

Appendix C. Surface Mining Greenhouse Gas Emissions Quantification

The following analysis is based upon greenhouse gas emissions data provided by the U.S. Environmental Protection Agency (EPA) official U.S. Inventory of Greenhouse Gas Emissions and Sinks ¹, as well as data provided by the U.S. Energy Information Administration (EIA) on greenhouse gas emissions ². Coal mining operations in the Appalachian region possess a twofold impact, both direct and indirect, on the environment due to greenhouse gas (GHG) emissions.

A direct impact is defined as any operation or function performed by the mining operation that is conducted on-site or by equipment that is operated at any time on-site that results in GHG emissions. An indirect impact is defined as any operation or function performed by the mining operation that is conducted off-site or by equipment off-site to assist in the transportation of the coal mined from the permitted site that results in GHG emissions.

The on-site mining operations as well as the transportation operations of the coal industry contribute to these environmental impacts, and thus must be quantified and included in decisions concerning environmental impact of this operation.

The following calculations will be used in the quantification of greenhouse gas emissions by Kopper Glo Mining, LLC Mining Company's Cooper Ridge Surface Mine 3270:

Direct Impacts:

Fuel Consumption Impacts ^{1,2}:

0.008887 metric tons CO₂ per gallon of gasoline consumed

0.01015 metric tons CO₂ per gallon of diesel consumed

Electricity Consumption Impacts ¹:

0.0000703 metric tons CO₂ per kWh electricity consumed

Deforestation Impacts ¹:

1.06 metric tons of CO₂ sequestration capability lost per acre disturbed per year

Indirect Impacts:

Transportation Impacts:

By Barge ³:

0.00001762 metric tons CO₂ per ton-mile

By Rail Train ³:

0.00002458 metric tons CO₂ per ton-mile

Utilizing the above reference calculations and materials, the following conclusion has been made concerning the environmental impact of greenhouse gas emissions by Cooper Ridge Surface Mine. The

mining operation will have a direct impact of 2,074.435 metric tons CO₂ due to fuel consumption annually, including both gasoline and diesel fuel consumption. The mining operation will have no direct impact from electricity consumption annually, as there is no wired electricity. The mining operation will have a direct impact of 500.532 metric tons CO₂ due to loss of sequestration capabilities due to deforestation annually. The mining operation will have an indirect impact of 4,423.729 metric tons CO₂ due to coal transportation by rail train annually.

The total direct impact of the mining operation annually is predicted to be 2,574.967 metric tons CO₂.

The total indirect impact of the mining operation annually is predicted to be 4,423.729 metric tons CO₂.

The total impact of the mining operation annually due to GHG emissions is predicted to be 6,998.696 metric tons CO₂.

The total direct impact of the mining operation for the life of the mine is predicted to be 23,689.6964 metric tons CO₂.

The total indirect impact of the mining operation for the life of the mine is predicted to be 40,698.305 metric tons CO₂.

The total impact of the mining operation for the life of the mine due to GHG emissions is predicted to be 64,388.001 metric tons CO₂.

*For a full breakdown of direct and indirect GHG emission sources by this mining operation and GHG emissions calculations please see the table below.

Taking into consideration that the EPA currently collects and maintains data pertaining to coal fired power plants and their related environmental impacts due to GHG emissions⁴, this analysis shall not include this impact as a quantifiable direct nor indirect impact by this mining operation. While coal fired power plants do generate a quantifiable impact, to include said impact in this analysis would result in a double calculation of environmental impact of GHG emissions by the coal industry as a whole. As reported by the EPA Facility Layout Information on Greenhouse Gases Tool (FLIGHT)⁴ in 2014, the state of Tennessee as a whole produced approximately fifty-three (53) million metric tons of CO₂ across all reporting industries. Based on the above calculations and predictions, this mining operation will produce less than 0.1% of the total reported CO₂ production of the state of Tennessee through direct and indirect impacts as defined above. This contribution to GHG emissions shall be minimal and controlled, placing no additional immediate threat to the environment.

References

¹ EPA GHG Equivalencies Calculator - Calculations and References. EPA. 2015.

<https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>

- ² U.S. Energy Information Administration. Diesel vs. Gasoline GHG Emissions Guidelines.
<https://nnsa.energy.gov/sites/default/files/nnsa/08-14-multiplefiles/DOE%202012.pdf>
- ³ American Commercial Barge Line. Safety and Sustainability. National Waterways Foundation. 2012.
<http://www.bargeacbl.com/site/safety-sustain/environmental-benefits-of-barging.html>
- ⁴ EPA Facility Layout Information on Greenhouse Gases Tool (FLIGHT). 2014.
<https://ghgdata.epa.gov/ghgp/main.do>

Permit #:	3270
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	Direct Impacts					Indirect Impacts			
	Avg. Gallons of Gasoline Used	Avg. Gallons of Diesel Used	Avg. Electric kWh Used	# of Acre Disturbed	# Years to Reveg	Avg. Tons of Coal Mined (to be combusted)	Tons of Coal Mined (to be combusted)	Transportation by Train	Transportation by Barge
Annual Uses/Reports	(Gallons)	(Gallons)		(Acres)	(Years)	(Tons per Year)	(Tons per Life of Permit)	(Miles)	(Miles)
	5000	200000	0	472.2	9.2	360,000	3,300,000.00	500	0

Annual	Total Gasoline Impact	Total Diesel Impact	Total Electric Impact	Total Loss from Tree Disturbed	Total Coal Combusted Impact	Transportation by Train	Transportation by Barge
(Metric tons CO2)	44.435	2030.000	0.000	500.532	632196.000	4423.729	0.000

Total Direct Annual Impact:	2574.967
Total Indirect Annual Impact:	4423.729
Total Annual Impact:	6998.696
(Metric tons CO2)	

Life of Permit	Total Gasoline Impact	Total Diesel Impact	Total Electric Impact	Total Loss from Tree Removal	Total Coal Combustion Impact	Transportation by Train	Transportation by Boat/Barge
(Metric tons CO2)	408.802	18676.00	0.000	4604.894	5795130.00	40698.305	0.000

Total Direct Life Impact:	23689.696
Total Indirect Life Impact:	40698.305
Total Life Impact:	64388.001
(Metric tons CO2)	