NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Gasoline Bulk Storage Tank, Construction

Reference Flow: 1 pc of Gasoline Bulk Storage Tank

Brief Description: Gasoline bulk storage tank based on Eagle Tanks Inc's 30,000 gal tank, adjusted to the needed capacity on a kg material/kg fuel basis. Includes security storage space. Materials include carbon and stainless steel.

Section I: Meta Data

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

Year Data Best Represents: 2009

Process Type: Manufacturing Process (MP)

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

Allocation Applied: No

Completeness: Individual Relevant Flows Recorded

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:

Required Capacity   *The volume of the tank to hold the required quantity*

Additional Storage Percent   *The added percent over the flow rate stored in the tank in case of emergency*

Tracked Input Flows:

Steel Plate, BF (85% Recovery Rate) [Metals]   *Steel plate from blast furnace used to construct the storage tank, assumes 85% recycled/recovery rate*

Stainless steel, 316 2B, 80% Recycled [Metals] *Stainless steel used to construct the storage tank, assumes 80% recycled/recovery rate*

Tracked Output Flows:

Gasoline Bulk Storage Tank [Construction] *Construction of a single gasoline bulk storage tank*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage4_C_Gasoline_Bulk_Storage_Tank_2010.01.xls*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

The scope of this unit process covers the materials required for the construction of a single gasoline bulk storage tank needed to store gasoline fuel while it is en route from the energy conversion facility through a pipeline to tanker transport to the refueling station as part of Life Cycle (LC) Stage #4. The process is based on the reference flow of 1 piece of gasoline bulk storage tank, as described below and shown in **Figure 1**. The gasoline bulk storage tank is assumed to be constructed of steel plate and stainless steel; other materials are assumed to be negligible.

This unit process is used in LC Stage #4 for the storage of gasoline during the transportation from the energy conversion facility ultimately to the refueling station. This unit process specifically focuses on the construction of the storage tank which holds the gasoline after it has been transported by a pipeline before it is transported by a tanker truck to the refueling station. The emissions associated with evaporation and power to run the bulk storage tank are not included; another unit process will calculate the associated emissions.

Boundary and Description

The construction of the gasoline bulk storage tank is based on manufacturer specifications for an Eagle Tank Double-Wall Horizontal-One Product tank with a capacity of 30,000 gallons. The bulk storage tank is used to store the gasoline after it has been produced before the refueling stations have space to store and dispense the fuel.

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the gasoline bulk storage tank (e.g., emitted while putting together the components of the storage tank, including transport of those components)

are not considered in this study. Upstream emissions from the production of raw materials used for the construction of the gasoline bulk storage tank (e.g., the steels) are calculated outside the boundary of this unit process, based on proprietary profiles available in the GaBi model. As shown in Figure 1 and discussed above, the gasoline storage tank constructed in this unit process is a step during LC Stage #4.

The total weight of a gasoline storage tank is readily available along with the material breakdown. The tank is comprised of stainless steel and steel plate (Eagle 2009a). According to Eagle Tanks, the ratio between the two is 75 percent to 25 percent, respectively (Eagle 2009b). It is assumed that the kg of steel per kg of gasoline does not change based on the capacity of the tank.

The adjustable parameters include the required capacity and the additional storage percentage. The required capacity is based on the output of the energy conversion facility. Values may range from 7,500 barrels/day to 50,000 barrels/day. The additional storage percentage should be a non-negative number and less than or equal to 20 percent at maximum.

Table 1 shows relevant properties and assumptions used to calculate the amount of the types of steel contained in a single gasoline bulk storage tank. Total weight for one bulk storage tank was found to be approximately 14,735 kg (32,486 lbs) (Eagle 2009a). **Table 2** provides a summary of modeled input and output flows. Additional detail regarding input and output flows, including calculation methods, is contained in the associated DS.

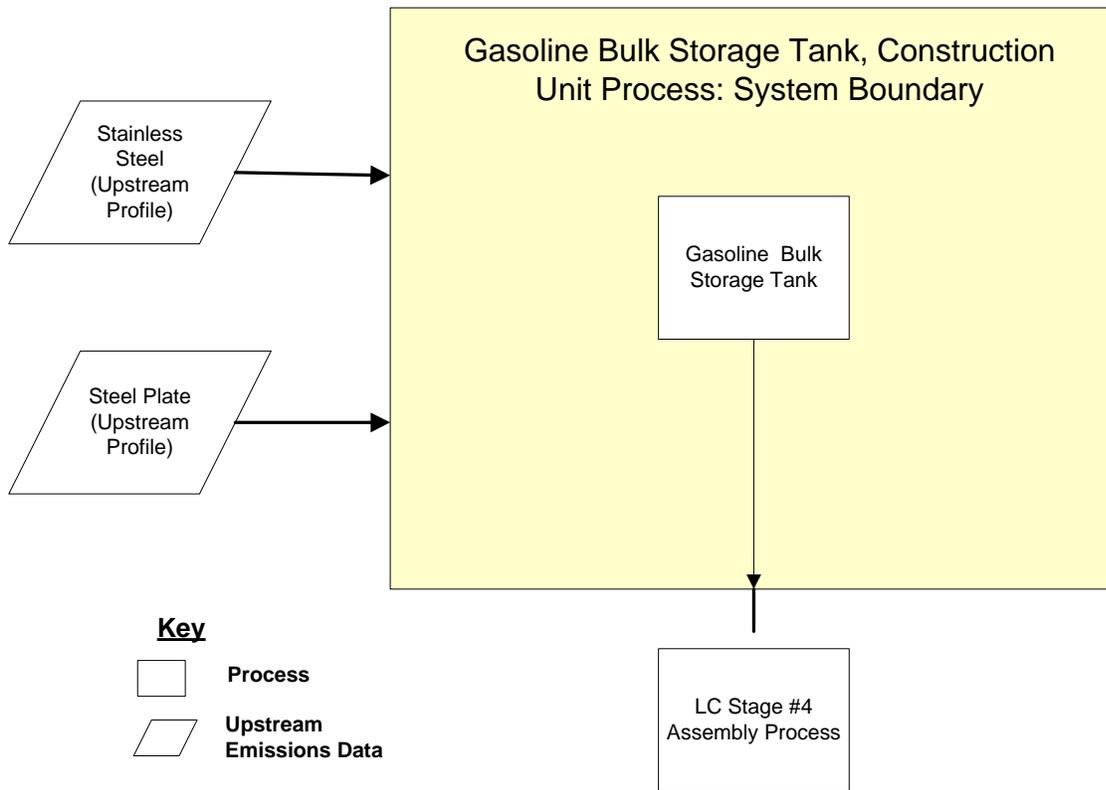## Figure 1: Unit Process Scope and Boundary

Table 1. General Properties

Property	Value	Reference
Eagle Tank's Double-Wall Horizontal One Product Tank Capacity (gal)	30,000	Eagle 2009a
Eagle Tank's Double-Wall Horizontal One Product Tank Weight (kg)	14,735	Eagle 2009a
Storage Requirements for a 50,000 barrel/day Plant (kg/day)	58,590,000	NETL Engineering Calculation
Emergency Storage Allotment (%)	5	NETL Engineering Judgment
Storage Requirements with Emergency Storage (kg)	61,950,000	NETL Engineering Calculation

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
Inputs		
Steel plate, BF (85% Recovery Rate) [Metals]	**4.0194E-06**	**kg**
Stainless steel, 316 2B, 80% Recycled [Metals]	**1.2058E-05**	**kg**
Outputs		
Gasoline Bulk Storage Tank [Construction]	1.00	pcs

* **Bold face** clarifies that the value shown *does not* include upstream environmental flows. Upstream environmental flows were added during the modeling process using GaBi modeling software, as shown in Figure 1.

Embedded Unit Processes

None.

References

Eagle 2009a   Eagles Tanks Incorporated. 2009. Double-wall Horizontal-One Product. Eagle Tanks Incorporated. http://www.eagletanks.com/tankspage/index.html (accessed December 17, 2009).

Eagle 2009b   Eagle Tanks Incorporated. 2009. Oral Communication via Telephone. May 26, 2009.

Section III: Document Control Information

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