

**ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM**

January 19, 2010

SUBJECT: US Steel Tower
Winthrop Management, LP
Suite 3050
600 Grant Street
Pittsburgh, PA 15219

Operating Permit: No. 0160

TO: Sandra L. Etzel
Chief Engineer

FROM: Ron Huffman
Air Quality Engineer

FACILITY DESCRIPTION:

The US Steel Tower is an office building located in downtown Pittsburgh, Pennsylvania with approximately three (3) million square feet of commercial office space. The source consists of four (4) boilers, three (3) emergency generators, two (2) fuel oil storage tanks, and a four (4) cell cooling tower. Two boilers are natural gas fired, with No. 2 fuel oil used as a back-up fuel. Two boilers fire only natural gas. Each boiler vents through to a separate stack. The emergency generators are designed to power equipment in the event that utility power is interrupted. The generators are No. 2 fuel oil fired and vent to a combined stack. The boilers were permitted under operating permit #160 issued September 11, 1998.

The US Steel Tower is a minor source for particulate matter (PM), particulate matter of 10 microns or less in diameter (PM₁₀), sulfur dioxide (SO₂), volatile organic compounds (VOCs), nitrogen oxides (NO_x), carbon monoxide (CO), and Hazardous Air Pollutants (HAPs), as defined in section 2101.20 of Article XXI.

EMISSION SOURCES:

ID	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK ID
BLR-1	Cleaver Brooks Boiler D-86	Uncontrolled	71.9 MMBtu/hr	Natural Gas/ No. 2 Fuel Oil ¹	S-001
BLR-2	Cleaver Brooks Boiler D-86	Uncontrolled	71.9 MMBtu/hr	Natural Gas/ No. 2 Fuel Oil ¹	S-002
BLR-3	VA Power Co. Boiler TG-5903 VHJ-150	Uncontrolled	6.28 MMBtu/hr	Natural Gas	S-003
BLR-4	VA Power Co. Boiler TG-5903 VHK-250	Uncontrolled	10.8 MMBtu/hr	Natural Gas	S-004
EG-001	Emergency Generator Caterpillar D399	Uncontrolled	800 kW	No. 2 Fuel Oil	S-005
EG-002	Emergency Generator Caterpillar D399	Uncontrolled	800 kW	No. 2 Fuel Oil	S-005
EG-003	Emergency Generator Caterpillar 3516	Uncontrolled	1,500 kW	No. 2 Fuel Oil	S-005
T-001	Storage Tank	Uncontrolled	10,000 gallon	No. 2 Fuel Oil	-
T-002	Storage Tank	Uncontrolled	10,000 gallon	No. 2 Fuel Oil	-

¹ No. 2 fuel oil used as a back-up fuel only.

Miscellaneous Emission Sources:

The US Steel Tower has a four (4) cell cooling tower (1,800 tons of cooling capacity, each cell) and paved roads. The Department has determined that emissions from these sources are negligible.

Emission Controls:

There are no control devices associated with any of the emission sources located at the US Steel Tower.

EMISSION CALCULATIONS:

Boilers (BLR-1 and BLR-2):

Boilers BLR-1 and BLR-2 are natural gas-fired with No.2 fuel oil used as a back-up fuel. In order to stay below major source thresholds for NO_x and SO₂, natural gas usage for the two boilers shall not exceed 870 million cubic feet (MMCF) per year and fuel oil usage shall not exceed 900,000 gallons per year. In addition, the No. 2 fuel oil shall not exceed 0.2% sulfur content. Potential to Emit calculations are based on U.S. EPA AP-42 Chapter 1.3 - Fuel Oil Combustion, Tables 1.3-1, 1.3-2, 1.3-3, 1.3-9, 1.3-10, and 1.3-11, published September 1998; and Chapter 1.4 - Natural Gas Combustion, Tables 1.4-1 through 1.4-4, published July 1998. A 15% adjustment factor was added to all emissions calculated using AP-42 factors to account for

operational variability of equipment. Appendix A includes detailed emission calculations for the boilers. The following table shows the maximum potential emissions from the boilers.

Maximum Potential Emissions for Boilers BLR-1 and BLR-2

POLLUTANT	Natural Gas HOURLY EMISSION LIMIT (lbs/hr)	No. 2 Fuel Oil HOURLY EMISSION LIMIT (lbs/hr)	ANNUAL EMISSION LIMIT (tons/yr)¹	COMBINED ANNUAL EMISSION LIMIT (tons/yr)²
PM ³	0.58	1.08	2.25	4.49
PM ₁₀ ³	0.58	1.08	2.25	4.49
SO ₂	0.05	16.8	7.5	15.0
NO _x	8.11	11.8	30.2	60.4
VOC	0.45	0.20	1.46	2.93
CO	6.81	2.95	22.3	44.6

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

² Combined limit for boilers BLR-1 and BLR-2.

³ PM and PM₁₀ emissions based on §2104.02.a.1 limits.

Natural Gas Only Boilers (BLR-3 and BLR-4):

Boilers BLR-3 and BLR-4 are natural gas-fired. Potential to Emit calculations are based on U.S. EPA AP-42 Chapter 1.4 - Natural Gas Combustion, Tables 1.4-1 through 1.4-4, published July 1998. A 15% adjustment factor was added to all emissions calculated using AP-42 factors to account for operational variability of equipment. Appendix A includes detailed emission calculations for the boilers. The following table shows the maximum potential emissions from the boilers.

Maximum Potential Emissions (lb/hr) for Boilers BLR-3 and BLR-4

ID	PM¹	PM₁₀¹	SO₂	NO_x	VOC	CO
BLR-3	0.05	0.05	0.004	0.71	0.04	0.59
BLR-4	0.09	0.09	0.01	1.22	0.07	1.02
Total	0.14	0.14	0.01	1.93	0.11	1.62

¹ PM and PM₁₀ emissions based on §2104.02.a.1 limits.

Maximum Potential Emissions (tons/year¹) for Boilers BLR-3 and BLR-4

ID	PM²	PM₁₀²	SO₂	NO_x	VOC	CO
BLR-3	0.22	0.22	0.02	3.10	0.17	2.61
BLR-4	0.38	0.38	0.03	5.33	0.29	4.48
Total	0.60	0.60	0.05	8.43	0.46	7.08

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

² PM and PM₁₀ emissions based on §2104.02.a.1 limits.

Emergency Generators (EG-001, EG-002 and EG-003):

The emergency generators EG-001, EG-002 and EG-003 are fuel oil fired. In order to stay below major source thresholds for SO₂ each generator shall not exceed the source requested 150 hours per year in operation. Potential to Emit calculations were based on U.S. EPA AP-42 Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-1 and 3.4-2, published October 1996. A 15% adjustment factor was added to all emissions calculated using AP-42 factors to account for operational variability of equipment. Appendix A includes detailed emission calculations for the emergency generators. The following tables show the maximum potential emissions from each emergency generator.

Maximum Potential Emissions (lbs/hr) for the Emergency Generators

ID	PM	PM₁₀	SO₂	NO_x	VOC	CO
EG-001	0.97	0.97	2.23	33.1	0.97	7.6
EG-002	0.97	0.97	2.23	33.1	0.97	7.6
EG-003	1.75	1.75	4.03	59.8	1.75	13.7
Total	3.68	3.68	8.49	126	3.68	28.9

¹ PM and PM10 emissions based on §2104.02.a.1 limits.

Maximum Potential Emissions (tons/year¹) for the Emergency Generators

ID	PM	PM₁₀	SO₂	NO_x	VOC	CO
EG-001	0.07	0.07	0.17	2.48	0.07	0.57
EG-002	0.07	0.07	0.17	2.48	0.07	0.57
EG-003	0.13	0.13	0.30	4.49	0.13	1.03
Total	0.28	0.28	0.64	9.45	0.28	2.17

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

² PM and PM10 emissions based on §2104.02.a.1 limits.

Fuel Tanks:

The permittee maintains two (2) fuel oil storage tanks. VOC emissions are expected to be minimal due to the low turnover rate and low volatility of the stored liquid (fuel oil).

EMISSIONS SUMMARY (entire facility):

Maximum Potential Emissions for Entire Facility

POLLUTANT	ANNUAL EMISSION LIMIT (tons/year)¹
PM	4.77
PM ₁₀	4.77
SO ₂	15.6
NO _x	78.3
VOC	3.20
CO	46.8
HAPs	2.87

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

OPERATING PERMIT APPLICATION COMPONENTS:

1. Operating Permit #160, issued September 11, 1998.
2. Permit Application dated May 15, 2006.

REGULATORY APPLICABILITY:

1. **Article XXI Requirements for Issuance:**

The following Article XXI requirements apply to this facility:

§2103.13.c (Operating Permits): The boilers (BLR-1 through BLR-4) were permitted under operating permit #160, issued September 11, 1998. The operating permit expired September 10, 2003. A timely and complete application for an Operating Permit renewal was submitted. The 1998 operating permit contained errors. The capacities and fuel usage capabilities of the boiler were incorrect. Therefore, the short term limits for each boiler were incorrectly calculated. The permit renewal reflects the true boiler characteristics. All short term limits included in the 1998 permit have been revised and will be considered RACT.

§2103.12.a.2.B (Standards for Issuance): Existing sources, where no limits have been established under Article XXI, are subject to Reasonably Available Control Technology (RACT) requirements.

- (a) The Department has determined that RACT for the existing boilers (BLR-1 and BLR-2) is the potential to emit as shown in Appendix A, page 2 and 3. Particulate and sulfur oxide limitations have been established by §2104.02.a.1 and §2104.03.a.2.A, respectively.
- (b) The Department has determined that RACT for the existing boilers (BLR-3 and BLR-4) is the potential to emit as shown in Appendix A, page 2. Particulate and sulfur oxide limitations have been established by §2104.02.a.1 and §2104.03.a.2.A, respectively.
- (c) The Department has determined that RACT for the existing emergency generators (EG-001, EG-002 and EG-003) is the potential to emit as shown in Appendix A, page 4. Particulate and sulfur oxide limitations have been established by §2104.02.a.1 and §2104.03.a.2.A,

respectively.

- (d) The Department has determined that RACT for the existing fuel storage tanks are operation in accordance with the manufacturers' specification and good engineering practices.

§2103.20.b.4 (Synthetic Minors): This rule applies because in order to stay below minor source thresholds for NO_x and SO₂ each generator is limited to 150 hours per year of operation; natural gas usage for boilers BLR-1 and BLR-2 is limited to 870 million cubic feet (MMCF) per year; fuel oil usage for boilers BLR-2 and BLR-2 is limited to 900,000 gallons per year; and the sulfur content of the fuel oil is limited to 0.2% by weight.

§2104.02.a.1 (Particulate Mass Emissions): This rule applies to fuel burning or combustion equipment where the actual heat input to such equipment is greater than 0.50 MMBtu per hour.

- (a) Pursuant to this rule, particulate emissions from each boiler shall not exceed 0.008 lbs/MMBtu of actual heat input at any time while combusting natural gas; and 0.015 lbs/MMBtu of actual heat input at any time while combusting fuel oil.
- (b) Pursuant to this rule, particulate emissions from each emergency generator shall not exceed 0.28 lb/MMBtu of actual heat input at any time while combusting grade No. 2 fuel oil.

§2104.03 (Sulfur Oxide Emissions): This rule applies to fuel burning or combustion equipment.

- (a) Pursuant to this rule, sulfur oxide emissions from the boilers BLR-1 and BLR-2 shall not exceed 0.93 lb/MMBtu of actual heat input at any time because these units have an actual heat input capacity greater than 50 MMBtu/hr, but less than 200 MMBtu/hr. The sulfur oxide emission rate was determined by the formula $A = 1.7 \times E^{-0.14}$ (where A = allowable emissions in pounds per million BTUs of actual heat input and E = actual heat input in millions of BTUs per hour).
- (b) Pursuant to this rule, sulfur oxide emissions from the boilers BLR-3 and BLR-4 shall not exceed the potential to emit.
- (c) Pursuant to this rule, sulfur oxide emissions from the emergency generators shall not exceed 1.0 lb/MMBtu of actual heat input at any time because these units have an actual heat input capacity greater than 0.50 MMBtu/hr, but less than 50 MMBtu/hr.

§2105.12.a (Volatile Organic Compound Storage Tanks): The requirements of §2105.12.a for Volatile Organic Compound Storage Tanks are not applicable to the storage tanks. Although storage tanks T-001 and T-002 are greater than 2,000 gallons and No. 2 fuel oil is classified as a volatile organic liquid; the fuel oil has a maximum vapor pressure of 0.008 psia which is less than the vapor pressure threshold defined in §2105.12.a.

2. **Testing Requirements:**

Testing is not required, but the Department reserves the right to require testing in the future to assure compliance with the terms and conditions of Operating Permit No. 0160.

3. **New Source Review (NSR) and Prevention of Significant Deterioration (PSD):**

NSR and PSD do not apply. The facility is a minor source for all criteria pollutants.

4. **New Source Performance Standards**

40 CFR 60, Subpart Dc for Small Industrial-Commercial-Institutional Steam Generating Units: The boilers BLR-1, BLR-2, BLR-3 and BLR-4 commenced construction before June 9, 1989. Therefore, these boilers are not subject to the requirements of 40 CFR 60, Subpart Dc.

40 CFR 60, Subpart Kb for Volatile Organic Liquid Storage Vessels: This rule does not apply to the existing storage tanks because their capacities are less than 75 cubic meters (19,813 gallons).

40 CFR 60, Subpart IIII for Stationary Compression Ignition Internal Combustion Engines: This rule is not applicable to the emergency generators, each commenced construction prior to the applicable date of July 11, 2005. The following table shows the installation date of each emergency generator.

GENERATOR ID	INSTALLATION DATE
EG-001	1998
EG-002	1969
EG-003	1969

5. **National Emission Standards For Hazardous Air Pollutants**

40 CFR 63, Subpart ZZZZ for Stationary Reciprocating Internal Combustion Engines: Pursuant to 40 CFR 63.6590(b)(3), a stationary RICE that is considered an existing emergency stationary RICE does not have to meet the requirements of 40 CFR 63, Subpart ZZZZ and no initial notification is necessary. Therefore, the existing emergency generators at this source are not subject to this subpart because they commenced construction before June 12, 2006.

6. **Risk Management Plan; CAA Section 112(r):**

The source is not required to have a risk management plan at this time because none of the regulated chemicals exceed the thresholds on the regulation.

METHOD OF DEMONSTRATING COMPLIANCE:

Compliance with the emission standards set in this permit will be demonstrated by:

- (a) recording boiler BLR-1 and BLR-2 fuel consumption monthly, maintaining fuel oil certifications from fuel suppliers, and providing written notice of fuel consumption and sulfur content to the Department semiannually;
- (c) recording boiler BLR-3 and BLR-4 fuel consumption and the name of natural gas supplier and providing written notice of natural gas specifications to the Department semiannually;
- (c) recording emergency generator fuel consumption, cold starts, operating hours, and maintenance activities, maintaining fuel oil certifications from fuel suppliers, and providing written notice to the Department semiannually; and
- (d) operating and maintaining the fuel storage tanks in accordance with the manufacturers' specification and good engineering practices.

See Operating Permit No. 0160 for the specific conditions for determining compliance with the applicable requirements.

RECOMMENDATION:

All applicable Federal, State and County regulations have been addressed in the permit application. The operating permit application for US Steel Tower should be approved with the emission limitations and terms and conditions in Operating Permit No. 0160.