Attachment 1
(Enclosure to EPA Comments to the TCEQ's Proposed SIP Revisions)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

May 8, 2023

Ms. Gwen Ricco
Office of Legal Services
Texas Commission on Environmental Quality (MC 205)
Post Office Box 13087
Austin, Texas 78711-3087

RE: Quadrennial Review Comments, Non-Rule Project Number 2023-045-115-AI

Dear Ms. Ricco:

The United States Environmental Protection Agency (EPA) has prepared comments for consideration regarding the 30 Texas Administrative Code (TAC) Chapter 115, Control of Air Pollution from Volatile Organic Compounds, open for public review as part of the Quadrennial review process under the Texas Government Code §2001.039. Please see EPA comments provided in the enclosure of this letter.

If you have any questions, please contact our Air Permits Section Manager, Cynthia Kaleri at (214) 665-6772, or Jonathan Ehrhart at (214) 665-2295.

Sincerely,

Jeff Robinson
Branch Manager
Air Permits, Monitoring & Grants Branch

Enclosure

ENCLOSURE

30 Texas Administrative Code Chapter 115
Quadrennial Review - EPA Comments

Summary:

The Texas Administrative Code ("TAC") Chapter 115 rules allow flares to be used as a method to control emissions from process vents. As discussed in detail below, in the years since TCEQ adopted and EPA approved the 30 TAC Chapter 115 flare monitoring requirements, a great deal of information has been collected showing that the traditional monitoring requirements provided for in 40 CFR § 60.18 and referred to by 30 TAC Chapter 115 are not adequate to ensure assisted flares continuously provide for 98% destruction and removal efficiency ("DRE") at all times. EPA has had to address similar concerns as part of a Title V petition. *See e.g., In the Matter of BP Amoco Chemical Company,* Order on Petition No. VI-2017-6 at 19-25 (July 20, 2021).

Given the number of flares in the Houston/Galveston area, it is especially important that TCEQ address this issue by considering requirements that align with the most advanced scientific knowledge available at the time. The Highly-Reactive Volatile Organic Compounds ("HRVOC") rules for flares rely on 99% DRE for ethylene and propylene and 98% DRE for all other HRVOCs. TCEQ has also developed guidance which contains agency-accepted flare destruction efficiencies that are based upon the assumption of 99% DRE for compounds with three carbons or less and 98% DRE for compounds with greater than 4 carbon atoms. However, EPA has not explicitly identified flare parameters and monitoring requirements that can ensure 99% DRE at all times. As such, EPA recommends that the Chapter 115, HRVOC rules, and any agency guidance applying similar DRE assumptions for 40 CFR 60.18-compliant flares, are evaluated and revised to ensure that appropriate DRE's are identified and verified through ongoing compliance measures. To claim such DRE's, EPA recommends that TCEQ update their flare monitoring and operational requirements consistent with the substantive requirements laid out in EPA's sector-specific rulemakings – e.g., Petroleum Refinery MACT and Ethylene Production MACT. In the absence of adequate monitoring and operational requirements sufficient to account for potential issues relevant to flare performance, EPA does not believe that assisted flares in compliance with the current 30 TAC Chapter 115, Subchapter H requirements can assume 98% DRE or higher for the purposes of demonstrating compliance with the HRVOC cap at § 115.722.

What Did EPA Approve?

The 30 TAC Chapter 115 HRVOC rules supplement Texas' existing rules for controlling volatile organic compounds ("VOCs") by providing more extensive requirements for certain equipment in HRVOC service and provided improvement to the Texas SIP's VOC Reasonable Available Control Technology ("RACT") rules. These additional controls of HRVOC emissions were to help attain and maintain the National Ambient Air Quality Standards ("NAAQS") for ozone in the Houston, Galveston, and Brazoria ("HGB") ozone nonattainment area. This area was classified as moderate[1] attainment status at the time of the original SIP approval of the 30 TAC

[1] Adoption Date: 05/23/2007 Proposal Date: 12/13/2006 EPA Action: Approved on 04/22/2009 (74 FR 18298) Background: Effective June 15, 2004, the HGB area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty,

Chapter 115 HRVOC rules on October 6, 2006 (71 FR 52655). The 30 TAC Chapter 115 HRVOC rules were adopted by TCEQ based on findings that certain highly reactive chemicals (ethylene, propylene, 1,3 butadiene and butenes) contribute disproportionately to the ozone problem in the HGB area. VOCs are a class of compounds that react in the atmosphere with oxides of nitrogen and oxygen in the presence of sunlight to form ozone. HRVOC is a term used to refer to chemicals that because of their very high propensity (reactivity rate) to form ozone had been targeted for additional control beyond the level of control that had been established for controlling VOCs in general. At the time of SIP approval, ambient measurements from both airplanes and ground based monitors had shown that the historical emissions estimates for HRVOCs were substantially underestimated. *See* 70 Fed. Reg. 17641 (April 7, 2005).[2] Therefore, there was a need to improve the emissions estimates of HRVOCs through better source monitoring. The rules established improved monitoring requirements for flares, cooling towers, process vents and pressure relief valves and established a 1200 lb/hour site-wide short-term limit on HRVOCs for sources in Harris County.

When EPA approved the 30 TAC Chapter 115 rules into the SIP, this included 30 TAC 115.10 – Definitions. TCEQ defines HRVOCs at § 115.10(21) and defines them separately for Harris County from the other seven counties that compose the eight county HGB non-attainment area. TCEQ defines HRVOCs in Harris County to include 1,3-butadiene; all isomers of butene (e.g., isobutene (2-methylpropene or isobutylene), alpha-butylene (ethylethylene), and beta-butylene (dimethylethylene, including both cis- and trans-isomers)); ethylene; and propylene. TCEQ only includes ethylene and propylene in the HRVOC definition for Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller Counties.

Flares Subject to 30 TAC Chapter 115

Flares are used in a wide variety of applications both for the control of continuous vent emissions and for the control of intermittent emissions during start up, shutdowns and malfunctions. The ability of flares to safely handle a wide range of flow rates and chemicals makes them a popular choice for vent gas disposal. Because flares are not enclosed combustion devices, it is difficult to directly measure the emissions from flares. EPA established minimum requirements for the operation of flares in the General Provisions of the New Source Performance Standards ("NSPS") and National Emission Standards for Hazardous Air Pollutants ("NESHAP") rules at 40 Code of Federal Regulations (CFR) §§ 60.18 and 63.11(b). The requirements in the General Provisions are then coupled with more specific requirements in the various NSPS and NESHAP Subparts for sources subject to Parts 60, 61, and 63. Texas adopted, by reference, minimum

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Montgomery, and Waller Counties) was designated nonattainment for the 1997 eight-hour ozone National Ambient Air Quality Standard (NAAQS) (69 FR 23951). The area was classified as moderate nonattainment with an attainment date of June 15, 2010. On May 23, 2007, the commission adopted the 2007 HGB 1997 Eight-Hour Ozone Nonattainment Area RFP SIP Revision along with the 2007 HGB 1997 Eight-Hour Ozone Nonattainment Area SIP Revision and associated rule revisions. On June 15, 2007, the TCEQ submitted the SIP revisions to the EPA along with a request that the HGB area be reclassified from a moderate to a severe nonattainment area for the 1997 eight-hour ozone NAAQS, with an attainment deadline of June 15, 2019. (See the Governor's 2007 reclassification request letter).

[2] Specifically, data from the Texas 2000 Air Quality Study ("TexAQS 2000") and subsequent TexAQS 2006 both included plane flights, helicopter flights, and mobile ground monitoring that indicated the emission inventories underestimated the HRVOC emissions.

performance requirements for net heating value ("NHV") and exit velocity in § 60.18 for flares in HRVOC service within the 30 TAC Chapter 115 HRVOC rules. These rules include limits for the minimum heating value for the inlet gas to a flare and for maximum gas exit velocity at the flare tip.

The Texas Chapter 115 HRVOC rules establish additional flow and composition monitoring requirements beyond those in § 60.18 to ensure flares controlling HRVOCs are operated properly. Using the flow data and an assumed DRE for a properly operated flare, a company could estimate the HRVOC emission rate to determine compliance with the short and long-term caps for HRVOC emissions. When meeting the heating value and exit velocity requirements of 40 CFR § 60.18, the 30 TAC Chapter 115 rules allow companies to assume a 98% DRE for most VOCs and a 99% DRE for ethylene and propylene routed to a flare for the purposes of demonstrating compliance with the short-and long-term caps. Flares not operated in compliance with the heating value and exit velocity requirements of 40 CFR § 60.18 are required to assume a lower DRE of 93% for HRVOC. *See e.g.,* 30 TAC § 115.725(d)(7). *See also* 70 Fed. Reg. 17642 (April 7, 2005).[3] Texas bases these assumed destruction efficiencies on EPA studies of flare destruction efficiencies that were performed in 1983-1986.[4]

For flares, TCEQ has indicated that the SIP-approved 30 TAC Chapter 115 HRVOC requirements at 30 TAC § 115.725(d)(7)[5] allows for the assumption of 99% DRE for ethylene and propylene and 98% DRE for all other HRVOCs when the flares are complying with the continuous monitoring requirements at § 115.725(d) and in continuous compliance with the net heating value and velocity specifications of 40 CFR § 60.18. However, a considerable amount of research in flare combustion efficiency has occurred since EPA originally approved the Chapter 115 HRVOC rules into the Texas SIP. Consequently, EPA has added specific requirements to various subparts of regulations addressing the use of a flare as a control device. For example, in the NESHAP for Refineries at 40 CFR Part 63, Subpart CC, EPA requires additional operational limits and monitoring for flares beyond what is in 40 CFR. § 60.18. Yet, Section 115.725(d)(5) requires that the NHV is calculated according to the equation at § 60.18(f)(3), which only accounts for the heating value of flare inlet gas as it enters the flare header. This value does not account for any dilution in heating value from assist media (e.g., steam), nor does it require calculation of the NHV of the combustion zone gas ("NHVcz") as defined in 40 CFR § 63.641. The HRVOC DRE assumptions at § 115.725 were approved into the Texas SIP in 2006 (71 FR 52655), long before EPA's evaluation and data analyses regarding the potential for flare over-

[3] Although the Chapter 115 HRVOC regulations authorize the use of these assumed DRE's, the 2022 TCEQ Emissions Inventory Guidelines acknowledge the potential for flare over-assistance, including flares subject to Chapter 115. *See* TCEQ, 2022 Emissions Inventory Guidelines, RG-360/22 at 133 (January 2023) ("For assisted flares, there is potential for over-assisting the waste gas stream, and the destruction efficiency may be lower than either the permitted efficiency or the appropriate efficiencies contained in Chapter 115 HRVOC regulations or Table A-8. Emissions determinations must be adjusted accordingly.")

[4] *See e.g.,* Evaluation of the Efficiency of Industrial Flares: Test Results, EPA-600/2-84-095 (May 1984); Evaluation of the Efficiency of Industrial Flares: Flare Head Design and Gas Composition, EPA-600/2-85-106 (September 1985); Evaluation of the Efficiency of Industrial Flares: H_2S Gas Mixtures and Pilot Assisted Flares, EPA-600/2-86-080 (September 1986).

[5] *See also id.* §§ 115.725(e)(3), 115.725(f)(5), and 115.725(g)(2)(E) (Containing similar language regarding the assumption of 99% and 98% DRE; each with varying monitoring requirements depending on flare service.)

assistance and DRE reduction was conducted as a part of the Petroleum Refinery MACT and Ethylene Production MACT rulemakings some 6 to 8 years later.[6]

According to TCEQ, "The use of a 99% destruction efficiency for ethylene and propylene in a flare meeting the requirements of 40 CFR §60.18 is based on a limited amount of data from EPA flare studies conducted in the early 1980's."[7] *See* 29 Tex. Reg. 11656 regarding Rule Project No. 2004-037-115-AI (December 17, 2004). Since this time, and as discussed at length throughout the Petroleum Refinery MACT and Ethylene Production MACT rulemakings, EPA has found that compliance with General Provisions at 40 C.F.R §§ 60.18(b) and 63.11(b) are inadequate to ensure proper performance of flares at refineries and other petrochemical facilities (including ethylene production units), particularly when either assist steam or assist air is used. *See* 84 Fed. Reg. 54294 (October 9, 2019) and 79 Fed. Reg 36905 (June 30, 2014).[8] As a result, compliance with the NHV and velocity requirements at §§ 60.18(b) and 63.11(b) are not sufficient to ensure 98% DRE, let alone 99% DRE, for steam or air assisted flares. EPA acknowledges that for certain types of flares and/or vent gases, the General Provisions (combined with the relevant NSPS or NESHAP) may be sufficient provided they are not susceptible to over-assistance. EPA promulgated the additional requirements in specific rules such as the Petroleum Refinery MACT and Ethylene Production MACT (i.e., in addition to the part 60/63 General Provisions - e.g., flare tip velocity requirements, visible emissions requirements, and continuously lit pilot flame) to ensure 98% DRE when in continuous compliance with these regulations. However, these regulations were not designed to ensure compliance with 99% DRE. As the EPA explained in its final rule for petroleum refineries:

> Based on the results of all of our analyses, the EPA is finalizing a single minimum NHVcz operating limit for flares subject to the Petroleum Refinery MACT standards of 270 BTU/scf during any 15-minute period. The agency believes, given the results from the various data analyses conducted, that this operating limit is appropriate, reasonable and will ensure that refinery flares meet *98-percent destruction efficiency* at all times when operated in concert with the other suite of requirements refinery flares need to achieve (e.g., flare tip velocity requirements, visible emissions requirements, and continuously lit pilot flame requirements).

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[6] As the EPA explained for flares at petroleum refineries: "In 2012, the EPA compiled information and test data collected on flares and summarized its preliminary findings on operating parameters that affect flare combustion efficiency . . . The EPA submitted the report, along with a charge statement and a set of charge questions to an external peer review panel. The panel concurred with the EPA's assessment that three primary factors affect flare performance: (1) The flow of the vent gas to the flare; (2) the amount of assist media (e.g., steam or air) added to the flare; and (3) the combustibility of the vent gas/assist media mixture in the combustion zone (i.e., the net heating value, lower flammability, and/or combustibles concentration) at the flare tip." *See* 79 Fed. Reg. 36905 (June 30, 2014).

[7] The EPA flare studies referenced in 29 Tex. Reg. 11656 were based on a particular flare operating under certain conditions. According to the RTC, TCEQ relied on this limited test data to apply a 99% propylene and ethylene DRE to future flares subject to 30 TAC Chapter 115 HRVOC regulations.

[8] EPA made similar findings for flares in the April 6, 2023, proposed amendments to the New Source Performance Standards for the Synthetic Organic Chemical Manufacturing Industry (SOCMI) and the National Emission Standards for Hazardous Air Pollutants that apply to the SOCMI (commonly known as the Hazardous Organic NESHAP or "HON") and Group I and II Polymers and Resins Industries. *See* 88 Fed. Reg. 25147 (April 25, 2023); *see also* EPA Office of Enforcement and Compliance Assurance, Enforcement Alert, EPA 325-F-012-002 (August 2012).

80 Fed. Reg. 75211 (December 1, 2015) (emphasis added).

The EPA similarly explained in its proposed rulemaking for the Ethylene Production MACT:

> The Agency believes, given the results from the various data analyses conducted for the Petroleum Refinery Sector Rule, that this NHVcz operating limit promulgated for flares used in the Petroleum Refinery Sector source category is also appropriate, reasonable, and will ensure flares used as APCDs [air pollution control devices] in the Ethylene Production source category *meet 98-percent destruction efficiency* at all times when operated in concert with the other proposed suite of requirements that flares need to comply with (*e.g.,* continuously lit pilot flame requirements, visible emissions requirements, and flare tip velocity requirements) (see the memoranda titled *Petroleum Refinery Sector Rule: Operating Limits for Flares* and *Flare Control Option Impacts for Final Refinery Sector Rule* in Docket ID Nos. EPA-HQ-OAR-2010-0682-0206 and EPA-HQ-OAR-2010-0682-0748, respectively).

84 Fed. Reg. 54298 (October 9, 2019) (emphasis added).

In response to EPA comments on the proposed amendment to the HRVOC regulations at 29 Tex. Reg. 11656 (December 17, 2004), TCEQ stated, in relevant part, that ". . . the commission will continue to follow technological advances in this area [referring to PFTIR pilot studies for the determination of actual flare destruction efficiency] and will reevaluate use of the assumed destruction efficiency in the future if reliable data indicate a need to do so." Since their adoption on December 01, 2004, the § 115.725 rules have undergone quadrennial review by TCEQ only once (that EPA could find a record for in the Texas Register)[9] which did not receive any public comments and did not result in a revision to the DRE assumptions for HRVOCs. Additionally, these Chapter 115 Subchapter H rules have not been amended since they became effective on December 23, 2004.

EPA believes that in light of the aforementioned rulemakings, EPA and TCEQ[10] have sufficient data concerning assisted flares to conclude that the HRVOC standards, and the monitoring therein, may not ensure that assisted flares will achieve 98% or 99% DRE at all times. EPA encourages TCEQ to evaluate the § 115.725 assumed destruction efficiencies for steam and air assisted flares, as the agency has previously committed to do, now that reliable flare performance data is available and such data has been used in EPA rules addressing the control requirements of

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[9] *See* 44 Tex. Reg. 485 (February 1, 2019).

[10] Dating back to at least 2012, multiple TCEQ publications have documented TCEQ's awareness and research regarding the potential for issues that affect flare destruction efficiency. *See* TCEQ, 2011 Emissions Inventory Guidelines, RG-360/11 at A-51 to A-52 (January 2012) ("In the fall of 2010, TCEQ funded a research project on flare destruction and removal efficiency (DRE) at a flare-test facility. The results demonstrated that air-assisted and steam-assisted flares must operate with a very limited range of assist rates to achieve the assumed DRE of 98 percent or greater. This project also demonstrated that operating a flare in compliance with 40 CFR 60.18 does not ensure that the flare will achieve 98 percent DRE. Flare assist rates and other operating information should be reviewed and assessed to determine whether a flare may be operating at assist ranges that do not achieve 98 percent DRE, in which case the flare DRE must be reduced accordingly when determining and reporting flare emissions in the EI. The final report and additional project information are at www.tceq.texas.gov/goto/2010-flare-study.")

flares. If TCEQ wishes to continue to afford the attribution of 98% or 99% HRVOC DRE for all air or steam assisted flares, TCEQ should provide rigorous technical justification for their continued use and should consider amending the 30 TAC Chapter 115, Subchapter H, Division 1 requirements to contain essential operational limitations and monitoring provisions that are sufficient to ensure such destruction efficiencies at all times. Without adequate monitoring and operational requirements sufficient to account for potential issues affecting flare performance, EPA does not believe that assisted flares in compliance with the current Chapter 115, Subchapter H requirements can assume 98% or higher DRE for the purposes of demonstrating compliance with the HRVOC cap at § 115.722.

In addition to authorizing a > 98% DRE assumption for demonstrating compliance with the short- and long-term HRVOC caps under 30 TAC Chapter 115, EPA understands that TCEQ has also developed flare guidance with similar assumptions. This guidance similarly contains agency-accepted flare destruction efficiencies that allow for the assumption of 99% DRE for compounds with three carbons or less (e.g., acetylene, ethylene, propylene, methylacetylene, as well as methanol, ethanol, propanol, ethylene oxide, and propylene oxide) and 98% DRE for compounds with greater than 4 carbon atoms. *See* TCEQ, Air Permits Division NSR Emission Calculations, Attachment A – Flare Factors at 8 (March, 2021); *See also* TCEQ 2022 Emissions Inventory Guidelines, RG-360/22, Table A-8 at 143 (January 2023) (Allowing for a 99% DRE assumption C1-C3 VOCs and 98% DRE for C4+ VOC compounds). EPA's concerns for the Chapter 115 flare DRE assumptions are the same concerns we have with the DRE assumptions allowed by TCEQ's flare guidance. The guidance allows for DRE assumptions that TCEQ's very own flare performance study concludes are not guaranteed. Specifically, since at least 2012, TCEQ's emissions inventory guidance has referenced its 2010 flare study which identified that operating a flare in compliance with 40 CFR § 60.18 does not ensure that the flare will achieve 98% DRE. *See supra* note 10. However, this same document appears to afford flares in compliance with § 60.18 the ability to assume and apply 99% and 98% DRE depending on waste stream composition. For the reasons identified throughout this letter, EPA encourages TCEQ to also take a hard look at the flare DRE assumptions allowed by its guidance for 60.18-compliant flares and ensure that appropriate DRE assumptions are identified.

Additionally, TCEQ previously received public comments on 30 TAC Chapter 115 related to the addition of other reactive VOCs. TCEQ replied that the Commission would use the stakeholder process, in conjunction with data from other air quality studies and monitoring, to determine future actions regarding other VOCs. TCEQ also received comments that additional monitoring was needed. In responding to these comments, TCEQ stated, "The commission will continue to evaluate new technologies and methods of measuring VOCs, data collected from ambient monitors in the HGB area, as well as other ongoing research activities to determine if further control and monitoring of specific VOCs other than the current HRVOCs is necessary to achieve attainment" *see* 29 Tex. Reg. 11642 (December 17, 2004). Monitoring that is currently available for flares includes pilot flame monitor, auto gas chromatograph (GC), H_2 analyzer, calorimeter, flare gas flow monitor, steam fine controls/metering, and air fine controls/metering.

Flares subject to the Chapter 115 HRVOC rules can be found in multiple counties in the HGB area and are not limited to only Harris County. EPA believes that TCEQ should consider if the definition of HRVOC needs to be revised and updated to apply consistently to all eight counties

in the HGB area. TCEQ should consider whether the initial factual, legal, and policy reasons for adopting each rule in these subchapters continue to exist and to take into consideration current industry and scientific knowledge and the current attainment status of the HGB area. Effective November 7, 2022, the HGB area was reclassified to severe nonattainment for the 2008 Ozone NAAQS.[11] EPA encourages TCEQ to use this opportunity to increase the effectiveness of the Chapter 115 rules as enhanced monitoring, operational requirements, and compliance measures for flares could contribute to an improvement in regional air quality.

Lastly, EPA Region 6 conducted an analysis for Harris County using EPA's EJScreen to assess key demographic and environmental indicators. This analysis shows a total population of approximately 4.68 million residents, 11% are limited English speaking and 36% are low income. The current air toxics cancer risk (excess lifetime risk per million) is equal to or greater than 36, whereas the state risk is, on average, 31. Upon review of the EJScreen EJ Indices, which combine certain demographic indicators with 12 environmental indicators, the results show that eight of the 12 EJ Indices in the county exceed the 70th percentile in the state of Texas. EPA knows from previous EJScreen analysis performed for permit reviews in Harris County, that there are localized areas with greater EJ Indices scores and where AirToxScreen has shown greater air cancer toxic risk.

EJ communities are most impacted by ozone and therefore it is important that TCEQ take what actions they can to ensure permit holders are accounting for their flare emissions properly versus simply assuming flare DRE's will be achieved at all times. HRVOCs are precursors to the formation of ground level ozone and thus contribute to exceedances of the NAAQS for ozone in the HGB area. As you know, children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure. Children are also more likely than adults to have asthma. When inhaled, ozone can damage the lungs. Relatively low amounts of ozone can cause chest pain, coughing, shortness of breath, and lung irritation. EPA utilized the CDC PLACES[12] mapping and data tool to better understand the health impacts that ground level ozone would have on the communities in the HGB area. This data shows that the prevalence of asthma among adults is at 9.3% in Galveston and Chambers Counties and 8.8% in Harris County, while the U.S. average is 9.2%. The prevalence of coronary heart disease was equal to or greater than the U.S. average of 5.5% for the majority of the counties in the HGB area. The percentage of the population that currently lack of health insurance among adults aged 18 – 64 years was significantly higher in the HGB counties (35.8% in Harris, 28.5 in Chambers) when compared to the U.S. at 13.5%.

We encourage TCEQ to consider using EJScreen and other available data when evaluating rulemaking actions for EJ and civil rights concerns. TCEQ should ensure that its actions help protect those most vulnerable to air pollution impacts. Addressing flare efficiency and ensuring that assumed DRE's are being achieved in practice through appropriate monitoring and operational requirements would be beneficial throughout the HGB area.

[11] *See* 87 Fed. Reg. 60926 (October 7, 2022).
[12] *See* https://www.cdc.gov/places/index.html