65-853

KOPPERS INDUSTRIES

Nathan J. Prepelka

FAX TRANSMISSION

436 Seventh Avenue, Suite 1800
Pittsburgh, PA 15219
Telephone: 412/227-2114
Fax: 412/227-2423

To:	Mark Wayner	**Date:**	12/1/1997
Fax#:	442-4194	**Pages:**	2
Subject:			

COMMENTS:

PLEASE DELIVER THE ATTACHED TO THE ABOVE-REFERENCED PERSON AS SOON AS POSSIBLE.

DRAFT

Annual NOx Potential Emissions for the RACT Plan, the Unmodified Title V Application, Current Potential Emission Rates and Recommended RACT Permit Limits

Source	RACT Plan		Unmodified Title V Application		Current Potential Emission Rates		Recommended RACT Permit Limits		
	Emissions [TPY]	Technical Basis	Emissions [TPY]	Technical Basis	Emissions [TPY]	Technical Basis	Emissions [TPY]	Emissions [lb/hr]	Technical Basis
Coke Battery Underfire	120.4	AIRS (80 lb/MMCF) 3008.8 MMCF/yr COG							
Battery 1B			214.3	Draft AP-42 (1.22 lb/ton coal) 351,323 tons coal for Battery 1B	285.6	4/97 Stack Test (1.597 lb/ton coal) 541,267 tons coal/yr	357.0	81.5	25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Battery 2			110.1	Draft AP-42 (1.22 lb/ton coal) 180,409 tons coal for Battery 2	245.3	4/97 Stack Test (2.672 lb/ton coal) 541,267 tons coal/yr	306.6	70.0	25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Flares	4.7	AIRS (80 lb/MMCF) 116.4 MMCF/yr COG	136.0	AP-42 (0.068 lb/MMBtu) 2890.8 MMCF/yr COG main flare 4380.0 MMCF/yr COG supp. Flare	136.0	Same as Title V	170.0		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke Pushing	7.6	AIRS (0.03 lb/ton coal) 504,000 tons coal/yr	4.3	Easterly (1995) emission factor (0.016 lb/ton coal) 531,732 tons coal/yr	4.8	11/96 Stack Test (0.0178 lb/ton coal) 541,267 tons coal/yr	6.0	10.5	25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke Quenching	151.2	AIRS (0.6 lb/ton coal) ~~504,000 tons coal/yr~~	0.0	~~Engineering Judgement~~	0.0	Same as Title V	0.0		
Coke Battery Charging, Door Leaks, Topside Leaks, Soaking	0.3	AIRS emission factors corrected for PLD (0.2), PLL (0.65) and PLO (0.65)	0.7	Engineering calculations involving NESHAP Visible Emissions (VE) limits and AP-42/AIRS emission factors	0.7	Same as Title V	0.9		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Boilers 1 and 2		RACT Plan addressed emissions from Boilers 3 - 6, now shutdown	28.0	Plan Approval limit 14.0 TPY per boiler	112.1	Emission Limit set by PADEP agreement with Koppers Industries, Inc.	112.1		Set by negotiated settlement.
TOTALS	284.2	TPY	493.4	TPY	784.6	TPY	952.6		TPY

DRAFT

Annual VOC Potential Emissions for the RACT Plan, the Unmodified Title V Application, Current Potential Emission Rates and Recommended RACT Permit Limits

Source	RACT Plan		Unmodified Title V Application		Current Potential Emission Rates		Recommended RACT Permit Limits		
	Emissions [TPY]	Technical Basis	Emissions [TPY]	Technical Basis	Emissions [TPY]	Technical Basis	Emissions [TPY]		Technical Basis
Coke Battery Underfire	1.8	AIRS (1.2 lb/MMCF) 3006.8 MMCF/yr COG							
Battery 1B			1.0	AIRS (1.2 lb/MMCF) 1582.0 MMCF/yr COG Battery 1B	1.0	4/97 Stack Test (0.0054 lb/ton coal) 357,623 tons coal/yr	1.3	0.3	25% margin for operational flexibility, changes in emission factors; and variability in stack testing.
Battery 2			0.5	AIRS (1.2 lb/MMCF) 812.4 MMCF/yr COG Battery 2	1.9	4/97 Stack Test (0.0203 lb/ton coal) 183,644 tons coal/yr	2.4	0.5	25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Flares	0.1	AIRS (1.2 lb/MMCF) 118.4 MMCF/yr COG	118.7	Engineering calculations involving amount of COG flared, COG composition and assumed 99% destruction efficiency	118.7	Same as Title V	148.4		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke Pushing	50.4	AIRS (0.2 lb/ton coal) 504,000 tons coal/yr	2.4	Easterly (1995) emission factor (0.009 lb/ton coal) 531,732 tons coal/yr	0.6	11/96 Stack Test (0.0023 lb/ton coal) 541,287 tons coal/yr	0.8	1.3	25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke Quenching	5.0	AIRS (0.02 lb/ton coal) 504,000 tons coal/yr	5.3	AIRS (0.02 lb/ton coal) 531,732 tons coal/yr	5.4	Same as Title V 541,287 tons coal/yr	6.8		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke Battery Charging, Door Leaks, Topside Leaks, Soaking	28.8	AIRS emission factors corrected for PLD (0.2), PLL (0.65) and PLO (0.65)	15.8	Engineering calculations involving NESHAP Visible Emissions (VE) limits and AP-42/AIRS emission factors	36.2	.083 lb/ton coal for charging per agreement with PADEP; other emissions same as Title V 541,287 tons coal/yr	45.3		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Boilers 1 and 2		RACT Plan addressed emissions from Boilers 3 - 6, now shutdown	2.7	AIRS (1.2 lb/MMCF) 4555.2 MMCF/yr COG	2.7	Same as Title V	2.7		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
Coke By-products Plant	31.7	AP-42 storage tank equations, equipment leak emission factors, liquid loading equation	35.1	AP-42 TANKS program, equipment leak emission factors, liquid loading equation	35.2	Same methodology as Title V 541,267 tons coal/yr	44.0 ~~2.7~~		25% margin for operational flexibility, changes in emission factors, and variability in stack testing.
TOTALS	117.8	TPY	181.6	TPY	201.7	TPY	210.2		TPY

KOPPERS INDUSTRIES

Koppers Industries, Inc.
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Fax: (412) 227-2423

January 13, 1998

Mr. William J. Charlton, Chief
Engineering Services
Pennsylvania Department of Environmental Protection
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222

RE: **Koppers Industries, Inc.**
Response to January 6th Phone Call

Dear Mr. Charlton,

In response to the questions you posed to me during the January 6th phone call, Koppers Industries, Inc. ("KII") respectfully submits this letter and enclosure. After discussing the issues with the consulting group, Enviroplan Consulting, responsible for assisting KII in the Reasonably Available Control Technology Permit Application submittal, the attached response and backup documentation was received on January 9, 1998. Each issue that you and I discussed is specifically addressed in the enclosures.

Hopefully, this transmittal is fully responsive to your concerns. If you require any further information or wish to discuss KII's answers, please call me at 227-2114.

Thank you for your assistance and patience in this matter.

Sincerely,

Nathan J Prepelka

Nathan J. Prepelka, R.E.M.
Environmental Manager

Enclosures

CC:	R. D. Collins	K-1700
	S. T. Smith	K-1800
	T. J. Wojtowicz	K-1650
	R. J. Burkhart	Monessen Coke Plant
	G. Shamitko	Monessen Coke Plant
	M. Wayner	PADEP – Title V Section

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JAN 14 1998
DEP, Southwest Regional Offic
Air Quality

ENVIROPLAN CONSULTING

January 7, 1998
Ref. No. 1686-15

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JAN - 9

Mr. Nathan J. Prepelka, R.E.M.
Supervisor, Environmental Programs
Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Re: NO$_x$/VOC RACT Permit for Monessen Coke Plant: Flare Emissions

Dear Nate:

Per your request, I have addressed each of the issues raised by PADEP concerning the NO$_x$ and VOC emission limits for flares at the Monessen Coke Plant. My comments are summarized below:

Issue #1: Quantity of Coke Oven Gas (COG) Flared

PADEP has requested that we base flare potential emissions on a more realistic estimate of the maximum quantity of COG flared, rather than on the design capacities of the flares. Accordingly, we have estimated this quantity based on the following: 1) a maximum plant wide COG generating capacity of 10,425 CF/ton coal, 2) a maximum coal charge of 541,267 tons/year, 3) a COG allocation of 40% for underfiring, 30% for boilers, and 30% for flares, and 4) a 25% "safety margin". This is calculated as follows:

no

Max COG Flared = (10,425 CF/ton)(541,267 tons/yr)(0.3)(1.25) = 2116 MMCF/yr

Based on this quantity, potential NO$_x$ and VOC emissions from COG flaring are as follows (see Title V Application - Attachment A and comments below for derivation of emission factors):

$\frac{39.6}{1.25} = 31.7$

NO$_x$ = (0.068 lb/MMBtu)(550 MMBtu/MMCF)(2116 MMCF/yr)/(2000 lb/ton) = 39.6 TPY NOx

.027 #/ft^3 12%

VOC = (2116 MMCF/yr)(27,200 lb COG/MMCF)(0.12 VOC content COG)(1-0.99 flare control effic.)/(2000 lb/ton) = 34.5 TPY /1.25 = 27.6

Issue #2: NO$_x$ Emission Factor for Flares

In the above calculation for NO$_x$ emissions from COG flaring, we applied the AP-42 Section 13.5 emission factor for industrial flares of 0.068 lb/MMBtu (Table 13.5-1). Although this factor was based on emission tests using crude propylene containing 80% propylene and 20% propane, we believe this emission factor represents the best available means for estimating NO$_x$ emissions from

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COG flaring. According to U.S. EPA, flares do not lend themselves to conventional emission testing techniques, and there are very limited available test data on flare emissions. A copy of AP-42 Section 13.5 is attached.

Issue #3: Use of a 99% VOC Combustion Efficiency for Flares

We based our VOC emission estimates for COG flaring on a 99% combustion efficiency. This is consistent with U.S. EPA's May 1995 draft of AP-42 Section 12.2 (Coke Production), in which a 99% combustion efficiency for the flaring of bypassed COG is used. A copy of Table 12.2-5 of this draft, showing the use of the 99% combustion efficiency, is attached.

We should note that U.S. EPA has established flare combustion efficiency criteria in 40 CFR 60.18 which specify that 98% combustion efficiency can be achieved provided appropriate operating conditions are met. This efficiency has been demonstrated in recent EPA flare emission tests when burning an offgas having a net heating value of at least 300 Btu/scf. It is not unreasonable, therefore, to assume a 99% combustion efficiency for COG (net heating value approximately 550 Btu/scf).

Issue #4: Differences in NO_x/VOC Emissions Between COG Flares and Coke Battery Underfiring Systems

PADEP has questioned why we didn't apply recent Monessen coke battery combustion stack test data in estimating NO_x and VOC emissions from flares. We do not believe these stack test data are appropriate for estimating flare emissions. NO_x and VOC emissions from combustion are a function of burner design, combustion temperature, combustion residence time at peak temperature, combustion turbulence, fuel-to-air ratio, and other factors. Compared to flares, coke battery underfiring systems are characterized by much higher combustion temperatures, residence times, and turbulence levels, which would favor significantly higher NO_x emissions and higher VOC combustion efficiencies (i.e., lower VOC emissions).

There is a well-established exponential relationship between thermal NO_x emissions and peak combustion temperature. Likewise, it is well known that higher combustion temperatures result in greater VOC destruction efficiency. Application of the recent Monessen combustion stack test-derived emission factors to the maximum quantity of COG flared (i.e., 2116 MMCF/yr) would result in significantly higher NO_x emissions (199.1 TPY vs 39.6 TPY) and lower VOC emissions (1.1 TPY vs 34.5 TPY), compared to the flare emission estimates presented earlier. We, therefore, feel it is inappropriate to apply coke battery combustion stack test data to flare emission estimates.

If you have any questions, please call me at 973-575-2555, Ext. 3223.

Sincerely,

ENVIROPLAN CONSULTING

Allen Dittenhoef

Allen C. Dittenhoefer, Ph.D.
Senior Vice President
Environmental Studies Division

ACD/kg

13.5 Industrial Flares

13.5.1 General

Flaring is a high-temperature oxidation process used to burn combustible components, mostly hydrocarbons, of waste gases from industrial operations. Natural gas, propane, ethylene, propylene, butadiene and butane constitute over 95 percent of the waste gases flared. In combustion, gaseous hydrocarbons react with atmospheric oxygen to form carbon dioxide (CO_2) and water. In some waste gases, carbon monoxide (CO) is the major combustible component. Presented below, as an example, is the combustion reaction of propane.

$$C_3H_8 + 5\ O_2 \longrightarrow 3\ CO_2 + 4\ H_2O$$

During a combustion reaction, several intermediate products are formed, and eventually, most are converted to CO_2 and water. Some quantities of stable intermediate products such as carbon monoxide, hydrogen, and hydrocarbons will escape as emissions.

Flares are used extensively to dispose of (1) purged and wasted products from refineries, (2) unrecoverable gases emerging with oil from oil wells, (3) vented gases from blast furnaces, (4) unused gases from coke ovens, and (5) gaseous wastes from chemical industries. Gases flared from refineries, petroleum production, chemical industries, and to some extent, from coke ovens, are composed largely of low molecular weight hydrocarbons with high heating value. Blast furnace flare gases are largely of inert species and CO, with low heating value. Flares are also used for burning waste gases generated by sewage digesters, coal gasification, rocket engine testing, nuclear power plants with sodium/water heat exchangers, heavy water plants, and ammonia fertilizer plants.

There are two types of flares, elevated and ground flares. Elevated flares, the more common type, have larger capacities than ground flares. In elevated flares, a waste gas stream is fed through a stack anywhere from 10 to over 100 meters tall and is combusted at the tip of the stack. The flame is exposed to atmospheric disturbances such as wind and precipitation. In ground flares, combustion takes place at ground level. Ground flares vary in complexity, and they may consist either of conventional flare burners discharging horizontally with no enclosures or of multiple burners in refractory-lined steel enclosures.

The typical flare system consists of (1) a gas collection header and piping for collecting gases from processing units, (2) a knockout drum (disentrainment drum) to remove and store condensables and entrained liquids, (3) a proprietary seal, water seal, or purge gas supply to prevent flash-back, (4) a single- or multiple-burner unit and a flare stack, (5) gas pilots and an ignitor to ignite the mixture of waste gas and air, and, if required, (6) a provision for external momentum force (steam injection or forced air) for smokeless flaring. Natural gas, fuel gas, inert gas, or nitrogen can be used as purge gas. Figure 13.5-1 is a diagram of a typical steam-assisted elevated smokeless flare system.

Complete combustion requires sufficient combustion air and proper mixing of air and waste gas. Smoking may result from combustion, depending upon waste gas components and the quantity and distribution of combustion air. Waste gases containing methane, hydrogen, CO, and ammonia usually burn without smoke. Waste gases containing heavy hydrocarbons such as paraffins above methane, olefins, and aromatics, cause smoke. An external momentum force, such as steam injection

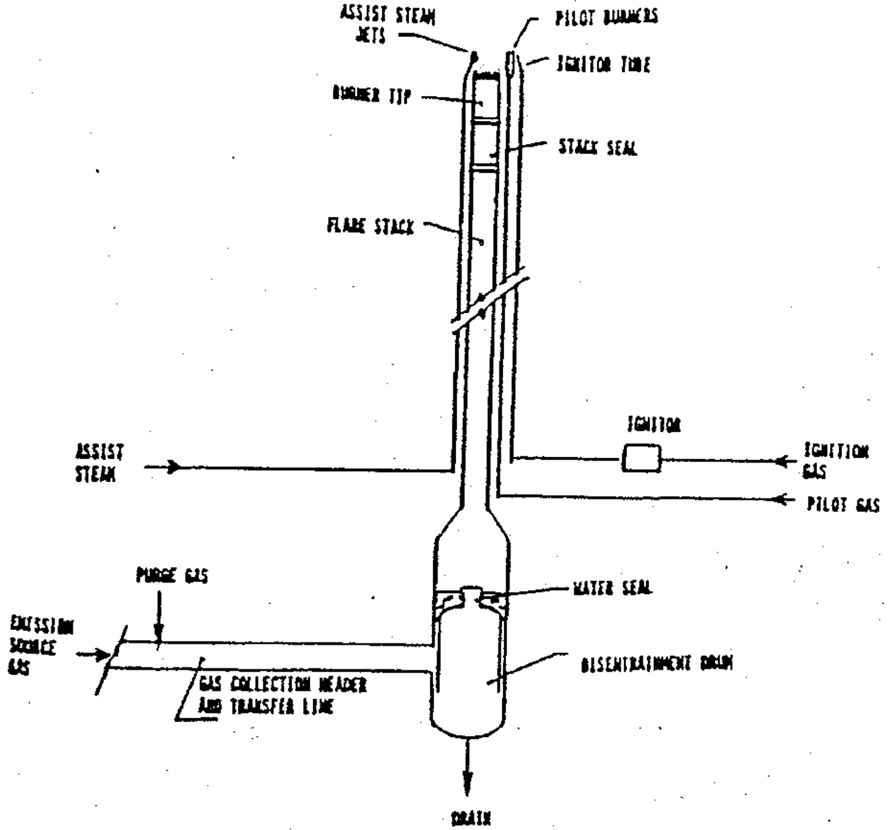

Figure 13.5-1. Diagram of a typical steam-assisted smokeless elevated flare.

or blowing air, is used for efficient air/waste gas mixing and turbulence, which promotes smokeless flaring of heavy hydrocarbon waste gas. Other external forces may be used for this purpose, including water spray, high velocity vortex action, or natural gas. External momentum force is rarely required in ground flares.

Steam injection is accomplished either by nozzles on an external ring around the top of the flare tip or by a single nozzle located concentrically within the tip. At installations where waste gas flow varies, both are used. The internal nozzle provides steam at low waste gas flow rates, and the external jets are used with large waste gas flow rates. Several other special-purpose flare tips are commercially available, one of which is for injecting both steam and air. Typical steam usage ratio varies from 7:1 to 2:1, by weight.

Waste gases to be flared must have a fuel value of at least 7500 to 9300 kilojoules per cubic meter kJ/m^3 (200 to 250 British thermal units per cubic foot [Btu/ft^3]) for complete combustion; otherwise fuel must be added. Flares providing supplemental fuel to waste gas are known as fired, or endothermic, flares. In some cases, even flaring waste gases having the necessary heat content will also require supplemental heat. If fuel-bound nitrogen is present, flaring ammonia with a heating value of 13,600 kJ/m^3 (365 Btu/ft^3) will require higher heat to minimize nitrogen oxides (NO_x) formation.

At many locations, flares normally used to dispose of low-volume continuous emissions are designed to handle large quantities of waste gases that may be intermittently generated during plant emergencies. Flare gas volumes can vary from a few cubic meters per hour during regular operations up to several thousand cubic meters per hour during major upsets. Flow rates at a refinery could be from 45 to 90 kilograms per hour (kg/hr) (100 - 200 pounds per hour [lb/hr]) for relief valve leakage but could reach a full plant emergency rate of 700 megagrams per hour (Mg/hr) (750 tons/hr). Normal process blowdowns may release 450 to 900 kg/hr (1000 - 2000 lb/hr), and unit maintenance or minor failures may release 25 to 35 Mg/hr (27 - 39 tons/hr). A 40 molecular weight gas typically of 0.012 cubic nanometers per second (nm^3/s) (25 standard cubic feet per minute [scfm]) may rise to as high as 115 nm^3/s (241,000 scfm). The required flare turndown ratio for this typical case is over 15,000 to 1.

Many flare systems have 2 flares, in parallel or in series. In the former, 1 flare can be shut down for maintenance while the other serves the system. In systems of flares in series, 1 flare, usually a low-level ground flare, is intended to handle regular gas volumes, and the other, an elevated flare, to handle excess gas flows from emergencies.

13.5.2 Emissions

Noise and heat are the most apparent undesirable effects of flare operation. Flares are usually located away from populated areas or are sufficiently isolated, thus minimizing their effects on populations.

Emissions from flaring include carbon particles (soot), unburned hydrocarbons, CO, and other partially burned and altered hydrocarbons. Also emitted are NO_x and, if sulfur-containing material such as hydrogen sulfide or mercaptans is flared, sulfur dioxide (SO_2). The quantities of hydrocarbon emissions generated relate to the degree of combustion. The degree of combustion depends largely on the rate and extent of fuel-air mixing and on the flame temperatures achieved and maintained. Properly operated flares achieve at least 98 percent combustion efficiency in the flare plume, meaning that hydrocarbon and CO emmissions amount to less than 2 percent of hydrocarbons in the gas stream.

The tendency of a fuel to smoke or make soot is influenced by fuel characteristics and by the amount and distribution of oxygen in the combustion zone. For complete combustion, at least the stoichiometric amount of oxygen must be provided in the combustion zone. The theoretical amount of oxygen required increases with the molecular weight of the gas burned. The oxygen supplied as air ranges from 9.6 units of air per unit of methane to 38.3 units of air per unit of pentane, by volume. Air is supplied to the flame as primary air and secondary air. Primary air is mixed with the gas before combustion, whereas secondary air is drawn into the flame. For smokeless combustion, sufficient primary air must be supplied, this varying from about 20 percent of stoichiometric air for a paraffin to about 30 percent for an olefin. If the amount of primary air is insufficient, the gases entering the base of the flame are preheated by the combustion zone, and larger hydrocarbon molecules crack to form hydrogen, unsaturated hydrocarbons, and carbon. The carbon particles may escape further combustion and cool down to form soot or smoke. Olefins and other unsaturated hydrocarbons may polymerize to form larger molecules which crack, in turn forming more carbon.

The fuel characteristics influencing soot formation include the carbon-to-hydrogen (C-to-H) ratio and the molecular structure of the gases to be burned. All hydrocarbons above methane, i. e., those with a C-to-H ratio of greater than 0.33, tend to soot. Branched chain paraffins smoke more readily than corresponding normal isomers. The more highly branched the paraffin, the greater the tendency to smoke. Unsaturated hydrocarbons tend more toward soot formation than do saturated ones. Soot is eliminated by adding steam or air; hence, most industrial flares are steam-assisted and some are air-assisted. Flare gas composition is a critical factor in determining the amount of steam necessary.

Since flares do not lend themselves to conventional emission testing techniques, only a few attempts have been made to characterize flare emissions. Recent EPA tests using propylene as flare gas indicated that efficiencies of 98 percent can be achieved when burning an offgas with at least 11,200 kJ/m^3 (300 Btu/ft^3). The tests conducted on steam-assisted flares at velocities as low as 39.6 meters per minute (m/min) (130 ft/min) to 1140 m/min (3750 ft/min), and on air-assisted flares at velocities of 180 m/min (617 ft/min) to 3960 m/min (13,087 ft/min) indicated that variations in incoming gas flow rates have no effect on the combustion efficiency. Flare gases with less than 16,770 kJ/m^3 (450 Btu/ft^3) do not smoke.

Table 13.5-1 presents flare emission factors, and Table 13.5-2 presents emission composition data obtained from the EPA tests.[1] Crude propylene was used as flare gas during the tests. Methane was a major fraction of hydrocarbons in the flare emissions, and acetylene was the dominant intermediate hydrocarbon species. Many other reports on flares indicate that acetylene is always formed as a stable intermediate product. The acetylene formed in the combustion reactions may react further with hydrocarbon radicals to form polyacetylenes followed by polycyclic hydrocarbons.[2]

In flaring waste gases containing no nitrogen compounds, NO is formed either by the fixation of atmospheric nitrogen (N) with oxygen (O) or by the reaction between the hydrocarbon radicals present in the combustion products and atmospheric nitrogen, by way of the intermediate stages, HCN, CN, and OCN.[2] Sulfur compounds contained in a flare gas stream are converted to SO_2 when burned. The amount of SO_2 emitted depends directly on the quantity of sulfur in the flared gases.

Table 13.5-1 (English Units). EMISSION FACTORS FOR FLARE OPERATIONS[a]

EMISSION FACTOR RATING: B

Component	Emission Factor ($lb/10^6$ Btu)
Total hydrocarbons[b]	0.14
Carbon monoxide	0.37
Nitrogen oxides	0.068
Soot[c]	0 - 274

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (μg/L); lightly smoking flares, 40 μg/L; average smoking flares, 177 μg/L; and heavily smoking flares, 274 μg/L.

Table 13.5-2. HYDROCARBON COMPOSITION OF FLARE EMISSION[a]

Composition	Volume %	
	Average	Range
Methane	55	14 - 83
Ethane/Ethylene	8	1 - 14
Acetylene	5	0.3 - 23
Propane	7	0 - 16
Propylene	25	1 - 65

[a] Reference 1. The composition presented is an average of a number of test results obtained under the following sets of test conditions: steam-assisted flare using high-Btu-content feed; steam-assisted using low-Btu-content feed; air-assisted flare using high-Btu-content feed; and air-assisted flare using low-Btu-content feed. In all tests, "waste" gas was a synthetic gas consisting of a mixture of propylene and propane.

References For Section 13.5

1. *Flare Efficiency Study*, EPA-600/2-83-052, U. S. Environmental Protection Agency, Cincinnati, OH, July 1983.

2. K. D. Siegel, *Degree Of Conversion Of Flare Gas In Refinery High Flares*, Dissertation, University of Karlsruhe, Karlsruhe, Germany, February 1980.

3. *Manual On Disposal Of Refinery Wastes, Volume On Atmospheric Emissions*, API Publication 931, American Petroleum Institute, Washington, DC, June 1977.

DRAFT

Draft Table 12.2-5 (English Units).
EMISSION FACTORS FOR COKE PRODUCTION: BYPASSED COKE OVEN GAS[a]
(SCC 3-03-003-___)

EMISSION FACTOR RATING: E

Pollutant	Uncontrolled	Flared
Benzene soluble organics (BSO)	44	ND
Filterable PM[b]	40	ND
Condensible PM[c]	40	ND
Carbon monoxide	48	4.8
Carbon dioxide	21	780
Hydrogen sulfide	6.6	0.10
Ammonia	6.5	0.065[d]
Hydrogen cyanide	2.1	0.021[d]
Heavy hydrocarbons	35	1.7
Sulfur dioxide	0	13
Methane	120	1.2[d]
Ethane	12	0.12[d]
Propane	1.1	0.010[d]
Butane	0.7-	0.0070[d]
Ethylene	17	0.17[d]
Propylene	3.5	0.035[d]
Butene	2.9	0.029[d]
Pentene	0.60	0.0060[d]
Benzene	22	0.22[d]
Toluene	1.9	0.019[d]
Xylene	0.20	0.0020[d]
Acetylene	0.40	0.0040[d]
Tar acids (CxHxOH)	0.70	0.0070[d]
Tar bases (CxHxN)	0.50	0.0050[d]
Solvents	0.70	0.0070[d]
Naphthalene	7.0	0.07[d]
Tar oil	1.0	0.010[d]

[a] Reference 9. SCC = Source Classification Code. ND = no data. Factor units are lb/ton of coal charged and are used to estimate emissions of bypassed coke oven gas that is vented directly to atmosphere or flared as required by the NESHAP. To estimate total emissions per episode, multiply emission factor by average coal usage rate (ton/hr) and duration of venting episode in hours.

[d] Emissions after flaring are considered as "trace". The factors are based on an assumed 99 percent destruction.

[b] Filterable PM is that PM collected on or before the filter of an EPA Method 5 (or equivalent) sampling train.

[c] Condensible PM is that PM collected in the impingers portion of a PM sampling train.

KOPPERS INDUSTRIES

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Pittsburgh, PA 15219-1800

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RECEIVED
JUN 18 1998
DEP, Southwest Regional Office
Air Quality

June 16, 1998

CERTIFIED MAIL
RETURN RECEIPT
REQUESTED
Z 120 264 165

Mr. William J. Charlton, Chief
Engineering Services
Pennsylvania Department of Environmental Protection
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222

RE: **Koppers Industries, Inc. – Monessen Coke Plant**
Response to June 2, 1998 Meeting

Dear Mr. Charlton:

Koppers Industries, Inc. ("KII") would like to thank the Pennsylvania Department of Environmental Protection (the "Department") for the June 2, 1998 meeting and this opportunity to amend the Reasonably Available Control Technology ("RACT") Permit. During this June 2nd meeting, the Department requested that KII provide three responsive items, as follows:

1. Propose RACT Permit language reflecting the method of demonstrating compliance with the limitations placed on those sources that are not subject to stack testing.

2. Proposed potential-to-emit emission rates for the coke battery underfire stacks (1B and 2) as well as the pushing emission control system ("PECS") stack.

3. Determine whether there was an annual coal feed capacity limit under the 40 CFR Part 63 Subpart L Maximum Achievable Control Technology ("MACT") regulations for coke plants.

Proposed RACT Permit language for Condition 8

Emissions from the flare, coke quenching, coal charging, miscellaneous sources, fugitives and coke by-products plant have been calculated by the methods described in the United States Environmental Protection Agency ("USEPA") AP-42 document and the *Airs Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* document. These factors are based upon USEPA testing on "representative" plants and may underestimate or overestimate the emissions from a particular source. KII would like the following language to be added to condition 8 of the KII RACT Permit in order to assure that future compliance is determined in the same manner as the limits are originally generated.

Compliance with the RACT NOx and VOC limits for flare, coke quenching, coal charging, miscellaneous, fugitives and coke by-product plant sources will be based upon engineering calculations, the USEPA TANKS program and other methods including those described in the USEPA AP-42 document and the *Airs Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants* document.

Proposed potential-to-emit emission rates for coke battery underfire and PECS stacks

The initial RACT Permit application for the KII Monessen Coke Plant included permit limits, which were developed using a combination of annual compliance tests and air emission factors. Additionally, KII requested (in a December 3, 1997 letter to Mr. Mark Wayner) that the Department grant KII a 25% margin on the tested and calculated limits to allow for operational flexibility, stack testing variability as well as possible future changes to the USEPA emission factors. This 25% margin was not granted in the RACT Permit that was issued on March 20, 1998.

As this margin was not granted, KII initiated an internal investigation to determine whether compliance with these tightened limits was attainable on a continuous basis. Air Compliance Consultants, Inc. ("ACCI") was retained to conduct a diagnostic test program on the 1B coke battery underfire stack. It was determined over a 40 hour test program that emissions varied during the battery cycles, and the results of the previous test program, which were used to develop the RACT Permit levels, were low due to an incorrect stack diameter measurement.

In addition to the annual compliance test for coke battery underfire stacks and the PECS stack, KII is planning to conduct extended testing for both VOCs and NOx. The purpose of this test program will be to determine the maximum hourly emission rate and the variability in the potential emissions for each unit under normal operating conditions. At the conclusion of the test program, suggested RACT permit limitations will be submitted with the stack test results in a report to the Department. The test program, including the anticipated testing dates for each source, the method of testing and the method of determining the RACT permit limitations will be submitted to the Department within two weeks.

Annual coal feed capacity limit under the MACT rule

Considerable discussion came up during the June 2nd meeting about whether KII would be limited based upon capacity under the MACT rule. This discussion came about under RACT Permit condition 6, which states, in part, that the RACT limits are "based on 541,000 tons of coal charged per year." KII interprets this to mean that the RACT Permit limits will change if the amount of coal charged changes. The Department believed that this throughput quantity might have been derived from the MACT rule and requested that KII examine the rule.

ACCI researched the issue and found, under the MACT rulemaking, that the capacity is defined in terms of the physical equipment and not based on the limitation of coke or coal throughput. As long as KII does not modify the actual battery to increase capacity, they will not be subject to new source standards. ACCI made this determination by reviewing the proposed and final Federal Register Notices, reviewing the Code of Federal Regulations, and contacting several people involved in the rule development. The following points summarize ACCI's findings:

1. Capacity is not specifically defined by the rule and throughput numbers were not mentioned in the proposed or final regulations or their respective preambles.

2. David Ailor of the American Coke and Coal Chemicals Institute ("ACCCI") was involved with the rulemaking in 1992 for 40 CFR Part 63 Subpart L. He did not recall any intent to develop a coal feed or coke produced limitation in the proposed or final Federal Register notices (57 FR 57534 and 58 FR 57898). His understanding was that the "capacity" referred to in Subpart L referred to the physical equipment existing before, during and after rulemaking. To the best of his knowledge, a numerical limitation on coke production or coal use was not intended or included in any of the rulemaking. The use and production figures for most facilities are probably in the background information, but it is not part of any regulatory rulemaking.

3. David Menotti of the ACCCI (legal counsel and expert) was an advisory committee member during the rulemaking process. According to Mr. Menotti, 40 CFR Part 63 Subpart L discussions related to capacity caps are related to construction of new ovens and pad-up reconstruction of existing ovens. Facility capacity must be estimated if an oven is to be reconstructed to avoid new source review.

4. Amanda Agnew is listed as the USEPA's contact under the proposed and final regulation for 40 CFR Part 63 Subpart L and was involved in the rulemaking process. According to Ms. Agnew, the capacity of all coke oven batteries nationwide was reviewed during the rulemaking process. She did not recall the specifics, but believed the "capacity" of the ovens was based on the "physical size" and construction of the ovens and not throughput. This database established the baseline for the rulemaking.

KII believes that this letter is responsive to the requests made by the Department during the June 2nd meeting. If any further information is needed, please contact me at 227-2114. Again, KII will submit the test program for the coke battery underfire and PECS stacks to the Department within the next two weeks.

Thank you for your cooperation and patience in this matter.

Sincerely,

Nathan J. Prepelka

Nathan J. Prepelka, R.E.M.
Environmental Manager

cc: M. Wayner PADEP
J. P. Pezze PADEP