west virginia department of environmental protection

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, West Virginia 25304-2345

v.

Order No.: CO-SIP-C-2017-9
Facility ID No. 03-54-009-00002

MOUNTAIN STATE CARBON, LLC
1851 Main Street
Follansbee, West Virginia 26037

Consent Order

This Consent Order (Order) is issued by the Director of the Division of Air Quality (Director), under the authority of West Virginia Code, Chapter 22, Article 5 , Section 1 *et seq.* to Mountain State Carbon, LLC (MSC), a wholly owned subsidiary of AK Steel Corporation.

I. Findings of Fact

In support of this Order, the Director, Division of Air Quality, hereby finds the following:

1. MSC owns and operates a coke facility that produces metallurgical-grade coke and coke gas byproducts (light oil, ammonium sulfate, fuel gas, coal tar, sulfuric acid) from coal. It is located at 1851 Main Street, Follansbee, West Virginia 26037 (Facility).

2. The Facility produces coke from metallurgical coal by heating the coal in specially-designed ovens in the absence of air. This process also produces coke oven gas (COG) as it heats up and transforms the metallurgical coal into coke. The COG produced in the oven rises to the top of the oven chamber then exits the oven and is transported by pipeline to the by-products plant where valuable products are extracted from the COG. The remaining COG is then used as fuel to heat the coke oven and produce steam in on-site boilers. Excess COG is sent to the excess COG Flare where it is combusted.
3. Metallurgical coal contains small concentrations of sulfur. The coking of coal produces hydrogen sulfide (H_2S). While many coke batteries do not employ any desulfurization control, MSC operates a desulfurization unit with an H_2S scrubber and acid plant that controls H_2S in the COG. The burning of the COG as fuel and in the excess COG Flare converts the remaining H_2S to sulfur dioxide (SO_2).
4. Periodic required maintenance of the desulfurization unit requires taking offline the H_2S scrubber and acid plant. Due to the nature of a coke battery, the coke battery cannot temporarily cease operation, thus continued operation is necessary during the desulfurization unit outage.
5. MSC identified all sources of stack and fugitive SO_2 at the Facility. The primary sources of SO_2 at the Facility are the following:

Primary Facility SO_2 Sources		
#1 Battery Combustion (P001-4)	Boiler 6 (P017)	Excess COG Flare (P024-1)
#2 Battery Combustion (P002-4)	Boiler 7 (P018)	# 1, 2, 3, Battery Pushing Baghouse (P001-5)
#3 Battery Combustion (P003-4)	Boiler 9 (S1)	#8 Battery Pushing Venturi Scrubber (P004-5)
#8 Battery Combustion (P004-4)	Boiler 10 (S5)	Acid Plant Tail Gas (P021-19)

6. The Excess COG flare stack operates in compliance with Section 8.1.6 of the Facility's existing Title V Permit to Operate that limits the COG rate to 7.1 MMSCF per day. Modeling demonstrations support that an Excess COG flare stack emissions rate of 139.8 pounds of SO_2 per hour (approximately 24 MMSCF of COG per day) will not compromise attainment with the NAAQS. MSC recognizes that an increase of COG to the flare from existing permitted levels will require a permit pursuant to 45 CSR § 13.

7. The Cross Creek Tax District, Brooke County, West Virginia, which includes the MSC facility, was designated by U.S. EPA as nonattainment for the 2010 primary SO_2 National Ambient Air Quality Standard (NAAQS). 78 Fed. Reg. 47191 (August 5, 2013). U.S. EPA based its determination on air quality monitoring data.

8. The nonattainment designation for the 2010 SO_2 NAAQS was based on data collected during the three calendar year period of 2009 through 2011. The design values for all monitors in the nonattainment area for calendar year periods of 2015 and 2016 are below 50 parts per billion (ppb) which is well below the NAAQS of 75 ppb.

9. Pursuant to Consent Decree, Civil Action No. 5:93-cv-195, filed January 30, 1996, and a source-specific SIP submission, 69 Fed. Reg. 24986 (May 5, 2004), as codified at 40 C.F.R. § 52.2520(d), the facility is authorized to conduct limited planned and unplanned maintenance on the plant's desulfurization system to ensure its performance and reliability. The events are commonly referred to as maintenance outages. It is technically infeasible to intermittently shutdown a coke battery for maintenance outages on the desulfurization system. Furthermore, the Consent Decree and source-specific SIP submission contemplate that the outage events occur during meteorologically desirable periods to ensure that ground level concentrations of SO_2 are minimized. Modeling demonstrations for outages with respect to the 1-hour standard indicate that meteorological periods can occur throughout the year and more likely to be found during the months of April and November.

II. Order for Compliance

Now, therefore, in accordance with Chapter 22, Article 5, Section 1 *et seq.* of the West Virginia Code, it is hereby agreed between the parties, and ORDERED by the Director:

1. COG Combustion Sources

   a. Except during maintenance outages as defined in Section II.4.a, SO_2 emissions from COG combustion sources shall not exceed the following limitations:

COG Combustion Sources	SO_2 in (lb/hr) as a daily average
#1 Battery (P001-4)	21.4
#2 Battery (P002-4)	21.4
#3 Battery (P003-4)	24.5
#8 Battery (P004-4)	115.4
Combined Boilers #6, #7, #9, #10 (P017, P018, S1, S5)	85.7

b. MSC shall monitor the quantity of COG combusted in each COG combustion source and shall record the daily total of COG combusted at each COG combustion source. MSC shall install, operate, and maintain a continuous monitoring system (CMS) for COG flow for each COG combustion source consistent with appropriate methodologies of 40 CFR Part 60, and in accordance with manufacturer's specifications. COG flow meters shall be calibrated upon initial installation following manufacturer's instructions, MSC shall follow the manufacturer's instructions and use good engineering judgement to repeat the calibration. With respect to operational performance of the CMS, compliance with this condition shall be satisfied when downtime (e.g., system breakdowns, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high-level calibration drift adjustments) is less than 5 percent of the total operating time for a calendar year.

c. Within 60 days of the effective date of this revised Order, MSC shall submit a COG CMS plan to the Department, which shall include at a minimum, the following:
    i. Description, and diagram, of the COG flow monitor site locations;
    ii. Monitoring component table, identifying each gas measuring component of the COG flow CMS, by manufacturer and model number;
    iii. Identification and description of major hardware and software components of the data acquisition and handling system (DAHS), including manufacturer, model number and version number of all software;
    iv. Readings for each flow monitoring device must be recorded at least once per hour during each 24-hour period during DAHS operation and once per day

during DAHS down time. The average COG flow rate must be computed from the individual readings.

v. A flow diagram denoting the complete information handling path from output signals of CMS components to final reports;

vi. Planned maintenance schedule;

vii. Referenced calibration procedures and schedule; and

viii. Example list of critical spare parts to be maintained on site.

d. MSC shall notify the DAQ of the replacement of any major components of the COG CMS or DAHS and update the COG CMS plan, within 60 days.

e. MSC shall continuously monitor the concentration of H_2S, in grains of H_2S per 100 cubic feet of COG and shall record the daily average H_2S concentration. The H_2S monitor system shall extract COG from the main COG distribution pipeline after the COG has been processed through the byproducts plant. MSC shall continuously operate and maintain a H_2S continuous emission monitor (CEM) subject to 40 CFR § 60 Appendix B, Performance Specification 7 and an annual relative accuracy testing audit (RATA) pursuant to the provisions of 40 CFR § 60, Appendix A, Method 15.

f. MSC shall calculate and record the pounds of SO_2 per hour as a daily average for each COG combustion source, based on the following equation:

$$\frac{Concentration\ H_2S\left[\frac{grains\ H2S}{100\ SCF\ COG}\right] \times COG\ Combusted\left[\frac{MMSCF\ COG}{Day}\right] \times 1.88\left[\frac{lbs\ SO_2}{lb\ H_2S}\right] \times 10{,}000\left[\frac{100\ SCF}{MMSCF}\right]}{24\left[\frac{hours}{day}\right] \times 7{,}000\left[\frac{grains}{lb}\right]} =$$

$$SO_2\ \left[\frac{lbs}{hr}\right], \text{ as a daily average}$$

Where,

- 1.88 is the stoichiometric conversion of H_2S to SO_2 at 100 % combustion, based on a molecular weight of 64 for SO_2 and 34 for H_2S
- 7,000 is the unit conversion of grains to pounds [lbs]
- MMSCF represents million cubic feet of gas at standard temperature and pressure

g. MSC shall operate and maintain a data acquisition and monitoring system for the collection and archival of sulfur emissions data collected by the H_2S and flow monitors on each COG combustion source.

2. Pushing Emissions Control Sources

a. SO_2 emissions from pushing emissions control sources shall not exceed the following limitations:

Pushing Emission Control Sources	SO_2 in (lb/hr)
#1, 2, 3 Batteries Total (P001-5)	10.48
#8 Battery (P004-5)	15.72

b. MSC will conduct a stack test for sulfur dioxide of the #8 Battery pushing emissions control (PEC) source by June 30, 2016. MSC will conduct a stack test for sulfur dioxide of the Nos. 1, 2, and/or 3 Batteries PEC source within 6 months of start-up of Nos. 1, 2, and/or 3 Batteries or by June 30, 2016 (whichever is later), utilizing 40 CFR § 60, Appendix A, Method 6 or equivalent. Thereafter, stack testing for each Battery PEC shall occur twice per Title V permit term.

c. MSC shall submit to the Director for approval a test protocol detailing the proposed test methods, the date, and the time the proposed testing is to take place, as well as identifying the sampling locations and other relevant information. The test protocol must be received by the Director no less than thirty (30) days prior to the date the testing is to take place. In addition, MSC shall notify the Director at least fifteen (15) days prior to any testing so the Director may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Director.

d. Test results shall be submitted to the Director no more than sixty (60) days after the date the testing takes place.

3. Acid Plant Tail Gas Scrubber

a. SO_2 emissions from the acid plant tail gas scrubber shall not exceed the following limitation:

Source	SO_2 in (lbs/hr)
Acid Plant Tail Gas Scrubber (P021-19)	6.0

b. MSC will conduct an initial stack test of the acid plant tail gas scrubber by June 30, 2016, utilizing 40 CFR § 60, Appendix A, Method 6 or equivalent. Thereafter, stack testing for the acid plant tail gas scrubber shall occur twice every five years. Upon incorporation of this Consent Order into the Facility Title V permit pursuant to Section II.7,stack testing for the acid plant tail gas scrubber shall occur twice per permit term.

c. MSC shall submit to the Director for approval a test protocol detailing the proposed test methods, the date, and the time the proposed testing is to take place, as well as identifying the sampling locations and other relevant information. The test protocol must be received by the Director no less than thirty (30) days prior to the date the testing is to take place. In addition, MSC shall notify the Director at least fifteen (15) days prior to any testing so the Director may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Director.

d. Test results shall be submitted to the Director no more than sixty (60) days after the date the testing takes place.

e. MSC shall monitor scrubber recirculation flow rate to ensure compliance with the emission limit in Section II.3.a.

f. The testing protocol in Section II.3.c shall include a procedure for establishing a minimum scrubber recirculation flow rate as a 24-hour average that demonstrates compliance with the emission limit in Section II.3.a.

g. For each calendar day, MSC shall maintain the scrubber recirculation flow rate as a 24-hour average at or above the minimum rate as established during the stack test.

h. For each calendar day that the Acid Plant Tail Gas Scrubber operates, MSC shall record the 24-hour average scrubber recirculation flow rate.

i. MSC may re-establish the minimum scrubber recirculation flow rate limit through subsequent stack tests.

j. The operational limitation required by Section II.3.g shall become effective no later than ninety days following completion of the initial stack test.

4. Maintenance Outages

a. MSC conducts outages necessary for the maintenance, repair and replacement of the COG H_2S scrubber, acid plant and associated ancillary equipment for continued desulfurization of the facility's COG. The following restrictions shall apply during the outages:

i. MSC shall be limited to a maximum of 20 days in any calendar year for planned maintenance outages of the desulfurization unit in the coke by-products recovery plant. No single scheduled outage period shall exceed 240 hours with a COG concentration in excess of 50 grains of H_2S/100 cubic feet. The start of a planned maintenance shall begin at the time of the first 3-hour block average that is greater than 50 grains of H_2S/100 cubic feet of COG. The planned maintenance shall be concluded at the time of the first 3-hour block average (following a maintenance start) that is less than or equal to 50 grains of H_2S/100 cubic feet of COG.

ii. MSC shall notify the Director in writing 30 days prior to undertaking any planned maintenance outage of the desulfurization unit. Such notice shall include, at a minimum, a detailed explanation of each and every maintenance and/or repair activity intended to be undertaken and a schedule for completion of each such activity, as well as evidence of compliance with the Sections II.4.iii and II.4.iv.

iii. MSC utilized air quality dispersion modeling to determine what periods represent the most favorable dispersion of excess SO_2 emissions to prevent to the greatest extent practicable any violation of the NAAQS for SO_2, and based

on such modeling, MSC shall conduct planned maintenance outages during the months of April and November.

iv. Prior to any planned maintenance outage of the desulfurization unit, MSC shall prepare and submit a SO_2 mitigation plan to the Director outlining what measures MSC will employ during the outage to ensure continued attainment of the NAAQS. This plan shall include the employment of reasonable controls and process measures to reduce SO_2 emissions from the Facility. These controls and measures include, but are not limited to, reduced coke production rates at the Coke Oven Batteries #1, #2, #3 and #8. During the outage, MSC shall operate at a coke production rate of no more than 63 ovens per day on # 8 Battery, or no more than a combined 51 ovens per day on #8 Battery and no more than 72 ovens per day total on the #1, #2, #3 Batteries.

v. No later than 30 days after completing a planned maintenance outage of the desulfurization unit, MSC shall submit a monitored impacts report identifying the monitored SO_2 impacts associated with the planned maintenance outage of the desulfurization unit. The monitored impacts report shall include any deviation of the SO_2 mitigation plan that was submitted for the respective outage period. Should all necessary monitoring data not be available within 15 days following the planned maintenance outage, the report shall be filed 15 days following receipt of the applicable monitoring data. Upon notice from WVDEP, if valid monitored SO_2 concentrations exceed 75 ppb as a one hour average (at the Mahan Lane, McKims Ridge, Marland Heights or Logan Street SO_2 monitors) on two (2) or more calendar days at a single monitor in a calendar year during a maintenance outage, MSC shall review the circumstances, investigate the cause(s) of the exceedance(s), and submit to the Director a NAAQS exceedance report. The NAAQS exceedance report shall identify the contributing factors of each monitored concentration over 75 ppb and, for each reasonably controllable factor, specify the appropriate reasonable controls and process measures to be taken during future outages to avoid a NAAQS violation. The NAAQS exceedance report shall be submitted within 60 days of

submission of the monitored impacts report, and include a commitment by MSC to implement any reasonable controls and process measures identified in the report during future outages.

vi. During the planned maintenance outage, MSC shall only use coal in the coke batteries with an average blended sulfur content of no greater than 1.25%. Compliance with the sulfur content limits will be supplier certification data or similar data.

vii. MSC shall be limited to a maximum of 3 days, or 72 hours, taken in any combination of hours or days in any calendar year, for unplanned maintenance outages of the desulfurization unit in the coke by-products recovery plant. For the purposes of counting hours, unplanned maintenance outages begin at the time of the first 3-hour block average that is greater than 50 grains of H_2S/100 cubic feet of COG, and conclude at the time of the first 3-hour block average (following a maintenance start) that is less than or equal to 50 grains of H2S/100 cubic feet of COG. During any unplanned maintenance outage, MSC shall employ the emissions control and mitigation measures described in Sections II.4.iv to the extent practicable under the circumstances. As soon as practicable, but no later than 24 hours after an unplanned outage has commenced, MSC shall notify the Director of such outage.

b. The requirements set forth in Section II.4 become effective on January 1, 2017.

c. The restrictions in this Section II.4 shall not apply if MSC conducts the maintenance outage without taking offline the H_2S scrubber in a circumstance where MSC employs equivalent redundant controls for desulfurization of the Facility's COG.

5. MSC shall maintain all records required by this Consent Order for a minimum of five years. All such records shall be located at the Facility and shall be available for WVDEP review.

6. MSC shall combine the #9 Boiler Stack and #10 Boiler Stack and divert the gas flow into the already combined #6 and #7 Boiler Stack (Combined Boiler Stack). MSC shall complete the engineering for the Combined Boiler Stack by April 1, 2016.

7. MSC shall complete the construction and commence operation of the Combined Boiler Stack by January 1, 2017.MSC shall physically disconnect the COG pipeline leading to the

Mingo Junction Energy Center located in Mingo Junction, Ohio, by January 1, 2017. The physical disconnection of the COG pipeline shall occur within the MSC plant boundary. MSC shall also not provide COG to any entity offsite of the MSC plant proper.

8. MSC shall submit quarterly reports to the Director by April 30th for the 1st quarter, by July 31st for the 2nd quarter, by October 31st for the 3rd quarter and by January 31st for the 4th quarter. The first quarterly report shall be submitted to the Director by April 30, 2017. These quarterly reports shall include the following:
   a. The pounds of SO_2 per hour as a daily average for each COG combustion source as required by Section II.1.d.
   b. The daily 24-hour average scrubber circulation flow rate as required by Section II.3.h.

III. Other Provisions

1. MSC hereby waives its right to appeal this Order under the provisions of Chapter 22, Article 5, Section 1 of the Code of West Virginia. Under this Order, MSC agrees to take all actions required by the terms and conditions of this Order and consents to and will not contest the Director's jurisdiction regarding this Order. However, MSC does not admit to any factual and legal determinations made by the Director and reserves all rights and defenses available regarding liability or responsibility in any proceedings regarding other than proceedings, administrative or civil, to enforce this Order.
2. The Director reserves the right to take further action if compliance with the terms and conditions of this Order does not adequately address the NAAQS nonattainment noted herein and reserves all rights and defenses which he or she may have pursuant to any legal authority, as well as the right to raise, as a basis for supporting such legal authority or defenses, facts other than those contained in the Findings of Fact.
3. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving MSC of the obligation to comply with any applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the terms and conditions of this Order may subject the MSC to additional penalties and injunctive relief in accordance with the applicable law.

4. The provisions of this Order are severable and should a court or board of competent jurisdiction declare any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.
5. This Order is binding on MSC, its successors and assigns.
6. This Order shall become effective immediately upon signing by both parties.
7. This Order supersedes and replaces CO-SIP-C-2015-14.

Mountain State Carbon, LLC

9/27/17

Name: Joseph C. Alter — Date

Title: Vice President-General Counsel and Corporate Secretary, AK Steel

West Virginia Department of Environmental Protection
Division of Air Quality

9-29-2017

Name: William F. Durham, Director — Date

Title: Director, Division of Air Quality