NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Ocean Vessel 30K DWT Construction

Reference Flow: 1 pcs of construction

Brief Description: Steel requirements for the construction of an ocean vessel with a cargo capacity of 30,000 DWT.

Section I: Meta Data

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

Year Data Best Represents: 2010

Process Type: Manufacturing Process (MP)

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:

Cargo Mass	*Mass of cargo transported during the life of a single 30,000 DWT dry-bulk ocean vessel*
Vessel Mass	*Mass of an unloaded 30,000 DWT dry-bulk ocean vessel*

Tracked Input Flows:

Steel plate, BF (85% Recovery Rate)	*Diesel from crude oil, for consumption during cargo transport (kg)*

Tracked Output Flows:

Ocean Vessel	*Reference flow (pcs)*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage3_C_OceanVessel_DWT30K_Construction_2010_01.xls*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

The scope of this unit process encompasses the materials and weights of those materials necessary to construct a single ocean vessel with 30,000 dry weight ton cargo capacity. The process is based on the reference flow of 1 piece of ocean vessel, as described below and shown in **Figure 1**. The ocean vessel is assumed to be constructed of steel plate. Other materials are assumed negligible.

This process is used during LC Stage #3 to manufacture an ocean-faring vessel for transport of wind turbine components from foreign manufacturers to U.S. wind power installation locations.

Boundary and Description

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the ocean vessel (e.g., that are emitted while putting together the components of the vessel, including transportation of these components) are not included in this study. Upstream emissions from the production of raw materials used for the construction of the ocean vessel (e.g., steel) are calculated outside the boundary of this unit process, based on proprietary profiles available within the GaBi model.

The construction of the ocean vessel is based on information provided by the U.S. Department of Transportation, Maritime Administration, giving specifications for ships in U.S. government-owned fleet (DOT 2009). Vessel masses were used to calculate the quantity of input steel plate (Steel plate, BF (85% Recovery Rate) [Metals]).

Table 1 shows relevant properties and assumptions used to calculate the amount of steel plate in one ocean vessel. **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 sheet.

Figure 1. Unit Process Flow Diagram

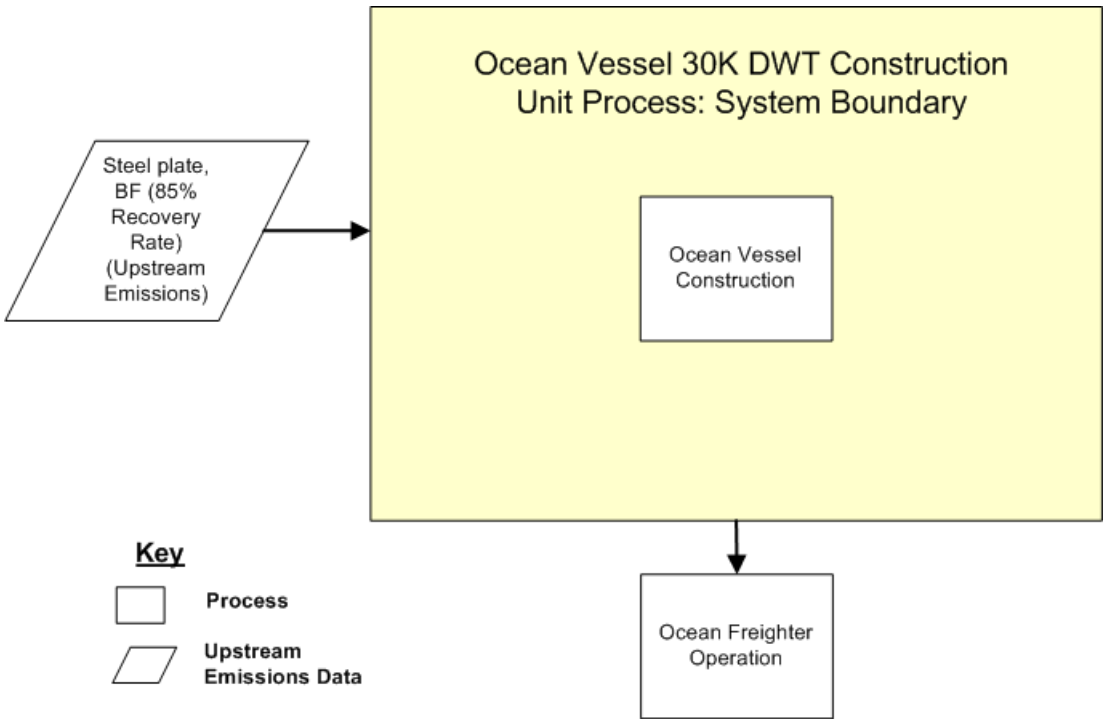

Table 1: Properties of Process

Property/ Parameter	Unit	Value
Annual dry bulk seaborne tonnage	tonnes/yr	2.50E+09
Share of dry bulk tonnage to 30,000 DWT	percent	50%
Lightship displacement	long tons	17941

Table 2: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
Inputs		
Steel plate, BF (85% Recovery Rate) [Metals]	**1.28E-03**	**kg**
Outputs		
UF6 Storage Container [Construction]	1	piece

* **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

DOT 2009 U.S. Department of Transportation, Maritime Administration. (2009). Maritime Administration: Ready Reserve Force. http://www.marad.dot.gov (Accessed August 27, 2010)

Section III: Document Control Information

Date Created: August 11, 2010

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Original/no revisions

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