OFFICE OF THE MAYOR
CITY OF HOUSTON
TEXAS

Bill White
Mayor

VIA FEDERAL EXPRESS

July 9, 2008

Information Quality Guidelines Staff
United States Environmental Protection Agency
Ronald Reagan Building, Room M1200
1300 Pennsylvania Ave NW
Washington, DC 20460

Re: Request for Correction of Information Under the Data Quality Act and EPA's Information Quality Guidelines

Dear Madam or Sir:

This Request for Correction is filed to ensure that the emission factors used by EPA to make air quality decisions that impact public health are accurate, reliable and unbiased, as required by law. The emission factors currently used by EPA significantly undercount emissions from petroleum refineries and chemical manufacturing plants.[1] Several studies have shown that actual emissions of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) from refineries and chemical manufacturing plants can be *100 times greater* than reported emissions based on EPA's emission factors, equations, and estimates.

VOCs and HAPs are air pollutants that have significant public health impacts, some of which are found in high concentrations in the air Houstonians breathe. VOCs contribute to the formation of ozone, and include toxic air pollutants like benzene, 1,3-butadiene,

[1] "Petroleum refinery" or "refinery" refers to those facilities that engage in "the physical, thermal and chemical separation of crude oil into its major distillation fractions which are then further processed through a series of separation and conversion steps into finished petroleum products." Office of Compliance Sector Notebook Project, U.S. Envtl. Prot. Agency, Profile of the Petroleum Refining Industry 4 (Sept. 1995). "Chemical manufacturing plant" or "chemical plant" refers to organic chemical manufacturing plants, or those facilities that "manufacture carbon-containing chemicals." Office of Compliance Sector Notebook Project, U.S. Envtl. Prot. Agency, Profile of the Organic Chemical Industry 3 (Nov. 2002).

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and toluene. HAPs are certain toxic air pollutants that Congress has identified as presenting "a threat of adverse human health effects."[2] Certain HAPs, like benzene and 1,3 butadiene, are also VOCs. This request to correct the data quality errors in the emission factors pertaining to refineries and chemical manufacturing plants is of particular urgency in light of the recently revised ozone standard and the significant amount of toxic emissions that communities situated near these facilities are exposed to. Without accurate emissions data, local, state, and federal governments are not able to make air quality management decisions that are protective of public health. Residents of Houston and its environs are particularly adversely impacted by the inaccurate inventories because of the large concentration of refining and chemical manufacturing facilities in close proximity to one another and to the more than 5 million residents of this area. Indeed, even the current under-counted inventories reported in the TRI show that Harris County, in which Houston is located, has the highest level of industrial benzene emissions of any county in the U.S. and is among the counties with the highest emissions of HAPs from industrial sources. [3]

Due to the public health consequences that result from the under-reporting of VOC and HAP emissions from refineries and chemical manufacturing plants, petitioner respectfully requests that EPA take immediate action to address the significant data quality errors in the emission factors by (1) immediately establishing firm deadlines to revise the emission factors subject to this petition, based upon reliable, accurate and unbiased data from direct observation and other accurate measurements, in order to create valid emission inventories, (2) requiring the use annually by large refineries and chemical manufacturing plants[4] of cost-effective remote sensing technologies and installation of fence line monitoring to verify emissions, and (3) requiring refineries and chemical plants undergoing modifications to document emissions reductions through the use of direct measurement if they wish to avoid installing pollution control technologies required under the Clean Air Act.

This Request for Correction ("RFC") of influential information is submitted by the City of Houston under the Data Quality Act[5] ("DQA") and the implementing guidelines issued

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[2] 42 U.S.C. § 7412(b).

[3] *See* U.S. Envtl. Prot. Agency, Toxics Release Inventory Explorer, *available at* http:// www.epa.gov/triexplorer/.

[4] "Large refineries and chemical manufacturing plants" should include (1) petroleum refineries that process more than 50,000 barrels per day and their related or adjacent chemical manufacturing plants and (2) organic chemical manufacturing plants that report more than 100 tons of VOC emissions annually. EPA defines "large" refineries as facilities that process more than 50,000 barrels per day. Office of Compliance Sector Notebook Project, U.S. Envtl. Prot. Agency, Profile of Petroleum Refining Industry 6 (Sept. 1995). EPA does not define what constitutes a "large" chemical manufacturing plant. Thus, petitioners define "large" chemical manufacturing plants as those organic chemical manufacturing facilities that *report* annual VOC emissions greater than 100 tons, the major source threshold for criteria pollutants. Petitioners must rely on self-reported emissions data as there is no other alternative definition, and note that these facilities are likely to emit far more tons of VOCs than reported as discussed in detail in this petition.

[5] Treasury and General Government Appropriation Act for Fiscal Year 2001, Pub. L. No. 106-554, § 515, 114 Stat. 2763A-153 [hereinafter Data Quality Act].

by the Office of Management and Budget ("OMB")[6] and the United States Environmental Protection Agency ("EPA").[7] The City of Houston seeks correction of the following emission factors, equations, and estimates:

- Fugitive Emissions and Controls, Sections 5.1.3 of the *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*[8] ("*AP-42 Series*")
- Liquid Storage Tanks, Chapter 7 of the *AP-42 Series*
- Industrial Flares, Section 13.5 of the *AP-42 Series*
- Average Emission Factors, Screening Ranges, EPA Correlations, and Unit-Specific Correlations for Refineries and the Synthetic Organic Chemical Manufacturing Industry ('SOCMI") in the *Protocol for Equipment Leak Emission Estimates*[9] ("Protocol")
- Emission factors that EPA has assigned a "D," "E," or "U" quality rating in the *Locating and Estimating Air Toxic Emissions from Sources of Series*[10] ("*L & E Series*")

These emission factors, equations, and estimates (hereinafter collectively called "the emission factors pertaining to refineries and chemical plants") do not comply with EPA's Information Quality Guidelines because they are inaccurate, unreliable, and biased.

I. Introduction

The emission factors pertaining to refineries and chemical plants violate the objectivity and utility standards of EPA's Information Quality Guidelines because they are not accurate, reliable, or unbiased. Under the Data Quality Act, federal agencies must "[i]ssue their own information quality guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information . . . disseminated by the agency."[11] EPA's Information Quality Guidelines state that EPA evaluates the "quality" of information based on the "objectivity, utility, and integrity" of that information.[12] The

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[6] Office of Mgmt. & Budget, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, 67 Fed. Reg. 8452 (Feb. 22, 2002).

[7] Office of Envtl. Information, U.S. Envtl. Prot. Agency, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity, of Information Disseminated by the Environmental Protection Agency (EPA/260-R-02-008) (Oct. 2002) [hereinafter EPA, Information Quality Guidelines].

[8] U.S. Envtl. Prot. Agency, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, *available at* http://www.epa.gov/ttn/chief/ap42/index.html [hereinafter EPA, AP-42 Series].

[9] U.S. Envtl. Prot. Agency, Protocol for Equipment Leak Emission Estimates (Nov. 1995), *available at* http://www.epa.gov/ttn/chief/efdocs/equiplks.pdf [hereinafter EPA, Protocol]

[10] U.S. Envtl. Prot. Agency, Locating and Estimating Air Toxic Emissions from Sources of Series, *available at* http://www.epa.gov/ttnchie1/le/ [hereinafter EPA, L & E Series]. This report series "characterizes the source categories for which emissions of a toxic substance have been identified," and identifies emission points and emission factors. *Id.* Refineries and chemical manufacturing plants are major emitters of toxic air pollutants.

[11] 67 Fed. Reg. at 8,458.

[12] EPA, Information Quality Guidelines § 5.1.

two quality standards relevant to this petition are objectivity and utility. "Objectivity focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance is accurate, reliable, and unbiased."[13] The utility standard "refers to the usefulness of the information to the intended users."[14]

The emission factors pertaining to refineries and chemical plants drastically undercount emissions,[15] and scientific studies have shown that these emission factors are inaccurate.[16] For example, EPA's own guidance documents state that there is "*inherent uncertainty* in the development and use of emission factors" for refineries,[17] and a recent technical memorandum cited numerous studies that demonstrate gross inaccuracies in emissions data for refineries that are the result of poor quality emission factors.[18]

The discrepancies between actual and estimated emissions for refineries and chemical plants can be dramatic. Studies conducted using remote sensing technologies show that actual VOC and HAP emissions of refineries can be *100 times greater* than reported emissions.[19] Airborne measurements of ethene taken over the Houston area showed that ethene emissions from petrochemical facilities were underestimated by *one to two orders of magnitude*.[20]

The emission factors pertaining to refineries and chemical plants do not comply with EPA's Information Quality Guidelines because they are inaccurate, unreliable, and biased, and produce fundamentally flawed emissions data that should not be used by regulatory decision-makers. Specifically, the emission factors pertaining to refineries and chemical plants violate EPA's Information Quality Guidelines because:

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[13] *Id.*
[14] *Id.*
[15] *See* Office of Inspector Gen., U.S. Envtl. Prot. Agency, EPA Can Improve Emissions Factors Development and Management (No. 2006-P-00017) (Mar. 22, 2006) [hereinafter EPA, EPA Can Improve] *and* Memorandum from Brenda Shine, U.S. Envtl. Prot. Agency, on Potential Low Bias of Reported VOC Emissions from the Petroleum Refining Industry to EPA Docket No. EPA-HQ-OAR-2003-0146 (July 27, 2007) [hereinafter EPA, Potential Low Bias]. As discussed *infra*, the majority of issues identified in the EPA memorandum that lead to the undercounting of refinery emissions are also found in the emissions data for chemical manufacturing plants and are not industry or source specific. For example, the emission factors, equations, and estimates for the SOCMI in the *Protocol* fail to account for emissions that are generated during startup, shutdown, or malfunction events or equipment leaks from storage tanks that result from poor maintenance.
[16] *See, e.g.*, Allan Chambers et al., Alberta Research Council, Refinery Demonstration of Optical Technologies for Measurement of Fugitive Emissions and for Leak Detection (Mar. 31, 2006) (Attachment A). Emission estimates in this study were calculated using the emission factors subject to this petition. *Id.* at 16.
[17] National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries, 72 Fed. Reg. 50716, 50725–26 (Sept. 4, 2007) (emphasis added).
[18] EPA, Potential Low Bias.
[19] *See, e.g.*, *supra* note 14.
[20] Alex Cuclis, Houston Advanced Research Ctr., Presentation to South Texas Section of the American Institute of Chemical Engineers: Underestimated Emissions Inventories (Feb. 7, 2008).

- ***EPA's Own Admissions and Scientific Studies Using Remote Sensing Technologies and Airborne Measurements Confirm that the Emission Factors are Inaccurate.*** One study found that measured emissions from a refinery were *100 times greater* than emission estimates based on emission factors.[21]

- ***The Emission Factors Fail to Account for Emissions Generated During Startup, Shutdown, and Malfunctions ("SSM[22]"), and Increased Emissions that Result from Poor Maintenance of Equipment.*** These uncounted emissions can be significant. The flare emissions produced during just one SSM event can *exceed* annual average emissions.[23]

- ***The Emission Factors Fail to Account for Environmental Variables that Significantly Impact Emissions.*** Emissions from storage tanks and flares increase significantly as wind speed increases. A study of one refinery using remote sensing technology estimated annual VOC emissions from tankage at 5,000 tons as opposed to the 153 tons estimated using emission factors.[24]

- ***The Emission Factors Do Not Account for Emissions from Delayed Coker Units.*** EPA has acknowledged, and other scientific studies have confirmed, that delayed coker units can be one of the largest sources of benzene emissions at refineries.[25]

- ***EPA Authorizes the Use of Emission Factors that EPA's own quality system determines are unreliable and likely to be inaccurate.*** EPA uses emission factors that EPA rates as "below average," "poor," or "unratable" quality even though EPA knows the data generated by the emission factor is likely to be inaccurate and unreliable.

- ***EPA Authorizes the Use of Emission Factors for Purposes the AP-42 Series Declares Inappropriate.*** Although the *AP-42 Series* states that

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[21] Chambers et al., *supra* note 15.

[22] Such events might variously be called "startup, shutdown and malfunction," startup, shutdown, maintenance and malfunction," "SSM," "SSMM," "excess emissions," and/or "upsets." SSM events are "non-routine events, such as equipment breakdowns, startup, shutdown and maintenance, at industrial facilities that cause them to emit more pollution than allowed by their permits and applicable rules." Envtl. Integrity Project, Gaming the System: How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air 1 (Aug. 2004).

[23] Robert E. Levy et al., Indus. Prof. for Clean Air, Reducing Emissions from Plant Flares (No. 61) 10 (Apr. 24, 2006) (Attachment B).

[24] Chambers et al., *supra* note 15, at 17.

[25] 72 Fed. Reg. 27,178, 27,198 (May 14, 2007) *and* Chambers et al., *supra* note 13, at 13–14.

emission factors should only be used for emissions inventory development. EPA has approved the use of emission factors for site-specific purposes.[26]

- ***The Emission Factors Are so Fundamentally Flawed they Produce Emissions Data that is of No Utility to Decision Makers.*** The inaccuracy, unreliability, and bias of the emission factors undermines the EPA and other agencies in making health-protective decisions based on this data.

EPA first documented the significant quality errors in emissions data caused by the use of inherently unreliable emission factors over twelve years ago,[27] and not yet corrected the errors in the emission factors. This failure to correct known inaccuracies in emissions data is particularly egregious given the fact EPA uses this data to make risk-based decisions and other important air quality management decisions. In the Houston areas, these errors are compounded because of the high number of facilities and their close proximity to one another and to large population centers, whose residual risk is under assessment at this time.

EPA should no longer rely on the use of these inherently unreliable emission factors that it has acknowledged to be inaccurate to make regulatory decisions that have impacts on public health. Specifically, petitioner requests that EPA take immediate action to establish firm deadlines to revise the emission factors, based upon data obtained through direct observation and other valid measures, in order to create accurate and reliable emissions inventories. EPA should prioritize development of new emission factors based on the relative unreliability of the current emission factor, the volume of impacted emissions, and toxicity of impacted emissions. Scientifically proven remote sensing technologies can be utilized to improve upon existing emission factors, so that emissions inventories are accurate and reliable. Remote sensing technologies, like Differential Absorption LIDAR ("DIAL"), are laser-based methods of direct measurement of emissions that identify and quantify fugitive, tank, and flare emissions.[28] Direct measurement of emissions produces data that will help provide a better understanding of how fugitive, tank, and flare emissions vary with environmental variables and other factors.[29]

EPA should also require large refineries and chemical plants to verify the accuracy of reported emissions using cost-effective remote sensing technologies annually. The approximate cost for each facility is $210,000 per year, and can help save a facility

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[26] EPA, EPA Can Improve, at 15–16.
[27] Office of Inspector Gen., U.S. Envtl. Prot. Agency, Emission Factor Development (No. 610036) (1996), *available at* http://www.epa.gov/oig/reports/1996/emisexsm.htm.
[28] Clearstone Eng'g Ltd., A Review of Experiences Using DIAL Technology to Quantify Atmospheric Emissions at Petroleum Facilities 2 (Sept. 6, 2006).
[29] *See* Chambers et al., *supra* note 15, at v.

millions of dollars.[30] Scientifically-proven remote sensing technologies provide emissions data that is more representative of actual emissions at refineries and chemical manufacturing plants than estimates based on the current emission factors. In addition, EPA should require fence line monitoring at large refineries and chemical plants to ensure that reported emissions are representative of the actual emissions that communities located near these facilities are exposed to.

Finally, EPA should immediately prohibit the use of emission factors for facilities undergoing modifications to document emissions reductions for facilities that wish to avoid installing pollution control technologies required under the Clean Air Act. These facilities should be required to use direct measurement technologies to prove they are, in fact, reducing actual emissions.

The City of Houston has a significant interest in ensuring that the public health of Houstonians is not compromised due to inaccurate emissions data that result from EPA's use of inaccurate, unreliable, and biased emission factors.[31] EPA relies heavily on the emission factors pertaining to refineries and chemical plants to prepare emissions inventories, and has inappropriately authorized the use of AP-42 emission factors for site-specific purposes. Because these emission inventories are the foundation for the entire air regulatory program, they are "influential scientific data" and must meet the very highest standard of data quality under EPA's Information Quality Guidelines.

II. EPA, Scientists, and Industry Agree that the Use of Current Emission Factors to Estimate Refinery and Chemical Manufacturing Plant Emissions Drastically Undercounts Emissions

There is widespread consensus among EPA, scientists, and industry that the emission factors pertaining to refineries and chemical plants are inaccurate, unreliable, and biased, and fall far short of meeting the "rigorous" quality standards they are subject to under EPA's Information Quality Guidelines.

EPA candidly acknowledges that the use of emission factors, generally, results in inaccurate and unreliable emissions data.[32] This emissions data is used to create regional and national emissions inventories, and EPA's Office of the Inspector General ("OIG") states that "[t]he heavy use of emission factors in the [national emissions inventory] makes the *reliability of the data highly uncertain*. Emission factors can result in emissions data of *questionable reliability* . . . ."[33]

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[30] Clearstone Eng'g Ltd., *supra* note 27, at 8 (noting that the cost of a DIAL study is $15,000 per day and takes about two weeks to complete for large refineries) (Attachment C) *and* Cuclis, *supra* note 19.

[31] *See* EPA, EPA Can Improve, at 24 ("EPA officials describe the emissions inventory as the foundation for the air program, upon which everything else is built.").

[32] *See supra* note 14 and footnote text.

[33] EPA, Improvements in Air Toxics Emissions Data, at 18 (emphasis added).

The emission factors pertaining to refineries and chemical plants are of particularly poor quality. EPA's OIG specifically noted that VOC emissions from fugitives and flares at "petroleum refineries were significantly under reported in the emissions inventory."[34] The OIG report concluded that the under-reporting was caused by the "poor quality" of the emission factors used to generate emissions data.[35] And, in the recently proposed NESHAPs from petroleum refineries, EPA readily admits that there is "*inherent uncertainty* in the development and use of emission factors."[36] A recent EPA technical memorandum documented numerous studies that demonstrated a low emission reporting bias for refineries and concluded that emissions data for refineries was biased due to the fundamental flaws in emissions estimates methodology.[37]

Numerous studies conducted using remote sensing technologies, like DIAL, show that emissions at refineries and chemical plants can be up to *100 times greater* than emission factors predict.[38] An EPA-sponsored workshop reported that "DIAL studies of 100-plus facilities executed under different climatic, environmental, and operating conditions *always* show that the facility has higher emissions than are reported" using emission factor estimates."[39]

One study conducted by the Alberta Research Council at an oil refinery in Alberta, Canada found that, compared with emission factor estimates, DIAL detected *33 times more VOC* and *96 times more benzene* (a known carcinogen) from storage emissions, and *12 times more VOC* and *8 times more benzene* from fugitive emissions.[40] Similarly, a DIAL study conducted in Sweden found that emissions at one refinery were *20 times higher* than what the emission factors predicted.[41] Another study conducted using DIAL in the United Kingdom found that "[t]he reported emissions from the LPG storage at Wytch Farm Gathering Station in 1995 were 16 tonnes per year, calculated using the API factors. . . . The DIAL estimates are equivalent to an annual NMVOC emission of 303 +/- 24 tonnes per year for the LPG store and 658 +/-130 tonnes per year from the stabilized

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[34] EPA, EPA Can Improve, at 11.
[35] *Id.* at 11–12.
[36] 72 Fed. Reg. 50,716, 50,725–26.
[37] *See supra* note 14 and footnote text.
[38] *Id.*
[39] Office of Air Quality Planning & Standards, U.S. Envtl. Prot. Agency, VOC Fugitive Losses: New Monitors, Emission Losses, and Potential Policy Gaps 38 [hereinafter EPA, VOC Fugitive Losses] (emphasis added).
[40] Chambers et al., *supra* note 15, at 17–18. The emission estimates were based on the "EPA Correlation Approach" estimation methodology in the *Protocol*. *Id.* Petitioners note that emissions estimates based on the emission factors in the *AP-42 Series* and *Protocol* are even *less* refined than estimates using the EPA Correlation Approach. EPA, Protocol, at 2–3.
[41] Lennart Frisch, County Admin. of Vastra Gotaland, Fugitive VOC-emissions Measured at Oil Refineries (No. 2003:56) 12 [hereinafter Frisch, Success Story] (Attachment D).

crude oil export plant."[42] The dramatic undercounting of emissions when emission factors are used has been extensively documented.[43]

The Second Texas Air Quality Study (TexAQS II) in 2006 confirmed that inventories based on these emission factors significantly underestimated petrochemical emissions.[44] The report, while focused on VOC emissions in the Houston-Galveston-Brazoria Ozone Non-Attainment Area, stated that ethene emissions from petrochemical facilities were underestimated in the 2004 TCEQ point source database by one or two orders of magnitude.[45] Measurements taken as part of the study also suggest that some toxic petrochemical emissions are similarly underestimated.[46] Airborne measurements showed high concentrations of benzene in the Houston Ship Channel area where many petrochemical facilities are located in contrast to relatively low benzene concentrations in urban areas of Houston.[47] Further, measurements taken in the Ship Channel from a ship recorded measurements of up to 50 parts per billion.[48] These high readings suggest that the petrochemical facilities in the ship channel area contribute more benzene than is recorded in the emission factor-based inventories.

EPA first documented the inaccuracies between emissions estimates generated by emission factors and actual emissions in 1996.[49] EPA's efforts to address the fundamental data quality errors in emission factors have not been enough, and the quality of emission factors has actually decreased. The overall number of emission factors that are rated "below average" quality or "poor" quality actually *increased*—from 56% in 1996 to 62% in 2004. In a report entitled "EPA Can Improve Emissions Factors Development and Management," the OIG noted significant deficiencies in EPA's emission factors program that "resulted in the use of poor and low quality emissions factors."[50] The failure to address the *known* gross inaccuracies in emissions data that result from the use of inherently unreliable emission factors is particularly egregious due to EPA's decision to utilize this data to conduct risk assessments.

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[42] R.A. Robinson et al., Nat'l Physical Lab., Differential Absorption Lidar Measurements of VOC Emissions from Wytch Farm Crdue Oil Gathering Station (NPL Report COEM 13) 11–12 (1998) [hereinafter Robinson, Wytch Farm].
[43] Clearstone Engineering Ltd., *supra* note 27.
[44] Cuclis, *supra* note 19.
[45] *Id.*
[46] *Id.*
[47] *Id.* WP-3D readings found less than 200 ppt in urban areas of Houston, but recorded spikes of up to 1,000 to 2,000 ppt in the ship channel area. *Id.*
[48] *Id.*
[49] Office of Inspector Gen., U.S. Envtl. Prot. Agency, Emission Factor Development (No. 610036) (1996).
[50] EPA, EPA Can Improve, at 15.

III. The Emission Factors Pertaining to Refineries and Chemical Plants Violate the Objectivity and Utility Standards of EPA's Information Quality Guidelines

EPA states that emission factors must be of the "*highest quality obtainable*" because they are the foundation for the entire air program.[51] EPA evaluates the "quality" of information based on the "objectivity, utility, and integrity" of that information.[52] The two quality standards relevant to this petition are objectivity and utility. "Objectivity focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance is accurate, reliable, and unbiased."[53] The objectivity standard incorporates two elements: substance and presentation.[54] The utility standard "refers to the usefulness of the information to the intended users."[55] Because the emission factors pertaining to refineries and chemical plants drastically undercount emissions and are inherently unreliable, they violate both the objectivity and utility standards of EPA's Information Quality Guidelines.

A. The emission factors pertaining to refineries and chemical plants violate the objectivity standard because they are not accurate, reliable, or unbiased.

The emission factors pertaining to refineries and chemical plants violate both the substance and presentation elements of the objectivity standard. When ensuring that the substance of these emission factors is accurate, reliable, and unbiased, EPA must adhere to an adaptation of the quality principles in the Safe Drinking Water Act Amendments of 1996 because the emission factors are "influential scientific information" used to conduct risk assessments.[56] EPA must ensure that the information used in risk assessments is accurate through the use of the "best available science." Here, however, there is overwhelming scientific evidence that the emission factors pertaining to refineries and chemical plants used to estimate emissions from fugitives, tanks, and industrial flares drastically under-count actual emissions.[57]

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[51] EPA states that "the importance placed on emissions inventories require[] that they be of the highest quality obtainable considering their end use."[51] U.S. Envtl. Prot. Agency, Introduction to the Emission Inventory Improvement Program, 1.1-5, available at http://www.epa.gov/ttn/chief/eiip/techreport/volume01/101.pdf (last visited May 23, 2008). The OMB Guidelines anticipate that agencies may have to engage in *some* cost-benefit analysis when ensuring and maximizing data quality, and EPA has adopted a "graded approach . . . to establish the appropriate quality, objectivity, utility, and integrity of information products based on the intended use of the information and resources available." EPA, Information Quality Guidelines, § 6.2.

[52] EPA, Information Quality Guidelines, § 5.1.

[53] *Id.*

[54] 67 Fed. Reg. at 8,452.

[55] EPA, Information Quality Guidelines, § 5.1.

[56] Id. § 6.4. Petitioners note that the emission factors do not even satisfy the lesser quality standard for "influential scientific data" that is not used in risk assessments. This standard states that EPA ensures the reproducibility of this type of data "according to commonly accepted scientific . . . standards . . . to an acceptable degree of imprecision." Id. § 6.3. As discussed in detail in this petition, numerous scientific studies have demonstrated that emission estimates using emission factors can be up 100 times less accurate than measurements using remote sensing technologies.

[57] *See supra* note 14 and footnote text.

Specifically, the emission factors pertaining to refineries and chemical plants are not substantially accurate, reliable, and unbiased because (1) the emission factors incorporate the erroneous assumption that equipment is operating as designed under normal conditions; (2) the emission factors do not account for environmental variables that significantly impact emissions; (3) the emission factors do not include emissions from cokers; and (4) EPA uses emission factors that EPA itself identifies as "below average" or "poor" quality. In addition, the *AP-42 Series* violates the presentation component of the objectivity standard because EPA authorizes the use of AP-42 emission factors for purposes it specifically states are inappropriate in the *AP-42 Series*.

1. *The emission factors pertaining to refineries and chemical plants incorporate the erroneous assumption that equipment is new and operating under normal conditions.*

The emission factors pertaining to refineries and chemical plants were developed based on the assumption that all equipment is new and functioning as designed under normal, operating conditions. The tests used to develop emission factors are intentionally conducted on new equipment operating under normal conditions because emission factors are formulas that attempt to estimate long-term average emissions.[58] EPA itself notes that "[p]arameters that can cause short-term fluctuations in emissions are generally avoided in testing and not taken into account in test evaluation."[59] Further, "[s]ources often are tested more frequently when they are new and when they are believed to be operating properly, and *either situation may bias the results*."[60] The incorporation of this erroneous assumption in the development of the emission factors significantly distorts emissions data in two significant ways—emissions generated during upset, SSM events, and increased emissions that result from poor maintenance of equipment are not accounted for in a facility's reported emissions and emissions inventories.

Because emission factors incorporate the assumption that equipment is functioning as designed under normal conditions, emissions produced during SSM events are not accurately represented in reported emissions. The emissions from SSM events can be significant, and industry-filed reports show that for some facilities, releases from SSM events were actually higher than the total annual emissions reported to EPA's Toxics Release Inventory ("TRI") or state emission inventories for the entire facility for the entire year.[61] In 2004, for example, half of the 37 facilities studied had SSM emissions of at least one pollutant that were 25% or more of their reported annual emissions of that

[58] EPA, AP-42 Series, at 4–5.
[59] *Id.*
[60] *Id.* at 2–3. (emphasis added).
[61] Envtl. Integrity Project, Gaming the System: How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air (Aug. 2004).

pollutant.[62] For ten of the facilities, SSM emissions of at least one pollutant actually exceeded the annual emissions that each facility reported to the state for that pollutant.[63] A single SSM event at a refinery can release substantial amounts of HAPs.

VOC emissions released from flares at refineries and chemical plants during SSM events are also significant, and emissions produced during one of these events can actually *exceed* annual average emissions.[64] For example, "a large chemical complex reported 304 tons of VOC emissions due to upsets and 622 tons of VOC emissions total in 2000. The applicable permit allowed only 124 tons of VOC emissions."[65] The emissions produced during the SSM event were more than twice the permitted emissions allowed for the year. However, EPA studies in the 1980's that were used to develop the emission factors specifically "excluded abnormal flaring conditions which might represent large hydrocarbon releases during process upsets, start-ups and shutdowns."[66]

Similarly, basing emission factors on this faulty assumption fails to accurately account for increased emissions that result from poor maintenance of equipment. EPA itself notes the dramatic impact poor maintenance has on emissions from facilities in a recent technical memorandum discussing the low bias of VOC emissions from refineries.[67] An inspection of one California facility by state officials "revealed that *more than 80%* of the tanks had numerous leaks, gaps, torn seals, and other defects that caused excess emissions."[68] Failing to account for the significant emissions produced during SSM upset events or increased emissions that result from poor equipment maintenance results in grossly inaccurate, unreliable, and biased emissions data for refineries and chemical plants.

2. *The emission factors pertaining to refineries and chemical plants do not account for environmental variables that significantly impact emissions.*

The emission factors do not account for environmental variables that significantly impact emissions from refineries and chemical plants. Wind speed, for example, can have a substantial impact on emissions from storage tanks and flares. One study using remote sensing technology of a refinery in Canada found that emissions of VOCs from storage tanks increase when wind speed increases.[69] Emissions from storage tanks increased by a factor of four times when winds increased from 10 km/hour to 30 km/hour.[70] The group of eleven tanks studied emitted 0.3 kg/h of benzene in low wind speed (10 km/h), and 1.3

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[62] *Id*
[63] *Id.*
[64] Levy et al., *supra* note 22, at 10.
[65] *Id.* at 5.
[66] *Id.* at 8.
[67] EPA, Low Bias, at 6.
[68] *Id.* (emphasis added).
[69] *Id.* at 14.
[70] Chambers et al., *supra* note 15, at 15.

kg/h of benzene when winds reached 30 km/h.[71] The study showed that the annual emissions of VOCs from tankage at the refinery calculated using estimates based on direct measurement were approximately 5,000 tons, as opposed to the 153 tons based on calculations using AP-42 emission factors for tanks.

This is particularly significant in the context of storage tanks because the tanks at oil refineries and chemical plants are a major source of VOC emissions.[72] The Canadian study, for example, found that "[t]ankage was the source of 64% of the benzene emissions from the site."[73]

The American Petroleum Institute ("API") contends that the input of improper parameters into the emission factor equations, as opposed to quality errors in the equations themselves, are the reason for the vast differences between directly measured emissions and emissions estimates derived from emission factors.[74] However, EPA itself notes the improbability of this explanation, stating that "while these uncertainties could explain differences on the order of two or three, it is difficult to explain differences on the order of 30 to 100. Given the magnitude of the difference, either emissions are zero most of the time . . . or the annual emissions estimates are too low."[75]

Wind speed also has a significant impact on flare emissions from refineries and chemical plants.[76] The emission factors for industrial flares were developed based on the assumption that 98 to 99 percent of VOCs sent to the flare are destroyed.[77] However, flares become less efficient, and destroy less VOCs, as wind speeds increase.[78] The ability of flares to destroy VOCs (i.e. the destruction efficiency) decreases rapidly as wind speed increases from one to six meters per second.[79] A study published in the Journal of the Air and Waste Management Association ("JAWMA") found that "[a]s wind speeds increased beyond six meters per second, combustion efficiencies tended to level off at values between 10 and 15%."[80] The study further noted that "[t]heoretical considerations and observational evidence suggest that flare combustion efficiency typically may be at ~ 70% at low wind speeds ($U \leq 3.5$ m/sec). They should be even less at higher wind speeds."[81]

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[71] *Id.*
[72] *Id.* at 13.
[73] *Id.*
[74] EPA, Potential Low Bias, at 5.
[75] *Id.* at 6.
[76] Levy et al., *supra* note 22, at 1.
[77] Douglas M. Leahey et al., Theoretical and Observational Assessment of Flare Efficiency, 51 J. Air & Waste Mgmt. 1610, 1611 (2001).
[78] EPA, VOC Fugitive Losses, at viii (noting that "the emission factor for flare estimation is based on a flare operating in still air conditions").
[79] Leahey et al., *supra* note 77, at 1611.
[80] *Id.*
[81] *Id.* at 1615.

Areas near the City of Houston typically have wind speeds higher than one meter per second. Data taken from the National Climatic Data Center indicates that average annual wind speed for the Houston area through 2006 equaled 3.4 meters per second.[82] Wind gusts in the Houston area can even reach levels as high as 20.6.[83] Using this model and taking into account wind speed in the Houston area, the destruction efficiency rates for industrial flares in the area can be assumed to be worse than 70%, and not 98 to 99% as assumed by the emission factors for industrial flares. Additionally, flare stacks are generally 10 to 100 meters tall.[84] Wind speeds at heights where the flare flame is located are generally much stronger than average ground wind speeds. Destruction efficiencies are likely even lower, and the emissions factors for industrial flares will not produce emissions data that is representative of actual emissions from refinery and chemical plant flares. Because the emission factors pertaining to refineries and chemical plants do not take into account environmental variables like wind speed, the emission factors are not accurate, reliable, or unbiased.

3. The emission factors pertaining to refineries and chemical plants do not include emissions from coke areas at refineries.

The emission factors pertaining to refineries do not include fugitive emissions from cokers.[85] EPA has acknowledged that coke cutting is a "significant" source of VOCs,[86] and one remote sensing technology study of a Canadian refinery found that delayed cokers are the *single largest source of refinery benzene emissions*.[87] The study documented VOC emissions from the coker unit up to 305 kilograms per hour.[88] A recent study conducted using remote sensing technology at a Houston refinery documented VOC emission fluxes up to 44 pounds per hour, or approximately 20 kilograms per hour.[89] Although this figure is significantly less than the emissions documented at the Alberta refinery, a comparison of the two studies demonstrates the significant variability of fugitive emissions from site to site. Regardless, the fugitive emissions from these units are simply not represented in emissions data from refineries. The failure to account for them results in inaccurate, unreliable, and biased emissions data.

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[82] National Climatic Data Center, http://www1.ncdc.noaa.gov/pub/data/ccd-data/wndspd.txt (last accessed May 23, 2008). The data on this page was in miles per hour. The Houston average annual wind speed of 7.6 miles per hour equates to 3.4 meters per second.
[83] *Id.*
[84] EPA, AP-42 Series, at 13.5-1.
[85] *See* EPA, AP-42 Series, § 5.3.1.
[86] 72 Fed. Reg. 27,178, 27,198 (May 14, 2007).
[87] Chambers et al., *supra* note 15, at 13–14.
[88] *Id.* at 14.
[89] Rod Robinson et al., Nat'l Physical Lab., Draft Test Report: Measurements of VOC Emissions From Petrochemical Industry Sites in the Houston Area Using Differential Absorption Lidar (DIAL) During Summer 2007 24 (Feb. 6, 2008).

4. Emission factors rated "D," "E," or "U" quality are, by EPA's own definition, not accurate, reliable, or unbiased.

EPA authorizes the use of emission factors that EPA itself has determined produces unreliable data.[90] By EPA's own definition, "D," "E," and "U" quality rated emission factors may not produce accurate, reliable, or unbiased data.[91] EPA rates emission factors based on both the quality of the "emission data that will be used to develop the factor," and whether the emission factor is able to "stand as a national annual average emission factor for that source activity."[92] A "below average," or "D" quality rating means that the emission factor is derived from data that may lack a sufficient amount of detail to verify the data or is generated using "unproven or new methodologies," and "there may be reason to suspect that these facilities do not represent a random sample of the industry" because the data is derived from a small number of facilities.[93] A "poor," or "E," quality rating means that the data used to develop the factor is based on "unproven or new methodology," or "on a generally unacceptable method, but the method may provide an order-of-magnitude value for the source."[94] Further, "there may be reason to suspect that the facilities tested do not represent a random sample of the industry" or "there . . . [is] evidence of variability within the source category population." An "unratable," or "U," quality rating means "[t]he emission factor was developed from suspect data with no supporting documentation to accurately apply an A through E rating."[95]

This is particularly significant in the context of refineries and chemical manufacturing plants because a significant number of the emission factors that pertain to these sources are rated "D," "E," or "U." The emission factors for fugitive emissions for petroleum refineries are rated "D."[96] In addition, many of the emission factors in the *L & E Series* that pertain to refineries or chemical plants are rated "D," "E," or "U". The chart below illustrates the overall poor quality of these emission factors.

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[90] In fact, *over half* of all of the emission factors in the *AP-42 Series* are "below average" or "poor" quality. EPA, Improvements in Air Toxics Emissions Data, at 19. The number of emission factors that are rated "below average" or "poor" actually *increased*—from 56% in 1996 to 62% in 2004. *Id.*

[91] EPA itself has noted that even with A-rated, or "excellent," emission factors, there may be a significant amount of uncertainty as to whether emissions data derived from the emission factor is representative of actual emissions. EPA, EPA Can Improve, at 25. For example, an A-rated factor for a coal-fired boiler has an uncertainty range of plus 33.2 to minus 41.4, which means that emissions of nitrogen oxides could range from *783,000 tons to 1.8 million tons* nationwide. *Id.* Thus, an emission factor that is rated "D," "E," or "U" produces inherently uncertain emission data.

[92] EPA, AP-42 Series, at 9.

[93] *Id.* at 9–10.

[94] *Id.*

[95] U.S. Envtl. Prot. Agency, Locating and Estimating Air Toxics Emissions from Sources of Methyl Ethyl Ketone 2–3, *available at* http://www.epa.gov/ttnchie1/le/.

[96] EPA, AP-42 Series, at 5.1-13.

L & E Series Emission Factor Quality Ratings

Toxic Pollutant	Number of EF Related to Refineries or Chemical Plants	"D" Rating	"E" Rating	"U" Rating	Percentage of "D," "E," or "U" Rated EF
Benzene	83	1	0	69	84%
Butadiene	62	6	19	37	100%
Chlorobenzenes	25	0	4	21	100%
Methyl Chloroform	15	0	4	11	100%
Toluene	34	0	0	34	100%
Xylene	60	17	3	40	100%

Although a "D," "E," or "U" quality rating means that the emission factor is unreliable and likely to be inaccurate, EPA still permits the use of the factor to determine and report emissions.[97] By EPA's own definition, the "D," "E," and "U" rated emission factors pertaining to refineries and chemical plants in the *L & E Series* are not accurate, reliable, or unbiased.

5. *EPA authorizes the use of AP-42 emission factors for purposes other than those recommended by the AP-42 Series.*

The *AP-42 Series* does not meet the presentation element of the objectivity standard because EPA authorizes the use of AP-42 emission factors for purposes that are specifically defined as inappropriate in the *AP-42 Series*. The introductory text of the *AP-42 Series* states that use of AP-42 emission factors is appropriate for building area-wide emissions inventories.[98] EPA cautions that emission factors may only be used for site-specific purposes "as a last resort."[99] However, EPA's OIG has documented at least

[97] EPA, EPA Can Improve, at 17.
[98] EPA, AP-42 Series, at 2–3.
[99] *Id.* at 3 ("When such information is not available, use of emission factors may be necessary as a last resort. Whenever factors are used, one should be aware of their limitations in accurately representing a particular facility, and the risks of using emission factors in such situations should be evaluated against the costs of further testing or analysis.").

three instances "where EPA has issued guidance on the use of emissions factors for source-specific purposes that conflicted with the intent of AP-42 emissions guidance—that is, that emissions factors not be used at individual sources."[100] First, EPA guidance authorizes use of emission factors by facilities when "set[ting] permit limits at individual facilities."[101]

Second, EPA's New Source Review ("NSR") Workshop approves the use of AP-42 emission factors when determining whether a facility undergoing a modification will increase emissions.[102] The Plant-wide Applicability Limitation ("PAL") allows sources to escape the requirements of NSR "by allowing some emissions points within a facility to increase emissions provided the overall emissions remain below the plant-wide limit."[103] The OIG Report concludes that EPA allows for "wide latitude" in the use of AP-42 emission factors to determine whether a facility is subject to NSR requirements.[104] This is extremely significant because the "potential to emit" decision determines what type of control technology the new source will be subject to. Finally, in a recent reconsideration of a Maximum Achievable Control Standard, EPA permitted the use of emission factors."[105]

Thus, on one hand, EPA states that the use of emission factors in the *AP-42 Series* should only be used for creating emissions inventories because the emission factors produce unreliable source-specific emissions data, while they are approving the use of such factors in permitting decisions and setting MACT standards. The misrepresentation as to the use of AP-42 emission factors in the *AP-42 Series* violates the presentation element of the objectivity standard.

B. The emission factors pertaining to refineries and chemical plants violate the utility standard.

The emission factors pertaining to refineries and chemical plants also fail to meet the utility standard of the Information Quality Guidelines due to the material defects in emissions data developed using emission factors. The EPA Quality Manual requires that programs ensure that "the intended measurements or data acquisition methods are

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[100] EPA, EPA Can Improve, at 15 16.
[101] *Id.* at 16. "EPA issued air permit guidance documents approving the use of emissions factors to set permit limits at individual facilities. In response to concerns that Title V operating permits were too costly and burdensome to implement, in July 1995, EPA issued guidance . . . stating that facilities could use emissions factors estimates to determine emissions limits in the permit applications." *Id.*
[102] *Id.*
[103] *Id.*
[104] *Id.*
[105] *Id.*

appropriate for achieving project objectives," and that EPA confirm that "data of the type and quality needed and expected are obtained."[106]

The emission factors pertaining to refineries and chemical plants produce emissions data that is inaccurate, and the differences in actual and estimated emissions are so severe that data based on emission factors is practically useless to regulators and permitting agencies. For example, EPA uses emissions data generated by these emissions factors when making residual risk determinations under the Clean Air Act.[107] In order to accurately characterize the risk posed by sources of toxic air pollution, EPA must be able to determine with accuracy the actual emissions generated by these sources. In the case of the recent NESHAPs from petroleum refineries, EPA proposed a rule that was not protective of public health or the environment because it found that HAPs emissions from refineries were not significant, and did not pose a health risk to refinery communities or the environment.[108] The City of Houston commented extensively regarding the fact that EPA's conclusion was insupportable because it was based on an inventory known to be inaccurate and understated.

EPA itself acknowledged the inherent unreliability of the emissions data that was utilized to conduct the risk assessment. Data for the 153 petroleum refineries in the U.S. was developed from the 2002 NEI and "site-specific emissions and source information which were provided by the American Petroleum Institute (API) for [only] 22 facilities."[109] A report conducted by the Office of Inspector General found that *40%* of the reported emissions in the 2002 NEI are based on emissions factors.[110]

EPA admits in the discussion of the proposed rule for petroleum refineries that there is "*inherent uncertainty* in the development and use of emission factors," and "that the primary source of uncertainty in our exposure assessment is the *uncertainty in the underlying emissions data*."[111] In fact, data reported by the industry to the EPA's Toxics Release Inventory ("TRI") shows that HAP emissions from some refineries have actually *increased* since the original NESHAPs from petroleum refineries took effect.[112] HAP emissions at one refinery increased *159%* from 1995 to 2005.[113]

The incomplete and untrustworthy data upon which the risk analysis is based does not meet the requirements of the Data Quality Act and EPA's Information Quality Guidelines. Because the emissions data generated from the use of the emission factors

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[106] Office of Envtl. Info., U.S. Envtl. Prot. Agency, EPA Quality Manual for Environmental Programs (5360 A1) § 5-3 (May 2000), *available at* http://www.epa.gov/quality/qs-docs/5360.pdf.
[107] 72 Fed. Reg. 50716 (Sept. 4, 2007).
[108] *Id.*
[109] *Id.* at 50724.
[110] EPA, Improvements in Air Toxics Emissions Data, at 18.
[111] 72 Fed. Reg. 50,716, 50,725–26 (emphasis added).
[112] See Attachment E entitled "Refinery HAP Emissions."
[113] *Id.*

pertaining to refineries and chemical plants is fundamentally flawed, it should not be used by governmental agencies that must make important air quality decisions.

III. Relief Requested

There are significant inaccuracies in emissions data due to the use of poor quality emission factors as explained in this petition.[114] The emission factors pertaining to refineries and chemical plants are of particularly poor quality, and the fundamental flaws in these emission factors have not been effectively addressed by EPA to date. In light of the important public health decisions that are based on data generated from these emission factors, petitioners respectfully request EPA to : (1) immediately establish firm deadlines to revise the emission factors subject to this petition, based upon reliable, accurate and unbiased data from direct observation and other accurate measurements, in order to create valid emission inventories; (2) require the use annually by large refineries and chemical manufacturing plants of cost-effective remote sensing technologies and installation of fence line monitoring to verify emissions; and (3) require refineries and chemical plants undergoing modifications to document emissions reductions through the use of direct measurement if they wish to avoid installing pollution control technologies required under the Clean Air Act.

A. EPA should establish firm deadlines to address the fundamental data quality errors in the emission factors pertaining to refineries and chemical plants, and use remote-sensing technologies to develop accurate emission factors to be used in the development of emissions inventories.

The data in the emissions inventories—generated largely by emission factors—used by EPA and other governmental agencies to make key environmental decisions is inherently unreliable. Reports issued by EPA's OIG in recent years make it clear that EPA has not corrected the known data quality errors in the emission factors pertaining to refineries and chemical plants.[115] Petitioners acknowledge and appreciate the difficult task EPA is faced with in addressing the numerous emission factors pertaining to refineries and chemical plants that yield inaccurate and unreliable emissions data. However, petitioners respectfully request that EPA establish firm deadlines to address data quality errors in these emission factors due to the serious public health consequences that result from the under-reporting of emissions data.

EPA should prioritize the implementation of the development and improvement of the emission factors pertaining to refineries and chemical plants based on factors such as the toxicity of emissions, unreliability of the current emission factor, and volume of

[114] *See, e.g.*, EPA, EPA Can Improve.
[115] EPA, EPA Can Improve and EPA, Improvements in Air Toxics Emissions Data.

emissions. For example, improving the quality of the tank emission equations in Chapter 7 of the AP-42 Series should be a top priority. One study using remote sensing technology demonstrated that tankage can be a major source of benzene, a highly toxic air pollutant that is present in high concentrations in the City of Houston, and that the current emission equations resulted in drastic under-reporting.[116] Due to the toxicity of the emissions and the poor quality of the emission equation, EPA should identify the AP-42 tank emission equations as a top priority for quality improvement.

EPA should take advantage of scientifically-proven remote sensing technologies, or direct measurement, to evaluate and improve the quality of the emission factors pertaining to refineries and chemical plants. Remote sensing technologies, like Differential Absorption LIDAR ("DIAL")[117] and Solar Occultation Flux ("SOF"), are able to identify and quantify air emissions from equipment leaks, tanks, and flares that are much more difficult to measure than "stack" emissions. Over thirty studies using remote sensing technologies have been performed at petrochemical facilities,[118] and the accuracy of the emission measurements obtained using these technologies is generally undisputed.[119]

Studies conducted using remote sensing technologies can be used to identify and develop emission factors for unexpected sources of VOCs and HAPs, as well as improve upon the quality of existing emission factors.[120] For example, the Alberta DIAL study found that delayed cokers were significant emitters of VOCs.[121] Previously, this process unit was overlooked as a source of emissions.[122] The data generated by direct measurement of a facility's emissions can be used to develop a reliable emission factor for these process units. In addition, the Alberta DIAL concluded that additional studies using direct measurement technology "would lead to improved tank emissions estimation procedures" because the results would help explain how storage tank emissions "vary with wind speed, material stored, tank level, and other factors."[123] Thus, petitioners respectfully request EPA establish firm deadlines for addressing the data quality errors in the emission factors pertaining to refineries and chemical plants, and take advantage of remote sensing technologies to evaluate and improve upon these emission factors.

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[116] Chambers et al., *supra* note 15, at 13, 17.

[117] One particularly promising remote sensing technology is DIAL. "DIAL is an open-path optical sensing technique used for the remote measurement of trace gases in the atmosphere. It offers the unique ability to rapidly map pollutant concentrations . . . using a single instrument. Chambers et al., *supra* note 13, at iv. This technology is used throughout Europe and Canada, and has been validated in numerous studies. *See* Clearstone Engineering Ltd., *supra* note 27.

[118] Clearstone Engineering Ltd., *supra* note 27.

[119] EPA, VOC Fugitive Losses, at viii (noting that "industry does not question the accuracy of the DIAL measurements" and that "the technology exists to measure facility fugitive emissions plant wide and that the current method for estimating inventories does not capture all emissions").

[120] *See* Chambers et al., *supra* note 15, at v.

[121] *Id.* at 14.

[122] *Id.*

[123] *Id.* at v.

B. EPA should require large refineries and chemical plants to verify the accuracy of reported emissions annually using cost-effective remote sensing technologies and fence line monitoring.

EPA should require that large refineries and chemical plants verify the accuracy of their reported emissions annually with cost-effective remote sensing technologies. In addition to ensuring that emissions data used to develop emissions inventories is of the highest quality available, the use of remote sensing technologies provides an added financial benefit to industries. Remote sensing technologies identify and *quantify*[124] leaks, which enables refineries and chemical plants to correct serious leaks and significantly reduce the amount of valuable product lost.[125]

Fugitive emissions are essentially "leaks," and leaks equal lost profits for refineries and chemical plants. The valuable raw product that escapes from various equipment and process units could otherwise be sold. The inexpensive use of remote sensing technology once each year easily pays for itself with the significant cost-savings that result from identifying and repairing leaks. For example, an emissions evaluation of a large refinery using DIAL costs approximately $210,000.[126] This is relatively inexpensive for even a small refinery or chemical plant, whose annual revenues can exceed $125,000.00,[127] particularly when one considers the financial savings that can result by identifying and correcting leaks or broken equipment— in some cases, fixing a single leak can save a company approximately one million dollars per year.[128]

EPA should also require fence line monitoring for large refineries and chemical plants to assess ambient concentrations of air pollution, and to further evaluate the accuracy of reported emissions due to the serious public health impacts that are caused by exposure to toxic air pollutants. In addition to supporting the verification of emissions data, fence line monitoring that provides hourly measurements of benzene and other HAPs is an effective way to warn operators when elevated levels of toxic air pollutants are emitted by a facility. Fence line monitoring is particularly important to the protection of public health when the facility is located near residential neighborhoods, as is the case in and near Houston. Advanced fence line monitoring provides facility operators with the opportunity to timely react to elevated levels of toxic air pollutants and correct

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[124] Although some petrochemical plants and refineries employ the use of infrared cameras to detect and fix leaks, infrared cameras are unable to quantify the emissions from leaks, tanks, and flares. Because these emissions are not quantified, they are not reported, and are not represented in emissions inventories. Cuclis, *supra* note 17.

[125] Chambers, *supra* note 13, at ii.

[126] Clearstone Eng'g Ltd., *supra* note 25, at 8 (noting that the cost of a DIAL study is $15,000 per day and takes about two weeks to complete for large refineries).

[127] *See* Age Refining, Inc., Age Refining Begins Sales of B20 Diesel Fuel to Southwest Texas Market, http://www.sagepr.com/pdfs/AGE/1-AGEmediakit.pdf (last visited July 9, 2008) (noting that Age Refining, Inc., with an operable capacity of approximately 13,000 barrels per day, posts over $125,000 million in annual revenue).

[128] Cuclis, *supra* note 17.

problems.[129] Coupled with the use of remote sensing technologies to directly measure emissions, monitoring the ambient concentration of air pollution around the perimeter of refineries and chemical plants will enable EPA to verify emissions data and accurately assess the actual emissions that communities located next to large refineries and chemical plants are exposed to.

C. EPA should immediately prohibit the use of the emission factors pertaining to refineries and chemical plants for facility-specific emissions determinations pertaining to NSR, and require facilities to show actual emission reductions through the use of direct measurement.

EPA should immediately prohibit the use of these emission factors for facility-specific emission determinations pertaining to NSR review, and require facilities to show actual emission reductions through the use of direct measurement. As discussed *supra* Section III.A.5, EPA approves the use of AP-42 emission factors for facilities desiring to take advantage of the Plant-wide Applicability Limitation ("PAL")[130] PAL allows facilities to escape the requirements of stricter rules pertaining to new sources and major modifications "by allowing some emissions points within a facility to increase emissions provided the overall emissions remain below the plant-wide limit."[131] Many facilities use the emission factors pertaining to refineries and chemical plants to demonstrate emissions reductions in fugitive emissions at the facility. These facilities should be required to demonstrate that they are, in fact, reducing their overall emissions through direct measurement technology and not on emission factors that EPA knows are grossly inaccurate in order to avoid the rules that apply to major modifications.

IV. The Emission Factors in the *AP-42 Series*, *Protocol*, and *L & E Series* are Influential Scientific Information that EPA Disseminates to the Public.

A. EPA disseminates the emission factors in the *AP-42 Series*, *Protocol*, and *L & E Series* to the public.

The emission factors in the *AP-42 Series, Protocol*, and *L & E Series* are "influential scientific information" that is "disseminated to the public," and "should adhere to a rigorous standard of quality."[132] "Information" is defined as "any communication or representation of knowledge such as facts or data, in any medium or form," and

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[129] *See, e.g.*, La. Dep't of Envtl. Quality, EPA/State/Local/ Tribal Annual Air Monitoring Meeting: Louisiana Fenceline Monitoring Project, *available at* http://epa.gov/Region6/6pd/air/pd-q/airagenda08/la-fenceline-hazlet.pdf (noting that "plants gained an increased awareness of the effect of operations on emissions" through the use of fence line monitoring) *and* U.S. Envtl. Prot. Agency, Featured Story: Tosco-Rodeo Oil Refinery, http://www.epa.gov/region09/features/tosco/ (noting that fence line monitoring data allows facility operators, government agencies, and local communities to "gain a fuller understanding of air pollution exposures and risks").

[130] EPA, EPA Can Improve, at 15–16.

[131] *Id.* at 16.

[132] EPA Information Quality Guidelines, §§ 5.3, 6.2.

"generally includes material that EPA disseminates from a web page" if it is "adopted, endorsed, or used by EPA to support an Agency decision or position."[133] "EPA disseminates information . . . when EPA initiates or sponsors the distribution of information to the public."[134] The Information Quality Guidelines specifically note that "EPA initiates a distribution of information if EPA distributes information prepared or submitted by an outside party in a manner that reasonably suggests that EPA endorses or agrees with it; if EPA indicates in its distribution that the information supports or represents EPA's viewpoint; or if EPA in its distribution proposes to use or uses the information to formulate or support a regulation, guidance, policy, or other Agency decision or position."[135]

The emission factors published in the *AP-42 Series*, *Protocol*, and *L & E Series* are frequently referenced in agency rulemakings and guidance,[136] discussed at workshops sponsored by EPA,[137] and posted on EPA's website.[138] Although the test and process data utilized to develop the emission factors may be submitted by industry and state and local governments, EPA verifies and reviews the data, incorporates approved data into existing emission factors, and publishes the emission factors in the *AP-42 Series*, *Protocol*, and *L & E Series*.[139] The *AP-42 Series* itself states that the AP-42 emission factors "are cited in numerous other EPA publications and electronic databases."[140] EPA's Emission Factor and Inventory Group (EFIG), among others, relies on the emission factors in the *AP-42 Series*, *Protocol*, and *Locating and Estimating Series*[141] to develop emissions inventories and other emission estimating tools that are utilized for air quality management programs.[142] The emission factors in the *AP-42 Series*, *Protocol*, and *Locating and Estimating Series* are clearly information that EPA disseminates to the public, and subject to EPA's Information Quality Guidelines.

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[133] *Id.* § 5.3.
[134] *Id.*
[135] *Id.*
[136] *See, e.g.*, EPA, Low Bias.
[137] *See, e.g.*, EPA, VOC Fugitive Losses.
[138] U.S. Envtl. Prot. Agency, Emissions Factors & AP 42, http://www.epa.gov/ttn/chief/ap42/index.html (last visited May 12, 2008); U.S. Envtl. Prot. Agency, Locating & Estimating (L&E) Documents, http://www.epa.gov/ttnchie1/le/ (last visited June 16, 2008); U.S. Envtl. Prot. Agency, Protocol for Equipment Leak Emission Estimates (Nov. 1995), available at http://epa.gov/ttn/chief/efdocs/equiplks.pdf.
[139] For example, the emissions factors in Chapter 7 of the *AP-42 Series* were developed by the American Petroleum Institute (API). EPA, AP-42 Series, § 7.0-1. However, EPA notes that the factors developed by the API in the AP-42 series have been reviewed and approved by EPA. *Id.* at 7.1.3.
[140] *Id.* at 1.
[141] The *AP-42 Series* states that the *Protocol* should be used to estimate emissions from specific refineries. *Id.* at 5.1-12.
[142] *See* EPA, AP-42 Series, at 1 (noting that "The AP-42 Series is the principal means by which EFIG can document its emission factors").

B. The emission factors in the *AP-42 Series, Protocol,* and *L & E Series* are "influential scientific information."

The emission factors in the *AP-42 Series, Protocol,* and *L & E Series* are subject to a "rigorous" quality standard because the emission factors are "influential scientific information."[143] Under the Information Quality Guidelines, information is "influential" if EPA "can reasonably determine that dissemination of the information will have or does have a clear and substantial impact (i.e. potential change or effect) on important public policies or private sector decisions."[144] In addition, controversial scientific data is also considered "influential information" under the Information Quality Guidelines.[145] Influential information "should adhere to a *rigorous standard of quality*."[146] Further, EPA specifically states that "the importance placed on emissions inventories requires that they be of the *highest quality obtainable* considering their end use."[147]

EPA relies heavily on the use of emission factors to develop regional and national emissions inventories and make important air quality management decisions.[148] A recent report issued by the Office of the Inspector General for EPA found that "[e]missions factors are used for about *80 percent* of emissions determinations."[149] "EPA officials describe the emissions inventory as the *foundation for the air program*, upon which everything else is built. Emissions estimates *based on emission factors are used to develop much of this inventory* and, as such, are *critical measures* woven into the fabric of many air quality managers' *most important decisions*."[150] The NEI is used in risk assessments, air dispersion modeling and analysis, development of control strategies, promulgating regulations, screening sources for compliance investigations, and measuring EPA's progress in meeting air quality goals.[151]

In addition, as discussed *supra* in Section II.A.4, emission factors are inappropriately utilized beyond their stated purpose of developing emissions inventories for source specific purposes. Thus, the emission factors contained in the *AP-42 Series, Protocol,* and *L & E Series* are "influential scientific data," and subject to the "highest quality obtainable" because emission factors are the foundation for emissions inventories—upon which the entire air regulatory program is built—and are often used inappropriately to make air quality management decisions that have widespread impacts on public health, the environment, and the economy. Moreover, EPA's use of emission factors has been

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[143] EPA, Information Quality Guidelines, § 6.2.
[144] *Id.*
[145] *See id.* (noting that influential information "may also include precedent-setting or controversial scientific and economic issues)
[146] *Id.* (emphasis added).
[147] EIIP, at 1.1-5 (emphasis added).
[148] OIG, EPA Can Improve, at 4.
[149] *Id.* (emphasis added).
[150] *Id.* at 24 (emphasis added).
[151] *Id.*

heavily criticized by scientists, which means the emissions are controversial scientific information—another category of "influential information."[152]

V. The City of Houston is an "Affected Person."

The City of Houston has a significant interest in ensuring that air pollution emissions are accurately accounted for and reported to EPA and state agencies, and is an "affected person" entitled to seek correction of disseminated information that fails to meet quality standards under the Data Quality Act. EPA's Information Quality Guidelines do not define "affected person," noting that "a more open approach would be to ask complainants to describe how they are an affected person with respect to the information that is subject to their complaint."[153]

It is well known that Houston has some of the worst air pollution concentrations in the United States.[154] The Houston Ship Channel is home to the largest petrochemical complex in the country, and more than "400 chemical manufacturing facilities, including 2 of the 4 largest refineries in the U.S," emit high levels of pollutants into the air that Houstonians must breathe.[155] The air pollutants these facilities emit into Houston's air pose an unacceptable health risk for many Houston residents. A study conducted by Rice University, Baylor College of Medicine, Texas Southern University, University of Houston Law Center, and the University of Texas Medical Branch of Galveston concluded that individuals in the Houston area are "exposed to disproportionate levels" of benzene, 1,3-butadiene, formaldehyde, and diesel particulate matter, and face an increased health risk as a result.[156]

A recent study conducted by scientists at major research institutions, and led by the University of Texas-Houston Health Science Center, identified nine toxic chemicals that are found in Houston's air at levels that *individually* present a definite health risk.[157] The reported industrial emissions of these "definite health risk" pollutants are affected by the emission factors challenged in this petition. Thus, the interests of the City of Houston in

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[152] *See* EPA, Information Quality Guidelines, § 6.2 (noting that influential information "may also include precedent-setting or controversial scientific and economic issues).

[153] *Id.* § A.3.7.

[154] *See, e.g.*, City of Houston, Mayor's Task Force on the Health Effects of Air Pollution, A Closer Look at Air Pollution in Houston: Identifying Priority Health Risks 7 (June 2006) (noting that "Houston's air pollution predicament has been the subject of frequent media reports, the topic of numerous scientific articles, and the focus of public debate and political wrangling").

[155] *Id.* at 8.

[156] *See* Rice University, et. al., The Control of Air Toxics: Toxicology, Motivation and Houston Implications (noting that "[m]ounting evidence demonstrates that the population of Southeast Texas is exposed to disproportionate levels of toxic air pollutants" and "large portions of [Houston] have ambient air concentrations posing a risk higher than one excess cancer death in every 100,000 people). The study found that ambient concentration levels of 1,3-butadiene and diesel particulate matter indicate "risk greater than one excess cancer death per 10,000 people." *Id.*

[157] *See* City of Houston, *supra* note 155 (noting that 1,3-butadiene, chromium VI, benzene, ethylene dibromide, acrylonitrile, formaldehyde, acrolein, chlorine, and hexamethylene diisocyanate pose a definite health risk).

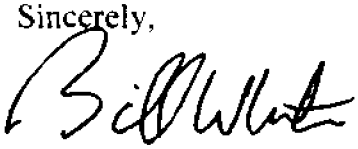
protecting the public health of its residents are significantly impacted by the data quality errors in the emission factors pertaining to refineries and chemical plants. The City of Houston is an "affected person" under the Data Quality Act, and is entitled to a correction of disseminated information that fails to conform to EPA's Information Quality Guidelines.

VI. Conclusion

The City of Houston has a significant interest in ensuring that emissions of air pollutants are accurately reported to local, state, and federal agencies that make important air quality management decisions. EPA, scientists, and industry acknowledge that the use of the current emission factors produces inaccurate, unreliable, and biased data, drastically undercounting emissions, by 100% to 3,000%. Studies using airborne measurements and remote sensing technologies have demonstrated that emissions are up to 100 times greater than emission factors predict. EPA efforts to address the fundamental data quality errors in the emission factors have not corrected the problems, particularly in light of the fact that emission factors are heavily relied upon to conduct risk assessments and make other important air quality management decisions that impact the public health, including the review of the benzene NESHAP. In fact, the number of emission factors now rated "below average," "poor," or "unratable" by EPA has grown in the past decade. EPA's continued reliance on inaccurate emission factors to develop emissions inventories is a clear violation of the Data Quality Act and EPA's Information Quality Guidelines.

For these reasons, the City of Houston respectfully requests that EPA take immediate action to address the significant data quality errors in the current emission factors by (1) establishing firm deadlines to improve the quality of the emission factors subject to this petition, based upon direct observation and other accurate measurements, in order to create reliable and accurate emission inventories (prioritizing the establishment of new emission factors based on the volume and toxicity of emissions and quality of current emission factors) , (2) requiring large refineries and chemical manufacturing plants to verify their reported emissions through the use of cost-effective remote sensing technologies annually and installation of fence line monitoring, and (3) requiring refineries and chemical plants undergoing modifications to document emissions reductions through the use of direct measurement if they wish to avoid installing pollution control technologies required under the Clean Air Act.

Sincerely,



Bill White
Mayor

cc: Rep. Gene Green, U.S. Congress
Richard Greene, Administrator, EPA Region 6
Robert J. Meyers, Principal Dep. Asst. Administrator, Office of Air & Radiation
Molly A. O'Neill, Assistant Administrator, Office of Environmental Information
Paul Tsirigotis, Division Director, Sector Policies and Program Division, U.S. EPA
Kent Hustvedt, Group Leader, Codings and Chemicals Group, U.S. EPA
Buddy Garcia, Chairman, Texas Commission on Environmental Quality
Larry Soward. Commissioner, Texas Commission on Environmental Quality
Bryan Shaw, Commissioner, Texas Commission on Environmental Quality