

## **GASOLINE STORAGE AND DISPENSING**

### **Date Initiated:**

March 16, 1993

### **Dates Modified / Updated:**

April 25, 2008

July 16, 1998

February 9, 1994

October 26, 1993

### **PROCESS DESCRIPTION:**

Gasoline storage and dispensing operations at retail service stations and private facilities release ROG vapors containing listed substances into the atmosphere. These emissions occur during underground storage tank loading, tank breathing, spillage, and vehicle refueling. Emission rates are highly dependent upon the installation and performance of Phase I and Phase II vapor recovery equipment. The primary components of gasoline vapor are benzene, hexane, toluene, xylenes, and a mixture of other nonmethane hydrocarbons. Actual vapor concentrations of each component will vary depending upon the composition and temperature of the gasoline.

Emission estimation techniques are based upon values published by the EPA (AP-42), CAPCOA, and the San Diego Air Pollution Control District. Annual emissions are assumed to be proportional to throughput. Maximum hourly emissions are assumed to occur during bulk loading of the underground tanks. The standard District estimation techniques for emission inventory purposes are as follows:

$$\mathbf{Ea = Ua \times EFt \times Ci}$$

$$\mathbf{Eh = T \times EF1 \times Ci}$$

Where:

**Ea** = Annual emissions of gasoline vapor, (lbs/year)

**Eh** = Maximum hourly emissions of gasoline vapor, (lbs/hour)

**U<sub>a</sub>** = Annual gasoline throughput, (gallons/year)

**T** = Maximum one-hour bulk gasoline delivery, (gallons)

**EF<sub>t</sub>** = Emission factor (combined) for throughput, (lbs/gallon)

**EF<sub>l</sub>** = Emission factors for underground tank loading, (lbs/gallon)

**C<sub>i</sub>** = Concentration of each listed substance in the gasoline vapor, (lbs/lb)

### **EMISSIONS INFORMATION:**

Uncontrolled gasoline vapor emission factors are based on information from EPA AP-42 (Section 5.2), EPA NESHAPS (Document 453/R-94-002a) and CAPCOA (Air Toxics Hot Spots Industry wide Risk Assessment Guidelines). Additional information amending these factors is based on a report to CAPCOA from Barney Mc Entire of the San Diego APCD dated 2/8/95. Maximum hourly emissions are assumed to occur during loading of the underground tanks. Actual emission factors used are:

<b>Emission Factors</b>	<b>Splash</b>	<b>Submerged</b>	<b>Phase I</b>	<b>Phase II</b>
<b>(lbs/1000 gallons)</b>	<b>Filling</b>	<b>Filling</b>	<b>V. R.</b>	<b>V. R.</b>
U/G Tank Loading	11.5	7.3	0.85	0.85
Tank Breathing	1	1	1	0.15
Vehicle Refueling	11	11	11	1.4
Spillage	0.7	0.7	0.7	0.4
Totals	24.2	20.0	13.55	2.8

<b>Gasoline Speciation Data</b>	<b>Weight % Vapor</b>	<b>Weight % Liquid</b>
Benzene	0.4 %	1.0 %
Ethyl Benzene	0.1 %	1.6 %
Hexane, Isomers of	1.4 %	1.8 %
Toluene	1.1 %	8.0 %
Xylene, Isomers of	0.4 %	2.4 %
2,2,4-Trimethylpentane	0.7 %	0.8 %

For fixed roof gasoline storage facilities used as bulk terminal distribution points (i.e.: Clarence Ochs Oil, Ramona Oil, Fallbrook Oil, Shuster Oil, etc.), the following emission

factors best approximate release;

<b>Emission Factors (lbs/1000 gallons)</b>	<b>Fixed Roof Storage Tanks used as Bulk Terminals</b>
U/G Tank Loading (assume Phase I)	0.85
Tank Breathing (assume same as standard sites)	0.15
Tanker Reloading (assume same as u/g loading)	0.85
Loading Rack releases (PV valve estimates)	0.02
Totals	1.87

### **ASSUMPTIONS / LIMITATIONS:**

- Emission factors are based on the level of installed controls with no adjustment for specific makes and models. Annual emissions are based on the gasoline throughput over the reporting period utilizing the specific emission factors for underground tank loading, breathing, vehicle refueling, and spillage. Maximum hourly emissions are assumed to occur during loading of the underground tanks (maximum deliveries are assumed to be 9200 gallons / delivery tanker or the total site storage tank capacity, whichever is less).

- Gasoline vapor speciation is based on information in the EPA NESHAPS Document for the Gasoline Distribution Industry (vapor speciation for reformulated / oxygenated fuel) and the CAPCOA Industry wide Risk Assessment Guidelines (liquid speciation).

- Emissions of organic vapors containing listed substances from tanks storing diesel, distillate oil, kerosene, jet fuel, motor oil, lubricants, machining oils, and residual oil are assumed to be below reporting levels. Aviation gas, however, should be considered equivalent to gasoline unless site specific information indicates otherwise.

- Bulk storage gasoline terminals with floating and fixed roof tanks, vapor processors, and tanker truck loading racks should not be evaluated with these estimation techniques. Separate calculation procedures have been developed for these processes and equipment.

- All equipment installed and operated in San Diego County is expected to be equipped with submerged fill pipes. All gasoline storage tanks over 250 gallons are expected to be equipped with Phase I controls. All equipment with throughputs exceeding 2000 gallons / month are expected to be equipped with Phase I and II controls.

- District Vapor Recovery staff is developing more refined emission factors for specific types of Phase II control equipment. It is expected that control systems utilizing combustion processors will be more efficient than balance type piping

arrangements. The general Phase II control factors should be used until more equipment specific values are available.

**FORMS:**

Use the reporting form for all sizes of tanks and types of vapor control equipment. Verify the accuracy of the permit equipment description. Indicate the presence of submerged fill pipes, Phase I vapor recovery equipment, and/or Phase II vapor recovery equipment. Do not report diesel throughput or dispensing.