



NETL Life Cycle Inventory Data

Process Documentation File

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage1_C_Coal_Crusher_254000lb_2010.01.xls*, which provides additional details regarding calculations, data quality, and references as relevant.

Goal and Scope

The scope of this unit process encompasses the materials and weights of those materials necessary to construct a single 254,000 lb coal crusher, to be used for the preparation of surface-mined Powder River Basin sub-bituminous coal. The unit process is based on the reference flow of 1 piece of coal crusher, 254,000 lbs, as described below, and as shown in **Figure 1**. The crusher is assumed to be constructed entirely of cold rolled steel; therefore cold rolled steel is assumed to be the only material required for crusher construction. Other materials are assumed to be negligible.

This unit process is used during LC Stage #1 to assist in the preparation of sub-bituminous coal. It is combined with other mine equipment construction unit processes in the assembly unit process for sub-bituminous coal, *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 coal crusher is based on manufacturer specifications for a Gundlach Braker model 12048 coal crusher. The crusher is used to crush the extracted coal into smaller pieces which is then stored, and later transported.

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the crusher (e.g., that are emitted while putting together the components of a crusher, 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 crusher (e.g., cold rolled steel) 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 crusher 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 crusher was readily available but reliable data for the material breakdown of crusher subcomponents were not. Therefore, the crusher was assumed to be composed entirely of cold rolled steel (Steel cold rolled (St) [Metals]).

Table 1 shows relevant properties and assumptions used to calculate the amount of cold rolled steel contained in a single crusher. Total weight for one crusher is estimated

to be approximately 115,213 kg (254,000 lbs) (Gundlach 2009). Based on the assumption that the crusher is constructed entirely out of cold rolled steel, 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

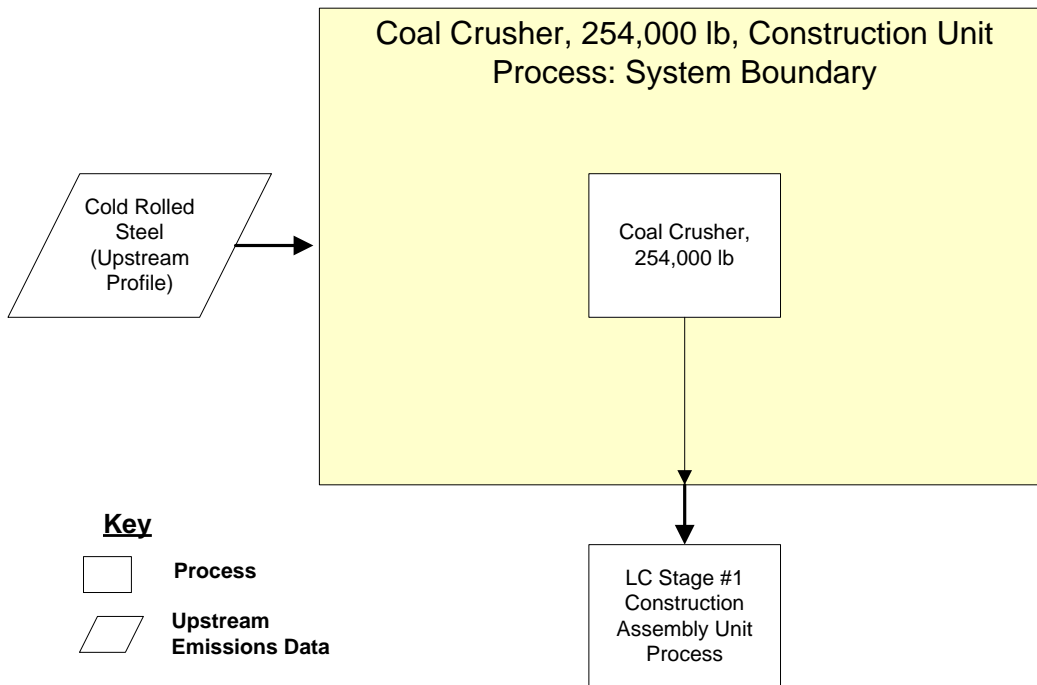


Table 1: Properties of the Coal Crusher, 254,000 lbs

Total Weight of Single Coal Crusher	Weight	Reference
One Crusher Weight, kg (lbs)	115,213 (254,000)	Gundlach 2009
Total Cold Rolled Steel in One Crusher, kg (lbs)	115,213 (254,000)	NETL Engineering Judgment

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
Inputs		
Steel cold rolled (St) [Metals]	115,213	kg
Outputs		
Coal Crusher, 254,000 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

Gundlach 2009
 Gundlach Equipment Corporation. 2009. Gundlach Breakers. Gundlach Equipment Corporation. http://www.gundlachcrushers.com/PDF_download/BreakerBrochure.cfm (accessed December 18, 2009).

Section III: Document Control Information

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