



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

March 23, 2023

Mr. Derrick Q. Boone
Assistant Public Services Director
City of High Point
211 South Hamilton Street
High Point, North Carolina 27261

Dear Mr. Boone:

This is in response to your letter of request, dated August 18, 2022, to the U.S. Environmental Protection Agency regarding an alternative monitoring procedure (AMP) which was prepared for you by GEL Engineering of NC, Inc., located in Raleigh, NC, acting on behalf of the City of High Point's Eastside (Eastside) Wastewater Treatment Plant (WWTP), located in Jamestown, NC. The procedure is related to monitoring of the WWTP's Sorbent Polymer Composite (SPC) Adsorber, CD-04, to indicate compliance with an emission standard. Eastside operates a sewage sludge fluidized bed incinerator (FBI) and is subject to 40 C.F.R. 60, Subpart M – Emissions Guidelines (EG) and Compliance Times for Existing Sewage Sludge Incineration (SSI) Units. The SPC system is used to control mercury emissions. Based on our review of the information provided, the EPA approves your request, subject to specific conditions. Details regarding our review and the basis for our approval are provided in the remainder of this letter.

On May 2, 2018, EPA delegated authority of the Federal SSI plan for existing SSI units to the North Carolina Department of Environmental Quality (NCDEQ) (See 83FR 19184). The approval of major alternatives to monitoring, however, are not delegated to state agencies under the provisions of 40 C.F.R. 62, § 62.16050. Under § 60.5175(b), if a facility does not use a wet scrubber, fabric filter, electrostatic precipitator, activated carbon injection, or afterburner, or if emissions are limited in some other manner (e.g., materials balance), then the facility must submit a petition to the EPA which proposes a monitoring plan for the alternative control device. The monitoring plan must be supported, and the instruments used for monitoring any approved alternative parameters must be calibrated by conducting an emission standard compliance demonstration testing event. Eastside installed SPC modules to control emissions of *mercury* from the SSI. SPC modules are fluoro-polymer adsorbers impregnated with carbon.

Description of SSI and SPC System

Eastside operates a sewage sludge FBI which is designated as source ES-01. The FBI is designed to incinerate up to a maximum charge rate of 3,000 pounds of dry sludge per hour. The FBI is fired by natural gas/No. 2 fuel oil-fired burners and the maximum auxiliary heat input rate is 5 million British

thermal units per hour (MMBtu/hr). Emissions from the FBI are controlled by a wet scrubber (CD-01) and SPC material adsorber (CD-04).

The SPC material adsorber consists of five layers of adsorbent, each layer containing 5 removable SPC modules. The configuration allows for the addition of SPC modules as needed in the future and can accommodate up to a maximum capacity of 45 SPC modules total. The dimensions of each individual SPC module are 26.9 inches (") length x 24.9" width x 13.06" height.

SSI Regulatory Requirements

Under 40 C.F.R. 60, § 60.5175(b)(1-5), a petition must identify specific parameters to be monitored, a discussion of the relationship between these parameters and the emissions of regulated pollutants, a discussion of the parameter operating limits and averaging periods, the instruments and methods used to monitor these parameters, and the frequency and methods for recalibrating the instruments used for monitoring these parameters.

City of High Point's Proposed AMP for the SPC Modules:

PROPOSED OPERATING PARAMETERS

Eastside WWTP proposes to monitor the following operating parameters:

- 1) Concentrations: SPC adsorption inlet and outlet mercury concentrations.
- 2) Pressure Drop: SPC adsorption system pressure drop.
- 3) Gas Temperature: SPC adsorption system inlet flue gas temperature.

RELATIONSHIP BETWEEN OPERATING PARAMETER LIMITS AND EMISSION LIMIT

Removal Efficiency

Eastside WWTP will simultaneously measure mercury concentration in the flue gas stream upstream and downstream of the SPC module system to determine the removal efficiency of the SPC modules system. The downstream concentration will be used to determine compliance with the mercury emission limit (0.037 mg/dscm @ 7% O₂) but is also used in the analysis to determine mercury removal efficiency of the SPC modules system. Flue gas mercury concentrations (inlet and outlet) will be determined the conduct of EPA Reference Method (RM) 30B, on a quarterly basis (*e.g.*, once every 3 months).

Eastside WWTP proposes to use a minimum removal efficiency of 70% for the SPC module system to serve as an indication of the system's capability to meet the mercury emission standard during non-testing events. Once the system's mercury removal efficiency drops below 70%, Eastside WWTP will replace mercury saturated SPC modules and rearrange other SPC modules to ensure a minimum removal efficiency of 70% for mercury will be maintained at all times.

Monitor Pressure Drop across the SPC Material Adsorber, CD-04

Pressure drops across CD-04 is measured by a differential pressure measuring instrument. Monitoring of the pressure drop is used to assist operators in determinations related to the SPC material adsorber's performance (e.g., buildup of dust, moisture, or precipitates). Normally, an increase in pressure is very slow and increases gradually over time. An acceleration in the rate of the increase in pressure drop across the SPC material adsorber is an indication that the process may be operating outside the intended design specification for pressure drop. The pressure drop will be monitored and recorded in the plant operation's supervisory control and data acquisition (SCADA) system.

Monitor SPC Material Adsorber Inlet Gas Temperature

The temperature of the inlet flue gas will be measured by a thermocouple equipped with an electronic signal transmitter. If the operating temperature exceeds 150 degrees Fahrenheit (°F), the SPC modules could be damaged. To prevent damage to the SPC system, the SCADA system is programmed to activate an alarm if the inlet gas temperature exceeds 120 °F, and shutdown the SPC material adsorber and sludge feed to the incinerator if the SPC material adsorber inlet gas temperature exceeds 150 °F. The SPC material adsorber inlet gas temperature will be monitored and recorded in the SCADA system.

ESTABLISHING OPERATOR PARAMETER LIMITS

Mercury concentrations, as determined at the exit of each SPC module, will assist Eastside WWTP in assessing the specific SPC module's ability to contribute to the overall system ability to meet the mercury emission standard at the outlet of the system. No upper limit is proposed for mercury removal efficiency, however, a lower limit of 70% efficiency is proposed for the overall system. Monitoring of the system's overall mercury removal efficiency will allow Eastside to assess the patterns of influent concentrations over time and understand the SPC system's removal efficiency ability. If in the future, data suggest that sufficient removal to meet mercury emission limits is still possible at 70% efficiency and below, the facility can consider submitting an alternative monitoring plan requesting a different lower limit for minimum efficiency.

EPA's Understanding of Post Wet Scrubber Flue Gas Conditions

Wet scrubbers inherently discharge flue gas which is *pseudo-saturated* with moisture. The moisturized stream may also contain water droplets, which may cover active mercury deposition adsorption sites, producing mercury adsorption inhibition. For this reason, indication of relative humidity (RH) in the adsorption zone is necessary to achieve mercury removal from the flue gas.

On October 27, 2022, after a discussion between EPA and Eastside WWTP, Eastside WWTP submitted temperature data for the wet scrubber outlet (TIT-0666) and the Mercury Control Stage, or M.R.V. Inlet (TIT-0702), for compliance demonstration stack testing conducted in 2019, 2020, 2021, and Eastside WWTP used the data measured and recorded during the stack testing to determine and propose a minimum "Delta T" parameter; the temperature difference between the scrubber outlet and the M.R.V. Inlet.

As Eastside WWTP explained in the submittal, the determination for the Delta T parameter is based on the lowest 4-hour averages observed in those reports. Specifically, the observed site-specific operating

parameter limit was observed as 7.91 °F in 2019, 8.26 °F in 2020, and 8.44 °F in 2021. Eastside WWTP contends, based on these data, the Delta T operating parameter is the appropriate parameter to measure since it shows that the operation of the M.R.V. preheater works to reduce the humidity.

EPA Region 4 Determination

The following table summarizes the parameters that the PA will approve as agreed upon by Eastside WWTP:

Parameter	Limit	Units	Recordkeeping Frequency	Averaging Period for Compliance
pressure drop	established during compliance tests	inches of water column	At least once every 15 minutes	12 hours
inlet gas temperatures	≤ 150	degrees Fahrenheit	At least once every 15 minutes	12 hours
removal efficiency	≥ 70%	N/A	quarterly	N/A
Delta T	≥ 8.6	degrees Fahrenheit	At least once every 15 minutes	12 hours

Based upon our review of your submittal, the EPA approves an AMP using pressure drop, inlet gas temperature, removal efficiency of the mercury modules, and Delta T (to establish % RH control) to indicate compliance with the mercury emissions limit of 0.037 mg/dscm @ 7% O₂.

This AMP approval was coordinated with the EPA’s Office of Enforcement and Compliance Assurance (OECA) and EPA’s Office of Air Quality Planning and Standards (OAQPS). If you have any questions regarding this approval, please contact Mark Bloeth of my staff at bloeth.mark@epa.gov or (404) 562-9013.

Sincerely,

ANTHONY TONEY  Digitally signed by ANTHONY TONEY
Date: 2023.03.23 10:31:26 -04'00'

Caroline Y. Freeman
Director
Air and Radiation Division

cc: Sara Ayres (OECA)
Amy Hambrick (OAQPS)