

TECHNICAL SUPPLEMENT 3: EQUIPMENT LEAK FUGITIVES

Technical Disclaimer

This technical supplement is intended to help you accurately determine and correctly report equipment leak fugitive emissions. It does not supersede or replace any state or federal law, rule, or regulation.

This guidance, which reflects our current understanding of how piping components work and how they generate emissions, how they are monitored or tested, and what data are available for emissions determination, may change over time as we continue our scientific studies and as new information becomes available. We welcome any data, information, or feedback that may improve our understanding of equipment leak fugitive emissions and thereby further improve determinations within the emissions inventory.

The calculation methods represented are intended as an emissions calculation aid; alternate calculation methods may be equally acceptable if they are based upon, and adequately demonstrate, sound engineering assumptions or data. If you have a question regarding the acceptability of a given emissions determination method, contact the Industrial Emissions Assessment Section at 512-239-1773.

Introduction

This technical supplement provides guidance for identifying, determining, and correctly reporting equipment leak fugitive emissions from piping components and associated equipment at industrial facilities. It does not address emissions from cooling towers, oil/water separators, material stockpiles, loading operations, or other sources not related to piping components.

Please note that structural representation of equipment leak fugitive areas in the emissions inventory is specifically addressed under “Issues of Special Concern” later in this supplement. For general guidance on this topic, consult Chapter 3, “Account Structure.”

Definitions

In this document, the phrase “traditional component types” refers to those component types traditionally considered and reported as sources of equipment leak fugitive emissions: valves, connectors, pumps, compressor seals, relief valves, sampling connections, process drains, and open-ended lines. “Nontraditional component types” refers to component types traditionally not treated as sources of equipment leak fugitive emissions, but which recent scientific studies have identified as such. Examples include screwed fittings, liquid relief valves, agitators, heat exchanger

heads, site glasses, bolted manways and hatches, blind flanges, caps and plugs, connectors, compression fittings, and metal-to-metal seals.

Expected Emissions

Equipment leak fugitive emissions may include organic or inorganic compounds in gaseous or liquid state, depending upon the composition of streams flowing through the associated piping components.

Quantifying Equipment Leak Fugitive Emissions

Introduction

Equipment leak fugitive emissions are determined using emission factors or equations statistically developed from component- and industry-specific sampling data. Methodologies will differ, depending upon whether a source is monitored using a VOC instrument detector or is not monitored. For monitored sources, base determinations on correlation equations and the individual screening values obtained with the instrument. For unmonitored sources, base determinations on average emission factors.

For detailed information on available emission factors and determination methods, see the EPA documents *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017) and *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks* (Emissions Inventory Improvement Program Document Series, Volume II, Chapter 4, November 1996), as well as the TCEQ document *Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives* available at <http://www.tceq.state.tx.us/permitting/air/nav/air_guidenewsourc.html> and the guidance available at the IEAS web page, <www.tceq.state.tx.us/goto/ieas>.

Requirements for Determining Equipment Leak Fugitive Emissions

Emissions from monitored equipment leak fugitive components must be determined using the actual monitoring data gathered at a site. Most LDAR program permit conditions require the retention of screening value data for all monitored components. Therefore, most accounts with a monitoring program will have the necessary data to use correlation equations to determine equipment leak fugitive emissions.

Specifically, if an account is required by permit condition, TCEQ rule, or commission order to retain screening value data for its monitored components, correlation equations must be used to determine emissions.

The IEAS has previously allowed the use of LDAR reduction credits applied to EPA’s average factors for annual emissions determinations. However, using actual leaking component data, which reflect a site’s actual leak fraction and LDAR program effectiveness, will provide more accurate emission determinations than use of average emission factors with LDAR reduction credits.

Since all monitored equipment leak fugitive sources should have individual screening values for monitored components, the use of average emission factors with LDAR reduction credits to determine emissions from monitored components will no longer be allowed. One exception is detailed under “Quantifying Emissions from Components Monitored by an Audio/Visual/Olfactory Inspection” later in this supplement.

Emissions Determination Methodologies: Order of Preference

The appropriate methodologies for determining VOC emissions for equipment leak fugitive components are, in order of preference:

- Unit-specific correlation equations developed in accordance with EPA guidelines (code as “M”)
- EPA correlation equations (code as “A”)
- EPA industry-appropriate average factors (code as “A”)

The use of reduction credits (from a LDAR program) applied to EPA’s average factors for emissions inventory purposes is no longer allowed, with few exceptions. One exception is detailed under “Quantifying Emissions from Components Monitored by an Audio/Visual/Olfactory Inspection” later in this supplement.

Emissions Factors

All emissions factors discussed in this supplement are available in the PDF document titled *Emissions Factors for Equipment Leak Fugitive Components* on the IEAS’ web page at <www.tceq.state.tx.us/goto/ieas>.

Determining Emissions from Monitored Components

Quantifying Emissions Using Correlation Equations

Emissions determinations for monitored equipment leak fugitive emissions sources must be determined using site-specific monitoring data. Specifically, correlation equations must be used to determine emissions when a permit condition, TCEQ rule, or commission order requires the retention of screening value data.

Correlation equations use an instrument-measured VOC concentration screening value to determine a component-specific emission rate. Screening value data are collected using a portable monitoring instrument to sample air from potential leak interfaces on individual pieces of equipment. Screening data must be collected in accordance with EPA Reference Method 21, as detailed in 40 CFR 60 Appendix A and *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017), available at the EPA's web site at <<http://www.epa.gov/ttnchie1/publications.html>>.

To determine emissions, the screening value data are used either in industry-specific correlation equations developed by the EPA or in correlation equations developed by a company for a specific process unit. The EPA correlation equations are available in *Protocol for Equipment Leak Emission Estimates* and in the PDF document titled *Emissions Factors for Equipment Leak Fugitive Components* on the IEAS' web site at <www.tceq.state.tx.us/goto/ieas>. The EPA has approved separate correlation equation sets for synthetic organic chemical manufacturing industry (SOCMI) components and petroleum industry components (which includes refineries, marketing terminals, and oil and gas production facilities).

The TCEQ accepts the use of correlation equations for screening values between zero and 100,000 parts per million. To determine emissions using correlation equations, you must consider each component's screening value (adjusted for the background concentration) as follows:

- Before using the screening value in the appropriate correlation equation, determine the screened stream's response factor and, if necessary, adjust the screening value according to the guidance in *Protocol for Equipment Leak Emission Estimates*.
- For each component with a nonzero screening value, enter the value into the applicable correlation equation to determine a mass emission rate. Sum the individual mass emission rates for each component to determine a total leak rate. Note that each individual screening value must be entered into the correlation equation to predict a component's leak rate. Averaged screening values should not be used to determine emissions.
- For each component with a screening value of zero, note that although the correlations predict a leak rate of zero for screening values of zero, the EPA data suggest that this prediction is incorrect. To account for screening values of zero, the EPA has established a default zero leak rate which should be applied to each component whose screening value was zero.

- For each component with a screening value above 100,000 ppm, use an EPA-developed default 100,000 ppm pegged leak rate. Note that if a pegged value of 10,000 ppm is indicated (i.e., the instrument was not calibrated to quantify the screening value between 10,000 ppm and 100,000 ppm), then the default 100,000 ppm pegged leak rate—**not** the default 10,000 ppm rate—should be used.

Since a component's screening concentration may vary from one monitoring period to another, emissions for each period should be based upon each component's screening concentration for that period. These period-specific emission rates should then be summed to obtain an annual emissions rate. For example, if components are monitored quarterly, each component's quarterly screening value should be used to determine quarterly emissions, and then the quarterly emission rates summed to obtain the component's total annual emissions.

When determining a component's leak duration, it would be most conservative to assume that the component was leaking at the measured concentration for the entire period since last monitored. An acceptable engineering estimate would be that the component was leaking at the measured concentration for half the monitoring period, plus the time needed to repair the component. The IEAS must approve any other method of determining leak durations before you use it.

When using the correlation equations to calculate emissions, the components must be monitored at least once during the year. Using monitoring data from a previous year to estimate future emissions is a difficult process. If this is done, sound engineering assumptions to support the calculations must be provided with the emissions inventory.

Detailed information about correlation equations can be found in *Protocol for Equipment Leak Emission Estimates*.

Unit-Specific Correlation Equations

If an account has developed its own set of unit-specific correlation equations for its equipment leak fugitive components, those equations may be used to determine emissions only if the equations, sampling procedures, and all related procedures and data comply with EPA Reference Method 21 and the guidance in *Protocol for Equipment Leak Emission Estimates*.

When using company-developed correlation equations, supply supporting documentation indicating the basis for these equations. Also, if the account-specific equations do not account for components with screening

values of zero, the IEAS may require the use of EPA's default zero leak rates. Likewise, if the account-specific equations do not account for components with pegged screening values, the IEAS may require the use of EPA's pegged leak rates.

Quantifying Emissions from Components Monitored by an Audio/Visual/Olfactory Inspection

For odorous or toxic inorganic compounds, an AVO inspection may be required by TCEQ rule, commission order, or permit condition. Generally, an AVO inspection program may only be applied to inorganic compounds that cannot be monitored by instrument. In limited instances, the AVO inspection program may be applied to extremely odorous organic compounds such as mercaptans.

If no monitoring or screening data exists for AVO-monitored components, then average emissions factors with AVO reduction credits applied can be used to determine emissions. To claim credit for this program, you must be able to produce, upon request, documentation that all elements of the program are in place and were followed.

AVO factors can be found in the PDF document titled *Emissions Factors for Equipment Leak Fugitive Components* on the IEAS' web site at <www.tceq.state.tx.us/goto/ieas>.

Determining Emissions from Unmonitored Components

Emissions Determination Requirements

Emissions for monitored equipment leak fugitive emissions sources must be determined using actual monitoring data. However, for unmonitored components, average emissions factors may still be used to quantify emissions.

Quantifying Emissions Using Average Factors

Average emission factors are divided into four categories:

- SOCFI factors,
- oil and gas production factors,
- refinery factors, and
- factors for petroleum marketing terminals.

Within each category, factors vary depending upon specific component type (connectors, valves, pumps, etc.) and material in service (light liquid, heavy liquid, gas-vapor, or water-light liquid). For components in liquid

service, you may need to choose between a “heavy liquid” factor and a “light liquid” factor. Use the “heavy liquid” factor if the stream’s vapor pressure is less than or equal to 0.044 psia at 68°F. If the stream’s vapor pressure is greater than 0.044 psia at 68°F, use the appropriate “light liquid” factor.

Note that the average factors generally determine total hydrocarbon emissions. Therefore, you may need to multiply the calculated emission rates by the stream’s weight percentage of VOC compounds to determine total VOC emissions.

The EPA average emissions factors for the industry types described in the following sections can be found in *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017), available at the EPA web site at <http://www.epa.gov/ttnchie1/publications.html>.

SOCMI Factors

Use the SOCMI factors to determine equipment leak emissions from chemical plants or chemical processes within refineries. SOCMI factors are divided into three categories: SOCMI average factors, “SOCMI with ethylene” factors, and “SOCMI without ethylene” factors.

Use the SOCMI average factors, which were developed to represent fugitive emission rates from all chemical plants, for streams containing between 11 percent and 85 percent ethylene. For streams containing more than 85 percent ethylene, use the “SOCMI with ethylene” factors. For streams containing less than 11 percent ethylene, use the “SOCMI without ethylene” factors.

Oil and Gas Production Factors

The oil and gas production factors are based on oil and gas production equipment leak emissions data gathered by the American Petroleum Institute and evaluated by the EPA. The oil and gas production factors include four different equipment service categories: gas, heavy oil (less than 20° API gravity), light oil (greater than 20° API gravity), and water/light oil (water streams in light oil service with a water content between 50 percent and 99 percent).

Refinery Factors

Use refinery factors to determine equipment leak fugitive emissions from a refinery process. For a chemical process located within a refinery that is not specifically considered a refinery process (for example, an MTBE production unit), use the SOCMI factors rather than the refinery factors to calculate emissions.

Petroleum Marketing Terminal Factors

Use the factors for petroleum marketing terminals to determine equipment leak fugitive emissions at gasoline-distribution facilities that are one step removed from local gasoline stations and other end users. Do not use these factors to determine equipment leak fugitive emissions from loading racks at chemical plants and refineries; instead, use the appropriate SOCFI or refinery factors.

The use of these factors must be accompanied by an AVO program performed monthly. To claim credit for this program, you must be able to produce, upon request, documentation that all elements of the program are in place and were followed. Because the petroleum marketing terminal factors include the appropriate reduction credit for the AVO inspection, no additional reductions may be taken.

If a monthly AVO inspection was not performed, use the refinery factors to determine emissions.

Quantifying Emissions from Components Exempt from Monitoring

Some components may be exempt from monitoring requirements based on size, physical location at a facility, or low vapor pressure. Exempt components' emissions, like those from unmonitored components, **must** be calculated and reported. Since these components are not monitored, calculate their associated emissions based on average factors with no reduction credit applied. When calculating emission rates, inaccessible components and other unmonitored components must be clearly identified and separated from monitored components.

Quantifying Emissions Using Average Factors with Emissions Reduction Credits

Quantifying emissions using average factors with emissions reduction credits applied implies the use of a monitoring (LDAR) program. Most instrument-based LDAR program permit conditions will require the retention of screening value data. Since the use of such data in correlation equations provides more accurate emissions determinations, the use of average factors with applied emissions reduction credits to determine actual annual emissions rates is no longer allowed.

Reduction Credit for Connector Monitoring

Because connector monitoring is not usually required, emission reductions are not typically claimed for these components. However, if a weekly physical inspection program is in place, a 30 percent emissions reduction credit applied to average factors is allowed. To claim credit for any such program, you must be able to produce, upon request, documentation that all elements of the program are in place and were followed.

If connectors are instrument-monitored, then you should use correlation equations to determine emissions according to the guidance in this supplement. In these cases, no additional reduction credit for connector monitoring may be applied to the correlation equation.

Quantifying Emissions of Odorous or Toxic Inorganic Compounds

The best method to determine equipment leak emissions of odorous or toxic inorganic compounds like chlorine (Cl_2), ammonia (NH_3), hydrogen sulfide (H_2S), hydrogen fluoride (HF), and hydrogen cyanide (HCN) would be to develop unit-specific correlation equations, as described in Section 2.3.4 of *Protocol for Equipment Leak Emission Estimates*. To develop these equations, it is necessary to use a monitoring instrument that could detect the inorganic compounds in question.

Note that it also would be necessary to use a monitoring instrument that could detect the inorganic compounds in question to apply either EPA-developed correlation equations or screening range emissions factors. If monitoring data are not available, calculate uncontrolled equipment leak fugitive emissions using the industry-specific factors discussed previously. Although these VOC emission factors were not developed specifically for use with inorganic compounds, they are presently the best data available for determining inorganic equipment leak fugitive emissions.

Quantifying Emissions for Nontraditional Components

Emissions from nontraditional piping sources should be calculated and included in all emissions inventories. While these sources have not historically been included, recent scientific studies and equipment monitoring have indicated that these components are a source of emissions.

Although component-specific factors do not exist for most nontraditional components, the TCEQ has identified appropriate substitute factors based on component, leak potential, and leak mechanism similarity. These factors are listed in Table A-4.

The component-specific emission factors for pressurized railcar loading operations threaded connections and quick-connect couplers are listed in Table A-4 and should be applied when a pressurized railcar is connected to the loading system using a loading arm. The loading arm may consist of a combination of threaded and quick-connect components and each component should be accounted for in the inventory.

Table A-4. Appropriate Substitute Factors for Nontraditional Components

To determine this nontraditional component's emissions use this factor.
Agitator	Light liquid pump
Blind flange	Flange
Bolted manway or hatch	Flange
Cap or plug	Flange
Compression fitting	Flange
Connector	Flange
Heat exchanger head: unmonitored monitored	Open-ended line Flange correlation equation
Liquid relief valve	Light liquid valve
Metal-to-metal seal	Flange
Screwed fitting	Flange
Site glass	Flange times two
Pressurized railcar loading arm: threaded connection quick connect coupler	0.0214 lb/hr/component 0.0055 lb/hr/component

Special Considerations when Quantifying Emissions

When determining fugitive emissions, note the following special considerations.

Hours of Operation

Equipment leak fugitive emission factors are independent of process unit throughput. Because emissions occur whenever material is in the line, regardless of process activity or downtime, all streams should be in service for 8,760 hours annually. Any exception to this service time would require that the lines be purged during process downtime.

Equipment Design Specifications

Certain facility design specifications may eliminate or minimize equipment leak fugitive emissions. If components are designed as described in the following sections, you may apply the stated emissions reduction credit.

Relief Valves: 100 percent control may be assumed if either of the following conditions is met:

- relief valve vents are routed to a properly operating control device; or
- relief valves are equipped with a rupture disc and pressure sensing device (between the valve and disc) to monitor for disc integrity.

It is important to verify proper relief valve operation if one of these design specifications is not used. If a relief valve does not reseat properly, the resulting emissions must be determined and reported. Possible sources of emissions include storage tanks, pressure tanks, loading operations, reactors, and mixing vessels controlled by relief valves.

Pumps: The following pump types are designed to be “leakless” and are eligible for a 100 percent control credit:

- canned pumps
- magnetic drive pumps
- diaphragm-type pumps
- pumps with double mechanical seals that use a barrier fluid at a higher pressure than the process fluid pressure
- pumps with double mechanical seals that vent the barrier fluid seal pot to a control device

Valves: You may take a 100 percent control credit for the following:

- bellows valves with bellows welded to both the bonnet and stem
- diaphragm-type valves
- seal-welded, magnetically actuated, packless, hermetically sealed control valves.

Connectors: You may take a 100 percent control credit if the connections are welded together around their circumference so that the flanges cannot be unbolted.

Compressors: You may take a 100 percent control credit if a compressor is designed with enclosed distance pieces and if the crankcase vents to a control device.

Double Mechanical Seals: You may tank a 75 percent control credit for any component employing double mechanical seals.

Speciation

Use current gas or liquid process stream analysis (or both) to speciate equipment leak fugitive emissions. For more information about speciation requirements for the emissions inventory, see Chapter 4.

Supporting Documentation

Include representative sample calculations for each equipment leak fugitive area, including a list of the components to which a 100 percent control credit has been applied with a footnote describing the specific control method. If screening range emissions factors are used, the IEAS may require that supporting documentation be submitted to verify that a permitted monitoring program is not required to retain screening value data.

In addition, if an equipment leak fugitive area emitted more than 5 tons during the year, complete and submit the Fugitive Data Form found at the end of this supplement.

Issues of Special Concern

May I put the whole plant's equipment leak fugitives under one facility and emission point?

In a relatively small plant, such as a natural gas compressor station or a petroleum marketing terminal, the entire plant's equipment leak fugitive emissions may be represented by one facility/emission point path. For larger plants, however, it is generally more appropriate to report fugitive emissions under more than one facility.

There are two main items to consider when breaking fugitive areas into multiple facilities. First, if different process areas within a plant follow different leak detection and repair programs, each area should be represented by a separate path to avoid confusion. Second, since stream composition may differ greatly between processes and may necessitate the use of different calculation methodologies, fugitive emissions from separate processes should be reported under separate facilities. Consider,

for instance, a refinery with a process area for MTBE production. Emissions determinations for the MTBE process area should use correlation equations or the SOCOMI average emission factors, as they are more appropriate than the refinery factors. Separate facility–emission point paths should represent the MTBE process area fugitives and the refinery fugitives.

Do I have to report emissions from components that are exempt from monitoring (such as components less than 2 inches in diameter)?

Yes. All components' emissions must be determined and reported, regardless of monitoring exemptions based on size, physical location, or low vapor pressure. Since these components are exempt from monitoring, an approach based on determining average factors will typically be used and no reduction credits from monitoring may be applied.

I have a unit that was shut down part of the year. Must I determine equipment leak fugitives for the entire year or just for the part of the year when the unit was operating?

Equipment leak fugitive emissions should be determined for the entire year (8,760 hours) unless the unit's lines were purged during the downtime.

I want to use correlation equations to determine equipment leak fugitive emissions. May I get screening values for a certain percentage of components and use the average value to represent all other components?

No. Correlation equations may only be used to determine emissions for those components with individual screening values. If screening values are not determined for certain components, you must use a different calculation methodology for these unmonitored components.

I have a crude oil storage and loading facility. May I use the emission factors for bulk terminals?

No. If you have monitoring data for the fugitive components, then monitoring data must be used to determine emissions in accordance with the guidance in this supplement.

In the absence of monitoring data, use the oil and gas production average factors to determine component emissions. The bulk terminal average factors were developed specifically for gasoline and gasoline product

loading operations. For crude oil storage and loading, the Oil and Gas Production factors would be more appropriate.

I have an LDAR program. Is there any way to represent this on my emissions inventory?

You may represent an LDAR program as part of an account's structure. For fugitive facilities with an LDAR program, add a CIN with abatement code 800. Since the LDAR reduction credits can no longer be applied to average factors for emissions determinations, you do not need to give a control efficiency for this type of CIN.

How do I find out if any new equipment leak fugitive factors have been developed or approved by the TCEQ?

To find out if new factors have been approved by the TCEQ, review the PDF document titled *Emissions Factors for Equipment Leak Fugitive Components*. This document is available on the IEAS' web page at <www.tceq.state.tx.us/goto/ieas>.

Do I have to report emissions of nonreactive compounds?

Nonreactive compounds like methylene chloride and acetone are still considered air contaminants and should be reported. This is particularly important if a nonreactive compound has an associated allowable emission rate. Nonreactive equipment leak fugitive emissions should be calculated in the same way as VOC fugitive emissions.

For my permit, I used the EPA's average emissions factors with LDAR reduction credits to determine my equipment leak fugitive emissions. Can I use this approach to report these emissions in the emissions inventory?

No. All monitored equipment leak fugitive components should either have limited data for leaking components or, preferably, have individual screening values. Since using this monitoring data with correlation equations or screening range emissions factors will provide a more accurate determination of a site's emissions, the use of LDAR reduction credits applied to average emission factors for emissions determinations will not be allowed.

I monitor my connectors only once every four years based on "skip period" provisions in my permit. For years where the connectors are not monitored, should I use the average factors with no reductions

applied to estimate my emissions? Or can I apply the correlation equations using the data from the last monitoring period?

Normally, the IEAS would require components to be monitored at least once during the current inventory year to use the correlation equations. Using monitoring data from previous years to predict future emissions requires the assumption that component leaks will not grow in the future—a questionable engineering assumption that will likely result in underestimation of emissions.

In the case of “skip period” provisions in a permit, it is permissible to use data from the last monitoring period in the correlation equations. To account for future leaking components, you should use leaking component screening values **before** any repairs are done. Since there is a history of monitoring and monitoring will occur in the future, the snapshot (as it were) taken before repairs should reasonably mirror any future monitoring.

Because there is no way to estimate the amount of time a component will leak in the future, the most conservative estimate would be to assume any leaking component will do so for an entire year. If you elect to use a different method to estimate your emissions, you must provide valid engineering assumptions to support your calculations.

In the past, I used screening range (leak/no-leak) emissions factors to determine emissions from my fugitive area. May I continue to use this method?

The correlation equations should be used to determine emissions from your fugitive area if you have screening value data from a monitoring program.

If your monitoring program does not retain screening value data, emissions must be determined using the best available method. If you elect to use the screening range emissions factors to estimate your emissions, you must supply valid engineering assumptions to support your calculations.

References

Texas Commission on Environmental Quality. 2000. *Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives*. TCEQ Air Permits Division draft document: Available online at: <http://www.tceq.state.tx.us/permitting/air/nav/air_chemdocs.html>. Accessed December 28, 2006.

Texas Commission on Environmental Quality. 2005. *Emissions Factors for Equipment Leak Fugitive Components*. TCEQ Industrial Emissions Assessment Section draft

Emissions Inventory Guidelines

document: Available online at: <www.tceq.state.tx.us/goto/ieas>. Accessed December 28, 2006.

U.S. Environmental Protection Agency. 1996. *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks*. Vol. 2, Emissions Inventory Improvement Program Document Series, chapter 4: Available online at: <www.epa.gov/ttn/chief/eiip/techreport/volume02/index.html>.

U.S. Environmental Protection Agency. 1995. *Protocol for Equipment Leak Emission Estimates*. EPA-453/R-95-017. Available online at: <www.epa.gov/ttnchie1/publications.html>. Accessed December 28, 2006.

Fugitive Data Form

TCEQ Emissions Inventory Year _____

TCEQ Air Account Number: _____

FIN: _____

COMPONENT COUNTS

	Service	Unmonitored Number of components	Monitored			
			Number of components	Leak definition (ppm)	Number of leakers	Number pegged
Valves	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Pumps	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Flanges	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Open- Ended Lines	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Con- nectors	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Relief Valves	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Com- pressor Seals	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					
Other	Gas/Vapor					
	Light liquid					
	Heavy liquid					
	H ₂ O/Light oil					

VOC PERCENTAGES

MONITORING EQUIPMENT DATA

Gas/vapor stream: _____ %
 Light liquid stream: _____ %

Pegged Component Screening Value: _____ ppm
 Calibration Range: _____ min _____ max

EMISSIONS DETERMINATION METHODOLOGY OR LDAR PROGRAM USED

- | | | |
|---|---|--|
| <input type="checkbox"/> Oil and Gas Factors | <input type="checkbox"/> SOCM I Average Factors | <input type="checkbox"/> SOCM I without Ethylene Factors |
| <input type="checkbox"/> Refinery Factors | <input type="checkbox"/> SOCM I with Ethylene Factors | <input type="checkbox"/> Correlation Equations |
| <input type="checkbox"/> Petroleum Marketing Terminal Factors | <input type="checkbox"/> Other (explain): _____ | |

LDAR PROGRAM: None 28M 28RCT 28VHP 28MID 28LAER
 AVO 28CNTA 28CNTQ HRVOC Other: _____

Instructions for Completing the Fugitive Data Form

Component Counts

Enter the number of each component type (valves, flanges, etc.) in each service (gas/vapor, light liquid, etc.). Note that *water/light liquid service* applies only to the oil and gas industry. Be certain to fill in all columns.

Unmonitored: Number of Components

For each component type, enter the number of unmonitored components in the fugitive area. If an LDAR program is in place, include components exempt from monitoring in this column.

Monitored: Number of Components

For each component type, enter the number of instrument-monitored components in the fugitive area.

Leak Definition

For each monitored component type, enter the leak definition level measured in parts per million.

Number of Leakers

For each monitored component type, enter the number of components that leaked at or above the leak definition threshold. Count each component once for each period during which it leaked. For example, if a valve monitored quarterly was found to be leaking each quarter in a year, it should be counted as four leakers.

Number Pegged

For each monitored component type, enter the number of components that leaked at or above the “pegged” screening value. Count each component once for each period during which it leaked at or above the pegged rate. For example, if a valve monitored quarterly was found to be leaking above the pegged rate each time, it should be counted as four pegged valves.

Monitoring Frequency

For each monitored component type, enter how frequently the components are monitored (annually, semiannually, quarterly, monthly, biweekly, etc.).

VOC Percentages

Enter the average VOC percentages for the gas/vapor stream and the light liquid stream. Heavy liquid streams are assumed to be 100 percent VOC.

Monitoring Equipment Data

Enter the equipment's calibration value range and the "pegged" components' screening value.

Emissions Determination Methodology

Select the industry type and methodology that you use to determine fugitive emissions. Please note that if more than one method is used for a single facility, you should create separate facilities for each factor group used.

LDAR Program Used

Select the leak detection and repair program followed by your account for this facility. Please note that if more than one LDAR program is followed for a single facility, you should create separate facilities for each such program.