NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Container Truck, Transport

Reference Flow: 1 kg of Cargo

Brief Description: This process includes all inputs for the raw material transportation for 1 kg of delivered biomass.

Section I: Meta Data

Geographical Coverage: US **Region:** N/A

Year Data Best Represents: 2008

Process Type: Transport Process (TP)

Process Scope: Gate-to-Gate Process (GG)

Allocation Applied: No

Completeness: Individual Relevant Flows Captured

Flows Aggregated in Data Set:

☒ Process ☒ Energy Use ☒ Energy P&D ☐ Material P&D

Relevant Output Flows Included in Data Set:

Releases to Air:	☒ Greenhouse Gases	☒ Criteria Air Pollutants	☐ Other
Releases to Water:	☒ Inorganic Emissions	☐ Organic Emissions	☐ Other
Water Usage:	☒ Water Consumption	☒ Water Demand (throughput)	
Releases to Soil:	☒ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

S2_TRK_DIST	*The distance the corn grain travels from the farm to the energy conversion facility*

Tracked Input Flows:

Cargo	*The cargo that the truck will carry*
Chip Truck	*The construction requirements to build a container truck*

Tracked Output Flows:

Cargo	*Cargo delivered*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_RMT_Biomass_ContainerTruck_2011.01.xls*, which provides additional details regarding relevant calculations, data quality, and references.

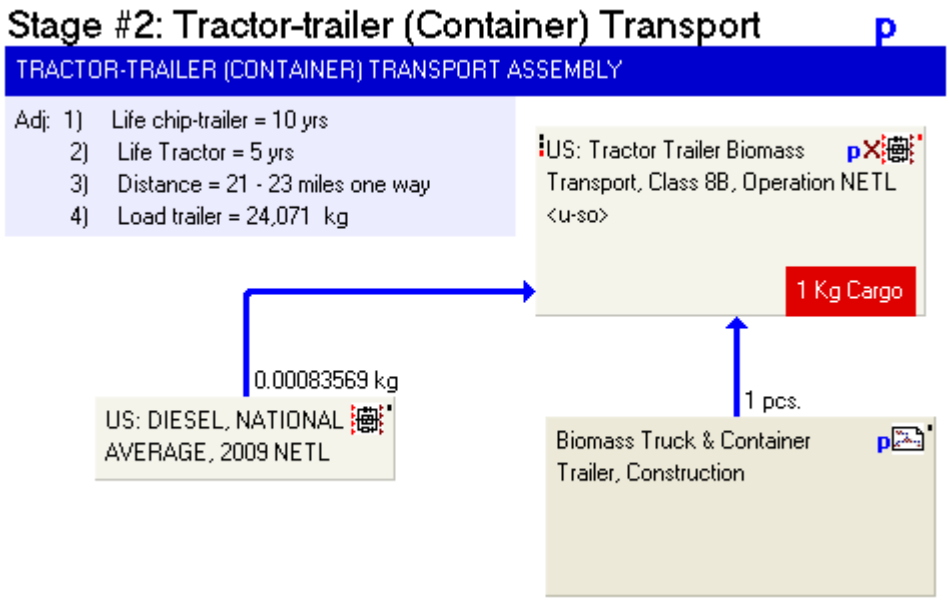
Goal and Scope

The scope of this unit process covers all aspects of raw material transportation (RMT) as seen in **Figure 1**. These processes were developed for the transportation of biomass feedstocks from the location of cultivation to the energy conversion facility; however, this aggregate process may be used for the transport of anything which requires a container truck. At the end, one kilogram of cargo is delivered to the life cycle (LC) Stage #3 boundary.

Boundary and Description

This unit process includes the construction and operation of a container truck. As built, the process transports biomass from the farm to the energy conversion facility. The truck consists of a cab and an enclosed, diesel-powered trailer. The transport distance is an adjustable parameter for RMT. The plan for RMT of corn grain is provided in **Figure 1**.

Figure 1: Plan for Container Truck Transportation, Including Construction and Operation of Profiles



Construction of the truck for RMT includes the materials required to construct the following piece of equipment for transport:

- Container/Chip Truck
  (DS/ DF DF_Stage2_C_Chip_Truck_Biomass_Transport_2010.01.doc)

The profiles and processes included in RMT are provided in **Table 1**. Those shown in bold face were developed by NETL.

Table 1: Profiles and Processes Included in RMT for Container Truck Transportation

Stage #2: Tractor-trailer (Container) Transport
- Biomass Truck & Container Trailer, Construction
  - DE: Lead (99,995%) PE
  - DE: Styrene-butadiene rubber mix (SBR) PE
  - RER: Aluminum sheet mix PE
  - RER: Nylon 6.6 granulate (PA 6.6) ELCD/PlasticsEurope <p-agg>
  - RER: Polyurethane flexible foam (PU) PlasticsEurope
  - US: Chip Truck, Biomass Transport, Construction NETL <u-so>
  - WOR: Steel Plate, BF, Manufacture NETL <u-so>
- US: DIESEL, NATIONAL AVERAGE, 2009 NETL <u-so>
- US: Tractor Trailer Biomass Transport, Class 8B, Operation NETL <u-so>

Parameters and Balances

The parameters for the highest level modeling plan for container truck transportation are shown in **Table 2**. These parameters may or may not include the adjustable parameters shown previously, depending on how the model was created. **Table** 3 presents the input and output balances for resources and emissions of interest for the RMT plan.

Table 2: Adjustable Parameters for RMT of Container Truck Transportation

Plan	Parameter	Value	Comment
LC Stage #2			
Stage #2: Tractor-trailer (Bale) Transport	Load_Trailer	22801.03	[kg] Maximum weight of corn grain transported by 1 trailer load.
Stage #2: Tractor-trailer (Bale) Transport	S2_TRK_DIST	33	[miles] adjustable parameter for distance from Origin to Destination.

Table 3: Inputs and Output Balances for RMT of Container Truck Transportation (kg/kg delivered)

Process or Category	Gate to Gate (RMT)
Inputs	
Flows	1.220E-02
Resources	1.220E-02
Energy resources	6.994E-04
Non renewable energy resources	6.990E-04
Crude oil (resource)	3.762E-04
Hard coal (resource)	1.292E-04
Lignite (resource)	6.407E-05
Natural gas (resource)	1.296E-04
Uranium (resource)	3.238E-09
Renewable energy resources	4.130E-07
Biomass	3.989E-07
Renewable fuels	3.016E-13
Wood	1.409E-08
Unspecified	0.000E+00
Land use	0.000E+00
Material resources	1.150E-02
Non renewable elements	1.467E-07
Aluminum	2.836E-13
Chromium	2.550E-11
Copper	6.070E-12
Iron	7.485E-08
Lead	2.456E-11
Magnesium	3.012E-14
Mercury	7.656E-12
Nickel	9.454E-14
Phosphorus	3.010E-09
Sulphur	6.834E-08
Zinc	4.769E-10
Non renewable resources	1.459E-03
Barium sulphate	1.769E-16
Basalt	2.557E-06
Bauxite	1.595E-04
Bentonite	1.486E-06
Calcium carbonate (CaCO3)	1.846E-09
Calcium chloride	1.811E-14

Process or Category	Gate to Gate (RMT)
Chalk (Calciumcarbonate)	5.238E-38
Chromium ore (39%)	2.010E-09
Clay	1.763E-07
Colemanite ore	1.024E-09
Copper - Gold - Silver - ore (1,0% Cu; 0,4 g/t Au; 66 g/t Ag)	1.351E-08
Copper - Gold - Silver - ore (1,1% Cu; 0,01 g/t Au; 2,86 g/t Ag)	8.233E-09
Copper - Gold - Silver - ore (1,16% Cu; 0,002 g/t Au; 1,06 g/t Ag)	4.647E-09
Copper - Molybdenum - Gold - Silver - ore (1,13% Cu; 0,02% Mo; 0,01 g/t Au; 2,86 g/t Ag)	1.132E-08
Copper ore (0.14%)	3.118E-08
Copper ore (1.2%)	1.401E-09
Copper ore (4%)	1.731E-18
Copper ore (sulphidic, 1.1%)	1.266E-10
Dolomite	7.687E-07
Feldspar (aluminum silicates)	2.123E-09
Ferro manganese	6.170E-12
Fluorspar (calcium fluoride; fluorite)	1.199E-06
Granite	6.645E-19
Gypsum (natural gypsum)	8.144E-08
Heavy spar (BaSO4)	3.580E-06
Ilmenite (titanium ore)	3.487E-17
Inert rock	1.154E-03
Iron ore (56,86%)	6.676E-05
Iron ore (65%)	3.783E-09
Kaolin ore	1.837E-09
Lead - zinc ore (4.6%-0.6%)	1.662E-05
Limestone (calcium carbonate)	3.158E-05
Magnesit (Magnesium carbonate)	2.200E-12
Magnesium chloride leach (40%)	2.299E-07
Manganese ore	4.160E-10
Manganese ore (R.O.M.)	2.960E-08
Molybdenite (Mo 0,24%)	6.982E-09
Natural Aggregate	5.891E-06
Nickel ore (1,5%)	3.738E-13
Nickel ore (1.6%)	5.694E-08
Olivine	6.417E-11
Peat	1.177E-07
Phosphate ore	4.686E-12
Phosphorus minerals	2.738E-07

Process or Category	Gate to Gate (RMT)
Phosphorus ore (29% P2O5)	2.868E-12
Potassium chloride	3.829E-08
Precious metal ore (R.O.M)	3.467E-10
Quartz sand (silica sand; silicon dioxide)	1.350E-07
Raw pumice	2.342E-11
Rutile (titanium ore)	3.278E-09
sand	7.676E-09
Slate	1.525E-10
Sodium chloride (rock salt)	9.787E-06
Sodium nitrate	1.606E-18
Sodium sulphate	1.234E-10
Soil	1.945E-06
Sulphur (bonded)	1.540E-13
Talc	4.958E-12
Tin ore	1.534E-17
Titanium ore	6.396E-09
Zinc - copper ore (4.07%-2.59%)	4.330E-07
Zinc - lead - copper ore (12%-3%-2%)	2.282E-06
Zinc - lead ore (4.21%-4.96%)	5.910E-19
Zinc ore (4%)	-4.896E-07
Zinc ore (sulphidic, 4%)	1.108E-17
Renewable resources	1.004E-02
Water	7.076E-03
Water	2.397E-03
Water (feed water)	2.203E-04
Water (ground water)	1.524E-03
Water (sea water)	8.977E-05
Water (surface water)	2.824E-03
Water (well water)	2.138E-05
Water (with river silt)	1.806E-16
Air	2.963E-03
Carbon dioxide	4.404E-06
Nitrogen	1.180E-06
Oxygen	0.000E+00
Unspecified	8.137E-11
Unspecified minerals	1.851E-11
Unspecified resources	6.286E-11
Area of Production Land	0.000E+00

Process or Category	Gate to Gate (RMT)
Output	
Flows	5.838E-03
Resources	2.771E-04
Energy resources	0.000E+00
Land use	0.000E+00
Material resources	2.771E-04
Renewable resources	2.771E-04
Water	2.751E-04
Water (river water)	2.654E-04
Water (wastewater)	9.696E-06
Nitrogen	0.000E+00
Oxygen	1.973E-06
Ecoinvent	3.362E-15
Long-term emission	3.362E-15
Fresh water	3.362E-15
Dissolved organic carbon, DOC (Ecoinvent)	3.362E-15
Production residues in life cycle	2.624E-04
Hazardous waste for disposal	4.622E-05
Dross (Fines)	3.064E-07
Natrium oxide	5.208E-07
Red mud (dry)	4.525E-05
Soil and sand containing heavy metals	6.382E-12
Toxic chemicals (unspecified)	1.497E-07
Hazardous waste for recovery	2.411E-07
Used oil	8.238E-08
Waste water processing residue	1.588E-07
Waste for disposal	8.548E-05
Incineration good	7.567E-08
Sludge from water works (6% dry matter-content)	3.215E-12
Waste (solid)	1.271E-07
Waste from steel works	8.527E-05
Waste for recovery	1.305E-04
Aluminum scrap	1.738E-12
Chemicals (unspecified)	5.690E-08
Cooling water	1.288E-04
Cryolite	1.428E-07

Process or Category	Gate to Gate (RMT)
Dross	2.597E-07
Gypsum (FDI)	2.965E-17
Plastic (unspecified)	7.863E-08
Production residues (unspecified)	5.760E-10
Rolling tinder	5.214E-24
Slag	1.117E-06
Waste paper	1.147E-11
Wood	7.526E-11
Wooden pallet (EURO)	3.232E-16
Mixed Waste (Hazardous or Radioactive)	0.000E+00
Neutralized residues	5.617E-18
Emissions to air	5.270E-03
Heavy metals to air	4.804E-09
Antimony	3.647E-12
Arsenic (+V)	5.004E-11
Arsenic trioxide	2.080E-16
Cadmium (+II)	1.301E-11
Chromium (+III)	6.315E-14
Chromium (unspecified)	1.464E-10
Cobalt	7.815E-12
Copper (+II)	2.003E-11
Heavy metals to air (unspecified)	5.519E-14
Hydrogen arsenic (arsine)	1.726E-14
Iron	1.637E-11
Lanthanides	2.343E-15
Lead (+II)	5.143E-10
Manganese (+II)	3.855E-11
Mercury (+II)	2.936E-11
Molybdenum	1.041E-12
Nickel (+II)	2.841E-10
Palladium	5.014E-19
Rhodium	4.840E-19
Selenium	6.836E-11
Silver	3.291E-17
Tellurium	8.419E-15
Thallium	1.477E-13
Tin (+IV)	4.242E-11
Titanium	1.485E-13

Process or Category	Gate to Gate (RMT)
Vanadium (+III)	1.096E-09
Zinc (+II)	2.472E-09
Inorganic emissions to air	2.796E-03
Ammonia	1.087E-08
Ammonium	3.328E-15
Ammonium nitrate	3.994E-16
Barium	2.354E-09
Beryllium	1.079E-12
Boron compounds (unspecified)	7.799E-10
Bromine	2.613E-10
Carbon dioxide	1.770E-03
Carbon dioxide (biotic)	3.487E-07
Carbon disulphide	5.311E-12
Carbon monoxide	6.558E-06
Chloride (unspecified)	4.807E-10
Chlorine	1.216E-09
Cyanide (unspecified)	4.543E-12
Fluoride	2.269E-08
Fluorides	1.363E-12
Fluorine	1.794E-13
Helium	5.173E-12
Hydrogen	1.347E-08
Hydrogen bromine (hydrobromic acid)	1.099E-12
Hydrogen chloride	3.083E-08
Hydrogen cyanide (prussic acid)	5.599E-12
Hydrogen fluoride	2.282E-08
Hydrogen iodide	1.171E-15
Hydrogen phosphorous	7.508E-13
Hydrogen sulphide	3.320E-08
Lead dioxide	4.701E-15
Nitrogen (atmospheric nitrogen)	1.395E-06
Nitrogen dioxide	1.198E-07
Nitrogen monoxide	1.583E-09
Nitrogen oxides	1.781E-06
Nitrous oxide (laughing gas)	4.443E-08
Oxygen	3.221E-07
Scandium	1.199E-15
Steam	1.011E-03

Process or Category	Gate to Gate (RMT)
Strontium	4.454E-14
Sulphur dioxide	3.768E-06
Sulphur hexafluoride	4.057E-14
Sulphuric acid	8.086E-12
Tin oxide	5.053E-17
Unspecified Particles	1.515E-10
Zinc oxide	1.011E-16
Zinc sulphate	4.345E-13
Organic emissions to air (group VOC)	4.308E-06
Group NMVOC to air	8.272E-07
Group PAH to air	2.102E-09
Anthracene	4.852E-14
Benzo{a}anthracene	2.441E-14
Benzo{a}pyrene	3.386E-11
Benzo{ghi}perylene	2.178E-14
Benzofluoranthene	4.356E-14
Chrysene	5.997E-14
Dibenz(a)anthracene	1.357E-14
Indeno[1,2,3-cd]pyrene	1.620E-14
Naphthalene	5.096E-12
Phenanthrene	1.601E-12
Polycyclic aromatic hydrocarbons (PAH)	2.061E-09
Halogenated organic emissions to air	5.677E-09
Dichloroethane (ethylene dichloride)	8.984E-15
Dichloromethane (methylene chloride)	3.270E-13
Dioxins (unspec.)	-6.849E-16
Halogenated hydrocarbons (unspecified)	3.901E-11
Polychlorinated biphenyls (PCB unspecified)	3.633E-14
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	3.974E-16
R 11 (trichlorofluoromethane)	2.367E-11
R 114 (dichlorotetrafluoroethane)	2.424E-11
R 116 (hexafluoroethane)	5.574E-10
R 12 (dichlorodifluoromethane)	5.088E-12
R 13 (chlorotrifluoromethane)	3.195E-12
R 22 (chlorodifluoromethane)	5.562E-12
Tetrafluoromethane	5.017E-09
Vinyl chloride (VCM; chloroethene)	1.642E-12
Acetaldehyde (Ethanal)	2.757E-10

Process or Category	Gate to Gate (RMT)
Acetic acid	1.166E-09
Acetone (dimethylcetone)	2.724E-10
Acrolein	3.424E-13
Aldehyde (unspecified)	1.407E-11
Alkane (unspecified)	2.004E-09
Alkene (unspecified)	1.033E-09
Aromatic hydrocarbons (unspecified)	4.856E-10
Benzene	7.141E-10
Butadiene	3.207E-15
Butane	3.400E-08
Butane (n-butane)	1.181E-09
Caprolactam	1.641E-14
Cyclohexane (hexahydro benzene)	2.313E-12
Diethylamine	8.319E-20
Ethane	9.801E-08
Ethanol	5.271E-10
Ethene (ethylene)	2.463E-11
Ethyl benzene	9.868E-10
Fluoranthene	1.580E-13
Fluorene	5.015E-13
Formaldehyde (methanal)	2.036E-09
Heptane (isomers)	1.007E-09
Hexamethylene diamine (HMDA)	1.887E-16
Hexane (isomers)	1.735E-08
Mercaptan (unspecified)	2.140E-11
Methanethiol	3.853E-12
Methanol	5.118E-10
NMVOC (unspecified)	4.803E-07
Octane	5.540E-10
Pentane (n-pentane)	1.428E-08
Phenol (hydroxy benzene)	5.772E-14
Propane	1.580E-07
Propene (propylene)	1.030E-10
Propionic acid (propane acid)	4.126E-14
Styrene	3.070E-13
Toluene (methyl benzene)	4.715E-10
Trimethylbenzene	4.922E-16
Xylene (dimethyl benzene)	4.122E-09

Process or Category	Gate to Gate (RMT)
Hydrocarbons (unspecified)	2.866E-08
Methane	3.075E-06
Organic chlorine compounds	4.856E-11
Unspecified Organic Compounds	1.053E-16
VOC (unspecified)	3.768E-07
Other emissions to air	2.469E-03
Aldehydes, unspecified	5.266E-17
Exhaust	2.269E-03
Particulate Matter, unspecified	9.638E-09
Sand (Silica) (SiO2)	1.004E-12
Used air	2.005E-04
Particles to air	8.334E-07
Dust (PM10)	4.593E-08
Dust (PM2.5)	5.968E-08
Dust (unspecified)	7.277E-07
Metals (unspecified)	7.159E-11
Unspecified Organic Chlorine Compounds	6.948E-16
Wood (dust)	1.865E-14
Radioactive emissions to air	2.780E-11
Uranium (total)	2.780E-11
Unspecified Heavy Metals	5.426E-20
Emissions to fresh water	2.028E-05
Analytical measures to fresh water	3.640E-07
Adsorbable organic halogen compounds (AOX)	3.190E-10
Biological oxygen demand (BOD)	2.225E-08
Chemical oxygen demand (COD)	2.450E-07
Nitrogenous Matter (unspecified, as N)	8.829E-09
Solids (dissolved)	5.294E-08
Total dissolved organic bounded carbon	1.818E-08
Total organic bounded carbon	1.649E-08
Heavy metals to fresh water	2.262E-06
Aluminium	3.898E-07
Antimony	3.453E-09
Arsenic (+V)	1.109E-08
Cadmium (+II)	1.109E-09
Chromium (+III)	8.970E-12
Chromium (+VI)	5.027E-13
Chromium (unspecified)	1.920E-08

Process or Category	Gate to Gate (RMT)
Cobalt	3.091E-13
Copper (+II)	1.619E-08
Heavy metals to water (unspecified)	1.276E-12
Iron	9.674E-07
Lead (+II)	3.756E-08
Manganese (+II)	3.038E-10
Mercury (+II)	1.891E-10
Molybdenum	6.777E-11
Nickel (+II)	2.963E-07
Selenium	1.274E-11
Silver	3.372E-09
Strontium	1.495E-09
Thallium	7.471E-15
Tin (+IV)	1.015E-12
Titanium	7.378E-12
Unspecified Substance	4.694E-16
Vanadium (+III)	2.274E-11
Zinc (+II)	5.141E-07
Inorganic emissions to fresh water	1.492E-05
Acid (calculated as H+)	3.179E-08
Aluminum (+III)	2.181E-09
Ammonia	5.691E-09
Ammonium (total N)	4.219E-06
Ammonium / ammonia	1.335E-08
Barium	3.331E-10
Beryllium	8.326E-14
Boron	5.398E-10
Bromate	4.368E-13
Bromine	5.726E-14
Calcium (+II)	6.535E-07
Carbonate	2.835E-08
Chlorate	4.371E-10
Chloride	6.353E-06
Chlorine (dissolved)	2.994E-09
Copper ion (+II/+III)	4.739E-17
Cyanide	3.145E-08
Fluoride	2.214E-07
Fluorine	3.312E-12

Process or Category	Gate to Gate (RMT)
Hydrogen chloride	6.531E-14
Hydrogen fluoride (hydrofluoric acid)	6.730E-14
Hydrogen Ions (H+)	1.048E-13
Hydroxide	9.773E-08
Inorganic salts and acids (unspecified)	1.812E-20
Magnesium (+III)	1.763E-08
Magnesium chloride	1.364E-13
Metal ions (unspecific)	1.965E-08
Neutral salts	1.522E-13
Nitrate	1.873E-07
Nitrate (as total N)	1.683E-15
Nitrogen	8.608E-09
Nitrogen organic bounded	1.931E-09
Phosphate	3.154E-10
Phosphorus	3.785E-07
Potassium	1.629E-09
Silicate particles	2.143E-14
Sodium (+I)	2.056E-06
Sodium chloride (rock salt)	2.713E-13
Sodium hypochlorite	1.037E-12
Sulphate	5.839E-07
Sulphide	3.822E-09
Sulphite	1.569E-10
Sulphur	2.875E-11
Sulphuric acid	8.421E-12
Unspecified Iron Oxides	1.202E-15
Unspecified Oil	4.258E-15
Unspecified Organic Chlorine compounds	9.650E-18
Unspecified Salt	3.861E-14
Unspecified Solids (Suspended)	1.499E-13
Organic emissions to fresh water	1.815E-08
Halogenated organic emissions to fresh water	2.975E-13
1,2-Dibromoethane	5.433E-16
Chlorinated hydrocarbons (unspecified)	1.265E-19
Chloromethane (methyl chloride)	2.961E-13
Dichloroethane (ethylene dichloride)	3.617E-17
Dichloropropane	1.514E-19
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	1.481E-18

Process or Category	Gate to Gate (RMT)
Vinyl chloride (VCM; chloroethene)	8.459E-16
Hydrocarbons to fresh water	3.377E-09
Acenaphthene	6.306E-14
Acenaphthylene	2.616E-14
Acetic acid	1.126E-10
Acrylonitrile	1.107E-14
Anthracene	9.305E-14
Aromatic hydrocarbons (unspecified)	3.529E-11
Benzene	1.264E-10
Benzo{a}anthracene	8.845E-15
Benzofluoranthene	4.546E-15
Chrysene	3.934E-14
Cresol (methyl phenol)	7.444E-13
Ethyl benzene	6.598E-12
Fluoranthene	1.088E-14
Hexane (isomers)	8.131E-14
Hydrocarbons (unspecified)	1.362E-09
Methanol	4.417E-10
Oil (unspecified)	8.328E-10
Phenol (hydroxy benzene)	1.835E-10
Polycyclic aromatic hydrocarbons (PAH, unspec.)	1.598E-10
Toluene (methyl benzene)	7.857E-11
Xylene (isomers; dimethyl benzene)	3.654E-11
Carbon, organically bound	4.489E-09
Naphthalene	3.901E-12
N-unspecified (N)	3.332E-15
Organic chlorine compounds (unspecified)	8.633E-12
Organic compounds (dissolved)	9.397E-09
Organic compounds (unspecified)	8.764E-10
Unspecified wastewater	2.520E-12
Other emissions to fresh water	0.000E+00
Particles to fresh water	2.712E-06
Metals (unspecified)	3.479E-10
Silicon dioxide (silica)	1.136E-15
Soil loss by erosion into water	1.263E-12
Solids (suspended)	2.696E-06
Suspended solids, unspecified	1.552E-08
Unspecified Oxides	9.992E-16

Process or Category	Gate to Gate (RMT)
Radioactive emissions to fresh water	0.000E+00
Bromide	0.000E+00
Radionuclide	0.000E+00
Sulfite	0.000E+00
Unspecified Solids (Dissolved)	2.889E-13
Uranium (total)	0.000E+00
Emissions to sea water	7.573E-06
Analytical measures to sea water	2.360E-08
Adsorbable organic halogen compounds (AOX)	1.332E-15
Biological oxygen demand (BOD)	1.469E-09
Chemical oxygen demand (COD)	2.066E-08
Total organic bounded carbon	1.469E-09
Heavy metals to sea water	4.857E-09
Arsenic (+V)	5.636E-11
Cadmium (+II)	2.856E-11
Chromium (unspecified)	9.554E-11
Cobalt	2.010E-11
Copper (+II)	1.615E-10
Iron	4.344E-10
Lead (+II)	4.207E-11
Manganese (+II)	4.427E-11
Mercury (+II)	6.513E-13
Molybdenum	1.458E-12
Nickel (+II)	5.932E-11
Silver	4.325E-12
Strontium	3.494E-09
Tin (+IV)	5.180E-12
Titanium	5.276E-13
Vanadium (+III)	1.444E-11
Zinc (+II)	3.946E-10
Inorganic emissions to sea water	6.371E-06
Aluminum (+III)	1.699E-11
Ammonia	5.048E-10
Barium	1.237E-09
Beryllium	1.068E-12
Boron	2.747E-10
Calcium (+II)	3.000E-08
Carbonate	7.779E-08

Process or Category	Gate to Gate (RMT)
Chloride	6.177E-06
Magnesium	7.496E-09
Nitrate	1.009E-10
Sodium (+I)	2.934E-08
Sulphate	3.296E-08
Sulphide	1.413E-08
Sulphur	1.470E-10
Organic emissions to sea water	3.913E-09
Hydrocarbons to sea water	3.876E-09
Acenaphthene	1.082E-12
Acenaphthylene	4.145E-13
Acetic acid	2.524E-12
Anthracene	3.649E-13
Aromatic hydrocarbons (unspecified)	1.469E-11
Benzene	3.615E-10
Benzo{a}anthracene	2.370E-13
Benzofluoranthene	2.575E-13
Chrysene	1.327E-12
Cresol (methyl phenol)	3.807E-12
Ethyl benzene	2.891E-11
Fluoranthene	2.767E-13
Hexane (isomers)	4.156E-13
Oil (unspecified)	2.612E-09
Phenol (hydroxy benzene)	4.936E-10
Toluene (methyl benzene)	2.275E-10
Xylene (isomers; dimethyl benzene)	1.271E-10
Naphthalene	3.706E-11
Particles to sea water	1.169E-06
Solids (suspended)	1.169E-06
Emissions to agricultural soil	0.000E+00
Emissions to industrial soil	3.977E-08
Heavy metals to industrial soil	9.837E-09
Arsenic (+V)	1.218E-14
Cadmium (+II)	1.110E-12
Chromium (+III)	2.271E-11
Chromium (unspecified)	2.903E-11
Cobalt	5.015E-13
Copper (+II)	2.299E-11

Process or Category	Gate to Gate (RMT)
Iron	4.117E-11
Lead (+II)	3.407E-11
Manganese (+II)	7.195E-12
Mercury (+II)	2.276E-13
Nickel (+II)	2.391E-11
Strontium	9.560E-09
Zinc (+II)	9.414E-11
Inorganic emissions to industrial soil	2.973E-08
Aluminum (+III)	3.343E-11
Ammonia	1.504E-08
Bromide	4.298E-12
Calcium (+II)	5.972E-10
Chloride	5.049E-09
Fluoride	1.433E-10
Magnesium (+III)	8.257E-11
Phosphorus	1.555E-09
Potassium (+I)	3.730E-09
Sodium (+I)	5.223E-11
Sulphate	4.920E-10
Sulphide	2.952E-09
Organic emissions to industrial soil	2.068E-10
Oil (unspecified)	2.068E-10
Radioactive emissions to industrial soil	0.000E+00
Calcium Fluoride	0.000E+00
Radionuclide	0.000E+00

Embedded Unit Processes

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None.

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