ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

December 9, 2016

SUBJECT: Renewal Title V Operating Permit Application
U.S. Steel Mon Valley Works - Irvin Plant
Camp Hollow Road
West Mifflin, PA 15122

RE: Operating Permit File No. 0050

TO: Jayme Graham
Air Quality Program Mgr.

FROM: Hafeez A. Ajenifuja
Air Quality Engineer

FACILITY DESCRIPTION:

The U. S. Steel Irvin Works is a secondary steel processing facility located in West Mifflin Borough, Allegheny County, Pennsylvania. The Irvin Plant receives steel slabs and performs one of several finishing processes on the steel slabs. The finishing processes commonly referred to as secondary steel processes; include hot and cold rolling, continuous pickling, annealing, and galvanizing. The facility is composed of an 80" hot strip mill, 64" & 84" continuous hydrochloric acid pickle lines, a cold reduction mill, HPH annealing furnaces, open coil annealing furnaces, a continuous annealing furnace, continuous galvanizing line no.1, continuous galvanizing and aluminum coating line no. 2, four coke oven gas flares, and four natural gas/coke oven gas fired boilers.

The U.S. Steel Irvin Plant is a major source of volatile organic compounds (VOCs), oxides of nitrogen (NO_X), particulate matter (PM), particulate matter less than 10 microns in diameter (PM-10), sulfur dioxide (SO_2), and carbon monoxide (CO), as defined in Section 2101.20 of Article XXI.

PROCESS DESCRIPTION:

This is a Title V renewal application for U. S. Steel Irvin Works located in West Mifflin Borough, Allegheny County. The original operating permit was issued on February 15, 2005 and the facility's operations, processes and emissions are still the same as in the original operating permit. This renewal Title V permit incorporate all the conditions from issued installation permits No. 0050-I006 (Issued on January 27, 2006) for Open Coil Annealing Furnaces No.15 and No.16 (P010). The Continuous Terne Line (P014) and Continuous Galvaneal Furnace (Part of P012) have been removed from the permit. They are no longer in operation.

EMISSION CALCULATION:

The emissions from the facility's operations are shown in the tables below and detailed emission estimations are shown in Appendix A.

Emissions from facility furnaces firing natural gas are shown in Table 1 below:

Pollutants	Emissions							
	80" Hot Strip Mill Reheat Furnaces 1-5[a,b] 140 MMBtu/hr Each		HPH Box Annealing Furnaces 1-31[c] 4.9 MMBtu/hr Each		No 1 Continuous Galvanizing Line Furnace[c] Preheat Furnace 50 MMBtu/hr		No. 2 Continuous Galvanizing & Aluminum Coating Lines[c] 18 MMBtu/hr	
	Lbs/hr	Tons/yr[g]	Lbs/ hr	Tons/yr[g]	lb/hr	Tons/yr[g]	Lbs/hr	Tons/yr[g]
PM/PM_{10}	7.0	18.25	0.04	0.78	0.40	1.75	0.14	0.63
[d]SO_X	30.12	131.91	0.003	0.013	0.03	0.13	0.01	0.04
NO_x	NA	NA	0.49	2.15	3.0	13.14	7.20	31.54
[e]CO	NA	NA	0.47	2.06	4.83	21.16	1.74	7.62
[f]*VOC*	NA	NA	0.03	0.13	0.32	1.40	0.11	0.50

[a]The emission is for each furnace
[b]PM/PM-10 emissions for the 80" HSM Reheat Furnaces are from §2104.02.b.
[c]PM/PM-10 emissions are from §2104.02.a.1
[d]Emissions factor from AP-42, March 1998, Table 1.4-2
[e]Emission factor from AP-42, March 1998, Table 1.4-1
[f]Emission factor from AP-42, March 1998, Table 1.4-2
[g]A year is defined as any consecutive 12-month period
N/A = the facility will perform emissions tests and evaluations to develop emission factors that can be applied to quantify CO, NO_X and VOC emission.

Emissions from facility furnaces firing natural gas are shown in Table 1 cont. below:

Pollutants	Emissions							
	No. 1 Continuous Annealing Furnace 45 MMBtu/hr		OCA Furnaces 1-9[a,c] 7.2 MMBtu/hr each		OCA Furnaces 10-13[a,c] 9 MMBtu/hr each		OCA Furnaces[h] 14 5.4 MMBtu/hr	
	lbs/hr	tons/yr[f]	lb/hr	tons/yr[f]	lb/hr	tons/yr[f]	lbs/hr	tons/yr[f]
PM/PM_{10}	0.36	1.58	0.06	0.25	0.07	0.32	0.04	0.18
[d]SO_X	0.03	0.12	0.004	0.02	0.01	0.02	0.004	0.02
NO_x	4.50	19.71	0.72	3.15	0.90	3.94	0.75	3.28
[e]CO	4.35	19.05	0.70	3.07	0.87	3.81	0.47	2.10
[f]VOC	0.28	1.25	0.05	0.22	0.06	0.26	0.03	0.13

[a]The emission is for each furnace
[b]PM/PM-10 emissions for the continuous tern line is from §2104.02.b.
[c]PM/PM-10 emissions are from §2104.02.a.1
[d] SO_x emissions factor from AP-42, March 1998, Table 1.4-2
[e] CO emission factor from AP-42, March 1998, Table 1.4-1
[f] VOC emission factor from AP-42, March 1998, Table 1.4-2
[g]A year is defined as any consecutive 12-month period

Table 2: Emissions from facility furnaces firing coke oven gas

Pollutants	Emissions									
	80" Hot Strip Mill Reheat Furnaces 1-5[a,c] 140 MMBtu/hr Each		HPH Box Annealing Furnaces 1-31[a,b] 4.9 MMBtu/hr Each		No. 1 Continuous Annealing Furnace[c] 45 MMBtu/hr		Open Coil Annealing Furnaces			
							OCA Furnaces 1-9[a,c] 7.2 MMBtu/hr each		OCA Furnaces 10-13[a,c] 9 MMBtu/hr each	
	Lbs/hr	Tons/yr[f]	Lbs/hr	Tons/yr[f]	lb/hr	Tons/yr[f]	Lb/hr	Tons/yr[f]	Lbs/hr	Tons/yr[f]
PM/PM_{10}	7.0	18.25	0.10	0.43	0.90	3.94	0.14	0.63	0.18	0.79
[d]SO_X	30.12	131.91	1.05	4.62	9.68	42.40	1.55	6.78	1.94	8.48
[e]NO_x	NA	NA	0.74	3.24	18.00	78.84	2.88	12.61	3.60	13.84
[e]CO	NA	NA	0.21	0.92	1.66	19.04	0.30	1.31	0.38	1.66
[e]VOC	NA	NA	0.01	0.044	0.12	0.53	0.02	0.09	0.02	0.09

[a] The emission is for each furnace
[b]PM/PM-10 emissions for the 80" HSM Reheat Furnaces are based on §2104.02.b.
[c]PM/PM-10 emissions based on §2104.02.a.1
[d]SO_x emission based on 40 grains of H2S/100 cf-COG per §2105.21.h.4
[e] The facility will perform emissions tests and evaluations to develop emission factors that can be applied to quantify CO, NO_X and VOC emission
[f]A year is defined as any consecutive 12-month period

Sample Calculation Furnace (PM)

PM emission = 7 lbs/hr and 100 lbs/day from §2104.02.b a

PM = (100 lbs/day)*(356 days/yr)*(tons/2000lb) = **18.25 tons/yr**

Table 4: Emissions from facility Open Coil Annealing Furnaces No. 15 and 16 firing natural gas and coke oven gas

Pollutant	lbs/hr – each furnace (natural gas)	lbs/hr – each furnace (coke oven gas)	tons/yr[1]- (each furnace)	tons/yr[1]- (both furnaces)
Particulate Matter	0.015	0.102	0.45	0.90
PM-10	0.015	0.071	0.31	0.63
SO_2	0.005	1.61	7.04	14.10
NO_X	0.28	0.35	1.52	3.04
CO	0.68	0.30	2.96	5.93
VOC	0.044	0.020	0.19	0.39

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

Table 5: Coke Oven Gas Flares No. 1 through No. 3 and Peachtree A & B Flare
(Emissions from Each Flare)

Pollutant	lbs/hr (each)	tons/yr[1] (each)	tons/yr[1] (Combined)
Particulate Matter	1.22	5.36	21.44
PM-10	1.22	5.36	21.44
SO_2	30.25	132.50	530
NO_X	9.56	41.88	167.52
CO	52.03	227.90	911.64
VOC	8.86	38.80	155.20
HCL	1.28	5.62	22.47

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

RENEWAL OPERATING APPLICATION COMPONENTS:

1. Renewal Permit Application No. 0050 was received on July 31, 2009.

METHOD OF DEMONSTRATING COMPLIANCE:

Compliance is demonstrated by use of emission testing for the 64" and 84" Continuous Coil Pickle Lines as well as a continuous measurement of the scrubber makeup water flow rate and recirculation water flow rate. Compliance for the No. 3 Five Stand Cold Reduction Mill is demonstrated by VOC emission testing of the mist eliminator stack. The VOC content of the cold mill lubricating oil shall not exceed 7% by volume and the VOC content of the water-oil emulsion rolling solution shall not exceed 2% by volume. Compliance determination for the 80" Hot Strip Mill Reheat Furnaces No. 1-5, the No. 2 Continuous Annealing Furnace and Boilers No. 1-4 is the performance of an annual adjustment of the combustion process as required in the Plan Approval Order and Agreement No. 258 Upon Consent, dated December 30, 1996. These sources as well as the remaining sources at the Irvin plant are subject to monitoring, record keeping and reporting requirements as detailed for each source in the Renewal Title V Operating Permit 0050.

REGULATORY APPLICABILITY:

1. Article XX1 Requirements for Issuance:

The requirements of Article XXI, Parts B and C for the issuance of this renewal permit have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually. These sections reference various regulations in Article XXI related to visible emissions, testing, monitoring, recordkeeping and reporting requirements.

Fuel burning or combustion equipment and process sources at the Irvin Plant are subject to the particulate matter emission limitations in §2104.02 and the sulfur oxide emission limitations in §2104.03. These conditions are referenced in Section V (Emission Unit Level Terms and Conditions) of the Title V Operating Permit.

2. Testing Requirements:

a) 80" Hot Strip Mill

The facility will test all five furnaces firing coke oven gas only for SO_2 emissions every two years (24 consecutive months) according to approved U.S. EPA test methods and Section 2108.02 of Article XXI or other method approved by the Department. The amount of sulfur (expressed as H_2S) in the incoming coke oven gas to be combusted in the furnaces will be measured once per day and used to determine SO_2 emissions, assuming 100% of the H_2S is converted to SO_2.

b) 64" and 84" Continuous Coil Pickle Lines

These sources are tested for HCl and particulate matter (PM and PM-10) emissions every two and half (2 1/2) years to determine compliance with the MACT Standard (for HCl) in 40 CFR 63, Subpart CCC. The concentration of HCl in the exhaust gases shall not exceed 6 ppmv (or an HCl mass emission rate that corresponds to a collection efficiency of 99%) for the 64" pickle line and 18 ppmv (or an HCl mass emission rate that corresponds to a collection efficiency of 97%) for the 84" pickle line. Testing of the 64" pickle line scrubber will be conducted once every five years to demonstrate compliance with the 99% collection efficiency standard.

c) No. 3 Five Stand Cold Reduction Mill

The cold reduction mill is tested for compliance with the particulate matter (PM and PM-10) emission standard of 0.025 lbs of particulate per ton of steel rolled. This testing is performed at least once every 5 years.

d) 80" Hot Strip Mill Reheat Furnaces No. 1-5, No. 2 Continuous Annealing Furnace and Boilers No. 1-4

An annual adjustment or "tune-up" on the combustion process of this equipment is performed once every twelve (12) months. The annual tune-up includes: [Plan Approval Order and Agreement Upon Consent Number 258, dated December 30, 1996]

1) Inspection, adjustment, cleaning, or necessary replacement of fuel-burning equipment, including the burners and moving parts necessary for proper operation as specified by the manufacturer;
2) Inspection of the flame pattern or characteristics and adjustments necessary to minimize total emissions of NO_x, and to the extent practicable minimizes emissions of carbon monoxide (hereafter referred as "CO");

3) Inspection of the air-to-fuel ratio control system and adjustments necessary to ensure proper calibration and operation as specified by the manufacturer; and

4) Determine and record the CO and NO_x emission rate after the annual tune-up.

The hydrogen sulfide (H_2S) content of the coke oven gas combusted in the furnaces and boilers is limited to 35 grains per 100 dry standard cubic feet of coke oven gas.

3. New Source Performance Standards (NSPS)

There are no NSPSs that are applicable to sources at the Irvin Plant. The NSPS for boilers with heat inputs less than 100 MMBTU/hour (40 CFR Part 60, Subpart Dc) applies to boilers constructed after June 9, 1989. The boilers at the Irvin Plant were constructed prior to June 9, 1989.

4. National Emission Standards for Hazardous Air Pollutants (NESHAP)

The 64" and 84" Continuous Coil Pickle Lines are subject to the NESHAP for Steel Pickling-HCl Process Facilities in 40 CFR Part 63, Subpart CCC. This regulation is also referred to as the MACT (Maximum Achievable Control Technology) for Steel Pickling. This NESHAP sets HCl emission limitations and control device collection efficiency requirements for new and existing steel pickling facilities. Subpart CCC also contains testing, monitoring, recordkeeping, reporting and work practice requirements for these pickling facilities.

The Irvin Plant is not subject to the NESHAP for Integrated Iron and Steel Manufacturing at 40 CFR Part 63, Subpart FFFFF because this is a steel finishing facility that does not contain the sources that are subject to this regulation (i.e., blast furnaces, sinter plant or BOPF steel making furnaces).

5. Compliance Assurance Monitoring:

The Compliance Assurance Monitoring (CAM) rule found in 40 CFR 64 is applicable to the Five Stand Cold Reduction Mill its associated cyclone mist eliminator because the uncontrolled Particulate Matter (PM) emission is more than 100 tons per year (Title V threshold) and the post – control emission is less than 100 tons/year.

The facility has chosen to perform weekly measurement of in-let pressure for each fan, daily recordings of production, hours of operation and lubricant VOC content. Conditions have been incorporated into the operating permit to restrict the inlet static pressure to no more than -8" w.c., monitor/measure, record and report the cyclone mist eliminator pressure weekly

CAM Emission Unit Identification

SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	Pre-Control Emission Limit tons/yr (each)	Post 'Control Emission Limit tons/yr	NESHAP/ NSPS After November 15, 1990	CAM Applicable
80-Inch Hot Strip Mill Reheat Furnaces No. 1 to No. 5	None	140 MMBtu/Hr	NA	NA	NA	NO
64-Inch Continuous Coil Hydrochloric Acid Pickle Line	Packed Tower Scrubber	1,047,174 tons/yr	HCL = 179.13	1.79	Yes	NO
84-Inch Continuous Coil Hydrochloric Acid Pickle Line	Packed Tower Scrubber	1,576,800 tons/yr	HCL = 418.33	12.55	Yes	NO
Cold Reduction Mill (Mill Stands No. 1 to No. 5)	Cyclone Mist Eliminator	3,767,676 tons/yr	PM = 525	31.25	NA	YES
HPH Batch Annealing Furnaces (31 individual furnaces)	None	4.9 MMBtu/hr, each furnace	NA	NA	NA	NO
Open Coil Annealing Furnaces No. 1 to No. 9	None	7.2 MMBtu/hr, each	NA	NA	NA	NO
Open Coil Annealing Furnaces No. 10 to No. 13	None	9.0 MMBtu/hr, each	NA	NA	NA	NO
Open Coil Annealing Furnace No. 14	None	5.4 MMBtu/hr	NA	NA	NA	NO
Open Coil Annealing Furnace No. 15 & No. 16	None	7.47 MMBtu/hr, each	NA	NA	NA	NO
Continuous Annealing	None	45 MMBtu/hr	NA	NA	NA	NO
No.1 Continuous Galvanizing Galvaneal Furnace	None	18 MMBtu/hr	NA	NA	NA	NO
No.1 Continuous Galvanizing Preheat Furnace	None	50 MMBtu/hr	NA	NA	NA	NO

6. <u>Reasonable Available Control Technology (RACT)</u>

The facility is subject to NO_x Reasonable Available Control Technology (NO_x and VOC RACT) because it is a major source of NO_x and VOC.

EMISSIONS SUMMARY:

The allowable emission summary including emissions from the four flares for the U.S Steel Irvin plant is given in Table below:

EMISSION SUMMARY

Pollutant	Annual Emissions (tons/year)
PM	**123.89**
PM_{10}	**124.52**
NO_X	**749.15**
SO_X	**1,127.51**
CO	**1,179.08**
VOC	**203.99**
LEAD	**0.08**
HYDROCHLORIC ACID	**36.77**

RECOMMENDATIONS:

All the sources, operations and conditions are still the same as in the original permit. All applicable Federal, State, and County regulations have been addressed in the permit application. I recommend the issuance of the renewal operating permit No. 0050.