

Report on Air Emissions from Facilities Burning Waste Tires in California in 2017

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Executive Summary

This report summarizes pollutant emissions from facilities in California that burned waste tires as a supplemental fuel in 2017, the most recent year for which complete data are available. The report has been prepared pursuant to Section 42889.4 of the California Public Resources Code.

Nine facilities in the state of California were permitted to burn waste tires in 2017 in combination with coal, coke, or biomass. Of these, four facilities burned 9.23 million tires as a supplemental fuel in 2017. These data were compiled from local air districts that have jurisdiction to grant air quality permits, and establish, track, and enforce emissions limits.

Emissions data reported are from the combustion devices (kilns and boilers) where waste tires were actually burned. It does not include emissions from other processes such as internal combustion engines, process heaters, etc. **Table 1 and Table 2** summarize the total criteria and toxic pollutant emissions from kilns and boilers at the four facilities where waste tires were burned in 2017. Tires make up between less than one percent and 36 percent of the total fuel burned. Because tires are burned with other fuels, the emissions are for the whole combined-fuel process (e.g., coal, coke, and tires), not just the waste tire portion.

Table 1. Total criteria pollutant emissions from all devices which burn tire-derived fuel in 2017.

Criteria Pollutants	Emissions	Units
Total Organic Gases	129	tons/year
Reactive Organic Gases	119	tons/year
Oxides of Nitrogen	6,068	tons/year
Oxides of Sulfur	562	tons/year
Carbon Monoxide	8,172	tons/year
Total Particulate Matter	378	tons/year
Particulate Matter ≤ 10 micrometers	240	tons/year
Particulate Matter ≤ 2.5 micrometers	124	tons/year

Table 2. Total toxic pollutant emissions from all devices which burn tire-derived fuel in 2017.

Toxic Pollutants	Emissions	Units
Acetaldehyde	45	pounds/year
Benzene	58	pounds/year
Formaldehyde	161	pounds/year
Hydrogen Chloride	5,304	pounds/year
Total Metals	55	pounds/year
Total Polycyclic Aromatic Hydrocarbons	7	pounds/year
Hexavalent Chromium	5,424	milligrams/year
Dioxins	5	milligrams/year
Furans	5	milligrams/year

Introduction

Pursuant to Section 42889.4 of the California Public Resources Code, since 2002, the California Air Resources Board (CARB) has published a report summarizing criteria and toxic air pollutant emissions generated from facilities that burn waste tires as a supplemental fuel. Specifically, this section requires the following:

If facilities are permitted to burn tires in the previous calendar year, the State Air Resources Board, in conjunction with air pollution control districts and air quality management districts, shall post on its Web site, updated on or before July 1 of the subsequent year, information summarizing the types and quantities of air emissions, if any, from those facilities.

Waste tires are defined in Section 42807 of the California Public Resources Code as follows:

“Waste tire” means a tire that is no longer mounted on a vehicle and is no longer suitable for use as a vehicle tire due to wear, damage, or deviation from the manufacturer’s original specifications. A waste tire includes a repairable tire, scrap tire, altered waste tire, and a used tire that is not organized for inspection and resale by size in a rack or a stack in accordance with Section 42806.5, but does not include a tire derived product or crumb rubber.

Tires have a heating value of approximately 13,000 to 15,000 British Thermal Units per pound, roughly the same as a superior quality coal. In California, waste tires are used as tire-derived fuel in two applications: cement kilns that often burn coal or coke, and facilities producing electric power, generally from biomass.

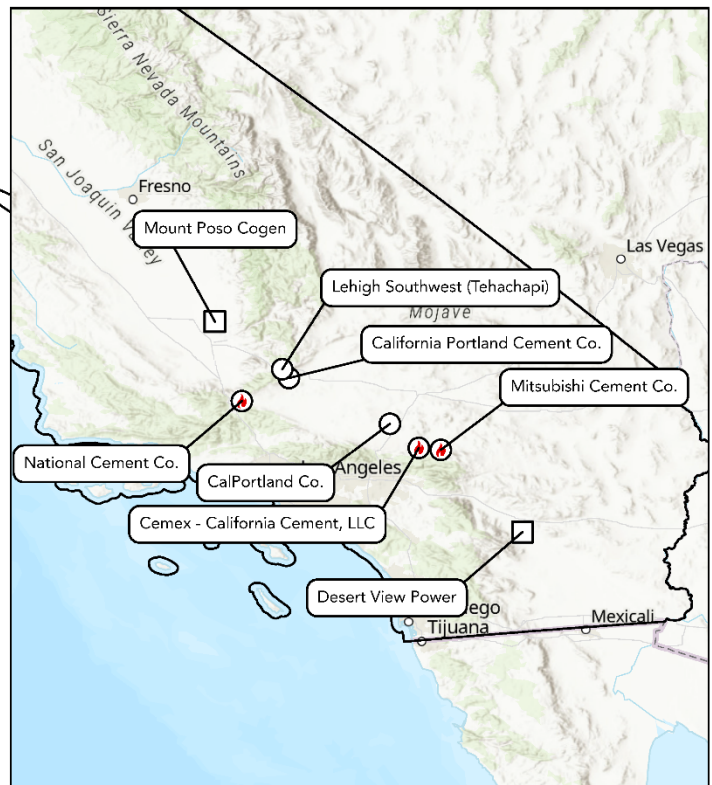
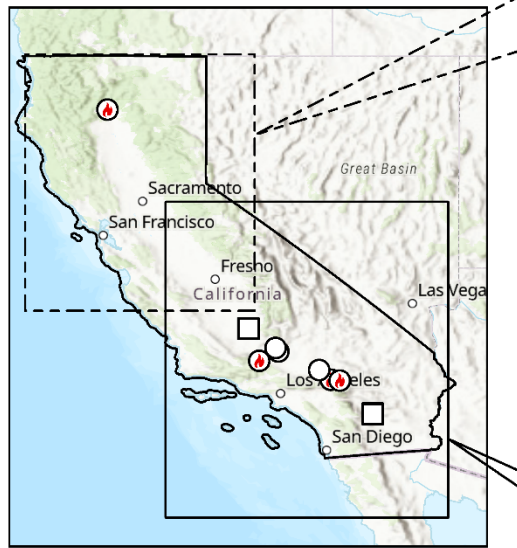
This report summarizes the emissions from the combustion processes (kilns and boilers) where tires were actually burned, rather than the total facility emissions. A more comprehensive emissions inventory for all the operations at each facility is available on the website www.arb.ca.gov/app/emsinv/facinfo/facinfo.php.

Facility Information

Nine facilities in the State are permitted to burn tire-derived fuel. **Figure 1** shows the names and locations of these facilities. Of these, four facilities reported burning tires as a supplemental fuel in 2017 and are labeled as such in Figure 1. All four facilities are cement plants.

Figure 1.

Facilities Permitted to Burn Tires in California



- Cement facility permitted to burn tires
- Cogeneration facility permitted to burn tires
- 🔥 Indicates whether tires were burned

Base map source: California State Parks, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community,

Figure 1. Facilities permitted to burn tires in 2017.

In 2017, about 9.23 million waste tires were burned by these facilities. In all of these facilities, the tires were burned in combination with coal, coke, or biomass. **Table 3** displays the number of tires burned at facilities in 2017, along with the percentage of tires used as part of the total fuel mix.

Table 3. Number of tires burned and percentage of tires in total fuel burned by facilities permitted to burn waste tires in 2017.

Air District	Facility Name and Location	Tires Burned (millions)	Total Fuel (tons)	Tires in Fuel (%)
Eastern Kern	California Portland Cement Company Mojave, CA	0	NA	0
	National Cement Company Lebec, CA	3.78	69,185	35.36
	Lehigh Southwest Cement Tehachapi, CA	0	NA	0
Mojave Desert	Cemex – California Cement, LLC Apple Valley, CA	2.49	115,171	17.76
	CalPortland Company Oro Grande, CA	0	NA	0
	Mitsubishi Cement Company Lucerne Valley, CA	1.89	192,414	8.94
Shasta County	Lehigh Southwest Redding, CA	1.07	31,252	25.50
San Joaquin Valley	Mount Poso Cogeneration Company Bakersfield, CA	0	NA	0
South Coast	Desert View Power Mecca, CA	0	NA	0
Overall ⁽¹⁾	NA	9.23	408,022	11.46

⁽¹⁾ Total may differ from the sum of each individual facility due to rounding.

NA - Not applicable. Facilities that did not burn tires are not required to report total fuel for this survey.

As shown in Table 3, the percentage of tires burned as part of the total fuel mix ranged from less than one percent to 36 percent. The number of tires burned and total weight were reported by the facility operators to the local air districts. Under State law, local air districts are responsible for granting air quality permits, establishing, and enforcing emissions limits, and tracking facility emissions.

Criteria Pollutant Emissions

Table 4 summarizes the criteria pollutant emissions from cement facility kilns or boilers where tires were part of the fuel mix burned in 2017. The data were reported by the local air districts to CARB’s California Emissions Inventory Database and Reporting System (CEIDARS). The pollutants reported in Table 4 are total organic gases (TOG), reactive organic gases (ROG), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), total particulate matter (PM), particulate matter 10 micrometers or less in diameter (PM₁₀), and particulate matter 2.5 micrometers or less in diameter (PM_{2.5}).

Table 4. Criteria pollutant emissions from kilns and boilers at cement facilities where tire-derived fuel was burned in 2017 (tons per year).

Cement Facility	TOG	ROG	NOx	SOx	CO	PM	PM ₁₀	PM _{2.5}
National Cement Company Lebec, CA	28	27	1,288	11	2,992	139	58	11
Cemex – California Cement, LLC Apple Valley, CA	72	66	2,298	198	1,148	141	92	46
Mitsubishi Cement Company Lucerne Valley, CA	25	23	1,880	344	2,510	51	44	38
Lehigh Southwest Redding, CA	3	3	602	8	1,522	46	46	29
Grand Total ⁽¹⁾	129	119	6,068	562	8,172	378	240	124

⁽¹⁾ Total may differ from the sum of each individual facility due to rounding.

Because tires are burned in combination with other fuels, the data represent emissions from the whole combined-fuel process (e.g., coal and tires), not just the tire-derived fuel portion.

Toxic Pollutant Emissions

Table 5 summarizes the estimated toxic air pollutant emissions from the cement kilns and boilers where tires were part of the fuel mix burned in 2017. In most cases, the toxic emission estimates are reported in pounds per year (lbs/yr). However, due to the comparatively lower emission rates of hexavalent chromium, dioxins and furans, the estimates for these substances are reported in units of milligrams per year (mg/yr).

Table 5. Estimated toxic pollutant emissions from kilns and boilers at cement facilities where tire-derived fuel was burned in 2017.

Cement Facility	Acetaldehyde	Benzene	Formaldehyde	Hydrogen Chloride	Total Metals	Total PAHs ⁽²⁾	Hexavalent Chromium	Dioxins	Furans
Units	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	mg/yr	mg/yr	mg/yr
National Cement Company Lebec, CA	10	12	34	1,134	12	1	1,160	1	1
Cemex – California Cement, LLC Apple Valley, CA	13	16	45	1,485	15	2	1,518	1	1
Mitsubishi Cement Company Lucerne Valley, CA	19	25	68	2,240	23	3	2,291	2	2
Lehigh Southwest Redding, CA	4	5	14	445	5	< 1	455	< 1	< 1
Grand Total ⁽¹⁾	45	58	161	5,304	55	7	5,424	5	5

⁽¹⁾ Total may differ from the sum of each individual facility due to rounding.

⁽²⁾ Polycyclic Aromatic Hydrocarbons

The estimated emissions in Table 5 are primarily based on source tests in which tires were burned in combination with other fuels. As such, the data represent emissions from the whole combined-fuel process (e.g., coal and tires), not just the tire-derived fuel portion. Cement plant emission factors were derived from a source test at Mitsubishi Cement.

Conclusions

Of nine facilities permitted to burn waste tires in California, four burned tires as a supplemental fuel in 2017. These facilities burned approximately 9.23 million waste tires in combination with coal, coke, or biomass. As is typical for combustion sources, the bulk of emissions for the combined fuel were criteria pollutants, particularly NO_x and CO, with comparatively lower SO_x, PM₁₀, PM_{2.5}, TOG and ROG. As mentioned previously, emission values in this report represent total emissions only from devices which burned tires.

References

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