

Area Source Emission Inventory Methodology Gasoline Dispensing Facilities (Revised October 2017)

EMISSION INVENTORY SOURCE CATEGORIES:

SIC = 5541 Gasoline Service Stations

NAICS = 447110 (Gasoline Stations with Convenience Stores); 447190 (Other Gasoline Stations)

EMISSION INVENTORY CODES AND DESCRIPTION:

EIC	CES	DESCRIPTION
330-374-1100-0000	46532	Gasoline Dispensing Tanks – Working Losses
330-376-1100-0000	46557	Gasoline Dispensing Tanks – Breathing Losses
330-378-1100-0000	46540	Vehicle Refueling – Vapor Displacement
330-380-1100-0000	46565	Vehicle Refueling - Spillage

METHODOLOGY DESCRIPTION:

Annual gasoline throughput totals are supplied to the District from dispensing facilities as required by permit through the annual reporting process. Once submitted and entered, an internally-generated report is used to separate the throughput between non-agricultural aboveground storage tanks (ASTs) and underground storage tanks (USTs). Agricultural aboveground storage tanks are exempt from permit at this time and gasoline throughputs are estimated from CARB's 2004 fuel carrier survey.¹ ASTs and USTs have different emission factors due to differences in required vapor control technologies and daily temperature fluctuations. Emission factors are based on the California Air Pollution Control Officers Association's (CAPCOA) values that have been adjusted to better represent Santa Barbara County dispensing facility emissions. See the *Assumptions* section for more details. Emissions for GDF loading losses are calculated using the following equation, which can also be replicated to calculate emissions from breathing, refueling and spillage losses:

$$E_L = TP * [(3C_L * AST_{non-ag}\%) + (1_L * AST_{ag}\%) + (7_L * UST\%)] / 2000$$

E_L = Loading loss emissions (tons)

TP = Gasoline throughput (kgal)

$3C_L$ = Scenario 3C loading loss (lb/kgal)

1_L = Scenario 1 loading loss (lb/kgal)

7_L = Scenario 7 loading loss (lb/kgal)

$AST_{non-ag}\%$ = percentage of gasoline stored in non-agricultural aboveground storage tanks

¹ CARB's Initial Statement of Reasons for Proposed Rulemaking: Adoption of Regulations for the Certification and Testing of Gasoline Vapor Recovery Systems using Aboveground Storage Tanks, Table H-3 (2007)

AST_{ag}% = percentage of gasoline stored in agricultural aboveground storage tanks

UST% = percentage of gasoline stored in underground storage tanks

ASSUMPTIONS:

1. Data provided through the annual reporting process is accurate and complete.
2. All permitted gasoline tanks have CARB-certified systems in accordance with District Rule 316.²
3. Scenario 3C is used to estimate emissions from all non-agricultural ASTs in Santa Barbara County.³
4. Scenario 7 is used to estimate emissions from all USTs in Santa Barbara County.
5. Agricultural tanks are exempt from permit and are assumed not to have any vapor controls.
6. Scenario 1 is used to estimate emissions from all agricultural ASTs in Santa Barbara County.
7. The 2004 fuel carrier survey estimates that there are a total of 539 agricultural ASTs in Santa Barbara County. This is assumed to be reasonable and accurate.
8. Agricultural ASTs have an average annual throughput of 1,600 gallons of gasoline. This is based on the assumption that the average AST is a 500 gallon tank and is re-filled four times a year and each re-filling supplies 80 percent of the AST's maximum capacity.⁴
9. Working loss is equal to loading loss.
10. 100% of Total Organic Gases (TOG) is reactive (i.e., the fraction of reactive organic gases, or FROG, is 1.0).

EMISSION FACTORS:

SBCAPCD GDF Scenarios (lb ROG/kgal)⁵

Scenario	Scenario Description	Loading	Breathing	Refueling	Spillage	Total
1	AST: No Control	8.4	2.1	8.4	0.61	19.51
2	AST: Phase I only	0.42	2.1	8.4	0.61	11.53
3A	AST: Phase I and II w/o Vent Valve	0.42	2.1	0.42	0.42	3.36
3B	AST: Phase I and II w/Vent Valve	0.42	0.525	0.42	0.42	1.785
3C	AST: Phase I EVR and II w/Vent Valve	0.15	0.53	0.42	0.42	1.52
4	UST: No Control	8.4	1	8.4	0.61	18.41
5A	UST: Phase I only	0.42	1	8.4	0.61	10.43
5B	UST: Phase I with Vent Valve	0.42	0.25	8.4	0.61	9.68
6A	UST: Phase I and II w/o Vent Valve	0.42	1	0.42	0.42	2.26
6B	UST: Phase I and II w/Vent Valve	0.42	0.25	0.42	0.42	1.51
6C	UST: Phase I EVR and II w/Vent Valve	0.15	0.25	0.42	0.42	1.24
7	UST: Phase I & Phase II EVR	0.15	0	0.38	0.24	0.77

² SBCAPCD Rule 316: Storage and Transfer of Gasoline (amended 1/15/2009)

³ ARB Regulatory Advisory – July 1, 2014 deadline for aboveground storage tanks to install Phase I EVR

⁴ CARB's Initial Statement of Reasons for Proposed Rulemaking: Adoption of Regulations for the Certification and Testing of Gasoline Vapor Recovery Systems using Aboveground Storage Tanks, Table H-3 (2007)

⁵ CAPCOA's Air Toxics "Hot Spots" Program: Gasoline Service Station Industrywide Risk Assessment Guidelines (1997), with updates from the SBCAPCD GDF EF Memo (2006)

TEMPORAL ACTIVITY:

Activity is assumed to be uniform throughout the year as shown in the table below.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%

EMISSIONS EXAMPLE:**2016 GDF Process Rates and Emissions**

	Throughput (gallons)	Loading (ton/yr)	Breathing (ton/yr)	Refueling (ton/yr)	Spillage (ton/yr)
Aboveground (AST _{non-ag})	1,215,364	0.091	0.319	0.255	0.255
Aboveground (AST _{ag})	862,400	3.622	0.906	3.622	0.263
Underground (UST)	168,242,057	12.618	0	31.966	20.189
Total	170,319,821	16.331	1.225	35.843	20.707