ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

November 21, 2022

SUBJECT:	Review of Application Title V Operating Permit U. S. Steel Clairton Works 400 State Street Clairton, PA 15025-1855
RE:	Operating Permit No. 0052-OP22 Metallurgical Coke and Coke By-Products
TO:	JoAnn Truchan, PE Section Chief, Engineering
FROM:	Hafeez Ajenifuja Air Quality Engineer

FACILITY DESCRIPTION:

U. S. Steel Mon Valley Works Clairton Plant is the largest by-products coke plant in North America. The Clairton Plant operates 10 coke batteries and produces approximately 13,000 tons of coke per day from the destructive distillation (carbonization) of more than 18,000 tons of coal. During the carbonization process, approximately 225 million cubic feet of coke oven gas are produced. The volatile products of coal contained in the coke oven gas are recovered in the by-products plant. In addition to the coke oven gas, daily production of these by-products include 145,000 gallons of crude coal tar, 55,000 gallons of light oil, 35 tons of elemental sulfur, and 50 tons of anhydrous ammonia

The Clairton Plant is located approximately 20 miles south of Pittsburgh on 392 acres along 3.3 miles of the west bank of the Monongahela River. The Plant was built by St Clair Steel Company in 1901 and bought by U.S. Steel in 1904. The first coke batteries were built in 1918. The coke produced is used in the blast furnace operations in the production of molten iron for steel making.

The Clairton Plant is a major source of CO, NO_X, PM, PM_{10}, $PM_{2.5}$, SO_2, VOCs, and Hazardous Air Pollutants (HAPs) as defined in Article XXI §2101.20

OPERATING PERMIT DESCRIPTION:

This is a Title V renewal permit for U. S. Steel Clairton Works located in Municipality of Clairton, Allegheny County.

The following changes were made during the Title V renewal:

1) The responsible official and facility's contact name was changed

2) Condition V.M.4.n (Coke by-product plant) was deleted because Koppers facility is no longer in operation.

3) Condition V.N (Wharf Crane Unloader) was deleted because the source has been removed from the facility.

4) Condition V.O (Coke Screening Station #3) was deleted because the screening station was demolished and replaced with No.4 Screening station, IP 0052-I013, issued on December 2, 2008.

5) The SO_2 SIP permit IP 0052-I017 requirements have been incorporated into the Title V operating permit

6) The C-Battery and the quench tower installation permit IP 0052-I011 issued on July 24, 2008, modified in February 15, 2018 and March 26, 2018 requirements have been incorporated into the Title V operating permit

7) IP 0052-I014 & I014a, issued on March 9, 2011 and amended on May 24, 2011 requirements for the new quench towers 5A for batteries 13-15 and 7A for batteries 19 and 20 have been incorporated into the Title V.

8) IP 0052-I016 (for truck light oil loading - P044b) issued on August 2, 2017 requirements have been incorporated into the permit

9) RACT IP 0052-20a issued on April 20, 2020, modified on December 7, 2020, and December 11, 2020 requirements have been incorporated into the permit.

Emission Unit Identification

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
P001	Coke Battery No. 1	Pushing Emission Control (PEC) Baghouse (P050 - Serves Batteries 1, 2 & 3)	517,935 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S001
P002	Coke Battery No. 2	PEC Baghouse (P050 - Serves Batteries 1, 2 & 3)	517,935 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S002
P003	Coke Battery No. 3	PEC Baghouse (P050 - Serves Batteries 1, 2 & 3)	517,935 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S003
P007	Coke Battery No. 13	PEC Baghouse (P052 - Serves Batteries 13, 14 & 15)	545,675 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S007
P008	Coke Battery No. 14	PEC Baghouse (P052 - Serves Batteries 13, 14 & 15)	545,675 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S008
P009	Coke Battery No. 15	PEC Baghouse (P052 - Serves Batteries 13, 14 & 15)	545,675 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S009
P010	Coke Battery No. 19	PEC Baghouse (P053 - Serves Batteries 19 & 20)	1,002,290 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S010
P011	Coke Battery No. 20	PEC Baghouse (P053 - Serves Batteries 19 & 20)	1,002,290 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S011
P012	Coke Battery B	PEC Baghouse (P054)	1,491,025 tons of coal charged per year	Coal, recycled coke plant materials, and bulk density control additives	S012

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
P046	Coke Battery C	PROven® system Pushing Emission Control System Baghouse	1,379,059 tons of coal charged per year	Coal, supplemented with recycled coke plant materials such as tar decanter sludge, bio sludge, and coke oven gas pipeline material, synfuel, metallurgical coke, petroleum coke, coke breeze, synfuel additive, and bulk density control additives; Coke Oven Gas	S046 (Combustion Stack) S047 (PEC Baghouse Stack
P013	Quench Tower No. 1 (Serves Batteries 1, 2 and 3)	Baffles	1,553,805 tons of coal per year	Incandescent coke and water	NA
P051	Quench Tower No. 5A (Serves Batteries 13, 14 & 15)	Baffles	1,637,025 tons of coal per year	Incandescent coke and water	NA
P015	Quench Tower No. 5 (Alternate/Backup-Serves Batteries 13, 14 & 15)	Baffles	1,637,025 tons of coal per year	Incandescent coke and water	NA
P052	Quench Tower No. 7A (Serves Batteries 19 & 20)	Baffles	2,004,580 tons of coal per year	Incandescent coke and water	NA
P016	Quench Tower No. 7 (Alternate/Backup-Serves Batteries 19 & 20)	Baffles	2,004,580 tons of coal per year	Incandescent coke and water	NA
P017	Quench Tower B (Serves Battery B)	Baffles	1,491,025 tons of coal per year	Incandescent coke and water	NA
P047	Quench Tower C (Serves Battery C)	Baffles	1,107,384 tons of coke per year	Incandescent coke and water	NA
P019	Desulfurization Plant	Afterburner	6,394,800 tons of coke per year	Coke oven tail gas	S023
P020	Keystone Cooling Tower	Mist Eliminators	39,420,000,000 gallons of water cooled per year	Heated non-contact cooling water	NA

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
P021	Coke By-Product Recovery Plant	Gas Blanketing	8,240,605 tons of coal charged per year	Raw coke oven gas	
P022	Continuous Barge Unloader No. 1	NA	4,598,635 tons of coal per year	Coal	NA
P023	Continuous Barge Unloader No. 2	NA	3,641,605 tons of coal per year	Coal	NA
P024	Pedestal Crane Unloader	NA	2,792,250 tons of coal per year	Coal	NA
P025	Clam Shell Unloader	NA	2,978,400 tons of coal per year	Coal	NA
P026	Coal Transfer	Dust Suppressant	8,240,605 tons of coal per year	Coal	NA
P027	No.1 Primary Pulverizer	NA	4,598,635 tons of coal per year	Coal	NA
P028	No. 1 Secondary Pulverizer	NA	4,598,635 tons of coal per year	Coal	NA
P029	No. 2 Primary Pulverizer	NA	3,641,605 tons of coal per year	Coal	NA
P030	No. 2 Secondary Pulverizer	NA	3,641,605 tons of coal per year	Coal	NA
P031	Surge Bins and Bunkers	NA	8,240,605 tons of coal per year	Coal	NA
P032	Coke Transfer	NA	3,568,240 tons of coke per year	Coke	NA
P033	Coke Transfer	NA	2,825,830 tons of coke per year	Coke	NA
P034	Coke Screening Station No. 1 (Batteries 1-3)	NA	2,411,190 tons of coke per year	Coke	NA
P035	Coke Screening Station No. 2 (Batteries 13-15, 19 and 20)	NA	2,825,830 tons of coke per year	Coke	NA
P041	Boom Conveyor (coal pile destocking)	NA	5,584,500 tons of coal per year	Coal	NA
P042	Coal and Coke Recycle Screening	NA	262,800 tons of coal and coke per year	Coal and Metallurgical Coke	NA
P043	Coke Screening-Peters Creek	NA	3,066,000 tons of coke per year	Metallurgical Coke	NA
P044 a	Light Oil Barge Loading	Vapor Recovery to Boiler	55,000,000 gallons per year	Light Oil, Tar, and Tar Distillates	NA
P044 b	Light Oil Truck Loading	Vapor Recovery/Balancing System	49,315 gal/ day	Light Oil	NA
P044 d	Coal Crude Tar Truck/Rail Loading	NA	130,000-gal average/ day	Coal Crude Tar	NA

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
P045	Regenerator Stone Cleaning	NA	7,700 tons of stone per year	Regenerator Stones	NA
B001	Boiler No. 1 (Babcock & Wilcox)	NA	760 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B002	Boiler No. 2 (Combustion Engineering)	NA	481 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B005	R1 Boiler (Riley Stoker)	NA	229 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B006	R2 Boiler (Riley Stoker)	NA	229 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B007	T1 Boiler (Erie City Zurn)	NA	156 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B008	T2 Boiler (Erie City Zurn)	NA	156 MMBtu/hour	Coke Oven Gas and Natural Gas	NA
B010	Ammonia Flare	NA	12.5 MMBtu/hour	Propane (assist gas)	NA
E001	Coal Storage Piles	NA	164,000 tons of coal (Normal Inventory)	Coal	NA
E002	Coke Storage Pile - Peters Creek	NA	60,000 tons of coal (Normal Inventory)	Coke	NA
E003	Coke Storage Pile – South Yard	NA	20,000 tons of coal (Normal Inventory)	Coke	NA
F001	Fugitive Emissions (Plant Roadways)	Road Dust Control Program	Paved roads = 7.8413 miles Unpaved roads = 1.1742 miles	NA	NA
G001	Misc. Fugitive Emissions (Abrasive blasting of coke oven doors)	NA	Approximately 18 coke oven doors per week	Black Beauty Abrasive Material	NA

Process flow diagrams for the sources listed in Table 1-1 are contained in Section II of the Title V Operating Permit.

1.0 PROCESS DESCRIPTIONS:

The emission sources listed in Table 1-1 can be divided into four general categories:

- Coke oven batteries and related equipment
- Coke By-Products and Desulfurization Plant
- Coal and coke handling facilities
- Miscellaneous facilities

1.1 Coke Oven Batteries and Related Equipment

The Clairton Works currently operates 10 by-product coke oven batteries. By-product coke ovens are designed and operated to permit collection of the volatile material evolved from coal during the coking process. Each battery contains from 64 to 87 ovens. Coal is charged through opening in the top of the ovens and during the coking cycle, refractory-lined doors seal both ends of each oven. Combustion chambers on each side of the coking chamber (oven) consist of a large number of flues which permit uniform heating of the entire length of the coking chamber. To permit escape of the volatile matter driven from the coal during coking, an opening is provided at the top of the oven at both ends of the coking chamber. Each opening is fitted with an offtake pipe, which connects the oven with the gas collecting main. The coking cycle normally takes between 16 to 18 hours. After the coking cycle is completed, a pusher ram pushes the incandescent coke into a quench car. The quench car is moved to the quench tower where a stationary array of water spays cool the incandescent coke. The quenched coke is then dumped on the coke wharf.
Pollutant emissions from the coke batteries are controlled by pollution control equipment, and maintenance and other work practices that minimize fugitive emissions. These work practices and/or emission control practices include:

1.1.1 Coal Charging - Charging emissions that escape during coal charging are controlled by:

a. Volumetric controls to ensure the proper amount of coal is charged to the oven (extra coal would block gas passages);

b. Stage charging, wherein not all of a Larry car's hoppers are emptied at once so the exhaust system is not overwhelmed; (Larry cars receive coal from coal storage bins and are equipped with two hoppers that discharge a measured volume of coal to the oven. They move along rails on top of the battery.)

c. Use of steam aspirators in the battery offtakes to create exhaust suction to draw emissions into the collecting main;

d. Automatic lid lifters on newer batteries to minimize the time that lids remain open; and

e. After charging is completed, the charging holes are lidded and sealed, and steam aspirators are turned off.

1.1.2 Coking Process

Once the ovens have been charged with coal, the coking process begins. The walls of the ovens contain heating flues, of which half burn COG and the other half transport the residual heat from the combustion flues to a heat exchanger called a regenerator. The waste gases coming out of the heat exchanger are discharged from the combustion stack. The destructive distillation of coal produces raw coke oven gas, which is cleaned and used as a fuel in the heating flues. To prevent the entry of air into the oven during coking, a slight positive pressure is maintained in the oven. The by-products of coking (gases) are carried through the offtake system to the collector main and then to the by-product recovery plant. Any volatiles contained in the bulk density additives or other recycled coke plant materials are also carried to the byproducts plant. At the conclusion of the coking cycle, the doors are removed, and the incandescent coke is pushed by a ram into the hot car. Atmospheric emissions during coking result from fugitive emissions (charging, offtake, door and lid leaks) and from the combustion stack.

1.1.3 Coke Pushing

Coke pushing for batteries 1-3 and 19 begins when the coke side oven door is removed; for batteries 13-15, 20, B and C, pushing begins when the coke mass begins to move and ends when the hot car enters the quench tower. During the push for batteries 1-3, 13-15, 19-20 and C, gases are drawn from the hot car into the hood where they are channeled to the exhaust duct and then to a baghouse.

There are two types of pushing emission control (PEC) systems installed at the Clairton Works. A coke-side shed is installed on the coke-side of Battery B. The shed consists of two parts: the main shed and the secondary shed. The main shed covers all the ovens on the coke-side of the battery and is provided with blowers and a baghouse for collecting particulates emitted during pushing. The secondary shed covers the area of hot car travel from the end of the main shed to the quench tower. The main evacuation system is in operation at all times so that fugitive emissions from coke-side door leaks as well as emissions generated during the coke pushing operation are captured by the baghouse.

Batteries 1-3, 13-15, 19, 20 and C use a moveable hood/fixed duct system that consists of a hood that covers the quench car and mates with an enclosed guide. The hood connects to a duct which in turn is connected to a baghouse. During the push, gases are drawn from the coke guide and quench car into the hood where they are channeled to the exhaust duct. There are separate baghouses for each battery group (batteries 1-3, 13-15, and 19-20, & C).

1.1.4 Travel

After receiving the hot coke, the hot car travels to the quench tower. During travel the hot car is uncovered. Emissions to the atmosphere consist mainly of particulate released as part of the hot air rising from the coke in the car. Smaller amounts of SO_2, NO_X, CO and other pollutants are also released.

1.1.5 Quench Tower

Incandescent coke, after it is pushed from the ovens, is transported by means of a quench car or hot car to a quench tower. Quenching of coke minimizes it from burning due to further exposure to air.

1.1.6 Other Fugitive Emissions

Routine inspection and maintenance programs conducted by the Clairton Works result in minimizing fugitive emissions from the batteries and emissions from the combustion stacks.

1.2 Coke By-Products and Desulfurization Plant:

1.2.1 By-Products Plant

During the coking process, approximately 225 million cubic feet of raw coke oven gas are produced each day. The gases evolved leave the oven through standpipes, pass into goosenecks, and then into the gas collection main. The axi compressors are used to move the coke oven gases which are composed of water vapor, tar, light oils (primarily benzene, toluene and xylene), heavy hydrocarbons, and other chemical compounds. The raw COG exiting the ovens is shock cooled by spraying recycled flushing liquor in the gooseneck. This spray cools the gas and precipitates tar, condenses various vapors, and serves as the carry medium for the condensed compounds. Additional cooling of the gas in the final coolers precipitates most of the remaining tar. After leaving the final coolers, the gas carries approximately three-fourths of the ammonia and 95 percent of the light oil originally present in the raw coke oven gas. This gas enters the PhosAm Absorber where the ammonia is removed, and further processing produces anhydrous ammonia. The remaining stream which contains light oil and other compounds is further processed to produce a light oil product. The daily production of these by-products includes approximately 145,000 gallons of crude coal tar, 55,000 gallons of light oil, 50 tons of anhydrous ammonia and 35 tons of elemental sulfur (produced in the desulfurization plant). Emissions of volatile organics from storage tanks and other equipment in the by-products plant are controlled by a gas blanketing system. The carrier gas in the blanketing system is clean coke oven gas (COG). Storage tank atmospheric vents and other equipment are connected to this blanketing system where the collected organic vapors are mixed with the coke oven gas. This coke oven gas is used as fuel for boilers, furnaces and other fuel burning equipment at the Clairton Works and the Irvin and Edgar Thomson Plants.

1.2.2 Desulfurization Plant

After the volatile products in the COG are removed, the COG is processed in the desulfurization plant to remove hydrogen sulfide (H_2S) and other sulfur compounds. There are two Claus Plants in the desulfurization plant, a primary plant and a backup in the event the primary Claus Plant is out of service. The Claus Plant converts the H_2S and other sulfur compounds in the COG to elemental sulfur. The elemental sulfur is sold. The Shell Claus Offgas Treatment (SCOT) Plant separates the gas from the Claus Plant into a concentrated hydrogen sulfide stream and acid offgas. The concentrated hydrogen sulfide stream is sent back to the Claus Plant for further sulfur removal and recovery. The acid offgas is incinerated by the SCOT Plant incinerator. The concentration of H_2S in the COG is normally reduced to approximately 10 grains per 100 dry standard cubic feet (dscf) of COG or approximately 0.045 percent sulfur, the most stringent limit in Article XXI, §2105.21.h.

1.3 Coal and Coke Handling Facilities

Coal is delivered to the plant in barges. Continuous barge unloaders remove the coal from the barge and conveyors transport the coal to the coal surge and blending bins. The blended coal is then transferred to the primary and secondary coal pulverizers and then to coal storage bunkers. From the bunkers, the pulverized coal is loaded onto Larry cars and then charged to the batteries.

After being quenched with water, coke is discharged onto an inclined surface called the coke wharf which allows for the drainage of excess water. The heat transfer during this time also brings the coke to a lower temperature making it safe to handle. Quenched coke is transferred from the coke wharf to one of three screening stations. Screening Station No. 1 (P034) receives coke from Batteries 1-3, Screening Station No. 2 (P035) receives coke from Batteries 13-15 and 19 & 20, and Screening Station No. 4 receives coke from Batteries B & C. Screening Station No. 4 is equipped with a baghouse to control particulate emissions from the screening operation. The screened coke is then transferred to rail cars for shipment or to coke storage areas.

1.4 Miscellaneous Facilities

1.4.1 Ammonia Flare (B010)

Atmospheric vents from three wastewater treatment surge tanks are connected to the ammonia flare to destroy volatile organic emissions from these vents. The flare also destroys the ammonia fumes that are generated during the loading of anhydrous ammonia into tank trucks.

1.4.2 Light Oil Loading Station

Light oil is loaded approximately once a week into 400,000-gallon river transport barges. Light oil is pumped from the light oil storage tanks into the barge at a rate of 1,200 gpm. The vapors that are displaced by the light oil in the barge are removed by use of an eductor. The gas used to drive the eductor is 100 psig natural gas. The vapors from the barge combined with the natural gas are then routed to the downriver gas system.

1.4.3 Boilers (B001, B002, and B005-B008)

These boilers produce process steam for various facilities at the coke plant. Desulfurized coke oven gas is the primary fuel used in these boilers; however, they are also equipped to fire natural gas or a combination of coke oven gas and natural gas.

2.0 MAXIMUM POTENTIAL EMISSIONS:

The discussion below provides information on how the emission limits in the permit were derived.

2.1 Coke Battery Combustion Stack Emissions

Emissions from the combustion stacks are due to the combustion of desulfurized coke oven gas (COG) and the leakage of raw COG from the oven into the heating flues and natural gas.
NOx, CO & VOC emissions are based on emissions factor from November 3, 2015 stack test, firing coke oven gas and natural gas emission is based on AP-42. Table 1.4-2.

Emissions from each of the combustion stack firing coke oven gas and natural gas are shown in the Tables below. The VOC emissions are based on the highest emissions rate between coke oven gas and natural gas.

Coke Batteries 1-3 Combustion Stack Emissions

Battery No. 1 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)**	Supplementary 24-hr Limi (lb/hr)[1]	Annual** Emission Limit (tons/year)[1]
PM	0.030 gr/dscf	0.030 gr/dscf	14.47		63.38
PM_{10}			14.47		63.38
$PM_{2.5}$			14.47		63.38
$PM_{Condensable}$	7.67	5.7	3.46		15.17
NO_X	192.56	140	76.81		336.44
CO	8.78	84	40.94		179.33
VOC	1.11	5.5	2.17		9.50
SO_X***			10.41	13.27	45.60

[1]A year is defined as any consecutive 12-month period.
**NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
**COG NO_X, CO, VOC & PM (condensable) Emission factors for the underfiring stack were based on the November 3, 2015 stack test
**TSP emission is based on Article XXI, §2105.21
**NG emission factors are based on AP-42. Table 1.4-2.
***SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.

Battery No. 2 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limi (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.030 gr/dscf	0.030 gr/dscf	14.75		64.61
PM_{10}			14.75		64.61
$PM_{2.5}$			14.75		64.61
$PM_{Condensable}$	11.65	5.7	4.64		20.34
NO_X	164.10	140	68.39		299.54
CO	7.86	84	40.67		178.14
VOC	0.79	5.5	2.08		9.09
SO_X***			9.15	11.66	40.08

[1] A year is defined as any consecutive 12-month period.

*NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization

**COG NO_X, CO, VOC & PM (condensable) Emission factors for the underfiring stack were based on the November 3, 2015 stack test.

**TSP emission is based on Article XXI, §2105.21

**NG emission factors are based on AP-42, Table 1.4-2.

***SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.

*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.

Battery No. 3 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limit (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.030 gr/dscf	0.030 gr/dscf	14.75		64.61
PM_{10}			14.75		64.61
$PM_{2.5}$			14.75		64.61
$PM_{Condensable}$	5.35	5.7	2.78		12.17
NO_X	173.44	140	71.15		311.64
CO	8.53	84	40.87		179.02
VOC	0.34	5.5	1.99		8.72
SO_X***			10.57	13.47	46.30

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization
**COG NO_X, CO, VOC Emission factors for the underfiring stack were based on the October 19, 2012 stack test.
**TSP emission is based on Article XXI, §2105.21
**PM (condensable) emission factor was based on September 17-18, 2014
**NG emission factors are based on AP-42, Table 1.4-2.
*** SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Coke Batteries 13-15 Combustion Stack Emissions

Battery No. 13 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limit (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.015 gr/dscf	0.015 gr/dscf	8.33		36.50
PM_{10}			8.33		36.50
$PM_{2.5}$			8.33		36.50
$PM_{Condensable}$	6.34	5.7	2.97		13.0
NO_X	124.13	140	54.04		236.71
CO	50.60	84	38.38		168.08
VOC	0.56	5.5	1.80		7.86
SO_X***			13.93	15.70	61.03

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
**COG NO_X, CO, and VOC Emission factors for the underfiring stack were based on the April 27, 2012 stack test.
**TSP emission is based on Article XXI, §2105.21
**PM (condensable) emission factor was based on October 16-17, 2014 stack test.
**NG emission factors are based on AP-42, Table 1.4-2.
*** SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Battery No. 14 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limit (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.015 gr/dscf	0.015 gr/dscf	8.33		36.50
PM_{10}			8.33		36.50
$PM_{2.5}$			8.33		36.50
$PM\text{-}_{Condensable}$	3.87	5.7	2.20		9.64
NO_X	101.90	140	47.13		206.43
CO	72.84	84	45.29		198.38
VOC	0.51	5.5	1.78		7.80
SO_X***			14.03	15.80	61.45

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
**COG NO_X, CO, and VOC Emission factors for the underfiring stack was based on the April 27, 2012 stack test.
**TSP emission is based on Article XXI, §2105.21
**PM (condensable) emission factor was based on October 14-15, 2014 stack test.
**NG emission factors are based on AP-42, Table 1.4-2.
*** SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Battery No. 15 Combustion Stack

Pollutant	**Emission Factors Lb/mmcf COG**	**Emission Factors Lb/mmcf NG**	**Hourly Emission Limit (lb/hr)***	**Supplementary 24-hr Limit (lb/hr)*****	**Annual* Emission Limit (tons/year)[1]**
PM	0.015 gr/dscf	0.015 gr/dscf	8.33		36.50
PM_{10}			8.33		36.50
$PM_{2.5}$			8.33		36.50
$PM_{Condensable}$	3.86	5.7	2.20		9.62
NO_X	138.59	140	58.54		256.41
CO	7.24	84	24.94		109.26
VOC	0.23	5.5	1.69		7.42
SO_X***			18.67	21.04	81.77

[1]A year is defined as any consecutive 12-month period.

*NO_X, CO, and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.

**COG V, CO, and VOC Emission factors for the underfiring stack was based on the October 23-24, 2012 stack test.

**TSP emission is based on Article XXI, §2105.21

**PM (condensable) emission factor was based on September 12, 15-16, 2014 stack test

**NG emission factors are based on AP-42, Table 1.4-2.

*** SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.

*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Emission Limitations for Batteries No. 19 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limit (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.030 gr/dscf	0.030 gr/dscf	25.2		110.2
PM_{10}			25.2		110.2
$PM_{2.5}$			25.2		110.2
$PM\text{-}_{Condensable}$	5.13	5.7	4.57		20.02
NO_X	429.65	140	272.97		1195.62
CO	78.83	84	135.87		595.13
VOC	2.28	5.5	3.83		16.76
SO_X***			29.37	33.09	128.64

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
*COG NO_X, CO, and VOC Emission factors for the underfiring stack were based on the October 16, 2012 stack test.
**TSP emission is based on Article XXI, §2105.21
**PM (condensable) emission factor was based on September 9-10, 2014 stack test
**NG emission factors are based on AP-42, Table 1.4-2.
*** SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Emission Limitations for Battery 20 Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly Emission Limit (lb/hr)*	Supplementary 24-hr Limit (lb/hr)***	Annual* Emission Limit (tons/year)[1]
PM	0.015 gr/dscf	0.015 gr/dscf	13.4		58.5
PM_{10}			13.4		58.5
$PM_{2.5}$			13.4		58.5
PM-$_{\textbf{Condensable}}$	5.13	5.7	4.57		20.02
NO_X	429.65	140	272.97		1195.62
CO	78.83	84	135.87		595.13
VOC	2.28	5.5	3.83		16.76
SO_X***			27.00	30.42	118.26

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
*COG NO_X, CO, and VOC Emission factors for the underfiring stack were based on the October 16, 2012 stack test.
**TSP emission is based on Article XXI, §2105.21
** PM_{10}= 88.4% of TSP: R.J. Lee Group 1990 and Stack Testing specific to Clairton Plant 2006 Particle Size Data.
** $PM_{2.5}$= 83.7% of TSP: R.J. Lee Group 1990 and Stack Testing specific to Clairton Plant 2006 Particle Size Data.
**PM (condensable) emission factor was based on September 11, 2014 stack test
**NG emission factors are based on AP-42, Table 1.4-2.
***SO_X lb/hr limits is based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
*** SO_X tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017

Battery B Combustion Stack

Pollutant	Emission Factors Lb/mmcf COG	Emission Factors Lb/mmcf NG	Hourly** Emission Limit (lb/hr)*	Supplementary 24-hr Emission Limit*** (lb/hr)	Annual* Emission Limit** (tons/year)[1]
PM	0.015 gr/dscf	0.015 gr/dscf	12.40		54.33
PM_{10}			12.40		54.33
$PM_{2.5}$			12.40		54.33
$PM_{Condensable}$	4.70	5.7	6.41		28.07
NO_X	149.70	140	175.56		768.94
CO	42.57	84	219.21		961.47
SO_X			21.38***	27.26	93.64****
VOC	0.74	5.5	3.77		16.51

[1]A year is defined as any consecutive 12-month period.
*NO_X, CO and VOC emissions include combustion stack, soaking, charging, door leaks, lid leaks, offtake leaks, decarbonization.
**COG NO_X, Emission factors for the underfiring stack was based on CEM data.
**COG CO and VOC Emission factors for the underfiring stack was based on the November 6, 2015 stack test.
**TSP emission is based on Article XXI, §2105.21
**PM (condensable) emission factor was based on November 6, 2015 stack test
**NG emission factors are based on AP-42, Table 1.4-2.
***Limits are based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
****Tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State.

Battery C Combustion Stack Emissions

Pollutant	Hourly Emission Limit (lb/hr)	Supplementary 24-hr Emission Limit (lb/hr)	Annual Emission Limit (tons/year)[1]
Particulate Matter	17.6		77.0
PM_{10}	17.2		75.4
$PM_{2.5}$	17.0		74.5
Nitrogen Oxide	139.22		609.80
Carbon Monoxide	100.22		438.98
Sulfur Dioxide	32.03*	40.83	140.29**
Volatile Organic Compounds	12.31		54.0
Total Reduced Sulfur	2.0		8.80
Benzene	1.0		4.38
HCl	5.0		22.0
Napthalene	0.11		0.50

[1]A year is defined as any 12 consecutive months.
C-Battery emissions are based on IP 0052-I011b.
**Limits are based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
**Tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State.

Coke Batteries Combustion Stacks Information

Batteries #	Coal Charged		COG Throughput		Flow Rate*
	Coal Charge	Tons/yr	MMcf/hr	Mmcf/yr	Dscfm
1-3	59.13	517,935	0.296	2,592.960	56,280
13-15	62.29	545,675	0.311	2,724.360	64,800
19	114.42	1,002,290	0.572	5,010.720	97,800
20	114.42	1,002,291	0.572	5.010.720	102,960
B	170.21	1,491,025	0.851	7,454.760	96,480
C	157.43	1,379,059	0.95	8,322.000	102,491

Coal charged and coke oven gas throughputs, and stack exhaust conditions are from the Title V Application
*Exhaust gas flow rates are based on stack test performed from 3/17/1998 to 7/26/2011. Because of the variability in stack test results, exhaust gas flow rates (dscfm) were increased by 20%.
C Battery flow is based on IP 11a emissions spreadsheet.

PM Emission Factors for the Battery Combustion Stack:

Pollutants	Emissions Factors					
	Battery 1-3	Batteries 13-15	Battery 19	Battery 20	Battery B	Battery C
	Emission Factor gr/dscf	Emission Factor gr/dscf	Emission Factor gr/dscf	Emission Factor gr/dscf	Emission Factor gr/dscf	Emission Factor gr/dscf
[1]PM/PM_{10}	0.030	0.015	0.030	0.015	0.015	0.10

[1]PM emission factors from allowable emissions per §2105.21.f. Exhaust gas volume flow rates are the maximum rate measured for each battery group plus 10% and rounded up.

Sample Calculation for combustion stack

PM emission = (0.030 gr/dscf) × (56,280 dscf/min) × (lb/7,000 gr) × (60 min/hr)

= **14.47 lbs/hr**

= (14.47 lb/hr) × (8,760 hr/yr) × (tons/2,000lb) = **64.61 ton/yr**

NOTE: The test flow rate is 46,900 dscf, and it was increase by 20%

2.2 Coke Battery Fugitive Emissions

Fugitive emissions from pushing operations occur when the pushing emission control (PEC) hood system is out of service due to routine maintenance or a breakdown and the emissions that are generated when the coke side door is removed, and the coke is pushed. Fugitive emissions also occur when the PEC hood does not capture all the emissions that are generated during the pushing cycle.

The emission limitations contained in federal and ACHD regulations were used to estimate maximum potential fugitive emissions from the 9 coke batteries at the Clairton Works. These maximum potential emissions are listed in Table 2-1.

Coke Battery Fugitive Emission Limitations

Coke Oven Batteries	Emission Limitation				
	40 CFR 63.304(b)(2) & (4)				§2105.21.a.1
	Charging Visible Emissions (V.E.) (seconds/charge)	Door Leaks (%)	Lid Leaks (%)	Offtake Leaks (%)	Charging V.E. (second/5-charges)*
1-3	12	3.8	0.4	2.5	55
13, 14 & 15	12	3.8	0.4	2.5	55
19 & 20	12	3.8	0.4	2.5	55
B	12	4.3	0.4	2.5	55
C	12	2		1.5	-

*A total of 55 seconds of visible emissions for 5 consecutive charges.

The above limitations in §63.304(b)(2) were used to estimate the Benzene Soluble Organic (BSO) emission rate according to the procedures in AP-42, Draft Section 12.2 (July 2001), Table 12.2-2, Footnote h. Table 2-2 below lists the information required to calculate the BSO emissions rate for each coke battery.

Table 2-2
Coke Battery Statistics

Coke Oven Batteries	Statistics per Battery				
	Ovens/battery (each)	Charges/day	No. of Doors	No. of Lids	No. of Offtakes
1-3	64	89	128	256	128
13, 14 & 15	61	90	122	244	122
19 & 20	87	129	174	348	174
B	75	109	150	300	150
C	84	109	168	336	168

BSO emission rates were calculated as follows (AP-42, Table 12.2-2, and Footnote h):

Example Calculations for Battery No. 1

- **BSO Emission Rate for Charging**

BSO = (Avg. No. of oven/battery) × (seconds of visible emissions/10) × (0.0042) × 2.205lb/kg
= (64/17.26) × (4.46 seconds/10) × 0.0042 × 2.205
= 0.0153 lbs/hr

Therefore, fugitive CO emission =

(0.0153 lbs/hr) × 1.1 (CO Ration to BSO, Table 2-3 below) = **0.0168 lbs/hr**, or

(0.0168 lbs/hr) × 8760/2000 = **0.074 tpy**

- **BSO Emission Rate for Door Leaks***

BSO = (Avg. No. of doors visibly leaking (yard) × 0.019 + (Avg. No. of doors visibly leaking (bench) × 0.011 + Avg. No. of doors without leaks × 0.002
= (3.8/100 × 128 × 0.019) + (128 × 0.06 × 0.011) + (1 – 6/100 – 3.8/100) x (128 × 0.002)
= 0.408 kg/hr × 2.205 lb/kg
= 0.90 lb/hr

** The average number of doors with visible leaks as observed from the bench is 6 percent. The average BSO leak rate for doors without visible leaks is 0.002 kg/hr.*

- **BSO Emission Rate for Lid Leaks**

BSO = Average No. of lids leaking × 0.0033 × 2.205 lb/kg
= (256 × 0.4/100) × 0.0033 × 2.205
= 0.00745 lb/hr

- **BSO Emission Rate for Offtake Leaks**

BSO = Average No. of offtakes leaking × 0.0033 × 2.205 lbs/kg
= (128 x 2.5/100) × 0.0033 × 2.205 lb/kg

= 0.0233 lb/hr

Emission rates for criteria and hazardous air pollutants were derived from the ratio of other pollutants to the BSO emission factors presented in Table 12.2-4 of AP-42, Section 12.2. These factors are presented in the following table:

Ratios of Other Pollutants to BSO

Pollutant	Ratio to BSO
Filterable PM (leaks)	0.9
Filterable PM (charging)	0.8
Carbon Monoxide	1.1
VOC	2.2
TOC	5.2
Ammonia	0.15
Benzene	0.5
Carbon Disulfide	0.001
Hydrogen Cyanide	0.035
Hydrogen Sulfide	0.15
Naphthalene	0.2
Phenol	0.0006
Toluene	0.04
Xylene	0.005

2.3 Coke Battery PEC Emissions

Pushing operation is described in section 1.1.3 above and emissions from the operation are shown below:

Batteries 1, 2 & 3 PEC System Baghouse

Pollutant***	gr/dscf	Hourly Emission Limit (lb/hr)	Annual Emission Limit (tons/year)*
Particulate Matter	0.010	1.98	8.68
PM_{10}	0.010	1.98	8.68
SO_2**		7.10	31.10
NO_X		2.22	9.70
CO		4.61	20.17
VOC		0.23	0.10

*A year is defined as any consecutive 12-month period.
**SO_2 limit is based on SO_2 SIP IP 0052-I017. The limits are combined for all the three (3) batteries.
***NO_X, CO, & VOC emissions include PEC baghouse, PEC travel hot car, pre-push and PEC fugitive emissions.

Batteries 13, 14 & 15 PEC System Baghouse

Pollutant***	lbs/ton-coke	Hourly Emission Limit (lb/hr)	Annual Emission Limit (tons/year)*
Particulate Matter	0.040	5.80	25.40
PM_{10}	0.040	5.80	25.40
SO_2**		7.46	32.67
NO_X		2.33	10.22
CO		5.36	23.46
VOC		0.13	0.55

*A year is defined as any consecutive 12-month period.
**SO_2 limit is based on SO_2 SIP IP 0052-I017. The limits are combined for all the three (3) batteries.
***NO_X, CO, & VOC include PEC baghouse, PEC travel hot car, pre-push and PEC fugitive emissions.

Batteries 19 & 20 PEC System Baghouse

Pollutant***	gr/dscf	Hourly Emission Limit (lb/hr)	Annual Emission Limit (tons/year)*
Particulate Matter	0.010	1.67	7.18
PM_{10}	0.010	1.67	7.18
SO_2**		7.78	34.08
NO_X		4.29	18.78
CO		8.91	39.04
VOC		0.18	0.79

*A year is defined as any consecutive 12-month period.
**SO_2 limits are based on SO2 SIP IP 0052-I017. The limits are for both batteries.
***NO_X, CO, & VOC include PEC baghouse, PEC battery travel hot car, pre-push and PEC fugitive emissions.

Battery B PEC System Baghouse

Pollutant***	lb/ton-coke	Hourly Emission Limit (lb/hr)	Annual Emission Limit (tons/year)*
Particulate Matter	0.040	5.28	23.14
PM_{10}	0.040	5.28	23.14
SO_2**		7.50	32.85
NO_X		5.24	22.96
CO		12.30	53.87
VOC		2.79	12.20

*A year is defined as any consecutive 12-month period.
**SO_2 limit is based on SO_2 SIP IP 0052-I017.
*** NO_X, CO, & VOC include PEC baghouse, PEC battery travel hot car, pre-push and PEC fugitive emissions.

Battery C PEC System Baghouse**

Pollutant	Hourly Emission Limit (lb/hr)	Annual Emission Limit (tons/year) [1]
Particulate Matter	7.7	33.5
PM_{10}	3.4	14.9
$PM_{2.5}$	1.4	6.1
Nitrogen Oxides	3.6	15.9
Sulfur Oxides*	8.65	37.89
Carbon Monoxide	8.7	38.2
Volatile Organic Compounds	0.3	1.2
Total Reduced Sulfur	0.3	1.3
Benzene	0.04	0.19
Cyanide Compounds	0.09	0.39

[1]A year is defined as any 12 consecutive months.
*SO_2 SIP IP 0052-I017, Condition V.B.1.c.
**The PEC baghouse emissions limits are based on IP11.

2.4 Quench Towers Emissions

Quench Tower No. 1-P013 (For Batteries 1-3)

Quench Tower No. 1 serves and quenches coke from Batteries No. 1, 2, 3. Emissions are shown in Table below:

Emission Limitations for Quench Tower No. 1

POLLUTANT***	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	8.51	37.30
PM_{10}	5.11	23.40
$PM_{2.5}$	4.26	18.25
PM-condensable	3.51	15.42
SO_2	0.75	3.29
NO_X	0.35	1.55
VOC	2.22	9.71

*A year is defined as any consecutive 12-month period.
**SO_2 limit is based on SO_2 SIP IP 0052-I017.
**NO_X, SO_X, VOC and TSP Emission factors were based on Average of Battery13-15, Battery 19-20 Coke Quench Tower testing May 31-June 1, 2011, March 21-23, 2011.
***PM_{10} emissions are based 60% of TSP using results from the particle size analysis from the 2011 test of QT #7.
***$PM_{2.5}$ emissions are based on 50% of TSP using results from the particle size analysis from the 2011 test of QT #7.

Quench Towers Nos. 5A (P051) and 5 (P015)- For Batteries 13-15

Quench Tower No. 5A is the primary quench tower for Batteries 13-15, while Quench Tower No. 5 serves as the alternate/backup. Quench Tower No. 5A emissions are based on IP 0052-I014, issued on March 9, 2011.

Quench Tower No. 5A Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	29.25	128.11
PM_{10}(total)	28.53	124.94
$PM_{2.5}$ (total)	27.80	121.76
NO_X	0.43	1.90
Sulfur Dioxides**	7.56	33.11
Volatile Organic Compounds	25.87	113.29

[1]A year is defined as any 12 consecutive months
**SO_2 SIP IP 0052-I017, Condition V.B.1.c

Quench Tower No. 5 Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	5.61	24.56
PM_{10}(total)	3.36	14.73
$PM_{2.5}$ (total)	2.80	12.28
PM-condensable	2.06	9.0
NO_X	0.43	1.88
Sulfur Dioxides	1.01	4.42
Volatile Organic Compounds	2.09	9.17

[1]A year is defined as any 12 consecutive months.
**NO_X, SO_X, VOC and TSP emission/emission factors are based on Battery13-15 Coke Quench Tower #5 testing, May 31-June 1, 2011.
***PM_{10} emissions are based on 60 of TSP using results from the particle size analysis from the 2011 test of QT #7.
***$PM_{2.5}$ emissions are based on 50% of TSP using results from the particle size analysis from the 2011 test of QT #7.
***PM-condensable emission/emission factor is based Battery 13-15 Quench Tower testing May 3 - June 1, 2011.

Quench Towers Nos. 7A and 7 (For Batteries 19-20)

Quench Tower No. 7A is the primary quench tower for Batteries 19-20, while Quench Tower No. 7 serves as the alternate/backup. Quench Tower No. 7A emissions are based on IP 0052-I014, issued on March 9, 2011 and Quench Tower No. 7 emissions are based on emission factors established during testing on March 21-23, 2011.

Quench Tower No. 7A Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	35.82	156.88
PM_{10} (total)	34.93	152.99
$PM_{2.5}$ (total)	34.04	149.10
Sulfur Dioxides**	7.21	31.58
NO_X	0.39	1.70
Volatile Organic Compounds	25.48	111.60

[1]A year is defined as any 12 consecutive months.
**SO_2 SIP IP 0052-I017, Condition V.B.1.c

Quench Tower No. 7 Emission Limitations

POLLUTANT*	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	15.10	66.15
PM_{10}(total)	9.06	39.70
$PM_{2.5}$ (total)	7.55	33.08
PM-condensable	6.57	28.77
NO_X	0.39	1.70
Sulfur Dioxides	0.66	2.91
Volatile Organic Compounds	3.16	13.83

[1]A year is defined as any 12 consecutive months.
*PM_{10} 60% of TSP using results from the particle size analysis from the March 21-23, 2011 test of QT 7.
*$PM_{2.5}$ emission is based on 50% of TSP using results from the particle size analysis from the March 21-23, 2011 test of QT #7.

Quench Tower B (For Battery B)

Quench Tower B is the primary quench tower for coke battery B and emission/emission factors are based on Battery B Coke Quench Tower testing May 20-22, 2014.

Quench Tower No. B Emission Limitations

POLLUTANT***	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	6.87	30.08
PM_{10}	4.12	18.05
$PM_{2.5}$	3.43	15.04
PM-condensable	2.64	11.57
SO_2	4.09	17.91
NO_X	0.66	2.89
VOC	2.24	9.83

*A year is defined as any consecutive 12-month period.
**SO_2 limit is based on SO_2 SIP IP 0052-I017.
**NO_X, SO_X, VOC and TSP Emissions/Emission factors were based on B Battery Quench Tower testing, May 20-22, 2014.
**PM_{10} emissions is based 60% of TSP using results from the particle size analysis from the 2014 test of QT B.
**$PM_{2.5}$ emission is based on 50% of TSP using results from the particle size analysis from the 2014 test of Q B.

Quench Tower C (For C Battery)

Quench Tower C is the primary quench tower for coke battery C and emissions limits are based on C Battery IP 0052-I011, issued on July 24, 2008, and amended on March 26, 2018.

Quench Tower No. C Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	24.7	108.3
PM_{10}	24.1	105.5
$PM_{2.5}$	23.7	103.8
Sulfur Dioxides**	5.0	21.90
Volatile Organic Compounds	10	44
Total Reduced Sulfur	34	148.90
Cyanide Compounds	0.3	1.3

*A year is defined as any 12 consecutive months.
**SO_2 SIP IP 0052-I017, Condition V.B.1.c

2.5 Boilers Emissions

Emissions from each of the six (6) boilers are shown below:

Boiler 1 Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year) [1]
Particulate Matter	15.20	66.58
PM_{10}	15.20	66.58
NO_X	364.80*	1,598
CO	59.90	262.19
VOC	0.69	3.01

[1]A year is defined as any consecutive 12-month period.
[2]NO_X emissions are based on RACT IP 0052-I020b.
[3]CO emissions are based on AP-42, July 1998, Table 1.4-1, firing NG.
[4]VOC emissions are based on 2014 diagnostic Stack Test, firing COG.
[5] Particulate Matter emissions is based on 0.02 lb/MMBtu per §2104.02.a.4.

Boiler 2 Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	9.62	42.14
PM_{10}	9.62	42.14
NO_X	177.97*	780
CO	37.89	165.94
VOC	0.21	0.93

[1]A year is defined as any consecutive 12-month period.
[2]NO_X emissions are based on RACT IP 0052-I020b and the lbs/hr is based on a 30-day rolling average.
[3]CO emissions are based on AP-42, July 1998, Table 1.4-1, firing NG.
[4]VOC emissions are based on 2014 diagnostic Stack Test, firing COG.
[5] Particulate Matter emissions are based on 0.02 lb/MMBtu per §2104.02.a.4.

Boiler R1 or Boiler R2 (B005 or B006) Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT Per Boiler (lb/hr)	ANNUAL EMISSION LIMIT Per Boiler (tons/year)[1]
Particulate Matter	4.58	20.06
PM_{10}	4.58	20.06
NO_X	70.99	310.94
CO	48.49	212.01
VOC	0.10	0.44

[1]A year is defined as any consecutive 12-month period.
[2]NO_X emissions are based on RACT IP 0052-I020b and the lbs/hr is based on a 30-day rolling average.
[3]CO emissions are based on AP-42, July 1998, Table 1.4-1, firing NG.
[4]VOC emissions are based on 2014 diagnostic Stack Test, firing COG.
[5]Particulate Matter emissions are based on 0.02 lb/MMBtu per §2104.02.a.4.

Boilers T1 or T2 Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT Per Boiler (lb/hr)	ANNUAL EMISSION LIMIT Per Boiler (tons/year) [1]
Particulate Matter	3.12	13.67
PM_{10}	3.12	13.67
NO_X	48.36	211.82
CO	12.90	53.82
VOC	0.07	0.30

[1]A year is defined as any consecutive 12-month period.
[2]NO_X emissions are based on RACT IP 0052-I020b and the lbs/hr is based on a 30-day rolling average.
[3]CO emissions are based on AP-42, July 1998, Table 1.4-1, firing NG.
[4]VOC emissions are based on2014 diagnostic Stack Test, firing COG.
[5] Particulate Matter emissions is based on 0.02 lb/MMBtu per §2104.02.a.4.

SO_2 emissions from B001, B002, B005, B006, B007, and B008 shall not exceed the following limitations (SO2 SIP IP 0052-I017, Condition V.A.1.b):

SO_2 Emission Limitations for the Boilers

30 day rolling*** average limit (lb/hr)*	Supplementary*** 24-hr Limit* (lb/hr)	Tons/year**
118.44	134.06	518.77

*Limits are based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
**Tons/year value is used to demonstrate the expected tons/year from this unit. The value is derived by converting the 30-day rolling average limit lb/hr to an annual tons per year value. These limits are based on ACHD's SO_2 State Implementation Plan (SIP) Permit Revision and USEPA SO_2 Guidance dated September 14, 2017.
***Emission limits are on an aggregate basis

2.6 Desulfurization Plant Emissions (P019)

The desulfurization plant is used to remove hydrogen sulfide (H_2S) and other sulfur compounds, and it consists of two Claus Plants. One clause plant is use continuously and the other is use as a backup in the event the primary Claus Plant is out of service. The Claus Plant converts the H_2S and other sulfur compounds in the COG to elemental sulfur. The potential emission calculations (lb/hr) are based on SCOT Plant Stack Test November 17-18, 2015. PM_{10} and $PM_{2.5}$ emissions are 96% & 94% of TSP based on AP-42 Section 12.2-19 Final 05/2008.

SCOT Plant Emissions Limitations

POLLUTANT**	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)*
SO_2***	24	105.12

*A year is defined as any consecutive 12-month period.
***SO_2 SIP IP 0052-I017, Condition V.B.1.c

2.7 Coke By-Product Recovery Plant Emissions

During the coking process, approximately 225 million cubic feet of raw coke oven gas are produced each day. The gases evolved leave the oven through standpipes, pass into goosenecks, and then into the gas collection main. Coke By-Product Recovery Plant emissions are shown in the table below (emissions breakdown are shown in Appendix A) and are comprised of emissions from the following components:

Final Cooler Sump [Emission Factor (lb/ton) × Coke Produced (ton/yr) × (1-Control Efficiency)]
Equipment Leaks (include components from light oil and coke oven gas)
Flushing Liquor Storage Tanks [Coal Charged (TPY) × Emission Factor (lb/ton) × (1 ton/2,000 lbs)]
Crude Tar Storage Tanks
Light Oil Collecting Tanks
Light Oil Decanters

The VOC and Benzene emissions are based on Installation Permit 91-I-0021 P

Coke By-Products Recovery Plant Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lbs/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
VOC		68.0
Benzene		54

[1]A year is defined as any consecutive 12-month period.

2.8 Coal Storage Piles Emissions (E001)

The coal storage piles PM and PM_{10} fugitive emissions are based on emission factors 4.62 lbs/acre·day and 2.08 lbs/acre·day from the 2016 TVOP application emissions spreadsheet. The facility has 32 acres uncovered. The emissions are shown in the Table below:

Coal Storage Pile Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	6.6	26.98
PM_{10}	2.77	12.15

[1]A year is defined as any 12 consecutive months
PM= (4.62 lbs/acre·day)*(32 acres)*(365 day/yr)*(tons/2000lb)

2.9 Coke Storage Pile - Peters Creek (E002)

The Peters Creek coke storage piles PM, PM_{10} and $PM_{2.5}$ fugitive emissions are based on emission factors 1.16 lbs/acre·day, 0.52 lbs/acre·day and 0.23 lbs/acre·day from the 2016 TVOP application emissions spreadsheet. The facility has 68 acres uncovered. The emissions are shown in the Table below:

Coke Storage Pile Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	3.29	14.40
PM_{10}	1.47	6.45
$PM_{2.5}$	0.66	2.88

[1]A year is defined as any 12 consecutive months.
PM= (1.16 lbs/acre·day)*(68 acres)*(365 day/yr)*(tons/2000lb)

2.10 Coke Storage Pile - South Yard (E003)

The South Yard coke storage piles PM, PM_{10} and $PM_{2.5}$ fugitive emissions are based on the 1.16 lbs/acre·day, 0.52 lbs/acre·day and 0.23 lbs/acre·day from the 2016 TVOP application emissions spreadsheet. The facility has 5 acres uncovered. The emissions are shown in the Table below:

Coke Storage Pile-South Yard Emission Limitations

POLLUTANT	HOURLY EMISSION LIMIT (lb/hr)	ANNUAL EMISSION LIMIT (tons/year)[1]
Particulate Matter (total)	0.24	1.06
PM_{10}	0.11	0.47
$PM_{2.5}$	0.45	0.21

[1]A year is defined as any 12 consecutive months.
PM = (1.16 lbs/acre·day)*(5 acres)*(365 day/yr)*(tons/2000lb)

3.0 PERMIT APPLICATION COMPONENTS

1. Title V Operating Permit Application received September 26, 2016
2. Stack test, November 17-18, 2015 (SCOT Plant)
3. Stack test, May 20-22, 2014 (Battery B Quench)
4. Stack test, November 3, 2012 (Battery 1 & 2 underfiring)
5. Stack test, October 19, 2012 & September 17-18, 2014 (Battery 3 underfiring)
6. Stack test, October 23-24, 2012 & October 14-15, 2014 stack test (Battery 15 underfiring)
7. Stack test, October 16, 2012 & September 9-11 (Battery 19 & 20 underfiring)
8. Stack test, April 27, 2012 & October 14-17, 2014 (Battery 13 & 14 underfiring)
9. Stack test, November 6, 2015(Battery B underfiring)
10. Stack test, September 1, 2011 (Cooling Towers)
11. Stack test, June 22, 2011 (Cooling Towers)
12. Stack test, May 31-June 1, 2011 (No. 1 & No. 5 Quench Tower)
13. Stack test, March 21-23, 2011 (No. 7 Quench Tower)
14. The following Installation Permits:

Permit No.	Issued (Amended)	Description
0052-I001	11/19/97	No. 1 Quench Tower
0052-I002b	01/16/98 (01/20/05)	Ammonia Flare
0052-I003	01/26/98	No. 3 Screening Station
0052-I004a	04/06/98 (05/05/02)	Methanol Tanks
0052-I005a	07/24/00 (07/15/04)	Fan Upgrades
0052-I006	12/05/01	Fan Upgrades
0052-I007	12/05/01	Fan Upgrades
0052-I008	12/05/01	Fan Upgrades
0052-I009	not issued	Synfuel Process
0052-I010	not issued	No. 3 Screening Station
0052-I011b	07/24/08 (03/26/18)	Battery C
0052-I012	09/04/09	Battery D – *not installed*
0052-I013	12/02/08	No. 4 Screening Station
0052-I014a	03/10/11 (05/24/11)	Quench Towers
0052-I015	03/01/17 (Issued but not installed)	Truck & Rail Loading
0052-I016	08/02/17	Light Oil Loading
0052-I017	09/14/17	SO_2 SIP
0052-I018	05/06/19	Temporary Combustion Stack
0052-I019	not issued	Cogeneration Process
0052-I020b	04/24/20 (12/11/20)	RACT II
0052-I021	not issued	PEC Baghouse

4.0 METHODS OF DEMONSTRATING COMPLIANCE

Various methods are used to demonstrate compliance with ACHD and federal regulations. These methods are summarized below:

4.1 Coke Oven Batteries (P001-P003, P007-P009; P0010 – P012 & P046)

Daily visible emission observations using Method 303 per 40 CFR 63.04 (40 CFR 63 Subpart L) are used to demonstrate compliance with charging emissions, door leaks, lid leaks, offtake leaks and collector mains. Weekly visible emission observations are also performed for charging, door leaks, lid leaks, offtake leaks, combustion stack opacity, pushing emission opacity and hot car travel. Stack testing is also performed on the combustion stacks (see Section 5.0). Monthly records of coal charged to the batteries, coke produced, coke oven gas produced, sulfur content of the coal and coke, total number of pushes, number of controlled pushes, pushing outages and coke oven gas flaring incidents are submitted to the ACHD. The pushing emission control baghouses are tested every two years for particulate matter and opacity.

4.2 Quench Towers and Alternate Quench Towers (P013, P015–P017, P038- P039, P047)

All quench towers are equipped with baffles and the water used for quenching the incandescent coke will be equivalent to or better than the water quality standards established for the Monongahela River per Article XXI, §2105.21.g. Quench towers are inspected on a periodic basis to determine the condition of the tower and baffles.

4.3 Desulfurization Plant (P019)

The concentration of sulfur compounds (expressed as hydrogen sulfide, H_2S) in the desulfurized coke oven gas are measured continuously to determine compliance with the limitation of 35 grains of H_2S per 100 dry standard cubic feet of COG. Emission testing of the SCOT plant incinerator is performed every two years (see Section V.O.2 of the operating permit).

4.4 Coke By-Products Recovery Plant (P021)

Emissions from the by-products plant are controlled by a gas-blanketing system that captures volatile organic compounds that are released through storage tank vents and from other equipment. Other measures, such as seals on pumps, compressors, etc. also control the release of VOCs. The gas blanketing system and other measures used to control VOC emissions are routinely checked for leaks and when leaks or equipment malfunctions are identified, repairs are initiated as soon as possible.

4.5 Coal and Coke Handling Facilities (P022-P036 and P041-P043)

Visible emission observations will be conducted in accordance with §2107.02 and /or §2107.11. Stack testing for PM_{10} of the No. 3 Coke Screening Station (P036) baghouse outlet will be conducted at least once every five years. Monthly records of material throughput for these sources will be submitted to the ACHD every six months.

4.6 Boilers (B001, B002, B005-B008, and B010)

Boilers No.1 and 2 are equipped NO_X CEMS and stack testing is performed every two years to measure the SO_2 emission rate. These boilers combust COG and natural gas and stack testing is performed every two years to measure the NO_X and SO_2 emission rates.

5.0 TESTING REQUIREMENTS:

Emission testing once every two years is required for the sources listed below. This requirement along with the parameters to be tested and references to the applicable testing methods and procedures are included in the Title V Operating Permit.

Source ID's	Source Name	Pollutant
P001-P003; P007– P011	Coke Battery Combustion Stacks	NO_X, CO and SO_2
P012	Coke Battery Combustion Stacks	NO_X CEMS, CO and SO_2
P019	SCOT Plant Incinerator	Sulfur Compounds
B001 & B002	Boilers No. 1 and 2	NO_X CEMS, CO and SO_2
B005 & B006	Boilers R1 and R2	$NO_{X,}$ CO and SO_2
B007 & B008	Boilers T1 and T2	$NO_{X,}$ CO and SO_2

6.0 APPLICABLE REQUIREMENTS

1. Allegheny County Health Department Rules and Regulations

The requirements of Article XXI, Parts B and C for the issuance of this renewal permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

2. Pennsylvania State Requirements

Title 25, Pennsylvania Code, Chapter 145, Subchapter A for non-EGUs**:** NO_X Budget Trading Program has been addressed in Site Level Section of the permit.

3. New Source Performance Standards (NSPS)

a) 40 CFR Part 60, Subpart Y: Standards of Performance for Coal Preparation Plants:

Continuous Barge Unloader No. 2 (P023) is subject to the opacity standard in §60.254(a). The No. 1 Continuous Barge Unloader was constructed before the applicability date of Subpart Y which is October 24, 1974. Most of the other requirements in NSPS Part 60, Subpart Y are not applicable to USS operation at this time, because they only apply to facility with construction or modification date after April 28, 2008.

b) 40 CFR 60, Subpart D: Standards of Performance for Fossil-Fuel-Fired Steam Generators for which Construction is Commenced After August 17, 1971:

c) 40 CFR 60, Subpart Db: Standards for Industrial-Commercial-Institutional Steam Generating Units:

Boiler Nos. 1 & 2 are not subject to Subpart D and Boilers R1, R2, T1 & T2 are not subject to Subpart Db because they were installed prior to the applicability dates of these standards.

4. National Emission Standards for Hazardous Air Pollutants (NESHAPS) & MACT

a) 40 CFR 61, Subpart M for Asbestos:

40 CFR 61.145 and 150 apply to the entire Clairton Works facility because the facility is involved in the demolition or renovation activity containing asbestos material.

b) 40 CFR Part 61, Subpart L for Benzene Emissions from Coke By-Product Recovery Plants:

This standard is applicable to the equipment associated with the by-products recovery plant (tar decanters, tar storage tanks, light-oil condensers, light-oil sumps, etc.) including pumps, valves, exhausters, pressure relief devices, sampling connection systems, open-ended valves or lines, flanges or other connectors, and control devices.

c) 40 CFR Part 61, Subpart V for Equipment Leaks (Fugitive Emission Sources):

The facility is subject to the provisions of NESHAP, Subpart V because it is applicable to equipment that is intended to operate in volatile hazardous air pollutant (VHAP) service such as pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges, etc. VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a VHAP.

d) 40 CFR Part 61, Subpart FF for Benzene Waste Operations:

The provision of this subpart is applicable to the facility because the facility operates coke by-product recovery plant with benzene-containing hazardous waste. The monitoring, recordkeeping and reporting requirements have been included in the permit.

5. National Emission Standards for Hazardous Air Pollutants for Source Categories

a) 40 CFR Part 63, Subpart L for Coke Oven Batteries:

The provisions of this subpart apply to the facility because the facility operates by-product coke oven batteries at a coke plant. Subpart L sets standards for fugitive emissions from coke oven doors, topside port lids, offtake systems, charging and collecting mains. The standard also requires the installation of a flare for each battery so that coke oven emissions shall not be vented to the atmosphere through by-pass bleeder stacks, except through the flare system. It also specifies work practice standards for the operation and maintenance of coke batteries. The requirements have been included in both the site level and source level section of the permit.

b) 40 CFR Part 63, Subpart Y for Marine Tank Vessel Loading Operations:

Subpart Y applies to the loading of light-oil at the Clairton Works onto barges and requires that organic vapors that may be released during loading operations be captured and ducted to a control device. The description of the terminal vapor collection system for light oil loading provided by the Clairton Works meets the definition of a vapor balancing system as defined in §63.561.

The testing requirements of this subpart do not apply to the facility because the barge loading operation is owned and operated by a different owner, but the United State Steel Corporation is required to make sure the owner or operator comply with all the testing and other requirements that is applicable to the owner or operator (e.g., vapor tightness pressure test, leak test etc.) by providing a copy of the test report and supporting documentation before loading any product.

The applicable requirements have been included in the permit

c) 40 CFR Part 63, Subpart CCCCC for Coke Ovens: Pushing, Quenching, and Battery Stacks:

The facility is subject to this subpart because it operates a coke oven battery at a coke plant that is (or is part of) a major source of hazardous air pollutant (HAP) emissions. A major source of HAP is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons or more per year or any combination of HAP at a rate of 25 tons or more per year.

This subpart sets emission standards and work practice standards for coke pushing, coke quenching and coke battery combustion (underfire) stacks. These standards are effective April 14, 2006.

d) 40 CFR Part 68: Chemical Accident Prevention Provisions:

The Clairton Works recovers the ammonia evolved during the coking process and produces anhydrous ammonia. This process is therefore subject to the Part 68 provisions and requires the preparation of a Risk Management Plan.

e) 40 CFR Part 82: Protection of Stratospheric Ozone**:**

These provisions apply to the entire Clairton Works facility.

f) Greenhouse Gas Reporting (40 CFR Part 98):

The facility is a major source of greenhouse gas (CO_2) emissions and the facility is required to submit report to the US EPA in accordance with 40 CFR Part 98.

6. Environmental Justice

The city of Clairton is considered an environmental justice (EJ) area, defined by the Pennsylvania DEP as "any census tract where 20 percent or more individuals live at or below the federal poverty line, and/or 30 percent or more of the population identifies as a non-white minority, based on data from the U.S. Census Bureau and the federal guidelines for poverty". Because this is an existing facility, alternative site location is not feasible. The operating permit contains all testing, monitoring, recordkeeping, and reporting requirements (as required under §70.6(a)(3)).

7.0 EMISSIONS SUMMARY:

The following table summarizes the estimated annual maximum potential emissions (including fugitive) from the U. S. Steel Mon Valley Works - Clairton Plant. These annual (consecutive 12 month) emission estimates assume that all sources operate continuously at their maximum capacity.

POLLUTANT	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	1,892.09
PM_{10}	1,577.79
$PM_{2.5}$	1,228.40
Sulfur Dioxide	1,907.33
Carbon Monoxide	4,792.18
Nitrogen Oxides	8,965.53
Volatile Organic Compounds	570.36
Ammonia	14
Benzene	62.12
HCL	22
H_2S	103.30
Napthalene	2.05
Toluene	0.69
TRS	159
Cyanide Compound	1.69

*A year is defined as any consecutive 12-month period.

8.0 RECOMMENDATIONS

All applicable Federal, State and County regulations have been addressed in the permit. The Title V renewal operating permit should be approved with the emission limitations, terms and conditions in the Title Operating Permit No. 0052-OP22.

Appendix A

Potential Emissions

(*Detailed emission calculations are contained in the attached spreadsheets)*

By-Products Recovery Plant Emissions (P021)

By-Products Recovery Plant Emissions			
Operational Data[1]:			
Parameter	Units	Value	
Potential Total Coke Produced	tons/year	6,295,859	
2015 Actual Total Coke Produced	tons/year	3,776,245	
BRP Control Efficiency	%	0.98	
Maximum Hours of Operation	hours/year	8760	
Number of Components			
Light Oil Pumps	No. of Components	0	
Light Oil Valves	No. of Components	24	
COG Exhausters	No. of Components	0	
Calculation Data:			
Parameter	Units	Actual	Potential
LO Benzene Release	lbs/yr	0.0371	2.7068
COG Benzene Release	lbs/yr	0	0
LO Benzene Wt. Fraction	lbs/yr	0.7914	0.7914
COG Benzene Wt. Fraction	lbs/yr	0.0578	0.0578
Benzene Vapor Pressure	mmHg	95.2	95.2

Final Cooler Sump

	Final Cooler Sump[2]			
	Actual (lb/hr)	*Actual (TPY)*	*Potential (lb/hr)*	*Potential (TPY)*
VOC	*0.3735*	*1.6357*	*0.6226*	*2.7272*
Acetonitrile				
Ammonia				
Benzene	*0.2586*	*1.1329*	*0.4312*	*1.8888*
Carbon Disulfide				
Cyanide Compounds	*0.0048*	*0.0209*	*0.0079*	*0.0348*
Dicyclopentadiene				
Ethylbenzene	*0.0036*	*0.0157*	*0.0060*	*0.0262*
Ethylene				
Hexane				
Hydrogen Cyanide				
Hydrogen Sulfide				
Naphthalene	*0.0072*	*0.0314*	*0.0120*	*0.0524*
Phenol	*0.0006*	*0.0026*	*0.0010*	*0.0044*
Propylene				
Pyridine				
Styrene				
1,2,4-Trimethylbenzene				
Toluene	*0.0776*	*0.3399*	*0.1294*	*0.5666*
Xylene	*0.0259*	*0.1133*	*0.0431*	*0.1889*

Equipment Leaks

	Equipment Leaks[3]			
	Actual (lb/hr)	Actual (TPY)	Potential (lb/hr)	Potential (TPY)
VOC	1.60E-06	7.03E-06	1.17E-04	5.13E-04
Acetonitrile	5.10E-08	2.24E-07	3.73E-06	1.63E-05
Ammonia	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	4.23E-06	1.85E-05	3.09E-04	1.35E-03
Carbon Disulfide	9.60E-08	4.20E-07	7.01E-06	3.07E-05
Cyanide Compounds	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dicyclopentadiene	5.09E-08	2.23E-07	3.71E-06	1.63E-05
Ethylbenzene	1.74E-08	7.63E-08	1.27E-06	5.57E-06
Ethylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	3.83E-09	1.68E-08	2.80E-07	1.23E-06
Hydrogen Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hydrogen Sulfide	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	8.35E-11	3.66E-10	6.09E-09	2.67E-08
Phenol				
Propylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pyridine	8.53E-10	3.74E-09	6.23E-08	2.73E-07
Styrene	2.62E-09	1.15E-08	1.91E-07	8.37E-07
1,2,4-Trimethylbenzene	1.53E-09	6.72E-09	1.12E-07	4.90E-07
Toluene	1.56E-07	6.84E-07	1.14E-05	4.99E-05
Xylene	1.33E-08	5.83E-08	9.72E-07	4.26E-06

Notes:
1. Data linked to inputs on "Input Data" tab.
2. Final Cooler Sump Emissions (TPY) = Emission Factor (lb/ton) * Coke Produced (ton/yr) * (1-Control Efficiency)
Final Cooler Sump Emissions (lb/hr) = Final Cooler Sump Emissions (TPY) * (1 ton/2000 lbs) * (yr / 8,760 hours)
VOC Emissions = Sum of Benzene, Ethylbenzene, Naphthalene, Phenol, Toluene, and Xylene Emissions
3. Equipment Leaks include components from light oil and coke oven gas.
Quantity Benzene Released (lb/yr) = ACCCI Emission Factor per source * hours/yr * 2.20462 lb/kg. 120 hours represents a worst case scenario of a 5-day leak.
Equipment Leak Emissions (TPY) = Benzene Release * ((Chemical Wt. Fraction * Chemical VP) / (Benzene Wt. Fraction * Benzene VP)) * (1 ton/2000 lbs)
Equipment Leak Emissions (lb/hr) = Equipment Leaks (TPY) * (2000 lbs / 1 ton) / (hours/year)

Storage Tanks Data

Operational Data[4]**:**				
Parameter	Units	Flushing Liquor	Tar	Light Oil
Throughput	gallons/yr	1,839,600,000	40,288,877	13,155,641

Flushing Liquor Storage Tanks[5]					
			Vertical Tank		
Tank	PA Reg.	Used By	Height	Diameter	Capacity
Number	Number	Process	(feet)	(feet)	(gal)
A	B	C	D	E	F
3TA-18-23		#1 Unit FL Decanters	30	28	140,000
3TA-30-35		#2 Unit FL Decanters	26	28	120,000
3TA-12		FL Circulation/Surge Tanks	11	28.5	55,000
3TA-13		FL Circulation/Surge Tanks	11	28.5	55,000
3TA-36		FL Circulation/Surge Tanks	13	28.5	60,000
3TA-37		FL Circulation/Surge Tanks	13	28.5	60,000
CTS-4		FL Pumphouse Sump #1	36	18	68,523
CWS-24, 25		FL Pumphouse Sump #2	24	18	45,682

Flushing Liquor Storage Tanks[5]									
	Tanks 4.0								
Tank	Volume	Volume	Volume	Max. Vol.	Avg. Vol.	Liquid Height		Dome Roof	Tank Roof
Number	(ft^3)	(1 ft^3)	(gal/1ft^3)	(gal)	(gal)	Max. (ft)	Avg. (ft)	Radius	Height
A	G	H	I	J	K	L	M	N	O
3TA-18-23	18,473	616	4,606	133,000	70,000	29	15	28	4
3TA-30-35	16,010	616	4,606	114,000	60,000	25	13	28	4
3TA-12	7,017	638	4,772	52,250	27,500	11	6	29	4
3TA-13	7,017	638	4,772	52,250	27,500	11	6	29	4
3TA-36	8,293	638	4,772	57,000	30,000	12	6	29	4
3TA-37	8,293	638	4,772	57,000	30,000	12	6	29	4
CTS-4	9,161	254	1,904	65,097	34,262	34	18	18	2
CWS-24, 25	6,107	254	1,904	43,398	22,841	23	12	18	2

Flushing Liquor Storage Tanks[5]					
		Actual Emissions			
Tank	Consumption	Breathing	Working	Total	Total
Number	(gal)	Losses (lbs)	Losses (lbs)	Losses (lbs)	Losses
A	P	Q	R	S	(Tons)
3TA-18-23	426,252,679	0.00	17,142.47	17,142.47	0.17
3TA-30-35	365,359,439	0.00	14,693.54	14,693.54	0.15
3TA-12	167,456,410	91.22	6,734.54	6,825.76	0.07
3TA-13	167,456,410	91.22	6,734.54	6,825.76	0.07
3TA-36	182,679,720	115.93	7,346.77	7,462.70	0.07
3TA-37	182,679,720	115.93	7,346.77	7,462.70	0.07
CTS-4	208,629,374	118.37	8,390.38	8,508.75	0.09
CWS-24, 25	139,086,249	78.91	5,593.59	5,672.50	0.06
Total		611.58	73,982.60	74,594.18	0.75

Crude Tar Storage Tanks

Tank Number A	PA Reg. Number B	Used By Process C	Vertical Tank Height (feet) D	Diameter (feet) E	Capacity (gal) F
3TA-49	108A	#1 Crude Tar Storage	45	45	500,000
3TA-44	099A	#2 Crude Tar Storage	45	45	500,000
3TA-43	098A	#3 Crude Tar Storage	45	45	500,000
3TA-42	097A	#4 Crude Tar Storage	45	45	500,000
3TA-41	096A	#5 Crude Tar Storage	45	45	500,000
3TA-45	008A	#6 Crude Tar Storage	45	45	500,000
3TA-48	005A	#7 Crude Tar Storage	45	45	500,000
3TA-47	003A	#8 Crude Tar Storage	45	45	500,000
3TA-46	004A	#9 Crude Tar Storage	45	45	500,000
3TA-14-17		Tar Collecting Tanks	44	10	26,000
3TA-25-28		Tar Collecting Tanks	44	10	26,000

Tank Number A	Tanks 4.0 Volume (ft^3) G	Volume ($1 ft^3$) H	Volume ($gal/1ft^3$) I	Max. Vol. (gal) J	Avg. Vol. (gal) K	Liquid Height Max. (ft) L	Avg. (ft) M	Dome Roof Radius N	Tank Roof Height O
3TA-49	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-44	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-43	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-42	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-41	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-45	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-48	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-47	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-46	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-14-17	3,456	79	588	24,700	13,000	42	22	10	1
3TA-25-28	3,456	79	588	24,700	13,000	42	22	10	1

Tank Number A	Consumption (gal) P	Actual Emissions Breathing Losses (lbs) Q	Working Losses (lbs) R	Total Losses (lbs) S	Total Losses (Tons)
3TA-49	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-44	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-43	OOS				
3TA-42	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-41	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-45	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-48	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-47	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-46	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-14-17	258,517	59.80	66.05	125.85	0.001
3TA-25-28	258,517	59.80	66.05	125.85	0.001
Total		119.60	10,292.90	10,412.50	0.10

Crude Tar Storage Tanks

Tank	PA Reg.	Used By	Vertical Tank		
Number	Number	Process	Height (feet)	Diameter (feet)	Capacity (gal)
A	B	C	D	E	F
3TA-49	108A	#1 Crude Tar Storage	45	45	500,000
3TA-44	099A	#2 Crude Tar Storage	45	45	500,000
3TA-43	098A	#3 Crude Tar Storage	45	45	500,000
3TA-42	097A	#4 Crude Tar Storage	45	45	500,000
3TA-41	096A	#5 Crude Tar Storage	45	45	500,000
3TA-45	008A	#6 Crude Tar Storage	45	45	500,000
3TA-48	005A	#7 Crude Tar Storage	45	45	500,000
3TA-47	003A	#8 Crude Tar Storage	45	45	500,000
3TA-46	004A	#9 Crude Tar Storage	45	45	500,000
3TA-14-17		Tar Collecting Tanks	44	10	26,000
3TA-25-28		Tar Collecting Tanks	44	10	26,000

Tank	Tanks 4.0								
Number	Volume (ft^3)	Volume (1 ft^3)	Volume (gal/1ft^3)	Max. Vol. (gal)	Avg. Vol. (gal)	Liquid Height Max. (ft)	Liquid Height Avg. (ft)	Dome Roof Radius	Tank Roof Height
A	G	H	I	J	K	L	M	N	O
3TA-49	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-44	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-43	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-42	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-41	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-45	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-48	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-47	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-46	71,569	1,590	11,897	475,000	250,000	40	21	45	6
3TA-14-17	3,456	79	588	24,700	13,000	42	22	10	1
3TA-25-28	3,456	79	588	24,700	13,000	42	22	10	1

Tank		Actual Emissions			
Number	Consumption (gal)	Breathing Losses (lbs)	Working Losses (lbs)	Total Losses (lbs)	Total Losses (Tons)
A	P	Q	R	S	
3TA-49	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-44	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-43	OOS				
3TA-42	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-41	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-45	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-48	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-47	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-46	4,971,480	0.00	1,270.10	1,270.10	0.01
3TA-14-17	258,517	59.80	66.05	125.85	0.001
3TA-25-28	258,517	59.80	66.05	125.85	0.001
Total		119.60	10,292.90	10,412.50	0.10

Light Oil Collecting Tanks

Tank Number A	PA Reg. Number B	Used By Process C	Vertical Tank Height (feet) D	Diameter (feet) E	Capacity (gal) F
4FA-109	130A	Light Oil Barge Loading T-61	30	38	270,000
4FA-110	131A	Light Oil Storage T-62	30	38	270,000
4FA-111	132A	Light Oil Storage T-63	30	38	270,000
4FA-112	133A	Light Oil Storage T-64	30	38	270,000
4FA-119	142A	Light Oil Storage T-59	30	38	250,000
4FA-120	143A	Light Oil Storage T-60	30	38	250,000
Total					

Tank Number A	Tanks 4.0 Volume (ft^3) G	Volume (1 ft^3) H	Volume (gal/1ft^3) I	Max. Vol. (gal) J	Avg. Vol. (gal) K	Liquid Height Max. (ft) L	Liquid Height Avg. (ft) M	Dome Roof Radius N	Tank Roof Height O
4FA-109	34,023	1,134	8,484	256,500	135,000	30	16	38	5
4FA-110	34,023	1,134	8,484	256,500	135,000	30	16	38	5
4FA-111	34,023	1,134	8,484	256,500	135,000	30	16	38	5
4FA-112	34,023	1,134	8,484	256,500	135,000	30	16	38	5
4FA-119	34,023	1,134	8,484	237,500	125,000	28	15	38	5
4FA-120	34,023	1,134	8,484	237,500	125,000	28	15	38	5

Tank Number A	Consumption (gal) P	Actual Emissions Breathing Losses (lbs) Q	Working Losses (lbs) R	Total Losses (lbs) S	Total Losses (Tons)
4FA-109	2,711,468	3,660.70	4,544.17	8,204.87	0.08
4FA-110	2,711,468	3,660.70	4,544.17	8,204.87	0.08
4FA-111	2,711,468	3,660.70	4,544.17	8,204.87	0.08
4FA-112	OOS				
4FA-119	2,510,619	3,775.59	4,207.56	7,983.15	0.08
4FA-120	2,510,619	3,775.59	4,207.56	7,983.15	0.08
Total		18,533.28	22,047.63	40,580.91	0.41

Light Oil Decanters

Tank Number A	PA Reg. Number B	Used By Process C	Vertical Tank Height (feet) D	Vertical Tank Diameter (feet) E	Vertical Tank Capacity (gal) F
V-604		Light Oil Decanters	12.8	12	9,000
V-605		Light Oil Decanters	12.8	12	9,000

	Tanks 4.0								
Tank Number A	Volume (ft^3) G	Volume (1 ft^3) H	Volume (gal/1ft^3) I	Max. Vol. (gal) J	Avg. Vol. (gal) K	Liquid Height Max. (ft) L	Liquid Height Avg. (ft) M	Dome Roof Radius N	Tank Roof Height O
V-604	1,448	113	846	8,550	4,500	10	5	12	2
V-605	1,448	113	846	8,550	4,500	10	5	12	2

Tank Number A	Consumption (gal) P	Actual Emissions Breathing Losses (lbs) Q	Actual Emissions Working Losses (lbs) R	Actual Emissions Total Losses (lbs) S	Total Losses (Tons)
V-604	6,577,821	253.31	2,311.30	2,564.61	0.03
V-605	6,577,821	253.31	2,311.30	2,564.61	0.03
Total		506.62	4,622.60	5,129.22	0.05

Notes:
4. Data linked to inputs on "Input Data" tab. It is assumed that the Potential Throughput and 2015 Actual Throughputs are the same.
5. Emission calculations based on methodologies from 2015 AEI. It is assumed that the Potential Emissions are equal to the 2015 Actual Emissions.

Storage Tank HAPS Emissions[6]

Pollutant	Actual Emissions (tpy)				
	Crude Tar Storage Tanks	Light Oil Collecting Tanks	Light Oil Barge (T-61)	Light Oil Decanters	Total HAPS Emissions
Acetonitrile		0.0013	0.0003	0.0002	0.0018
Ammonia	0.0001				0.0001
Anthracene	0.0009				0.0009
Benzene	0.0004	0.2612	0.0662	0.0414	0.3692
Benzo(g,h,i)Perylene	0.0003				0.0003
Biphenyl	0.0003				0.0003
Carbon Disulfide		0.0015	0.0004	0.0002	0.0022
Cresol	0.0002				0.0002
Dibenzofuran	0.0012				0.0012
Dicyclopentadiene		0.0005	0.0001	0.0001	0.0007
2,4-Dimethylphenol	0.0000				0.0000
Ethylbenzene	0.0000	0.0002	0.0000	0.0000	0.0002
Hexane		0.0000	0.0000	0.0000	0.0001
Lead	0.0000				0.0000
2-Methyl-pyridine		0.0001	0.0000	0.0000	0.0001
Naphthalene	0.0094	0.0021	0.0005	0.0003	0.0123
Benzo(a)anthracene	0.0010				0.0010
Chrysene	0.0011				0.0011
Benzo(a)pyrene	0.0013				0.0013
Benzo(b)fluoranthene	0.0014				0.0014
Benzo(k)fluoranthene	0.0002				0.0002
Indeno(1,2,3-cd)pyrene	0.0003				0.0003
Fluoranthene	0.0046				0.0046
Phenanthrene	0.0043				0.0043
Phenol	0.0000				0.0000
Pyridine		0.0007	0.0002	0.0001	0.0010
Styrene	0.0001	0.0021	0.0005	0.0003	0.0030
1,2,4-Trimethylbenzene	0.0000	0.0003	0.0001	0.0000	0.0004
Toluene	0.0002	0.0300	0.0076	0.0048	0.0425
Xylene	0.0001	0.0051	0.0013	0.0008	0.0073
Zinc	0.0000				0.0000

Notes:
6. HAPS Emissions (TPY) = VOC Emissions (TPY) * weight fraction

Miscellaneous Air Fugitives

Operational Data[7]:

Flushing Liquor Decanters

Parameter	Units	Battery 1	Battery 2	Battery 3
Potential Coal Charged	Tons/yr	517,935	517,935	517,935
2015 Actual Coal Charged	Tons/yr	858,898		

Parameter	Units	Battery 13	Battery 14	Battery 15	Battery 19	Battery 20	Battery B	Battery C
Potential Coal Charged	Tons/yr	545,675	545,675	545,675	1,002,290	1,002,290	1,491,025	1,379,059
2015 Actual Coal Charged	Tons/yr	908,642			1,146,750		984,779	1,206,205
Operating Hours	8760							

Methanol Usage

Parameter	Units	Value
Potential Winter Lid Slurry	lbs/yr	1,251,682
2015 Actual Winter Lid Slurry	lbs/yr	750,757
Potential Methanol Tanks for Air Lines	lbs/yr	20,374
2015 Methanol Tanks for Air Lines	lbs/yr	12,220
Maximum Hours of Operation	hours/year	8760
Percent Recovery by Process (Efficiency)	%	0%

	Flushing Liquor Decanters[8]				Methanol Usage[9]			
	Actual (lb/hr)	Actual (TPY)	Potential (lb/hr)	Potential (TPY)	Actual (lb/hr)	Actual (TPY)	Potential (lb/hr)	Potential (TPY)
VOC					7.394	32.3865	12.328	53.9956
Ammonia	13.6389	59.7383	21.5472	94.3767				
Hydrochloric Acid	1.9847	8.6931	3.3052	14.4766				
Hydrogen Cyanide	0.4103	1.7970	0.6482	2.8389				
Hydrogen Sulfide	3.7461	16.4080	5.9182	25.9219				
Methanol					7.394	32.3865	12.328	53.9956
Phenol	1.4964	6.5542	2.3641	10.3546				

Notes:

7. Data linked to inputs on "Input Data" tab.
8. Emissions (TPY) = Coal Charged (TPY) * Emission Factor (lb/ton) * (1 ton/2000 lbs)
   Emissions (lb/hr) = Emissions (TPY) * (2000 lb/1 ton) * (yr/8760 hours)
9. Methanol Usage Emissions include emissions from lid slurry, tanks, and air lines. Tank losses are in closed loop so emissions are considered to be zero.
   Lid Slurry Emissions (TPY) = Winter Lid Slurry (lbs/yr) * Weight % * (1 ton / 2000 lbs)
   Air Lines Emissions (TPY) = Methanol Tank for Air Lines (lb/yr) * (1-Efficiency) * (1 ton / 2000 lbs)
   Emissions (lb/hr) = Emissions (TPY) * (2000 lb/1 ton) * (yr/8760 hours)

By-Products Recovery Plant Total Emission (P021)

Pollutant	By-Products Recovery Plant (P021)			
	Actual (lb/hr)	Actual (TPY)	Potential (lb/hr)	Potential (TPY)
VOC	7.7680	34.0240	13.2490	58.0305
Acetonitrile	0.0004	0.0018	0.0004	0.0018
Ammonia	13.6389	59.7384	21.5472	94.3768
Anthracene	0.0002	0.0009	0.0002	0.0009
Benzene	0.3429	1.5021	0.5158	2.2593
Benzo(a)anthracene	0.0002	0.0010	0.0002	0.0010
Benzo(a)pyrene	0.0003	0.0013	0.0003	0.0013
Benzo(b)fluoranthene	0.0003	0.0014	0.0003	0.0014
Benzo(k)fluoranthene	0.0001	0.0002	0.0001	0.0002
Benzo(g,h,i)Perylene	0.0001	0.0003	0.0001	0.0003
Biphenyl	0.0001	0.0003	0.0001	0.0003
Carbon Disulfide	0.0005	0.0022	0.0005	0.0022
Chrysene	0.0003	0.0011	0.0003	0.0011
Cresol	0.0000	0.0002	0.0000	0.0002
Cyanide Compounds	0.0048	0.0209	0.0079	0.0348
Dibenzofuran	0.0003	0.0012	0.0003	0.0012
Dicyclopentadiene	0.0002	0.0007	0.0002	0.0007
2,4-Dimethylphenol	0.0000	0.0000	0.0000	0.0000
Ethylbenzene	0.0036	0.0159	0.0060	0.0264
Ethylene	0.0000	0.0000	0.0000	0.0000
Fluoranthene	0.0011	0.0046	0.0011	0.0046
Hexane	0.0000	0.0001	0.0000	0.0001
Hydrochloric Acid	1.9847	8.6931	3.3052	14.4766
Hydrogen Cyanide	0.4103	1.7970	0.6482	2.8389
Hydrogen Sulfide	3.7461	16.4080	5.9182	25.9219
Indeno(1,2,3-cd)pyrene	0.0001	0.0003	0.0001	0.0003
Lead	0.0000	0.0000	0.0000	0.0000
Methanol	7.3942	32.3865	12.3278	53.9956
Naphthalene	0.0100	0.0437	0.0148	0.0647
Phenanthrene	0.0010	0.0043	0.0010	0.0043
Phenol	1.4970	6.5569	2.3651	10.3590
Propylene	0.0000	0.0000	0.0000	0.0000
Pyridine	0.0002	0.0010	0.0002	0.0010
Styrene	0.0007	0.0030	0.0007	0.0030
1,2,4-Trimethylbenzene	0.0001	0.0004	0.0001	0.0004
Toluene	0.0873	0.3824	0.1391	0.6092
Xylene	0.0275	0.1206	0.0448	0.1962