



## DRAF TECHNICAL MEMORANDUM

**To:** Thomas Moore, Western Regional Air Partnership  
**From:** John Grant, Rajashi Parikh, and Alison Pollack  
**Date:** March 3, 2009  
**Subject:** California PRP18b on-road, off-road equipment, and locomotive emission inventory updates

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The current PRP18a emission inventory estimates for mobile sources in California were originally developed by ENVIRON in 2005<sup>1</sup> and then updated in the fall of 2007 (see Appendix A<sup>2</sup>). Those updated inventories reflected all “on the books” regulations in effect at that time. Since mid-2007, both the EPA and the California Air Resources Board (CARB) have promulgated new mobile source emissions standards. ENVIRON has developed updated California on-road, off-road equipment, and locomotive emission inventories for 2018, based on the most recently enacted regulations, for use in PRP18b regional air quality modeling to be conducted by WRAP. These emission inventory updates were developed based on discussion with and inputs from CARB staff. A brief description of emission inventory inputs, revisions, and processing is presented below.

### ON-ROAD EMISSIONS

On December 12, 2008 California Air Resources Board (CARB) adopted the Statewide Truck and Bus rule requiring retrofitting of older on-road diesel trucks (<http://www.arb.ca.gov/regact/2008/truckbus08/truckbus08.htm>). The October 2008 Staff Report (Initial Statement of Reasons, ISOR) says that the rule will result in significant NO<sub>x</sub> and PM emissions reductions: 105 TPD NO<sub>x</sub> and 7.8 TPD PM statewide in 2017. While the effect of the rule will differ by county, CARB has not completed their analysis of the county-level effects. CARB therefore provided statewide heavy-duty diesel adjustment factors by pollutant.

On-road emissions were updated by applying the scaling factors provided by the CARB as shown in Table 1 to the previously generated 2018 on-road emission inventories (see Appendix A). Emissions from all other vehicle types were held constant from the previous 2018 emission inventory.

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<sup>1</sup> Pollack, A.K., L. Chan, P. Chandraker, J. Grant, C. Lindhjem, S. Rao, J. Russell, C. Tran. 2006. “WRAP MOBILE Source Emission Inventories Update.” Prepared for Western Governors’ Association, Denver, CO. May.

<sup>2</sup> The September 2007 memo in the Appendix updated California emissions for 2002 and 2018. The 2002 emissions updates were used in the Plan02d emissions, which were used in WRAP air quality modeling in late 2007. The 2018 emissions updates reported therein have not been used in any modeling, and will be replaced by the emissions updates reported in this memo for PRP18b.

**Table 1.** CA 2018 on-road emission inventory scaling factors.

<b>Pollutant</b>	<b>Medium Heavy-Duty Diesel Trucks</b>	<b>Heavy Heavy-Duty Diesel Trucks</b>
Reactive Organic Compounds (ROG)	0.6277	0.5969
Nitrogen Oxides (NOx)	0.4450	0.6658
Particulate Matter (PM10 and PM2.5)*	0.6885	0.4624

\* exhaust mode only

## OFF-ROAD EMISSIONS

CARB's In-Use Off-Road Diesel Vehicles regulation was adopted on July 26, 2007 (<http://www.arb.ca.gov/regact/2007/ordiesl07/ordiesl07.htm>). This regulation is not incorporated into the OFFROAD2007 model, and was not incorporated into PRP18a emission inventory for CA. The Technical Support Document for the rule estimates statewide emissions reductions of about 5 TPD for PM and 48 TPD for NOx.

Off-road equipment emissions were generated by reducing emissions from the PRP18a emission inventory in accordance with percent reductions for equipment types affected, as provided by CARB. EIC codes for which emissions were reduced are shown in Appendix B. CARB's estimated percent reductions from the previous 2018 off-road equipment emission inventory (i.e., emissions estimated without this regulation implemented) to be applied to the appropriate EIC codes are 21.3% for NOx, and 64.3% for PM10 and PM2.5.

In addition to this CARB regulation, EPA announced final locomotive emissions standards (Tier 4), and estimated the expected benefit of normal fleet turnover and the additional benefit of the rule<sup>3</sup>. The regulations include a retrofit of existing equipment as well as new locomotive emission standards. CARB staff developed their own estimates of the effects of this rule on all locomotive emissions in California as 9.3% for NOx, 29.9% for PM10 and PM2.5, and 42.4% for HC.

## GENERATION OF SMOKE AND NIF FILES

Emissions files were generated in the format needed for SMOKE emissions processing as described in Grant et.al.<sup>Error! Bookmark not defined.</sup> The pollutants included in the SMOKE files are volatile organic compounds (VOC), NO<sub>x</sub>, carbon monoxide (CO), ammonia (NH<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter less than ten microns (PM10), EC10, OC10, SO<sub>4</sub>(10), particulate matter less than 2.5 microns (PM2.5), EC2.5, OC2.5, SO<sub>4</sub>(2.5), coarse PM (PMC), NO, and NO<sub>2</sub>. Separate files were prepared by year and by season. The SMOKE files include emissions by county and SCC, which indicates equipment type and fuel type.

Annual emissions files in EPA's NIF format were also prepared for submission to the WRAP Emissions Data Management System (EDMS), the on-line repository of all WRAP emissions data ([http://www.wrapedms.org/default\\_login.asp](http://www.wrapedms.org/default_login.asp)). These NIF files contain a smaller set of

<sup>3</sup> EPA, 2008. "Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters Per Cylinder," Assessment and Standards Division Office of Transportation and Air Quality U.S. Environmental Protection Agency, EPA420-R-08-001, March.

pollutants; the additional pollutants needed for air quality modeling are not included. Annual emissions NIF files were prepared for 2018.

## EMISSIONS SUMMARIES

Annual 2018 on-road emissions by year for the previous (PRP18a) and current updated emission inventory are presented in Table 2. Results show considerable decreases in VOC, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions for heavy-duty diesel vehicles from the previous 2018 emissions inventory as a result of recent regulations. The emissions reductions from the PRP18a emission inventory for heavy-duty diesel vehicles (HDDV) in Table 2 are not exactly the same as the percent reductions implied in Table 1 because the HDDV category includes not just medium and heavy heavy-duty vehicles, but also a relatively small amount of emissions from light heavy-duty vehicles, urban and school buses, and motor homes. Annual off-road emissions by year are shown in Table 3. Results show considerable decreases in NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> off-road emissions from the previous 2018 emissions inventory as a result of recent regulations.

**Table 2.** California annual on-road emissions totals (tons per day).

Vehicle Type	VOC	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	NH <sub>3</sub>
<b>2018 revised</b>							
LDGV	110.4	72.6	907.0	18.3	10.7	2.0	2.0
LDGT1	120.0	98.6	984.7	17.3	11.9	1.7	1.4
LDGT2	37.7	39.7	351.6	5.9	4.2	0.7	0.4
HDGV	30.1	54.9	258.1	1.0	0.5	0.2	0.1
MC	40.4	11.5	273.2	0.3	0.2	0.0	0.0
LDDV	0.0	0.5	0.2	0.0	0.0	0.0	0.0
LDDT	0.2	4.2	1.6	0.2	0.1	0.0	0.0
HDDV	19.2	313.1	151.0	11.5	8.5	1.1	0.2
<b>2018 Statewide Totals</b>	<b>358.2</b>	<b>595.1</b>	<b>2927.8</b>	<b>54.4</b>	<b>36.0</b>	<b>5.7</b>	<b>4.1</b>
<b>2018 previous</b>							
LDGV	110.4	72.6	907.3	18.3	10.7	2.0	2.0
LDGT1	120.0	98.6	984.7	17.3	11.9	1.7	1.4
LDGT2	37.7	39.7	351.6	5.9	4.2	0.7	0.4
HDGV	30.1	54.9	258.1	1.0	0.5	0.2	0.1
MC	40.4	11.5	273.2	0.3	0.2	0.0	0.0
LDDV	0.0	0.5	0.2	0.0	0.0	0.0	0.0
LDDT	0.2	4.2	1.6	0.2	0.1	0.0	0.0
HDDV	30.3	414.1	151.0	18.2	14.7	1.1	0.2
<b>2018 Statewide Totals</b>	<b>369.2</b>	<b>696.1</b>	<b>2,927.8</b>	<b>61.2</b>	<b>42.2</b>	<b>5.7</b>	<b>4.1</b>
<b>2018 percent change from revised to previous</b>							
LDGV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LDGT1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LDGT2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HDGV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LDDV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LDDT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HDDV	-36.6%	-24.4%	0.0%	-37.4%	-42.5%	0.0%	0.0%
<b>2018 Statewide Totals</b>	<b>-3.0%</b>	<b>-14.5%</b>	<b>0.0%</b>	<b>-11.1%</b>	<b>-14.9%</b>	<b>0.0%</b>	<b>0.0%</b>

**Table 3. California annual off-road emissions totals (tons per day).**

<b>Off-road Category</b>	<b>VOC</b>	<b>NOx</b>	<b>CO</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>NH3</b>
<b>2018 revised</b>							
Agricultural Equipment	8.6	51.7	94.3	2.3	2.1	0.00	0.00
Airport Ground Support Equipment	0.8	4.6	30.4	0.0	0.0	0.00	0.00
Commercial Equipment	11.0	18.5	351.7	1.2	0.9	0.00	0.00
Construction and Mining Equipment	23.5	129.4	204.6	2.7	2.3	0.02	0.02
Industrial Equipment	9.2	59.6	377.7	1.0	0.9	0.01	0.01
Lawn and Garden Equipment	81.6	10.5	596.7	0.9	0.7	0.00	0.00
Logging Equipment	0.5	2.6	12.7	0.1	0.1	0.00	0.00
Oil Field Equipment	1.7	13.1	8.4	0.1	0.1	0.00	0.00
Pleasure Craft	118.3	38.2	761.8	15.3	11.5	0.00	0.00
Recreational Equipment	87.9	2.8	259.4	0.6	0.4	0.69	0.96
Locomotive	7.08	121.8	44.3	3.0	2.8	0.07	0.05
Aircraft	46.3	78.4	341.0	10.4	10.3	5.23	0.02
<b>2018 Statewide Totals</b>	<b>396.5</b>	<b>531.2</b>	<b>3,083.0</b>	<b>37.6</b>	<b>32.1</b>	<b>6.02</b>	<b>1.07</b>
<b>2018 previous</b>							
Agricultural Equipment	8.6	51.7	94.3	2.3	2.1	0.00	0.00
Airport Ground Support Equipment	0.8	5.2	30.4	0.1	0.1	0.00	0.00
Commercial Equipment	11.0	18.5	351.7	1.2	0.9	0.00	0.00
Construction and Mining Equipment	23.5	163.8	204.6	6.7	5.9	0.02	0.02
Industrial Equipment	9.2	62.6	377.7	1.2	1.1	0.01	0.01
Lawn and Garden Equipment	81.6	10.5	596.7	0.9	0.7	0.00	0.00
Logging Equipment	0.5	2.6	12.7	0.1	0.1	0.00	0.00
Oil Field Equipment	1.7	16.7	8.4	0.4	0.4	0.00	0.00
Pleasure Craft	118.3	38.2	761.8	15.3	11.5	0.00	0.00
Recreational Equipment	87.9	2.8	259.4	0.6	0.4	0.69	0.96
Locomotive	12.3	134.2	44.3	4.3	4.0	0.07	0.06
Aircraft	46.3	78.4	341.0	10.4	10.3	5.23	0.02
<b>2018 Statewide Totals</b>	<b>401.6</b>	<b>585.3</b>	<b>3,083.0</b>	<b>43.7</b>	<b>37.4</b>	<b>6.02</b>	<b>1.07</b>
<b>2018 change from previous to revised</b>							
Agricultural Equipment	0%	0%	0%	0%	0%	0%	0%
Airport Ground Support Equipment	0%	-13%	0%	-57%	-64%	0%	0%
Commercial Equipment	0%	0%	0%	0%	0%	0%	0%
Construction and Mining Equipment	0%	-21%	0%	-60%	-61%	0%	0%
Industrial Equipment	0%	-5%	0%	-18%	-18%	0%	0%
Lawn and Garden Equipment	0%	0%	0%	0%	0%	0%	0%
Logging Equipment	0%	0%	0%	0%	0%	0%	0%
Oil Field Equipment	0%	-21%	0%	-64%	-64%	0%	0%
Pleasure Craft	0%	0%	0%	0%	0%	0%	0%
Recreational Equipment	0%	0%	0%	0%	0%	0%	0%
Locomotive	-42%	-9%	0%	-30%	-30%	0%	0%
Aircraft	0%	0%	0%	0%	0%	0%	0%
<b>2018 Statewide Totals</b>	<b>-1%</b>	<b>-9%</b>	<b>0%</b>	<b>-14%</b>	<b>-14%</b>	<b>0%</b>	<b>0%</b>

## APPENDIX A

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ENVIRON

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# ENVIRON

## TECHNICAL MEMORANDUM

**To:** Thomas Moore, Western Regional Air Partnership  
**From:** John Grant, Rajashi Parikh, and Alison Pollack  
**Date:** September 27, 2007  
**Subject:** California 2002 and 2018 on-road, off-road equipment, aircraft, and locomotive emission inventory updates

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Per the request of the Western Regional Air Partnership (WRAP), ENVIRON has processed state of California on-road, off-road equipment, locomotive, and aircraft emission inventories for 2002 and 2018 for use in regional air quality modeling to be conducted by WRAP. A brief description of emission inventory inputs and processing is presented below.

### ON-ROAD EMISSIONS

On-road emissions were generated by running the California Air Resources Board (CARB) EMFAC2007 model. To generate emissions, EMFAC2007 was run for the middle month of each season (month of January, April, July, and October for winter, spring, summer and autumn, respectively) to derive weekday emissions estimates for each season and pollutant of interest. Average day adjustment factors by vehicle class were applied to weekday emissions to generate seasonal average day emission as in the previous WRAP mobile source emission inventory<sup>1</sup>. Annual average day emissions were estimated as the average of seasonal daily emission estimates. Ammonia emissions, not available in EMFAC2007, were estimated using CARB provided 1999 and 2014 ammonia emissions factors of 100 milligrams per mile and 24 milligrams per mile, respectively; 2002 and 2018 ammonia emission factors were estimated by linearly interpolating and linearly extrapolating the CARB provided emission factors.

Additional pollutants were estimated and SMOKE and National Inventory Format (NIF) files were generated as described below.

### OFF-ROAD EMISSIONS

CARB provided emissions estimates for aircraft, locomotive, and traditional off-road equipment types that were generated using internal models and spreadsheets. CARB provided county-level average day annual, winter, and summer emissions for off-road equipment, aircraft, and locomotive emissions for 2002 and 2018.

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<sup>1</sup> Pollack, A.K., L. Chan, P. Chandraker, J. Grant, C. Lindhjem, S. Rao, J. Russell, C. Tran. 2006. "WRAP MOBILE Source Emission Inventories Update." Prepared for Western Governors' Association, Denver, CO. May.

A number of processing steps were required to generate off-road emissions for California for input to WRAP:

- The CARB equipment type codes were matched to EPA NONROAD equipment codes (SCCs) using a CARB cross-reference file.
- Per CARB input, autumn emissions were assumed to be equivalent to summer emissions and spring emissions were assumed equivalent to winter emissions.
- The CARB files did not include ammonia emissions. Ammonia emissions were estimated using scaling factors based on sulfur dioxide emissions, derived using gasoline and nonroad diesel fuel sulfur values provided by CARB.

Additional pollutants were estimated and SMOKE and NIF files were generated as described below.

## **ADDITIONAL POLLUTANTS**

For CMAQ modeling, additional model species are required beyond what was provided by CARB and generated by EMFAC. Specifically, particulate matter needed to be split into elemental carbon (EC), organic carbon (OC), and sulfate (SO<sub>4</sub>); and nitrogen oxides (NO<sub>x</sub>) needed to be split into NO and NO<sub>2</sub>. Emissions estimates for these additional model species were generated consistent with methodology utilized in the most recent WRAP mobile sources emissions inventory<sup>1</sup>.

## **GENERATION OF SMOKE AND NIF FILES**

Emissions files were generated in the format needed for SMOKE emissions processing. For these files the additional pollutants described above were calculated. The pollutants included in the SMOKE files are volatile organic compounds (VOC), NO<sub>x</sub>, carbon monoxide (CO), ammonia (NH<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter less than ten microns (PM<sub>10</sub>), EC<sub>10</sub>, OC<sub>10</sub>, SO<sub>4</sub>(10), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), EC<sub>2.5</sub>, OC<sub>2.5</sub>, SO<sub>4</sub>(2.5), coarse PM (PMC), NO, and NO<sub>2</sub>.

Separate files were prepared by year and by season. The SMOKE files include emissions by county and SCC, which indicates equipment type and fuel type.

Annual emissions files in EPA's NIF format were also prepared for submission to the WRAP Emissions Data Management System (EDMS), the on-line repository of all WRAP emissions data ([http://www.wrapedms.org/default\\_login.asp](http://www.wrapedms.org/default_login.asp)). These NIF files contain a smaller set of pollutants; the additional pollutants needed for air quality modeling are not included. Annual emissions NIF files were prepared for 2002 and 2018.

## **EMISSIONS SUMMARIES**

Annual on-road emissions by year and MOBILE6 vehicle type are presented in Table 1. Results show considerable decreases in VOC, NO<sub>x</sub>, CO, SO<sub>x</sub>, and NH<sub>3</sub> as well as decreases in PM<sub>10</sub> and PM<sub>2.5</sub> emissions from 2002 to 2018. Annual off-road emissions by year are shown in Table 2. Results show considerable decreases in VOC, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> and SO<sub>x</sub> off-road emissions from 2002 to 2018.

**Table 1.** California annual on-road emissions totals (tons per day).

Vehicle Type	VOC	NOx	CO	PM10	PM2.5	SOx	NH3
<b>2002</b>							
LDGV	447.6	351.4	3,873.2	15.0	8.5	2.6	39.3
LDGT1	277.9	342.9	3,049.1	11.5	7.3	1.9	24.4
LDGT2	66.2	108.1	827.2	3.1	2.0	0.7	6.3
HDGV	94.2	109.7	1,047.6	0.7	0.4	0.2	1.8
MC	33.0	6.0	244.1	0.2	0.2	0.0	0.4
LDDV	0.5	3.3	1.9	0.4	0.4	0.1	0.0
LDDT	0.7	12.6	5.2	0.7	0.5	0.3	0.0
HDDV	47.9	769.9	209.6	34.9	31.0	5.9	0.1
<b>2002 Statewide Totals</b>	<b>968.1</b>	<b>1,704.1</b>	<b>9,258.0</b>	<b>66.6</b>	<b>50.2</b>	<b>11.7</b>	<b>72.3</b>
<b>Previous 2002 Statewide Totals</b>	<b>890.3</b>	<b>1,592.0</b>	<b>8,939.1</b>	<b>42.7</b>	<b>28.8</b>	<b>11.1</b>	<b>60.6</b>
<b>2018</b>							
LDGV	110.4	72.6	907.3	18.3	10.7	2.0	2.0
LDGT1	120.0	98.6	984.7	17.3	11.9	1.7	1.4
LDGT2	37.7	39.7	351.6	5.9	4.2	0.7	0.4
HDGV	30.1	54.9	258.1	1.0	0.5	0.2	0.1
MC	40.4	11.5	273.2	0.3	0.2	0.0	0.0
LDDV	0.0	0.5	0.2	0.0	0.0	0.0	0.0
LDDT	0.2	4.2	1.6	0.2	0.1	0.0	0.0
HDDV	30.3	414.1	151.0	18.2	14.7	1.1	0.2
<b>2018 Statewide Totals</b>	<b>369.2</b>	<b>696.1</b>	<b>2,927.8</b>	<b>61.2</b>	<b>42.2</b>	<b>5.7</b>	<b>4.1</b>
<b>Previous 2018 Statewide Totals</b>	<b>332.0</b>	<b>556.3</b>	<b>2,933.5</b>	<b>48.3</b>	<b>30.8</b>	<b>5.2</b>	<b>81.0</b>

**Table 2.** California annual off-road emissions totals (tons per day).

Off-road Category	VOC	NOx	CO	PM10	PM2.5	SOx	NH3
<b>2002</b>							
Agricultural Equipment	25.7	131.9	126.5	7.8	7.0	0.69	0.07
Airport Ground Support Equipment	2.2	12.5	28.1	0.2	0.2	0.00	0.00
Commercial Equipment	28.7	38.7	434.1	1.9	1.6	0.03	0.00
Construction and Mining Equipment	54.8	356.6	256.1	19.5	17.7	1.06	0.10
Industrial Equipment	29.6	132.2	290.5	5.4	4.9	0.29	0.18
Lawn and Garden Equipment	134.4	13.1	608.0	1.1	0.8	0.01	0.00
Logging Equipment	1.7	10.4	16.8	0.5	0.5	0.00	0.00
Oil Field Equipment	4.1	39.7	20.0	1.5	1.3	0.13	0.01
Pleasure Craft	152.4	25.2	724.6	6.8	5.1	0.00	0.00
Recreational Equipment	52.9	1.2	181.1	0.4	0.2	0.42	0.42
Locomotive	11.9	188.1	31.2	4.6	4.2	6.97	0.07
Aircraft	32.5	46.3	249.9	8.3	8.2	3.27	0.01
<b>2002 Statewide Totals</b>	<b>530.8</b>	<b>995.9</b>	<b>2,966.9</b>	<b>57.9</b>	<b>51.6</b>	<b>12.87</b>	<b>0.87</b>
<b>Previous 2002 Statewide Totals</b>	<b>530.0</b>	<b>899.5</b>	<b>3,142.7</b>	<b>62.2</b>	<b>55.4</b>	<b>20.66</b>	<b>1.50</b>
<b>2018</b>							
Agricultural Equipment	8.6	51.7	94.3	2.3	2.1	0.00	0.00
Airport Ground Support Equipment	0.8	5.2	30.4	0.1	0.1	0.00	0.00
Commercial Equipment	11.0	18.5	351.7	1.2	0.9	0.00	0.00
Construction and Mining Equipment	23.5	163.8	204.6	6.7	5.9	0.02	0.02
Industrial Equipment	9.2	62.6	377.7	1.2	1.1	0.01	0.01
Lawn and Garden Equipment	81.6	10.5	596.7	0.9	0.7	0.00	0.00
Logging Equipment	0.5	2.6	12.7	0.1	0.1	0.00	0.00
Oil Field Equipment	1.7	16.7	8.4	0.4	0.4	0.00	0.00
Pleasure Craft	118.3	38.2	761.8	15.3	11.5	0.00	0.00
Recreational Equipment	87.9	2.8	259.4	0.6	0.4	0.69	0.96
Locomotive	12.3	134.2	44.3	4.3	4.0	0.07	0.06
Aircraft	46.3	78.4	341.0	10.4	10.3	5.23	0.02
<b>2018 Statewide Totals</b>	<b>401.6</b>	<b>585.3</b>	<b>3,083.0</b>	<b>43.7</b>	<b>37.4</b>	<b>6.02</b>	<b>1.07</b>
<b>Previous 2018 Statewide Totals</b>	<b>305.9</b>	<b>458.4</b>	<b>2,711.1</b>	<b>40.5</b>	<b>34.9</b>	<b>5.18</b>	<b>2.28</b>

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## Appendix B

### Off-road Equipment EICs Associated with the CARB in-use diesel regulation

Category	EIC Code	Equipment Type
Airport Ground Support Equipment	86088912100070	A/C Tug Narrow Body
	86088912100090	A/C Tug Wide Body
	86088912100720	Baggage Tug
	86088912100790	Belt Loader
	86088912100820	Bobtail
	86088912100990	Cargo Loader
	86088912101010	Cargo Tractor
	86088912102720	Forklift
	86088912104180	Lift
Construction and Mining Equipment	86088912105660	Other GSE
	86088712100880	Bore/Drill Rigs
	86088712100900	Bore/Drill Rigs
	86088712100920	Bore/Drill Rigs
	86088712100930	Bore/Drill Rigs
	86088712100940	Bore/Drill Rigs
	86088712100950	Bore/Drill Rigs
	86088712100960	Bore/Drill Rigs
	86088712102000	Cranes
	86088712102020	Cranes
	86088712102040	Cranes
	86088712102050	Cranes
	86088712102060	Cranes
	86088712102070	Cranes
	86088712102080	Cranes
	86088712102100	Crawler Tractors
	86088712102110	Crawler Tractors
	86088712102120	Crawler Tractors
	86088712102130	Crawler Tractors
	86088712102140	Crawler Tractors
	86088712102150	Crawler Tractors
	86088712102160	Crawler Tractors
	86088712102580	Excavators
	86088712102590	Excavators
	86088712102600	Excavators
	86088712102610	Excavators
	86088712102620	Excavators
	86088712102630	Excavators
	86088712103700	Graders
	86088712103710	Graders
	86088712103720	Graders
	86088712103730	Graders
	86088712103740	Graders
	86088712103750	Graders
	86088712104700	Off-Highway Tractors
	86088712104710	Off-Highway Tractors
	86088712104720	Off-Highway Tractors
	86088712104730	Off-Highway Tractors
	86088712104740	Off-Highway Tractors
	86088712104750	Off-Highway Trucks
86088712104760	Off-Highway Trucks	
86088712104770	Off-Highway Trucks	

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Category	EIC Code	Equipment Type
	86088712104780	Off-Highway Trucks
	86088712104790	Off-Highway Trucks
	86088712105360	Other Construction Equipment
	86088712105370	Other Construction Equipment
	86088712105390	Other Construction Equipment
	86088712105410	Other Construction Equipment
	86088712106110	Pavers
	86088712106120	Pavers
	86088712106130	Pavers
	86088712106140	Pavers
	86088712106150	Pavers
	86088712106210	Paving Equipment
	86088712106230	Paving Equipment
	86088712106240	Paving Equipment
	86088712106250	Paving Equipment
	86088712107680	Rollers
	86088712107700	Rollers
	86088712107710	Rollers
	86088712107720	Rollers
	86088712107730	Rollers
	86088712107750	Rough Terrain Forklifts
	86088712107770	Rough Terrain Forklifts
	86088712107790	Rough Terrain Forklifts
	86088712107800	Rough Terrain Forklifts
	86088712107810	Rough Terrain Forklifts
	86088712107820	Rubber Tired Dozers
	86088712107830	Rubber Tired Dozers
	86088712107840	Rubber Tired Dozers
	86088712107850	Rubber Tired Dozers
	86088712107860	Rubber Tired Dozers
	86088712107890	Rubber Tired Loaders
	86088712107910	Rubber Tired Loaders
	86088712107920	Rubber Tired Loaders
	86088712107930	Rubber Tired Loaders
	86088712107940	Rubber Tired Loaders
	86088712107950	Rubber Tired Loaders
	86088712107960	Rubber Tired Loaders
	86088712108020	Scrapers
	86088712108030	Scrapers
	86088712108040	Scrapers
	86088712108050	Scrapers
	86088712108060	Scrapers
	86088712108270	Skid Steer Loaders
	86088712108290	Skid Steer Loaders
	86088712108600	Surfacing Equipment
	86088712108610	Surfacing Equipment
	86088712108620	Surfacing Equipment
	86088712108630	Surfacing Equipment
	86088712108640	Surfacing Equipment
	86088712108650	Surfacing Equipment
	86088712109320	Tractors/Loaders/Backhoes
	86088712109340	Tractors/Loaders/Backhoes
	86088712109350	Tractors/Loaders/Backhoes
	86088712109360	Tractors/Loaders/Backhoes
	86088712109420	Trenchers

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Category	EIC Code	Equipment Type
	86088712109470	Trenchers
	86088712109490	Trenchers
	86088712109500	Trenchers
	86088712109510	Trenchers
	86088712109530	Trenchers
<b>Industrial Equipment</b>	86088612100210	Aerial Lifts
	86088612100230	Aerial Lifts
	86088612100240	Aerial Lifts
	86088612100250	Aerial Lifts
	86088612102890	Forklifts
	86088612102920	Forklifts
	86088612102950	Forklifts
	86088612102960	Forklifts
	86088612102970	Forklifts
	86088612105560	Other General Industrial Equipmen
	86088612105580	Other General Industrial Equipmen
	86088612105600	Other General Industrial Equipmen
	86088612105610	Other General Industrial Equipmen
	86088612105620	Other General Industrial Equipmen
	86088612105630	Other General Industrial Equipmen
	86088612105640	Other General Industrial Equipmen
	86088612105810	Other Material Handling Equipment
	86088612105830	Other Material Handling Equipment
	86088612105840	Other Material Handling Equipment
	86088612105850	Other Material Handling Equipment
86088612105860	Other Material Handling Equipment	
<b>Oil Drilling</b>	86089112102391	Drill Rig (Mobile)
	86089112102392	Drill Rig (Mobile)
	86089112102393	Drill Rig (Mobile)
	86089112102394	Drill Rig (Mobile)
	86089112102395	Drill Rig (Mobile)
	86089112102396	Drill Rig (Mobile)
	86089112102397	Drill Rig (Mobile)
	86089112102398	Workover Rig (Mobile)
	86089112102399	Workover Rig (Mobile)
	86089112102400	Workover Rig (Mobile)
	86089112102401	Workover Rig (Mobile)
	86089112102402	Workover Rig (Mobile)
	86089112102403	Workover Rig (Mobile)
	86089112102406	Workover Rig (Mobile)

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