

Louisville Metro Air Pollution Control District
850 Barret Ave., Louisville, Kentucky 40204
xx August 2015

Construction Statement of Basis

Company: Medical Center Steam Plant

Plant Location: 235 Abraham Flexner Way, Louisville, Kentucky 40202

Date Application Received: 2/12/2015, 2/27/2015, 3/30/2015, 3/10/2015, 7/13/2012

Application Number: 69338, 69787, 70240, 69981, 35636

Public Comment Date: x/xx/2015

District Engineer: Yiqiu Lin

Permit No: C-0148-1003-15

Plant ID: 0148

SIC Code: 4961

NAICS: 221330

Introduction:

This permit will be issued pursuant to District Regulation 2.03, *Authorization to Construct or Operate; Demolition/Renovation Notices and Permit Requirements*. Its purpose is to provide methods of determining continued compliance with all applicable requirements.

Jefferson County is classified as an attainment area for lead (Pb), nitrogen dioxide (NO₂), carbon monoxide (CO), 1 hr and 8 hr ozone (O₃), and particulate matter less than 10 microns (PM₁₀); and is a non-attainment area for the 1997 standard for particulate matter less than 2.5 microns (PM_{2.5}), unclassifiable for the 2012 standard for particulate matter less than 2.5 micron (PM_{2.5}) and partial non-attainment for sulfur dioxide (SO₂).

Application Type/Permit Activity:

- Initial Issuance
- Permit Revision
 - Administrative
 - Minor
 - Significant
- Permit Renewal
- Construction

Compliance Summary:

- Compliance certification signed
- Source is out of compliance
- Compliance schedule included
- Source is operating in compliance

I. Source Information

1. **Plantwide Overall Process Description:** Steam production and distribution plant
2. **Project Description:** The source proposed to install a lime injection system for each coal fired boiler. The source also requested to re-issue construction permit 244-08-C and 35728-12-C for updated standards.
3. **Site Determination:** There are no other facilities that are contiguous or adjacent and under common control.
4. **Emission Unit Summary:**

Construction No.	Equipment Description
C-0148-1003-15-V	Three (3) lime injection systems (C13-C15), make Schenk Process, model 520, used to control HCl emissions for each boilers #4, 5, and 6 (unit U2). Modification to allow an increase in the maximum plant-wide heat input capacity from 362 MMBtu/hr to 418 MMBtu/hr, allow six boilers to operate simultaneously, and to remove the 10% annual capacity factor limit for Boiler #1. Installation of three (3) new MAC Process 168MCF494 baghouses (C10-C12) one for each boiler #4, 5, and 6. (Current baghouse (C7) will be replaced) This construction permit replaces construction permit 244-08 and 35728-12.

5. Permit Revisions

Revision No.	Permit No.	Issue Date	Public Notice Date	Change Type	Change Scope	Description
Initial	C-0148-1003-15-V	x/xx/2015	x/xx/2015	Initial	Entire Permit	Initial permit issuance for lime injection system; Incorporation of revised construction permit 244-08 and 35728-12.

6. **Fugitive Sources:** There are no fugitive emissions for this project.

7. Plantwide Emission Summary:

Pollutant	District Calculated Actual Emissions (tpy) 2013 Data	Pollutant that triggered Major Source Status (based on PTE)
CO	90.2	Yes
NO _x	153.1	Yes
SO ₂	354.0	Yes
PM ₁₀	54.6	Yes
VOC	1.39	No
Total HAPs	18.7	Yes
Single HAP > 1 tpy		
Hydrochloric Acid	15.83	Yes
Hydrogen Fluoride	1.98	No
Greenhouse Gas	85,837 CO ₂ e	Yes

8. Applicable Requirements:

PSD 40CFR60 SIP 40CFR63
 NSR 40CFR61 District-Origin Other

9. MACT Requirements:

The source is subject to 40 CFR 63, Subpart DDDDD. The compliance date for existing boilers is January 31, 2016.

10. Referenced Federal Regulations in Permit:

40 CFR 60 Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutant for Industrial, Commercial, and Institutional Boilers and Process Heaters
40 CFR 64	Compliance Assurance Monitoring for Major Stationary Sources

II. Regulatory Analysis

1. Acid Rain Requirements: This equipment is not subject to the Acid Rain Program.

2. **Stratospheric Ozone Protection Requirements:** Title VI of the CAAA regulates ozone depleting substances and requires a phase-out of their use. This rule applies to any facility that manufactures, sells, distributes, or otherwise uses any of the listed chemicals. This source does not manufacture, sell, or distribute any of the listed chemicals. The source's use of listed chemicals is that in fire extinguishers, chillers, air conditioners and other HVAC equipment.
3. **Prevention of Accidental Releases 112(r):** The source does not manufacture, process, use, store, or otherwise handle one or more of the regulated substances listed in 40 CFR Part 68, Subpart F, and District Regulation 5.15, Chemical Accident Prevention Provisions, in a quantity in excess of the corresponding specified threshold amount.
4. **40 CFR Part 64 Applicability Determination:** The coal-fired boilers are subject to 40 CFR Part 64 - *Compliance Assurance Monitoring (CAM) for Major Stationary Source* since PM emissions from each of the boilers are greater than the major source threshold and control devices are required to achieve compliance with standards. The source submitted an initial PM CAM Plan on July 15, 2004 and an updated CAM Plan on January 6, 2015.
5. **Basis of Regulation Applicability**

- a. **Plant-wide**

MCSP is a Title V major source for NO_x, CO, SO₂, PM₁₀, Total HAP, and Single HAP. Regulation 2.16 - *Title V Operating Permits* establishes requirements for major sources. Based on the plantwide PTE evaluation, MCSP is a PSD major source for NO_x, CO, SO₂, particulate matter, and greenhouse gases (GHGs).

Regulations 5.00 5.20, 5.21, and 5.23 (STAR Program) establishes requirements for environmental acceptability of toxic air contaminants (TACs) and the requirement to comply with all applicable emission standards. MCSP submitted their TAC Environmental Acceptability Demonstration to the District in December 2006, March 2007, March 2008, and August 2014. Compliance with the STAR EA Goals was demonstrated in the source's EA Demonstrations. Tier 4 AREMOD air dispersion modeling was performed for each emission unit that has non-de minimis TAC emissions. The District reviewed the EA Demonstrations submitted by the source. The carcinogen risk and non-carcinogen risk values, calculated using the District approved PTE for each unit and the Tier 4 AREMOD model results from the source's EA Demonstration, comply with the STAR EA goals required in Regulation 5.21 controlled.

b. **Applicable Regulations:**

Regulation	Title	Type
2.03	Permit Requirements Non-Title V Construction and Operating Permits and Demolition Renovation Notices and Permit Requirements	SIP
2.04	Construction or Modification of Major Sources in or Impacting upon Non-Attainment Areas (Emission Offset Requirements)	SIP
2.16	Title V Operating Permits	Local
5.00	Definitions	Local
5.01	General Provisions	Local
5.02	Adoption of National Emission Standards for Hazardous Air Pollutants	Local
5.14	Hazardous Air Pollutants and Source Categories	Local
5.20	Methodology for Determining Benchmark Ambient Concentration of a Toxic Air Contaminant	Local
5.21	Environmental Acceptability for Toxic Air Contaminants	Local
5.22	Procedures for Determining the Maximum Ambient Concentration of a Toxic Air Contaminant	Local
5.23	Categories of Toxic Air Contaminants	Local
6.07	Standards of Performance for Existing Indirect Heat Exchangers	SIP
6.42	Reasonably Available Control Technology Requirements for Major Volatile Organic Compound- and Nitrogen Oxides-Emitting Facilities	SIP
7.02	Adoption and Incorporation by Reference of Federal New Source Performance Standards	Local
7.06	Standards of Performance for New Indirect Heat Exchangers	SIP

c. **Permit C-0148-1003-15:** Lime injection systems and permit 244-08 and 35728-12 revision.

i. **Equipment:**

Emission Point	Description	Applicable Regulation	Basis for Applicability
U1-E1	One (1) natural gas fired boiler with low NO _x burners, designated as Boiler #1, with a rated heat input capacity of 56 MMBtu/hr, make VOGT, model CL-VS, SN-7152. (1954, 2004)	STAR* 7.06, 6.42, 40CFR60 Subpart Dc, 40CFR63, DDDDD	Regulation 5.00, 5.01, 5.20, 5.21, 5.22, 5.23 establishes the requirements for Environmental Acceptability for TACs. The source is a Group I company with Category 1TACs which potentially could exceed the de minimis values.
U1-E2	One (1) natural gas fired boiler, designated as Boiler #2, with a rated heat input capacity of 56 MMBtu/hr, make VOGT, model CL-VS, SN-9638. (1954)	STAR 6.07, 6.42, 40 CFR 63, DDDDD	Existing indirect heat exchangers for which was in being or under construction prior to April 19, 1972 are subject to Regulation 6.07.
U1-E3	One (1) natural gas-fired boiler with low NO _x burner, designated as Boiler #3, with a rated heat input capacity of 56 MMBtu/hr, make VOGT, model CL-VS, SN-7861. (1954, 2012)	STAR 7.06, 6.42, 40CFR60 Subpart Dc, 40 CFR 63, DDDDD	New indirect heat exchangers with a capacity less than 250 MMBtu/hr for which commenced after April 9, 1972 are subject to Regulation 7.06.
U2-E4	One (1) boiler using coal as a primary fuel and natural gas as the secondary fuel, designated as Boiler #4, with a rated heat input capacity of 102 MMBtu/hr, make VOGT, model CL-VS, SN-11620. (1969)	STAR* 6.07, 6.42, 40 CFR 63, DDDDD, 40 CFR 64	Regulation 7.08 establishes the requirements for PM emission from existing processes that commences construction after September 1, 1976.
U2-E5	One (1) boiler using coal as a primary fuel and natural gas as the secondary fuel, designated as Boiler #5, with a rated heat input capacity of 102 MMBtu/hr, make VOGT, model CL-VS, SN-11621. (1969)	STAR 6.07, 6.42, 40 CFR 63, DDDDD, 40 CFR 64	Regulation 6.42 applies to the NO _x emissions from all NO _x emitting facilities located at major NO _x source.
U2-E6	One (1) coal-fired boiler designated as Boiler #6, with a rated heat input capacity of 100 MMBtu/hr, make VOGT, model CL-VS, SN-17193. (1981)	STAR 7.06, 6.42, 40 CFR 63, DDDDD, 40 CFR 64	40 CFR 63, Subpart DDDDD establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers and process heaters located at major sources.
I.A.	Lime storage silos and lime handling hoppers and feeders	7.08	40 CFR 64 establishes compliance assurance monitoring requirements for each unit that has emissions greater than major source threshold and control devices are required to achieve compliance with standards.
* STAR rules consist of Regulation 5.00, 5.01, 5.20, 5.21, 5.22, and 5.23.			

ii. Standards/Operating Limits**1) NO_x**

(a) Regulation 6.42, section 4.3 requires permit applicant for NO_x-emitting facilities to propose RACT emission-limiting standards and RACT emission control technology. The NO_x RACT Plan-Amendment 3 was adopted by the Air Pollution Control Board of Jefferson County on August 21, 2013.

(a) Construction permit 244-08 allows an increase in the maximum plant-wide heat input capacity from 362 MMBtu/hr to 418 MMBtu/hr and the 10% annual capacity factor limit for Boiler #1 was removed. It was demonstrated that these modifications did not trigger PSD review.

2) SO₂

(a) Boiler #2, #4 and #5 are subject to Regulation 6.07. The emission standard for SO₂ is determined in accordance with Regulation 6.07, section 4.1.

(b) Boilers #1, #3, and #6 are subject to Regulation 7.06. The emission standard for SO₂ is determined in accordance with Regulation 7.06, section 5.1.3.2.

3) PM

(a) Boilers #2, #4 and #5 are subject to Regulation 6.07. The emission standard for PM is determined in accordance with Regulation 6.07, section 3.1.

(b) Boilers #1, #3, and #6 are subject to Regulation 7.06. The emission standard for PM is determined in accordance with Regulation 7.06, section 4.1.4.

(b) A one-time PM compliance demonstration has been performed for Boiler #4, #5, and #6 when they are combusting coal. The lb/MMBtu standard can be exceeded uncontrolled. Therefore, the baghouses must be utilized at all time when Boiler #4, #5, and #6 are combusting coal.

- (c) The emission standard for PM for lime storage silos, hoppers, or feeders is determined in accordance with Regulation 7.08, Table 1. Since the capacity of each piece of equipment is less than 1,000 lb/hr, the PM emission standard is 2.34 lb/hr.
 - (d) The District has performed a one-time PM compliance demonstration for the lime handling equipment and the lb/hr standard cannot be exceeded uncontrolled. Therefore, there are no monitoring, record keeping, and reporting requirements with respect to PM lb/hr emission limits.
- 4) **Opacity**
- (a) Regulation 6.07, section 3.2 and Regulation 7.06, section 4.2 establish opacity standards for the boilers.
 - (b) Regulation 7.08, section 3.1.1 establishes opacity standards for the lime handling equipment.
- 5) **TAC**
- (c) Regulation 5.20, 5.21, 5.22, and 5.23 established requirements for Group I sources to demonstrate environmental acceptability.
 - (d) Medical Center Steam Plant submitted the TAC Environmental Acceptability Demonstration to the District in December 2006, March 2007, March 2008, and August 2014. Compliance with the STAR EA Goals was demonstrated in the source's EA Demonstrations. Tier 4 AREMOD air dispersion modeling was performed for each emission unit that has non-de minimis TAC emissions. The District reviewed the EA Demonstrations submitted by the source. The carcinogen risk and non-carcinogen risk values, calculated using the District approved PTE for each unit and the Tier 4 AREMOD model results from the source's EA Demonstration, comply with the STAR EA goals required in Regulation 5.21 controlled.
 - (e) The coal-fired boilers have TAC emission standards for metal compounds since its EA Demonstration

was based on controlled PTE. If the controlled PTE for the TAC is less than de minimis level, use De Minimis as limit. If the controlled PTE for the TAC is greater than de minimis level, modeling results were used to calculate risk value to compare to the EA Goals and controlled PTE is used as limit.

6) **HAP**

40 CFR 63.7495, 7500, and 7505 establish emission limits, work practice standards, and operating limits for new and existing boilers.

iii. **Monitoring and Record Keeping**

1) **NO_x**

(f) NO_x RACT Plan establishes monitoring and record keeping requirements for NO_x emissions.

(g) In a letter dated March 7, 2002 from EPA Region 4, EPA has identified certain types of alternative record keeping requirements for units that are regulated under 40 CFR 60 Subpart Dc that can be approved by the District without additional input from EPA.

2) **SO₂**

40 CFR 60.48c(g)(2) establishes requirements for fuel usage monitoring and record keeping for new boilers.

3) **PM**

In accordance with 40 CFR 64, Compliance Assurance Monitoring for Major Stationary Sources, MCSP is required to propose a CAM Plan for PM, based on current process and control device operating requirements and practices. The initial CAM Plan was received on July 15, 2004 and an updated CAM Plan was received on January 6, 2015. The CAM Plan establishes monitoring and record keeping requirements for coal-fired boilers at this plant.

4) **Opacity**

The District has determined that using a natural gas fired boiler will inherently meet the 20% opacity standard.

Therefore, the company is not required to perform periodic monitoring to demonstrate compliance with the opacity standard.

5) **HAP**

40 CFR 63.7510, 7515, 7520, 7521, 7522, 7525, 7530, 7533, 7535, 7540, 7541, 7555, 7560 establish monitoring and record keeping requirements for new and existing boilers.

iv. **Reporting**

HAP

40 CFR 63.7545 and 7550 establish reporting requirements for new and existing boilers.

v. **Testing**

1) **NO_x**

The source is required to conduct compliance testing in according with Regulation 6.42 and the NO_x RACT Plan.

2) **HAP**

40 CFR 63.7510, 7515, 7520, and 7521 establish testing requirements for new and existing boilers.

III. Other Requirements

1. **Temporary Sources:** The source did not request to operate any temporary facilities.
2. **Short Term Activities:** The source did not report any short term activities.
3. **Emissions Trading:** N/A
4. **Operational Flexibility:** The source did not request any operational flexibility for these emission points.
5. **Compliance History:**

Incident Date	Regulation Violated	Result
05/02/1995	Regulation 6.07, Section 3 for Opacity	Agreement
05/11/2007	Regulation 2.16, Section 5, failure to comply with Title V permit	Board Order 09/19/2007
10/13/2010	Regulation 2.16, Section 5, failure to comply with Title V permit	Board Order 07/20/2011
12/9/2011	Regulation 2.16, Section 5, failure to comply with Title V permit	Board Order 10/15/2014
4/27/2013	Regulation 2.03, Section 5, failure to comply with District permit	Agreement
7/30/2013	Regulation 2.03, Section 1, failure to obtain permit to construct/modify	Agreement

6. Calculation Methodology:

For the coal-fired and natural gas-fired boilers, emission factors or control efficiencies determined by the performance tests shall be used for emission calculations. Emission factors from AP-42, 1.1 and 1.4 may be utilized if performance test are not available. Metal emission factors for coal-fired boilers were determined per equations in AP-42, 1.1-16 using PM emissions from stack tests and metal concentrations per coal samplings or flyash samplings, or directly came from AP-42, 1.1-18 if sampling data are not available. The following emission factors shall be used to calculate metal emissions for coal-fired boilers unless newer emission factors are approved in writing by the District:

Metal Emissions for Coal-fired Boilers	CAS No.	Uncontrolled (lb/ton)	Controlled (lb/ton)	Emission Factor Sources
Antimony compounds	7440-36-0	3.31E-04	1.39E-05	AP-42, 1.1-16
Arsenic compounds	7440-38-2	2.76E-03	3.84E-05	AP-42, 1.1-16
Beryllium compounds	7440-41-7	4.67E-03	2.12E-05	AP-42, 1.1-16
Cadmium compounds	7440-43-9	2.76E-04	1.80E-06	Ash Samplings
Chromium VI	7440-47-3	1.02E-03	5.35E-05	AP-42, 1.1-16
Chromium III	16065-83-1	2.79E-03	1.47E-04	AP-42, 1.1-16
Cobalt compounds	7440-48-4	7.30E-04	3.18E-05	AP-42, 1.1-16
Lead compounds	7439-92-1	4.29E-03	6.74E-05	AP-42, 1.1-16
Manganese compounds	7439-96-5	2.77E-03	1.81E-05	Ash Samplings
Mercury compounds	7439-97-6	8.30E-05	8.30E-05	AP-42, 1.1-18
Nickel compounds	7440-02-0	2.25E-03	1.89E-04	AP-42, 1.1-16
Selenium compounds	7782-49-2	1.30E-03	1.30E-03	AP-42, 1.1-18

Emission factors for flyash silos are derived from the emission factor for cement supplement uploading to elevated storage silo pneumatically (3-05-011-17) from AP-42, 11.12, Concrete Batching, Table 2, PM = 3.14 lbs/ton, PM10 = PM2.5 = 1.10 lbs/ton (uncontrolled). The emission factors for flyash are adjusted per moisture content, per AP-42, 13.2.4, equation (1). The adjusted emission factor for silos and transfer bins are PM = 0.3493 lbs/ton; PM10 = PM2.5 = 0.1224 lbs/ton

Emission factors from AP-42, 11.19 shall be used for coal emission calculations for handling facilities.

7. **Insignificant Activities:** There are no insignificant activities contained in this construction permit.
8. **Permit Fee:** The permit fees are based on initial issuance of a new construction permit for a Title V source (\$2,582.58), major source MACT review (\$1,033.03), and De Minimis determination for HCl (\$103.31). The total permit fees are \$3,718.92.