





# NETL Life Cycle Inventory Data

## Process Documentation File

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### Section II: Process Description

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#### Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS\_Stage1\_C\_Line\_Pan\_2.5\_Tons\_2010.01.xls*, which provides additional details regarding relevant calculations, data quality, and reference.

#### Goal and Scope

The scope of this unit process encompasses the weight of materials necessary to construct a single 2.5-short-ton line pan, to be used during the longwall underground mining of coal. The process is based on the reference flow of 1 piece of line pan, as described below and shown in **Figure 1**. The line pan is assumed to be constructed entirely of steel plate; other materials are assumed to be negligible.

This process is used during Life Cycle (LC) Stage #1 to assist in the mining of Illinois No. 6 bituminous coal from an underground coal mine. It is combined with other longwall mining system equipment construction unit processes in an individual assembly unit processes for a longwall miner, *DS\_Stage1\_C\_Assembly\_Longwall\_Miner\_System\_2010.01.xls*. The assembly unit process quantifies the fraction of each piece of underground mining equipment, including the line pan described here, needed under LC Stage #1 to produce 1 kg of Illinois No. 6 bituminous coal ready for transport (LC Stage #2) to the energy conversion facility (LC Stage #3).

#### Boundary and Description

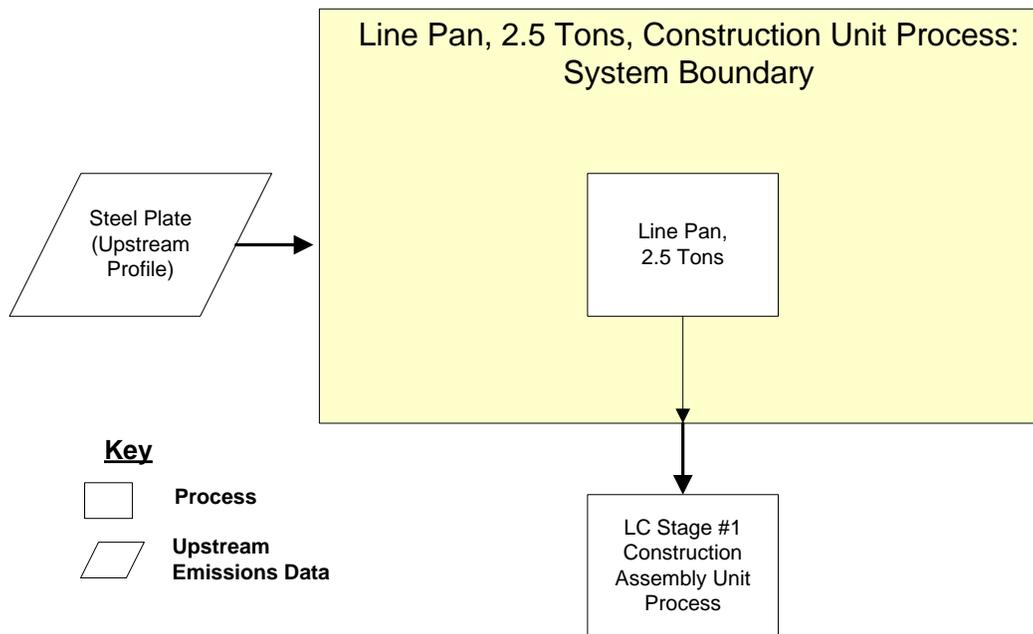
Construction of the line pan is based on communication with an equipment manufacturer for a Joy Mining line pan. The line pan carries loose coal from the mine face to a stage loader to be loaded onto a conveyor belt for removal to the surface.

**Figure 1** provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the line pan (e.g., that are emitted while putting together the components of a line pan, 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 line pan (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 line pan constructed in this unit process is incorporated into the longwall mining system assembly processes for LC Stage #1 for Illinois No. 6 bituminous coal.

The total weight of a line pan was readily available, but reliable data for the material breakdown of line pan subcomponents were not. Therefore, the line pan 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 line pan. The manufacturer gave a weight of approximately 2,268 kg (5,000 lbs) (Bruniany 2008). Based on the assumption that the line pan 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.

**Figure 1: Unit Process Scope and Boundary**



**Table 1: Properties of the 2.5-Ton Line Pan**

Total Weight of Single Line Pan	Weight	Reference
One Line Pan Weight, kg (lbs)	2,268 (5,000)	Bruniany 2008
Total Steel Plate in One Line Pan, kg (lbs)	2,268 (5,000)	NETL Engineering Judgment

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
<b>Inputs</b>		
Steel Plate, BF (85% Recovery Rate) [Metals]	2,267.9	kg
<b>Outputs</b>		
Line Pan, 2.5 Tons [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

Bruniany 2008

Bruniany, Cas. 2008. *E-mail Interview*. August 18, 2008.

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### Section III: Document Control Information

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Original/no revisions

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### Section IV: Disclaimer

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