NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Blasthole Drill, 250,000 lbs, Construction

Reference Flow: 1 piece (pcs) of Blasthole Drill, 250,000 lbs

Brief Description: Encompasses the materials necessary to construct a single blasthole drill to drill holes for blasting at a large surface coal mine with dragline based on a P&H 250XP-DL Dragline Application Drill. Quantifies the amount of steel needed.

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:

Tracked Input Flows:

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

Tracked Output Flows:

Blasthole Drill, 250,000 lbs [Construction]	*Construction of a single P&H 250,000 lb, model 250XP-DL dragline blasthole drill*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage1_C_Blasthole_Drill_250000_lb_2010.01.xls*, which provides additional details regarding calculations, data quality, and references as relevant.

Goal and Scope

The scope of this process encompasses the materials and weights of those materials necessary to construct a single 250,000 lb blasthole drill, to be used for mining in a large scale surface mine. The process is based on the reference flow of 1 piece of blasthole drill, 250,000 lbs, as described below, and as shown in **Figure 1.** The blasthole drill is assumed to be constructed entirely of steel; other materials are assumed to be negligible. By default, all steel within this study was assumed to be steel plate, based on available GaBi profiles, unless other steel types were specified per available data, or a higher grade of steel would be required, per NETL engineering judgment. Therefore, all steel considered in this unit process was assumed to be steel plate.

This process is used during LC Stage #1 to assist in the mining of coal from surface mines (such as Powder River Basin sub-bituminous coal). It is combined with other mining equipment construction unit processes in the assembly unit process, DF_Stage1_C_Assembly_PRB_Coal_Surface_Mine_2010.01.doc. This assembly unit process quantifies the fraction of each piece of equipment needed under LC Stage #1 to produce 1 kg of coal ready for transport (LC Stage #2) to the energy conversion facility (LC Stage #3).

Boundary and Description

Construction of the blasthole drill is based on manufacturer specifications for a P&H 250XP-DL Dragline Application Drill, Rotary Blasthole Drill which weighs 250,000 lbs. The blasthole drill is used to facilitate removal of overburden and coal at the surface mine. The blasthole drill produces a series of holes, into which blasting powder is inserted and exploded, in order to loosen and facilitate overburden removal and coal extraction. This unit process considers only the construction materials required for the blasthole drill. Use of explosives is considered in a separate unit process.

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the blasthole drill (e.g., that are emitted while putting together the components of a blasthole drill, 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 blasthole drill (e.g., steel plate) are calculated outside the boundary of this unit process, based on proprietary profiles available within the GaBi model. As shown in Figure 1 and discussed above, the blasthole drill

constructed in this unit process is incorporated into the surface mine assembly processes for LC Stage #1 for surface mined Powder River Basin sub-bituminous coal.

The total weight of a blasthole drill was readily available but reliable data for the material breakdown of blasthole drill subcomponents were not. Therefore, the blasthole drill was assumed to be composed entirely of steel plate (Steel plate, BF (85% Recovery Rate) [Metals]).

Table 1 shows relevant properties and assumptions used to calculate the amount of steel plate contained in a single blasthole drill. Total weight for one blasthole drill is estimated to be approximately 113,400 kg (250,000 lbs) (P&H 2009). Based on the assumption that the blasthole drill is constructed entirely out of steel plate, the total weight is assigned to this material. **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 Scope and Boundary

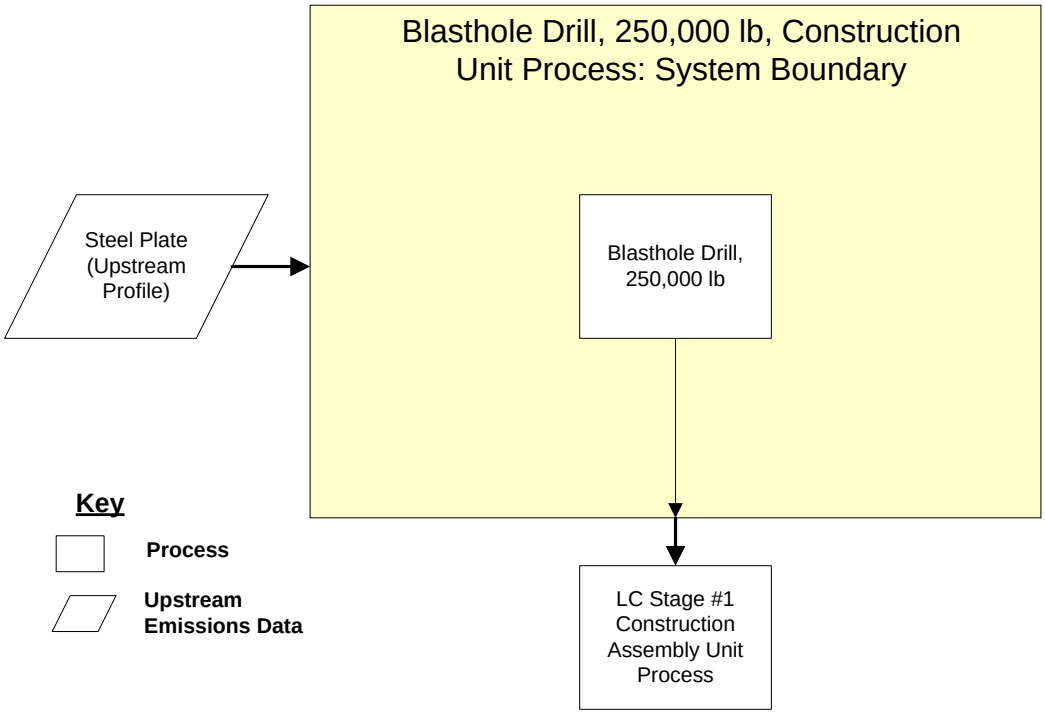

Table 1: Properties of the Blasthole Drill

Total Weight of Single Blasthole Drill	Weight	Reference
One Blasthole Drill Weight, kg (lbs)	113,400 (250,000)	P&H 2009
Total Steel Plate in One Blasthole Drill, kg (lbs)	113,400 (250,000)	NETL Engineering Judgment

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
Inputs		
Steel Plate, BF (85% Recovery Rate) [Metals]	**113,400**	**kg**
Outputs		
Blasthole Drill, 250,000 lbs [Construction]	1.00	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

P&H 2009 — P&H Mining Equipment. 2009. P&H 250XP-DL Dragline Application Drill, Rotary Blasthole Drill: Operating Specifications. P&H Mining Equipment. http://www.phmining.com/MinePro/Literature/Spec/250XP-DL.pdf (accessed December 18, 2009).

Section III: Document Control Information

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