Appendix B

Emissions Inventory Methodology

Emission Estimation Methodology for Cargo Handling Equipment Operating at Ports and Intermodal Rail Yards in California

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EXECUTIVE SUMMARY

The California Air Resources Board (ARB) staff developed a statewide emission estimation methodology for cargo handling equipment at ports and intermodal rail yards. This effort was undertaken to support the development of a statewide emission control strategy addressing emissions from cargo handling equipment at ports and intermodal rail yards. The methodology reflects updated population and activity data for cargo handling equipment statewide by equipment type based on a survey conducted by ARB in early 2004 and recent emission inventories prepared for the ports of Los Angeles and Long Beach. Emissions estimates were developed for nine equipment types associated with California's ports and intermodal rail yards including aerial lifts, cranes, excavators, forklifts, container handling equipment, other general industrial equipment, sweeper/scrubbers, tractor/loader/backhoes, and yard trucks. A total of 16 ports and 14 intermodal rail yards are included in this estimation.

The ARB staff estimates that in 2004, cargo handling equipment diesel-fueled engines operating at ports and intermodal rail yards in California emitted approximately 0.65 tons per day of diesel PM. In addition, those engines are estimated to have emitted approximately 19 tons per day of oxides of nitrogen (NOx). As shown in Table ES-1, yard trucks, container handling equipment (top picks, sides picks, etc.), and cranes are responsible for the majority of the emissions representing approximately 90 percent of the emissions for all pollutants.

Table ES-1: Estimated Statewide 2004 Cargo Handling Equipment Emissions

Equipment Types	Numbers of Equipment	2004 Pollutant Emissions, Tons Per Day	
		NOx	Diesel PM
Cranes	**321**	1.93	0.07
Excavators	**28**	0.24	0.01
Forklifts	**464**	0.54	0.03
Container Handling Equipment	**487**	3.25	0.11
Other, General Industrial Equipment	**40**	0.08	<0.01
Sweeper/Scrubbers	**28**	0.04	<0.01
Tractor/Loader/ Backhoe	**93**	0.18	0.01
Yard Trucks	**2,277**	12.78	0.42
Totals	**3,738**	19.04	0.65

Emissions were also allocated to the districts based on the location of a port or intermodal rail yard. Only 8 of the 35 air pollution control (APCD) or air quality management districts (AQMD) (districts) in California had emissions associated with ports or intermodal rail yards. A summary of the emission estimates for the 8 districts with the highest estimates of emissions is provided in Table ES-2. As is shown, the

districts with the ports or intermodal rail yards responsible for the largest contributions of emissions are in the South Coast AQMD and the Bay Area AQMD. Those two districts account for approximately 90 percent of the statewide numbers of cargo handling equipment and 85 percent of the emissions of all pollutants from cargo handling equipment.

Table ES-2: Estimated District Allocations of Statewide 2004 Cargo Handling Equipment Emissions

District	NOx	Diesel PM
Bay Area	3.34	0.11
Mojave	0.08	<0.01
North Coast	0.06	<0.01
San Diego	0.75	0.03
San Joaquin	0.55	0.01
South Coast	13.38	0.45
Ventura	0.66	0.02
Yolo-Solano	0.08	<0.01

Note 1: The following districts had no cargo handling equipment emissions allocated to them: Amador, Antelope Valley, Butte, Calaveras, Colusa, El Dorado, Feather River, Glenn, Great Basin Unified, Imperial, Kern, Lake, Lassen, Mariposa, Mendocino, Modoc, Monterey Bay, Unified, Northern Sierra, Northern Sonoma, Placer, Sacramento, San Luis Obispo, Santa Barbara, Shasta, Siskiyou, Tehama, and Tuolumne.
Note 2: The total emissions may vary slightly from the values shown in Table ES-1 due to rounding.

I. INTRODUCTION

A. Background

In this chapter, ARB staff provides background on the cargo handling equipment emissions inventory, our purpose and goals in preparing an emissions inventory update, and a general overview of the methodology developed to estimate the emissions from cargo handling equipment.

Cargo handling equipment is used for commercial purposes to move consumer goods through California's ports and intermodal facilities. There are a number of types of cargo handling equipment including container handling equipment such as top picks and rubber tire gantry cranes and bulk handling equipment which includes tractors, sweepers, fork lifts, and excavators.

A list of the different types of cargo handling equipment and a brief description of the work done by that equipment type is found in Table I-1. This equipment is generally operated at a port or intermodal facility, although it can be used at other facilities such as distribution centers.[1]

Table I-1: Categories of Cargo Handling Equipment Included in the Emissions Inventory

Equipment Type	Description
Cranes	Cranes include rubber tire gantry cranes and other mobile cranes used to move containers from vessels to dockside, used to stack and unstack containers, and used to move containers to and from yard trucks
Excavators	Used to pick up heavy bulk materials and other dry bulk materials
Forklifts	Used to move cargo, truck chassis, or other equipment short distances for placement on or removal from stacks
Container Handling Equipment	Includes side picks, top picks, reach stackers. Used to stack containers, move containers from one area of the terminal to another, or move containers on and off yard trucks
Other, General Industrial Equipment	Includes a variety of equipment types including aerial lifts, euclids, rail-car movers, and heavy duty off-highway trucks
Sweeper/Scrubbers	Used to clean up after bulk goods movement
Tractor/Loader/ Backhoe	Used to load and unload bulk materials
Yard Truck	Used to move containers to and from ships/trains, move containers within or off the terminal, and move containers to and from RTG cranes for placement on or removal from stacks

Cargo handling equipment can be a significant source of diesel particulate matter (PM) emissions in communities near ports and intermodal rail facilities. To reduce diesel

[1] Cargo handling equipment used at other types of facilities associated with the movement of goods in California, such as distribution centers, are not included in this emissions inventory.

particulate matter (PM) emissions in communities near ports and intermodal rail yards, ARB staff are undertaking a rule-making effort to require reductions in emissions from cargo handling equipment. To support that rule-making and to assist in understanding the impacts from any proposed rule, it is necessary to develop a detailed emissions inventory for the specific types of equipment used in these facilities.

Our goals in undertaking this emissions inventory update were to:

- Update the inventory to reflect the most current cargo handling equipment fleets;
- Develop a consistent methodology that could be used statewide to estimate emissions from cargo handling equipment at ports and intermodal rail yards;
- Establish a structure that would allow allocation of the statewide emissions to individual ports and/or intermodal rail facilities; and
- Accurately reflect adopted regulations and other regulatory programs in the baseline inventory and in any future year forecasts.

II. EMISSION CALCULATION METHODOLOGY

In this section, we provide a discussion of the methodology used to develop the cargo handling equipment emission estimation methodology.

Briefly, the approach used to develop the cargo handling equipment emissions inventory estimates entailed determining the average annual emissions per engine for each equipment type and then multiplying that value by the total number of engines in that grouping. The majority of the inputs that went into developing the average annual emissions came from individual engine profiles developed using the information from a Cargo Handling Equipment Survey conducted by the ARB in 2004 and cargo handling equipment population information provided by the ports of Los Angeles and Long Beach. These inputs were then processed using a template based on the ARB's OFFROAD model (ARB, 2000) to estimate annual emissions per engine for each equipment type. This data was then expanded to include the estimated statewide population of cargo handling equipment fitting a specific age and horsepower range. To estimate port-specific emissions, the populations of cargo handling equipment were allocated based on the ARB Survey and the port-specific data. Emission estimates were developed for the eight types of equipment described in Table I-1. Estimates for oxides of nitrogen (NOx) and particulate matter (PM) were made.

Below, we provide a more detailed discussion of the methodology used to estimate the cargo handling equipment emission inventory, including the assumptions and data inputs used.

A. Methodology

The basic equation used for estimating emissions from cargo handling equipment is:

$$E_{y,t} = S\,Pop_{t,v,x} * HP * \%Load_{t} * EF_{v,x} * Hrs_{t}$$

where

E = pollutant specific emissions (tons per year of NOx and diesel PM)
Pop = cargo handling equipment type-specific population
HP = engine average rated brake horsepower in a given horsepower range
% Load = average engine load
EF = emission factor
Hrs = average annual use in hours
y = inventory year
t = equipment type (cranes, yard trucks, etc)
v = engine age (based on model year)
x = horsepower range of the engine

Each of these elements, and how they were incorporated into the cargo handling equipment emission estimates, are discussed below. The base year for the cargo handling equipment emissions inventory is 2004.

B. Emission Inventory Inputs

1. Population

The cargo handling equipment populations were developed using information from the ARB 2004 Cargo Handling Equipment Survey, the 2001 Port of Los Angeles emissions inventory, and the 2002 Port of Long Beach emissions inventory. These sources of information are described below. In addition, the steps taken to develop port-specific and intermodal facility-specific estimates of the numbers of cargo handling equipment for 2004 are described.

ARB's Cargo Handling Equipment Survey (December 2004)

The ARB conducted a survey of cargo handling equipment owner/operators to collect information about the different types of cargo handling equipment (ARB's Statewide Cargo Handling Equipment Survey, or ARB Survey). Owners/operators of cargo handling equipment were sent a copy of the ARB's survey in 2004. The survey requested, for the year 2004, information about the numbers of different types of cargo handling equipment at port terminals, annual use, information about the general equipment operating conditions, and engine information (make and model of the engine, horsepower, annual hours of use, any control equipment associated with it, etc.). The ARB Survey also requested information on projected estimated growth in equipment and hours of operation in 2010 and 2020.

The survey was sent to more than 120 owner/operators statewide and the ARB received 69 responses representing approximately 2,000 pieces of equipment. A copy of the ARB Survey is provided in Appendix C. Because the Ports of Los Angeles and Long Beach had recently conducted a similar survey, the terminal operators at those two ports were only requested to respond to the survey questions on anticipated growth and the types of installed controls.

Port of Los Angeles and Port of Long Beach Cargo Handling Equipment Data

To develop port-wide emissions inventories, the Ports of Los Angeles and Long Beach (the Ports) authorized Starcrest Consulting Group to collect information about the cargo handling equipment that operate on their respective properties. The Port of Los Angeles collected information for 2001 and the Port of Long Beach collected data for 2002. The information collected by Starcrest was provided to the ARB and included information about the equipment type, owner/operator contact information, engine-specific information (make, model, load factor, etc.), and annual activity.

Estimating 2004 Cargo Handling Equipment Populations

To make the cargo handling equipment emission estimates compatible with the ARB's OFFROAD model, the different equipment types at ports and intermodal rail yards collected through the ARB Survey and the Ports of Los Angeles (POLA) and Long

Beach (POLB) were allocated to the eight equipment categories described previously in Table I-1. Because the cargo handling equipment populations for the ports of Los Angeles and Long Beach were associated with 2001 and 2002, respectively, these populations were grown to 2004 estimates using a 3% annual growth factor for both the equipment populations and the equipment activity. This growth factor is based on the projected growth data collected as a part of the ARB Survey. The populations of cargo handling equipment, by type, were assigned to a port or intermodal facility based on ARB Survey data.[2]

In addition, adjustments to the cargo handling equipment populations at several ports were made due to partial, or no, reporting of the cargo handling equipment at a number of ports. Using information gathered by contacting the ports directly or from published information regarding cargo throughputs, the ARB staff developed estimates of the populations for cargo handling equipment for each port where information was not complete.

Based on this approach, we estimate that there are approximately 3,700 pieces of cargo handling equipment statewide.

Table II-1: Estimated Statewide Cargo Handling Equipment Populations[3]

Equipment Type	Estimated 2004 Population
Cranes	321
Excavators	28
Forklifts	464
Container Handling Equipment	487
Other, General Industrial Equipment	40
Sweeper/Scrubbers	28
Tractor/Loader/Backhoe	93
Yard Truck	2,277
Total	3,738

2. Average Horsepower

Using the ARB's 2004 Cargo Handling Equipment Survey and the cargo handling equipment emissions inventory data for the ports of Los Angeles and Long Beach, average horsepower for various engine horsepower ranges were estimated by equipment type. Below, the horsepower range of the equipment, the average horsepower, and the average annual hours of operation for each equipment type at ports (Table II-2) and at intermodal rail yards (Table II-3) are presented below.

[2] There were no additional adjustments to cargo handling equipment populations associated with intermodal rail yards because 100 percent of the intermodal facilities reported their equipment populations.

[3] The population values only include diesel-fueled engines. While there are gasoline and alternate fuel-powered cargo handling equipment, this inventory only focuses on diesel-fueled equipment.

Table II-2: 2004 Cargo Handling Equipment Profiles at Ports

Equipment Type	HP Range	Average HP	Average Annual Use (hrs – 2004)
Cranes	< 50	43	1371
	51 - 120	112	
	121 - 175	150	
	176 - 250	210	
	251 - 500	412	
	501 - 750	657	
	751 - 1000	966	
Excavators	176 - 250	245	2222
	251 - 500	387	
Forklifts	< 50	45	1098
	51 - 120	103	
	121 - 175	154	
	176 - 250	208	
	251 - 500	278	
Container Handling Equipment	51 - 120	111	2388
	121 - 175	164	
	176 - 250	236	
	251 - 500	310	
	751 - 1000	930	
Other General Equipment	<50	50	693
	51 – 120	99	
	121 – 175	157	
	176 – 250	225	
	251 - 500	387	
Sweeper/Scrubber	< 50	48	872
	51 - 120	106	
	121 - 175	148	
	176 - 250	180	
Tractor/Loader/Backhoe	<50	40	755
	51 – 120	88	
	121 – 175	148	
	176 – 250	203	
	251 – 500	356	
	501 – 750	750	
Yard Trucks	51 – 120	85	2536
	121 – 175	172	
	176 – 250	212	
	251 – 500	434	
	501 - 750	635	

Table II-3: 2004 Cargo Handling Equipment Profiles at Intermodal Rail Yards

Equipment Type	HP Range	Average HP	Average Annual Use (hrs – 2004)
Cranes	176 – 250	236	1632
	251 – 500	309	
Forklifts	51 – 120	93	803
	121 – 175	153	
	176 – 250	200	
Container Handling Equipment	121 – 175	160	2388
	176 – 250	208	
	251 – 500	299	
Other General Equipment	126 – 175	150	1632
	176 – 250	250	
	251 - 500	344	
Sweeper/Scrubber	176 – 250	200	872
Tractor/Loader/Backhoe	51 – 120	70	755
Yard Truck	126 – 175	150	1289
	176 – 250	203	

Note: If there is not a specific horsepower range listed for a specific type of equipment, then there were no engines in that size range used by that type of equipment.

3. Activity

The ARB Survey and the information provided by the ports of Los Angeles and Long Beach provided engine-specific annual use values (hours of operation). It was assumed that all of an engine's hours of operation occurred within the borders of California. The equipment type-specific annual average use, in hours, can be found in Tables II-2 and II-3 above. The annual use values were used to estimate cumulative engine use. Cumulative engine use is estimated by multiplying the annual use by the age of the engine. The estimate of cumulative engine use is the basis for estimating the impacts of engine deterioration on emissions from individual engines. A discussion of how emission factor deterioration rates were developed is provided in subsection 6 "Emission Factor Deterioration."

4. Engine Load Factor

The engine load under normal operating conditions is another key activity input. Information about the operating load factors for cargo handling equipment was taken from the engine load factors specified in the ARB's OFFROAD model for the specific type of cargo handling equipment or similar equipment. Table II-4 below provides the engine load factors, by equipment type, used to estimate emissions.

Table II-4: Engine Load Factors

Equipment Type	Engine Load Factor
Cranes	43%
Excavators	57%
Forklifts	30%
Container Handling Equipment	59%
Other, General Industrial Equipment	51%
Sweeper/Scrubbers	68%
Tractors/Loaders/Backhoes	55%
Yard Trucks	65%

Staff considered using an alternative load factor for yard tractors to better represent the engine load yard trucks operate under in their day-to-day activities. However, after additional investigation, ARB staff decided not to revise the engine load factor at this time. This decision is based on a lack of adequate test data to support the use of a revised yard truck engine load factor. There is a study underway by the ARB and the Port of Los Angeles to investigate cargo handling equipment load factors. As the results of those studies become available, the cargo handling equipment emission inventory will be revised.

5. Emission Factors

In 2004, the cargo handling equipment populations at California's ports and intermodal rail yards were comprised of a mix of cargo handling equipment units with different engines types (off-road and on-road) and units employing voluntary emission control strategies (controlled). In an effort to take this equipment mix into account, the ARB staff developed a composite emission factor based on the relative percentage off-road, on-road, and retrofitted engines. The emission factors for off-road engines are taken from the ARB's OFFROAD model. Emission factors for on-road engines were taken from the ARB's on-road engine certification standards. The emission factors for retrofitted equipment were developed using OFFROAD emission factors with the control device-specific control efficiencies applied.

6. Emission Factor Deterioration

As an engine ages, the pollutant-specific emission factors slowly increase. This phenomenon is described as "deterioration" and is primarily due to the wear on the various parts of an engine with use. Deterioration occurs at different rates for each pollutant. When developing emission estimates, it is essential that deterioration be taken into account and factored in the emissions estimation methodology. The deterioration rates used in the OFFROAD model are expressed as the percent increase in emissions over the percent of an engine's useful life consumed (see Appendix A). The methodology used for cargo handling equipment relies on the deterioration functions developed for the ARB's OFFROAD model. However, modifications were made to better reflect the operation of cargo handling equipment.

The deteriorated emission factors were developed using the same methodology found in the ARB's OFFROAD model.

Deteriorated Emission Factor

$$EF = ZH + DR * Hrs$$

And

Deterioration Rate

$$DR = (ZH * DF) / UL$$

Where: EF = emission factor, in grams per horsepower-hour (g/hp-hr)
ZH = zero-hour emission rate, or when the equipment is new (g/hp-hr)
Hrs = cumulative hours, or total number of hours accumulated on the equipment (equipment age x average annual activity, from survey data)
DR = deterioration rate, or the increase in ZH emissions as the equipment is used (g/hp-hr)
DF = deterioration factor (% increase per % useful life consumed)
UL= useful life of engine (in hours) (cargo handling equipment survey maximum useful life * average annual activity)

Two of the components, zero hour emission factors (ZH) and useful life values (UL), were revised based on the data gathered by the ARB's cargo handling equipment survey and the cargo handling equipment emissions inventory done by the ports of Los Angeles and Long Beach. A discussion of these two adjustments is provided below.

Zero Hour Emission Rates

As discussed above, revised zero hour emission factors were developed using a weighted average based on the product of the numbers of off-road, on-road, and retrofitted engines in the statewide cargo handling equipment population and the emission factors associated with those engines. The numbers of off-road, on-road, and controlled engines were based on engine model information collected from the ARB's survey and the emission inventories at the ports. Table II-5 below provides a summary of the percentage breakdown for the different engine configurations (on-road, off-road or controlled) estimated for each model year.

Table II-5: Estimated Percentages of Existing Cargo Handling Equipment with Onroad, Offroad, or Controlled Engines

Model Yr	Yard Trucks		Cranes	Forklift	Other, General Equip
	Onroad	Offroad w/controls	Offroad w/controls	Offroad w/controls	Offroad w/controls
1980	0.0%	0.0%	0.0%	0.0%	0.0%
1981	0.0%	0.0%	0.0%	0.0%	0.0%
1982	0.0%	0.0%	0.0%	0.0%	0.0%
1983	0.0%	0.0%	0.0%	0.0%	0.0%
1984	0.0%	0.0%	0.0%	0.0%	0.0%
1985	27.3%	0.0%	0.0%	0.0%	0.0%
1986	0.0%	0.0%	0.0%	0.0%	0.0%
1987	0.0%	0.0%	0.0%	0.0%	0.0%
1988	0.0%	0.0%	0.0%	0.0%	0.0%
1989	0.0%	0.0%	0.0%	0.0%	0.0%
1990	13.8%	0.0%	0.0%	0.0%	0.0%
1991	0.0%	0.0%	0.0%	0.0%	0.0%
1992	0.0%	0.0%	0.0%	0.0%	0.0%
1993	7.9%	0.0%	0.0%	0.0%	0.0%
1994	0.0%	0.0%	0.0%	0.0%	0.0%
1995	24.9%	0.0%	0.0%	0.0%	0.0%
1996	24.9%	65.0%	13.1%	8.0%	42.9%
1997	24.9%	65.0%	13.1%	8.0%	42.9%
1998	24.9%	65.0%	13.1%	8.0%	42.9%
1999	24.9%	65.0%	13.1%	8.0%	42.9%
2000	24.9%	65.0%	13.1%	8.0%	42.9%
2001	24.9%	65.0%	13.1%	8.0%	42.9%
2002	24.9%	65.0%	13.1%	8.0%	42.9%
2003	24.9%	65.0%	13.1%	8.0%	42.9%
2004	24.9%	65.0%	13.1%	8.0%	42.9%

Useful Life

The average useful life for each type of cargo handling equipment was based on operators responses to the ARB Cargo Handling Equipment Survey. Table II-6 provides the average useful life by equipment type based upon where the equipment is used, at a port or at a rail yard. Table II-6 also includes the average annual usage (from Tables II-2 and II-3) and the engine load factor (from Table II-4).

Table II-6: Cargo Handling Equipment Useful Life Inputs

Equipment Type	Average Annual Usage (hrs/yr)	Average Annual Usage (hrs/yr)	Engine Load Factors	Average Useful Life (yrs)	Average Useful Life (yrs)
	Port	Rail	Port/Rail	Port	Rail
Cranes	1371	1632	0.43	24	18
Excavators	2222	NA	0.57	16	NA
Forklifts	1098	803	0.30	16	20
Container Handling Equipment	2388	2388	0.59	16	18
Other, General Industrial Equipment	693	1632	0.51	16	16
Sweeper/Scrubbers	872	872	0.68	16	16
Tractors/ Loaders/ Backhoes	755	755	0.55	16	16
Yard Trucks	2536	1289	0.65	12	8

The percent useful life (%UL) was estimated by dividing the engine age by the useful life for a specific equipment type. The final deteriorated emission factors are developed using the following equation:

$$EF = ZH + DR * Hrs$$

$$= ZH + \frac{ZH * DF}{UL} * Hrs$$

$$= ZH + ZH(DF) * \frac{Hrs}{UL}$$

7. Fuel Correction Factors

California implemented diesel fuel regulations in 1993, which lowered the limits of aromatic compounds and the sulfur content of fuel marketed in California. The fuel correction factors used in the development of a statewide cargo handling equipment emission inventory are contained in the ARB's OFFROAD model. The fuel correction factors are dimensionless multipliers applied to the basic exhaust emission rates. These fuel correction factors account for the differences in the properties of CARB diesel fuels compared to those of commercially dispensed fuels. Specifics about the fuel correction factors are found in Appendix A.

8. Add-on Controls and Other Emission Reduction Strategies

A number of the state's deep-water ports have encouraged voluntary implementation of cargo handling equipment emission reduction strategies using state funding, such as the Carl Moyer Program, or through port funding mechanisms. Many operators have taken advantage of these programs by implementing various control options including

installation of diesel oxidation catalysts (DOCs), using emulsified fuels alone or in conjunction with a DOC, or installation of diesel particulate filters.

As a result of these voluntary programs, approximately 1,400 cargo handling equipment vehicles, primarily yard trucks, have been retrofitted with DOCs or replaced with new, cleaner engines in the last three years. As stated previously, the impacts from these voluntary strategies are included in the inventory methodology by adjusting the zero-hour emission rates.

C. Emission Projections

Emission projections for the years 2010 and 2020 were developed. These projections reflect expected growth rates in equipment populations and activity; the turnover or attrition of the fleet; and the change in emission factors over time as the new engine standards are implemented. Below, ARB staff describes the assumptions used to generate the emission projections for future years.

1. Growth Factors

The growth factors used to estimate cargo handling equipment emissions in future years was based on an analysis done by ARB staff using growth estimates provided by terminal owner/operators as a part of the ARB's 2004 Cargo Handling Equipment Survey. The terminal owner/operators provide estimates of the numbers of pieces of equipment, by equipment type, they anticipated having in 2010 and 2020. In addition, the terminal owner/operators were asked to provide estimates of the percent of growth in activity of their equipment in 2010 and 2020.

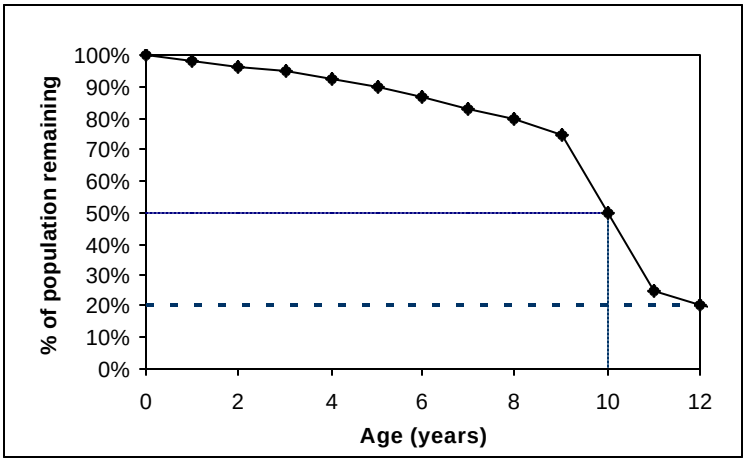
ARB staff used these estimates to develop statewide growth estimates for both equipment populations and equipment activity using weighted averages of the estimated growth over two time intervals, 2004 – 2010 and 2010 – 2020. The estimated growth rates in cargo handling equipment populations and activity varied by equipment type. The growth rates, by equipment type, used to develop future year cargo handling equipment emission estimates are presented in Appendix A.

2. Equipment Attrition or Scrappage

Scrappage is a function that describes the relationship between equipment age and the proportion of equipment that has been removed from service. This function is expressed in terms of a fraction of the average lifetime of the equipment. The average lifetime varies by the type of cargo handling equipment. For this cargo handling equipment emission estimation methodology, the scrappage function in the ARB's OFFROAD model was used. However, the application of the scrappage function was tailored to align with our understanding of the useful life information gathered in the ARB Survey. It was assumed that, at the average useful life determined from the ARB Survey, 20 percent of the engines for a given model year would remain.

For example, the average useful life reported in the ARB Survey for port yard trucks is 12 years. This means that on average, a yard truck is kept 12 years, however there are some yard trucks that are removed from service more quickly and others that remain beyond 12 years. In the scrappage curve developed for the current cargo handling emission estimation methodology, approximately 50 percent of the original population remains at 80 percent of the average useful life, in this case approximately 10 years. Approximately 20 percent of the original population remains at 12 years. The entire population of engines were accounted for in the inventory, however in the model, the engines were distributed over 12 model years. An example of the port yard truck attrition curve is presented in Figure II-1.[4] Similar attrition curves were developed for container handling equipment, general cargo handling equipment and cranes.

Figure II-1: Attrition Curve, 12-year Useful Life



Additional discussion of the role the scrappage function plays in the development of off-road equipment and a tabular representation of the ARB scrappage rate function is presented in the ARB's OFFROAD model.

3. New Engine Standards

Emission factors for future years were based on the OFFROAD model which incorporates the impacts of new engine standards (Tier 3 and 4) for each year and horsepower range. The emission factors reflect any phase-in of emission standards allowed by the regulations establishing the new engine standards.

[4] The model developed for cargo handling equipment did not deteriorate emissions past the average useful life. Rather it assumed any engine past the average useful life would have the same emissions as an engine at the average useful life.

III. EMISSION ESTIMATES

A. Statewide Emission Estimates

The emission inventory for cargo handling equipment includes total emissions for the entire state, subtotals for each of the air basins and subtotals for each county, or a portion of a county, in each air basin. The data in Table III-1 summarizes the statewide inventory of oxides of nitrogen (NOx) and diesel particulate matter (PM) for 2004 by equipment type.

Table III-1: Estimated Statewide 2004 Cargo Handling Equipment Emissions (tons per day)

Equipment Types	Numbers of Equipment	2004 Pollutant Emissions, Tons Per Day	
		NOx	Diesel PM
Cranes	**321**	1.93	0.07
Excavators	**28**	0.24	0.01
Forklifts	**464**	0.54	0.03
Container Handling Equipment	**487**	3.25	0.11
Other, General Industrial Equipment	**40**	0.08	<0.01
Sweeper/Scrubbers	**28**	0.04	<0.01
Tractor/Loader/ Backhoe	**93**	0.18	0.01
Yard Trucks	**2,277**	12.78	0.42
Total	**3,738**	19.04	0.65

As can be determined from the information presented in Table III-1, yard trucks, container handling equipment (top picks, sides picks, etc.), and cranes are the responsible for approximately 90 percent of the emissions for all pollutants.

B. District-specific Emission Estimates

Estimates of emissions from cargo handling equipment were made on a port-by-port and intermodal facility-specific basis using the numbers of specific equipment types located at each facility. These emissions were then allocated to the appropriate air pollution control and air quality management districts based on the location of the ports and intermodal facilities. A summary of district-specific emissions for NOx and PM is provided in Table III-2.

Table III- 2: Estimated 2004 Cargo Handling Equipment Emissions By District (tons per day)[5]

District	NOx	Diesel PM
Bay Area	3.34	0.11
Mojave	0.08	<0.01
North Coast	0.06	<0.01
San Diego	0.75	0.03
San Joaquin	0.55	0.01
South Coast	13.38	0.45
Ventura	0.66	0.02
Yolo-Solano	0.08	<0.01

These emission estimates vary slightly from the statewide emission estimates as a result of rounding issues associated with the software package used to develop the emission estimates.

C. Cargo Handling Equipment-specific Emission Estimates

Appendix B contains emission estimates by equipment type for 2004. The estimates are presented by equipment type, by model year, and by horsepower category.

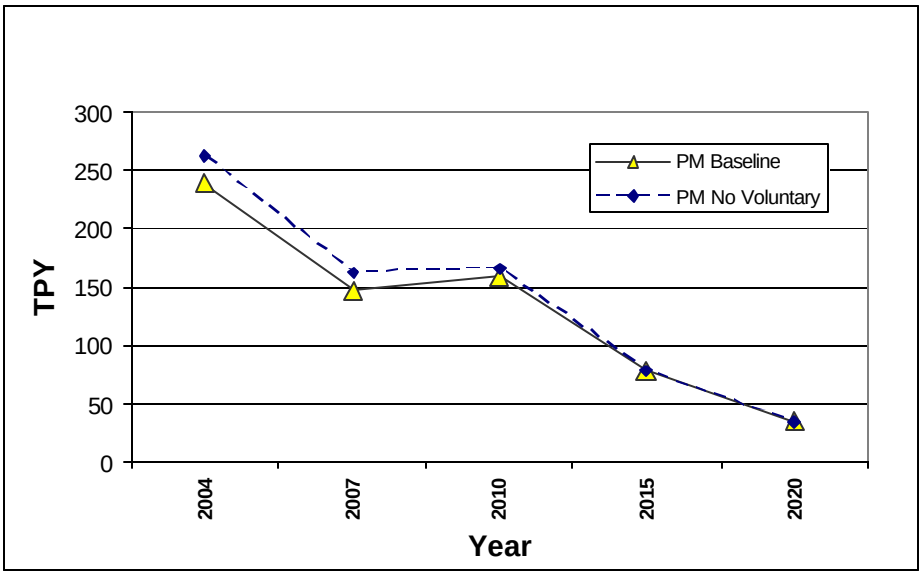
D. Benefits of Voluntary Programs and Future Emission Projections

The emission reductions attributable to the voluntary emission reduction strategies (retrofits) implemented at California's ports have been incorporated in the baseline emission estimates. The ARB estimates that the installation of aftertreatment control technologies will result in an estimated 13 percent reduction in diesel PM emissions from 2004 through 2020. The ARB staff is unable to project any future emission reductions associated with voluntary emission reduction strategies because information about the continued implementation of these programs is uncertain.

Estimates of emission reductions attributable to these voluntary programs are based on information provided by the ports of Los Angeles, Long Beach, and Oakland in addition to information collected as a part of the ARB's Cargo Handling Equipment Survey. Graphic depiction of the impact of the voluntary emission reduction programs are presented in Figure III-1.

[5] The following districts have no cargo handling emissions associated with them: Amador, Antelope Valley, Butte, Calaveras, Colusa, El Dorado, Feather River, Glenn, Great Basin Unified, Imperial, Kern, Lake, Lassen, Mariposa, Mendocino, Modoc, Monterey Bay, Unified, Northern Sierra, Northern Sonoma, Placer, Sacramento, San Luis Obispo, Santa Barbara, Shasta, Siskiyou, Tehama, and Tuolumne.

Figure III-1: Baseline vs. Voluntary Programs – Diesel PM Emissions (tons per year)



Because the majority of the voluntary efforts involved the installation of diesel oxidation catalysts, the ARB staff estimates there are minimal reductions in NOx attributable to the voluntary installation of exhaust aftertreatment control devices on cargo handling equipment. While a small percentage of cargo handling equipment engines are using emulsified fuels, which result in some NOx reductions (up to 20 percent), the ARB staff is unable to quantify the benefits at this time.

Table III-3 below presents the cargo handling equipment emission estimates for the years 2010 and 2020 assuming the growth factors presented in Appendix A.

Table III-3: Cargo Handling Equipment Engines Projected Year 2010 and 2020 Emission Estimates

Equipment Types	2010 Emission, Tons per Day			2020 Emission, Tons per Day		
	Numbers of Equipment	NOx	Diesel PM	Numbers of Equipment	NOx	Diesel PM
Cranes	470	1.83	0.06	602	1.33	0.03
Excavators	29	0.18	0.01	32	0.05	<0.01
Forklifts	530	0.39	0.02	607	0.17	0.01
Container Handling Equipment	738	3.43	0.12	1111	1.70	0.05
Other General Industrial Equipment	60	0.08	<0.01	93	0.04	<0.01
Sweepers/ Scrubbers	43	0.04	<0.01	64	0.02	<0.01
Tractors/ Loaders/ Backhoes	132	0.17	0.01	200	0.08	<0.01
Yard Trucks	2810	10.20	0.31	3790	3.02	0.09
Total	4811	16.34	0.53	6500	6.41	0.18

REFERENCES

(ARB, 2000) Air Resources Board. *Staff Report: Public Meeting to Consider Approval of California's Emissions Inventory for Off-Road Large Compression-Ignited Engines (= 25HP) Using the New OFFROAD Emissions Model*; January 2000.

Emission Inventory Inputs
(Population Allocations, Useful Life, Deterioration Factors, Growth Factors, Fuel Correction Factors)

The basic equation used for estimating emissions from cargo handling equipment is:

$$E_y = S\,Pop_{t,v,x} * HP * \%Load_t * EF_{v,x} * Hrs_t$$

where

E = pollutant emissions (NO_x, and PM)
Pop = cargo handling equipment type-specific population
HP = engine average rated brake horsepower in a given horsepower range
% Load = average engine load
EF = emission factor
Hrs = average annual use
y = inventory year
t = equipment type (cranes, yard trucks, etc)
v = engine age (based on model year)
x = horsepower range of the engine

This equation will serve as the basis on which cargo handling emission estimation methodology-specific information will be presented in this Appendix.

1. Equipment Populations

Cargo Handling Equipment Population Allocation Percentages – by facility

The equipment population percentages for California's intermodal rail yards were estimated from the facility-specific populations. The equipment percentages for each facility are presented below in Table BA-1a and BA-1b. For the purposes of developing emission estimates for cargo handling equipment in future years, ARB staff assumed that these population distributions remain the same from year-to-year.

Table BA-1a: Equipment Population Allocations, By District, for Ports

District	% Statewide
BAAQMD	19
San Diego	4.3
San Joaquin Valley Unified	2.4
South Coast	70
Ventura	3.8
Yolo-Solano	0.5

Table BA-1b: Equipment Population Allocations, By District, for Intermodal Rail Yards

District	% Statewide
BAAQMD	9.1
Mojave Desert	6.4
San Joaquin Valley Unified	8.7
South Coast	75.8

2. Engine Useful Life

The following equipment-specific average useful life information was developed using information from the ARB's cargo handling equipment survey and the cargo handling equipment emission inventories developed for the ports of Los Angeles and Long Beach.

Table BA-2: Equipment Useful Life

Equipment Type	Activity (hrs/yr)	Activity (hrs/yr)	Total Useful Life (yrs)	Total Useful Life (yrs)
	Port	Rail	Port	Rail
Cranes	1371.1	1632.3	24	18
Excavators	2222.2	1162.0	16	NA
Forklifts	1098.1	802.8	16	20
Container Handling Equipment	2387.7	2388.0	16	18
Other, General Industrial Equipment	692.7	1631.6	16	16
Sweeper/Scrubbers	871.5	872.0	16	16
Tractors/ Loaders/ Backhoes	755.1	755.0	16	16
Yard Trucks	2536.0	1289.4	12	8

3. Deterioration Factor Tables

The cargo handling emission inventory methodology relied on the OFFROAD deterioration factors (percent increase in emissions per percent useful life). These factors are presented in Table BA-3 below.

Table BA-3: Deterioration Rates for Diesel Engines (% increase per % useful life consumed)

HP	Deterioration Factor	
	NOx	PM
25-50	0.06	0.31
51-120	0.14	0.44
121-250	0.14	0.44
>250	0.21	0.67

4. Growth Factors

The population and activity annual average growth factors by facility type shown below in Tables BA-4 and BA-5 were developed from the ARB's 2004 Cargo Handling Equipment Survey and the cargo handling equipment emission inventories developed by the ports of Los Angeles and Long Beach. These estimates are population weighted values that went into developing the projected emissions from cargo handling equipment.

Table BA-4: Cargo Handling Equipment Population Annual Average Growth Rates

Equipment Type	Ports (percent annual average growth)		Intermodal Rail Yards (percent annual average growth)	
	2004 - 2010	2010 - 2020	2004 - 2010	2010 - 2020
Container Handling Equipment	7.1	3.9	7.8	8.7
Cranes	5.9	2.6	5.9	2.6
Excavators	0.8	1	NA	NA
Forklifts	2.2	1.2	2.9	3.8
Tractors/Loaders/Backhoes	0.3	0.3	0	0
Yard Trucks	3.1	2.1	6.4	7.5

Table BA-5: Cargo Handling Equipment Activity Annual Average Growth Rates

Equipment Type	Ports (percent annual average growth)		Intermodal Rail Yards (percent annual average growth)	
	2004 - 2010	2010 - 2020	2004 - 2010	2010 - 2020
Container Handling Equipment	9.1	3.9	7.1	8.6
Cranes	7.4	4.9	4.4	2.4
Excavators	0.8	2	NA	NA
Forklifts	2.7	2.1	2.9	3.8
Tractors/Loaders/Backhoes	0	0	0	0
Yard Trucks	3.3	2.4	6.1	7.2

5. Fuel Correction Factors

California implemented diesel fuel regulations in 1993, which lowered the limits of aromatic compounds and the sulfur content of fuel marketed in California. The fuel correction factors used in the development of a statewide cargo handling equipment emission inventory are contained in the ARB's OFFROAD model and summarized in Table BA-6 below. The fuel correction factors are dimensionless multipliers applied to the basic exhaust emission rates. These fuel correction factors accounts for the differences in the properties of certified fuels compared to those of commercially dispensed fuels.

Table BA-6: Fuel Correction Factors

Area	Calendar Years	Hp Group	Model Years	NOx	PM
SCAQMD and Ventura	Pre-1985	All	All	1.000	1.000
	1985 – 1993	All	All	1.000	0.950
All	Pre-1994	All	All	1.000	1.000
	1994 – 2006	<25	Pre-1995	0.930	0.750
		25 – 50	Pre-1999		
		51 – 100	Pre-1998		
		101 – 175	Pre-1997		
		176+	Pre-1996		
		<25	1995+	0.948	0.822
		25 – 50	1999 – 2010		
		51 – 100	1998 – 2010		
		101 – 175	1997 – 2010		
		176+	1996 – 2010		
	2007+	<25	Pre-1995	0.930	0.720
		25 – 50	Pre-1999		
		51 – 100	Pre-1998		
		101 – 175	Pre-1997		
		176+	Pre-1996		
		<25	1995+	0.948	0.800
		25 – 50	1999 – 2010		
		51 – 100	1998 – 2010		
		101 – 175	1997 – 2010		
		176+	1996 – 2010		
		All	2011+	0.948	0.852

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

Port/Rail	Equipment	model yr	Hp	Total Pop	NOX tpd	PM tpd
P	Crane	2004	50	0	0.0001	0.0000
P	Crane	2003	50	0	0.0001	0.0000
P	Crane	2002	50	0	0.0001	0.0000
P	Crane	2001	50	0	0.0001	0.0000
P	Crane	2000	50	0	0.0000	0.0000
P	Crane	1999	50	0	0.0000	0.0000
P	Crane	1998	50	0	0.0002	0.0000
P	Crane	1997	50	0	0.0001	0.0000
P	Crane	1996	50	0	0.0000	0.0000
P	Crane	1995	50	0	0.0000	0.0000
P	Crane	1994	50	0	0.0000	0.0000
P	Crane	1993	50	0	0.0001	0.0000
P	Crane	1992	50	0	0.0000	0.0000
P	Crane	1991	50	0	0.0000	0.0000
P	Crane	1990	50	0	0.0001	0.0000
P	Crane	1989	50	0	0.0000	0.0000
P	Crane	1988	50	0	0.0000	0.0000
P	Crane	1987	50	0	0.0000	0.0000
P	Crane	1986	50	0	0.0001	0.0000
P	Crane	1985	50	0	0.0000	0.0000
P	Crane	1984	50	0	0.0000	0.0000
P	Crane	1983	50	0	0.0000	0.0000
P	Crane	1982	50	0	0.0001	0.0000
P	Crane	1981	50	0	0.0000	0.0000
P	Crane	1980	50	0	0.0001	0.0000
P	Crane	2004	120	0	0.0001	0.0000
P	Crane	2003	120	0	0.0002	0.0000
P	Crane	2002	120	0	0.0001	0.0000
P	Crane	2001	120	0	0.0001	0.0000
P	Crane	2000	120	0	0.0000	0.0000
P	Crane	1999	120	0	0.0000	0.0000
P	Crane	1998	120	0	0.0003	0.0000
P	Crane	1997	120	0	0.0001	0.0000
P	Crane	1996	120	0	0.0001	0.0000
P	Crane	1995	120	0	0.0000	0.0000
P	Crane	1994	120	0	0.0000	0.0000
P	Crane	1993	120	0	0.0001	0.0000
P	Crane	1992	120	0	0.0001	0.0000
P	Crane	1991	120	0	0.0000	0.0000
P	Crane	1990	120	0	0.0001	0.0000
P	Crane	1989	120	0	0.0001	0.0000
P	Crane	1988	120	0	0.0001	0.0000
P	Crane	1987	120	0	0.0001	0.0000
P	Crane	1986	120	0	0.0001	0.0000
P	Crane	1985	120	0	0.0000	0.0000
P	Crane	1984	120	0	0.0000	0.0000
P	Crane	1983	120	0	0.0000	0.0000
P	Crane	1982	120	0	0.0002	0.0000
P	Crane	1981	120	0	0.0001	0.0000
P	Crane	1980	120	0	0.0003	0.0000
P	Crane	2004	175	0	0.0001	0.0000
P	Crane	2003	175	0	0.0002	0.0000
P	Crane	2002	175	0	0.0002	0.0000
P	Crane	2001	175	0	0.0002	0.0000
P	Crane	2000	175	0	0.0000	0.0000
P	Crane	1999	175	0	0.0000	0.0000
P	Crane	1998	175	0	0.0004	0.0000
P	Crane	1997	175	0	0.0002	0.0000
P	Crane	1996	175	0	0.0001	0.0000
P	Crane	1995	175	0	0.0000	0.0000
P	Crane	1994	175	0	0.0000	0.0000
P	Crane	1993	175	0	0.0001	0.0000
P	Crane	1992	175	0	0.0001	0.0000
P	Crane	1991	175	0	0.0000	0.0000
P	Crane	1990	175	0	0.0002	0.0000
P	Crane	1989	175	0	0.0001	0.0000
P	Crane	1988	175	0	0.0001	0.0000

P	Crane	1987	175	0	0.0001	0.0000
P	Crane	1986	175	0	0.0002	0.0000
P	Crane	1985	175	0	0.0000	0.0000
P	Crane	1984	175	0	0.0000	0.0000
P	Crane	1983	175	0	0.0000	0.0000
P	Crane	1982	175	0	0.0003	0.0000
P	Crane	1981	175	0	0.0001	0.0000
P	Crane	1980	175	0	0.0004	0.0000
P	Crane	2004	250	3	0.0056	0.0001
P	Crane	2003	250	5	0.0092	0.0002
P	Crane	2002	250	3	0.0075	0.0002
P	Crane	2001	250	3	0.0076	0.0002
P	Crane	2000	250	1	0.0014	0.0000
P	Crane	1999	250	1	0.0014	0.0000
P	Crane	1998	250	8	0.0184	0.0004
P	Crane	1997	250	3	0.0064	0.0001
P	Crane	1996	250	2	0.0035	0.0001
P	Crane	1995	250	1	0.0019	0.0001
P	Crane	1994	250	1	0.0019	0.0001
P	Crane	1993	250	2	0.0057	0.0003
P	Crane	1992	250	1	0.0038	0.0002
P	Crane	1991	250	0	0.0000	0.0000
P	Crane	1990	250	2	0.0077	0.0004
P	Crane	1989	250	2	0.0049	0.0002
P	Crane	1988	250	2	0.0049	0.0002
P	Crane	1987	250	2	0.0067	0.0003
P	Crane	1986	250	2	0.0081	0.0004
P	Crane	1985	250	0	0.0000	0.0000
P	Crane	1984	250	0	0.0014	0.0001
P	Crane	1983	250	0	0.0014	0.0001
P	Crane	1982	250	3	0.0125	0.0007
P	Crane	1981	250	1	0.0042	0.0002
P	Crane	1980	250	4	0.0182	0.0010
P	Crane	2004	500	8	0.0233	0.0005
P	Crane	2003	500	12	0.0354	0.0008
P	Crane	2002	500	8	0.0243	0.0005
P	Crane	2001	500	8	0.0269	0.0006
P	Crane	2000	500	1	0.0062	0.0001
P	Crane	1999	500	1	0.0063	0.0001
P	Crane	1998	500	18	0.0822	0.0018
P	Crane	1997	500	6	0.0287	0.0006
P	Crane	1996	500	3	0.0158	0.0003
P	Crane	1995	500	1	0.0083	0.0004
P	Crane	1994	500	1	0.0084	0.0004
P	Crane	1993	500	4	0.0253	0.0011
P	Crane	1992	500	3	0.0170	0.0008
P	Crane	1991	500	0	0.0000	0.0000
P	Crane	1990	500	6	0.0346	0.0016
P	Crane	1989	500	3	0.0218	0.0010
P	Crane	1988	500	3	0.0220	0.0010
P	Crane	1987	500	3	0.0298	0.0015
P	Crane	1986	500	4	0.0360	0.0018
P	Crane	1985	500	0	0.0000	0.0000
P	Crane	1984	500	1	0.0061	0.0003
P	Crane	1983	500	1	0.0061	0.0003
P	Crane	1982	500	6	0.0557	0.0029
P	Crane	1981	500	2	0.0187	0.0010
P	Crane	1980	500	9	0.0813	0.0044
P	Crane	2004	750	4	0.0178	0.0004
P	Crane	2003	750	6	0.0284	0.0006
P	Crane	2002	750	4	0.0204	0.0004
P	Crane	2001	750	4	0.0259	0.0005
P	Crane	2000	750	1	0.0048	0.0001
P	Crane	1999	750	1	0.0048	0.0001
P	Crane	1998	750	9	0.0629	0.0014
P	Crane	1997	750	3	0.0219	0.0005
P	Crane	1996	750	2	0.0121	0.0003
P	Crane	1995	750	1	0.0064	0.0003
P	Crane	1994	750	1	0.0064	0.0003

P	Crane	1993	750	2	0.0194	0.0009
P	Crane	1992	750	1	0.0130	0.0006
P	Crane	1991	750	0	0.0000	0.0000
P	Crane	1990	750	3	0.0265	0.0012
P	Crane	1989	750	2	0.0167	0.0008
P	Crane	1988	750	2	0.0168	0.0008
P	Crane	1987	750	2	0.0228	0.0011
P	Crane	1986	750	2	0.0275	0.0014
P	Crane	1985	750	0	0.0000	0.0000
P	Crane	1984	750	0	0.0047	0.0002
P	Crane	1983	750	0	0.0047	0.0002
P	Crane	1982	750	3	0.0426	0.0022
P	Crane	1981	750	1	0.0143	0.0008
P	Crane	1980	750	4	0.0622	0.0033
P	Crane	2004	999	2	0.0170	0.0003
P	Crane	2003	999	3	0.0258	0.0005
P	Crane	2002	999	2	0.0168	0.0003
P	Crane	2001	999	2	0.0170	0.0004
P	Crane	2000	999	0	0.0031	0.0001
P	Crane	1999	999	0	0.0041	0.0002
P	Crane	1998	999	4	0.0537	0.0023
P	Crane	1997	999	1	0.0188	0.0008
P	Crane	1996	999	1	0.0103	0.0004
P	Crane	1995	999	0	0.0042	0.0002
P	Crane	1994	999	0	0.0042	0.0002
P	Crane	1993	999	1	0.0127	0.0006
P	Crane	1992	999	1	0.0085	0.0004
P	Crane	1991	999	0	0.0000	0.0000
P	Crane	1990	999	1	0.0173	0.0008
P	Crane	1989	999	1	0.0109	0.0005
P	Crane	1988	999	1	0.0110	0.0005
P	Crane	1987	999	1	0.0149	0.0007
P	Crane	1986	999	1	0.0180	0.0009
P	Crane	1985	999	0	0.0000	0.0000
P	Crane	1984	999	0	0.0030	0.0002
P	Crane	1983	999	0	0.0031	0.0002
P	Crane	1982	999	1	0.0278	0.0015
P	Crane	1981	999	0	0.0093	0.0005
P	Crane	1980	999	2	0.0407	0.0022
P	Excavator	2004	250	1	0.0033	0.0001
P	Excavator	2003	250	1	0.0025	0.0001
P	Excavator	2002	250	1	0.0037	0.0001
P	Excavator	2001	250	0	0.0023	0.0001
P	Excavator	2000	250	1	0.0039	0.0001
P	Excavator	1999	250	0	0.0009	0.0000
P	Excavator	1998	250	1	0.0034	0.0001
P	Excavator	1997	250	0	0.0015	0.0000
P	Excavator	1996	250	0	0.0017	0.0000
P	Excavator	1995	250	0	0.0014	0.0001
P	Excavator	1994	250	0	0.0030	0.0001
P	Excavator	1993	250	0	0.0025	0.0001
P	Excavator	1992	250	0	0.0010	0.0000
P	Excavator	1991	250	0	0.0005	0.0000
P	Excavator	1990	250	0	0.0012	0.0001
P	Excavator	1989	250	0	0.0013	0.0001
P	Excavator	1988	250	1	0.0048	0.0002
P	Excavator	2004	500	3	0.0169	0.0004
P	Excavator	2003	500	2	0.0121	0.0003
P	Excavator	2002	500	2	0.0148	0.0003
P	Excavator	2001	500	1	0.0100	0.0002
P	Excavator	2000	500	2	0.0215	0.0005
P	Excavator	1999	500	1	0.0051	0.0001
P	Excavator	1998	500	2	0.0190	0.0005
P	Excavator	1997	500	1	0.0082	0.0002
P	Excavator	1996	500	1	0.0093	0.0002
P	Excavator	1995	500	1	0.0079	0.0004
P	Excavator	1994	500	1	0.0167	0.0008
P	Excavator	1993	500	1	0.0138	0.0007
P	Excavator	1992	500	0	0.0054	0.0003

P	Excavator	1991	500	0	0.0030	0.0001
P	Excavator	1990	500	0	0.0064	0.0003
P	Excavator	1989	500	1	0.0071	0.0004
P	Excavator	1988	500	2	0.0264	0.0014
P	Forklift	2004	50	0	0.0001	0.0000
P	Forklift	2003	50	1	0.0003	0.0000
P	Forklift	2002	50	4	0.0009	0.0001
P	Forklift	2001	50	2	0.0005	0.0000
P	Forklift	2000	50	2	0.0006	0.0001
P	Forklift	1999	50	1	0.0002	0.0000
P	Forklift	1998	50	3	0.0008	0.0001
P	Forklift	1997	50	0	0.0001	0.0000
P	Forklift	1996	50	0	0.0001	0.0000
P	Forklift	1995	50	0	0.0001	0.0000
P	Forklift	1994	50	0	0.0001	0.0000
P	Forklift	1993	50	1	0.0003	0.0000
P	Forklift	1992	50	2	0.0005	0.0001
P	Forklift	1991	50	2	0.0006	0.0001
P	Forklift	1990	50	1	0.0004	0.0000
P	Forklift	1989	50	1	0.0002	0.0000
P	Forklift	1988	50	14	0.0042	0.0005
P	Forklift	2004	120	1	0.0005	0.0000
P	Forklift	2003	120	5	0.0032	0.0003
P	Forklift	2002	120	15	0.0103	0.0009
P	Forklift	2001	120	8	0.0052	0.0005
P	Forklift	2000	120	9	0.0066	0.0006
P	Forklift	1999	120	4	0.0026	0.0002
P	Forklift	1998	120	10	0.0070	0.0007
P	Forklift	1997	120	2	0.0017	0.0001
P	Forklift	1996	120	1	0.0013	0.0001
P	Forklift	1995	120	1	0.0008	0.0001
P	Forklift	1994	120	1	0.0013	0.0001
P	Forklift	1993	120	4	0.0039	0.0003
P	Forklift	1992	120	6	0.0057	0.0004
P	Forklift	1991	120	7	0.0066	0.0005
P	Forklift	1990	120	5	0.0049	0.0004
P	Forklift	1989	120	3	0.0027	0.0002
P	Forklift	1988	120	53	0.0503	0.0040
P	Forklift	2004	175	1	0.0006	0.0000
P	Forklift	2003	175	4	0.0032	0.0001
P	Forklift	2002	175	13	0.0136	0.0007
P	Forklift	2001	175	7	0.0069	0.0003
P	Forklift	2000	175	8	0.0087	0.0004
P	Forklift	1999	175	3	0.0035	0.0002
P	Forklift	1998	175	9	0.0093	0.0005
P	Forklift	1997	175	2	0.0018	0.0001
P	Forklift	1996	175	1	0.0016	0.0001
P	Forklift	1995	175	1	0.0010	0.0000
P	Forklift	1994	175	1	0.0016	0.0001
P	Forklift	1993	175	4	0.0048	0.0002
P	Forklift	1992	175	5	0.0070	0.0003
P	Forklift	1991	175	6	0.0081	0.0004
P	Forklift	1990	175	5	0.0060	0.0003
P	Forklift	1989	175	3	0.0033	0.0002
P	Forklift	1988	175	47	0.0621	0.0029
P	Forklift	2004	250	1	0.0008	0.0000
P	Forklift	2003	250	5	0.0045	0.0001
P	Forklift	2002	250	15	0.0183	0.0004
P	Forklift	2001	250	7	0.0093	0.0002
P	Forklift	2000	250	9	0.0117	0.0003
P	Forklift	1999	250	4	0.0048	0.0001
P	Forklift	1998	250	10	0.0126	0.0003
P	Forklift	1997	250	2	0.0024	0.0001
P	Forklift	1996	250	1	0.0018	0.0000
P	Forklift	1995	250	1	0.0016	0.0001
P	Forklift	1994	250	1	0.0024	0.0001
P	Forklift	1993	250	4	0.0074	0.0004
P	Forklift	1992	250	6	0.0108	0.0005
P	Forklift	1991	250	7	0.0126	0.0006

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

P	Forklift	1990	250	5	0.0093	0.0005
P	Forklift	1989	250	3	0.0051	0.0003
P	Forklift	1988	250	51	0.0969	0.0050
P	Forklift	2004	500	0	0.0002	0.0000
P	Forklift	2003	500	1	0.0008	0.0000
P	Forklift	2002	500	2	0.0027	0.0001
P	Forklift	2001	500	1	0.0015	0.0000
P	Forklift	2000	500	1	0.0024	0.0001
P	Forklift	1999	500	1	0.0010	0.0000
P	Forklift	1998	500	1	0.0026	0.0001
P	Forklift	1997	500	0	0.0005	0.0000
P	Forklift	1996	500	0	0.0004	0.0000
P	Forklift	1995	500	0	0.0003	0.0000
P	Forklift	1994	500	0	0.0005	0.0000
P	Forklift	1993	500	1	0.0015	0.0001
P	Forklift	1992	500	1	0.0022	0.0001
P	Forklift	1991	500	1	0.0026	0.0001
P	Forklift	1990	500	1	0.0019	0.0001
P	Forklift	1989	500	0	0.0011	0.0001
P	Forklift	1988	500	8	0.0198	0.0010
P	Container Handling Equip	2004	120	3	0.0065	0.0004
P	Container Handling Equip	2003	120	1	0.0046	0.0004
P	Container Handling Equip	2002	120	1	0.0032	0.0003
P	Container Handling Equip	2001	120	1	0.0020	0.0002
P	Container Handling Equip	2000	120	1	0.0044	0.0004
P	Container Handling Equip	1999	120	0	0.0015	0.0001
P	Container Handling Equip	1998	120	2	0.0052	0.0005
P	Container Handling Equip	1997	120	1	0.0049	0.0004
P	Container Handling Equip	1996	120	1	0.0037	0.0003
P	Container Handling Equip	1995	120	0	0.0013	0.0001
P	Container Handling Equip	1994	120	1	0.0021	0.0002
P	Container Handling Equip	1993	120	1	0.0031	0.0002
P	Container Handling Equip	1992	120	0	0.0010	0.0001
P	Container Handling Equip	1991	120	0	0.0000	0.0000
P	Container Handling Equip	1990	120	0	0.0010	0.0001
P	Container Handling Equip	1989	120	0	0.0002	0.0000
P	Container Handling Equip	1988	120	0	0.0007	0.0001
P	Container Handling Equip	2004	175	15	0.0484	0.0017
P	Container Handling Equip	2003	175	9	0.0315	0.0013
P	Container Handling Equip	2002	175	6	0.0285	0.0014
P	Container Handling Equip	2001	175	4	0.0177	0.0009
P	Container Handling Equip	2000	175	8	0.0391	0.0020
P	Container Handling Equip	1999	175	3	0.0135	0.0007
P	Container Handling Equip	1998	175	10	0.0465	0.0025
P	Container Handling Equip	1997	175	7	0.0343	0.0018
P	Container Handling Equip	1996	175	5	0.0308	0.0013
P	Container Handling Equip	1995	175	2	0.0108	0.0005
P	Container Handling Equip	1994	175	3	0.0177	0.0008
P	Container Handling Equip	1993	175	4	0.0261	0.0012
P	Container Handling Equip	1992	175	1	0.0083	0.0004
P	Container Handling Equip	1991	175	0	0.0000	0.0000
P	Container Handling Equip	1990	175	1	0.0084	0.0004
P	Container Handling Equip	1989	175	0	0.0014	0.0001
P	Container Handling Equip	1988	175	1	0.0059	0.0003
P	Container Handling Equip	2004	250	31	0.1359	0.0028
P	Container Handling Equip	2003	250	18	0.0871	0.0019
P	Container Handling Equip	2002	250	12	0.0755	0.0017
P	Container Handling Equip	2001	250	8	0.0470	0.0011
P	Container Handling Equip	2000	250	17	0.1042	0.0024
P	Container Handling Equip	1999	250	6	0.0362	0.0009
P	Container Handling Equip	1998	250	20	0.1251	0.0030
P	Container Handling Equip	1997	250	14	0.0927	0.0023
P	Container Handling Equip	1996	250	11	0.0705	0.0016
P	Container Handling Equip	1995	250	4	0.0325	0.0015
P	Container Handling Equip	1994	250	6	0.0534	0.0025
P	Container Handling Equip	1993	250	9	0.0789	0.0038
P	Container Handling Equip	1992	250	3	0.0252	0.0012
P	Container Handling Equip	1991	250	0	0.0000	0.0000
P	Container Handling Equip	1990	250	3	0.0258	0.0013

P	Container Handling Equip	1989	250	0	0.0043	0.0002
P	Container Handling Equip	1988	250	2	0.0180	0.0009
P	Container Handling Equip	2004	500	38	0.2076	0.0046
P	Container Handling Equip	2003	500	22	0.1220	0.0028
P	Container Handling Equip	2002	500	15	0.0889	0.0020
P	Container Handling Equip	2001	500	9	0.0608	0.0014
P	Container Handling Equip	2000	500	21	0.1700	0.0039
P	Container Handling Equip	1999	500	7	0.0590	0.0014
P	Container Handling Equip	1998	500	24	0.2041	0.0049
P	Container Handling Equip	1997	500	18	0.1512	0.0037
P	Container Handling Equip	1996	500	14	0.1151	0.0027
P	Container Handling Equip	1995	500	5	0.0529	0.0024
P	Container Handling Equip	1994	500	8	0.0870	0.0041
P	Container Handling Equip	1993	500	11	0.1287	0.0062
P	Container Handling Equip	1992	500	4	0.0411	0.0020
P	Container Handling Equip	1991	500	0	0.0000	0.0000
P	Container Handling Equip	1990	500	4	0.0420	0.0021
P	Container Handling Equip	1989	500	1	0.0071	0.0004
P	Container Handling Equip	1988	500	2	0.0294	0.0015
P	Container Handling Equip	2004	999	0	0.0060	0.0001
P	Container Handling Equip	2003	999	0	0.0036	0.0001
P	Container Handling Equip	2002	999	0	0.0025	0.0001
P	Container Handling Equip	2001	999	0	0.0015	0.0000
P	Container Handling Equip	2000	999	0	0.0034	0.0001
P	Container Handling Equip	1999	999	0	0.0015	0.0001
P	Container Handling Equip	1998	999	0	0.0053	0.0002
P	Container Handling Equip	1997	999	0	0.0040	0.0002
P	Container Handling Equip	1996	999	0	0.0030	0.0001
P	Container Handling Equip	1995	999	0	0.0011	0.0000
P	Container Handling Equip	1994	999	0	0.0017	0.0001
P	Container Handling Equip	1993	999	0	0.0026	0.0001
P	Container Handling Equip	1992	999	0	0.0008	0.0000
P	Container Handling Equip	1991	999	0	0.0000	0.0000
P	Container Handling Equip	1990	999	0	0.0008	0.0000
P	Container Handling Equip	1989	999	0	0.0001	0.0000
P	Container Handling Equip	1988	999	0	0.0006	0.0000
P	Other General Industrial Equip	2004	50	0	0.0001	0.0000
P	Other General Industrial Equip	2003	50	0	0.0001	0.0000
P	Other General Industrial Equip	2002	50	0	0.0001	0.0000
P	Other General Industrial Equip	2001	50	0	0.0000	0.0000
P	Other General Industrial Equip	2000	50	0	0.0001	0.0000
P	Other General Industrial Equip	1999	50	0	0.0000	0.0000
P	Other General Industrial Equip	1998	50	0	0.0001	0.0000
P	Other General Industrial Equip	1997	50	0	0.0000	0.0000
P	Other General Industrial Equip	1996	50	0	0.0000	0.0000
P	Other General Industrial Equip	1995	50	0	0.0000	0.0000
P	Other General Industrial Equip	1994	50	0	0.0000	0.0000
P	Other General Industrial Equip	1993	50	0	0.0000	0.0000
P	Other General Industrial Equip	1992	50	0	0.0000	0.0000
P	Other General Industrial Equip	1991	50	0	0.0000	0.0000
P	Other General Industrial Equip	1990	50	0	0.0000	0.0000
P	Other General Industrial Equip	1989	50	0	0.0000	0.0000
P	Other General Industrial Equip	1988	50	0	0.0001	0.0000
P	Other General Industrial Equip	2004	120	1	0.0006	0.0000
P	Other General Industrial Equip	2003	120	1	0.0005	0.0000
P	Other General Industrial Equip	2002	120	1	0.0006	0.0000
P	Other General Industrial Equip	2001	120	1	0.0004	0.0000
P	Other General Industrial Equip	2000	120	1	0.0006	0.0001
P	Other General Industrial Equip	1999	120	0	0.0002	0.0000
P	Other General Industrial Equip	1998	120	1	0.0006	0.0000
P	Other General Industrial Equip	1997	120	0	0.0003	0.0000
P	Other General Industrial Equip	1996	120	0	0.0003	0.0000
P	Other General Industrial Equip	1995	120	0	0.0002	0.0000
P	Other General Industrial Equip	1994	120	1	0.0005	0.0000
P	Other General Industrial Equip	1993	120	0	0.0004	0.0000
P	Other General Industrial Equip	1992	120	0	0.0002	0.0000
P	Other General Industrial Equip	1991	120	0	0.0001	0.0000
P	Other General Industrial Equip	1990	120	0	0.0002	0.0000
P	Other General Industrial Equip	1989	120	0	0.0002	0.0000

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

P	Other General Industrial Equip	1988	120	1	0.0007	0.0001
P	Other General Industrial Equip	2004	175	1	0.0005	0.0000
P	Other General Industrial Equip	2003	175	0	0.0004	0.0000
P	Other General Industrial Equip	2002	175	1	0.0006	0.0000
P	Other General Industrial Equip	2001	175	0	0.0004	0.0000
P	Other General Industrial Equip	2000	175	1	0.0006	0.0000
P	Other General Industrial Equip	1999	175	0	0.0002	0.0000
P	Other General Industrial Equip	1998	175	0	0.0006	0.0000
P	Other General Industrial Equip	1997	175	0	0.0002	0.0000
P	Other General Industrial Equip	1996	175	0	0.0003	0.0000
P	Other General Industrial Equip	1995	175	0	0.0002	0.0000
P	Other General Industrial Equip	1994	175	0	0.0004	0.0000
P	Other General Industrial Equip	1993	175	0	0.0004	0.0000
P	Other General Industrial Equip	1992	175	0	0.0001	0.0000
P	Other General Industrial Equip	1991	175	0	0.0001	0.0000
P	Other General Industrial Equip	1990	175	0	0.0002	0.0000
P	Other General Industrial Equip	1989	175	0	0.0002	0.0000
P	Other General Industrial Equip	1988	175	0	0.0007	0.0000
P	Other General Industrial Equip	2004	250	1	0.0011	0.0000
P	Other General Industrial Equip	2003	250	1	0.0009	0.0000
P	Other General Industrial Equip	2002	250	1	0.0013	0.0000
P	Other General Industrial Equip	2001	250	1	0.0008	0.0000
P	Other General Industrial Equip	2000	250	1	0.0013	0.0000
P	Other General Industrial Equip	1999	250	0	0.0003	0.0000
P	Other General Industrial Equip	1998	250	1	0.0012	0.0000
P	Other General Industrial Equip	1997	250	0	0.0005	0.0000
P	Other General Industrial Equip	1996	250	0	0.0006	0.0000
P	Other General Industrial Equip	1995	250	0	0.0005	0.0000
P	Other General Industrial Equip	1994	250	1	0.0010	0.0000
P	Other General Industrial Equip	1993	250	0	0.0009	0.0000
P	Other General Industrial Equip	1992	250	0	0.0003	0.0000
P	Other General Industrial Equip	1991	250	0	0.0002	0.0000
P	Other General Industrial Equip	1990	250	0	0.0004	0.0000
P	Other General Industrial Equip	1989	250	0	0.0004	0.0000
P	Other General Industrial Equip	1988	250	1	0.0016	0.0001
P	Other General Industrial Equip	2004	500	1	0.0020	0.0000
P	Other General Industrial Equip	2003	500	1	0.0014	0.0000
P	Other General Industrial Equip	2002	500	1	0.0018	0.0000
P	Other General Industrial Equip	2001	500	1	0.0012	0.0000
P	Other General Industrial Equip	2000	500	1	0.0026	0.0001
P	Other General Industrial Equip	1999	500	0	0.0006	0.0000
P	Other General Industrial Equip	1998	500	1	0.0023	0.0000
P	Other General Industrial Equip	1997	500	0	0.0010	0.0000
P	Other General Industrial Equip	1996	500	0	0.0011	0.0000
P	Other General Industrial Equip	1995	500	0	0.0009	0.0000
P	Other General Industrial Equip	1994	500	0.56	0.0020	0.0001
P	Other General Industrial Equip	1993	500	0	0.0016	0.0001
P	Other General Industrial Equip	1992	500	0	0.0006	0.0000
P	Other General Industrial Equip	1991	500	0	0.0004	0.0000
P	Other General Industrial Equip	1990	500	0	0.0008	0.0000
P	Other General Industrial Equip	1989	500	0	0.0008	0.0000
P	Other General Industrial Equip	1988	500	1	0.0031	0.0002
P	Other General Industrial Equip	2004	750	0	0.0009	0.0000
P	Other General Industrial Equip	2003	750	0	0.0006	0.0000
P	Other General Industrial Equip	2002	750	0	0.0008	0.0000
P	Other General Industrial Equip	2001	750	0	0.0006	0.0000
P	Other General Industrial Equip	2000	750	0	0.0011	0.0000
P	Other General Industrial Equip	1999	750	0	0.0003	0.0000
P	Other General Industrial Equip	1998	750	0	0.0010	0.0000
P	Other General Industrial Equip	1997	750	0	0.0004	0.0000
P	Other General Industrial Equip	1996	750	0	0.0005	0.0000
P	Other General Industrial Equip	1995	750	0	0.0004	0.0000
P	Other General Industrial Equip	1994	750	0	0.0009	0.0000
P	Other General Industrial Equip	1993	750	0	0.0007	0.0000
P	Other General Industrial Equip	1992	750	0	0.0003	0.0000
P	Other General Industrial Equip	1991	750	0	0.0002	0.0000
P	Other General Industrial Equip	1990	750	0	0.0003	0.0000
P	Other General Industrial Equip	1989	750	0	0.0004	0.0000
P	Other General Industrial Equip	1988	750	0	0.0013	0.0001

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

P	Sweeper/Scrubber	2004	50	1	0.0003	0.0000
P	Sweeper/Scrubber	2003	50	0	0.0002	0.0000
P	Sweeper/Scrubber	2002	50	1	0.0002	0.0000
P	Sweeper/Scrubber	2001	50	0	0.0001	0.0000
P	Sweeper/Scrubber	2000	50	1	0.0002	0.0000
P	Sweeper/Scrubber	1999	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1998	50	0	0.0003	0.0000
P	Sweeper/Scrubber	1997	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1996	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1995	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1994	50	0	0.0002	0.0000
P	Sweeper/Scrubber	1993	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1992	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1991	50	0	0.0000	0.0000
P	Sweeper/Scrubber	1990	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1989	50	0	0.0001	0.0000
P	Sweeper/Scrubber	1988	50	0	0.0003	0.0000
P	Sweeper/Scrubber	2004	120	1	0.0013	0.0001
P	Sweeper/Scrubber	2003	120	1	0.0012	0.0001
P	Sweeper/Scrubber	2002	120	1	0.0013	0.0001
P	Sweeper/Scrubber	2001	120	1	0.0008	0.0001
P	Sweeper/Scrubber	2000	120	1	0.0014	0.0001
P	Sweeper/Scrubber	1999	120	0	0.0003	0.0000
P	Sweeper/Scrubber	1998	120	1	0.0012	0.0001
P	Sweeper/Scrubber	1997	120	0	0.0007	0.0001
P	Sweeper/Scrubber	1996	120	0	0.0007	0.0001
P	Sweeper/Scrubber	1995	120	0	0.0005	0.0000
P	Sweeper/Scrubber	1994	120	1	0.0010	0.0001
P	Sweeper/Scrubber	1993	120	0	0.0008	0.0001
P	Sweeper/Scrubber	1992	120	0	0.0003	0.0000
P	Sweeper/Scrubber	1991	120	0	0.0002	0.0000
P	Sweeper/Scrubber	1990	120	0	0.0004	0.0000
P	Sweeper/Scrubber	1989	120	0	0.0004	0.0000
P	Sweeper/Scrubber	1988	120	1	0.0016	0.0001
P	Sweeper/Scrubber	2004	175	1	0.0010	0.0000
P	Sweeper/Scrubber	2003	175	1	0.0008	0.0000
P	Sweeper/Scrubber	2002	175	1	0.0012	0.0001
P	Sweeper/Scrubber	2001	175	0	0.0008	0.0000
P	Sweeper/Scrubber	2000	175	1	0.0013	0.0001
P	Sweeper/Scrubber	1999	175	0	0.0003	0.0000
P	Sweeper/Scrubber	1998	175	1	0.0011	0.0001
P	Sweeper/Scrubber	1997	175	0	0.0005	0.0000
P	Sweeper/Scrubber	1996	175	0	0.0006	0.0000
P	Sweeper/Scrubber	1995	175	0	0.0004	0.0000
P	Sweeper/Scrubber	1994	175	0	0.0009	0.0000
P	Sweeper/Scrubber	1993	175	0	0.0007	0.0000
P	Sweeper/Scrubber	1992	175	0	0.0003	0.0000
P	Sweeper/Scrubber	1991	175	0	0.0002	0.0000
P	Sweeper/Scrubber	1990	175	0	0.0003	0.0000
P	Sweeper/Scrubber	1989	175	0	0.0004	0.0000
P	Sweeper/Scrubber	1988	175	1	0.0014	0.0001
P	Sweeper/Scrubber	2004	250	1	0.0009	0.0000
P	Sweeper/Scrubber	2003	250	0	0.0007	0.0000
P	Sweeper/Scrubber	2002	250	1	0.0010	0.0000
P	Sweeper/Scrubber	2001	250	0	0.0006	0.0000
P	Sweeper/Scrubber	2000	250	1	0.0011	0.0000
P	Sweeper/Scrubber	1999	250	0	0.0003	0.0000
P	Sweeper/Scrubber	1998	250	0	0.0010	0.0000
P	Sweeper/Scrubber	1997	250	0	0.0004	0.0000
P	Sweeper/Scrubber	1996	250	0	0.0005	0.0000
P	Sweeper/Scrubber	1995	250	0	0.0004	0.0000
P	Sweeper/Scrubber	1994	250	0	0.0008	0.0000
P	Sweeper/Scrubber	1993	250	0	0.0007	0.0000
P	Sweeper/Scrubber	1992	250	0	0.0003	0.0000
P	Sweeper/Scrubber	1991	250	0	0.0002	0.0000
P	Sweeper/Scrubber	1990	250	0	0.0003	0.0000
P	Sweeper/Scrubber	1989	250	0	0.0004	0.0000
P	Sweeper/Scrubber	1988	250	0	0.0013	0.0001
P	Tractor/Loader/Backhoe	2004	50	0	0.0000	0.0000

P	Tractor/Loader/Backhoe	2003	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	2002	50	1	0.0002	0.0000
P	Tractor/Loader/Backhoe	2001	50	0	0.0001	0.0000
P	Tractor/Loader/Backhoe	2000	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1999	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	50	4	0.0013	0.0001
P	Tractor/Loader/Backhoe	1997	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1996	50	0	0.0002	0.0000
P	Tractor/Loader/Backhoe	1995	50	0	0.0001	0.0000
P	Tractor/Loader/Backhoe	1994	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1990	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	50	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	50	1	0.0004	0.0000
P	Tractor/Loader/Backhoe	2004	120	0	0.0002	0.0000
P	Tractor/Loader/Backhoe	2003	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	2002	120	2	0.0015	0.0001
P	Tractor/Loader/Backhoe	2001	120	1	0.0005	0.0000
P	Tractor/Loader/Backhoe	2000	120	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1999	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	120	11	0.0084	0.0008
P	Tractor/Loader/Backhoe	1997	120	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1996	120	1	0.0013	0.0001
P	Tractor/Loader/Backhoe	1995	120	1	0.0010	0.0001
P	Tractor/Loader/Backhoe	1994	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	120	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1990	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	120	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	120	3	0.0035	0.0003
P	Tractor/Loader/Backhoe	2004	175	0	0.0001	0.0000
P	Tractor/Loader/Backhoe	2003	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	2002	175	1	0.0013	0.0001
P	Tractor/Loader/Backhoe	2001	175	0	0.0004	0.0000
P	Tractor/Loader/Backhoe	2000	175	0	0.0002	0.0000
P	Tractor/Loader/Backhoe	1999	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	175	6	0.0071	0.0004
P	Tractor/Loader/Backhoe	1997	175	0	0.0002	0.0000
P	Tractor/Loader/Backhoe	1996	175	1	0.0010	0.0000
P	Tractor/Loader/Backhoe	1995	175	1	0.0008	0.0000
P	Tractor/Loader/Backhoe	1994	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	175	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1990	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	175	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	175	2	0.0028	0.0001
P	Tractor/Loader/Backhoe	2004	250	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	2003	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	2002	250	1	0.0023	0.0001
P	Tractor/Loader/Backhoe	2001	250	0	0.0008	0.0000
P	Tractor/Loader/Backhoe	2000	250	0	0.0004	0.0000
P	Tractor/Loader/Backhoe	1999	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	250	8	0.0129	0.0003
P	Tractor/Loader/Backhoe	1997	250	0	0.0004	0.0000
P	Tractor/Loader/Backhoe	1996	250	1	0.0016	0.0000
P	Tractor/Loader/Backhoe	1995	250	1	0.0016	0.0001
P	Tractor/Loader/Backhoe	1994	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	250	0	0.0006	0.0000
P	Tractor/Loader/Backhoe	1990	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	250	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	250	2	0.0058	0.0003
P	Tractor/Loader/Backhoe	2004	500	1	0.0010	0.0000
P	Tractor/Loader/Backhoe	2003	500	0	0.0000	0.0000

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

P	Tractor/Loader/Backhoe	2002	500	3	0.0067	0.0001
P	Tractor/Loader/Backhoe	2001	500	1	0.0025	0.0001
P	Tractor/Loader/Backhoe	2000	500	1	0.0016	0.0000
P	Tractor/Loader/Backhoe	1999	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	500	18	0.0519	0.0013
P	Tractor/Loader/Backhoe	1997	500	1	0.0016	0.0000
P	Tractor/Loader/Backhoe	1996	500	2	0.0065	0.0002
P	Tractor/Loader/Backhoe	1995	500	2	0.0065	0.0003
P	Tractor/Loader/Backhoe	1994	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	500	1	0.0023	0.0001
P	Tractor/Loader/Backhoe	1990	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	500	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	500	6	0.0234	0.0012
P	Tractor/Loader/Backhoe	2004	750	0	0.0002	0.0000
P	Tractor/Loader/Backhoe	2003	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	2002	750	0	0.0013	0.0000
P	Tractor/Loader/Backhoe	2001	750	0	0.0006	0.0000
P	Tractor/Loader/Backhoe	2000	750	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1999	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1998	750	2	0.0095	0.0002
P	Tractor/Loader/Backhoe	1997	750	0	0.0003	0.0000
P	Tractor/Loader/Backhoe	1996	750	0	0.0012	0.0000
P	Tractor/Loader/Backhoe	1995	750	0	0.0012	0.0001
P	Tractor/Loader/Backhoe	1994	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1993	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1992	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1991	750	0	0.0004	0.0000
P	Tractor/Loader/Backhoe	1990	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1989	750	0	0.0000	0.0000
P	Tractor/Loader/Backhoe	1988	750	0	0.0043	0.0002
P	Yard Tractor	2004	120	0	0.0004	0.0000
P	Yard Tractor	2003	120	0	0.0004	0.0000
P	Yard Tractor	2002	120	0	0.0004	0.0000
P	Yard Tractor	2001	120	0	0.0003	0.0000
P	Yard Trac tor	2000	120	0	0.0005	0.0000
P	Yard Tractor	1999	120	0	0.0001	0.0000
P	Yard Tractor	1998	120	0	0.0002	0.0000
P	Yard Tractor	1997	120	0	0.0002	0.0000
P	Yard Tractor	1996	120	0	0.0002	0.0000
P	Yard Tractor	1995	120	0	0.0002	0.0000
P	Yard Tractor	1994	120	0	0.0005	0.0000
P	Yard Tractor	1993	120	0	0.0003	0.0000
P	Yard Tractor	1992	120	0	0.0005	0.0000
P	Yard Tractor	2004	175	153	0.5160	0.0144
P	Yard Tractor	2003	175	101	0.4318	0.0117
P	Yard Tractor	2002	175	118	0.6316	0.0211
P	Yard Tractor	2001	175	71	0.3840	0.0131
P	Yard Tractor	2000	175	134	0.7319	0.0256
P	Yard Tractor	1999	175	25	0.1359	0.0048
P	Yard Tractor	1998	175	45	0.2520	0.0092
P	Yard Tractor	1997	175	33	0.1852	0.0069
P	Yard Tractor	1996	175	46	0.2988	0.0091
P	Yard Tractor	1995	175	36	0.2310	0.0094
P	Yard Tractor	1994	175	86	0.6260	0.0287
P	Yard Tractor	1993	175	56	0.3990	0.0187
P	Yard Tractor	1992	175	94	0.6949	0.0329
P	Yard Tractor	2004	250	152	0.6144	0.0116
P	Yard Tractor	2003	250	100	0.5110	0.0084
P	Yard Tractor	2002	250	117	0.7217	0.0123
P	Yard Tractor	2001	250	71	0.4412	0.0077
P	Yard Tractor	2000	250	133	0.8453	0.0153
P	Yard Tractor	1999	250	24	0.1578	0.0029
P	Yard Tractor	1998	250	45	0.2940	0.0056
P	Yard Tractor	1997	250	33	0.2172	0.0043
P	Yard Tractor	1996	250	46	0.3065	0.0057
P	Yard Tractor	1995	250	35	0.2958	0.0130
P	Yard Tractor	1994	250	85	0.8054	0.0401

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

P	Yard Tractor	1993	250	56	0.5156	0.0263
P	Yard Tractor	1992	250	93	0.9018	0.0467

R	Crane	2004	250	0	0.0011	0.0000
R	Crane	2003	250	0	0.0010	0.0000
R	Crane	2002	250	0	0.0015	0.0000
R	Crane	2001	250	0	0.0015	0.0000
R	Crane	2000	250	0	0.0015	0.0000
R	Crane	1999	250	0	0.0008	0.0000
R	Crane	1998	250	0	0.0010	0.0000
R	Crane	1997	250	0	0.0013	0.0000
R	Crane	1996	250	0	0.0013	0.0000
R	Crane	1995	250	0	0.0017	0.0001
R	Crane	1994	250	0	0.0000	0.0000
R	Crane	1993	250	0	0.0000	0.0000
R	Crane	1992	250	0	0.0003	0.0000
R	Crane	1991	250	0	0.0010	0.0000
R	Crane	1990	250	0	0.0007	0.0000
R	Crane	1989	250	0	0.0011	0.0000
R	Crane	1988	250	0	0.0014	0.0001
R	Crane	1987	250	0	0.0014	0.0001
R	Crane	1986	250	0	0.0029	0.0002
R	Crane	2004	500	6	0.0152	0.0003
R	Crane	2003	500	5	0.0123	0.0003
R	Crane	2002	500	6	0.0157	0.0003
R	Crane	2001	500	6	0.0174	0.0004
R	Crane	2000	500	6	0.0221	0.0005
R	Crane	1999	500	3	0.0111	0.0002
R	Crane	1998	500	4	0.0150	0.0003
R	Crane	1997	500	5	0.0189	0.0004
R	Crane	1996	500	5	0.0187	0.0004
R	Crane	1995	500	5	0.0246	0.0011
R	Crane	1994	500	0	0.0000	0.0000
R	Crane	1993	500	0	0.0000	0.0000
R	Crane	1992	500	1	0.0050	0.0002
R	Crane	1991	500	3	0.0153	0.0007
R	Crane	1990	500	2	0.0103	0.0005
R	Crane	1989	500	3	0.0155	0.0007
R	Crane	1988	500	4	0.0208	0.0010
R	Crane	1987	500	3	0.0212	0.0011
R	Crane	1986	500	5	0.0426	0.0021
R	Forklift	2004	120	0	0.0000	0.0000
R	Forklift	2003	120	0	0.0000	0.0000
R	Forklift	2002	120	0	0.0000	0.0000
R	Forklift	2001	120	0	0.0000	0.0000
R	Forklift	2000	120	0	0.0001	0.0000
R	Forklift	1999	120	1	0.0002	0.0000
R	Forklift	1998	120	0	0.0000	0.0000
R	Forklift	1997	120	0	0.0001	0.0000
R	Forklift	1996	120	0	0.0001	0.0000
R	Forklift	1995	120	0	0.0001	0.0000
R	Forklift	1994	120	0	0.0001	0.0000
R	Forklift	1993	120	0	0.0001	0.0000
R	Forklift	1992	120	0	0.0001	0.0000
R	Forklift	1991	120	0	0.0000	0.0000
R	Forklift	1990	120	0	0.0000	0.0000
R	Forklift	1989	120	0	0.0001	0.0000
R	Forklift	1988	120	0	0.0000	0.0000
R	Forklift	1987	120	0	0.0000	0.0000

R	Forklift	1986	120	0	0.0000	0.0000
R	Forklift	1985	120	0	0.0000	0.0000
R	Forklift	1984	120	0	0.0001	0.0000
R	Forklift	2004	175	0	0.0002	0.0000
R	Forklift	2003	175	0	0.0003	0.0000
R	Forklift	2002	175	0	0.0000	0.0000
R	Forklift	2001	175	0	0.0004	0.0000
R	Forklift	2000	175	1	0.0007	0.0000
R	Forklift	1999	175	3	0.0022	0.0001
R	Forklift	1998	175	0	0.0000	0.0000
R	Forklift	1997	175	1	0.0007	0.0000
R	Forklift	1996	175	0	0.0004	0.0000
R	Forklift	1995	175	0	0.0004	0.0000
R	Forklift	1994	175	1	0.0009	0.0000
R	Forklift	1993	175	1	0.0009	0.0000
R	Forklift	1992	175	0	0.0004	0.0000
R	Forklift	1991	175	0	0.0000	0.0000
R	Forklift	1990	175	0	0.0000	0.0000
R	Forklift	1989	175	1	0.0009	0.0000
R	Forklift	1988	175	0	0.0000	0.0000
R	Forklift	1987	175	0	0.0000	0.0000
R	Forklift	1986	175	0	0.0000	0.0000
R	Forklift	1985	175	0	0.0000	0.0000
R	Forklift	1984	175	0	0.0006	0.0000
R	Forklift	2004	250	0	0.0003	0.0000
R	Forklift	2003	250	0	0.0003	0.0000
R	Forklift	2002	250	0	0.0000	0.0000
R	Forklift	2001	250	0	0.0004	0.0000
R	Forklift	2000	250	1	0.0008	0.0000
R	Forklift	1999	250	3	0.0024	0.0001
R	Forklift	1998	250	0	0.0000	0.0000
R	Forklift	1997	250	1	0.0008	0.0000
R	Forklift	1996	250	0	0.0004	0.0000
R	Forklift	1995	250	0	0.0005	0.0000
R	Forklift	1994	250	1	0.0011	0.0001
R	Forklift	1993	250	1	0.0011	0.0001
R	Forklift	1992	250	0	0.0006	0.0000
R	Forklift	1991	250	0	0.0000	0.0000
R	Forklift	1990	250	0	0.0000	0.0000
R	Forklift	1989	250	1	0.0011	0.0001
R	Forklift	1988	250	0	0.0000	0.0000
R	Forklift	1987	250	0	0.0000	0.0000
R	Forklift	1986	250	0	0.0000	0.0000
R	Forklift	1985	250	0	0.0000	0.0000
R	Forklift	1984	250	0	0.0008	0.0000
R	Container Handling Equip	2004	175	0	0.0002	0.0000
R	Container Handling Equip	2003	175	0	0.0000	0.0000
R	Container Handling Equip	2002	175	0	0.0007	0.0000
R	Container Handling Equip	2001	175	0	0.0004	0.0000
R	Container Handling Equip	2000	175	0	0.0007	0.0000
R	Container Handling Equip	1999	175	0	0.0000	0.0000
R	Container Handling Equip	1998	175	0	0.0004	0.0000
R	Container Handling Equip	1997	175	0	0.0004	0.0000
R	Container Handling Equip	1996	175	0	0.0004	0.0000
R	Container Handling Equip	1995	175	0	0.0000	0.0000
R	Container Handling Equip	1994	175	0	0.0022	0.0001
R	Container Handling Equip	1993	175	0	0.0004	0.0000

2004 Emission Estimates (tons per day) by Facility Type, by Equipment Type, by Model Year, and by Horsepower Category

R	Container Handling Equip	1992	175	0	0.0004	0.0000
R	Container Handling Equip	1991	175	0	0.0000	0.0000
R	Container Handling Equip	1990	175	0	0.0013	0.0001
R	Container Handling Equip	1989	175	0	0.0018	0.0001
R	Container Handling Equip	1988	175	0	0.0005	0.0000
R	Container Handling Equip	1987	175	0	0.0006	0.0000
R	Container Handling Equip	1986	175	0	0.0006	0.0000
R	Container Handling Equip	2004	250	1	0.0021	0.0000
R	Container Handling Equip	2003	250	0	0.0000	0.0000
R	Container Handling Equip	2002	250	1	0.0058	0.0001
R	Container Handling Equip	2001	250	1	0.0029	0.0001
R	Container Handling Equip	2000	250	1	0.0059	0.0001
R	Container Handling Equip	1999	250	0	0.0000	0.0000
R	Container Handling Equip	1998	250	1	0.0030	0.0001
R	Container Handling Equip	1997	250	1	0.0031	0.0001
R	Container Handling Equip	1996	250	1	0.0031	0.0001
R	Container Handling Equip	1995	250	0	0.0000	0.0000
R	Container Handling Equip	1994	250	3	0.0204	0.0010
R	Container Handling Equip	1993	250	1	0.0041	0.0002
R	Container Handling Equip	1992	250	1	0.0042	0.0002
R	Container Handling Equip	1991	250	0	0.0000	0.0000
R	Container Handling Equip	1990	250	2	0.0128	0.0006
R	Container Handling Equip	1989	250	2	0.0173	0.0009
R	Container Handling Equip	1988	250	1	0.0044	0.0002
R	Container Handling Equip	1987	250	1	0.0060	0.0003
R	Container Handling Equip	1986	250	1	0.0059	0.0003
R	Container Handling Equip	2004	500	0	0.0020	0.0000
R	Container Handling Equip	2003	500	0	0.0000	0.0000
R	Container Handling Equip	2002	500	1	0.0043	0.0001
R	Container Handling Equip	2001	500	0	0.0024	0.0001
R	Container Handling Equip	2000	500	1	0.0061	0.0001
R	Container Handling Equip	1999	500	0	0.0000	0.0000
R	Container Handling Equip	1998	500	0	0.0031	0.0001
R	Container Handling Equip	1997	500	0	0.0032	0.0001
R	Container Handling Equip	1996	500	0	0.0031	0.0001
R	Container Handling Equip	1995	500	0	0.0000	0.0000
R	Container Handling Equip	1994	500	2	0.0210	0.0010
R	Container Handling Equip	1993	500	0	0.0042	0.0002
R	Container Handling Equip	1992	500	0	0.0043	0.0002
R	Container Handling Equip	1991	500	0	0.0000	0.0000
R	Container Handling Equip	1990	500	1	0.0132	0.0007
R	Container Handling Equip	1989	500	2	0.0178	0.0009
R	Container Handling Equip	1988	500	0	0.0045	0.0002
R	Container Handling Equip	1987	500	0	0.0061	0.0003
R	Container Handling Equip	1986	500	0	0.0061	0.0003
R	Other General Industrial Equip	2004	175	0	0.0002	0.0000
R	Other General Industrial Equip	2003	175	0	0.0002	0.0000
R	Other General Industrial Equip	2002	175	0	0.0001	0.0000
R	Other General Industrial Equip	2001	175	0	0.0001	0.0000
R	Other General Industrial Equip	2000	175	0	0.0001	0.0000
R	Other General Industrial Equip	1999	175	0	0.0000	0.0000
R	Other General Industrial Equip	1998	175	0	0.0001	0.0000
R	Other General Industrial Equip	1997	175	0	0.0000	0.0000
R	Other General Industrial Equip	1996	175	0	0.0000	0.0000
R	Other General Industrial Equip	1995	175	0	0.0000	0.0000
R	Other General Industrial Equip	1994	175	0	0.0000	0.0000
R	Other General Industrial Equip	1993	175	0	0.0000	0.0000

R	Other General Industrial Equip	1992	175	0	0.0000	0.0000
R	Other General Industrial Equip	1991	175	0	0.0000	0.0000
R	Other General Industrial Equip	1990	175	0	0.0000	0.0000
R	Other General Industrial Equip	1989	175	0	0.0000	0.0000
R	Other General Industrial Equip	1988	175	0	0.0001	0.0000
R	Other General Industrial Equip	2004	250	0	0.0007	0.0000
R	Other General Industrial Equip	2003	250	0	0.0005	0.0000
R	Other General Industrial Equip	2002	250	0	0.0004	0.0000
R	Other General Industrial Equip	2001	250	0	0.0002	0.0000
R	Other General Industrial Equip	2000	250	0	0.0002	0.0000
R	Other General Industrial Equip	1999	250	0	0.0001	0.0000
R	Other General Industrial Equip	1998	250	0	0.0004	0.0000
R	Other General Industrial Equip	1997	250	0	0.0001	0.0000
R	Other General Industrial Equip	1996	250	0	0.0001	0.0000
R	Other General Industrial Equip	1995	250	0	0.0001	0.0000
R	Other General Industrial Equip	1994	250	0	0.0001	0.0000
R	Other General Industrial Equip	1993	250	0	0.0000	0.0000
R	Other General Industrial Equip	1992	250	0	0.0001	0.0000
R	Other General Industrial Equip	1991	250	0	0.0000	0.0000
R	Other General Industrial Equip	1990	250	0	0.0001	0.0000
R	Other General Industrial Equip	1989	250	0	0.0001	0.0000
R	Other General Industrial Equip	1988	250	0	0.0003	0.0000
R	Other General Industrial Equip	2004	500	1	0.0024	0.0000
R	Other General Industrial Equip	2003	500	0	0.0015	0.0000
R	Other General Industrial Equip	2002	500	0	0.0009	0.0000
R	Other General Industrial Equip	2001	500	0	0.0007	0.0000
R	Other General Industrial Equip	2000	500	0	0.0008	0.0000
R	Other General Industrial Equip	1999	500	0	0.0005	0.0000
R	Other General Industrial Equip	1998	500	0	0.0015	0.0000
R	Other General Industrial Equip	1997	500	0	0.0004	0.0000
R	Other General Industrial Equip	1996	500	0	0.0002	0.0000
R	Other General Industrial Equip	1995	500	0	0.0003	0.0000
R	Other General Industrial Equip	1994	500	0	0.0003	0.0000
R	Other General Industrial Equip	1993	500	0	0.0001	0.0000
R	Other General Industrial Equip	1992	500	0	0.0002	0.0000
R	Other General Industrial Equip	1991	500	0	0.0001	0.0000
R	Other General Industrial Equip	1990	500	0	0.0004	0.0000
R	Other General Industrial Equip	1989	500	0	0.0004	0.0000
R	Other General Industrial Equip	1988	500	0	0.0010	0.0001
R	Sweeper/Scrubber	2004	250	0	0.0004	0.0000
R	Sweeper/Scrubber	2003	250	0	0.0003	0.0000
R	Sweeper/Scrubber	2002	250	0	0.0002	0.0000
R	Sweeper/Scrubber	2001	250	0	0.0001	0.0000
R	Sweeper/Scrubber	2000	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1999	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1998	250	0	0.0003	0.0000
R	Sweeper/Scrubber	1997	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1996	250	0	0.0000	0.0000
R	Sweeper/Scrubber	1995	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1994	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1993	250	0	0.0000	0.0000
R	Sweeper/Scrubber	1992	250	0	0.0000	0.0000
R	Sweeper/Scrubber	1991	250	0	0.0000	0.0000
R	Sweeper/Scrubber	1990	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1989	250	0	0.0001	0.0000
R	Sweeper/Scrubber	1988	250	0	0.0002	0.0000
R	Tractor/Loader/Backhoe	2004	120	0	0.0001	0.0000

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R	Tractor/Loader/Backhoe	2003	120	0	0.0001	0.0000
R	Tractor/Loader/Backhoe	2002	120	0	0.0001	0.0000
R	Tractor/Loader/Backhoe	2001	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	2000	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1999	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1998	120	0	0.0001	0.0000
R	Tractor/Loader/Backhoe	1997	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1996	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1995	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1994	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1993	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1992	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1991	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1990	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1989	120	0	0.0000	0.0000
R	Tractor/Loader/Backhoe	1988	120	0	0.0000	0.0000
R	Yard Tractor	2004	175	70	0.1071	0.0030
R	Yard Tractor	2003	175	42	0.0791	0.0021
R	Yard Tractor	2002	175	22	0.0518	0.0017
R	Yard Tractor	2001	175	13	0.0302	0.0010
R	Yard Tractor	2000	175	10	0.0241	0.0008
R	Yard Tractor	1999	175	3	0.0081	0.0003
R	Yard Tractor	1998	175	27	0.0674	0.0024
R	Yard Tractor	1997	175	2	0.0050	0.0002
R	Yard Tractor	1996	175	2	0.0054	0.0002
R	Yard Tractor	2004	250	36	0.0715	0.0014
R	Yard Tractor	2003	250	21	0.0525	0.0009
R	Yard Tractor	2002	250	11	0.0332	0.0006
R	Yard Tractor	2001	250	6	0.0195	0.0003
R	Yard Tractor	2000	250	5	0.0156	0.0003
R	Yard Tractor	1999	250	2	0.0053	0.0001
R	Yard Tractor	1998	250	14	0.0441	0.0008
R	Yard Tractor	1997	250	1	0.0033	0.0001
R	Yard Tractor	1996	250	1	0.0031	0.0001

Survey Instructions

Before you begin filling out the Mobile Cargo Handling Equipment Survey (Survey) form, please read the instructions carefully. A sample Survey has been included in this packet for your assistance.

THE SURVEY FORM

Explanations for each Survey data field are provided below. If you have more than one terminal, please complete a separate Survey for each terminal. Please complete all pages of the Survey to the best of your knowledge. If you do not have exact numbers or data for specific fields, please provide your best estimation. If you need additional forms for any of the sections, you may either photocopy each page needed or download blank survey pages from the following web site address: http://www.arb.ca.gov/msprog/offroad/cargo/documents/survey.htm.

Please return the completed Surveys by **January 31, 2005**, to the following:

California Air Resources Board
Attn: Lisa Williams
Stationary Source Division
P.O. Box 2815
Sacramento, CA 95812-2815
CONFIDENTIAL MATERIALS ENCLOSED (if that's the case)

In an effort to simplify and streamline the data gathering process, we have made the Survey forms available electronically. If you prefer to submit the Survey forms electronically, please see the Electronic Submittal Form in Part II for the information about how to obtain a diskette (or download the Survey from the Internet). To access the Survey on our website, please go to: http://www.arb.ca.gov/msprog/offroad/cargo/documents/survey.htm.

If you have any questions, please contact Lisa Williams at (916) 327-1498 or via e-mail at lwilliam@arb.ca.gov.

Survey Data Fields

Section I: Terminal Information

Terminal/Facility Name: Please enter the terminal or facility that owns or operates the cargo handling equipment.

Port/Rail Yard: Port or rail yard where the terminal operates.

Address, City, Zip: Mailing address, city, and zip code for the terminal/facility.

Contact Name, Phone, E-mail: Please enter the name and title of the person to be contacted by ARB if we have questions about the information provided.

Small Business: If your terminal/facility is a California Small Business as defined by California Gov. Code Sec. 11342.610, please check the "Yes" box.

Confidential: Please indicate as to whether or not you would like ARB to treat your information as confidential information. If you designate information as confidential, you also need to fill out the confidential information submittal form and return that to ARB with your Survey.

Section II: Forecasted Growth

This section is intended to provide us with your best estimates on forecasted growth. This information will be used to help provide us with a general estimate of emissions and trends.

Avg # New Replacement Equipment Purchased Annually: Please enter the average number of new pieces of equipment purchased to replace previously existing equipment over a 12-month period for each equipment type.

Expected Average Useful Life in # Years: Please enter the average # of years each equipment type is expected to last.

Forecasted Growth for 2010
Expected % Increase in # of Equipment: Please indicate the percentage of increase in the number of each equipment type that you expect to see by 2010.

Expected % Increase in # of Hours: Please indicate the expected percentage of increase by 2010 in the number of hours each equipment type will be operated.

Forecasted Growth for 2020
Expected % Increase in # of Equipment: Please indicate the percentage of increase in the number of each equipment type that you expect to see between now and 2020.

Expected % Increase in # of Hours: Please indicate the expected percentage of increase between now and 2020 in the number of hours each equipment type will be operated.

Comments: Please provide any additional comments you may have.

Section III: In-Use Equipment and Engine Information

Equipment Type: Please enter the type of equipment (i.e., forklift, yard truck, RTG crane, etc.).

# of Equipment: If you have multiple equipment with identical information (same make, model, engines, fuel, horsepower, rebuild/repower info, and average hours), please enter the number of equipment here. If any of the equipment information differs (i.e., one was repowered but one was not), please enter each one individually on its own line.

Equipment Make and Model Year: The manufacturer and model year of the equipment (not the engine).

Engine Make, Model, and Model Year: Please enter the manufacturer, model number, and model year for the engine (not the equipment).

Fuel Type: Please enter one of the following fuel type codes for the equipment:

- A = EPA Off-Road Diesel
- B = CARB Diesel #2
- C = Ultra-low Sulfur (15 ppm) Diesel
- D = Ethanol-blended Diesel (i.e., O_2 Diesel)
- E = Emulsified Diesel (i.e., PuriNOx)
- F = Biodiesel 20% (B20)
- G = Biodiesel 100% (B100)
- H = Natural Gas (CNG, LNG)
- I = Liquefied Petroleum Gas (LPG)
- J = Electricity

Rated HP: The rated horsepower of the engine.

Repowered?: Please indicate if the engine were repowered, and if so, what year(s) the repower occurred. Repowered means that the engine was replaced (into the existing equipment).

Rebuilt?: Please indicate if the engine were rebuilt, and if so, what year(s).

Avg. Annual Hours: The average number of hours the equipment operates each 12-month year.

Section IV: Emission Controls

Please only complete this section for the equipment that have emission controls installed.

from Section III: Please enter the corresponding # from Section III column 1.

Control Equipment: Please check the appropriate box(es) for the emission control(s) installed (DOC for diesel oxidation catalyst, DPF for diesel particulate filter, SCR for selective catalytic reduction, or Other). If Other is checked, please indicate the emission control system.

Year Installed: The year the emission control equipment was installed on the engine.

Installed cost: The cost of the equipment including installation.

Avg. Annual Maintenance Cost: The average cost of maintenance over each 12-month period.

Purchased with new equipment or engine?: Please indicate if the emission controls came with a new piece of equipment or with a new engine.

Grants Received: Please indicate if either a port grant or Carl Moyer Program funding was provided for the emission controls.

Notes or Comments: Please provide any additional information you feel might be valuable (i.e., your experience with the emission control equipment failures or successes).

Section V: Confidentiality Statement

Please complete this section if you have indicated in Section I that the information you have provided on this Survey is confidential.

California Air Resources Board Survey: Mobile Cargo Handling Equipment at Intermodal Facilities

Section I: Terminal/Facility Information

Terminal/Facility Name: _____ Port/Rail Yard: _____ Page ____ of ____
Address: _____ City: _____ Zip: _____
Contact Name: _____ Small Business*: Yes ☐ No ☐
Contact Phone: _____ * Small business as defined by California Gov. Code 11342.610
Contact E-Mail: _____

Confidential? Yes ☐ No ☐ **If "Yes", please complete Confidentiality Statement (Section V)**

Section II: Forecasted Growth

	Equipment Type											
	Yard Trucks	**RTG Cranes**	**Cranes (not RTG)**	**Top Picks**	**Side Picks**	**Reach Stackers**	**Rubber-Tired Loaders**	**Forklifts**	**Skid Steer Loaders**	**Excavators**	**Dozers**	**Other (Explain)**
Avg # New Replacement Equipment Purchased Annually												
Expected Useful Life in # Years												
Forecasted Growth for 2010												
Expected % Increase in # of Equipment												
Expected % Increase in # of Hours												
Forecasted Growth for 2020												
Expected % Increase in # of Equipment												
Expected % Increase in # of Hours												

Comments: _____

_____

_____

Terminal/Facility Name: _____ Port/Rail Yard: _____ Page ____ of ____

Section III: In-Use Equipment and Engine Information

#	Equipment Type	# of Equipment	Equipment Make	Equipment Model Year	Engine Make	Engine Model	Engine Model Year	Fuel Type*	Rated HP	Repowered?		Rebuilt?		Avg. Annual Hours
1										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	
2										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	
3										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	
4										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	
5										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	
6										No ☐	Yes ☐ Years:	No ☐	Yes ☐ Years:	

*** Fuel Type Codes:**

- A = EPA Off-Road Diesel
- B = CARB Diesel #2
- C = Ultra-low Sulfur (15 ppm) Diesel
- D = Ethanol-blended Diesel (i.e., O_2 Diesel)
- E = Emulsified Diesel (i.e., PuriNOx)
- F = Biodiesel 20% (B20)
- G = Biodiesel 100% (B100)
- H = Natural Gas (CNG, LNG)
- I = Liquefied Petroleum Gas (LPG)
- J = Electricity

Please photocopy this page if additional room is needed.

California Air Resources Board Survey: Mobile Cargo Handling Equipment at Intermodal Facilities

Terminal/Facility Name: ______________________ Port/Rail Yard: ______________________________ Page ____ of ____

Section IV: Emission Controls

# from Section III	Control Equipment*	Year Installed	Installed Cost	Avg. Annual Maintenance Cost	Purchased with new equipment or engine?	Grants Received	Notes or Comments
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	
	DOC ☐ DPF ☐ SCR ☐ Other ☐ ________				No ☐ Yes ☐	Port Grant ☐ Carl Moyer ☐	

Please photocopy this page if additional room is needed.

If you wish to designate any information contained in your survey data as **CONFIDENTIAL INFORMATION**, please provide the information requested below and return it with your completed Survey form.

In accordance with Title 17, California Code of Regulations (CCR), Sections 91000 to 91022, and the California Public Records Act (Government Code Section 6250 et seq.), the information that a company provides to the Air Resources Board (ARB) may be released (1) to the public upon request, except trade secrets which are not emissions data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and 2) to the Federal Environmental Protection Agency, which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulation, and 3) to other public agencies provided that those agencies preserve the protections afforded information which is identified as a trade secret, or otherwise exempt from disclosure by law (Section 39660(e)).

Trade secrets, as defined in Government Code 6254.7, are not public records and therefore will not be released to the public. However, the California Public Records Act states that air pollution emission data are always public records, even if the data comes within the definition of trade secrets. Even so, the information used to calculate air pollution data is not "emission data," and will not be released to the public if it is a trade secret.

If any company believes that any of the information it may provide is a trade secret or otherwise exempt from disclosure under any provision of law, **it must identify the confidential information as such at the time of submission to the ARB and must provide the name, address, and telephone number of the individual to be consulted**. If the ARB receives a request for disclosure or seeks to disclose the data claimed to be confidential, the ARB may ask the company to provide documentation of its claim of trade secret or exemption at a later date. Data identified as confidential will not be disclosed unless the ARB determines, in accordance with the above referenced regulations, that the data do not qualify for a legal exemption from disclosure. The regulations establish substantial safeguards before any such disclosure.

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In accordance with the provisions of Title 17, California Code of Regulations, Sections 91000 to 91022, and the California Public Records Act (Government Code Sections 6250 et seq.)

Company Name: _____

declares that all the information submitted in response to the California Air Resources Board's information request on the Survey is confidential "trade secret" information, and request that it be protected as such from public disclosure. All inquiries pertaining to the confidentiality of this information should be directed to the following person:

Printed Name: _____ Title: _____

Signature: _____ Date: _____

Mailing Address: _____

City/State: _____ Zip/Country: _____

Telephone: _____ E-Mail Address: _____