

Area Source Emission Inventory Methodology
Oil Seeps and Gas Seeps
(Revised August 2019)

EMISSION INVENTORY SOURCE CATEGORIES:

Natural (Non-Anthropogenic) Geogenic Sources

EMISSION INVENTORY CODES AND DESCRIPTION:

EIC	CES	DESCRIPTION
920-920-0100-0000	82297	Petroleum Seeps - Gas
920-920-1600-0000	82206	Petroleum Seeps - Oil

METHODOLOGY DESCRIPTION:

These categories pertain to the naturally occurring oil and gas seeps in the Santa Barbara Channel. Various studies have attempted to quantify the varying degree of emissions from oil and gas seeps. This methodology relies on one of the most recent studies performed by the UCSB Department of Earth Science.¹ Emission estimates are separated into the South Central Coast (SCC) and Outer Continental Shelf (OCS) air basins. Emissions (E) are determined by multiplying the estimated annual throughput (TP) of the natural source by the emission factor (EF). The annual throughput is allocated to either the SCC air basin or the OCS air basin depending on the location of the seep.

$$E = TP * EF$$

EMISSION FACTORS²:

Source Category	TOG EF	TOG EF Units	FROG ³
Petroleum Seeps - Gas	48,648.65	lbs/MMscf	0.19
Petroleum Seeps - Oil	105	lbs/bbl	0.99

ASSUMPTIONS:

1. 85% of gas seeps occur near Coal Oil Point, located in the SCC. All remaining gas seeps are located in the OCS.
2. 61% of oil seeps occur near Coal Oil Point, located in the SCC. All remaining oil seeps are located in the OCS.
3. All seeps that are located in the OCS occur within 25 miles from the shore, so they are attributed to the OC1 air basin.

¹ *Hydrocarbon Production from the South Ellwood Oil Field (Platform Holly) and the Effects on Naturally Occurring Oil and Gas Seeps*, James Boles (April 2015)

² As listed in the *Draft EIR/EIS Proposed ARCO Coal Oil Point Project Volume 1, Appendix 4 – Air Quality* (September 1986), and relisted in the *EPA Emission Inventory Improvement Program (EIIP), Volume V: Biogenic Sources Preferred Methods* (May 1996)

³ Fraction of Reactive Organic Gases, ROC Profile 550 for gas seeps and Profile 551 for oil seeps

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:

2018 Oil Seeps and Gas Seeps Process Rates and Emissions

Source Category	Air Basin	Throughput	Throughput Units	TOG (tons/yr)	ROC (tons/yr)
Petroleum Seeps - Gas	SCC	1,204	MMscf/year	29,299	5,567
Petroleum Seeps - Gas	OC1	204	MMscf/year	4,972	945
Petroleum Seeps - Oil	SCC	36,500	bbl/year	1,916	1,897
Petroleum Seeps - Oil	OC1	23,360	bbl/year	1,226	1,214