The coking cycle is typically 48 hours (about 2 days) for blast coke and 72 hours (about 3 days) for foundry coke. During the coking cycle, coal molecules are pyrolyzed and polymerized to create larger coke carbon crystalline structures. Pyrolysis products are released from the coal bed as volatile matter ("VM"). The VM is partially burned in the headspace, i.e., crown, of the oven above the coal bed. Partially combusted gases then pass into a sole flue system beneath the oven floor where essentially all of the combustion is completed. The flue gases then pass into a common tunnel where any remaining uncombusted volatile organics are oxidized and fully combusted.

In SunCoke's sole non-recovery plant (Jewell), the fully combusted flue gas is exhausted to the atmosphere through waste heat stacks on top of each battery of ovens. The waste heat stacks provide the natural draft to draw the VM and combustion air through the system. In SunCoke's heat recovery plants (Haverhill, Granite City, Middletown, and Indiana Harbor), the common tunnel system routes the flue gases from the coking process to heat recovery steam generators ("HRSGs") to recover heat for steam generation, which can be used as process steam or electricity that off-sets the use of fossil fuels. The HRSGs also cool the flue gases that go to downstream pollution control devices. Particulate matter ("PM"), sulfur dioxide ("SO^2"), mercury ("Hg"), acid gases, and other compounds are removed from the flue gases in a flue gas desulfurization ("FGD") system that consists of a spray dryer absorber ("SDA") with activated carbon injection, followed by a baghouse. Scrubbed flue gases are then emitted via induced draft fans through the main stack. The induced draft fans provide the draft that draws the gas through the entire system.

At the end of the coking cycle, after the coal has been converted to coke, the coke is pushed into a mobile hot car. At SunCoke's Jewell and Indiana Harbor plants, the hot car is a conventional open top design. At the remainder of SunCoke's plants (Haverhill, Granite City, and Middletown), the hot car is a flat push hot car design. The open top hot cars operate under a cokeside shed that captures pushing emissions. The flat push hot cars are equipped with a roof and multicyclone (also referred to as a multiclone) that captures pushing emissions. The cokeside sheds and multicyclones control HAP metals that are in the form of PM.[14]

The hot car travels on rails to convey the coke to the quench station. The open top hot cars are quenched directly inside the quench tower while a stationary quench ram transfers the coke loaf from the flat push hot cars to a quench car. Quenching is performed in a specially designed quench tower with baffles to control PM. Quenching emissions are also controlled by using water with total dissolved solids ("TDS") levels no greater than 1,100 milligrams per liter ("mg/L"). Acceptable quench makeup water is used (e.g., river water and retained stormwater runoff) to maintain the TDS level in the quench water at or below 1,100 mg/L. SunCoke's coke plants are a net user of water and do not discharge process waste waters.

Bypass vent stacks are normally closed. To safely maintain negative pressure in the coke ovens during an emergency (such as a severe storm with a major power outage) or during HRSG maintenance (typically 8 days per year) or FGD maintenance (typically 5 days per year), natural

[14] EPA-HQ-OAR-2002-0085-0873, EPA, Memorandum, *Technology Review for NESHAP for Coke Ovens: Pushing, Quenching, and Battery Stacks (40 CFR part 63, subpart CCCCC), and NESHAP for Coke Oven Batteries (40 CFR part 63, subpart L)*, at 5 (May 1, 2023).