NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Pipeline transport of liquids

Reference Flow: 1 kg of liquid product, pipeline

Brief Description: Transport of liquids via a pipeline powered by electric pumps.

Section I: Meta Data

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

Year Data Best Represents: 2009

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	☑ Other
Releases to Water:	☐ Inorganic	☐ Organic Emissions	☐ Other
Water Usage:	☐ Water Consumption	☐ Water Demand (throughput)	
Releases to Soil:	☐ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

Distance	*[km] Distance that the product is transported via pipeline*
losses	*[kg/kg] mass of losses per kg output*

Tracked Input Flows:

liquid product, pipeline	*[Technosphere] Liquid product to be transported via pipeline*

electricity [Electric Power]

Tracked Output Flows:

liquid product, pipeline *Reference flow*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage24_O_Pipeline_Liquid_Transport_2013.01.xlsx*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

This unit process provides a summary of electricity input associated with the transport of liquid products via pipeline. By default, no loss of product is assumed during pipeline transport. Scenarios with VOC speciation are provided for petroleum products. Users will need to add loss factors for other products. The reference flow of this unit process is: 1 kg of liquid product, pipeline.

Boundary and Description

Figure 1 provides an overview of the boundary of this process. The process assumes that the pipeline is operated by electricity, the burdens of which are accounted for in upstream processes. This process does have a parameter to account for pipeline losses, which impacts the amount of fluid taken in by the process. The output is 1 kg delivered liquid product.

The energy intensity of the process is taken from GREET (ANL, 2013).

Losses are assumed to be 0 by default. If losses are specified, then the make-up of those losses must be set by the user. Scenarios are included for crude, gasoline, diesel, and kerosene-type jet fuel. The losses for these petroleum products are assumed to only be volatile organic compounds (VOCs), and the speciation of the VOCs are based on data from the Environmental Protection Agency (EPA, 2011). **Table 1** provides the input and output flows based on transport with no loss.

Figure 1: Unit Process Scope and Boundary

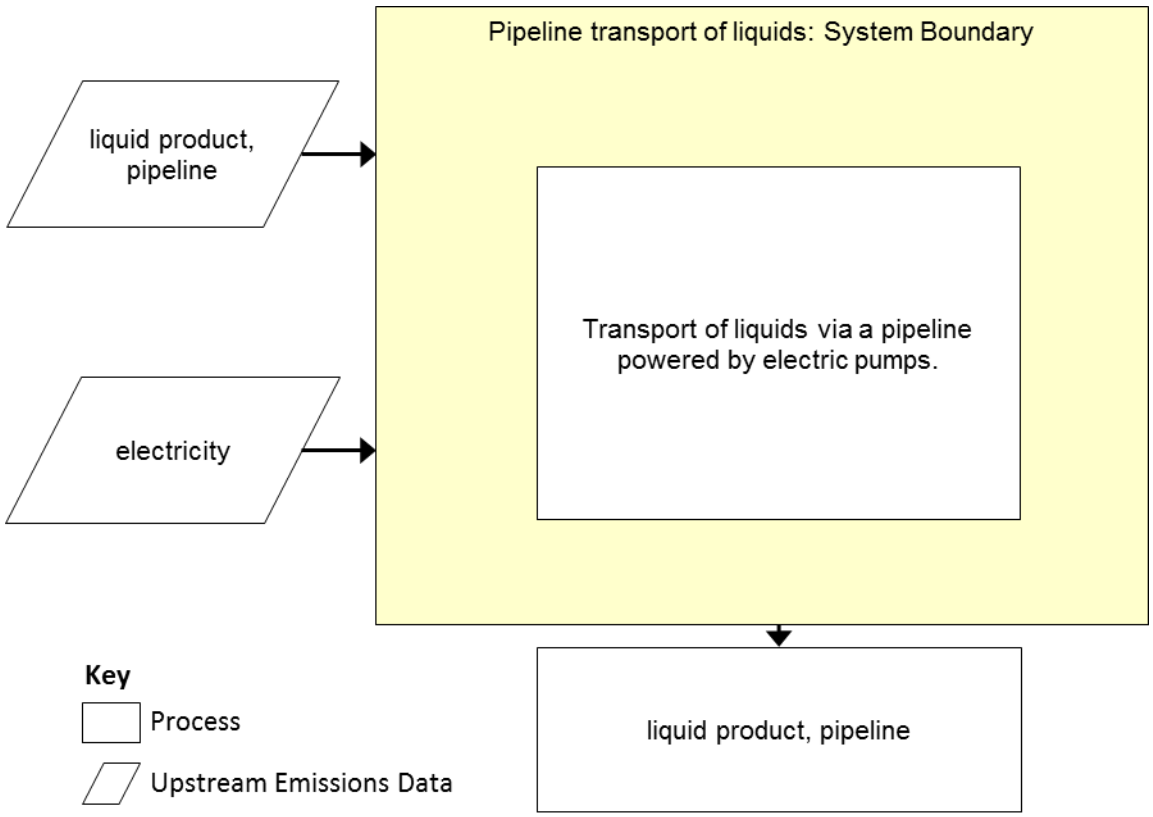

Table 1: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
Inputs		
liquid product, pipeline	**1.00E+00**	**kg**
electricity [Electric Power]	**8.11E-02**	**kWh**
Outputs		
liquid product, pipeline	**1.00E+00**	
1,2,4-Trimethylbenzene [Group NMVOC to air]	0.00E+00	kg
2,2,4-Trimethylpentane [Group NMVOC to air]	0.00E+00	kg
2,3,4-Trimethylpentane [Group NMVOC to air]	0.00E+00	kg
2,3-Dimethylbutane [Group NMVOC to air]	0.00E+00	kg
2,3 Dimethylpentane [Group NMVOC to air]	0.00E+00	kg
2,4-Dimethylpentane [Group NMVOC to air]	0.00E+00	kg
2-Methyl-2-butene [Group NMVOC to air]	0.00E+00	kg
2-Methylhexane [Group NMVOC to air]	0.00E+00	kg
2-Methylpentane [Group NMVOC to air]	0.00E+00	kg
3-Methylhexane [Group NMVOC to air]	0.00E+00	kg
3-Methylpentane [Group NMVOC to air]	0.00E+00	kg
Benzene [Group NMVOC to air]	0.00E+00	kg
Ethane [Group NMVOC to air]	0.00E+00	kg
Ethanol [Group NMVOC to air]	0.00E+00	kg
Ethyl benzene [Group NMVOC to air]	0.00E+00	kg
Formaldehyde (methanal) [Group NMVOC to air]	0.00E+00	kg
iso-Butane [Group NMVOC to air]	0.00E+00	kg
iso-Butene [Group NMVOC to air]	0.00E+00	kg
Hexane (isomers) [Group NMVOC to air]	0.00E+00	kg
iso-Pentane [Group NMVOC to air]	0.00E+00	kg
Octane [Group NMVOC to air]	0.00E+00	kg
Xylene (dimethyl benzene) [Group NMVOC to air]	0.00E+00	kg
Methane [Organic emissions to air (group VOC)]	0.00E+00	kg
Methyl tert-butylether [Group NMVOC to air]	0.00E+00	kg
Methyl cyclohexane [Group NMVOC to air]	0.00E+00	kg
Methyl cyclopentane [Group NMVOC to air]	0.00E+00	kg
2-Methyl-1-pentene [Group NMVOC to air]	0.00E+00	kg
m-Xylene [unspecified]	0.00E+00	kg
Butane (n-butane) [Group NMVOC to air]	0.00E+00	kg
Decane [Group NMVOC to air]	0.00E+00	kg
Dodecane [Group NMVOC to air]	0.00E+00	kg
Heptane (n-Heptane) [Organic intermediate products]	0.00E+00	kg
Hexane (n-hexane) [Organic intermediate products]	0.00E+00	kg
Nonane [Group NMVOC to air]	0.00E+00	kg

Octane (n-Octane) [Organic intermediate products]	0.00E+00	kg
Pentane (n-pentane) [Group NMVOC to air]	0.00E+00	kg
1-Tridecane [Group NMVOC to air]	0.00E+00	kg
1-Undecane [Group NMVOC to air]	0.00E+00	kg
o-Xylene [unspecified]	0.00E+00	kg
1-Pentadecane [Group NMVOC to air]	0.00E+00	kg
Propane [Group NMVOC to air]	0.00E+00	kg
1-Tetradecane [Group NMVOC to air]	0.00E+00	kg
Toluene (methyl benzene) [Group NMVOC to air]	0.00E+00	kg
trans-2-Pentene [Group NMVOC to air]	0.00E+00	kg

* **Bold face** clarifies that the value shown *does not* include upstream environmental flows.

Embedded Unit Processes

None.

References

ANL, 2013. Argonne National Laboratory. 2013. Update to Transportation Parameters in GREET. Argonne, IL : Argonne National Laboratory. Retrieved December 6, 2013 from http://greet.es.anl.gov/publication-tansportation-distribution-13

EPA, 2011. Environmental Protection Agency, 2011. SPECIATE Version 4.3. In Environmental Protection Agency (Ed.). Washington, D.C. Retrieved, from http://www.epa.gov/ttn/chief/software/speciate/index.html#documentation

Section III: Document Control Information

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