3.35E-09
Uranium-238 (isotope)	air	2.10e-01	0	0	0	2.10e-01	5.23E-09
Uranium-238 (isotope)	landfill	4.23e+01	0	0	0	4.23e+01	0.0001%
Uranium-238 (isotope)	surface water	2.90e+00	0	0	0	2.90e+00	7.23E-08
Xenon-131M (isotope)	air	0	4.60e+02	8.06e+02	1.53e-01	1.27e+03	0.0032%
Xenon-131M (isotope)	treatment	0	6.14e+01	1.07e+02	2.04e-02	1.69e+02	0.0004%
Xenon-133 (isotope)	air	7.63e+02	4.98e+03	1.16e+05	2.21e+01	1.22e+05	0.3045%
Xenon-133 (isotope)	treatment	0	9.43e+03	1.65e+04	3.13e+00	2.60e+04	0.0647%
Xenon-133M (isotope)	air	0	6.59e+04	7.73e+03	1.47e+00	7.36e+04	0.1835%
Xenon-133M (isotope)	treatment	0	7.72e+01	1.35e+02	2.57e-02	2.13e+02	0.0005%
Xenon-135 (isotope)	air	0	2.51e+03	4.39e+03	8.33e-01	6.90e+03	0.0172%
Xenon-135 (isotope)	treatment	0	7.03e+01	1.23e+02	2.34e-02	1.93e+02	0.0005%
Xenon-135M (isotope)	air	0	4.79e+01	8.39e+01	1.59e-02	1.32e+02	0.0003%
Xenon-138 (isotope)	air	0	1.59e+02	2.78e+02	5.28e-02	4.37e+02	0.0011%
Zinc-85 (isotope)	treatment	0	9.00e-02	1.58e-01	2.99e-05	2.48e-01	6.18E-09
Zirconium-93 (isotope)	landfill	1.84e-01	0	0	0	1.84e-01	4.60E-09
Zirconium-95 (isotope)	air	0	3.11e-04	5.44e-04	1.03e-07	8.55e-04	2.13E-11
Total radioactivity outputs		1.20e+07	1.02e+07	1.79e+07	3.40e+03	4.01e+07	100%

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