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# **DRAFT EPA Review of Available Documents for Developing Proposed Emissions Factors for Flares, Tanks, and Wastewater Treatment Systems**

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for Flares, Tanks, and Wastewater Treatment Systems**

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U.S. Environmental Protection Agency  
Office of Air Quality Planning and Standards  
Sector Policies and Programs Division  
Research Triangle Park, North Carolina 27711

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### **Disclaimer**

This report has been reviewed by the Sector Policies and Programs Division of the Office of Air Quality Planning and Standards, Office of Air and Radiation, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use.

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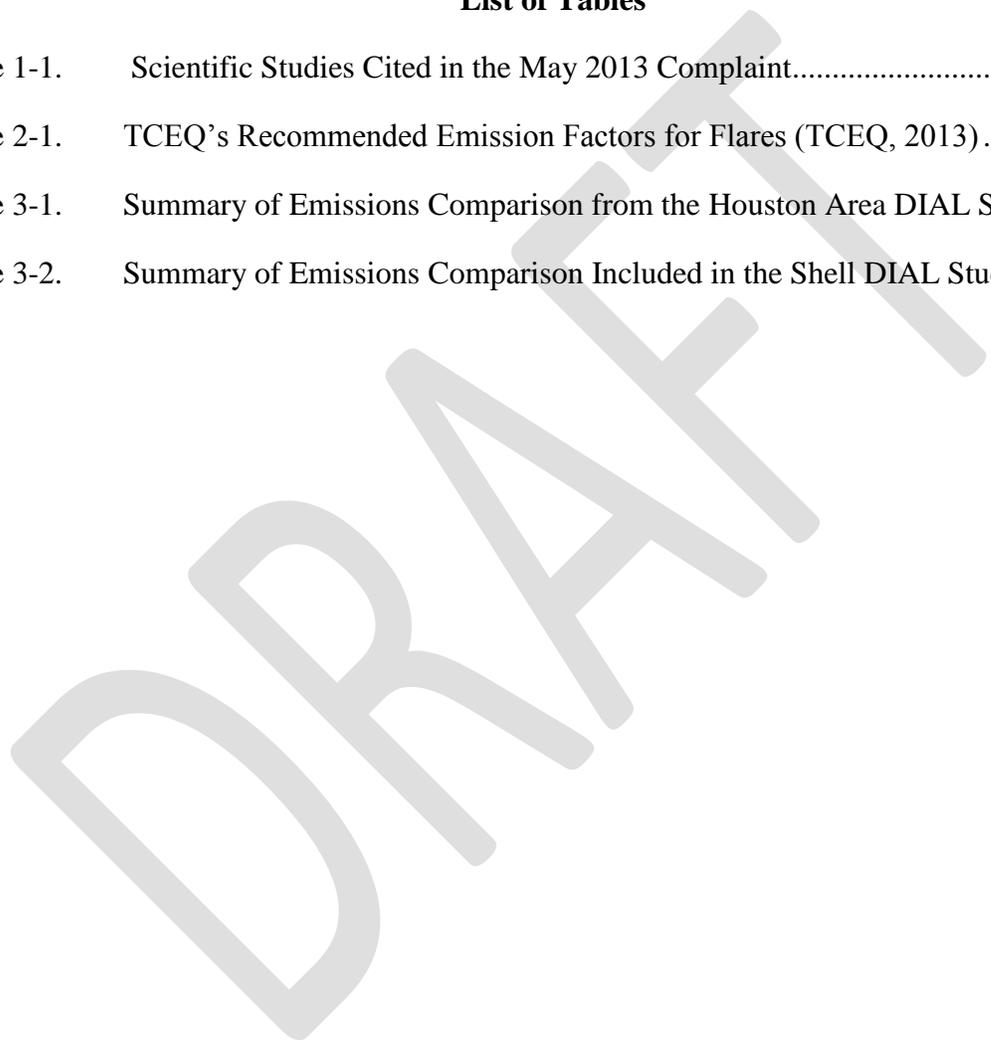
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## Section 1 Summary

On May 1, 2013, Air Alliance Houston, Community In-Power and Development Association, Inc. (CIDA), Louisiana Bucket Brigade, and Texas Environmental Justice Advocacy Services (TEJAS) (collectively, “Plaintiffs”) filed a lawsuit against the U.S. Environmental Protection Agency (EPA) alleging that the EPA had failed to review and, if necessary, revise emissions factors at least once every three years as required in Section 130 of the Clean Air Act (CAA). *Air Alliance Houston, et al. v. McCarthy*, No. 1:13-cv-00621-KBJ (D.D.C.). In the complaint, which is included as Appendix A to this report, the Plaintiffs sought to compel the EPA to expeditiously complete a review of the volatile organic compounds (VOC) emissions factors for industrial flares (“flares”), liquid storage tanks (“tanks”), and wastewater collection, treatment and storage systems (“wastewater treatment systems”), and, if necessary, revise these factors. In Paragraphs 35 and 36 of their complaint, the Plaintiffs cited several reports and studies that allegedly show VOC emissions from flares, tanks, and wastewater treatment systems “can be several orders of magnitude higher than AP-42 emissions factor estimates.” Complaint, ¶ 36. The reports cited in the complaint are listed in Table 1-1 in the order in which they were cited.

**Table 1-1. Scientific Studies Cited in the May 2013 Complaint**

Ref No.	Cited Document	Study Type
1	Patrick Milligan, Frank Martinsky, Kevin Good, and Bill Nelson, Office of Inspector General, <i>Evaluation Report: EPA Can Improve Emission Factors Development and Management</i> , Report No. 2006-P-0017 (2006). Available at: <a href="http://www.epa.gov/oig/reports/2006/20060322-2006-P-00017.pdf">http://www.epa.gov/oig/reports/2006/20060322-2006-P-00017.pdf</a>	Review
2	Brenda Shine, EPA/SPPD. Memorandum to EPA Docket No. EPA-HQ-OAR-2003-0146 dated July 27, 2007. <i>Potential Low Bias of Reported VOC Emissions from the Petroleum Refining Industry</i> . Available at <a href="http://www.regulations.gov/">http://www.regulations.gov/</a> , search for EPA-HQ-OAR-2003-0146-0010.	Review
3	David T. Allen and Vincent M. Torres, Univ. of Tex. at Austin, Ctr. Energy & Env'tl. Res., <i>TCEQ 2010 Flare Study Final Report</i> (2011), available at <a href="http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf">www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf</a>	Passive FTIR
4	David Randall & Jeff Coburn, EPA, EPA 453/R-10-002, <i>Critical Review of DIAL Emission Test Data for BP Petroleum Refinery in Texas City, Texas</i> , at ES-2 tbl. 1 (2010), [BP Texas City, TX] available at <a href="http://www.epa.gov/airtoxics/bp_dial_review_report_12-3-10.pdf">www.epa.gov/airtoxics/bp_dial_review_report_12-3-10.pdf</a>	DIAL

Ref No.	Cited Document	Study Type
5	Loren Raun & Dan W. Hoyt, Bur. Pollution Control & Prevention, City of Houston, <i>Measurement and Analysis of Benzene and VOC Emissions in the Houston Ship Channel Area and Select Major Stationary Sources Using DIAL (Differential Absorption Light Detection and Ranging) Technology to Support Ambient HAP Concentrations Reductions in the Community (DIAL Project)</i> (2011), [Shell Deer Park, TX] available at <a href="http://www.greenhoustontx.gov/dial20110720.pdf">www.greenhoustontx.gov/dial20110720.pdf</a>	DIAL
6	Marathon Petroleum Co., LLC, <i>Performance Test of a Steam-Assisted Flare with Passive FTIR</i> (May 2010), available at <a href="http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf">www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf</a>	Passive FTIR
7	Marathon Petroleum Co., LLC, <i>Performance Test of a Steam-Assisted Elevated Flare with Passive FTIR –Detroit</i> (2010), available at <a href="http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf">www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf</a>	Passive FTIR
8	Flint Hills resources Port Arthur, LLC, <i>PFTIR Test of Steam-Assisted Elevated Flares–Port Arthur</i> (2011), available at <a href="http://www.epa.gov/compliance/resources/publications/civil/programs/caa/portarthur-report.pdf">www.epa.gov/compliance/resources/publications/civil/programs/caa/portarthur-report.pdf</a>	Passive FTIR
9	Allan Chambers & Mel Strosher, Alberta Research Council, Inc., <i>Refinery Demonstration of Optical Technologies for Measurement of Fugitive Emissions and for Leak Detection</i> (2006), available at <a href="http://www.environmentalintegrity.org/pdf/publications/EIP_Att_D_Total_Upset.pdf">www.environmentalintegrity.org/pdf/publications/EIP_Att_D_Total_Upset.pdf</a>	DIAL

EPA entered into a consent decree with the Plaintiffs to settle the lawsuit. Under the terms of the consent decree, by August 19, 2014, EPA will review and either propose revisions to the VOC emission factors for flares, tanks and wastewater treatment systems under CAA section 130, or propose a determination under CAA section 130 that revision of these emission factors is not necessary. By December 19, 2014, EPA will issue final revisions to the VOC emission factors for flares, tanks and wastewater treatment systems, or issue a final determination that revision of these emission factors for flares is not necessary. EPA will post each proposed revision or determination (or combination thereof), and each final revision or determination (or combination thereof), on its AP-42 website on the dates indicated above.

There are three different types of cited reports listed in Table 1-1:

1. “Review” studies summarize information from a number of other studies.
2. “DIAL” studies contain differential infrared absorption LIDAR [light detection and ranging] (DIAL) measurement data and may include comparisons with emissions inventory estimates. These studies generally contain measurement data for a variety of different emissions sources at a refinery.
3. “Passive FTIR” studies contain passive Fourier transform infrared (FTIR) spectroscopy measurement data collected to assess the performance (combustion efficiency) of refinery flares.

EPA reviewed each of the cited reports to determine if the data provided in these reports could be used to support emissions factor development (or to support no revisions to certain emissions factors). Each report reviewed is briefly described and discussed in subsequent chapters of this report. Section 2 describes the “Review” studies, Section 3 describes the “DIAL” studies, and Section 4 describes the “Passive FTIR” studies. Additionally, EPA identified and reviewed two passive FTIR studies not listed in the complaint. These studies are discussed along with the cited passive FTIR in Section 4 of this report. Furthermore, a series of tests were conducted to quantify storage tank emissions at two facilities in the northeastern United States. The results of these tests are discussed in Section 5 of this report. We provide our conclusions regarding all of these reports in Section 6.

Based on our review, we are proposing that, while the cited reports provide valuable information regarding the potential emissions from petroleum refinery and other process units, the data from these studies (with the exception of the passive FTIR studies and one DIAL study) cannot be used for emissions factor development due to (1) the lack of operational data by which to normalize the emissions rates, (2) the fact that many of the measurements do not isolate one particular emissions source and/or (3) the fact that the studies did not attempt to characterize the range of normal operating conditions. However, the EPA is proposing that it is possible to form emissions factors for certain pollutants for industrial flares using DIAL and passive FTIR data. Sections 3.2 and 4 discuss this in greater detail.

## **Section 2 Review Studies**

Plaintiffs cited two review studies to support the allegation that “[t]he EPA has acknowledged, and scientific studies show, that the AP-42 emissions factors for flares, tanks, and wastewater treatment systems significantly underestimate VOC emissions from these processes.” Complaint, ¶ 35.

### **2.1 Office of Inspector General Review**

The Office of Inspector General (OIG) Review (Ref No. 1 in Table 1-1) (“OIG Review”) “sought to determine whether the air emissions factors used by the Environmental Protection Agency (EPA) are of acceptable quality for making key environmental decisions, and whether EPA’s process for developing, improving, and rating emissions factors is sufficient to meet users’ needs.” The report provides the following recommendations:

- Develop emissions factors guidance that addresses the development and appropriate use of emissions factors for non-inventory purposes.
- Establish a rating system that provides the quantitative range of uncertainty for emissions factors for both inventory and non-inventory purposes.
- Work with industry, State and local agencies, and others to leverage available resources for meeting increasing demands for new factors.
- Establish a workgroup to develop a comprehensive strategic plan for the Emissions Factors Program and ensure that requested resources are used to achieve program goals.

The OIG Review notes that EPA has increased the number of rated emissions factors included in AP-42 from 8,838 in 1996 to 17,110 in 2004, but it also notes that the majority of AP-42 emissions factors still have a below average (D) or poor (E) rating factor. In 1996, 56 percent of the AP-42 emissions factors were rated D or E, while 62 percent of the emissions factors were rated D or E in 2004. Thus, while the report notes that the EPA has made progress in developing rated emissions factors, the quality of the emissions factors remains low.

The OIG Review also highlights the point that AP-42 emissions factors are intended for use in wide-area emissions inventories and should be used only as a last resort when developing site-specific emissions estimates. The OIG Review described the misuse of AP-42 emissions factors in situations such as setting permit emissions limits and estimating a facility’s potential to emit. The introduction to AP-42 (EPA, 1995) includes the following recommendations and limitations on the use of emissions factors:

- “Data from source-specific emission tests or continuous emission monitors are usually preferred for estimating a source’s emissions because those data provide the best representation of the tested source’s emissions.”
- “Emission factors in AP-42 are neither EPA-recommended emission limits (e. g., best available control technology or BACT, or lowest achievable emission rate or LAER) nor standards (e. g., National Emission Standard for Hazardous Air Pollutants or NESHAP, or New Source Performance Standards or NSPS). Use of these factors as source-specific permit limits and/or as emission regulation compliance determinations is not recommended by EPA. Because emission factors essentially represent an average of a range of emission rates, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the factor. As such, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.”
- “If representative source-specific data cannot be obtained, emissions information from equipment vendors, particularly emission performance guarantees or actual test data from similar equipment, is a better source of information for permitting decisions than an AP-42 emission factor. 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 analyses.”

The OIG Review highlighted three industries for which emissions factors were considered unacceptable for the decisions being made, one of which was petroleum refineries. For petroleum refineries, the report cites a *Texas 2000 Air Quality Study* (TNRCC, 2000) (“TRNCC Study”) that compared ambient measurements of VOC concentrations with those

projected by emissions inventory estimates. According to the OIG, the TNRCC Study found that VOC emissions were under-reported, primarily due to under-reporting for flares, process vents, cooling towers, and process equipment leaks. Based on the TNRCC Study, Texas revised its emissions estimation guidelines and thereby improved its emissions inventory. Based on the improved emissions inventory, Texas revised its State Implementation Plan to include goals for VOC emissions reductions and to relax the previous goal for NO<sub>x</sub> emissions reductions. In this example, AP-42 emissions factors were being used for a wide-area emissions inventory, so their application was not necessarily incorrect, but reliance solely on AP-42 emissions factors rather than more detailed site-specific information resulted in an inaccurate assessment of what was needed in order to meet ozone air quality standards. The OIG review noted that Philadelphia and California's Bay Area Air Quality Management District found similar issues with their inventories. Philadelphia then adopted the guidelines developed by the Texas Commission on Environmental Quality (TCEQ) to improve their emissions inventory and the Bay Area Air Quality Management District issued a new rule [Regulation 12 Rule 11, which required monitoring flare vent gas flow and composition] to obtain more accurate emissions data.

As the OIG Review does not contain any emissions measurement data or recommended emissions factors, the current TCEQ emissions inventory guidelines (TCEQ, 2013) ("TCEQ Guidelines") were reviewed to better understand the emissions inventory improvements cited in the OIG review. The TCEQ Guidelines contained improved instructions on how to estimate emissions and when and how to use AP-42 emissions factors (including instructions for using the TANKS model), but in most cases the TCEQ Guidelines did not provide revised emissions factors. For example, the TCEQ Guidelines for estimating emissions from cooling towers is to use measured VOC concentrations and water recirculation rates to estimate cooling tower emissions. If VOC concentration data in the cooling water are not available, then the TCEQ Guidelines specify that the uncontrolled AP-42 emissions factor should be used. Based on these guidelines, the controlled AP-42 emissions factor should never be used. However, in the absence of these guidelines, most refineries used the controlled AP-42 emissions factor for cooling towers because they considered monitoring of chemical additive rates or other operating parameters to warrant the use of the controlled cooling towers AP-42 emissions factor (Lucas, 2007).

The one exception to the TCEQ Guidelines not providing revised emissions factors is the table of emissions factors for NO<sub>x</sub> and CO from flares. TCEQ’s revised emissions factors are based on the results of the historical flare study data (circa 1983 and 1985) with which the AP-42 emissions factors were developed (listed as reference 1 of AP-42 Section 13.5). As seen in Table 2-1, the TCEQ Guidelines subcategorized the emissions factors by flare type (steam-assisted versus air-assisted or unassisted) and by heat content of the flare vent gas (“high Btu” versus “low Btu”). The TCEQ Guidelines also provide instructions to use data with high time resolution in order to apply the correct emissions factor. As there were limited data within each subcategory, and these data are quite old, it is questionable whether the subcategorization of these data are statistically justified. Furthermore, as discussed in detail in Section 4 of this document, significantly more data by which to evaluate the NO<sub>x</sub> and CO flare emissions factors in AP-42 is now available.

**Table 2-1. TCEQ’s Recommended Emission Factors for Flares (TCEQ, 2013)**

<b>Contaminant</b>	<b>Assist Type</b>	<b>Waste Gas Stream Net Heating Value<sup>a,b</sup></b>	<b>Emission Factor</b>
NO <sub>x</sub>	Steam	High Btu	0.0485 lb/MMBtu
		Low Btu	0.068 lb/MMBtu
	Air or Unassisted	High Btu	0.138 lb/MMBtu
		Low Btu	0.0641 lb/MMBtu
CO	Steam	High Btu	0.3503 lb/MMBtu
		Low Btu	0.3465 lb/MMBtu
	Air or Unassisted	High Btu	0.2755 lb/MMBtu
		Low Btu	0.5496 lb/MMBtu

<sup>a</sup> High Btu: > 1000 Btu/scf

<sup>b</sup> Low Btu: 192–1000 Btu/scf

Based on our review of the TCEQ Guidelines, the emissions inventory improvements made by Texas were not based on improvements to or replacement of AP-42 emissions factors. The emissions inventory improvements were accomplished through better instructions on how to determine site-specific emissions estimates based on available monitoring data along with specific instructions on how and when to apply the AP-42 emissions factors when site-specific

monitoring data are not available. These guidelines effectively implement the recommendations and limitations on the use of AP-42 emissions factors as stated in the AP-42 introduction.

## 2.2 Shine Review

The Shine Review (Ref No. 2 in Table 1-1) summarized the findings from several studies, including the DIAL Alberta study (Ref. No. 9 in Table 1-1), the TNRCC Study and the OIG Review, that indicated that the refinery emissions inventories may be under-estimating VOC emissions. Key points made in the Shine Review include:

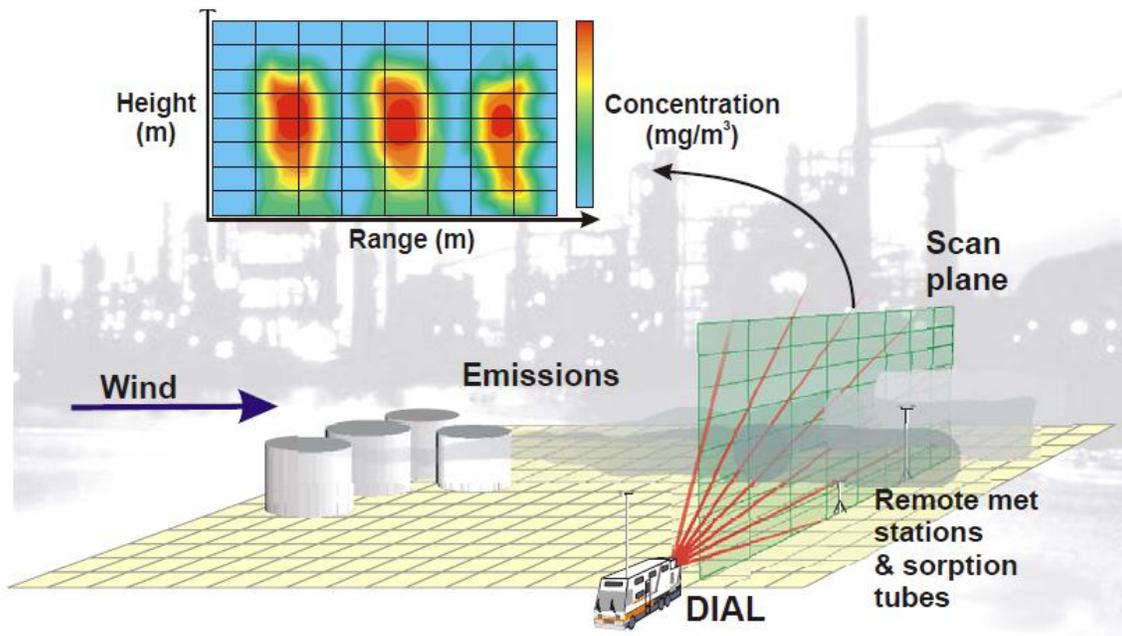
- Emissions inventories generally do not include emissions that occur during process upsets, malfunctions, startups or shutdowns.
- Unusual or unexpected emissions, such as leaks in heat exchange systems that cause high emissions from cooling towers or tank roof landings, are often omitted from emissions inventories.
- Improper characterization of process operating parameters used in emissions estimation methodologies can significantly impact the estimated air emissions.

The Shine Review did not critique or criticize AP-42 emissions factors or AP-42 emissions estimation methodologies, but rather the scope and rigorousness of compiled emissions inventories. The Shine Review also did not present any new emissions factors or data by which new emissions factors could be developed. In efforts to improve refinery emissions inventories to address the issues identified in the Shine review, the EPA funded the development of the *Emission Estimation Protocol for Petroleum Refineries* (RTI, 2011) (“*Refinery Protocol*”) to provide guidance on preferred means to develop site-specific air emissions estimates, including methods for estimating emissions during process upsets, malfunctions, startups or shutdowns. Similar to the TCEQ Guidelines and in accord with the AP-42 discussion on the use of AP-42 emissions factors, the *Refinery Protocol* describes a preference for continuous emissions measurement data or site-specific test data, with AP-42 emissions factors used as a last resort. The EPA required petroleum refineries to submit detailed, site-specific emissions inventories following the methodologies outlined in the *Refinery Protocol* in order to develop an improved emissions inventory for its sector rulemakings, including the risk and technology review (EPA, 2011).

### Section 3 DIAL Studies

DIAL is a laser-based measurement method for determining pollutant concentration profiles in the ambient air. The DIAL monitoring system has been used in a variety of studies to measure emissions from petroleum refinery and petrochemical sources. The DIAL studies cited in the complaint are report Ref Nos. 4, 5 and 9 in Table 1-1.

The DIAL monitoring system is typically situated downwind of an emissions source and the laser beam is shot across the emissions plume and pivoted to form a 2-dimensional vertical scan plane (see Figure 3.1). Small portions of the light from the laser are backscattered due to particles and molecules in the measurement path. This backscattered light is collected through a telescope system adjacent to the laser and measured via a sensitive light detector. The timing of the received light provides a measure of the distance of the emissions plume.



**Figure 3-1. Schematic of DIAL System Measuring Emissions (from Chambers and Stosher, 2006).**

DIAL measurements can be made specific to one compound, such as benzene, or general for a class of similar compounds, such as saturated hydrocarbons. Two different wavelengths of light are pulsed in quick succession: one wavelength that is absorbed strongly by the pollutant of interest and one of similar wavelength that is not absorbed. The difference in the returned signal strength between these two light pulses provides a measure of the concentration of the pollutant. Thus, a unique advantage of the DIAL monitoring system is that it can provide spatially resolved pollutant concentrations in the 2-dimensional scan plane.

Using the DIAL's measured pollutant concentration profile across the scan plane, and site-specific wind speed and direction measurements, it is possible to calculate a mass emissions rate for the pollutant of interest. If the wind speed and direction are too variable during the measurement scan, there can be high uncertainties in the calculated mass emissions rate. Therefore, the ability to accurately measure emissions from an emission source or set of sources using the DIAL instrumentation is dependent on an acceptable wind direction and wind speed conditions. Furthermore, measurement scans close to large objects, such as tanks, can be affected by wind speed changes caused by the large objects. These wind speed changes can create inaccuracies in the DIAL measurements.

At a refinery or petrochemical facility, there are typically multiple emission sources in close proximity. Emissions sources upwind of the DIAL scan plane can contribute to the measured emissions rate, therefore the DIAL investigator must perform scans upwind of the source of interest to rule out interfering sources. However, depending on the configuration of the plant, the wind direction, and timing of the measurement scans, it is not always possible to perform upwind scans or to isolate a single emissions source when performing upwind scans. As such, DIAL measurements can include emissions contributions from several sources, and it can be difficult to attribute emissions to particular sources, if upwind scans are not done correctly or if site-specific configurations limit the ability to isolate an emissions source.

A typical measurement scan is about 10-15 minutes in duration, so the method provides good time resolution. Multiple scans can be completed in succession, as long as the wind direction remains consistent. If winds are too variable, only periodic scans can be performed. Measurements made over short time periods may not be representative of average emissions from the source. Therefore, the most useful DIAL data are those where multiple DIAL scans were made at different times to account for variable source operating conditions. For purposes

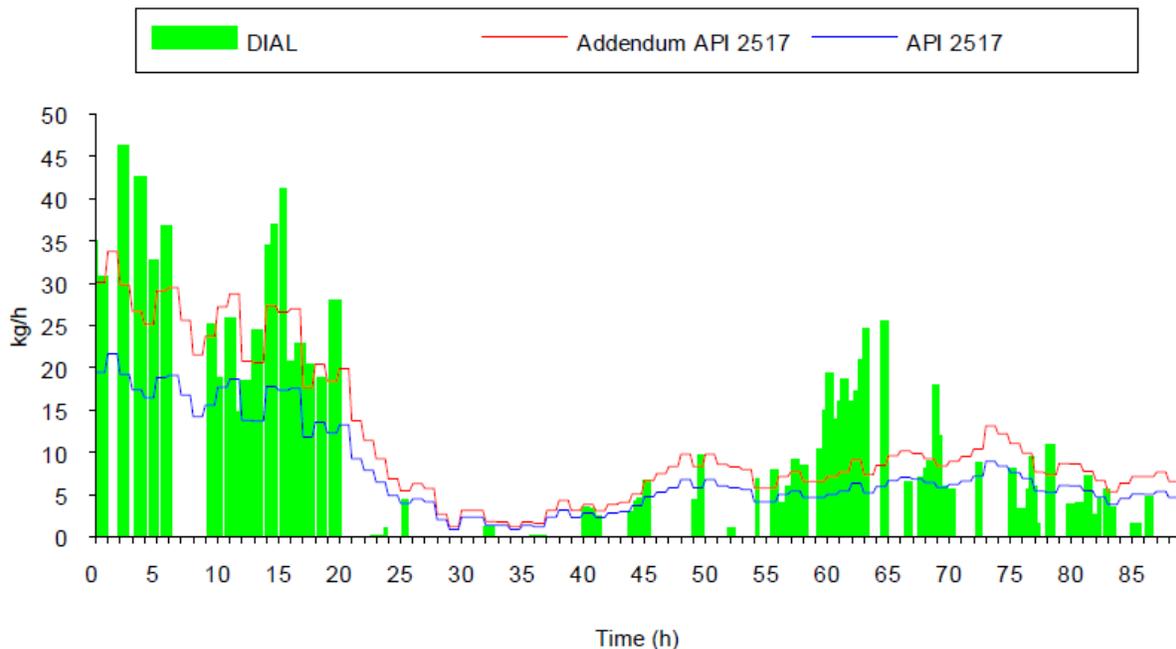
of emissions factors review, measurements are only useful when the operating conditions of the emitting source at the time of the measurements are known.

### **3.1 Alberta DIAL Study**

The Alberta DIAL Study (Ref No. 9 in Table 1-1) was the earliest of the DIAL studies examined in this report, and it found emissions from product storage tanks, cooling towers, and delayed coking unit (DCU) process area to be higher than expected based on the emissions inventory for the facility. Unfortunately, no corresponding process-specific data were available for the units tested. It is unknown, for example, what products were being stored in the tanks tested, what type of controls, if any, were on the storage tanks (fixed roof or floating roof), and whether the tanks were being actively filled during the test. Due to the lack of process operating data at the time of the test, it is impossible to develop emissions factors from the study data (i.e., no values are available to normalize the emissions).

The Alberta DIAL Study used the emissions measured during the study to project annual emissions by assuming the emissions rates measured occurred continuously for 8,760 hours per year. The extrapolated VOC emissions for the refinery's storage tanks were projected to be 5,090 tonnes/yr compared to 153 tonnes/yr as reported in Canada's National Pollutant Release Inventory (NPRI). However, as previously noted, measurements made over short time periods may not be representative of average emissions from a source. There are a variety of reasons why short-term emissions may be significantly higher than annual average emissions. For example, the Alberta DIAL Study was conducted in the summer (at higher than average temperatures) and during the day (when vessel loading activity is higher). These conditions would lead to higher than average emissions. Given the short-term nature of the DIAL measurements, it is difficult to conclude that the high short-term emissions rates measured during this study are truly representative of the long-term average emissions from storage tanks at the facility. Given the lack of process data, it is also difficult to conclude whether the emissions inventory estimates were properly determined or if there may have been unusual process conditions that explain the high short-term emissions. Considering these limitations, the Alberta DIAL Study is insufficient to support the assertion that the emissions estimation methodology for storage tanks as presented in AP-42 underestimates the long-term emissions from refinery storage tanks.

Prior to the Alberta DIAL Study, CONCAWE, a division of the European Petroleum Refiners Association, investigated and compared DIAL measurement data for external floating roof storage tanks with emissions estimates made using the AP-42 emissions factor methodology (see Smithers, et al., 1995). This study used a longer (90 hour) measurement period than the Alberta DIAL Study. Direct process and meteorological data were used to provide hourly input data for the organic liquid storage tank emissions factor equations developed by the American Petroleum Institute (API), which at the time were published as API Publication 2571. API retains the copyright to these equations, but has granted the EPA permission for the nonexclusive, noncommercial distribution of this material, which is provided in Section 7.1 of AP-42. Thus, the equations presented in AP-42 are essentially the same as those in the Addendum to API Publication 2571 (although more recent revisions to the API methods have also been incorporated into the 2006 update of AP-42 Section 7.1). As seen in Figure 3-1, the temporal variations in the hourly emissions calculated using the Addendum API 2517 (i.e., AP-42) equations agree well with the DIAL measurements.



**Figure 3-2. Comparison of DIAL and AP-42 Emission Estimates in CONCAWE 90-hour Study (Smithers et al., 1995).**

Smithers et al, (1995) determined that the DIAL measurement was 10% greater than predicted using the Addendum to API 2517, but noted that there were times when measured

emissions were higher than predicted by the AP-42 emissions equations. During hours 2 through 6 and hours 14-16, there were periods of high wind gusts. The deck fitting correlations were developed for average wind speeds from 2 to 15 miles per hour (mph) and API 2517 (as well as AP-42) specifically notes that these factors only apply when the average ambient wind speed is below 15 mph. It appears that application of the deck fitting correlations during times when wind speeds exceed 15 mph will result in an underestimate of the deck fitting emissions. The increase in the emissions during hours 55 to 64 appeared to be correlated with filling of the tank from half full to full during hours 55 to 62. While the AP-42 emissions methodology approach failed to predict this increase in emissions, Smithers et al, (1995) emphasized the overall difference between the measured and calculated emissions over the duration of the 90 hour testing period was only 10 percent. Thus, the CONCAWE study appears to support the assertion that the AP-42 emissions methodology can provide an accurate estimate of emissions from storage tanks in situations where detailed, site-specific data are used in the calculations,

The question was then posed: is hourly modeling needed to obtain accurate annual average emissions estimates, or can annual average conditions be used to accurately estimate annual average emissions? To answer this question, Coburn and Icenhour (2008) developed an external executable program to run the TANKS model (which implements the AP-42 emissions methodology) numerous times and save the results. This allowed input of hourly meteorological data and post-processing of the results to simulate the annual emissions that would be estimated if the TANKS model allowed for hourly input data. Emissions estimates were developed for a generic storage vessel storing a single fluid (gasoline RVP-7) and using meteorological data for Houston, Texas. They found that the annual emissions estimated for the model tank when using hourly input data agreed within 20 percent with the annual emissions estimated using annual average inputs. This study also found that, for this case, the highest hourly emissions rate (summer, high winds and day time high temperatures) was a factor of 5 to 10 times higher than the annual average emissions rate. Consequently, it is reasonable to conclude that long-term emissions rate extrapolations from DIAL measurements conducted over a very short time period could be up to 10 times higher than the reported annual average emissions. However, it is also possible that high-emitting tanks measured by DIAL are defective and in need of repair.

Although the Alberta DIAL Study measured emissions exceeded the annual average emissions inventory by a factor of 30, there is not enough data to determine the cause of the

discrepancy. Because no information is provided on the calculations for the emissions inventory, it is difficult to know if these calculations were performed in accordance with actual site conditions or in keeping with the recommended methodologies in AP-42. Likewise, it is unknown if the tanks measured may store different liquids over the course of the year, which could cause greater uncertainties in extrapolating annual emissions from short-term emissions measured for a single stored fluid. Based on these considerations, there is no direct evidence from the Alberta DIAL Study that the equations in AP-42, when correctly applied, systematically underestimates VOC emissions from storage tanks, and, based on the lack of process operating data at the time of the test, it appears that no emissions factors for tanks can be created from the data in the Alberta study.

### **3.2 Houston Area DIAL Study**

The Houston Area DIAL Study (Robinson et al., 2008) measured VOC emissions from multiple petrochemical industry sites in the Houston area during the summer of 2007, including a refinery in the Houston area (BP Texas City Refinery). The Houston Area DIAL Study at the BP Texas City Refinery included measurements for various storage tanks, the DCU process area, the wastewater treatment system, and several flares. A critical review of the VOC measurements performed at the BP Texas City Refinery was conducted by Randall and Coburn (Ref No. 4 in Table 1-1) to compare the DIAL emissions estimates for sources at the BP Texas City Refinery with refined emissions estimates based on AP-42 emissions methodologies, taking into account the process operating characteristics that existed during the time of the measurements. Specifically, storage tank emission estimates were developed using the TANKS model, emissions from the wastewater treatment system were developed using WATER9, and emissions estimates for flares were developed assuming various destruction efficiencies. For the critical review, representatives from the BP Texas City Refinery provided detailed information about tank contents, loading rates, wastewater flows, flare flow and composition. The refinery did not do any special sampling and analysis of storage tank or wastewater contents during the measurement period, but unlike the Alberta DIAL study, there was a significant amount of process data (e.g., tank contents, temperature, daily loading rates) that could be used for emissions model input. Table 3-1 provides a summary of the comparison of the measured DIAL emissions versus the air emissions estimates based on AP-42 methodologies. The column

“Estimated emissions using standard estimating procedures with actual conditions at the time of the DIAL test, lb/hr” are the emissions estimates developed by Randall and Coburn (2010). The column labeled “2007 EIQ average ozone season emission rates, lb/hr” are the average ozone season emissions rates reported to TCEQ by the BP Texas City Refinery in their emissions inventory.

There are over 100 storage tanks at the BP Texas City Refinery, but the Houston Area DIAL Study included measurement scans for only 14 tanks (Robinson, et al, 2008). In their *Critical Review*, Randall and Coburn (2010) identified 26 storage tanks that they opined may have contributed to the measured emissions attributed to the 14 tanks specified in the Houston Area DIAL Study. For the BP Texas City Refinery storage tanks, the reported measured emissions were generally higher than the emissions estimated using the AP-42 emissions methodology when considering only the tanks included in the Houston Area DIAL Study. (In Table 3-1, the lower value in the range of estimated emissions is based on only the tanks reported to be measured in the Houston Area DIAL Study.) However, when emissions were projected for all tanks upwind of the scan plane (the upper value in the range of estimated emissions in Table 3-1), the estimated emissions often agreed well with the DIAL measurements, although the extent to which the upwind tanks contributed to the emissions is not well understood. The possibility that some of the target tanks were defective and emitting more than AP-42 estimates cannot be ruled out. Additionally, in some cases, non-storage tank emissions sources appeared to the authors to contribute to higher than estimated emissions for certain storage tanks. For example, Tanks 1052, 1053, and 1055 (crude oil storing tanks) were downwind of the wastewater treatment system, and it appeared to the authors that the high emissions attributed to these tanks were likely caused by the emissions from the upwind wastewater treatment system. It is also possible that one or more of the tanks had defective floating roofs, or that the product factors for crude oil storage used in the AP-42 methodology, which specifically reduce the estimated emissions from crude oil storage to account for weathering, are incorrect. The largest discrepancy noted between measured and modeled emissions is for Tanks 53 and 55. Tank 53 was being actively filled during the time of the DIAL measurements. Emissions associated with working losses during loading events are generally much higher than breathing losses during non-loading periods. This likely contributed to the higher than expected measured emissions. It

**Table 3-1. Summary of Emissions Comparison from the Houston Area DIAL Study**

Source	Source Description	Compound	Average DIAL flux, lb/hr <sup>a</sup>	Estimated emissions using standard estimating procedures with actual conditions at the time of the DIAL test, lb/hr	2007 EIQ average ozone season emission rates, lb/hr <sup>b</sup>
Tanks 1020, 1021, 1024, and 1025	EFR <sup>c</sup> tanks storing crude oil	VOC	6.4 <sup>d</sup>	1.3 – 1.9 <sup>e</sup>	2.6 – 3.5 <sup>e</sup>
Tanks 1052, 1053, and 1055	EFR tanks storing crude oil	VOC	16.3 <sup>d</sup>	1.8 – 2.3 <sup>e</sup>	2.4 – 2.9 <sup>e</sup>
Tanks 501, 502, 503, and 504	EFR tanks storing light distillates	VOC	8.6 <sup>d</sup>	3.0 – 3.9 <sup>e</sup>	6.7 – 8.0 <sup>e</sup>
Tank 43	VFR <sup>f</sup> tank storing fuel oil #6	VOC	2	1.3	0.2
			9.3	1.3	0.2
Tanks 60, 63, 11, 12, 18, 42, 61, and 65	VFR and EFR tanks storing various products	VOC	9	0.6 – 9.1 <sup>e</sup>	4.6 – NA <sup>e,g</sup>
Tanks 54, 55, 56, and 98	VFR and EFR tanks storing various products	VOC	3.1 <sup>d</sup>	0.3 – 9.7 <sup>e</sup>	1.0 - NA <sup>e,g</sup>
Tanks 53 and 55	VFR tanks storing diesel fuel	VOC	23.8 <sup>d</sup>	4.8 – 5.2 <sup>e</sup>	1.0 – 2.0 <sup>e</sup>
F-8 EBU	Activated sludge unit	VOC	30	22 – 55 <sup>h</sup>	6.7
API separator	API separator	VOC	7	ND <sup>i</sup>	NA <sup>g</sup>
Wastewater vents	Vents from collection system	VOC	9	ND	NR <sup>j</sup>
Flare #6	Ground flare	VOC	13	17 <sup>k</sup>	40
Temporary flare	Temporary flare	VOC	6	100 – 300 <sup>k</sup>	196
ULC flare	Ultracracker flare	VOC	192	3 - 25 <sup>k</sup>	28.3
Coker Unit C	Coker	VOC	18	ND	NR
Coker Unit C	Coker while cutting coke	Benzene	1.8	ND	NR

<sup>a</sup> The tabulated values typically represent the average of calculated fluxes for several scans.

<sup>b</sup> In their 2007 emissions inventory, BP reported average ozone season emissions in lb/d; these values were divided by 24 to estimate the tabulated average hourly emission rates.

<sup>c</sup> EFR means external fixed roof tank.

<sup>d</sup> The results for storage tanks typically are summarized for a group of tanks because the DIAL scans typically could not isolate individual tanks. All scans along the same path and covering the same range were grouped, and the calculated fluxes for the scans in a group were averaged. The averages for all groups of

scans that apply to a group of tanks were then averaged to obtain the tabulated flux. Note that some groups of scans captured emissions from all of the listed tanks, while other groups of scans were downwind of only some of the listed tanks.

<sup>e</sup> Emissions were estimated for all tanks that appeared to be upwind of a group of scans, and the estimates for the individual tanks were summed. For each group of scans, the total emissions were estimated by summing the applicable individual tank emissions estimates. The upper end of the tabulated range represents the average of these sums. The lower end of the range represents the average emissions assuming only the tank(s) to which NPL attributed emissions were upwind of the scans.

<sup>f</sup> VFR means vertical fixed roof tank.

<sup>g</sup> The upper end of the range could not be determined because some of the tanks could not be found in the 2007 emissions inventory. The specific API separator of interest also could not be identified in the inventory.

<sup>h</sup> The low end of the range is based on pollutant properties used in modeling by BP, the measured benzene concentration, and annual average concentrations for other pollutants. The high end of the range is based on using the default pollutant properties in WATER9, the measured benzene concentration, and an assumption that all other pollutant concentrations at the time of DIAL testing were higher than average by the same percentage as benzene.

<sup>i</sup> ND means not determined.

<sup>j</sup> NR means not reported in the annual inventory.

<sup>k</sup> Estimated emission rates are based on assumed 98 percent destruction of C3+ hydrocarbons in flare gas at the time of DIAL testing. A range is presented for the temporary flare and ultracracker flare because the flow and composition of the flare gas varied significantly during the DIAL test period.

appears that the AP-42 emissions methodologies can reasonably predict the emissions from storage vessels, assuming the storage vessels are not defective and the correct inputs are used.

The wastewater treatment system had measured emissions rates during the Houston Area DIAL Study higher than projected by the refinery in its annual emissions inventory. The refinery typically runs two activated sludge units in parallel. During the time of the DIAL measurements, one of the activated sludge units was down for maintenance and all of the wastewater flow was managed in the one operating activated sludge unit. The unusually high VOC emissions measured during the test were caused by the reduced residence time in the operating activated sludge tank due to all of the wastewater flow being processed in the single operating activated sludge tank. When the single activated sludge unit was modeled based on the flow and concentrations during the time of the DIAL measurements, the modeled emissions estimates (AP-42 emissions equations as implemented in WATER9 emissions model) of 22 to 55 lbs VOC/hr agreed well with the DIAL emissions measurements of 30 lbs VOC/hr. Therefore, it appears that the AP-42 emissions equations were accurate for estimating the emissions from the activated sludge system for the defined operating conditions.

The Houston Area DIAL Study was one of the first studies that documented high emissions from a flare due to poor destruction efficiency. DIAL measurement scans were performed for three flares at the refinery: the ultracracker (ULC) flare, Flare No. 6, and a temporary flare. For many of the measurement scans, two flares were upwind of the scan plane, but DIAL's ability to identify and map the location of the emissions plume indicated that the bulk of the emissions were coming from the ULC flare. Based on vent gas flow rates, vent gas composition data, and DIAL measurement data, the temporary flare appeared to have a destruction efficiency of approximately 99.9 percent, and Flare No. 6 appeared to achieve a destruction efficiency of approximately 98 percent. However, the ULC flare appeared to achieve a destruction efficiency of only 50 to 80 percent. The ULC flare had a high steam to vent gas flow and did not have a visible flame, which suggested the poor combustion efficiency was likely caused by over-steaming of the flare. This finding led to a number of passive FTIR studies to evaluate flare performance, particularly for steam-assisted flares. These studies are described in greater detail in Section 4 of this document. The DIAL measurements along with the process data provided by BP for Flare 6 appear to be sufficient for use in calculating a VOC emissions factor; however, the Houston Area DIAL Study data from the ULC and temporary flares does

not appear to be useful in developing flare emissions factors for several reasons. First, most of the scan planes for the ULC flare also had the temporary flare as an upwind contributing source and it is not appropriate to assess a combined emissions factor for the two flares. Second, there were only three DIAL scans where emissions measurements included only the temporary flare; these three scans represent less than one hour of measurement data and do not appear to be sufficient for use in developing an emissions factor. Third, the operation of the ULC flare is not expected to be representative of a properly operated flare. The data suggest that the flare was oversteamed. Also, the net heating value of the fuels in the combustion zone (considering the steam addition rate) for the ULC flare were often below 200 British thermal units per standard cubic feet (Btu/scf). The EPA has recognized that this combustion zone heating value is too low, and such low values will not be allowed for petroleum refinery flares assuming the newly proposed refinery standards are finalized as proposed (see 79 FR 36880).

Because the BP Texas City DIAL measurements often included a number of upwind emissions sources and the tests are conducted over a limited operating range (temperatures/wind speeds), there appears to be no direct means by which to use the emissions measurements made during this study to develop new emissions factors for storage tanks and wastewater treatment systems. Additionally, the comparison of the DIAL measurement data with emissions model estimates using site specific data suggests that the AP-42 emissions equations for both storage tanks and wastewater treatment systems appears to provide a reasonably accurate means for estimating emissions from these sources. The DIAL VOC measurement data for Flare 6 are available and have been incorporated into the emissions factor development process (EPA, 2014). The DIAL VOC measurement data for the ULC and temporary flares do not appear to be appropriate for use in emissions factor development because most of the DIAL scans include emissions contributions from both flares, and it unclear what emissions are associated with each flare. It is necessary to know the emissions attributed to a particular emissions source in order to use data in emissions factor development.

### **3.3 Houston Ship Channel/Shell Deer Park DIAL Study**

The Shell DIAL study (Ref No. 5 in Table 1-1; Raun and Hoyt, 2011) measured VOC emissions from a combined petroleum refinery and chemical complex (Shell Deer Park facility) in the Houston Ship Channel area. Like the Houston Area DIAL Study, the Shell DIAL study

included DIAL VOC measurements around various storage tanks, the DCU process area, the wastewater treatment system, and several flares; it also included measurements around the light olefins processing area. For many of these sources, FTIR measurements were also conducted to improve compositional characterization of the plume. Estimates based on emissions factors (presumably based on AP-42 emissions factor methodologies) were also reported. A summary of the comparison of the emissions measurements and emissions factor estimates from the Shell DIAL study for some of the measured sources is provided in Table 3-2. (Note: The measured estimates are labelled “Estimate of 95<sup>th</sup> Upper Confidence Limit of the Mean.”)

Similar to the Houston Area DIAL Study, there are over 100 storage tanks at the Shell Deer Park refinery and emissions estimates were reported for 19 of these storage tanks. The emissions measured for the 19 storage tanks cited in the report were higher than the estimated emissions. In reviewing the scan planes for specific storage tank measurements, it appears that there were often 4 or more tanks upwind of the scan plane (or between “upwind” and “downwind” scans), but the emissions as reported (see Table 3-2) often include emissions for only one or two of these tanks. It is possible that there could be more emissions sources that are contributing to the measured emissions than are being accounted for in the Shell DIAL study emissions factor estimates, but the data is not conclusive with respect to these tanks.

With respect to the storage tank emissions factor estimates, it appears that some of the emissions estimates were developed using time dependent input factors (e.g., there are different emissions factor estimates for Southwest Tank AP-17 for January 15 and January 19), so at least some site-specific conditions were accounted for in these emissions estimates. However, the report lacks any real description or documentation regarding how these calculations were made and the level of site-specific operating data available for these emissions factor estimates. It could be possible that only wind speed and temperature were varied for the differing emissions factor estimates and data for other site-specific conditions (e.g., whether the tank was being actively filled, actual composition of tank contents, etc.) were not accounted for in the emissions factor estimates. The Shell DIAL study does appear to show that most of the tanks at the Shell Deer Park refinery that were targeted for DIAL measurement scans had higher than expected emissions during the time of the DIAL test. However, given the lack of process data, it does not appear possible to develop or revise the emissions factor methodologies for storage tanks based on the reported Shell DIAL study data.

**Table 3-2. Summary of Emissions Comparison Included in the Shell DIAL Study Report**

Area	Date	Emission Factor Based Calculation (lbs/hr)	VOC (V) or Benzene (B)	Estimate of the 95th Upper Confidence Limit of the Mean (lbs/hr)**	Potential Underestimation Multiplier	
Southwest Tanks	A-333	13-Jan	0.43	V		
	A-330	13-Jan	0.45	V		
	A-332	13-Jan	1.27	V		
	Total		2.15		20.18	9
	A-325	15-Jan	0.22	V		
	A-326	15-Jan	0.34	V		
	Total		0.56		13.15	23
	AP-17	19-Jan	0.46	V		
	Total		0.46		42.6	93
	AP-17	15-Jan	0.25	V		
AP-16	15-Jan	0.14	V			
Total		0.39		51.53	132	
West Tanks	A-310	1/14	0.17	V		
	G-324-R1	1/14	0.26	V		
	Total		0.43		15.8	37
CR-3		21-Jan	20.67	V		
		25-Mar	20.67	V		
	Average		20.67		27.37	1
East Tanks	J-327	22-Jan	0.14	V		
	J-328	22-Jan	0.12	V		
	J-331*	22-Jan	4.63	V		
	J-332*	22-Jan	4.63	V		
	Total		9.52		37.05	4
	J-327	23-Jan	0.15	V		
	J-328	23-Jan	0.12	V		
	Total		0.27		18.07	67
	J-327	28-Jan	0.11	V		
	J-328	28-Jan	0.16	V		
J-331*	28-Jan	4.63	V			
J-332*	28-Jan	4.63	V			
Total		9.53		35.98	4	
Northwest Wastewater		25-Jan	6.5	V		
		30-Jan	15	V		
		5-Feb	11.5	V		
	Average		11		1192	108
		9-Feb	0.019	B		
		13-Feb	0.2	B		
Average		0.11		7.3	67	

\* permit limits

\*\* from ProUCL

**Table 3-2. (Continued)**

Area	Date	Emission Factor Based Calculation (lbs/hr)	VOC (V) or Benzene (B)	Estimate of the 95th Upper Confidence Limit of the Mean (lbs/hr)**	Potential Underestimation Multiplier
East Wastewater	1-Feb	5.88	V		
	<b>Total</b>	5.88		43.35	7
Tanks T-OL913 and T-OL920	T-OL913 8-Feb	1.15	B		
	T-OL913 10-Feb	1.17	B		
	T-OL913 23-Mar	1.18	B		
	T-OL920 8-Feb	0.83	B		
	T-OL920 10-Feb	0.83	B		
	T-OL920 23-Mar	0.83	B		
	<b>Total of Tank Averages</b>	2.00		19.76	10
ACU BEU	12-Feb	3.41	B		
	15-Feb	3.41	B		
	<b>Average</b>	3.41		16.77	5
	26-Mar	2.49	V		
	<b>Total</b>	2.49		77.48	31
Tanks South of ACU BEU	D-350 2-Feb	0.03	B		
	D-351 12-Feb	0.09	B		
	D-381 15-Feb	0.3	B		
	D-352 22-Mar	0.02	B		
	<b>Total</b>	0.44		41.13	93

\*\* from ProUCL

Very high emissions were measured from the northwest wastewater treatment system. In late January and early February, the northwest wastewater treatment area had measured VOC emissions that ranged from 4 to 80 times higher than those projected based on emissions factors. According to the Shell refinery representatives, there was a temporary malfunction of a skimmer on one of the dissolved air flotation units, which caused an oil layer to develop on the top of the tank contents that impacted some of the measurements. The emission measurements taken during the malfunction are not appropriate for use in developing or revising the emissions factor methodologies for wastewater treatment tanks. Emissions from the wastewater treatment facility were also higher than estimates at times when the process was operating normally; however, the report does not appear to include sufficient process data from which to evaluate the appropriateness of the modeled emission estimates or the AP-42 emissions factors.

DIAL measurement scans were also conducted for the DCU process area, selected flares, and the olefins process area. The report did not appear to include emissions factor-based

emissions estimates for these sources or operating data by which emissions estimates based on emissions factors could be determined.

Given the lack of process operating data and occasions where the DIAL scans appeared to include emissions contributions from additional emissions sources which are not specifically cited in the study report, it does not appear that the Shell DIAL study can be directly used to update or revise emissions factors. Additionally, as noted in the Shine review (Ref No. 2 in Table 1-1), high emissions events that occur during process upsets, malfunctions, startups and shutdowns are not typically characterized in a facility's emissions inventory and emissions factors are not generally available or applicable for estimating emissions from these events. The Shell DIAL study certainly documents that high emissions can occur as a result of such events, as noted by the high emissions measured at the northwest wastewater treatment area during the malfunction of the DAF. The AP-42 emissions factors are intended for estimating emissions during representative normal operating conditions; they are not intended to account for emissions that occur as a result of process upsets or startup or shutdown events.

## **Section 4**

### **Passive FTIR Studies**

Following the Houston Area DIAL Study (discussed in detail in Section 3.2), a number of passive FTIR studies were performed at different refineries to investigate flare performance under different flare and assist gas flow rates. Many of these studies were cited in the Plaintiffs' complaint (Ref Nos. 3, 6, 7, and 8 in Table 1-1). Additional flare performance tests were conducted on one flare at a Shell facility (Shell 2011a and 2011b) and on one flare at an INEOS facility (INEOS 2010a and 2010b). All of these recent flare performance studies, as well as historical data on flare performance (see EPA, 1983 and 1985), were reviewed, compiled, and analyzed. Based on this review, the EPA prepared a report summarizing its findings and distributed the report for peer review (EPA, 2012). Based on comments received during the peer review process, the data were recompiled and analyzed using increased time resolution (minute-by-minute data) (see Sertkaya et al., 2013). Upon reviewing these data, the EPA concluded that some refinery flares, particularly steam- or air-assisted flares with low flare gas flow rates, were not achieving 98 percent destruction efficiency. Because it is the Agency's position that a well operated flare should, at minimum, be able to achieve this destruction efficiency, the EPA has proposed to amend the Refinery MACT standards (40 CFR part 63 subparts CC and UUU) to establish more stringent monitoring requirements and operating limits to ensure flares achieve a minimum destruction efficiency of 98 percent (79 FR 36880).

The review of passive FTIR studies summarized above previously focused on combustion efficiency of flares. In further reviewing this data, it appears the passive FTIR studies provide data that can be used to propose revisions to the existing AP-42 CO and NO<sub>x</sub> emissions factors and propose a VOC emissions factor for flares. This section summarizes the data available in each of the cited passive FTIR studies. We are proposing to revise section 13.5 of AP-42 to incorporate the new emissions factors developed with these data.

#### **4.1 2010 TCEQ Flare Study**

The purpose of the 2010 TCEQ flare study project (Ref No. 3 in Table 1-1; Allen and Torres, 2011) was to conduct field tests to measure flare emissions and collect process and operational data in a semi-controlled environment to determine the relationship between flare

design, operation, vent gas lower heating value (LHV), vent gas flow rate, destruction and removal efficiency (DRE), and combustion efficiency (CE). The TCEQ's primary objectives, as stated in the study report, included the following:

- Assess the potential impact of vent gas flow rate turndown on flare CE and VOC DRE.
- Assess the potential impact of steam/air assist on flare CE and VOC DRE at various operating conditions, including low vent gas flow rates.
- Determine whether flares operating over the range of requirements stated in 40 Code of Federal Regulations (CFR) § 60.18 achieve the assumed hydrocarbon DRE of 98 percent at varying vent gas flow rate turndown, assist ratios and vent gas heat content.
- Identify and quantify the hydrocarbon species in flare plumes visualized with passive infrared cameras.

Commensurate with the study objectives, the study report focused on VOC emissions at or near the operating conditions where flare performance deteriorates. Because the study specifically investigated flare performance while varying steam flow rates, some of the emissions measured during these tests are not likely to be representative of normal operating conditions. However, if the data are limited to those times when the flare was meeting the recommended combustion efficiency, it may be possible to use the data to develop emissions factors. Although the study report (Allen and Torres, 2011) does not include any data on the CO and NO<sub>x</sub> emissions, raw data on the emissions concentration measured during this study are available and have been incorporated into the emissions factor development process (EPA, 2014).

## **4.2 Marathon Petroleum Flare Tests**

Passive FTIR tests were conducted at two different Marathon Petroleum refineries (Ref No. 6 and 7 in Table 1-1). The main objective of these tests was to better understand the impacts of steam on the overall performance of the flare CE. As with the TCEQ flare study, many of the test runs were conducted with varying steam flow rates to determine how varying steam rates impact CE. Consequently, some of the emissions measured during these tests are not likely to be representative of normal operating conditions. However, if the data are limited to those times when the flare was meeting the recommended CE, it may be possible to use the data to develop

emissions factors. Although the reports do not include any data on the VOC, CO and NO<sub>x</sub> emissions, raw data on the emissions concentrations measured during the Marathon flare tests are available and has been incorporated into the emissions factor development process (EPA, 2014).

### **4.3 Flint Hills Flare Test**

Passive FTIR tests were conducted on two different flares at the Flint Hills Port Arthur Refinery (Ref No. 8 in Table 1-1). The overall objectives of the Flint Hills flare test program were as follows:

- Evaluate the impacts of CE over a range of operating scenarios by changing both flare vent gas composition and steam rates.
- Evaluate key operating parameters such as steam to vent gas ratio (S/VG) and Net Heating Value of the Combustion Zone (NHV<sub>cz</sub>) as indicators that may assist in maintaining flare operation at high efficiency conditions during day-to-day operation.

As with the other flare studies, because the objective of the tests was to evaluate conditions that affect flare CE, many of the test runs were conducted with varying steam flow rates that would likely not be representative of normal operating conditions. However, if the data are limited to those times when the flare was meeting the recommended CE, it may be possible to use the data to develop emissions factors. Although the report does not include any data on the VOC, CO and NO<sub>x</sub> emissions, raw data on the emissions concentrations measured during this study are available and have been incorporated into the emissions factor development process (EPA, 2014).

### **4.4 Additional Flare Tests**

In addition to the passive FTIR studies cited in the complaint, we are aware of passive FTIR studies conducted on two other industrial flares (Shell, 2011a and 2011b; ENIOS, 2010a and 2010b). These studies were similar to the previous passive FTIR studies in that they were largely conducted to identify the operating limits where flare performance begins to deteriorate. As with the other flare studies, because the objective of the tests was to evaluate conditions that affect flare CE, many of the test runs were conducted with varying steam flow rates that would likely not be representative of normal operating conditions. However, if the data are limited to those times when the flare was meeting the recommended CE, it may be possible to use the data

DRAFT – Do not cite or quote

to develop emissions factors. Raw data for measured VOC, CO and (for the INEOS study only) NO<sub>x</sub> emissions concentrations collected during these studies are available and have been incorporated into the emissions factor development process (EPA, 2014).

DRAFT

## **Section 5**

### **Tank Emissions Tests**

Global Companies LLC (Global) operates a petroleum terminal handling distillate and residual oil products in Chelsea, Massachusetts. Global discovered that its carbon bed (installed as an odor control system) was not adequately sized to control vapors from its residual oil tanks. As a result, Global conducted testing on the tank emissions to investigate the issue and discovered that emissions from the residual oil tanks had been significantly underestimated. In 2007, Global submitted a self-disclosure to the Massachusetts Department of Environmental Protection (MassDEP) and EPA Region 1 regarding these excess emissions.

As a result of this incident, EPA Region 1 required two facilities (Global in South Portland, Maine and Sprague Operating Resource LLC in Searsport, Maine) to conduct a series of tests to quantify emissions from storage tanks to determine compliance with various Clean Air Act requirements. These reports were reviewed in the context of determining whether changes should be made to the existing emissions estimation methodologies for tanks in Chapter 7 of AP-42.

#### **5.1 Global Companies LLC–South Portland, Maine**

Global operates a petroleum terminal handling distillate and residual oil products and asphalt in South Portland, Maine. EPA Region 1 issued a testing order to Global's South Portland facility under Section 114 of the Clean Air Act. Global tested headspace vapors from Tank No. 9 in July and August 2012 (Eastmount, 2012b). Tank No. 9 stored liquid asphalt at the time of the test. A temporary total enclosure (TTE), designed in accordance with EPA Method 204, was fitted over the single tank exhaust vent. The total hydrocarbons (THC) concentration, measured with EPA Method 25A, and methane concentration, measured with EPA Method 18, of the storage tank emissions were logged continuously for a period of 30 days. The testing timeframe included a period of filling the storage tank so that both breathing and working losses were represented. The methane emissions were subtracted from the THC readings to get a non-methane total gaseous organic compound concentration, as a measure for VOC. Global

conducted similar testing on Tank No. 3 in April 2013 (Eastmount, 2013b). Tank No. 3 stored No. 6 fuel oil at the time of the test. A TTE was fitted on the two exhaust vents. The THC and methane concentrations of the emissions were logged continuously for a period of 15 days. The testing timeframe included a period of filling the storage tank so that both breathing and working losses were represented.

The measured VOC tank breathing losses when extrapolated over the course of a year were 5.3 tons per year (tpy) for Tank No. 9 and 7.43 tpy for Tank No. 3. Hourly emissions during the filling operation were observed to increase approximately 33% for Tank No. 9 and 100% for Tank No. 3 from the emissions observed during non-filling operations.

While the data from the testing at the Global facility are interesting, the equations for estimating tank emissions in AP-42 are not based on a single emissions factor (EPA, 1995). AP-42 Chapter 7 contains a series of complex equations that rely heavily on site-specific inputs, including tank specific inputs (diameter, height, shell color and condition, type of roof, etc.), fuel specific inputs (vapor pressure, vapor molecular weight, throughput, etc.), and location specific inputs (to determine average temperature and solar insolation information). In order for the algorithms to provide reasonable estimates, the site specific information must be correct. In order to determine whether revisions to the AP-42 Chapter 7 equations are appropriate, targeted testing would need to be performed to isolate each input parameter to determine how each parameter affects the output of the equations. Testing would need to include tanks of different sizes, different places in the country, different times of year, different throughputs, different colors, different storage materials, etc. At this time, it does not appear that the necessary data to perform this analysis is available.

## **5.2 Sprague Operating Resource LLC– Searsport, Maine**

Sprague Operating Resource LLC (Sprague) operates a tank terminal in Searsport, Maine handling bulk liquid cargoes (including residual oil and asphalt), dry bulk products, and special heavy lift projects. Sprague also received a testing order under Section 114 of the Clean Air Act from EPA Region 1.

Sprague tested headspace vapors from Tank No. 3 in July and August 2012 (Eastmount, 2012a). Tank No. 3 stored No. 6 fuel oil at the time of the test. A TTE was fitted over the two tank exhaust vents. The THC and methane concentrations were logged continuously for a period

of 30 days. The testing timeframe included a period of filling the storage tank so that both breathing and working losses were represented. Sprague conducted similar testing on Tank No. 2 in May 2013 (Eastmount, 2013a). Tank No. 2 stored liquid asphalt at the time of the test. A TTE was fitted on the single exhaust vent. The THC and methane concentrations of the emissions were logged continuously for a period of 15 days. The testing timeframe included a period of filling the storage tank so that both breathing and working losses were represented.

The measured VOC tank breathing losses when extrapolated over the course of a year were 10.6 tpy for Tank No. 3 and 4.2 tpy for Tank No. 2. Hourly emissions during the filling operation were observed to be approximately four times higher for Tank No. 3 and decreased by 20 percent for Tank No. 2 from the emissions observed during non-filling operations. These emissions were much higher than expected, based on Sprague's emissions inventory estimates for the years 2006-2009 (CITE). A review of the emissions inventory calculations revealed the use of several default values.

Once again, while the data from the testing at the Sprague facility are interesting, in order to conclude whether revisions to the AP-42 Chapter 7 equations are appropriate, targeted testing would need to be performed to isolate each input parameter to determine how each parameter affects the output of the equations. Testing would need to include tanks of different sizes, different places in the country, different times of year, different throughputs, different colors, different storage materials, etc. At this time, it does not appear that the necessary data to perform this analysis is available. Without conducting further testing, it does not appear possible to say whether there are issues with the equations in AP-42 Chapter 7.

The testing performed at Sprague did highlight the need for site-specific data when using the AP-42 Chapter 7 equations for estimating emissions from tanks. This is especially important for a material like asphalt, for which no default data is available, or No. 6 fuel oil, which is often mixed with more volatile cutter material. The majority of emissions in this type of material are expected to come from the cutter stock, and as such, it is important to account for the vapor pressure contributed by the cutter when determining the vapor pressure of the fuel oil (API, 2013).

## **Section 6**

### **Proposed Conclusions**

The following conclusions are based on a review of the reports cited in the Plaintiffs' May 2013 complaint, along with other associated reports, available documents, and recent tank emissions testing. Based on our review, we propose the following conclusions:

1. Emissions inventory estimates can underestimate actual emissions because they often do not adequately account for site-specific conditions and do not generally account for unusual emissions that occur as a result of process upsets, malfunctions, startups and shutdowns. Improving emissions inventory guidelines, as done by TCEQ (2013) or as provided by the *Refinery Protocol* (RTI, 2011), appears to be the most effective way to improve emissions inventories.
2. DIAL studies are useful for identifying sources with high emissions. However, these studies to date do not appear to be useful for developing emissions factors because:
  - a. The available DIAL study reports do not provide the necessary process operating data by which to normalize the measured emissions in order to develop an emissions factor.
  - b. It can be challenging to isolate a single emissions source within a site boundary. It is not possible to develop an emissions factor when the emissions cannot be properly apportioned between the sources.
3. Raw data from passive FTIR flare studies do include measurement data for CO, NO<sub>x</sub>, and VOC. It may be possible to use these data to revise emissions factors for CO and NO<sub>x</sub> and propose an emissions factor for VOC from flares. Because passive FTIR studies for flares have generally focused on determining flare CE and identifying factors that affect flare CE, not all of the data are representative of normal operating conditions. However, if the data are limited to those times when the flare was meeting the recommended CE, it may be possible to use the data to develop emissions factors. As such, the EPA has incorporated this data into the emissions

factor development process. We are proposing to revise section 13.5 of AP-42 to incorporate the new emissions factors developed with these data.

4. For tanks, the equations in AP-42 can inaccurately estimate emissions when default values are used inappropriately or when site-specific inputs are not entered into the equations. It is important to develop site-specific vapor pressure information for materials, like No. 6 fuel oil, which are routinely mixed with more volatile materials. It is also important to note that the emissions estimation procedures only account for emissions in normal operating scenarios. Emissions from tanks that are improperly operated, defective (e.g. damaged floating roof rim seals and deck fittings), or in disrepair cannot be accurately estimated using these methods.
5. It does not appear possible to determine if the tank emissions estimation equations in AP-42 Chapter 7 need to be revised. In order to determine this, targeted testing would need to be performed to isolate each input parameter to determine how each parameter affects the output of the equations. Testing would need to include tanks of different sizes, locations, throughputs, colors, and content. Such testing would need to occur at different times throughout the year. At this time, it does not appear that the necessary data to perform this analysis is available.

## Section 7 References

- Allen, D. T. and V. M. Torres. 2011. *TCEQ 2010 Flare Study Final Report*. Prepared for the Texas Commission on Environmental Quality. August 1. Available at: [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf)
- API (American Petroleum Institute). 2013. *Manual of Petroleum Measurement Standards, Chapter 19.4. Evaporative Loss Reference Information and Speciation Methodology*. Third Edition, Addendum 1, American Petroleum Institute. November 2013.
- Chambers, A. and M. Strosher. 2006. *Refinery Demonstration of Optical Technologies for Measurement of Fugitive Emissions and for Leak Detection*. Prepared for Environment Canada, Ontario Ministry of the Environment, and Alberta Environment. March 31; revised November 1. Available at: [www.environmentalintegrity.org/pdf/publications/EIP\\_Att\\_D\\_Total\\_Upset.pdf](http://www.environmentalintegrity.org/pdf/publications/EIP_Att_D_Total_Upset.pdf)
- Clean Air Engineering, Inc. 2010a. *Performance Test of a Steam-Assisted Flare with Passive FTIR*. Prepared for Marathon Petroleum Co., LLC, Texas Refining Division, Texas City, Texas. May. Available at: [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf)
- Clean Air Engineering, Inc. 2010b. *Performance Test of a Steam-Assisted Elevated Flare with Passive FTIR –Detroit*. Prepared for Marathon Petroleum Co., LLC. Detroit Refinery, Detroit, Michigan. November. Available at: [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf)
- Clean Air Engineering, Inc. 2011. *PFTIR Test of a Steam-Assisted Elevated Flares – Port Arthur*. Prepared for Flint Hills Resources Port Arthur. LLC. Port Arthur Chemicals, Port Arthur, Texas. June 17. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0167.
- Coburn, J., and M. Icenhour. 2008. *Preliminary Analysis of Short-term Variability in Storage Vessel Emissions*. Memorandum from Jeff Coburn and Melissa Icenhour, RTI International, to Brenda Shine, EPA/OAQPS/SPPD. December 29, 2008.
- Coburn, J. 2013a. *Impact Estimates for Delayed Coking Units*. Memorandum from Jeff Coburn, RTI International, to Brenda Shine, EPA/OAQPS/SPPD. September 12, 2013. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0202.

- Coburn, J. 2013b. *Petroleum Refinery Sector Rule: Operating Limits for Flares*. Memorandum from Jeff Coburn, RTI International, to Andrew Bouchard and Brenda Shine, EPA/OAQPS. December 12, 2013. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0206.
- Eastmount Environmental Services, LLC. 2012a. *VOC and VOC HAP Emissions Testing from Residual Oil Tank No. 3 Tank Headspace and Loading Operations at Sprague's Searsport, Maine Terminal*. Prepared for Sprague Operating Resources LLC. Searsport Terminal, Searsport, Maine. October. Available at: <http://www.epa.gov/ttn/chief/consentdecre/Sprague Oil.zip>
- Eastmount Environmental Services, LLC. 2012b. *VOC and VOC HAP Emissions Testing from Asphalt Tank No. 9 Tank Headspace and Loading Operations at Global's South Portland, Maine Terminal*. Prepared for Global Companies LLC. South Portland Terminal, South Portland, Maine. November. Available at: <http://www.epa.gov/ttn/chief/consentdecre/Global Asphalt.zip>
- Eastmount Environmental Services, LLC. 2013a. *VOC and VOC HAP Emissions Testing from Asphalt Storage Tank No. 2 Tank Headspace and Loading Operations at Sprague's Searsport, Maine Terminal*. Prepared for Sprague Operating Resources LLC. Searsport Terminal, Searsport, Maine. July. Available at: <http://www.epa.gov/ttn/chief/consentdecre/Sprague Asphalt.zip>
- Eastmount Environmental Services, LLC. 2013b. *VOC and VOC HAP Emissions Testing from Residual Oil Tank No. 3 Tank Headspace and Loading Operations at Global's South Portland, Maine Terminal*. Prepared for Global Companies LLC. South Portland Terminal, South Portland, Maine. August. Available at: <http://www.epa.gov/ttn/chief/consentdecre/Global Oil.zip>
- EPA (U.S. Environmental Protection Agency). 1983. *Flare Efficiency Study*. Prepared for U.S. Environmental Protection Agency, Industrial Environmental Research Laboratory, Research Triangle Park, NC. July 1983. EPA-600/2-83-052. Available at: [http://www.epa.gov/ttn/chief/ap42/ch13/related/ref\\_01c13s05\\_jan1995.pdf](http://www.epa.gov/ttn/chief/ap42/ch13/related/ref_01c13s05_jan1995.pdf)
- EPA (U.S. Environmental Protection Agency). 1985. *Evaluation of the Efficiency of Industrial Flares: Flare Head Design and Gas Composition*. Prepared for U.S. Environmental Protection Agency, Air and Energy Research Laboratory, Research Triangle Park, NC. September 1985. EPA-600/2-85-106.
- EPA (U.S. Environmental Protection Agency). 1995. *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, AP-42, Fifth Edition, U.S.* Environmental Protection Agency, Office of Air Quality Planning and Standards. January 1995. Available at: <http://www.epa.gov/ttn/chief/ap42/index.html>
- EPA (U.S. Environmental Protection Agency). 2011. *Petroleum Refinery Emissions Information Collection, Part VI. Emissions Inventory Data*. OMB Control No. 2060-0657, Approved March 28, 2011. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0062.06.

- EPA (U.S. Environmental Protection Agency). 2012. *Parameters for Properly Designed and Operated Flares*. Prepared by U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. April 2012. Available at: <http://www.epa.gov/airtoxics/flare/2012flaretechreport.pdf>
- EPA (U.S. Environmental Protection Agency). 2014. DRAFT *Review of Emissions Test Reports for Emissions Factors Development for Flares and Certain Refinery Operations*. Prepared by U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. August 2014. Available at: [http://www.epa.gov/ttn/chief/consentdecree/draft\\_report\\_ef.pdf](http://www.epa.gov/ttn/chief/consentdecree/draft_report_ef.pdf)
- INEOS ABS (USA) Corporation. 2010a. *Passive Fourier Transform Infrared Technology (FTIR) Evaluation of P001 Process Control Device at INEOS ABS (USA) Corporation, Addyston, Ohio Facility*. July 2010. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0159. .
- INEOS ABS (USA) Corporation. 2010b. *Passive Fourier Transform Infrared Technology (FTIR) Evaluation of P001 Process Control Device at INEOS ABS (USA) Corporation, Addyston, Ohio Facility. Supplemental Report*. August 2010. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0159.
- Lucas, B. 2007. *Collection of Detailed Benzene Emissions Data from 22 Petroleum Refineries*. Memorandum from Bob Lucas, EPA/SPPD, to EPA Docket No. EPA-HQ-OAR-2003-0146. August 20, 2007. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2003-0146-0015.
- Milligan, P., F. Martinsky, K. Good, and B.I Nelson. 2006. *Evaluation Report: EPA Can Improve Emission Factors Development and Management*. Office of Inspector General Report No. 2006-P-0017. Available at: <http://www.epa.gov/oig/reports/2006/20060322-2006-P-00017.pdf>
- Randall, D., and J. Coburn. 2010. *Critical Review of DIAL Emission Test Data for BP Petroleum Refinery in Texas City, Texas*. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA 453/R-10-002. November. Available at: [www.epa.gov/airtoxics/bp\\_dial\\_review\\_report\\_12-3-10.pdf](http://www.epa.gov/airtoxics/bp_dial_review_report_12-3-10.pdf)
- Raun, L. and D. W. Hoyt. 2011. *Measurement and Analysis of Benzene and VOC Emissions in the Houston Ship Channel Area and Select Major Stationary Sources Using DIAL (Differential Absorption Light Detection and Ranging) Technology to Support Ambient HAP Concentrations Reductions in the Community (DIAL Project)*. City of Houston, Bureau of Pollution Control and Prevention. July 20. Available at: [www.greenhoustontx.gov/dial20110720.pdf](http://www.greenhoustontx.gov/dial20110720.pdf)

- Robinson, R., T. Gardiner, and B. Lipscombe. 2008. *Test Report: Measurements of VOC emissions from petrochemical industry sites in the Houston Area using Differential Absorption Lidar (DIAL) during Summer 2007*. Prepared for the Texas Commission on Environmental Quality. Reference No. QBN1701-TCEQ-2007. February 6. Available at: [http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/oth/200802\\_06-dial\\_test\\_report.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/oth/200802_06-dial_test_report.pdf)
- RTI (RTI International). 2011. *Emission Estimation Protocol for Petroleum Refineries*. Version 2.1.1, Final ICR Version Corrected. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. May. Docket Item No. EPA-HQ-OAR-2010-0682-0060. Most current version also available at <http://www.epa.gov/ttn/chief/efpac/protocol/>.
- Sertkaya, A., J. Renzaglia, and M. Thomas. 2013. Memorandum from Aylin Sertkaya, Jason Renzaglia, and Mae Thomas, ERG, to Andrew Bouchard and Brenda Shine, EPA. *Flare Performance Data: Summary of Peer Review Comment and Additional Data Analysis for Steam-Assisted Flares*. July 15, 2013. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2010-0682-0200.
- Shell Global Solutions (US) Inc. 2011a. *Shell Deer Park Refining LP Deer Park Refinery East Property Flare Test Report*. Prepared by Shell Global Solutions (US) Inc., Houston, TX (April). Available at: <http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/sdp-epf-test.pdf>
- Shell Global Solutions (US) Inc. 2011b. *Shell Deer Park Site Deer Park Chemical Plant OP-3 Ground Flare Performance Test Report*. Prepared by Shell Global Solutions (US) Inc., Houston, TX. May.
- Shine, B. 2007. *Potential Low Bias of Reported VOC Emissions from the Petroleum Refining Industry*. Memorandum from Brenda Shine, EPA/SPPD, to EPA Docket No. EPA-HQ-OAR-2003-0146 dated July 27, 2007. Available at <http://www.regulations.gov/>, Docket Item No. EPA-HQ-OAR-2003-0146-0010.
- Smithers, B.; McKay, J.; Van Ophem, G.; Van Parijs, K.; White, L. 1995. *VOC Emissions from External Floating Roof Tanks: Comparison of Remote Measurements by Laser with Calculation Methods*. Prepared for CONCAWE Air Quality Management Group, Report No. 95/52, Brussels. January. Available at: [http://files.gamta.lt/aaa/Tipk/tipk/4\\_kiti%20GPGB/46.pdf](http://files.gamta.lt/aaa/Tipk/tipk/4_kiti%20GPGB/46.pdf)
- Sprague Operating Resource LLC. *Searsport Summary 2005-2009 TRI Reporting*. Microsoft Excel file. Created February 16, 2011. Available at: [http://www.epa.gov/ttn/chief/consentdecree/Searsport\\_Summary\\_2005-2009\\_TRI\\_Reporting.xls](http://www.epa.gov/ttn/chief/consentdecree/Searsport_Summary_2005-2009_TRI_Reporting.xls)
- TCEQ (Texas Commission on Environmental Quality). 2013. *2012 Emissions Inventory Guidelines*. TCEQ Report No. RG-360/12. January. Available at: [http://www.tceq.texas.gov/publications/rg/rg-360\\_12/index.html](http://www.tceq.texas.gov/publications/rg/rg-360_12/index.html)

TNRCC (Texas Natural Resource Conservation Commission). 2000. *Texas 2000 Air Quality Study: Landmark Research in Texas on Ozone and Fine Particle Air Pollution*. TNRCC Report No. GI-260. (August - September). See also <http://www.utexas.edu/research/ceer/texaq/>

DRAFT

**Appendix A**  
**COMPLAINT**  
**MAY 2013**

DRAFT

**UNITED STATES DISTRICT COURT  
DISTRICT OF COLUMBIA**

AIR ALLIANCE HOUSTON )  
 2409 Commerce Street, Suite A )  
 Houston, TX 77003; )  
 )  
 COMMUNITY IN-POWER AND )  
 DEVELOPMENT ASSOCIATION, INC )  
 1301 Kansas Avenue; )  
 Port Arthur, TX 77640; )  
 )  
 LOUISIANA BUCKET BRIGADE )  
 4226 Canal Street )  
 New Orleans, LA 70119; and )  
 )  
 TEXAS ENVIRONMENTAL JUSTICE )  
 ADVOCACY SERVICES )  
 6733 Harrisburg Boulevard )  
 Houston, TX 77011; )  
 )  
 Plaintiffs, )  
 )  
 v. )  
 )  
 Bob Perciasepe, in his official capacity as )  
 Acting Administrator, United States )  
 Environmental Protection Agency, )  
 1101A EPA Headquarters, Ariel Rios Building )  
 1200 Pennsylvania Avenue, NW )  
 Washington, D.C. 20460 )  
 )  
 Defendant. )  
 \_\_\_\_\_ )

Case No. \_\_\_\_\_

**COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF**

**INTRODUCTION**

1. Plaintiffs Air Alliance Houston, Community In-Power and Development Association (CIDA), Louisiana Bucket Brigade, and Texas Environmental Justice Advocacy Services (TEJAS), (collectively, "Plaintiffs") bring this action pursuant to section 304(a)(2) of

the Clean Air Act (“CAA” or the “Act”), 42 U.S.C. § 7604(a)(2), to compel Defendant Bob Perciasepe, Acting Administrator of the United States Environmental Protection Agency (“EPA”), to perform the nondiscretionary duties required by section 130 of the Act, 42 U.S.C. § 7430. Specifically, the Administrator has failed to review and, if necessary, revise the emission factors for volatile organic compounds (VOCs), carbon monoxide, and nitrogen oxides at least once every three years. 42 U.S.C. § 7430.

2. An emission factor is a “representative value” or “tool” used to estimate emissions of a specific pollutant from an air pollution source. Emission factors are central to the CAA, and are used to calculate roughly eighty percent of air emissions from virtually all industrial sectors. Emissions data calculated from emission factors is used to: design regulations; develop emission control strategies; establish emission limits and other applicable permit requirements for major sources; guide enforcement priorities; and evaluate compliance with air quality standards.

3. Refineries and petrochemical plants release VOCs and other toxic pollutants that poses significant health risks to nearby communities and to the environment. VOCs are organic chemicals that readily vaporize into the air, and can combine with nitrogen oxides to form ozone. Ozone is a criteria pollutant that is responsible for respiratory ailments and increased hospital admissions for coughing, chest pain, throat and nose irritation, lung inflammation and other respiratory issues. Some VOCs are also toxic pollutants, such as benzene, 1,3-butadiene, and hexane—all known carcinogens.

4. VOC emissions from petroleum refineries, petrochemical plants, and other industrial sources are significantly underestimated because inaccurate emission factors are used to quantify emissions from industrial flares (“flares”), liquid storage tanks (“tanks”), and

wastewater collection, treatment, and storage systems (“wastewater treatment systems”) at these facilities. Numerous scientific studies have found that VOC emissions from these sources are several orders of magnitude higher than emission factor estimates, in some cases measuring VOC emissions 132 times above the estimated amount.

5. Under section 130 of the Act, 42 U.S.C. § 7430, the Administrator has a mandatory duty to review and, if necessary, revise, emission factors used to estimate emissions of VOCs from emission sources at least once every three years. The failure to comply with this mandate compromises EPA’s ability to implement the CAA in a manner that protects public health and the environment. Yet, the Administrator has failed to perform the nondiscretionary duty to review and, if necessary, revise the emission factors used to estimate VOC emissions from flares, tanks, and wastewater treatment systems within the statutory timeframe.

6. With this action, Plaintiffs seek to compel the Administrator to expeditiously complete a review of the VOC emission factors for flares, tanks, and wastewater treatment systems, and, if necessary, revise these factors as required by section 130 of the Act, 42 U.S.C. § 7430.

### **JURISDICTION AND VENUE**

7. This Court has jurisdiction over this action pursuant to 42 U.S.C. § 7604(a)(2) (action arising under the CAA citizen suit provision), 28 U.S.C. § 1331 (federal question), and 28 U.S.C. § 1361 (mandamus). This Court may order the Administrator to perform the requisite acts and duties, may issue a declaratory judgment and may grant further relief pursuant to 42 U.S.C. § 7604(a), (d) and 28 U.S.C. §§ 2201, 2202.

8. Pursuant to section 304(a) of the CAA, 42 U.S.C. § 7604(a), “the district courts shall have jurisdiction . . . to order the Administrator to perform such act or duty [which is not discretionary].”

9. Plaintiffs have a right to bring this action pursuant to section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2), and the Administrative Procedure Act, 5 U.S.C. §§ 701 to 706.

10. By certified letter posted July 18, 2012, Plaintiffs sent Administrator written Notice of Intent to Sue (“Notice”) and have thereby complied with the notice requirements of section 304(b)(2) of the CAA, 42 U.S.C. § 7604(b)(2), and 40 C.F.R. pt. 54. *See* Ex. A. More than 60 days have passed since Plaintiffs provided Notice. The Administrator has not responded to Plaintiff’s Notice or remedied the alleged violations. Therefore, an actual controversy exists between the parties.

11. Venue is vested in this Court under 28 U.S.C. § 1391(e) because the Administrator resides in this district.

### **PARTIES**

12. Plaintiff Air Alliance Houston is a nonprofit, non-membership organization, incorporated and existing under the laws of the State of Texas, located in Houston, Texas. Air Alliance Houston works to reduce air pollution exposure and related health effects on behalf of communities in the Houston region. Air Alliance Houston is concerned that inaccurate accounting of VOC emissions from the many petroleum refineries and petrochemical plants in the Houston area undermine its efforts to reduce air pollution. Communities in the Houston region are vulnerable to VOCs emitted from Houston facilities because of: the toxins they contain and the smog they produce; the lack of accurate information about air pollutants, concentrations, and resulting exposures has made, and continues to make, it difficult for

Houstonians to determine how to best protect themselves; the inaccurate emissions data caused by poor quality emissions factors has made, and continues to make, it difficult for community members to effectively exercise their right to review and comment on CAA permits designed to protect ambient air quality; and, the underreporting of emissions may expose community members to pollutants at levels that are higher than the law allows and in concentrations deleterious to human health.

13. Plaintiff Community In-Power and Development Association (CIDA) is a nonprofit, membership corporation located in Port Arthur, Texas. CIDA advocates for its members' environmental justice, social, and economic rights. CIDA is concerned about accurate accounting of VOC emissions from petroleum refineries and petrochemical manufacturing plants in the Port Arthur area. Members of CIDA are exposed to VOCs, and the related toxins and smog, emitted from these facilities where they live and work; the lack of information about air pollutants, concentrations, and resulting exposures has made, and continues to make, it hard for them to determine how best to protect themselves; the inaccurate and poor quality of emissions data has made, and continues to make, it difficult for them to effectively exercise their right to review and comment on CAA permits designed to protect ambient air quality; and, the underreporting of emissions may expose members to pollutants at levels that are higher than the law allows and in concentrations deleterious to human health. CIDA brings this action on behalf of itself and its members that live, work, and recreate near petroleum refineries and petrochemical plants in the Port Arthur area in Southeast Texas.

14. Plaintiff Louisiana Bucket Brigade is a nonprofit, membership-based environmental health and justice organization located in New Orleans, Louisiana. Its mission is to work with communities to create Louisiana neighborhoods that are free of toxic air pollution

from refineries and other industrial sources. Louisiana Bucket Brigade is concerned about accurate accounting of VOC emissions from Louisiana's many petroleum refineries and petrochemical manufacturing plants. Members of Louisiana Bucket Brigade are exposed to VOCs, and the related toxins and smog, emitted from these facilities where they live and work; the lack of information about air pollutants, concentrations, and resulting exposures has made, and continues to make, it hard for them to determine how best to protect themselves; the inaccurate and poor quality of emissions data has made, and continues to make, it difficult for them to effectively exercise their right to review and comment on CAA permits designed to protect ambient air quality; and, the underreporting of emissions may expose members to pollutants at levels that are higher than the law allows and in concentrations deleterious to human health. Louisiana Bucket Brigade brings this action on behalf of itself and its members that live, work, and recreate near petroleum refineries and petrochemical plants in Louisiana.

15. Plaintiff Texas Environmental Justice Advocacy Services (TEJAS) is a nonprofit corporation located in Houston, Texas. TEJAS's mission is to create sustainable, healthy communities in the Houston Ship Channel region by educating individuals on health impacts from environmental pollution and empowering individuals to promote enforcement of environmental laws. TEJAS is particularly concerned about accurate accounting of VOC emissions from petroleum refineries and petrochemical manufacturing plants in the Houston Ship Channel. Members of TEJAS are exposed to VOCs and the related toxins and smog emitted from these facilities where they live and work; the lack of information about air pollutants, concentrations, and resulting exposures, has made, and continues to make, it hard for them to determine how best to protect themselves; the inaccurate and poor quality of emissions data has made, and continues to make, it difficult for them to effectively exercise their right to

review and comment on CAA permits designed to protect ambient air quality; and, the underreporting of emissions may expose members to pollutants at levels that are higher than the law allows and in concentrations deleterious to human health. TEJAS brings this action on behalf of itself and its members that live, work, and recreate near petroleum refineries and petrochemical plants in the Houston Ship Channel.

16. The Plaintiffs and their members live, work, recreate, and breathe the air near petroleum refineries and petrochemical plants that emit VOCs from flares, tanks, and wastewater treatment systems. Plaintiffs' members have experienced, continue to experience, or are likely to experience, harm to their health and to their environmental, recreational, aesthetic, and economic interests due to the Administrator's ongoing failure to complete a review of emission factors as required by section 130 of the Act, 42 U.S.C. § 7430.

17. Defendant Bob Perciasepe is the Acting Administrator of the EPA and in that role is charged with the duty to review and, if necessary, revise, the emission factors in accordance with Section 130 of the Act. 42 U.S.C. § 7430.

### **LEGAL BACKGROUND**

18. The CAA was established "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population" and "to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution." 42 U.S.C. § 7401(b).

19. A "primary goal" of the Act is "pollution prevention." *Id.* § 7401(c).

20. As part of the regulatory framework prescribed by the Act to accomplish these objectives, EPA must establish "methods ('emission factors') used...to estimate the quantity of

emissions of . . . volatile organic compounds . . . from sources of such air pollutants.” 42 U.S.C. § 7430.

21. EPA must periodically review and revise these emission factors. Section 130 provides that “at least every 3 years [after Nov. 15, 1990], the Administrator *shall* review and, if necessary, revise, the methods (‘emission factors’) used for purposes of [the CAA] to estimate the quantity of emissions of . . . volatile organic compounds . . . from sources of such air pollutants.” 42 U.S.C. § 7430 (emphasis added). Section 130 requires that the Administrator complete a review, and either make a formal determination that revision is not appropriate, or revise the emission factors for VOCs within the statutory deadline. *See id.*

22. The timely review and, if necessary, revision of VOC emission factors is crucial to EPA’s ability to implement the CAA in a manner that is protective of public health. The EPA recognizes that timely review and revision of emission factors is critical because new test data, information, and technology can render existing emission factors obsolete or prove them to be unreliable.

### **FACTUAL BACKGROUND**

23. An emission factor is a “representative value” or “tool” used to estimate emissions of a specific pollutant from an air pollution source. EPA regulations define an “emission factor” as “the ratio relating emissions of a specific pollutant to an activity or material throughput level.” 40 C.F.R. § 51.50.

24. EPA has also defined “emission factor” as “a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.” Office of Air Quality Planning & Standards, Office of Air and Radiation, EPA, AP-42, Compilation of Air Pollutant Emission Factors Volume I: Stationary

Point and Area Sources 1 (5th ed. 1995), *available at* [www.epa.gov/ttn/chief/ap42/index.html](http://www.epa.gov/ttn/chief/ap42/index.html) [hereinafter AP-42]. EPA guidance documents define emission factors as “a tool that is used to estimate air pollutant emissions to the atmosphere.” Office of Air Quality Planning & Standards, Office of Air and Radiation, EPA, EPA-454/R-95-015, Procedures for Preparing Emission Factor Documents, 2-1 (1997), *available at* [www.epa.gov/ttnchie1/efdocs/procedur.pdf](http://www.epa.gov/ttnchie1/efdocs/procedur.pdf).

25. The Compilation of Air Pollutant Emission Factors, or AP-42 as it is commonly referred to, is the official compilation of emission factors and contains more than 1,700 emission factors for over 200 air pollutants. AP-42, *supra*. The AP-42 emission factors are used by major stationary sources to determine emissions from various pollution producing process units, including flares, tanks, and wastewater treatment systems.

26. The EPA Locating and Estimating Air Toxics Emissions (“L&E”) report series compiles available information on source categories of toxic air emissions and identifies potential release points and emission factors. Office of Air Quality Planning & Standards, Office of Air and Radiation, EPA, Locating and Estimating Air Toxics Emissions from Sources of (source category or substance) (2010), *available at* [www.epa.gov/ttnchie1/le/](http://www.epa.gov/ttnchie1/le/). The emission factors in the L&E report series cover toxic pollutants that are also VOCs, such as benzene and toluene. Whereas AP-42 emission factors sometimes do not differentiate between different types of VOCs, the emission factors in the L&E report series can be used to estimate emissions of specific toxics that are also VOCs and create an inventory of toxic air emissions.

27. Industry uses emission factors to report air pollution to EPA and state regulatory agencies. EPA and state agencies rely on this data to develop national, regional, state, and local emissions inventories. These emission inventories are the primary tool that EPA and state agencies use to develop emissions control strategies and make air quality management and

permitting decisions. *Basic Emissions Factors Information*, Env'tl. Prot. Agency, [www.epa.gov/ttn/chief/efpac/abefpac.html](http://www.epa.gov/ttn/chief/efpac/abefpac.html) (last updated July 17, 2012).

28. “Emissions factors have long been the fundamental tool in developing national, regional, state, and local emissions inventories for air quality management decisions and in developing emissions control strategies. More recently, emissions factors have been applied in determining site-specific applicability and emissions limitations in operating permits by federal, state, local, and tribal agencies, consultants, and industry.” *Id.* For example, emission factors are used to calculate pollutant loadings used in the development of federally mandated air quality plans designed to reduce smog and other pollutants. Emission factors may also be used to determine compliance; EPA relies on the emission inventories—based on self-reported industry emissions calculated using emission factors—to set an emission limit that industry then demonstrates compliance with using emission factors. In addition, regulated industries often use emission factors to determine if new or modified facilities will emit air pollution at levels that require a CAA permit and best available pollution control technologies. Because poor quality emission factors can significantly underestimate pollution emissions, the use of inaccurate emission factors can result in the public being exposed to more air pollution than the law allows.

29. Petroleum refineries and petrochemical plants utilize flares, tanks, and wastewater treatment systems—all of which emit significant quantities of harmful VOCs—in their operations. Low income and minority communities suffer disproportionate health and environmental impacts due to their proximity to these industrial sources, raising environmental justice concerns.

30. Flares are used to control VOC releases from industrial operations, including petroleum refineries and petrochemical plants by combusting excess gases—mostly

hydrocarbons—to convert them into inert compounds. VOCs and other toxic pollutants are released from flares as a result of incomplete combustion.

31. Liquid storage tanks are used in many industries that consume or produce organic liquid, including petroleum refining and petrochemical manufacturing. Tanks emit significant quantities of VOCs, some of which are toxic, such as benzene, toluene, and xylene.

32. Many industrial facilities, including petroleum refineries and petrochemical plants, generate wastewater streams containing organic compounds. Emissions from wastewater treatment systems are mostly fugitive VOCs and dissolved gases that evaporate from wastewater surfaces left open to the air during some of the treatment processes.

33. VOC emissions endanger human health and the environment. VOCs are substances that readily vaporize into the air, and include gaseous hydrocarbons and partially oxidized hydrocarbons. VOCs and nitrogen oxides combine in a light-induced chemical reaction to produce photochemical smog, an air pollution event that is characterized by high levels of ground-level ozone. Ozone is a criteria pollutant known to endanger public health and the environment.

At elevated levels, ozone has been shown in human laboratory and/or community studies to be responsible for the reduction of lung function, respiratory symptoms (e.g. cough, chest pain, throat and nose irritation), increased hospital admissions for respiratory causes, and increased lung inflammation. Animal studies have shown increased susceptibility to respiratory infection and lung structure changes. Ambient ozone has been linked to adverse effects on agricultural crops and forests.

National Emission Standards for Hazardous Air Pollutants for Source Categories; National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries—Catalytic Cracking (Fluid and Other) Units, Catalytic Reforming Units, and Sulfur Plant Units, 63 Fed.

Reg. 48,890, 48,893 (proposed Sept. 11, 1998). Some VOCs are also toxic pollutants, such as 1,3-butadiene, toluene, and benzene—a known carcinogen.

34. The existing emission factors used to estimate VOC emissions from flares, tanks, and wastewater treatment systems either significantly underestimate emissions or are rated poor quality by EPA, potentially exposing communities to high levels of VOCs that are prohibited by law and can have significant adverse health effects and pose grave risks to nearby communities.

35. The EPA has acknowledged, and scientific studies show, that the AP-42 emission factors for flares, tanks, and wastewater treatment systems significantly underestimate VOC emissions from these processes. *See, e.g.*, Office of Inspector Gen., EPA, 2006-P-00017, EPA Can Improve Emissions Factors Development and Management 11-12 (2006) (explaining that for refineries “[t]he under-reporting was caused largely due to the use of poor quality emissions factors”); Memorandum from Brenda Shine, EPA, to EPA (July 27, 2007) at 1, Docket ID No. EPA-HQ-OAR-2003-0146-0010 (“This document provides the basis for our hypothesis that there is a systematic low bias in reported emissions of VOC and air toxics from petroleum refineries.”).

36. Scientific studies conducted using remote sensing technology, including Differential Absorption Lidar (DIAL) and Passive Fourier Transform Infrared (PFTIR), show that VOC emissions from flares, tanks and wastewater treatment systems can be several orders of magnitude higher than AP-42 emission factor estimates. *See, e.g.*, David T. Allen and Vincent M. Torres, Univ. of Tex. at Austin, Ctr. Energy & Envtl. Res., *TCEQ 2010 Flare Study Final Report* (2011), available at [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf); David Randall & Jeff Coburn, EPA, EPA 453/R-10-002, Critical Review

of DIAL Emission Test Data for BP Petroleum Refinery in Texas City, Texas, at ES-2 tbl. 1 (2010), *available at* [www.epa.gov/airtoxics/bp\\_dial\\_review\\_report\\_12-3-10.pdf](http://www.epa.gov/airtoxics/bp_dial_review_report_12-3-10.pdf) (finding that VOC emissions from several units exceeded emission estimates based on AP-42 emission factors); Loren Raun & Dan W. Hoyt, Bur. Pollution Control & Prevention, City of Houston, Measurement and Analysis of Benzene and VOC Emissions in the Houston Ship Channel Area and Select Major Stationary Sources Using DIAL (Differential Absorption Light Detection and Ranging) Technology to Support Ambient HAP Concentrations Reductions in the Community (DIAL Project) (2011), *available at* [www.greenhoustontx.gov/dial20110720.pdf](http://www.greenhoustontx.gov/dial20110720.pdf) (finding that VOC and benzene emissions from tanks and wastewater treatment systems far exceeded emission estimates based on unidentified emission factors that are presumed to be from AP-42); Marathon Petroleum Co., LL.C., *Performance Test of a Steam-Assisted Flare with Passive FTIR* (May 2010), *available at* [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-txc.pdf); Marathon Petroleum Co., LL.C., *Performance Test of a Steam-Assisted Elevated Flare with Passive FTIR –Detroit* (2010), *available at* [www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf](http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/mpc-detroit.pdf); Flint Hills resources Port Arthur, LL.C., *PFTIR Test of Steam-Assisted Elevated Flares–Port Arthur* (2011), *available at* [www.epa.gov/compliance/resources/publications/civil/programs/caa/portarthur-report.pdf](http://www.epa.gov/compliance/resources/publications/civil/programs/caa/portarthur-report.pdf); Allan Chambers & Mel Stroscher, Alberta Research Council, Inc., *Refinery Demonstration of Optical Technologies for Measurement of Fugitive Emissions and for Leak Detection* (2006), *available at* [www.environmentalintegrity.org/pdf/publications/EIP\\_Att\\_D\\_Total\\_Upset.pdf](http://www.environmentalintegrity.org/pdf/publications/EIP_Att_D_Total_Upset.pdf).

37. The L&E emission factors used to estimate air emissions of certain toxics, including those that are also VOCs, from tanks and waste water treatment systems have been rated poor or below average quality by EPA. EPA assigns each emission factor a rating of A through E, with E being the poorest quality, based on certain data quality criteria. The emission factors in the L&E report series for estimating emissions of 1,3 butadiene, benzene, chlorobenzenes, toluene, methyl ethyl ketone, and xylene emissions from storage tanks and wastewater treatment systems are either unrated or are rated D—below average, or E—poor.

38. In 2008, the City of Houston filed a Data Quality Act petition asking EPA to correct the emission factors in AP-42 and the L&E report series that are used to estimate emissions from petroleum refineries and petrochemical manufacturing plants.

39. In response to the petition, EPA committed to developing a comprehensive protocol for the estimation of petroleum refinery emissions, providing a draft analysis of the DIAL study conducted at the BP Amoco facility in Texas City, evaluating data from any future remote sensing studies, and undertaking a review, and improvement, of existing emission factors and methodologies for specific emission sources, including tanks and flares. While EPA has completed several of these tasks, the Agency has not completed a Section 130 review of the VOC emission factors for flares, tanks, and wastewater treatment systems, and either made a formal determination that revision is not warranted or revised the emission factors.

40. The existing emission factors used to estimate VOC emissions from flares are included in section 13.5 of AP-42. The Administrator has not completed a review, and either made a formal determination that revision is not appropriate or revised these emission factors since September 1991. The existing emission factors for flares in AP-42 significantly underestimate actual VOC emissions from flares.

41. The existing emission factors in AP-42 used to estimate VOC emissions from flares are based primarily on a thirty-year old flare efficiency study conducted by EPA in 1983. Despite the availability of more recent test data demonstrating that emission factors underestimate VOC emissions from flares by overestimating flare efficiency by as much as 28%, EPA has not completed the requisite review. In addition to EPA's own report on operating parameters that affect flare combustion efficiency and performance, eleven studies on flare efficiency have been conducted since 2006 that EPA can use to update the emission factors for flares in AP-42. EPA's own report, published in 2012, found that certain operating parameters can reduce flare efficiency, and established certain parameters that flares must operate within to achieve and maintain combustion efficiency above 98%. At some facilities, EPA is already requiring installation of remote sensing technologies that directly measure combustion efficiency, and continuous monitoring of operating parameters that affect combustion efficiency. *See* Consent Decree, *United States v. BP Products N. A., Inc.*, Civil No. 2:12 CV 207, at app. D (N.D. Ind. Sept. 28, 2012), *available at* [www.epa.gov/compliance/resources/decrees/civil/caa/whiting-cd.pdf](http://www.epa.gov/compliance/resources/decrees/civil/caa/whiting-cd.pdf); Consent Decree, *United States v. Marathon Petroleum Co.*, Civ. Action No. 2:12-cv-11544, at 41-51 (E.D. Mich. April 5, 2012), *available at* [www.epa.gov/compliance/resources/decrees/civil/caa/marathonrefining-cd.pdf](http://www.epa.gov/compliance/resources/decrees/civil/caa/marathonrefining-cd.pdf). EPA's delay in completing the requisite review of the emission factors for flares is inexcusable in light of the available information documenting the extent to which existing emission factors undercount toxic VOC emissions from flares that nearby communities are continually exposed to.

42. The emission factors used to estimate VOC emissions from tanks are included in section 7.1 of AP-42 and the L&E report series. The Administrator has not completed a review,

and either made a formal determination that revision is not appropriate or revised the emission factors for tanks in AP-42 since at least 2006, and for the emission factors in the L&E report series in over fourteen years. EPA last completed a review of the existing L&E emission factors used to estimate benzene emissions from tanks in 1998; last reviewed the existing L&E emission factors used to estimate emissions of chlorobenzenes, methyl ethyl ketone, toluene, and xylene from tanks in 1994; last reviewed the existing L&E emission factors used to estimate emissions of trichloroethylene in 1989; last reviewed the existing L&E emission factors used to estimate emissions of ethylene oxide in 1986; and last reviewed the existing L&E emission factors used to estimate emissions of acrylonitrile and chloroform in 1984. The existing emission factors for tanks in AP-42 significantly underestimate actual VOC emissions, and the existing emission factors in the L&E report series for estimating acrylonitrile, benzene, chlorobenzenes, chloroform, ethylene oxide, methyl ethyl ketone, toluene, trichloroethylene, and xylene emissions from tanks are either unrated or are rated D—below average, or E—poor.

43. At least three scientific studies conducted since 2006 shows that existing emission factors significantly underestimate toxic VOC emissions from tanks. EPA's failure to complete the requisite review of emission factors for tanks is inexcusable in light of the information available to EPA, the significant amounts of toxic VOC emissions from tanks that are unaccounted for by emission factors, and the danger these emissions pose to nearby communities.

44. The existing emission factors used to estimate VOC emissions from wastewater treatment systems are included in section 4.3 of AP-42 and the L&E report series. The Administrator has not completed a review, and either made a formal determination that revision is not appropriate or revised the emission factors for wastewater treatment systems in AP-42

since at least 2006, and for the emission factors in the L&E report series in over fourteen years. EPA last completed a review of the existing L&E emission factors used to estimate benzene emissions from wastewater treatment systems in 1998; last reviewed the existing L&E emission factors used to estimate 1,3 butadiene emissions from wastewater treatment systems in 1996; last reviewed the existing L&E emission factors used to estimate emissions of chlorobenzenes and xylene emissions from wastewater treatment systems in 1994; and last reviewed the existing L&E emission factors used to estimate emissions of chloroform, epichlorohydrin and ethylene dichloride from wastewater treatment systems in 1984. The existing emission factors for wastewater treatment systems in AP-42 significantly underestimate actual VOC emissions, and the existing emission factors in the L&E report series for estimating benzene, 1,3 butadiene, chlorobenzenes, chloroform, epichlorohydrin, ethylene dichloride, and xylene emissions from wastewater treatment systems are either unrated or are rated D—below average, or E—poor.

45. Notwithstanding the poor quality of these emission factors and EPA's own acknowledgments and scientific data that makes clear that these emission factors can significantly undercount the emissions nearby communities are exposed to, the Administrator has failed to complete a review and make necessary revisions of these emission factors within the statutory timeframe in accordance with section 130 of the CAA. In light of EPA's continued failure to act, Plaintiffs issued a notice of intent to sue EPA for failure to comply with its statutory duties under section 130 of the CAA on July 18, 2012. *See* Ex. A.

#### **CAUSES OF ACTION**

46. Plaintiffs re-allege and incorporate the allegations of all foregoing paragraphs.

47. The Administrator has failed to review and, if necessary, revise the existing emission factors for flares in AP-42 since 1991. The Administrator's ongoing failure to

complete a Section 130 review, and either make a final determination that revision is not appropriate or revise the VOC emission factors for flares in AP-42 within the statutory timeframe constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2).

48. The Administrator has failed to review and, if necessary, revise the existing emission factors for tanks in AP-42 and L&E since at least 2006. The Administrator’s ongoing failure to complete a Section 130 review, and either make a final determination that revision is not appropriate or revise the VOC and other emission factors for tanks in AP-42 and L&E within the statutory timeframe constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2).

49. The Administrator has failed to review and, if necessary, revise the existing emission factors for wastewater treatment systems in AP-42 and L&E since at least 2006. The Administrator’s ongoing failure to complete a Section 130 review, and either make a final determination that revision is not appropriate or revise the VOC and other emission factors for tanks in AP-42 and L&E within the statutory timeframe constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2).

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiffs respectfully request that this Court:

A. Declare that the Administrator’s failure to complete a review of the VOC emission factors for flares in AP-42, and either make a final determination that revision is not

appropriate or revise the emission factors within the statutory timeframe, constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2);

B. Declare that the Administrator’s failure to complete a review of the VOC emission factors for tanks in AP-42 and L&E, and either make a final determination that revision is not appropriate or revise the emission factors within the statutory timeframe, constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2);

C. Declare that the Administrator’s failure to complete a review of the VOC emission factors for wastewater treatment systems in AP-42 and L&E, and either make a final determination that revision is not appropriate or revise the emission factors within the statutory timeframe, constitutes a “failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator” within the meaning of section 304(a)(2) of the CAA, 42 U.S.C. § 7604(a)(2);

D. Order the Administrator to complete the required Section 130 reviews and to either revise the VOC emissions factors for flares, tanks, and wastewater treatment systems in AP-42 and L&E, or make a final determination that such revision is not appropriate, pursuant to section 130 of the CAA, 42 U.S.C. § 7430, in accordance with expeditious deadlines specified by this Court;

E. Retain jurisdiction of this action to ensure compliance with this Court’s decree;

F. Award Plaintiffs the costs of this action, including attorney’s fees; and

G. Grant such other relief as the Court deems just and proper.

DATED: May 1, 2013

Respectfully submitted,

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/s/ Whitney Ferrell  
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*\*Motion to appear pro hac vice pending*

*Counsel for Air Alliance Houston,  
Community In-Power and Development  
Association, Louisiana Bucket Brigade,  
and Texas Environmental Justice Advocacy  
Services*

**CIVIL COVER SHEET**

JS-44 (Rev. 3/13 DC)

<p><b>I. (a) PLAINTIFFS</b></p> <p>Air Alliance Houston                  Community In-Power and Development Association, Inc.                  Louisiana Bucket Brigade                  Texas Environmental Justice Advocacy Services</p> <p>(b) COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF <u>88888</u>                  (EXCEPT IN U.S. PLAINTIFF CASES)</p>	<p><b>DEFENDANTS</b></p> <p>Bob Perciasepe, in his official capacity as Acting                  Administrator, United States Environmental Protection Agency</p> <p>COUNTY OF RESIDENCE OF FIRST LISTED DEFENDANT <u>11001</u>                  (IN U.S. PLAINTIFF CASES ONLY)</p> <p><small>NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED</small></p>																								
<p>(c) ATTORNEYS (FIRM NAME, ADDRESS, AND TELEPHONE NUMBER)</p> <p>Environmental Integrity Project                  One Thomas Circle, Suite 900                  Washington, D.C. 20005                  (202) 263-4456</p>	<p>ATTORNEYS (IF KNOWN)</p> <p>Jennifer Peterson, D.C. Bar No. 978352                  Whitney Ferrell, D.C. Bar No. 1013459 (pending motion to                  appear pro hac vice)</p>																								
<p><b>II. BASIS OF JURISDICTION</b>                  (PLACE AN X IN ONE BOX ONLY)</p> <p><input type="radio"/> 1 U.S. Government Plaintiff</p> <p><input checked="" type="radio"/> 2 U.S. Government Defendant</p> <p><input type="radio"/> 3 Federal Question (U.S. Government Not a Party)</p> <p><input type="radio"/> 4 Diversity (Indicate Citizenship of Parties in item III)</p>	<p><b>III. CITIZENSHIP OF PRINCIPAL PARTIES</b> (PLACE AN X IN ONE BOX FOR PLAINTIFF AND ONE BOX FOR DEFENDANT) <b>FOR DIVERSITY CASES ONLY!</b></p> <table style="width:100%; border: none;"> <thead> <tr> <th></th> <th style="text-align: center;">PTF</th> <th style="text-align: center;">DFT</th> <th></th> <th style="text-align: center;">PTF</th> <th style="text-align: center;">DFT</th> </tr> </thead> <tbody> <tr> <td>Citizen of this State</td> <td style="text-align: center;"><input type="radio"/> 1</td> <td style="text-align: center;"><input type="radio"/> 1</td> <td>Incorporated or Principal Place of Business in This State</td> <td style="text-align: center;"><input type="radio"/> 4</td> <td style="text-align: center;"><input type="radio"/> 4</td> </tr> <tr> <td>Citizen of Another State</td> <td style="text-align: center;"><input type="radio"/> 2</td> <td style="text-align: center;"><input type="radio"/> 2</td> <td>Incorporated and Principal Place of Business in Another State</td> <td style="text-align: center;"><input type="radio"/> 5</td> <td style="text-align: center;"><input type="radio"/> 5</td> </tr> <tr> <td>Citizen or Subject of a Foreign Country</td> <td style="text-align: center;"><input type="radio"/> 3</td> <td style="text-align: center;"><input type="radio"/> 3</td> <td>Foreign Nation</td> <td style="text-align: center;"><input type="radio"/> 6</td> <td style="text-align: center;"><input type="radio"/> 6</td> </tr> </tbody> </table>		PTF	DFT		PTF	DFT	Citizen of this State	<input type="radio"/> 1	<input type="radio"/> 1	Incorporated or Principal Place of Business in This State	<input type="radio"/> 4	<input type="radio"/> 4	Citizen of Another State	<input type="radio"/> 2	<input type="radio"/> 2	Incorporated and Principal Place of Business in Another State	<input type="radio"/> 5	<input type="radio"/> 5	Citizen or Subject of a Foreign Country	<input type="radio"/> 3	<input type="radio"/> 3	Foreign Nation	<input type="radio"/> 6	<input type="radio"/> 6
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**IV. CASE ASSIGNMENT AND NATURE OF SUIT**

(Place an X in one category, A-N, that best represents your Cause of Action and one in a corresponding Nature of Suit)

<p><input type="radio"/> <b>A. Antitrust</b></p> <p><input type="checkbox"/> 410 Antitrust</p>	<p><input type="radio"/> <b>B. Personal Injury/Malpractice</b></p> <p><input type="checkbox"/> 310 Airplane</p> <p><input type="checkbox"/> 315 Airplane Product Liability</p> <p><input type="checkbox"/> 320 Assault, Libel &amp; Slander</p> <p><input type="checkbox"/> 330 Federal Employers Liability</p> <p><input type="checkbox"/> 340 Marine</p> <p><input type="checkbox"/> 345 Marine Product Liability</p> <p><input type="checkbox"/> 350 Motor Vehicle</p> <p><input type="checkbox"/> 355 Motor Vehicle Product Liability</p> <p><input type="checkbox"/> 360 Other Personal Injury</p> <p><input type="checkbox"/> 362 Medical Malpractice</p> <p><input type="checkbox"/> 365 Product Liability</p> <p><input type="checkbox"/> 367 Health Care/Pharmaceutical Personal Injury Product Liability</p> <p><input type="checkbox"/> 368 Asbestos Product Liability</p>	<p><input checked="" type="radio"/> <b>C. Administrative Agency Review</b></p> <p><input type="checkbox"/> 151 Medicare Act</p> <p><b>Social Security</b></p> <p><input type="checkbox"/> 861 HIA (1395ff)</p> <p><input type="checkbox"/> 862 Black Lung (923)</p> <p><input type="checkbox"/> 863 DIWC/DIWW (405(g))</p> <p><input type="checkbox"/> 864 SSID Title XVI</p> <p><input type="checkbox"/> 865 RSI (405(g))</p> <p><b>Other Statutes</b></p> <p><input type="checkbox"/> 891 Agricultural Acts</p> <p><input checked="" type="checkbox"/> 893 Environmental Matters</p> <p><input type="checkbox"/> 890 Other Statutory Actions (If Administrative Agency is Involved)</p>	<p><input type="radio"/> <b>D. Temporary Restraining Order/Preliminary Injunction</b></p> <p>Any nature of suit from any category may be selected for this category of case assignment.</p> <p>*(If Antitrust, then A governs)*</p>
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**E. General Civil (Other)** OR  **F. Pro Se General Civil**

<p><b>Real Property</b></p> <p><input type="checkbox"/> 210 Land Condemnation</p> <p><input type="checkbox"/> 220 Foreclosure</p> <p><input type="checkbox"/> 230 Rent, Lease &amp; Ejectment</p> <p><input type="checkbox"/> 240 Torts to Land</p> <p><input type="checkbox"/> 245 Tort Product Liability</p> <p><input type="checkbox"/> 290 All Other Real Property</p> <p><b>Personal Property</b></p> <p><input type="checkbox"/> 370 Other Fraud</p> <p><input type="checkbox"/> 371 Truth in Lending</p> <p><input type="checkbox"/> 380 Other Personal Property Damage</p> <p><input type="checkbox"/> 385 Property Damage Product Liability</p>	<p><b>Bankruptcy</b></p> <p><input type="checkbox"/> 422 Appeal 27 USC 158</p> <p><input type="checkbox"/> 423 Withdrawal 28 USC 157</p> <p><b>Prisoner Petitions</b></p> <p><input type="checkbox"/> 535 Death Penalty</p> <p><input type="checkbox"/> 540 Mandamus &amp; Other</p> <p><input type="checkbox"/> 550 Civil Rights</p> <p><input type="checkbox"/> 555 Prison Conditions</p> <p><input type="checkbox"/> 560 Civil Detainee – Conditions of Confinement</p> <p><b>Property Rights</b></p> <p><input type="checkbox"/> 820 Copyrights</p> <p><input type="checkbox"/> 830 Patent</p> <p><input type="checkbox"/> 840 Trademark</p> <p><b>Federal Tax Suits</b></p> <p><input type="checkbox"/> 870 Taxes (US plaintiff or defendant)</p> <p><input type="checkbox"/> 871 IRS-Third Party 26 USC 7609</p>	<p><b>Forfeiture/Penalty</b></p> <p><input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC 881</p> <p><input type="checkbox"/> 690 Other</p> <p><b>Other Statutes</b></p> <p><input type="checkbox"/> 375 False Claims Act</p> <p><input type="checkbox"/> 400 State Reapportionment</p> <p><input type="checkbox"/> 430 Banks &amp; Banking</p> <p><input type="checkbox"/> 450 Commerce/ICC Rates/etc.</p> <p><input type="checkbox"/> 460 Deportation</p> <p><input type="checkbox"/> 462 Naturalization Application</p> <p><input type="checkbox"/> 465 Other Immigration Actions</p> <p><input type="checkbox"/> 470 Racketeer Influenced &amp; Corrupt Organization</p>	<p><input type="checkbox"/> 480 Consumer Credit</p> <p><input type="checkbox"/> 490 Cable/Satellite TV</p> <p><input type="checkbox"/> 850 Securities/Commodities/Exchange</p> <p><input type="checkbox"/> 896 Arbitration</p> <p><input type="checkbox"/> 899 Administrative Procedure Act/Review or Appeal of Agency Decision</p> <p><input type="checkbox"/> 950 Constitutionality of State Statutes</p> <p><input type="checkbox"/> 890 Other Statutory Actions (if not administrative agency review or Privacy Act)</p>
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<input type="radio"/> <b>G. Habeas Corpus/ 2255</b>  <input type="checkbox"/> 530 Habeas Corpus – General <input type="checkbox"/> 510 Motion/Vacate Sentence <input type="checkbox"/> 463 Habeas Corpus – Alien Detainee	<input type="radio"/> <b>H. Employment Discrimination</b>  <input type="checkbox"/> 442 Civil Rights – Employment (criteria: race, gender/sex, national origin, discrimination, disability, age, religion, retaliation)  *(If pro se, select this deck)*	<input type="radio"/> <b>I. FOIA/Privacy Act</b>  <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 890 Other Statutory Actions (if Privacy Act)  *(If pro se, select this deck)*	<input type="radio"/> <b>J. Student Loan</b>  <input type="checkbox"/> 152 Recovery of Defaulted Student Loan (excluding veterans)
<input type="radio"/> <b>K. Labor/ERISA (non-employment)</b>  <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Mgmt. Relations <input type="checkbox"/> 740 Labor Railway Act <input type="checkbox"/> 751 Family and Medical Leave Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Empl. Ret. Inc. Security Act	<input type="radio"/> <b>L. Other Civil Rights (non-employment)</b>  <input type="checkbox"/> 441 Voting (if not Voting Rights Act) <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 440 Other Civil Rights <input type="checkbox"/> 445 Americans w/Disabilities – Employment <input type="checkbox"/> 446 Americans w/Disabilities – Other <input type="checkbox"/> 448 Education	<input type="radio"/> <b>M. Contract</b>  <input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 153 Recovery of Overpayment of Veteran's Benefits <input type="checkbox"/> 160 Stockholder's Suits <input type="checkbox"/> 190 Other Contracts <input type="checkbox"/> 195 Contract Product Liability <input type="checkbox"/> 196 Franchise	<input type="radio"/> <b>N. Three-Judge Court</b>  <input type="checkbox"/> 441 Civil Rights – Voting (if Voting Rights Act)

**V. ORIGIN**  
 1 Original Proceeding  
  2 Remand from State Court  
  3 Remanded from Appellate Court  
  4 Reinstated or Reopened  
  5 Transferred from another district (specify)  
  6 Multi-district Litigation  
  7 Appeal to District Judge from Mag. Judge

**VI. CAUSE OF ACTION (CITE THE U.S. CIVIL STATUTE UNDER WHICH YOU ARE FILING AND WRITE A BRIEF STATEMENT OF CAUSE.)**  
 Action brought under 42 U.S.C. 7604(a)(2) against defendant for failure to review VOC emission factors for flares, tanks,

<b>VII. REQUESTED IN COMPLAINT</b>	CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23 <input type="checkbox"/>	DEMAND \$ _____	JURY DEMAND: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
<b>VIII. RELATED CASE(S) IF ANY</b>	(See instruction)	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	If yes, please complete related case form

DATE: May 1, 2013      SIGNATURE OF ATTORNEY OF RECORD:

**INSTRUCTIONS FOR COMPLETING CIVIL COVER SHEET JS-44**  
 Authority for Civil Cover Sheet

The JS-44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and services of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. Listed below are tips for completing the civil cover sheet. These tips coincide with the Roman Numerals on the cover sheet.

- I. COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF/DEFENDANT (b) County of residence: Use 11001 to indicate plaintiff if resident of Washington, DC, 88888 if plaintiff is resident of United States but not Washington, DC, and 99999 if plaintiff is outside the United States.
- III. CITIZENSHIP OF PRINCIPAL PARTIES: This section is completed only if diversity of citizenship was selected as the Basis of Jurisdiction under Section II.
- IV. CASE ASSIGNMENT AND NATURE OF SUIT: The assignment of a judge to your case will depend on the category you select that best represents the primary cause of action found in your complaint. You may select only one category. You must also select one corresponding nature of suit found under the category of the case.
- VI. CAUSE OF ACTION: Cite the U.S. Civil Statute under which you are filing and write a brief statement of the primary cause.
- VIII. RELATED CASE(S), IF ANY: If you indicated that there is a related case, you must complete a related case form, which may be obtained from the Clerk's Office.

Because of the need for accurate and complete information, you should ensure the accuracy of the information provided prior to signing the form.

AO 440 (Rev. 12/09; DC 03.10) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

District of Columbia

Air Alliance Houston, et. al.

Plaintiff

v.

Bob Perciasepe, in his official capacity as Acting Administrator, U.S. Environmental Protection Agency

Defendant

Civil Action No.

SUMMONS IN A CIVIL ACTION

To: (Defendant's name and address) Bob Perciasepe, in his official capacity as Acting Administrator, United States Environmental Protection Agency, 1101A EPA Headquarters, Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, D.C. 20460

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are:

Jennifer Peterson Environmental Integrity Project One Thomas Circle, Suite 900 Washington, DC 20005

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

ANGELA D. CAESAR, CLERK OF COURT

Date:

Signature of Clerk or Deputy Clerk

**Exhibit A**



1 Thomas Circle, Suite 900  
Washington, DC 20005  
main: 202-296-8800  
fax: 202-296-8822  
[www.environmentalintegrity.org](http://www.environmentalintegrity.org)

July 18, 2012

*Via Certified Mail*

Ms. Lisa P. Jackson  
Administrator  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, NW  
Washington, DC 20406  
[jackson.lisa@epa.gov](mailto:jackson.lisa@epa.gov)

***Re: Notice of Intent to Sue for Violations of Nondiscretionary Duties to Review and Revise Emission Factors under Section 130 of the Clean Air Act Every Three Years***

Dear Administrator Jackson,

We are writing on behalf of Air Alliance Houston, Texas Environmental Advocacy Services (“TEJAS”), Community In-power and Development Association, Inc. (“CIDA”), and Louisiana Bucket Brigade (“Plaintiffs”) to provide you with notice of our intent to file suit against Administrator Jackson, in her official capacity as Administrator of the U.S. Environmental Protection Agency (EPA), for failure to perform nondiscretionary duties under section 130 of the Clean Air Act (CAA), 42 U.S.C. § 7430, which requires the Administrator to review and, if necessary, revise emission factors for industrial flares (AP-42, section 13.5), liquid storage tanks (AP-42, section 7.1; L&E documents), and wastewater collection, treatment, and storage systems (AP-42, section 4.3; L&E documents) at least once every three years.

Under section 130 of the CAA, 42 U.S.C. § 7430, the Administrator has a mandatory duty to review and, if necessary, revise, the emission factors used to estimate emissions of carbon monoxide (CO), volatile organic compounds (VOCs), and oxides of nitrogen (NO<sub>x</sub>) from emission sources at least once every three years. The Administrator has failed to perform the nondiscretionary duty to review and, if necessary, revise, at least once every three years, emission factors used to estimate emissions of CO, VOCs, and NO<sub>x</sub> from flares, tanks, and wastewater treatment systems. EPA has not reviewed emission factors for flares since 1991, emission factors for wastewater treatment systems have not been reviewed since 1998, and emission equations for tanks have not been reviewed since 2006.<sup>1</sup>

Accurate accounting of air pollutant emissions is the linchpin of the CAA. Air emissions data is used to: design regulations, develop emission reduction control strategies, determine emission limits and applicable permit requirements for major sources, guide enforcement

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<sup>1</sup> See EPA, Compilation of Air Pollutant Emission Factors: Stationary Point and Area Sources (1995), *available at* [www.epa.gov/ttn/chief/ap42/index.html](http://www.epa.gov/ttn/chief/ap42/index.html) [hereinafter AP-42].

decisions, achieve air quality goals, and protect communities from toxic exposure.<sup>2</sup> Outdated emission factors can grossly underestimate emissions of air pollutants from petroleum refineries, chemical plants, and other industrial sources.<sup>3</sup> Emissions from petroleum refineries pose grave risks to nearby communities, many of which are low income and minority communities, because refinery emissions contain hazardous air pollutants such as benzene, which is a known carcinogen.<sup>4</sup> While the City of Houston filed a Data Quality Act petition in 2008 asking EPA to correct data quality errors in emission factors for petroleum refineries and chemical manufacturing plants, the EPA has yet to do so.<sup>5</sup> The lack of data means that cost-effective opportunities to reduce pollution are hidden in plain sight, which may force reliance on more expensive alternatives. The duty to timely review and revise section 130 emission factors is critical to EPA's ability to implement the CAA in a manner that is protective of public health.

Section 304 of the CAA, 42 U.S.C. § 7604(a)(2), authorizes citizen actions “against the Administrator where there is an alleged failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator.” Citizens must provide notice to the Administrator at least sixty days before filing a civil suit under section 130. 42 U.S.C. § 7604(b)(1)(A); 40 C.F.R. § 54.2. In accordance with Section 304 of the CAA, this letter serves to notify you that Plaintiffs intend to file suit in federal district court any time beginning sixty days from the postmarked date of this letter. 42 U.S.C. § 7604; 40 C.F.R. § 54.2(d).

## **I. Background: Section 130 Emission Factors**

Emission factors are used to estimate pollutant emissions when source-specific test data is not available.<sup>6</sup> Emission factors and emission inventories are fundamental tools of air quality management used by EPA to plan and implement air pollution control programs under the CAA.<sup>7</sup> Emission factors are used to calculate around eighty percent of national emissions from virtually all sources of air pollution.<sup>8</sup> Thus, reliable emission factors that accurately estimate

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<sup>2</sup> Office of Inspector General, EPA, 2006-P-00017, EPA Can Improve Emissions Factors Development and Management 1 (2006), *available at* [www.epa.gov/oig/reports/2006/20060322-2006-P-00017.pdf](http://www.epa.gov/oig/reports/2006/20060322-2006-P-00017.pdf) [hereinafter EPA, 2006 Inspector General Report] (“Quantifying air emissions is a vital aspect of air pollution programs. Regulatory authorities and others use emissions values in: (1) developing emissions inventories, (2) identifying and evaluating control strategies, (3) determining applicability of permit and regulatory requirements, and (4) assessing risks.”).

<sup>3</sup> *Id.* at 8 (“EPA officials have identified the inappropriate use of emissions factors for key environmental decisions, such as permit limits and the level of air pollution control equipment installed at specific facilities, resulting in the release of significant amounts of unidentified and uncontrolled emissions.”).

<sup>4</sup> *See* EPA, Toxics Release Inventory Explorer, *available at* [www.epa.gov/triexplorer](http://www.epa.gov/triexplorer) (last visited July 17, 2012).

<sup>5</sup> Letter from Bill White, Mayor, City of Houston, Tex., to Information Quality Guidelines Staff, EPA, Request for Correction of Information under the Data Quality Act and EPA's Information Quality Guidelines (July 9, 2008), *available at* [www.greenhoustontx.gov/reports/epaletter20080709.pdf](http://www.greenhoustontx.gov/reports/epaletter20080709.pdf).

<sup>6</sup> *See* AP-42, *supra* note 1, at 1.

<sup>7</sup> EPA, 2006 Inspector General Report, *supra* note 2, at 4 (“Emission factors are used to develop the emissions data that are the cornerstone of a host of important environmental decisions made by EPA . . . includ[ing] . . . facility permitting, development of control strategies, and compliance and enforcement decisions.”).

<sup>8</sup> *Id.* (citing U.S. Gov't Accountability Office (GAO), GAO-01-46, EPA Should Improve Oversight of Emissions Reporting by Large Facilities 3 (2001), *available at* [www.gao.gov/new.items/d0146.pdf](http://www.gao.gov/new.items/d0146.pdf) (“In preparing emissions reports, . . . large facilities rely primarily on estimates and extrapolation instead of directly measuring their pollutant emissions. To estimate their annual emissions of each pollutant, most facilities use industry- and pollutant specific

emissions are imperative to EPA's ability to make air quality management decisions that are protective of public health.

AP-42 is the EPA's official compilation of air pollutant emission factors and contains more than 1,700 rated emission factors for over 200 air pollutants.<sup>9</sup> AP-42 emission factors represent long-term average emissions and testing is generally done under normal operating conditions that do not account for conditions that may cause short-term fluctuations in emissions.<sup>10</sup> In addition, the EPA Locating and Estimating (L&E) documents compile available information on source categories of toxic air emissions and identify potential release points and emission factors.<sup>11</sup>

Although the CAA does not define "emission factor," the EPA has defined it as a "representative value" or "tool" used to estimate emissions of a specific pollutant from an air pollution source.<sup>12</sup> EPA regulations define "emission factor" as "the ratio relating emissions of a specific pollutant to an activity or material throughput level." 40 C.F.R. § 51.50; *see also* Air Emissions Reporting Requirements, 73 Fed. Reg. 76,539-01, 76,554 (Dec. 17, 2008). The AP-42 defines "emission factor" as "a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant."<sup>13</sup> EPA guidance documents broadly define "emission factor" as "a *tool* that is used to estimate air pollutant emissions to the *atmosphere*."<sup>14</sup> Thus, "emission factor" includes emission estimation tools or equations that are used to estimate emissions from liquid storage tanks and wastewater treatment systems.

## II. Section 130 Emission Factors for Flares, Tanks, and Wastewater Treatment Systems

The Administrator has not timely reviewed or revised emission factors used for estimating emissions from flares, tanks, and wastewater treatment systems. The EPA recognizes that the timely review and revision of emission factors is critical because there is a "moving target" aspect to emission factor development in that new information and processes can render existing emission factors obsolete or prove them to be unreliable.<sup>15</sup> The current AP-42 emission

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emissions factors . . . EPA's data show that, nationally, emissions factors are used for about 80 percent of emissions determinations.").

<sup>9</sup> AP-42, *supra* note 1, at 1.

<sup>10</sup> *See id.* at 4 ("emission factors essentially represent an average of a range of emission rates"); Letter from Elizabeth Craig, Acting Assistant Administrator, U.S. EPA, to Bill White, Mayor, Houston, Tex. 3 (Apr. 7, 2009) ("These factors are designed to be representative values relating the quantity of a pollutant released to the atmosphere *under normal operating conditions* with an activity associated with the release of that pollutant.") (emphasis added).

<sup>11</sup> EPA, Locating & Estimating (L&E) Documents, *available at* [www.epa.gov/ttnchie1/le/](http://www.epa.gov/ttnchie1/le/) (last visited July 17, 2012) [hereinafter L&E Documents].

<sup>12</sup> *Id.* at 1; EPA, EPA-454/R-95-015, Procedures for Preparing Emission Factor Documents, 2-1 (1997) [hereinafter EPA, Procedures for Preparing Emission Factor Documents], *available at* [www.epa.gov/ttnchie1/efdocs/procedur.pdf](http://www.epa.gov/ttnchie1/efdocs/procedur.pdf) (emphasis added).

<sup>13</sup> AP-42, *supra* note 1, at 1.

<sup>14</sup> EPA, Procedures for Preparing Emission Factor Documents, *supra* note 12, at 2-1.

<sup>15</sup> Office of Inspector General, EPA, No. 6100306, Emission Factor Development 12-13 () (1996), *available at* [www.epa.gov/oig/reports/1996/emisrept.pdf](http://www.epa.gov/oig/reports/1996/emisrept.pdf) [hereinafter EPA, 1996 Inspector General Report]

factors used to estimate emissions from flares, tanks, and wastewater treatment systems can significantly undercount emissions of CO, VOCs, and NO<sub>x</sub> from refineries and petrochemical plants.<sup>16</sup> The EPA has acknowledged, and scientific studies conducted using remote sensing technology, including Differential Absorption Lidar (DIAL) and Passive Fourier Transform Infrared (PFTIR), have consistently shown that actual emissions from these sources can be several orders of magnitude higher than emission factor estimates.<sup>17</sup> *See* Attachment A.

Three separate DIAL studies at refineries in North America have shown that emission factors for flares, tanks, wastewater treatment systems, and several other processes significantly underestimate emissions. An EPA review of a 2008 DIAL test at the BP Texas City petroleum refinery found that actual emissions from several units exceeded emission factor estimates for emissions from tanks and flares.<sup>18</sup> For flares, EPA found that actual average emissions were six times higher than the average hourly emissions in the emissions inventory report.<sup>19</sup> For storage tanks, EPA found that actual emissions were, in some cases, at least three to seven times higher than emission factor estimates.<sup>20</sup> A 2006 DIAL test at a refinery in Alberta Canada found that actual emissions from storage tanks exceeded emission factor estimates for benzene and VOCs.<sup>21</sup> A 2011 DIAL test at Shell Deer Park measured emission concentrations of benzene and VOCs that far exceeded emission factor estimates.<sup>22</sup> The DIAL test results found: actual VOC emissions from tanks were underestimated by a factor of 132; actual benzene emissions from tanks were underestimated by a factor of 93; actual VOC emissions from wastewater treatment systems were underestimated by a factor of 108; and actual benzene emissions from wastewater treatment systems were underestimated by a factor of 67.<sup>23</sup>

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<sup>16</sup> Alan Chambers & Mel Stroscher, *Refinery Demonstration of Optical Technologies for Measurement of Fugitive Emissions and for Leak Detection* (2006) [hereinafter *Alberta DIAL Study*]; Rod Robinson, Tom Gardiner & Bob Lipscombe, National Physical Laboratory, *Measurements Of VOC Emissions From Petrochemical Industry Sites In The Houston Area Using Differential Absorption Lidar (DIAL) During Summer 2007: DRAFT FOR COMMENT, 27-28* (2008) [hereinafter *BP Texas City DIAL Study*]; David Randall & Jeff Coburn, EPA, EPA 453/R-10-002, *Critical Review of DIAL Emission Test Data for BP Petroleum Refinery in Texas City, Texas, ES-1* (2010) [hereinafter *EPA, Review of BP Texas City DIAL Emissions Test Data*]; Dan Hoyt et. al., City of Houston Bureau of Pollution Control and Prevention, *Measurement and Analysis of Benzene and VOC Emissions in the Houston Ship Channel Area and Select Major Stationary Sources Using DIAL (Differential Absorption Light Detection and Ranging) Technology to Support Ambient HAP Concentrations Reductions in the Community (DIAL Project) 92* (2011) [hereinafter *Shell Deer Park DIAL Study*].

<sup>17</sup> *See e.g.*, *Shell Deer Park DIAL Study*, at 92 (“Based on the current data and associated statistics, the true emissions may be underestimated by a factor of as much as 132 for VOCs”); National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries, 72 Fed. Reg. 50,716, 50,725-26 (Sept. 4, 2007) (stating that EPA review of the data indicates “inherent uncertainty in the development and use of emission factors”); Memorandum from Brenda Shine, EPA, to EPA Docket No. EPA-HQ-OAR-2003-0146, *Potential Low Bias of Reported VOC Emissions from the Petroleum Refining Industry*, (July 27, 2007) [hereinafter *EPA, Memorandum from Brenda Shine*], available at <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2003-0146-0010>; EPA, 2006 Inspector General Report, *supra* note 2, at 11-12.

<sup>18</sup> EPA, *Review of BP Texas City DIAL Emissions Test Data*, *supra* note 16, at ES-2 & tbl. 1.

<sup>19</sup> *Id.* at ES-5.

<sup>20</sup> *Id.* at ES-1, ES-4 (“On average, the DIAL results for external floating roof tanks storing crude oil were at least 3 to 7 times higher than estimates that used conditions at the time of the DIAL testing.”).

<sup>21</sup> *Alberta DIAL Study*, *supra* note 16, at 27.

<sup>22</sup> *Shell Deer Park DIAL Study*, *supra* note 16, at 1, 92.

<sup>23</sup> *Id.*

## A. Flares

The emission factors used to estimate emissions from flares in section 13.5 of AP-42 were last revised in September 1991.<sup>24</sup> According to the EPA website, the most recent flare efficiency study was conducted in July 1983.<sup>25</sup> The emission factor for VOCs from flares is 0.14 lb/MMBtu; the emission factor for CO from flares is 0.37 lb/MMBtu; and the emission factor for NO<sub>x</sub> from flares is 0.068 lb/MMBtu.<sup>26</sup> Pollutants of concern from flaring include carbon particles (soot), unburned hydrocarbons, CO, other partially burned and altered hydrocarbons, NO<sub>x</sub>, and SO<sub>2</sub>.<sup>27</sup> Because it has been over twenty years since EPA last revised emission factors for flares, the Administrator has failed perform the nondiscretionary duty required by section 130 of the CAA, 42 U.S.C. § 7430.

## B. Tanks

The emission equations in section 7.1 of AP-42 are the only emissions estimating tool EPA has for tanks.<sup>28</sup> The major pollutant of concern from Liquid Storage Tanks are VOCs.<sup>29</sup> The emission estimation equations in section 7.1 of AP-42 were developed by the American Petroleum Institute (API).<sup>30</sup> These emission equations are the basis of the software program TANKS that is used to generate site-specific emission factors and estimate emissions from liquid storage tanks.<sup>31</sup> EPA recognizes that industry has an interest in developing conservative emission equations because “there is a financial benefit to industries to use emission factors that produce low emission estimates.”<sup>32</sup> Yet, despite the increased risk of generating biased or unrepresentative emission estimates,<sup>33</sup> the EPA has only reviewed emission equations for tanks once since they were first developed by API fifteen years ago.<sup>34</sup> The emission equations used to

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<sup>24</sup> AP-42, *supra* note 1, at ch. 13: Miscellaneous Sources, *available at* [www.epa.gov/ttn/chief/ap42/ch13/index.html](http://www.epa.gov/ttn/chief/ap42/ch13/index.html) (last visited July 17, 2012).

<sup>25</sup> *Id.*

<sup>26</sup> *Id.* at 13.5-4.

<sup>27</sup> *Id.* at 13.5-3.

<sup>28</sup> AP-42, *supra* note 1, at ch. 7, *available at* [www.epa.gov/ttn/chief/ap42/ch07/final/c07s01.pdf](http://www.epa.gov/ttn/chief/ap42/ch07/final/c07s01.pdf).

<sup>29</sup> *Id.*

<sup>30</sup> *Id.* at 7.1-9 (“These procedures are valid for all petroleum liquids, pure volatile organic liquids, and chemical mixtures with similar true vapor pressures”).

<sup>31</sup> *Id.*; *see also* TANKS Emission Estimation Software, *available at* [www.epa.gov/ttn/chief/software/tanks/](http://www.epa.gov/ttn/chief/software/tanks/) (last visited July 17, 2012).

<sup>32</sup> *See, e.g.* EPA, Memorandum from Brenda Shine, *supra* note 17; EPA, 1996 Inspector General Report, *supra* note 2, at 21 (“Industries may be more inclined to participate in a partnership that would result in lower emission factors because of the uses of these factors. Emission factors are sometimes used to determine whether a source needs to obtain a construction or Title V operating permit, and estimate annual emissions for the purpose of determining annual permit fees under the Title V permit program. These uses of emission factors provide industry with a financial incentive to use emission factors that produce low emission estimates. Emission factors that produce low emission estimates may allow a source to avoid obtaining a permit and implementing required emission controls. In addition, sources that obtain Title V permits would pay lower annual fees when these fees are based on emission factors that result in lower emission estimates.”).

<sup>33</sup> Shell Deer Park DIAL Study, *supra* note 16, at 1 (“Emission factors used to estimate emissions from the Southwest Tanks VOCs produced the most potential underestimated emissions compared to the DIAL measured emissions, off by a factor of 132.”); *see also id.* at 92, 99.

<sup>34</sup> *See* EPA, Emission Factor Documentation for AP-42 Section 7.1: Organic Liquid Storage Tanks Final Report (2006), *available at* [www.epa.gov/ttn/chief/ap42/ch07/bgdocs/b07s01.pdf](http://www.epa.gov/ttn/chief/ap42/ch07/bgdocs/b07s01.pdf).

estimate emissions from tanks in section 7.1 AP-42 were last reviewed in November 2006.<sup>35</sup> While the review falls outside of the statutory three year timetable, it is also unclear whether the 2006 review satisfies the substantive requirements of section 130.<sup>36</sup> In addition, it has been over fourteen years since EPA last reviewed L&E emission factors for VOC emissions from storage tanks.<sup>37</sup> EPA last reviewed L&E emission factors for benzene emissions from storage tanks in 1998, and L&E emission factors for methyl ethyl ketone, toluene, and xylene emissions from storage tanks in 1994.<sup>38</sup> Because it has been over five years since EPA last reviewed AP-42 emission equations for tanks, and over fourteen years since EPA last reviewed L&E emission factors for tanks, the Administrator has failed to perform the nondiscretionary duty required by section 130 of the CAA, 42 U.S.C. § 7430.

### C. Wastewater Treatment Systems

Methodologies for estimating emissions from wastewater treatment systems were last reviewed in February 1998.<sup>39</sup> Section 4.3 of AP-42 provides emission calculation methodologies for estimating air emissions from wastewater treatment systems. The Surface Impoundment Modeling System (SIMS) is a computer program that can be used to estimate emissions of organic compounds from wastewater treatment systems.<sup>40</sup> SIMS uses mass transfer correlations to predict VOC emissions from industrial waste water.<sup>41</sup> EPA recognizes that “in some cases, [] orders-of-magnitude differences may result between actual and estimated emissions, depending on differences in source configurations, control equipment, and operating practices.”<sup>42</sup>

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<sup>35</sup> *Id.*

<sup>36</sup> *See id.* at 1-1, 6-1 (While EPA states that the 2006 document is a background report, clarifying that the “purpose of this report is to provide background information to support revisions to AP-42 Section 7.1, Organic Liquid Storage Tanks,” the document also “summarize[s] the major changes made since the previous version of Section 7.1--Organic Liquid Storage Tanks (September 1997) of AP-42.”).

<sup>37</sup> The following pollutants are VOCs: benzene, methyl ethyl ketone, toluene, and xylene.

<sup>38</sup> EPA, EPA-454/R-98-011, Locating and Estimating Air Emissions from Sources of Benzene, 6-41 (1998) [hereinafter L&E Benzene Documents], *available at* [www.epa.gov/ttn/chief/le/benzene\\_pt1.pdf](http://www.epa.gov/ttn/chief/le/benzene_pt1.pdf). [www.epa.gov/ttn/chief/le/benzene\\_pt2.pdf](http://www.epa.gov/ttn/chief/le/benzene_pt2.pdf); EPA, EPA-454/R-93-046, Locating and Estimating Air Emissions from Sources of Methyl Ethyl Ketone, (1994), *available at* [http://www.epa.gov/ttn/chief/le/mek\\_l&e.pdf](http://www.epa.gov/ttn/chief/le/mek_l&e.pdf); EPA, EPA-454/R-93-047, Locating and Estimating Air Emissions from Sources of Toluene, 6-20 (1994), *available at* <http://www.epa.gov/ttn/chief/le/toluene.pdf>; EPA, EPA-454/R-93-048, Locating and Estimating Air Emissions from Sources of Xylene (1994) [hereinafter L&E Xylene Documents], *available at* <http://www.epa.gov/ttn/chief/le/xylene.pdf>.

<sup>39</sup> AP-42, *supra* note 1, at ch. 4: Evaporation Loss Sources, *available at* [www.epa.gov/ttn/chief/ap42/ch04/index.html](http://www.epa.gov/ttn/chief/ap42/ch04/index.html).

<sup>40</sup> *Id.* at 4.3-17 (SIMS program and user manual can be downloaded from EPA’s CHIEF electronic bulletin board).

<sup>41</sup> *Id.* (SIMS requires, at a minimum, waste water flow rate and component surface area. Default values are provided for all other inputs, however where site-specific information is available it should be entered in place of default values for a more accurate emissions estimate).

<sup>42</sup> L&E Benzene Documents, *supra* note 38, at 1-3; *see also id.*, at 6-25 – 6-26 (providing that wastewater emissions from petroleum refinery process units can be estimated by multiplying the average flow factor, the volatile HAP concentrations, and the fraction emitted for the specific process unit capacity); *see also id.* at 6-27 (providing non-AP42 wastewater emission factors for oil/water separators, air flotation systems, and sludge dewatering units at petroleum refineries).

In addition, it has been over fourteen years since EPA last reviewed L&E emission factors for VOC emissions from wastewater treatment systems.<sup>43</sup> EPA last reviewed L&E emission factors for benzene emissions from wastewater treatment systems in 1998; L&E emission factors for xylene emissions from wastewater treatment systems in 1994; and L&E emission factors for carbon tetrachloride, epichlorohydrin, and ethylene dichloride emissions from wastewater treatment systems in 1984.<sup>44</sup> Because EPA has not reviewed AP-42 SIMS or L&E emission factors for wastewater treatment systems in over fourteen years, the Administrator has failed perform the nondiscretionary duty required by section 130 of the CAA, 42 U.S.C. § 7430.

### III. Failure of the Administrator to Perform a Nondiscretionary Duty

Section 130 of the CAA, 42 U.S.C. § 7430, requires the Administrator to “at least every 3 years . . . review and, if necessary, revise, the methods (“emission factors”) used for purposes of [the CAA] to estimate the quantity of emissions of carbon monoxide, volatile organic compounds, and oxides of nitrogen from sources of such air pollutants.” This nondiscretionary duty to “review and, if necessary, revise” emission factors under section 130 includes a duty to make a determination – yes or no – as to whether revision of the emission factor is appropriate.<sup>45</sup>

The Administrator has not completed a review of emission factors for flares, tanks, or wastewater treatment systems within three years of the prior review, as required by section 130 of the CAA, 42 U.S.C. § 7430.<sup>46</sup> Specifically, the emission factors for tanks have not been reviewed since 2006, the emission factors for flares have not been reviewed since 1991, and emission factors for wastewater treatment systems have not been reviewed since 1998. Therefore, EPA is in violation of the Act for its failure to comply with the mandatory duties imposed by section 130 of the Act.

<sup>43</sup> The following pollutants are VOCs: benzene, carbon tetrachloride, epichlorohydrin, ethylene dichloride, and xylene.

<sup>44</sup> L&E Benzene Documents, *supra* note 38, at 6-27; L&E Xylene Documents, *supra* note 38; EPA, EPA-450/4-84-007b, Locating and Estimating Air Emissions from Sources of Carbon Tetrachloride, (1984), *available at* <http://www.epa.gov/ttn/chief/le/carbtet.pdf>; EPA, EPA-450/4-84-007j, Locating and Estimating Air Emissions from Sources of Epichlorohydrin, (1984), *available at* <http://www.epa.gov/ttn/chief/le/epichlor.pdf>; EPA, EPA-450/4-84-007d, Locating and Estimating Air Emissions from Sources of Ethylene Dichloride 82 (1984), *available at* <http://www.epa.gov/ttn/chief/le/ethylidi.pdf>.

<sup>45</sup> See *Env'tl Def. Fund v. Thomas*, 870 F.2d 892, 894-95 (2d Cir. 1989) (holding that “the Administrator has a non-discretionary duty to make *some* formal decision whether to revise [] NAAQS” under section 109 of the CAA, 42 U.S.C. § 7409(d), which requires the Administrator to “complete a thorough review of the criteria published under Section 108 ... and promulgate such new standards as may be appropriate” every 5 years); *Our Children's Earth Found. v. U.S. Env'tl. Prot. Agency*, 527 F.3d 842, 849 (9th Cir. 2008) (holding that the duty to determine whether revision is appropriate is implicit in EPA's non-discretionary duty to review and “if appropriate, revise” effluent limitation guidelines once every five years under section 304 of the CWA, 33 U.S.C. 1311(d)).

<sup>46</sup> EPA issued an emission estimation protocol for petroleum refineries in 2011 that outlines methodologies for estimating emissions from flares, tanks, and wastewater treatment systems. EPA, Emission Estimation Protocol for Petroleum Refineries (2011), *available at* [www.epa.gov/ttn/chief/efpac/protocol/Emission\\_Estimation\\_Protocol\\_for\\_Petroleum\\_Refinerie\\_052011.pdf](http://www.epa.gov/ttn/chief/efpac/protocol/Emission_Estimation_Protocol_for_Petroleum_Refinerie_052011.pdf). However, the protocol does not discharge EPA of its obligations under section 130; EPA has neither conducted a review to determine whether revisions to the emission factors are necessary, nor revised any emission factors. See *id.* at ch.1, ch.3, ch.6, ch.7.

## Conclusion

The Administrator is required to review and, if necessary, revise section 130 emission factors at least once every three years. However, EPA has failed to review emission factors for tanks since 2006, for flares since 1991, and for wastewater collection, treatment and storage since 1998. Plaintiffs intend to sue the Administrator for failure to perform the nondiscretionary duty under section 130 of the CAA and seek to compel EPA to review and revise the AP-42 emission factors used to estimate emissions of VOCs, NOx, and CO from flares, tanks, and wastewater treatment systems to accurately reflect emissions from refineries, petrochemical plants, and other industries. If you have any questions regarding the allegations in this notice or would like to discuss this matter further, please contact us at the number or email below.

Respectfully submitted,



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*CC (Via Certified Mail):*

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 Lisa Jackson  
 Administrator  
 U.S. EPA  
 Ariel Rios Building  
 1200 Pennsylvania Ave. NW  
 Washington, DC 20406

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Eric Holder  
 Attorney General of the United States  
 U.S. DOJ  
 950 Pennsylvania Ave, NW  
 Washington, DC 20530-0001

A. Signature  
 X *[Signature]*  Agent  Addressee

B. Received by (Printed Name) *[Signature]* C. Date of Delivery

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Agent  
 Addressee

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1. Article Addressed to:  
*Gina McCarthy*  
*Assistant Administrator, Office of Air & Radiation*

*V.S. EPA*  
*Ariel Rios Building*  
*1200 Pennsylvania Ave, NW*  
*Washington, DC 20406*

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 If YES, enter delivery address below:  No

3. Service Type  
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 Insured Mail  C.O.D.

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*Peter Tsirigots  
US EPA*

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		Arrival at Unit	July 22, 2012, 10:22 am	WASHINGTON, DC 20018	
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		Processed at USPS Origin Sort Facility	July 18, 2012, 9:07 pm	CAPITOL HEIGHTS, MD 20790	
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		Acceptance	July 18, 2012, 3:39 pm	WASHINGTON, DC 20005	