NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Petroleum, 2005 Foreign, Production and Transport

Reference Flow: 1 kg of 2005 Foreign Crude Oil

Brief Description: This process includes all inputs for the raw material acquisition and raw material transportation for 1 kg of 2005 foreign crude oil.

Section I: Meta Data

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

Year Data Best Represents: 2005

Process Type: Extraction Process (EP)

Process Scope: Cradle-to-Gate Process (CG)

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:

Algeria	*The portion of crude oil entering refineries from Algeria*
Angola	*The portion of crude oil entering refineries from Angola*
Canada	*The portion of crude oil entering refineries from Canada*
Canada Oil Sands	*The portion of crude oil entering refineries from Canada Oil Sands*
Ecuador	*The portion of crude oil entering refineries from Ecuador*

Iraq	*The portion of crude oil entering refineries from Iraq*
Kuwait	*The portion of crude oil entering refineries from Kuwait*
Mexico	*The portion of crude oil entering refineries from Mexico*
Nigeria	*The portion of crude oil entering refineries from Nigeria*
Other	*The portion of crude oil entering refineries from countries other than those listed*
Saudia_Arabia	*The portion of crude oil entering refineries from Saudi Arabia*
Venezuela	*The portion of crude oil entering refineries from Venezuela*
S2_F_TRAIN_DIS	*Train transport distance*
S2_TRK_TANK_DIS	*Tanker truck transport distance*
S2_WATDOMDISZ	*Domestic water carrier (tanker) transport distance*
S2_WATFOREDISZ	*Foreign water carrier (tanker) transport distance*
S2D_PIPE_LENGTH	*Domestic pipeline length*
S2F_PIPE_LENGTH	*Foreign pipeline length*

Tracked Input Flows:

Tracked Output Flows:

Foreign Crude Oil	*Crude oil extracted from foreign sources*

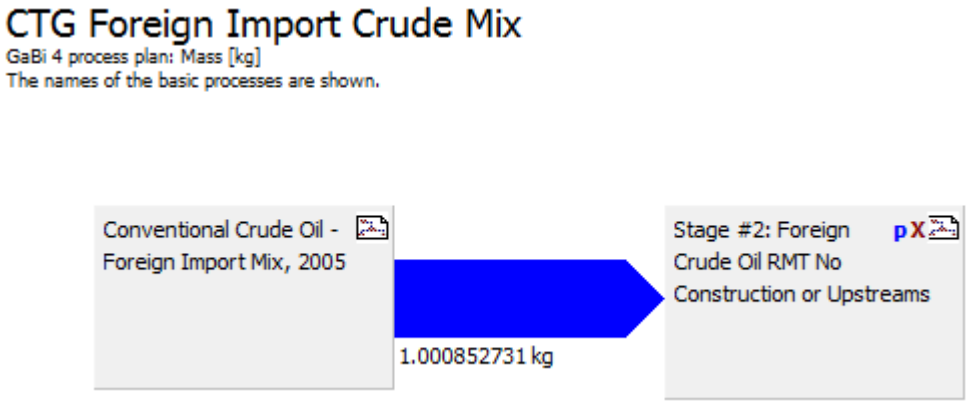
Section II: Process Description Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_CTG_Petroleum_2005_Foreign_2012.01.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 acquisition (RMA) and raw material transportation (RMT) to the energy conversion facility as seen in **Figure 1**. At the end, one kilogram of 2005 U.S. foreign crude oil is delivered to the life cycle (LC) Stage #3 boundary. The RMA and RMT are discussed separately below.

Figure 1: Plan for RMA and RMT of 2005 Foreign Crude Oil



Boundary and Description

LC stage #1, RMA of 2005 foreign crude oil, includes oil extracted from foreign sources. As shown in **Figure 2**, 2005 foreign crude oil RMA is composed of proprietary crude oil production processes for foreign countries considered in the 2005 foreign profile including Algeria, Angola, Canada, Ecuador, Iraq, Kuwait, Mexico, Nigeria, Saudi Arabia, Venezuela, and other exporting countries. These processes also account for any initial processing of the oil. The plan for RMA of 2005 foreign crude oil is provided in **Figure 2**.

No construction data is included for this RMA. The profiles and processes included in RMA are provided in **Table 1**. Those shown in bold face were developed by NETL.

Figure 2: Plan for RMA of Foreign Crude Oil

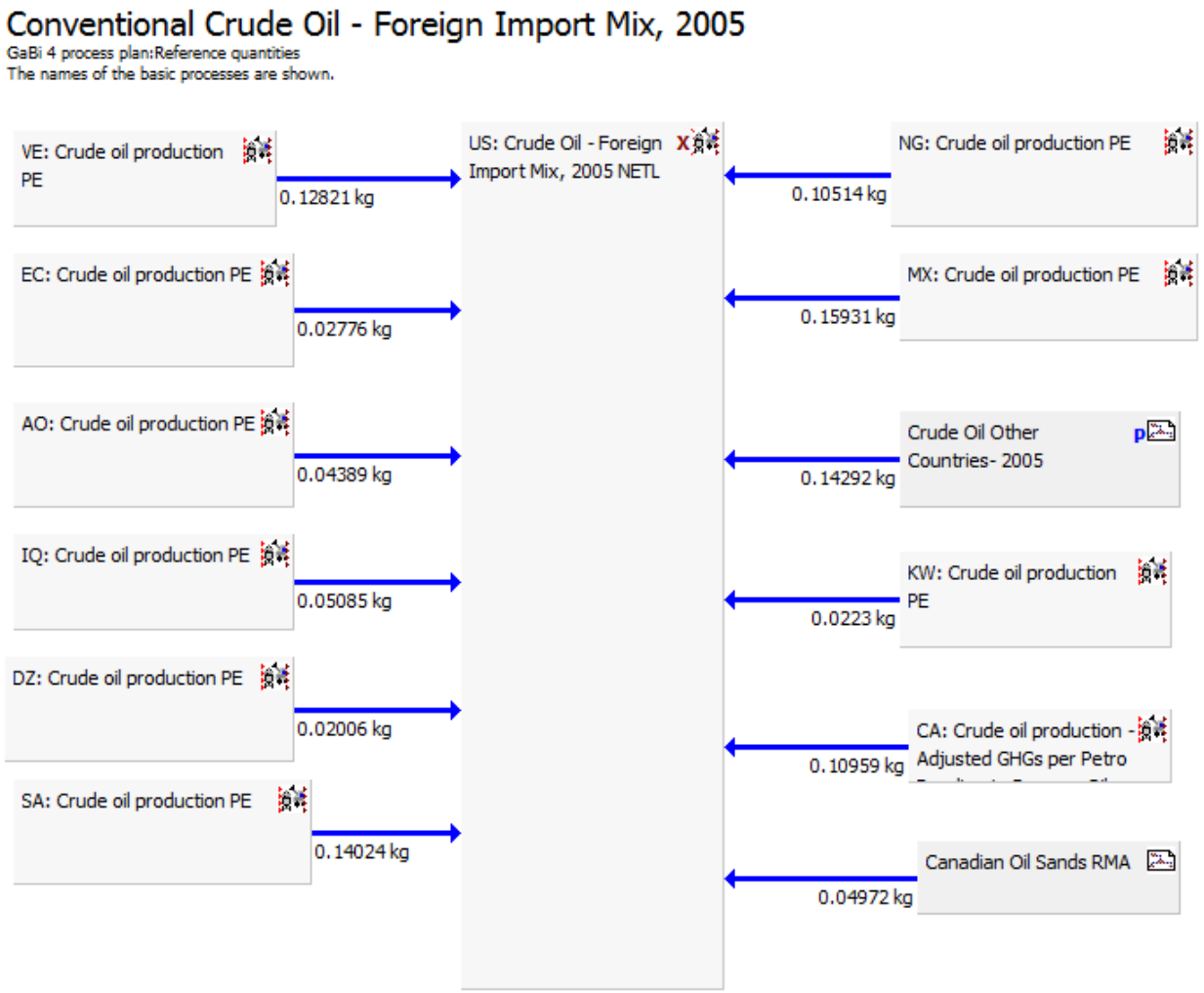


Table 1: Profiles and Processes Included in RMA for Foreign Crude Oil

Crude Oil - Foreign, 2005

- Crude oil - Canada NETL, 2005
  - CA: Crude oil Canadian (Conventional) NETL
  - CA: Crude sand oil production, NETL NETL
  - CA: Natural gas mix PE
- Crude Oil - Domestic, 2005-Updated
  - US: Crude oil production offshore PE
  - US: Crude oil production onshore PE
- AO: Crude oil production PE
- DZ: Crude oil production PE
- EC: Crude oil production PE
- IQ: Crude oil production PE
- KW: Crude oil production PE
- MX: Crude oil production PE

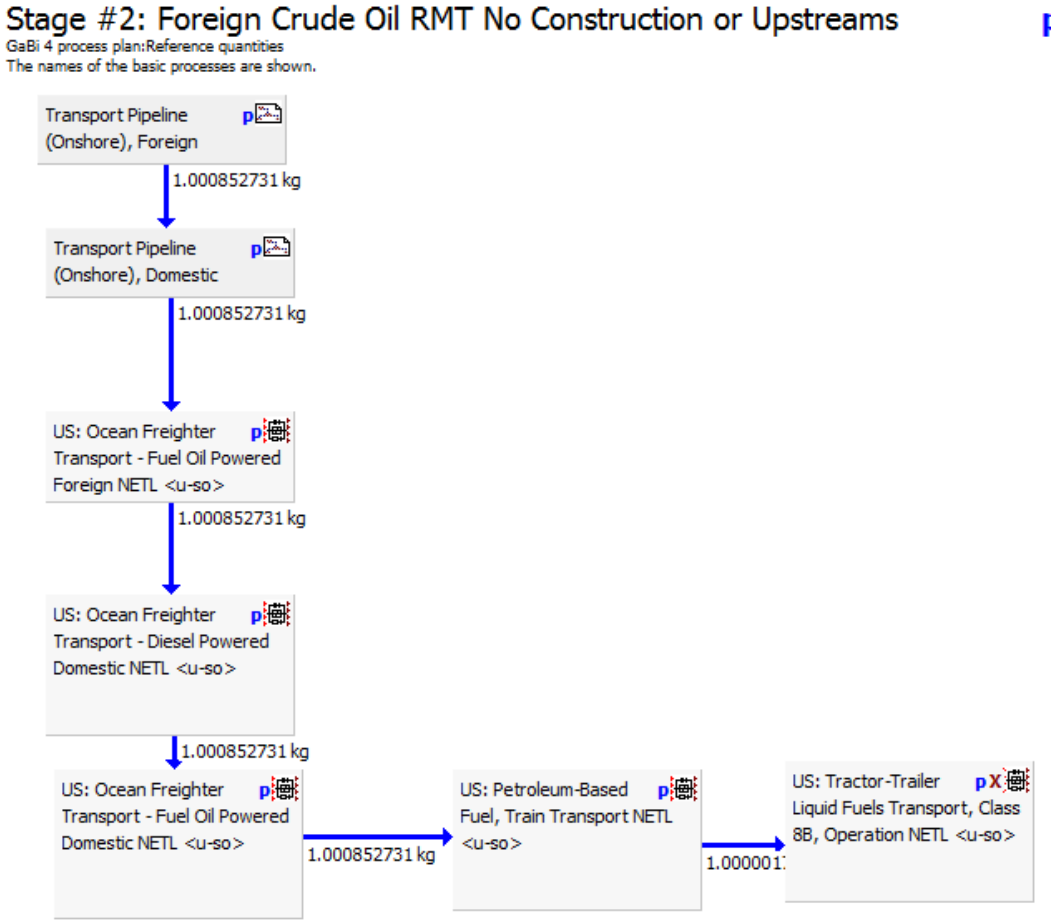
NG: Crude oil production PE

SA: Crude oil production PE

VE: Crude oil production PE

LC Stage #2 (RMT) includes the transport of the produced crude oil from the extraction site to the ECF (LC Stage #3). The construction of equipment used to transport 2005 foreign crude oil includes pipelines, water carriers (tanker ships), trains, and semi-trucks (tanker-tractor). The transport distance can be adjusted via a series of adjustable parameters for RMT, as shown previously. The plan for RMT of 2005 foreign crude oil is provided in **Figure 3.**

Figure 2: Plan for RMT of Foreign Crude Oil, Including Construction and Operation Profiles for Transport



Construction of the water carriers, train, and tractor-trailer for RMT w the materials required to construct the following pieces of equipment for transport:

- Water Carrier
  (DS/ DF DF_Stage2_C_Water_Carrier_300000DWT_2011.01.doc)
- Train

(DS/ DF DF_Stage2_C_Tanker_Railcar_26470_Gal_Net_Capacity_ 2010.01.doc);

- Pipeline Transport
  (DS/ DF DF_Stage2_O_Pipeline_Crude_Petroleum_Transport_2011.01.doc)
- Tractor-trailer
  (DS/ DF DF_Stage4_C_Tanker_Trailer_7500gal_2010.01.doc)

The profiles and processes included in RMT are provided in **Table 2**. Those shown in bold face were developed by NETL.

Table 2: Profiles and Processes Included in RMT for Foreign Crude Oil

Fuel Tanker-Tractor Transport
- Tanker Transport, 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: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>**
  - **WOR: Steel Plate, BF, Manufacture NETL <u-so>**
- Tanker-Tractor Transport, Operation
  - **US: DIESEL, NATIONAL AVERAGE, 2005 NETL <u-so>**
  - **US: Tractor-Trailer Liquid Fuels Transport, Class 8B, Operation NETL <u-so>**
- **US: Tanker (Truck) Transport NETL**

Off-Shore Transportation (water carrier)
- Water Carrier Tanker(10000-30000 DWT)Transport
  - Water Carrier (300,000 DWT), Construction
    - DE: Lead (99,995%) PE
    - RER: Aluminum sheet mix PE
    - RER: Polyurethane flexible foam (PU) PlasticsEurope
    - **US: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>**
    - US: Nylon 6 granulate (PA 6) PE
    - US: Styrene-butadiene rubber (SBR) PE
    - **WOR: Steel Plate, BF, Manufacture NETL <u-so>**
  - GLO: Tanker PE <u-so>
  - US: Fuel oil heavy at refinery PE
  - **US: Fuel tanker/10000 to 30000 dwt/ocean transport NETL**
- **US: Petroleum Water Carrier Loading/Unloading, Operation NETL <u-so>**

Off-Shore Transportation (water carrier)
- Water Carrier Tanker(10000-30000 DWT) Transport
  - Water Carrier (300,000 DWT), Construction

DE: Lead (99,995%) PE
RER: Aluminum sheet mix PE
RER: Polyurethane flexible foam (PU) PlasticsEurope
US: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>
US: Nylon 6 granulate (PA 6) PE
US: Styrene-butadiene rubber (SBR) PE
WOR: Steel Plate, BF, Manufacture NETL <u-so>
GLO: Tanker PE <u-so>
US: Fuel oil heavy at refinery PE
US: Fuel tanker/10000 to 30000 dwt/ocean transport NETL
US: Petroleum Water Carrier Loading/Unloading, Operation NETL <u-so>
On-Shore Transport Pipeline
Transport Pipeline (Onshore), Construction
US: Fuel Transport Pipeline, Construction NETL <u-so>
WOR: Steel Pipe, Welded, BF, Manufacture NETL <u-so>
Transport Pipeline (Onshore), Operation
US: North American Average Electricity Mix, 2007 080811 NETL
US: Pipeline Transport of Diesel Fuel, Operation NETL <u-so>
US: OnShore Transport Pipeline NETL
On-Shore Transport Pipeline
Transport Pipeline (Onshore), Construction
US: Fuel Transport Pipeline, Construction NETL <u-so>
WOR: Steel Pipe, Welded, BF, Manufacture NETL <u-so>
Transport Pipeline (Onshore), Operation
US: North American Average Electricity Mix, 2007 080811 NETL
US: Pipeline Transport of Diesel Fuel, Operation NETL <u-so>
US: OnShore Transport Pipeline NETL
Railroad Transport Fuel (Crude oil)
Fuel Train Construction
RER: Aluminum sheet mix PE
US: Coal Railcar, 244000 lbs Net Capacity, Construction NETL <u-so>
US: Tanker Railcar, 26,470 Gal Net Capacity, Construction NETL <u-so>
US: Tanker Unit Train Assembly, 100 Railcars, Construction NETL <u-so>
WOR: Steel Plate, BF, Manufacture NETL <u-so>
Fuel Transport Train, Operation
US: DIESEL, NATIONAL AVERAGE, 2005 NETL <u-so>
US: Petroleum-Based Fuel, Train Transport NETL <u-so>
US: Assembly: Fuel Rail Transport (Construction & Operation) NETL

Parameters and Balances

The parameters for the highest level modeling plan for RMA and RMT of 2005 foreign crude oil are shown in **Table 3**. These parameters may or may not include the adjustable parameters shown previously, depending on how the model was created. The distances for the various transportation mode are based on the travel distance for the average barrel of crude oil processed in the U.S. Not all barrels proceed via every mode of transportation listed, indicating why some distances are particularly short (e.g. truck and rail transport).

Table 3: Adjustable Parameters for RMA and RMT of Foreign Crude Oil

Plan	Parameter	Value	Comment
LC Stage #1			
Foreign Crude Oil RMA, 2005 NETL	Algeria	0.0201	[fraction] Portion of petroleum imported from Algeria
Foreign Crude Oil RMA, 2005 NETL	Angola	0.0439	[fraction] Portion of petroleum imported from Angola
Foreign Crude Oil RMA, 2005 NETL	Canada	0.1096	[fraction] Portion of petroleum imported from Canada
Foreign Crude Oil RMA, 2005 NETL	CA_Oil Sands	0.0497	[fraction] Portion of petroleum imported from Canadian oil sands
Foreign Crude Oil RMA, 2005 NETL	Ecuador	0.0278	[fraction] Portion of petroleum imported from Ecuador
Foreign Crude Oil RMA, 2005 NETL	Iraq	0.0508	[fraction] Portion of petroleum imported from Iraq
Foreign Crude Oil RMA, 2005 NETL	Kuwait	0.0223	[fraction] Portion of petroleum imported from Kuwait
Foreign Crude Oil RMA, 2005 NETL	Mexico	0.1593	[fraction] Portion of petroleum imported from Mexico
Foreign Crude Oil RMA, 2005 NETL	Nigeria	0.1051	[fraction] Portion of petroleum imported from Nigeria
Foreign Crude Oil RMA, 2005 NETL	other	0.1402	[fraction] Portion of petroleum imported from Saudi Arabia
Foreign Crude Oil RMA, 2005 NETL	Saudi Arabia	0.1429	[fraction] Portion of petroleum from other countries
Foreign Crude Oil RMA, 2005 NETL	Venezuela	0.1282	[fraction] Portion of petroleum imported from Venezuela
LC Stage #2			
2005 Foreign Crude Oil RMT	S2_F_TRAIN_DIS	1.2	[miles] User Defined parameter, default value is 200 miles one way.
2005 Foreign Crude Oil RMT	S2_TRK_TANK_DIS	2.7	[miles] adjustable parameter for distance from Origin to Destination.
2005 Foreign Crude Oil RMT	S2_WATDOMDISZ	331	[miles] Transportation via water carrier from U.S.A. ports to U.S.A. port (Domestic).
2005 Foreign Crude Oil RMT	S2_WATFOREDISZ	4309	[miles] Transportation via water carrier from foreign port to U.S.A. port (Foreign).
2005 Foreign Crude Oil RMT	S2D_PIPE_LENGTH	328.3	[mile] User Defined Value
2005 Foreign Crude Oil RMT	S2F_PIPE_LENGTH	66.3	[mile] User Defined Value.

Table 4 presents the input and output balances for resources and emissions of interest for the cradle-to-gate plan as well as each of the RMA and RMT plans.

Table 4: Inputs and Output Balances for Cradle-to-Gate, RMA, and RMT of Foreign Crude Oil (kg/kg delivered)

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Inputs			
Flows	1.967E+00	1.573E+00	3.945E-01
Resources	1.967E+00	1.573E+00	3.945E-01
Energy resources	1.095E+00	1.086E+00	9.550E-03
Non renewable energy resources	1.095E+00	1.086E+00	9.550E-03
Crude oil (resource)	1.006E+00	1.006E+00	4.025E-04
Crude oil Algeria	3.452E-02	3.452E-02	2.653E-06
Crude oil Angola	5.831E-02	5.831E-02	7.819E-06
Crude oil Argentina	7.923E-06	6.293E-06	1.629E-06
Crude oil Australia	7.498E-06	5.305E-06	2.193E-06
Crude oil Austria	8.456E-06	8.350E-06	1.062E-07
Crude oil Bolivia	3.802E-11	3.762E-11	3.936E-13
Crude oil Brazil	1.995E-05	1.847E-05	1.480E-06
Crude oil Brunei	1.094E-10	8.844E-11	2.094E-11
Crude oil Bulgaria	2.259E-11	3.344E-12	1.925E-11
Crude oil Cameroon	3.449E-05	3.381E-05	6.877E-07
Crude oil Canada	1.722E-01	1.722E-01	3.141E-05
Crude oil Chile	9.567E-09	9.505E-09	6.218E-11
Crude oil China	1.543E-06	1.127E-06	4.159E-07
Crude oil CIS	1.131E-03	1.113E-03	1.807E-05
Crude oil Colombia	2.351E-05	1.820E-05	5.307E-06
Crude oil Czech Republic	5.645E-07	5.574E-07	7.112E-09
Crude oil Denmark	2.543E-04	2.509E-04	3.442E-06
Crude oil Ecuador	4.210E-02	4.210E-02	2.361E-06
Crude oil Egypt	3.422E-05	3.378E-05	4.340E-07
Crude oil France	1.206E-05	1.190E-05	1.695E-07
Crude oil Gabon	1.844E-05	1.463E-05	3.808E-06
Crude oil Germany	3.529E-05	3.469E-05	6.021E-07
Crude oil Greece	1.689E-06	1.668E-06	2.124E-08
Crude oil Hungary	1.293E-09	1.178E-09	1.152E-10
Crude oil India	1.671E-11	1.895E-12	1.482E-11
Crude oil Indonesia	5.217E-06	3.745E-06	1.472E-06

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Crude oil Iran	2.348E-04	2.316E-04	3.166E-06
Crude oil Iraq	6.543E-02	6.542E-02	1.222E-05
Crude oil Ireland	3.898E-11	3.844E-11	5.401E-13
Crude oil Italy	5.350E-05	5.281E-05	6.824E-07
Crude oil Kuwait	3.672E-02	3.672E-02	5.357E-06
Crude oil Libya	3.550E-04	3.501E-04	4.851E-06
Crude oil Malaysia	5.374E-11	4.339E-11	1.035E-11
Crude oil Mexico	1.740E-01	1.740E-01	3.319E-05
Crude oil Netherlands	3.200E-05	3.155E-05	4.548E-07
Crude oil New Zealand	2.397E-07	1.667E-07	7.298E-08
Crude oil Nigeria	1.198E-01	1.197E-01	1.502E-05
Crude oil Norway	9.596E-04	9.375E-04	2.208E-05
Crude oil Oman	2.979E-06	2.610E-06	3.689E-07
Crude oil Poland	1.747E-06	1.718E-06	2.918E-08
Crude oil Qatar	8.489E-07	6.158E-07	2.330E-07
Crude oil Romania	3.382E-06	3.339E-06	4.250E-08
Crude oil Saudi Arabia	1.553E-01	1.553E-01	3.890E-05
Crude oil Slovakia	3.775E-12	2.698E-12	1.077E-12
Crude oil South Africa	4.733E-11	4.691E-11	4.254E-13
Crude oil Spain	2.816E-06	2.780E-06	3.536E-08
Crude oil Syria	1.280E-10	1.870E-11	1.093E-10
Crude oil Trinidad and Tobago	6.420E-06	4.985E-06	1.435E-06
Crude oil Tunisia	1.479E-05	1.459E-05	2.014E-07
Crude oil Turkey	7.177E-16	2.663E-16	4.514E-16
Crude oil United Arab Emirates	1.208E-06	8.616E-07	3.463E-07
Crude oil United Kingdom	1.403E-03	1.374E-03	2.911E-05
Crude oil USA	4.410E-04	3.231E-04	1.179E-04
Crude oil Venezuela	1.429E-01	1.428E-01	3.273E-05
Hard coal (resource)	8.246E-03	1.008E-03	7.237E-03
Hard coal Australia	3.507E-05	2.693E-05	8.149E-06
Hard coal Belgium	1.567E-08	7.249E-09	8.418E-09
Hard coal Bosnia and Herzegovina	1.938E-09	2.711E-10	1.667E-09
Hard coal Brazil	9.814E-08	9.236E-08	5.774E-09
Hard coal Canada	2.834E-04	2.672E-04	1.624E-05
Hard coal Chile	9.973E-07	9.908E-07	6.491E-09
Hard coal China	7.738E-06	6.766E-06	9.713E-07

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Hard coal CIS	6.723E-06	5.280E-06	1.443E-06
Hard coal Colombia	1.098E-04	4.349E-05	6.631E-05
Hard coal Czech Republic	2.322E-06	2.149E-06	1.730E-07
Hard coal France	3.099E-07	1.340E-07	1.758E-07
Hard coal Germany	5.057E-05	4.662E-05	3.948E-06
Hard coal India	1.067E-09	1.320E-17	1.067E-09
Hard coal Indonesia	1.787E-05	3.827E-06	1.404E-05
Hard coal Italy	2.910E-10	7.907E-11	2.120E-10
Hard coal Japan	2.907E-12	2.619E-12	2.883E-13
Hard coal Malaysia	1.875E-12	1.511E-12	3.642E-13
Hard coal Mexico	1.908E-05	1.905E-05	3.041E-08
Hard coal New Zealand	8.158E-07	8.105E-07	5.324E-09
Hard coal Poland	1.584E-05	1.385E-05	1.993E-06
Hard coal Portugal	9.811E-10	9.794E-10	1.647E-12
Hard coal South Africa	2.842E-05	2.296E-05	5.460E-06
Hard coal Spain	1.953E-06	1.929E-06	2.449E-08
Hard coal Turkey	3.238E-12	1.247E-12	1.991E-12
Hard coal United Kingdom	4.641E-06	2.621E-06	2.021E-06
Hard coal USA	7.624E-03	5.316E-04	7.092E-03
Hard coal Venezuela	3.615E-05	1.201E-05	2.414E-05
Hard coal Vietnam	2.413E-07	2.111E-07	3.018E-08
Lignite (resource)	7.253E-04	5.084E-04	2.169E-04
Lignite Australia	1.035E-05	9.327E-06	1.019E-06
Lignite Austria	3.100E-07	3.057E-07	4.316E-09
Lignite Bosnia and Herzegovina	4.464E-09	6.128E-10	3.851E-09
Lignite Bulgaria	4.171E-09	1.762E-09	2.408E-09
Lignite Canada	1.802E-04	1.792E-04	9.389E-07
Lignite CIS	2.232E-07	2.091E-07	1.405E-08
Lignite Czech Republic	1.269E-06	1.164E-06	1.051E-07
Lignite France	5.838E-08	1.189E-08	4.650E-08
Lignite Germany (Central Germany)	2.080E-04	2.020E-04	6.089E-06
Lignite Germany (Lausitz)	3.166E-05	2.635E-05	5.309E-06
Lignite Germany (Rheinisch)	5.845E-05	4.779E-05	1.066E-05
Lignite Greece	1.334E-06	1.275E-06	5.882E-08
Lignite Hungary	1.599E-08	4.976E-09	1.101E-08
Lignite India	2.135E-10	2.639E-18	2.135E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Lignite Macedonia	6.347E-09	1.221E-09	5.126E-09
Lignite Poland	5.024E-07	4.144E-07	8.792E-08
Lignite Romania	7.795E-10	1.112E-10	6.683E-10
Lignite Serbia and Montenegro	3.424E-08	4.920E-09	2.932E-08
Lignite Slovakia	2.197E-09	4.493E-10	1.748E-09
Lignite Slovenia	1.394E-08	3.836E-09	1.011E-08
Lignite Spain	4.084E-06	4.032E-06	5.158E-08
Lignite Turkey	8.895E-14	3.301E-14	5.595E-14
Lignite USA	2.288E-04	3.635E-05	1.924E-04
Natural gas (resource)	7.983E-02	7.813E-02	1.693E-03
Natural gas Algeria	2.684E-03	2.681E-03	2.909E-06
Natural gas Angola	7.135E-03	7.134E-03	9.967E-07
Natural gas Argentina	6.122E-06	5.929E-06	1.931E-07
Natural gas Australia	1.619E-06	1.368E-06	2.510E-07
Natural gas Austria	8.187E-07	8.084E-07	1.036E-08
Natural gas Bolivia	7.646E-08	7.567E-08	7.910E-10
Natural gas Brazil	2.439E-06	2.268E-06	1.711E-07
Natural gas Brunei	9.479E-07	7.666E-07	1.813E-07
Natural gas Bulgaria	2.149E-12	5.029E-13	1.647E-12
Natural gas Cameroon	8.609E-06	8.437E-06	1.717E-07
Natural gas Canada	1.416E-02	1.389E-02	2.738E-04
Natural gas Chile	2.276E-06	2.262E-06	1.479E-08
Natural gas China	1.759E-07	1.285E-07	4.735E-08
Natural gas CIS	1.005E-04	9.584E-05	4.684E-06
Natural gas Colombia	2.562E-06	1.984E-06	5.786E-07
Natural gas Czech Republic	4.137E-08	4.083E-08	5.457E-10
Natural gas Denmark	1.841E-05	1.799E-05	4.202E-07
Natural gas Ecuador	2.564E-03	2.563E-03	2.630E-07
Natural gas Egypt	3.461E-06	3.417E-06	4.391E-08
Natural gas France	1.088E-06	1.023E-06	6.465E-08
Natural gas Gabon	2.722E-06	2.160E-06	5.622E-07
Natural gas Germany	3.251E-05	2.995E-05	2.567E-06
Natural gas Greece	1.102E-07	1.088E-07	1.417E-09
Natural gas Hungary	1.137E-09	5.905E-10	5.468E-10
Natural gas India	8.201E-11	1.894E-13	8.182E-11
Natural gas Indonesia	2.715E-07	1.889E-07	8.260E-08

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Natural gas Iran	2.709E-05	2.672E-05	3.645E-07
Natural gas Iraq	2.629E-03	2.628E-03	1.232E-06
Natural gas Ireland	8.691E-08	8.570E-08	1.211E-09
Natural gas Italy	5.175E-06	5.056E-06	1.185E-07
Natural gas Japan	7.854E-13	6.941E-13	9.124E-14
Natural gas Kuwait	1.320E-03	1.319E-03	5.177E-07
Natural gas Libyan	9.192E-06	9.064E-06	1.272E-07
Natural gas Malaysia	9.390E-07	7.589E-07	1.802E-07
Natural gas Mexico	9.628E-03	9.624E-03	3.797E-06
Natural gas Netherlands	4.307E-05	3.812E-05	4.953E-06
Natural gas New Zealand	1.585E-08	1.101E-08	4.840E-09
Natural gas Nigeria	2.118E-02	2.117E-02	3.566E-06
Natural gas Norway	4.470E-05	4.121E-05	3.484E-06
Natural gas Oman	1.447E-06	1.226E-06	2.213E-07
Natural gas Poland	1.128E-07	1.107E-07	2.190E-09
Natural gas Qatar	1.444E-05	1.169E-05	2.746E-06
Natural gas Romania	2.161E-07	2.133E-07	2.748E-09
Natural gas Saudi Arabia	5.142E-03	5.138E-03	3.643E-06
Natural gas Slovakia	3.725E-11	2.552E-11	1.173E-11
Natural gas South Africa	2.470E-09	7.671E-10	1.703E-09
Natural gas Spain	2.696E-07	2.662E-07	3.382E-09
Natural gas Syria	1.375E-11	2.009E-12	1.174E-11
Natural gas Trinidad and Tobago	6.087E-05	4.896E-05	1.191E-05
Natural gas Tunisia	1.937E-06	1.911E-06	2.638E-08
Natural gas Turkey	7.260E-17	2.695E-17	4.565E-17
Natural gas United Arab Emirates	2.575E-07	2.209E-07	3.659E-08
Natural gas United Kingdom	9.865E-05	9.384E-05	4.808E-06
Natural gas USA	6.809E-03	5.476E-03	1.333E-03
Natural gas Venezuela	6.054E-03	6.051E-03	3.186E-06
Pit Methane	3.179E-05	4.460E-06	2.733E-05
Uranium (resource)	2.019E-07	2.047E-08	1.814E-07
Uranium natural	2.019E-07	2.047E-08	1.814E-07
Renewable energy resources	5.507E-07	4.756E-07	7.507E-08
Primary energy from geothermics	0.000E+00	0.000E+00	0.000E+00
Primary energy from hydro power	0.000E+00	0.000E+00	0.000E+00
Primary energy from solar energy	0.000E+00	0.000E+00	0.000E+00

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Primary energy from wind power	0.000E+00	0.000E+00	0.000E+00
Wood	5.507E-07	4.756E-07	7.507E-08
Land use	0.000E+00	0.000E+00	0.000E+00
Occupation	0.000E+00	0.000E+00	0.000E+00
Biotic Production	0.000E+00	0.000E+00	0.000E+00
Erosion Resistance	0.000E+00	0.000E+00	0.000E+00
Groundwater Replenishment	0.000E+00	0.000E+00	0.000E+00
Mechanical Filtration	0.000E+00	0.000E+00	0.000E+00
Physicochemical Filtration	0.000E+00	0.000E+00	0.000E+00
Transformation	0.000E+00	0.000E+00	0.000E+00
Biotic Production	0.000E+00	0.000E+00	0.000E+00
Erosion Resistance	0.000E+00	0.000E+00	0.000E+00
Groundwater Replenishment	0.000E+00	0.000E+00	0.000E+00
Mechanical Filtration	0.000E+00	0.000E+00	0.000E+00
Physicochemical Filtration	0.000E+00	0.000E+00	0.000E+00
Material resources	8.721E-01	4.872E-01	3.849E-01
Non renewable elements	1.212E-11	1.111E-11	1.004E-12
Iron	2.804E-13	2.565E-13	2.394E-14
Lead	8.647E-18	7.643E-18	1.005E-18
Sulphur	1.184E-11	1.086E-11	9.803E-13
Non renewable resources	1.301E-01	9.084E-02	3.925E-02
Barium sulphate	8.863E-16	7.834E-16	1.030E-16
Basalt	4.933E-05	4.907E-05	2.567E-07
Bauxite	2.119E-06	2.039E-06	8.000E-08
Bentonite	1.567E-03	1.553E-03	1.413E-05
Calcium chloride	9.075E-14	8.021E-14	1.054E-14
Chromium ore (39%)	5.645E-08	3.012E-08	2.633E-08
Clay	1.576E-04	1.560E-04	1.568E-06
Colemanite ore	3.888E-09	6.443E-10	3.244E-09
Copper - Gold - Silver - ore (1,0% Cu; 0,4 g/t Au; 66 g/t Ag)	1.149E-07	0.000E+00	1.149E-07
Copper - Gold - Silver - ore (1,1% Cu; 0,01 g/t Au; 2,86 g/t Ag)	7.003E-08	0.000E+00	7.003E-08
Copper - Gold - Silver - ore (1,16% Cu; 0,002 g/t Au; 1,06 g/t Ag)	3.953E-08	0.000E+00	3.953E-08
Copper - Molybdenum - Gold - Silver - ore (1,13% Cu; 0,02% Mo; 0,01 g/t Au; 2,86 g/t Ag)	9.630E-08	0.000E+00	9.630E-08
Copper ore (0.14%)	1.148E-06	5.268E-07	6.214E-07

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Copper ore (1.2%)	1.192E-08	0.000E+00	1.192E-08
Copper ore (4%)	5.757E-16	5.623E-16	1.338E-17
Copper ore (sulphidic, 1.1%)	6.830E-13	6.672E-13	1.588E-14
Dolomite	2.575E-09	2.336E-09	2.399E-10
Ferro manganese	4.324E-18	3.821E-18	5.023E-19
Fluorspar (calcium fluoride; fluorite)	2.917E-09	2.514E-09	4.026E-10
Gypsum (natural gypsum)	5.668E-05	5.566E-05	1.021E-06
Heavy spar (BaSO4)	3.791E-03	3.757E-03	3.412E-05
Inert rock	1.192E-01	8.047E-02	3.875E-02
Iron ore (56,86%)	1.154E-03	1.140E-03	1.356E-05
Iron ore (65%)	5.148E-08	4.876E-08	2.722E-09
Kaolin ore	6.582E-09	7.670E-10	5.815E-09
Lead - zinc ore (4.6%-0.6%)	3.055E-04	3.028E-04	2.741E-06
Limestone (calcium carbonate)	3.002E-03	2.693E-03	3.092E-04
Magnesit (Magnesium carbonate)	1.118E-09	1.096E-09	2.189E-11
Magnesium chloride leach (40%)	4.285E-05	4.235E-05	5.087E-07
Manganese ore	1.115E-08	5.779E-09	5.376E-09
Manganese ore (R.O.M.)	1.197E-05	1.186E-05	1.098E-07
Molybdenite (Mo 0,24%)	5.914E-08	3.079E-10	5.884E-08
Natural Aggregate	3.510E-04	2.472E-04	1.037E-04
Nickel ore (1,5%)	1.083E-11	1.851E-12	8.981E-12
Nickel ore (1.6%)	4.223E-05	4.182E-05	4.102E-07
Olivine	4.756E-17	4.203E-17	5.525E-18
Peat	2.035E-06	2.014E-06	2.079E-08
Phosphate ore	6.035E-09	6.029E-09	5.869E-12
Phosphorus minerals	1.119E-09	1.088E-09	3.072E-11
Potassium chloride	5.281E-10	5.182E-10	9.820E-12
Precious metal ore (R.O.M)	4.341E-09	1.910E-09	2.431E-09
Quartz sand (silica sand; silicon dioxide)	1.238E-04	1.235E-04	2.672E-07
Raw pumice	6.393E-10	7.449E-11	5.648E-10
Slate	7.999E-17	7.069E-17	9.293E-18
Sodium chloride (rock salt)	8.899E-07	8.073E-07	8.252E-08
Sodium sulphate	2.400E-12	1.863E-12	5.366E-13
Soil	1.426E-04	1.232E-04	1.940E-05
Sulphur (bonded)	5.864E-12	5.367E-12	4.972E-13
Talc	5.701E-10	4.642E-10	1.059E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Tin ore	7.687E-17	6.794E-17	8.930E-18
Titanium ore	3.938E-06	3.864E-06	7.372E-08
Zinc - copper ore (4.07%-2.59%)	5.098E-05	5.045E-05	5.370E-07
Zinc - lead - copper ore (12%-3%-2%)	2.120E-05	2.097E-05	2.300E-07
Zinc - lead ore (4.21%-4.96%)	1.966E-16	1.920E-16	4.570E-18
Zinc ore (sulphidic, 4%)	2.051E-15	2.020E-15	3.115E-17
Renewable resources	7.420E-01	3.964E-01	3.457E-01
Water	5.126E-01	2.959E-01	2.167E-01
Water	5.452E-05	0.000E+00	5.452E-05
Water (ground water)	1.207E-01	1.125E-01	8.196E-03
Water (river water)	0.000E+00	0.000E+00	0.000E+00
Water (sea water)	8.119E-03	8.136E-03	0.000E+00
Water (surface water)	3.838E-01	1.753E-01	2.085E-01
Air	2.293E-01	1.004E-01	1.289E-01
Carbon dioxide	1.239E-04	1.002E-04	2.372E-05
Nitrogen	3.404E-11	3.381E-11	2.322E-13
Oxygen	2.439E-07	5.199E-16	2.439E-07
Output			
Flows	8.090E-01	4.208E-01	3.882E-01
Resources	3.112E-01	1.491E-01	1.621E-01
Energy resources	0.000E+00	0.000E+00	0.000E+00
Non renewable energy resources	0.000E+00	0.000E+00	0.000E+00
Crude oil (resource)	0.000E+00	0.000E+00	0.000E+00
Crude oil Ecuador	0.000E+00	0.000E+00	0.000E+00
Crude oil Iraq	0.000E+00	0.000E+00	0.000E+00
Material resources	3.112E-01	1.491E-01	1.621E-01
Renewable resources	3.112E-01	1.491E-01	1.621E-01
Water	3.112E-01	1.491E-01	1.621E-01
Water (ground water)	0.000E+00	0.000E+00	0.000E+00
Water (river water)	3.104E-01	1.483E-01	1.621E-01
Water (sea water)	0.000E+00	0.000E+00	1.697E-05
Water (wastewater)	8.134E-04	8.134E-04	0.000E+00
Emissions to air	4.785E-01	2.527E-01	2.259E-01
Heavy metals to air	1.501E-07	1.281E-07	2.198E-08
Antimony	2.589E-10	5.284E-11	2.061E-10
Arsenic (+V)	3.209E-09	7.928E-10	2.417E-09

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Arsenic trioxide	2.104E-13	2.085E-13	1.910E-15
Cadmium (+II)	2.530E-10	1.232E-10	1.298E-10
Chromium (+III)	4.408E-11	4.329E-11	7.937E-13
Chromium (unspecified)	5.822E-10	3.720E-10	2.102E-10
Cobalt	3.673E-10	2.591E-10	1.082E-10
Copper (+II)	2.084E-09	1.829E-09	2.546E-10
Heavy metals to air (unspecified)	3.169E-12	1.875E-12	1.294E-12
Hydrogen arsenic (arsine)	1.746E-11	1.730E-11	1.585E-13
Iron	8.227E-10	7.570E-10	6.570E-11
Lanthanides	6.668E-14	5.974E-14	6.941E-15
Lead (+II)	5.416E-09	4.266E-09	1.149E-09
Manganese (+II)	1.867E-09	1.334E-09	5.321E-10
Mercury (+II)	4.370E-10	2.037E-10	2.334E-10
Molybdenum	5.741E-11	5.375E-11	3.661E-12
Nickel (+II)	1.944E-08	1.877E-08	6.692E-10
Palladium	2.512E-18	2.220E-18	2.918E-19
Rhodium	2.425E-18	2.143E-18	2.817E-19
Selenium	6.738E-09	7.141E-10	6.024E-09
Silver	8.461E-19	3.722E-19	4.739E-19
Tellurium	5.879E-12	5.773E-12	1.058E-13
Thallium	4.320E-11	4.246E-11	7.372E-13
Tin (+IV)	2.503E-09	2.231E-10	2.280E-09
Titanium	4.208E-12	3.530E-12	6.785E-13
Vanadium (+III)	9.960E-08	9.478E-08	4.824E-09
Zinc (+II)	6.324E-09	3.452E-09	2.872E-09
Inorganic emissions to air	3.381E-01	2.197E-01	1.183E-01
Ammonia	4.383E-06	3.233E-06	1.150E-06
Ammonium	9.723E-14	1.886E-14	7.838E-14
Ammonium nitrate	3.439E-14	3.147E-14	2.918E-15
Barium	2.392E-06	2.366E-06	2.526E-08
Beryllium	6.137E-11	3.287E-11	2.850E-11
Boron compounds (unspecified)	4.746E-08	5.869E-09	4.159E-08
Bromine	2.021E-08	2.379E-09	1.783E-08
Carbon dioxide	2.639E-01	2.068E-01	5.709E-02
Carbon dioxide (biotic)	2.415E-05	1.089E-05	1.325E-05
Carbon disulphide	2.828E-13	1.919E-13	9.085E-14

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Carbon monoxide	4.729E-04	4.499E-04	2.302E-05
Chloride (unspecified)	1.240E-08	1.202E-08	3.752E-10
Chlorine	1.095E-12	9.808E-13	1.147E-13
Cyanide (unspecified)	3.084E-10	2.822E-10	2.624E-11
Fluoride	5.322E-09	5.852E-10	4.737E-09
Fluorides	5.732E-09	5.732E-09	0.000E+00
Fluorine	2.267E-12	1.890E-12	3.773E-13
Helium	1.351E-09	1.322E-09	2.861E-11
Hydrogen	3.887E-07	3.873E-07	1.399E-09
Hydrogen bromine (hydrobromic acid)	4.640E-11	4.490E-11	1.496E-12
Hydrogen chloride	3.248E-07	1.908E-07	1.340E-07
Hydrogen cyanide (prussic acid)	1.902E-11	1.796E-11	1.058E-12
Hydrogen fluoride	5.141E-08	2.771E-08	2.370E-08
Hydrogen iodide	4.612E-15	3.411E-15	1.201E-15
Hydrogen phosphorous	1.456E-14	1.052E-14	4.040E-15
Hydrogen sulphide	6.643E-06	6.620E-06	2.262E-08
Lead dioxide	8.836E-15	3.888E-15	4.948E-15
Nitrogen (atmospheric nitrogen)	8.549E-05	8.039E-05	5.105E-06
Nitrogen dioxide	6.205E-15	2.215E-16	5.984E-15
Nitrogen monoxide	8.210E-12	8.015E-12	1.949E-13
Nitrogen oxides	6.766E-04	5.702E-04	1.064E-04
Nitrous oxide (laughing gas)	6.541E-06	5.393E-06	1.148E-06
Oxygen	8.560E-05	7.492E-05	1.068E-05
Scandium	3.248E-14	3.014E-14	2.340E-15
Steam	7.050E-02	1.037E-02	6.013E-02
Strontium	1.252E-12	1.139E-12	1.138E-13
Sulphur dioxide	1.467E-03	1.335E-03	1.322E-04
Sulphur hexafluoride	6.078E-13	2.699E-13	3.380E-13
sulphur oxide	8.123E-04	0.000E+00	8.123E-04
Sulphuric acid	1.125E-09	1.114E-09	1.147E-11
Tin oxide	7.686E-16	3.381E-16	4.306E-16
Zinc oxide	1.538E-15	6.765E-16	8.611E-16
Zinc sulphate	4.397E-10	4.357E-10	3.970E-12
Organic emissions to air (group VOC)	7.376E-03	6.488E-03	8.877E-04
Group NMVOC to air	2.038E-03	1.184E-03	8.543E-04
Group PAH to air	2.210E-08	2.158E-08	5.181E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Anthracene	1.209E-10	1.206E-10	3.835E-13
Benzo{a}anthracene	6.086E-11	6.067E-11	1.930E-13
Benzo{a}pyrene	2.822E-11	2.596E-11	2.256E-12
Benzo{ghi}perylene	5.429E-11	5.412E-11	1.722E-13
Benzofluoranthene	1.086E-10	1.082E-10	3.443E-13
Chrysene	1.495E-10	1.490E-10	4.740E-13
Dibenz(a)anthracene	3.382E-11	3.372E-11	1.073E-13
Indeno[1,2,3-cd]pyrene	4.039E-11	4.026E-11	1.281E-13
Naphthalene	1.270E-08	1.266E-08	4.028E-11
Phenanthrene	3.991E-09	3.978E-09	1.265E-11
Polycyclic aromatic hydrocarbons (PAH)	4.809E-09	4.348E-09	4.611E-10
Halogenated organic emissions to air	6.005E-09	2.523E-09	3.482E-09
Dichloromethane (methylene chloride)	3.509E-17	3.102E-17	4.077E-18
Dioxins (unspec.)	1.719E-15	1.704E-15	1.503E-17
Halogenated hydrocarbons (unspecified)	1.742E-17	1.540E-17	2.012E-18
Polychlorinated biphenyls (PCB unspecified)	3.836E-11	3.801E-11	3.478E-13
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	2.782E-15	1.620E-15	1.162E-15
R 11 (trichlorofluoromethane)	1.472E-09	1.396E-10	1.333E-09
R 114 (dichlorotetrafluoroethane)	1.508E-09	1.429E-10	1.365E-09
R 12 (dichlorodifluoromethane)	3.165E-10	3.000E-11	2.865E-10
R 13 (chlorotrifluoromethane)	1.987E-10	1.884E-11	1.799E-10
R 22 (chlorodifluoromethane)	3.460E-10	3.281E-11	3.132E-10
Tetrafluoromethane	2.585E-11	2.365E-11	2.199E-12
Vinyl chloride (VCM; chloroethene)	2.100E-09	2.098E-09	2.584E-12
Acetaldehyde (Ethanal)	2.930E-08	2.759E-08	1.708E-09
Acetic acid	2.231E-08	1.289E-08	9.425E-09
Acetone (dimethylcetone)	2.627E-08	2.458E-08	1.686E-09
Acrolein	8.535E-10	8.508E-10	2.706E-12
Aldehyde (unspecified)	4.496E-10	2.670E-10	1.826E-10
Alkane (unspecified)	1.223E-07	2.051E-08	1.018E-07
Alkene (unspecified)	1.051E-07	9.650E-09	9.547E-08
Aromatic hydrocarbons (unspecified)	1.807E-09	1.142E-09	6.642E-10
Benzene	1.089E-07	1.004E-07	8.534E-09
Butadiene	8.756E-14	1.020E-14	7.736E-14
Butane	1.154E-04	1.153E-04	1.123E-07

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Butane (n-butane)	4.168E-08	1.176E-08	2.993E-08
Cyclohexane (hexahydro benzene)	6.483E-12	4.400E-12	2.083E-12
Diethylamine	2.431E-18	4.716E-19	1.959E-18
Ethane	3.069E-04	3.065E-04	4.113E-07
Ethanol	1.001E-08	5.820E-09	4.190E-09
Ethene (ethylene)	6.888E-09	6.875E-09	1.310E-11
Ethyl benzene	1.082E-07	1.309E-08	9.514E-08
Fluoranthene	3.939E-10	3.927E-10	1.249E-12
Fluorene	1.250E-09	1.246E-09	3.964E-12
Formaldehyde (methanal)	7.996E-08	2.957E-08	5.039E-08
Heptane (isomers)	4.078E-06	4.077E-06	8.796E-10
Hexamethylene diamine (HMDA)	5.150E-15	6.001E-16	4.550E-15
Hexane (isomers)	6.049E-06	6.047E-06	1.657E-09
Mercaptan (unspecified)	2.790E-08	2.787E-08	3.155E-11
Methanol	9.056E-09	5.731E-09	3.325E-09
NMVOC (unspecified)	9.735E-04	1.211E-04	8.524E-04
Octane	2.243E-06	2.243E-06	4.839E-10
Pentane (n-pentane)	3.865E-05	3.851E-05	1.398E-07
Phenol (hydroxy benzene)	3.157E-13	2.615E-13	5.422E-14
Propane	5.900E-04	5.896E-04	3.960E-07
Propene (propylene)	9.474E-09	8.255E-10	8.649E-09
Propionic acid (propane acid)	2.564E-12	2.118E-12	4.458E-13
Styrene	7.180E-15	4.874E-15	2.306E-15
Toluene (methyl benzene)	8.290E-08	3.955E-08	4.335E-08
Trimethylbenzene	7.489E-15	3.295E-15	4.194E-15
Xylene (dimethyl benzene)	4.615E-07	6.362E-08	3.979E-07
Methane	5.248E-03	5.218E-03	3.086E-05
Organic chlorine compounds	1.723E-14	1.577E-14	1.462E-15
VOC (unspecified)	8.940E-05	8.690E-05	2.495E-06
Other emissions to air	1.330E-01	2.641E-02	1.066E-01
Exhaust	1.326E-01	2.611E-02	1.065E-01
non used primary energy from wind power	0.000E+00	0.000E+00	0.000E+00
Particulate Matter, unspecified	1.490E-05	1.490E-05	0.000E+00
Unused primary energy from solar energy	0.000E+00	0.000E+00	0.000E+00
Used air	3.561E-04	2.777E-04	7.841E-05
Waste heat	0.000E+00	0.000E+00	0.000E+00

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Particles to air	7.354E-05	1.823E-05	5.530E-05
Dust (PM10)	5.408E-06	5.230E-06	1.782E-07
Dust (PM2,5 - PM10)	5.141E-05	0.000E+00	5.141E-05
Dust (PM2.5)	9.671E-06	8.430E-06	1.241E-06
Dust (unspecified)	7.051E-06	4.573E-06	2.478E-06
Metals (unspecified)	1.145E-13	1.103E-13	4.213E-15
Wood (dust)	2.837E-13	1.248E-13	1.589E-13
Radioactive emissions to air	1.735E-09	1.760E-10	1.559E-09
Antimony (Sb124)	0.000E+00	0.000E+00	0.000E+00
Argon (Ar41)	0.000E+00	0.000E+00	0.000E+00
Carbon (C14)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs134)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs137)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co58)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co60)	0.000E+00	0.000E+00	0.000E+00
Hydrogen (H3)	0.000E+00	0.000E+00	0.000E+00
Iodine (I129)	0.000E+00	0.000E+00	0.000E+00
Iodine (I131)	0.000E+00	0.000E+00	0.000E+00
Krypton (Kr85)	0.000E+00	0.000E+00	0.000E+00
Krypton (Kr85m)	0.000E+00	0.000E+00	0.000E+00
Plutonium (Pu alpha)	0.000E+00	0.000E+00	0.000E+00
Radon (Rn222)	0.000E+00	0.000E+00	0.000E+00
Uranium (total)	1.735E-09	1.760E-10	1.559E-09
Uranium (U234)	0.000E+00	0.000E+00	0.000E+00
Uranium (U235)	0.000E+00	0.000E+00	0.000E+00
Uranium (U238)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe131m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe133)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe133m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe135)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe135m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe137)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe138)	0.000E+00	0.000E+00	0.000E+00
Emissions to fresh water	8.828E-03	8.649E-03	1.790E-04
Analytical measures to fresh water	6.766E-05	5.908E-05	8.576E-06
Adsorbable organic halogen compounds (AOX)	3.047E-07	3.043E-07	3.701E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Biological oxygen demand (BOD)	4.283E-06	4.244E-06	3.886E-08
Chemical oxygen demand (COD)	5.835E-05	5.008E-05	8.266E-06
Solids (dissolved)	2.530E-07	2.555E-08	2.275E-07
Total dissolved organic bounded carbon	3.246E-13	1.123E-14	3.133E-13
Total organic bounded carbon	4.471E-06	4.427E-06	4.317E-08
Heavy metals to fresh water	8.324E-06	3.055E-06	5.269E-06
Antimony	1.460E-15	6.424E-16	8.179E-16
Arsenic (+V)	1.199E-07	1.190E-07	8.127E-10
Cadmium (+II)	7.128E-08	7.027E-08	1.016E-09
Chromium (+III)	4.066E-10	5.610E-11	3.505E-10
Chromium (+VI)	2.433E-17	2.379E-17	5.410E-19
Chromium (unspecified)	1.804E-07	1.799E-07	4.667E-10
Cobalt	5.987E-11	5.919E-11	6.790E-13
Copper (+II)	3.967E-07	3.941E-07	2.618E-09
Heavy metals to water (unspecified)	3.632E-11	2.165E-11	1.468E-11
Iron	7.006E-06	1.815E-06	5.190E-06
Lead (+II)	8.821E-08	8.428E-08	3.922E-09
Manganese (+II)	2.355E-08	3.379E-09	2.017E-08
Mercury (+II)	1.570E-09	1.518E-09	5.246E-11
Molybdenum	4.358E-09	4.907E-10	3.868E-09
Nickel (+II)	1.237E-07	1.220E-07	1.767E-09
Selenium	8.043E-10	1.433E-10	6.610E-10
Silver	1.263E-11	7.190E-12	5.440E-12
Strontium	2.557E-07	2.166E-07	3.912E-08
Thallium	7.375E-12	7.308E-12	6.699E-14
Tin (+IV)	9.017E-12	6.566E-12	2.451E-12
Titanium	5.395E-10	1.370E-10	4.025E-10
Vanadium (+III)	1.416E-09	2.392E-10	1.176E-09
Zinc (+II)	4.959E-08	4.735E-08	2.241E-09
Inorganic emissions to fresh water	5.347E-03	5.214E-03	1.322E-04
Acid (calculated as H+)	2.005E-09	1.634E-09	3.704E-10
Aluminum (+III)	1.405E-07	1.476E-08	1.257E-07
Ammonia	2.105E-09	1.857E-09	2.485E-10
Ammonium / ammonia	1.368E-06	1.271E-06	9.729E-08
Barium	9.816E-07	9.810E-07	6.148E-10
Beryllium	5.196E-12	5.245E-13	4.672E-12

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Boron	4.870E-08	3.568E-09	4.513E-08
Bromine	9.847E-11	9.839E-11	7.875E-14
Calcium (+II)	7.638E-06	6.174E-07	7.021E-06
Carbonate	6.173E-05	6.171E-05	2.361E-08
Chloride	5.092E-03	5.018E-03	7.450E-05
Chlorine (dissolved)	2.025E-07	3.549E-08	1.670E-07
Cyanide	7.252E-11	7.082E-11	1.702E-12
Fluoride	2.196E-05	1.471E-06	2.049E-05
Fluorine	2.309E-09	2.278E-09	3.098E-11
Hydrogen chloride	4.441E-11	4.359E-11	8.290E-13
Hydrogen fluoride (hydrofluoric acid)	8.635E-11	8.623E-11	1.133E-13
Hydroxide	1.230E-09	1.193E-09	3.749E-11
Magnesium (+III)	2.241E-06	8.468E-07	1.395E-06
Magnesium chloride	6.833E-13	6.039E-13	7.938E-14
Neutral salts	1.209E-17	0.000E+00	1.209E-17
Nitrate	8.549E-07	1.348E-07	7.201E-07
Nitrogen	7.785E-10	7.641E-10	1.436E-11
Nitrogen organic bounded	8.281E-08	7.964E-08	3.170E-09
Phosphate	8.412E-09	6.805E-09	1.607E-09
Phosphorus	1.396E-07	1.394E-07	1.481E-10
Potassium	4.242E-08	4.202E-08	3.941E-10
Silicate particles	9.564E-12	9.469E-12	9.513E-14
Sodium (+I)	8.918E-05	8.578E-05	3.399E-06
Sodium chloride (rock salt)	2.307E-12	0.000E+00	2.307E-12
Sodium hypochlorite	4.609E-13	3.284E-13	1.325E-13
Sulphate	5.626E-05	3.212E-05	2.415E-05
Sulphide	1.127E-05	1.127E-05	3.188E-09
Sulphite	1.462E-08	9.745E-10	1.364E-08
Sulphur	2.518E-10	1.859E-10	6.594E-11
Sulphuric acid	5.728E-09	5.621E-09	1.069E-10
Organic emissions to fresh water	7.962E-06	7.893E-06	6.844E-08
Halogenated organic emissions to fresh water	4.815E-11	4.699E-11	1.158E-12
1,2-Dibromoethane	1.523E-15	1.034E-15	4.892E-16
Chlorinated hydrocarbons (unspecified)	3.402E-17	3.289E-17	1.123E-18
Chloromethane (methyl chloride)	4.815E-11	4.699E-11	1.155E-12
Dichloropropane	4.134E-18	4.815E-19	3.652E-18

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	8.410E-23	7.433E-23	9.771E-24
Vinyl chloride (VCM; chloroethene)	3.457E-15	0.000E+00	3.457E-15
Hydrocarbons to fresh water	3.176E-06	3.149E-06	2.668E-08
Acenaphthene	1.603E-10	1.603E-10	5.988E-14
Acenaphthylene	6.891E-11	6.888E-11	2.426E-14
Acetic acid	2.780E-09	2.737E-09	4.339E-11
Acrylonitrile	3.023E-13	3.523E-14	2.671E-13
Anthracene	2.994E-10	2.993E-10	7.001E-14
Aromatic hydrocarbons (unspecified)	4.297E-08	4.258E-08	3.992E-10
Benzene	3.684E-07	3.683E-07	1.127E-10
Benzo{a}anthracene	1.840E-11	1.839E-11	9.639E-15
Benzofluoranthene	2.292E-12	2.285E-12	6.998E-15
Chrysene	6.749E-11	6.745E-11	4.700E-14
Cresol (methyl phenol)	6.524E-12	4.816E-12	1.708E-12
Ethyl benzene	2.010E-08	2.009E-08	6.087E-12
Fluoranthene	2.088E-11	2.087E-11	1.191E-14
Hexane (isomers)	7.128E-13	5.261E-13	1.868E-13
Hydrocarbons (unspecified)	1.872E-09	4.912E-10	1.380E-09
Methanol	3.083E-08	9.668E-09	2.117E-08
Oil (unspecified)	2.026E-06	2.024E-06	1.946E-09
Phenol (hydroxy benzene)	3.736E-07	3.734E-07	1.218E-10
Polycyclic aromatic hydrocarbons (PAH, unspec.)	2.704E-09	1.347E-09	1.356E-09
Toluene (methyl benzene)	2.242E-07	2.241E-07	7.608E-11
Xylene (isomers; dimethyl benzene)	8.221E-08	8.214E-08	6.815E-11
Carbon, organically bound	4.774E-06	4.732E-06	4.176E-08
Naphthalene	1.157E-08	1.157E-08	3.419E-12
Organic chlorine compounds (unspecified)	1.736E-14	1.588E-14	1.478E-15
Organic compounds (dissolved)	1.922E-14	0.000E+00	1.922E-14
Organic compounds (unspecified)	1.182E-24	1.161E-24	2.082E-26
Other emissions to fresh water	0.000E+00	0.000E+00	0.000E+00
non used primary energy from water power	0.000E+00	0.000E+00	0.000E+00
Unused primary energy from geothermal	0.000E+00	0.000E+00	0.000E+00
Waste heat	0.000E+00	0.000E+00	0.000E+00
Particles to fresh water	3.397E-03	3.364E-03	3.289E-05
Metals (unspecified)	1.048E-12	1.017E-12	3.066E-14

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Soil loss by erosion into water	1.627E-09	1.626E-09	1.583E-12
Solids (suspended)	3.397E-03	3.364E-03	3.289E-05
Radioactive emissions to fresh water	0.000E+00	0.000E+00	0.000E+00
Americium (Am241)	0.000E+00	0.000E+00	0.000E+00
Antimony (Sb124)	0.000E+00	0.000E+00	0.000E+00
Antimony (Sb125)	0.000E+00	0.000E+00	0.000E+00
Carbon (C14)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs134)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs137)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co58)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co60)	0.000E+00	0.000E+00	0.000E+00
Curium (Cm alpha)	0.000E+00	0.000E+00	0.000E+00
Hydrogen (H3)	0.000E+00	0.000E+00	0.000E+00
Iodine (I129)	0.000E+00	0.000E+00	0.000E+00
Iodine (I131)	0.000E+00	0.000E+00	0.000E+00
Manganese (Mn54)	0.000E+00	0.000E+00	0.000E+00
Plutonium (Pu alpha)	0.000E+00	0.000E+00	0.000E+00
Radium (Ra226)	0.000E+00	0.000E+00	0.000E+00
Ruthenium (Ru106)	0.000E+00	0.000E+00	0.000E+00
Silver (Ag110m)	0.000E+00	0.000E+00	0.000E+00
Strontium (Sr90)	0.000E+00	0.000E+00	0.000E+00
Uranium	0.000E+00	0.000E+00	0.000E+00
Emissions to sea water	1.041E-02	1.040E-02	1.219E-05
Analytical measures to sea water	1.598E-05	1.591E-05	7.009E-08
Adsorbable organic halogen compounds (AOX)	4.920E-13	4.872E-13	4.743E-15
Biological oxygen demand (BOD)	5.427E-07	5.375E-07	5.233E-09
Chemical oxygen demand (COD)	1.489E-05	1.483E-05	5.963E-08
Total organic bounded carbon	5.427E-07	5.375E-07	5.233E-09
Heavy metals to sea water	1.272E-06	1.269E-06	3.417E-09
Arsenic (+V)	2.198E-07	2.198E-07	6.340E-11
Cadmium (+II)	9.737E-08	9.720E-08	1.616E-10
Chromium (unspecified)	3.444E-07	3.443E-07	1.539E-10
Cobalt	1.415E-09	1.385E-09	2.979E-11
Copper (+II)	3.422E-07	3.419E-07	3.701E-10
Iron	1.762E-08	1.719E-08	4.300E-10
Lead (+II)	6.904E-08	6.896E-08	8.292E-11

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Manganese (+II)	1.843E-09	1.798E-09	4.459E-11
Mercury (+II)	6.357E-10	6.338E-10	1.825E-12
Molybdenum	1.894E-12	1.396E-12	4.979E-13
Nickel (+II)	1.267E-07	1.266E-07	1.165E-10
Silver	5.617E-12	4.140E-12	1.477E-12
Strontium	1.615E-08	1.486E-08	1.295E-09
Tin (+IV)	6.728E-12	4.959E-12	1.769E-12
Titanium	6.856E-13	5.053E-13	1.802E-13
Vanadium (+III)	9.710E-10	9.504E-10	2.065E-11
Zinc (+II)	3.390E-08	3.326E-08	6.424E-10
Inorganic emissions to sea water	9.959E-03	9.951E-03	7.944E-06
Aluminum (+III)	2.206E-11	1.625E-11	5.802E-12
Ammonia	6.558E-10	4.834E-10	1.724E-10
Barium	1.960E-06	1.958E-06	1.513E-09
Beryllium	8.073E-11	7.905E-11	1.675E-12
Boron	3.568E-10	2.630E-10	9.382E-11
Calcium (+II)	3.895E-08	2.870E-08	1.025E-08
Carbonate	1.233E-04	1.232E-04	9.514E-08
Chloride	9.748E-03	9.740E-03	7.671E-06
Magnesium	1.041E-07	1.007E-07	3.386E-09
Nitrate	1.598E-07	1.597E-07	1.233E-10
Sodium (+I)	1.084E-05	1.073E-05	1.045E-07
Sulphate	5.194E-05	5.190E-05	4.025E-08
Sulphide	2.244E-05	2.243E-05	1.731E-08
Sulphur	1.909E-10	1.407E-10	5.020E-11
Organic emissions to sea water	5.902E-06	5.897E-06	4.677E-09
Hydrocarbons to sea water	5.877E-06	5.873E-06	4.631E-09
Acenaphthene	3.691E-10	3.678E-10	1.330E-12
Acenaphthylene	1.558E-10	1.553E-10	5.078E-13
Acetic acid	1.772E-10	1.747E-10	2.513E-12
Anthracene	5.961E-10	5.957E-10	4.356E-13
Aromatic hydrocarbons (unspecified)	5.427E-09	5.375E-09	5.233E-11
Benzene	7.256E-07	7.252E-07	3.704E-10
Benzo{a}anthracene	4.870E-11	4.841E-11	2.916E-13
Benzofluoranthene	1.886E-11	1.855E-11	3.185E-13
Chrysene	2.043E-10	2.027E-10	1.636E-12

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Cresol (methyl phenol)	4.944E-12	3.644E-12	1.300E-12
Ethyl benzene	4.025E-08	4.021E-08	3.439E-11
Fluoranthene	5.568E-11	5.533E-11	3.451E-13
Hexane (isomers)	5.398E-13	3.979E-13	1.420E-13
Oil (unspecified)	3.754E-06	3.751E-06	3.134E-09
Phenol (hydroxy benzene)	7.470E-07	7.464E-07	6.383E-10
Toluene (methyl benzene)	4.406E-07	4.404E-07	2.172E-10
Xylene (isomers; dimethyl benzene)	1.628E-07	1.626E-07	1.754E-10
Naphthalene	2.436E-08	2.432E-08	4.568E-11
Particles to sea water	4.319E-04	4.277E-04	4.164E-06
Solids (suspended)	4.319E-04	4.277E-04	4.164E-06
Emissions to industrial soil	5.019E-05	5.012E-05	7.508E-08
Heavy metals to industrial soil	1.262E-05	1.261E-05	1.805E-08
Arsenic (+V)	1.495E-11	1.493E-11	2.463E-14
Cadmium (+II)	1.392E-10	1.389E-10	2.951E-13
Chromium (+III)	4.155E-13	4.059E-13	9.688E-15
Chromium (unspecified)	3.706E-08	3.701E-08	4.759E-11
Cobalt	6.613E-10	6.606E-10	7.077E-13
Copper (+II)	3.740E-10	3.736E-10	3.684E-13
Iron	5.372E-08	5.366E-08	5.735E-11
Lead (+II)	1.033E-11	1.030E-11	2.536E-14
Manganese (+II)	7.744E-09	7.725E-09	1.966E-11
Mercury (+II)	7.418E-13	7.410E-13	7.730E-16
Nickel (+II)	1.062E-08	1.057E-08	4.927E-11
Strontium	1.251E-05	1.249E-05	1.787E-08
Zinc (+II)	4.072E-09	4.066E-09	5.957E-12
Inorganic emissions to industrial soil	3.756E-05	3.751E-05	5.621E-08
Aluminum (+III)	4.126E-08	4.120E-08	5.894E-11
Ammonia	1.968E-05	1.966E-05	2.696E-08
Bromide	5.668E-09	5.662E-09	6.065E-12
Calcium (+II)	9.210E-09	4.122E-09	5.088E-09
Chloride	6.613E-06	6.605E-06	7.370E-09
Fluoride	1.889E-07	1.887E-07	2.022E-10
Magnesium (+III)	1.336E-09	6.331E-10	7.032E-10
Phosphorus	2.035E-06	2.032E-06	2.909E-09
Potassium (+I)	4.707E-06	4.702E-06	5.757E-09

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Sodium (+I)	7.949E-10	3.498E-10	4.451E-10
Sulphate	6.112E-07	6.103E-07	9.587E-10
Sulphide	3.667E-06	3.662E-06	5.752E-09
Organic emissions to industrial soil	6.685E-09	5.859E-09	8.257E-10
Oil (unspecified)	6.685E-09	5.859E-09	8.257E-10

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