San Joaquin Valley
Unified Air Pollution Control District

DRAFT
Procedures for Quantifying Fugitive VOC Emission Sources at Petroleum Facilities

Approved By: _____________________________ Date: _____________
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Director of Permit Services

I. Purpose:

The purpose of this policy is to establish the EPA and CACPCOA fugitive VOC emission factors as the accepted fugitive emission factors for quantifying volatile organic compound (VOC) emissions from fugitive components and define what fugitive emission sources are associated with permitted equipment and are therefore subject to permit.

II. Applicability:

This policy is applicable to new and modified emission units, as defined in Rule 2201, that include fugitive VOC emission sources at petroleum facilities.

As used in this policy, petroleum facility means light crude oil, heavy crude oil, and gas production operations, gas plants, refineries, and marketing terminals.

This policy is to be used to estimate VOC emissions from fugitive components, including but not limited to valves, flanges, compressors, etc, and to define what fugitive emission sources are associated with permitted equipment and therefore subject to permit consistent with the requirements of Rule 2020 section 6.14.

III. Background:

Previously, emissions from fugitive components at petroleum facilities were calculated using a variety of methods including using emission factors in API 4322, using emission factors in District policy SSP-1910 titled “Wellhead Polished Rod Packings VOC Emission Factor”, and calculating uncontrolled emissions and applying a vapor control system control efficiency (the CARB/KVB method). These methods shall no longer be used.
The approved methods for calculating fugitive emissions are those contained in EPA’s “Protocol for Equipment Leak Emission Estimate” dated 11/95 (EPA document) and “California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities” dated 2/99 (CAPCOA document). The CAPCOA document was developed to provide guidance to Districts in California for implementing the emission factors in the EPA document.

The EPA document includes emission factors for four industry types:
1) oil and gas production operations
2) refineries,
3) marketing terminals, and
4) synthetic organic chemical manufacturing (SOCMI),

For each industry type, there are four tiers of emission factors (listed in increasing refinement and accuracy)
1) average emission factors,
2) screening range emission factors
3) EPA correlation equation emission factors, and
4) unit specific correlation equation emission factors.

The CAPCOA document provides revisions to two sets of emission factors in the EPA document, as follows:
Table IV-2c “CAPCOA oil and gas production screening value range emission factors”
Table IV-3a “CAPCOA refinery and marketing terminal correlation equation emission factors”

Additionally, a 6/11/97 letter from CAPCOA to WSPA describes the implementation of the EPA and CAPCOA emission factors for Districts in California, as follows.

**Refineries and Marketing Terminals**
Average emission factors can be used when there is no reliable site-specific data to use with the correlation equations. For the average emission factors, no control efficiency due to I & M will be used. Screening value range emission factors from the EPA document can be used. CAPCOA revised EPA correlation equation emission factors in CAPCOA document Table IV-3a can be used.

**Oil and Gas Production Operations**
Average emission factors can be used when there are no reliable site-specific data to use with the correlation equations. For the average emission factors, no control efficiency due to I & M will be used. CAPCOA revised screening value range emission factors in CAPCOA document table IV-2c can be used. EPA correlation equation emission factors in the EPA document can be used.
IV. District Approved Fugitive Emission Factors

Emission factors in the CAPCOA document or emission factors in the EPA document shall be used for new or modified emissions units. However, the emission factors in the CAPCOA document will take precedent over emission factors in the EPA document.

The average emission factors, screening range emission factors, EPA correlation equation emission factors, or unit specific correlation equation emission factors may be used. However, the same emission factors must be used for all equipment in an emissions unit. In no case shall the emissions exceed the uncontrolled potential to emit of the emissions unit.

It is preferable, though not required, to have the same calculation basis for all emissions units within a permit unit. It is permissible to have different emission factors for separate emissions units, even within a permit unit, provided the appropriate emission factor for each emission unit is stated in the ATC/PTO.

The emission factors may be adjusted for the site specific VOC content of the hydrocarbon vapors provided the VOC content is limited by permit condition and periodic sampling and analysis is required.

When using the screening range emission factors, any allowance in the Rules for leaks $>10,000$ ppmv must be accounted for. Rules 4401, 4403, 4451, 4452, and 4623, and proposed rules 4409 and 4455 allow for some leaks $>10,000$ ppmv. For the number of allowed leaks, the screening range $>10,000$ ppmv emission factors shall be used for the number of leaking components allowed (unless the permittee specifically requests a lower limit), and the $<10,000$ ppmv emission factors for the remaining components. In determining the emission rate from the number of allowable leakers, those components with the highest emission factors shall be assumed to be the leakers. If a maximum number of allowable leaks above $10,000$ ppmv is not limited by any rule, the permittee must specify the maximum number of leaking components for each category of component and provide offsets, when required, for the resulting increase in emissions.

The DEL may not exceed the uncontrolled potential to emit of the emissions unit.

VOC emissions are not assessed to the following components.

- Fugitive emission components that are always operated under a vacuum, i.e. less than atmospheric pressure of 14.7 psia. Permit conditions requiring monitoring and record keeping to verify that the components are operated under a vacuum will be required.
- For oil and gas production operations, components handling oil with an API gravity less than 30 and components in water/oil service ($\geq50\%$ water)
• For refineries, components handling liquids with an API gravity less than 30.
• Piping and components handling fluid streams with a VOC content of 10% or less by weight. Permit conditions requiring periodic monitoring and record keeping to verify the VOC content is 10% or less by weight will be required. VOC emissions may be assessed to such components if they handle significant quantities of hazard air pollutants (HAPs) as determined by the District. Permittee’s shall provide the District with written notification at least 30 days prior to installation of components handling fluid streams with a VOC content of 10% or less by weight.
• Components that are part of field gas production pipelines, i.e. produced gas lines discharging to sales gas pipelines or gas processing plants, except for permit units and their fugitive components on such pipelines. Please note that vapor control system piping serving tanks, steam enhanced well, separators, heater treaters, etc. are not field gas production pipelines.

The permittee must satisfy Rule 2201 requirements for any calculated increase in emissions due to using the revised emission factors pursuant to policy APR1110 Use of Revised Generally Accepted Emission Factors.

V. Associating fugitive emission sources with permitted emission units pursuant to Rule 2020 6.14

Rule 2020 section 6.12 provides a permit exemption for fugitive sources that are associated with equipment that is exempt from permit. Additionally, Rule 2020 section 6.14 states that if fugitive emission sources are associated with equipment that is required to have a permit, such fugitive emission sources are not exempt from permit. Such sources are to be permitted as part of the associated permitted equipment, i.e. a separate permit is not required.

In determining if fugitive sources are associated with permit exempt or permitted emission units, the following guidelines shall be used. Notwithstanding the following, all fugitive emission sources that are part of a vapor control system are not exempt from permit.

Fugitive emission sources are associated with the equipment located at one surface site. Surface site means any graded pad site, gravel pad site, foundation, or platform where a group of equipment is installed. Surface sites connected by a road, piping, or a powerline are not part of the same surface site.

Fugitive emission sources are associated only with equipment that is located at the same surface site. If the surface site includes only equipment for which a permit is not required, then all fugitive emission sources at that surface site are exempt from permit. Conversely, if the surface site includes some equipment for which a permit is required, then all fugitive emission sources at that surface site
are not exempt; the fugitive emission sources are permitted as part of the lowest numbered permit unit at that surface site.

Please note that fugitive emissions sources (even those exempt from permit) must comply with all applicable Regulation IV requirements.

VI. Utilizing Revised Emission Factors

Use of the revised emission factors is limited only to new or modified emissions unit. See policy APR1110 Use of Revised Generally Accepted Emission Factors.

Please note that if Rule 2201 is applicable due to a modification of an emission unit, Rule 2201 requirements apply to the entire emission unit, not just for the new or modified components.

VII. Permitting Issues

Definition of emission unit for purposes of this policy

The following definition does not supersede the definition of emission unit in Rule 2201. An emission unit is an operation that results in the liberation of VOC emissions from process streams including any vapor control piping up to where it connects to a shared vapor control system. Examples include, but are not limited to, tanks, free water knockouts, and production separator vessels that vent to a vapor control system.

Please note that production separator vessels that vent to a gas gathering system are not a separate emission units.

Shared control equipment is considered its own emission unit and will be issued its own permit pursuant to policy APR-1025 Permit Unit Determination, as revised on XX/XX/XX. Please note that control equipment that is not shared with two or more emission units will be permitted as part of the emission unit that it serves.

All components of a shared vapor control system that are downstream of the last permit unit to where the vapors are controlled by dedicated control device, such a flare or waste gas disposal well, part of the shared vapor control system emission unit. Should the vapors be distributed to other permitted equipment for incineration, as in the case of steam generators, or further treatment, as in the case of a natural gas processing plant, that emissions unit terminates at the connection to the piping leading to such incineration or further treatment systems.

Emissions units and their associated fugitive emission sources (as defined above) are part of the same emission unit. Fugitive emission sources associated with an emission unit are those fugitive emission sources that are attached to the emission unit including any liquid piping and vapor piping components downstream of it to
the next emission unit or to where such piping ties into the shared vapor control system.

Addition and/or removal of fugitive components

Addition and/or removal of fugitive emission sources can be made without an ATC provided such change does not constitute a new emission unit or modification of an existing emission unit and the existing daily emission limit (as calculated using accepted emission factors) can continue to be complied with.

Overestimating fugitive components to provide operational flexibility

In order to provide for construction uncertainties and/or addition or removal of fugitive emission sources (provided such change does not include a new emission unit or modify an existing emission unit as defined in Rule 2201) a permittee may establish a fugitive emission limit at up to 120% of expected fugitive emissions.

Subsequent addition or removal of fugitive emission sources (provided such change does not include a new emission unit or modify an existing emission unit as defined in Rule 2201) may be made without an ATC. The permittee shall be required to maintain accurate records of the number, type, and calculated emissions for the components installed and update such records when new fugitive emission sources are installed, removed, or replaced. All fugitive components shall be subject to all permit requirements, including inspection, maintenance, and record keeping.

Any permit or rule requirements that limit the percentage of leaking components shall be based on the total number of components actually installed, not on the number of permitted components.

Petroleum facility tanks

Each tank connected to vapor control is a separate emission unit.

Steam-enhanced and in-situ combustion wells

All wells connected to a shared vapor control system are one emission unit. The shared vapor control system is a separate emission unit. Please note that when implementing policy APR1110 Use of Revised Generally Accepted Emission Factors the pre-project emissions for the wells are to be based on the maximum number of fugitive components on the wells installed plus the number of fugitive components associated with the additional wells authorized by valid ATC.
Throughput and true vapor pressure of liquids stored in tanks

Regardless of the method used to ascertain the emission rate from tanks with vapor control, the District must obtain information on the service, throughput, and true vapor pressure of liquids stored in tanks. While this information may not be specified on a permit, it may be used to determine when proposed changes at a stationary source result in a change in the method of operation that would be subject to Rule 2201.

Expression of a daily emission limit (DEL) for emissions from fugitive components on ATCs/PTOs

The DEL for an emission unit may be expressed directly as a lb/day limit or indirectly as a combination of a component count for each component type, emission factors for each component type, and a maximum number of leaking components (if screening range factors are used). Emissions from some or all of the emissions units within a permit unit may be expressed as one or more DEL(s). However, in some cases a DEL for each new or modified emission unit may be required.

Each permit must contain one or more DELs that limit the NSR authorized emissions from that permit unit, emissions from multiple permit units shall not be grouped and placed on a single permit in lieu of each permit unit’s DEL.