Fleet Average Calculator

Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower
1	1995		334
2	1992		452
3	1999		239
4	2004		125
5	2002		220

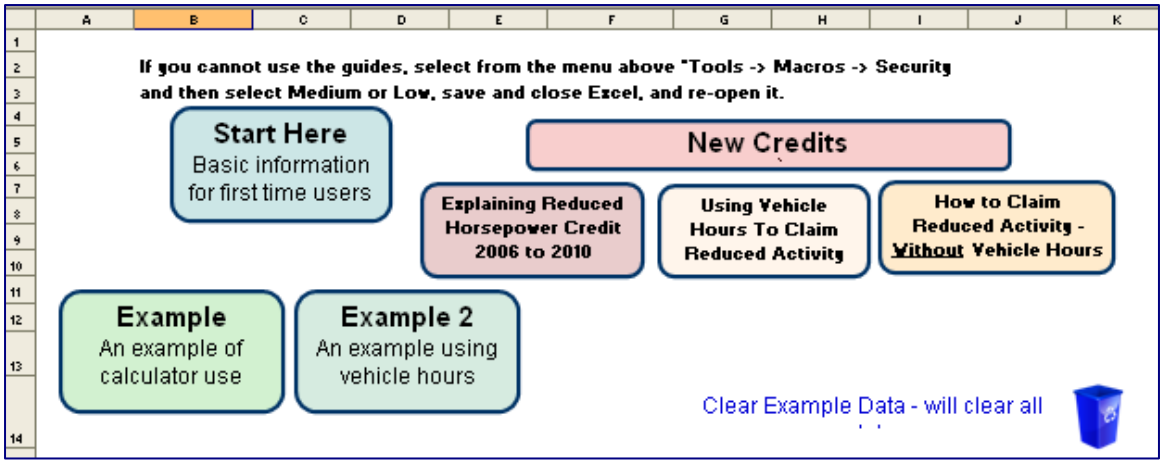
Introduction

The fleet average calculator is an Excel spreadsheet that takes the horsepower and engine model year of all vehicles in your fleet, and determines whether you meet the requirements of the off-road diesel regulation. Fleets can also enter actions that award early credits, or determine what their fleet needs to do to comply with the regulation. Fleets can enter retrofits, retirements, upgrades of current equipment through repowers or replacements, electric vehicles, reduced activity, and other credits to find a custom path to complying with the off-road diesel regulation.

For general information about the regulation, please visit our knowledge center here: http://www.arb.ca.gov/msprog/ordiesel/knowcenter.htm

Using the Calculator

When a fleet opens the calculator, they will first see a number buttons leading to guides and explanations, as shown below. These buttons can be clicked to provide either more information or examples of fleets using the calculator.



If you are familiar with the calculator, you may want to view the buttons detailing the new credits, and possibly skip to Example 2. For those new to the calculator, it is recommended that you begin with the button that says "Start Here", and then view both examples. Each takes only a few minutes to complete. After each example you can click the recycling bin to remove all the information the calculator inserted during the example.

Inserting Your Baseline Information

Directly below all the guides is the first table to insert your March 1, 2006, fleet. To enter your information, scroll down. You will need the engine model year and horsepower of every vehicle in the fleet. You can also enter an equipment name or inventory or tracking number for each vehicle.

	Hp Repowered					Hp with PM VDECS =	Hp Turnover Credit for NOx	PM Fleet Average =	NOx Fleet Average =
	0.0					0.0	0.0	0.49	8.7
Baseline (Enter fleet as it was on March 1, 2006)									
Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM VDECS Level (Enter 1, 2, 3, or NA)	NOx VDECS Level (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)
1	1995		334		T0	NA	NA	0.490	8.900
2	1992		452		T0	NA	NA	0.490	8.900
3	1999		239		T1	NA	NA	0.400	6.900
4	2004		125		T2	NA	NA	0.220	4.300
5	2002		220		T1	NA	NA	0.400	6.900
6	2006		190		T3	NA	NA	0.150	2.600
7	1992		650		T0	NA	NA	0.490	8.900
8	1980		345		T0	NA	NA	0.680	11.900

You do not need to enter the Tier, or the NOx and PM emissions factors; these are filled in by the calculator.

Entering in Actions Taken in the Fleet

To the right of the baseline information are a series of columns where you can insert which vehicles you have retired, scrapped and sold, which ones you have retrofit, or repowered, or which vehicles you have added since March 1, 2006. Scrolling to the right, you will see the column to enter in all actions taken from March 1, 2006, to March 1, 2007. This guide will go over how to insert each action into the calculator.

In the screenshot below, the fleet has scrolled over to the right from the screenshot above, and we can see the heading now says “March 1, 2006, to March 1, 2007” instead of “Baseline”.

The fleet has retired vehicle #2 during this period, so they enter in an “R” over the model year, and delete the horsepower.

Retired vehicle entered into calculator

	O	P	Q	R	S	T	U
25					March 1, 2006, to March 1, 2007		
26	Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM V Level 1, 2, N
27	1	1995		334		T0	N
28	2	R					N
29	3	1999		239		T1	N
30	4	2004		125		T2	N

Scrolling to the right, the fleet can enter information on actions that happened between March 1, 2007, and March 1, 2008, then further to the right all actions from March 1, 2008, to March 1, 2009, and so on.

Compliance

Beginning in 2010 for large fleets, above the list of fleet equipment, the calculator determines whether the fleet meets the fleet averages, or if not, whether the fleet meets the BACT requirements. (For more information on the requirements, see http://www.arb.ca.gov/msprog/ordiesel/documents/largefleet2010fs.pdf)

For our example fleet, the fleet average for NOx and PM are not met, and the BACT requirements are not met. Therefore, the NOx and the PM requirements have not yet been met, and the fleet is not in compliance.

NOx Requirements Fulfilled?	NO			PM Requirements Fulfilled?	NO		
NOx Requirements (Comply with either Fleet Average or BACT)				PM Requirements (Comply with either Fleet Average or BACT)			
Fleet Average		BACT		Fleet Average		BACT	
NOx Fleet Target =	6.0	Needed Hp Turnover =	456.9	PM Fleet Target =	0.21	Needed Hp with VDECS =	1142.2
NOx Fleet Average =	8.7			PM Fleet Average =	0.50		
NOx Fleet Average w/ Hours =	10.2	Current Hp Turnover =	452.0	PM Fleet Average w. Hours =	0.58	Current Hp with VDECS =	452.0

March 1, 2009, to March 1, 2010

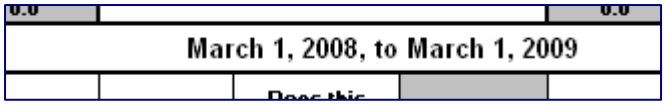
Engine Model Year	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM VDECS Level (Enter 1, 2, 3, or NA) Before Jan.1, 2010	NOx VDECS Level (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)
1995	334		T0	NA	NA	0.490	8.900
R				NA	NA		
1999	239		T1	NA	NA	0.400	6.900
2004	125		T2	NA	NA	0.220	4.300

For fleets that are not in compliance, the fleet can add in additional retirements, retrofits, repowers, or other actions until they are in compliance with both PM and NOx.

The calculator will allow a fleet to plan a course of actions through 2020 (or for a small fleet using the small fleet calculator, 2026)

How to Report Each Action

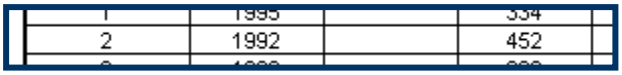
For any action the first step is to find the right time period. For actions that occurred in, for example, September, 2008, you want to enter them below the box which says:



Retirements
For any vehicle which is sold, retired, scraped, permanently moved out of state, permanently disabled by removing the engine, (but **not** low-use or vehicles returned from a lease) you can indicate the vehicle is retired by:

- **Type in 'R' over the model year, and**
- **Delete the horsepower.**

Before retirement



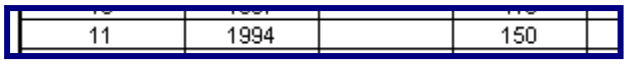
After retirement

Repowers
For any vehicle repowered with a Tier 1 engine or better before March 1, 2009, or a Tier 2 engine after March 1, 2009, to claim credit:

- **Replace the model year of the old engine with the new engine model year**
- **Update the horsepower from the old engine horsepower to the new if necessary**.

The following vehicle with ID #11 had it's 1994, 150 horsepower engine repowered with a 2005, 161 horsepower engine.

Before repower



After repower

Enter a 'Y' in the column "Has this vehicle been repowered with a New Engine (Y/N)". After March 1, 2009, there will not be a column to enter 'Y". Simply replace the model year and horsepower with the information of the new engine added to the vehicle.

Adding Vehicles
For vehicles added after March 1, 2006, enter in the vehicle information below the other vehicles, including the engine model year, horsepower, and inventory number (if you have one).

For vehicle with id #21 below, the information is added below the previous vehicle.

Before adding the vehicle

19	1999		320
20	2004		410

After adding the vehicle

19	1999		320
20	2004		410
21	2003		273

Retrofits

For all verified exhaust retrofits, see (http://www.arb.ca.gov/msprog/ordiesel/vdecs.htm) enter in the level of the retrofit under 'PM VDECS'. Currently all verified devices on the market are level 3. If the device also reduces NOx, enter in the percent that NOx is reduced by, such as '40'. Do not enter "0.4".

- **Enter '3' in the column for PM VDECS**
- **Enter in a NOx percent reduction, if any**

Before

Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM VDECS Level (Enter 1, 2, 3, or NA)	NOx VDECS Level (Enter % Reduction or NA)
1	2002		234		T1	NA	NA
2	2001		410		T2	NA	NA

After

Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM VDECS Level (Enter 1, 2, 3, or NA)	NOx VDECS Level (Enter % Reduction or NA)
1	2002		234		T1	NA	NA
2	2001		410		T2	3	40.0%

Retrofits installed between January 2, 2010 to March 1, 2010 (without a purchase order from before September 1, 2009), and retrofits prior to January 1, 2010, funded through an air quality program not allowing double credit must have the total horsepower of the retrofit vehicles entered above and to the left of the March 1, 2009 to March 1, 2010 compliance year.

Retrofits from Jan. 2, 2010, to March 1, 2010 or retrofits receiving single credit due to funding

Enter the total Hp of all applicable vehicles retrofit (vehicles using manufacturer or installer delay need not be totaled here)

Total Hp:	0

Electric or On-road Engines
For electric vehicles claimed for credit, or on-road engines installed in off-road vehicles in the fleet, the fleet can:

- **Enter 'ON' for on-road engines, or 'E' for electric vehicles below the question "Does this vehicles have an On-road Engine or Electric Motor?"**

In the following example, the 410 horsepower engine is an on-road engine, and the 180 horsepower is an electric vehicle.

Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier
234		T1
410		T2
190		T0
180		T0
170		T1

Before

Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier
234		T1
410	ON	T2
190		T0
180	E	T0
170		T1

After

Low-Use Vehicles
Low use vehicles will not directly be entered on the calculator. Additionally, before reporting vehicles as low use, fleets should familiarize themselves with the low-use provisions, outlined here
http://www.arb.ca.gov/msprog/ordiesel/faq/faqlowuse.pdf

- **For year-to-year low use, the vehicle should not be included in the calculator.**
- **For those permanently designated low-use for NOx credit, enter in the total horsepower of all permanent low-use vehicles in the appropriate field.**

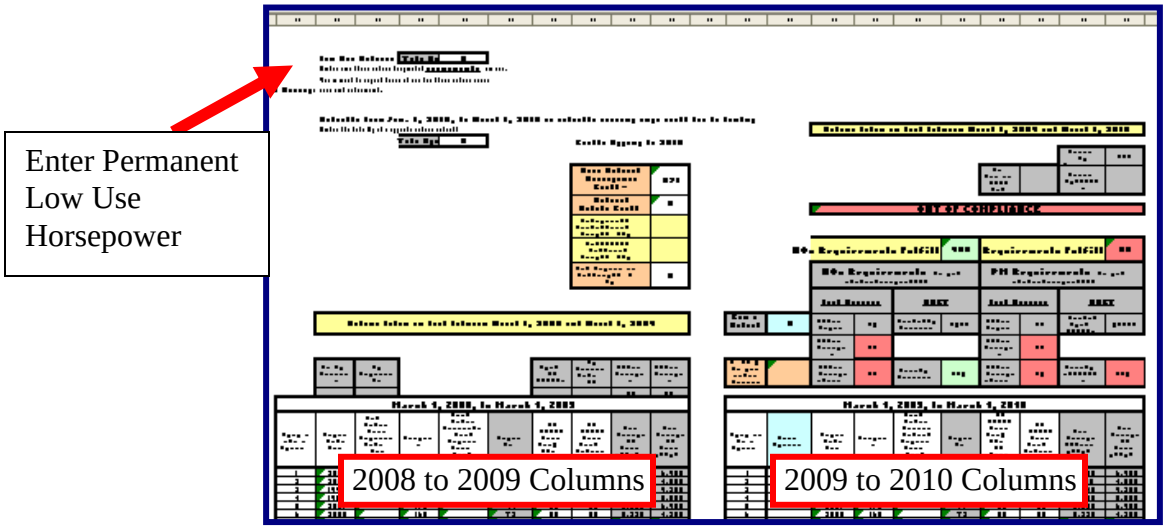
For a fleet with a three vehicles (100 horsepower, 50 horsepower, and 74 horsepower) that were designated permanent low use, the fleet would enter:

Low Use Vehicles: | **Total Hp:** | 224

Enter only those vehicles designated **permanently** low use.

You will need to report hours of use for these vehicles every year until retirement.

This field is located above the March 1, 2008, to March 1, 2009, columns.



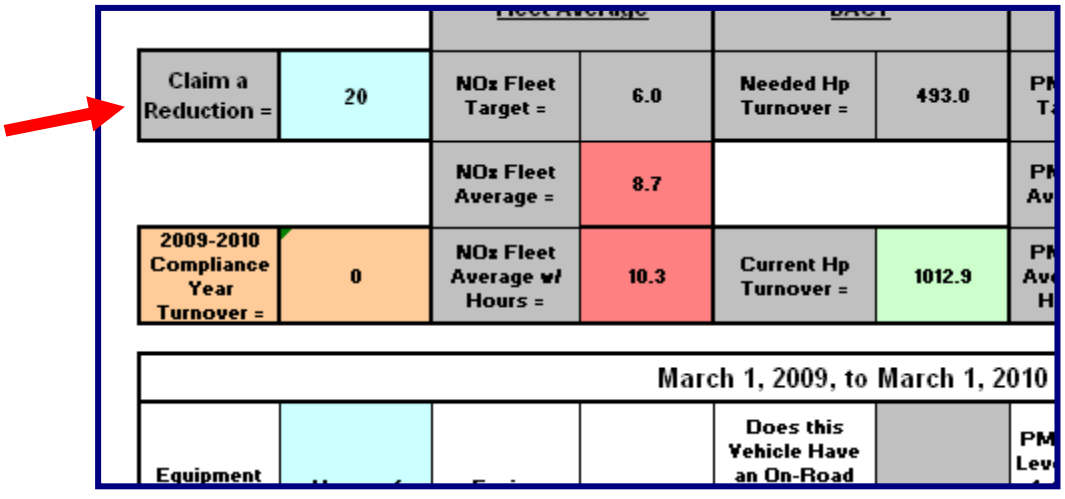
Reduced Activity Credit – Not Using Vehicle Hours

Before claiming reduced activity, fleet should first read the guide to reduced activity in the early credit FAQ, here:
http://www.arb.ca.gov/msprog/ordiesel/faq/faq-early-credit.pdf
Entering in the percent reduction in activity is simple, however a fleet must first determine if they can claim more than 20 percent, and whether they will have the records to support that reduction in activity.

To claim the reduced activity:

- **Enter in the percent reduction activity as a whole number (e.g. '20' not "0.20") in the reduced activity field**

This field is to the left of the 2010 compliance summary, as shown below.



Fleets will also need to identify vehicles that were in the fleet for a portion of the year, but not the entire year. For vehicles retired or added in 2007, the fleet needs to fill in the number of days in the calendar year 2007 that the vehicle was in the fleet, in the appropriate column in the March 1, 2006, to March 1, 2007, fields.

For vehicle on line 4 below, the vehicle was retired on January 25, 2007. The fleet enters 25 for days in the fleet. Note that for vehicles in the fleet the entire year, the fleet simply leaves the field blank.

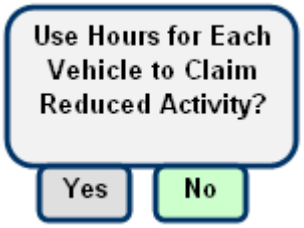
		March 1, 2006, to March 1, 2007						
Jan to Dec, 2007 - Hours of Operation =	If vehicle was not in fleet throughout 2007, days in fleet (out of 365).	Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM Leve 1, 2
		1	1995		334		T0	
		2	1992		452		T0	
		3	1999		239		T1	
	25	4	R					
		5	2002		220		T1	
		6	2006		190		T3	
		7	1992		650		T0	
	10	8						

For vehicle on line 8 above, the vehicle was added to the fleet on December 21, 2007. The model year and horsepower have not been added yet (the model year and horsepower will be added to the right under the column for March 1, 2007, to March 1, 2008), but the fleet still needs to include the total number of days in the fleet.

Reduced Activity Credit – Using Vehicle Hours

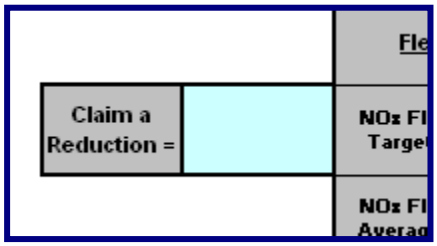
To use the hours of operation for the fleet to claim reduced activity, fleets will need to either (1) select yes on the button shown below, next to the 2006 to 2007 columns, or (2) manually select cell AW21, next to the 2010 compliance calculations, and hit delete so that no entry, not even '0', is shown.

(1)

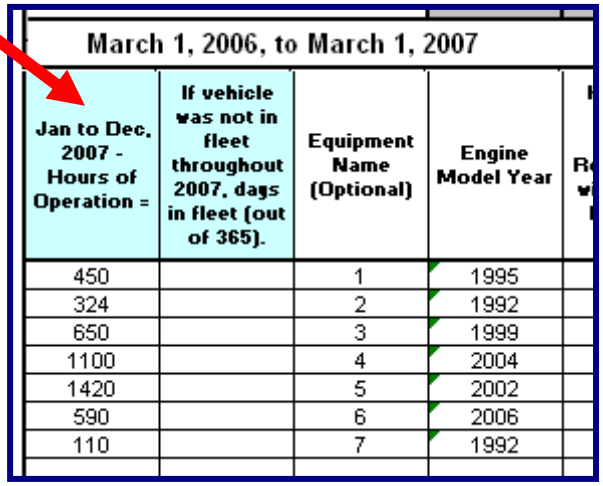


Or

(2)

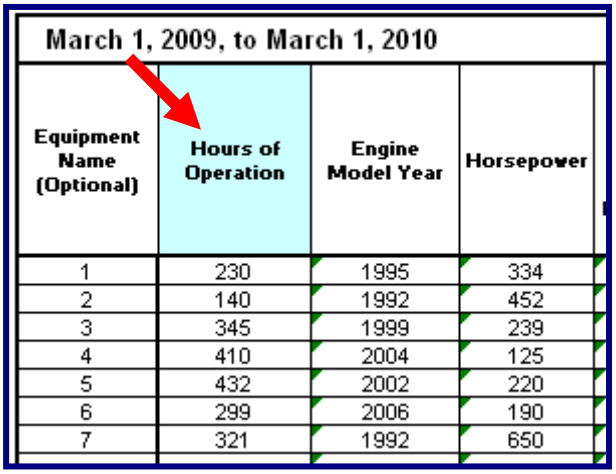


After that, the fleet can enter the hours of use for each vehicle from the calendar year 2007, in the column for 2006-2007, shown below. Then the fleet can enter the hours of use for each vehicle from March 1, 2009, to March 1, 2010.



March 1, 2006, to March 1, 2007

Jan to Dec, 2007 - Hours of Operation =	If vehicle was not in fleet throughout 2007, days in fleet (out of 365).	Equipment Name (Optional)	Engine Model Year	R
450		1	1995	
324		2	1992	
650		3	1999	
1100		4	2004	
1420		5	2002	
590		6	2006	
110		7	1992	

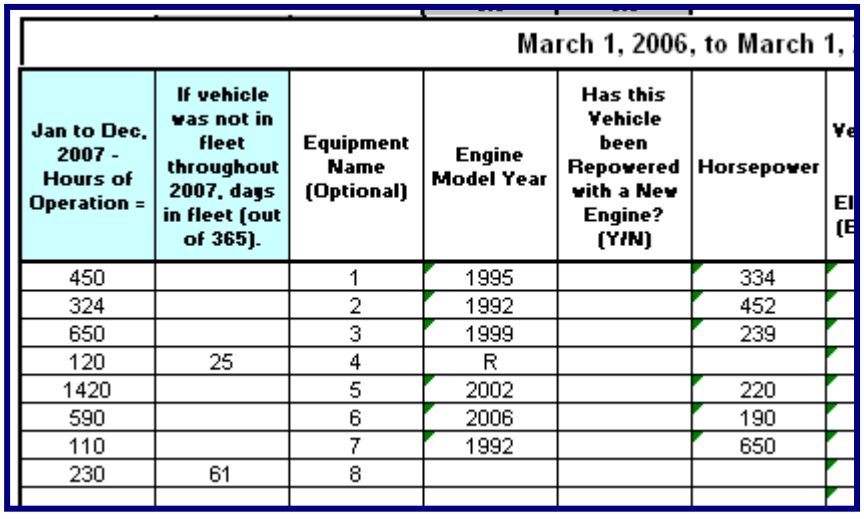


March 1, 2009, to March 1, 2010

Equipment Name (Optional)	Hours of Operation	Engine Model Year	Horsepower
1	230	1995	334
2	140	1992	452
3	345	1999	239
4	410	2004	125
5	432	2002	220
6	299	2006	190
7	321	1992	650

Additionally, for 2007 only, vehicles in the fleet only a portion of 2007 must be identified and the number of days in the fleet, out of the year, must be inserted.

For the vehicle on line 4 below, the fleet retired the vehicle on January 25, 2007, and between the first of the year and the vehicle retirement 25 days later, the fleet ran the vehicle 120 hours.



March 1, 2006, to March 1,

Jan to Dec, 2007 - Hours of Operation =	If vehicle was not in fleet throughout 2007, days in fleet (out of 365).	Equipment Name (Optional)	Engine Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Ye / El (E
450		1	1995		334	
324		2	1992		452	
650		3	1999		239	
120	25	4	R			
1420		5	2002		220	
590		6	2006		190	
110		7	1992		650	
230	61	8				

On line 8 above, the fleet added the vehicle on November 1, 2007. In the 61 days until the end of the year, the fleet used the vehicle 230 hours, as shown above. Note the model year and horsepower will not be input until the

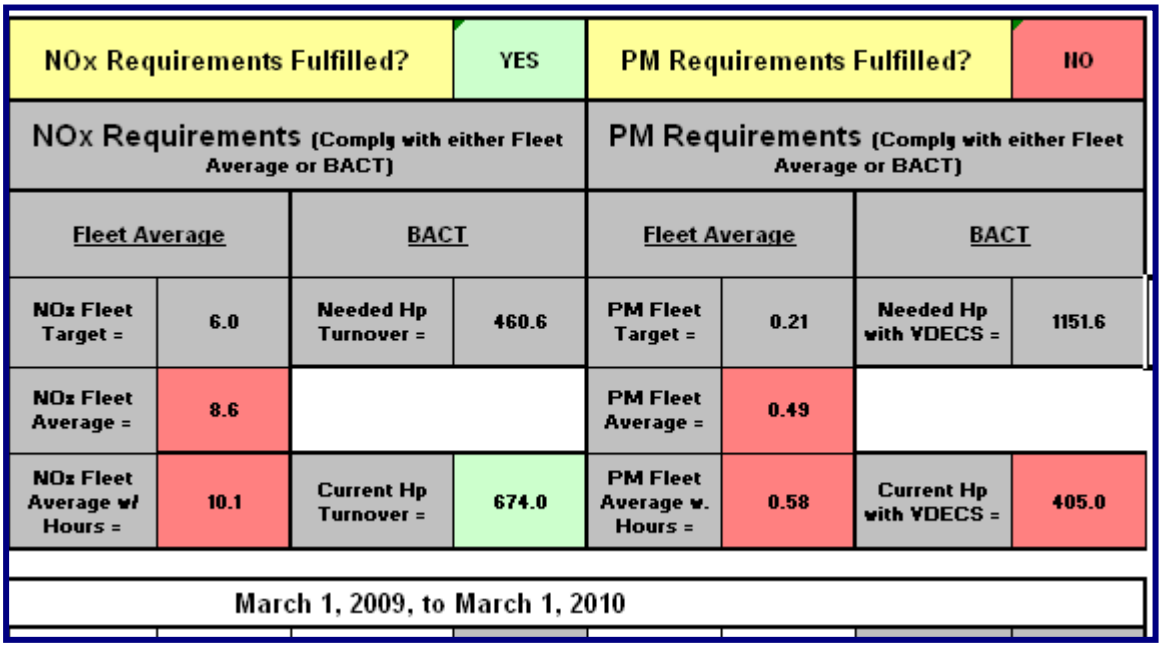
columns to the right for the March 1, 2007, to March 1, 2008, compliance year.

Compliance

After a fleet has put in all their information, the goal is to see if you already have enough credits to meet the requirements, or if you need to take additional actions.

Scroll over to the compliance display for 2010. In the example below, the fleet has entered all their information, and has enough credit to meet the NOx requirements, but not the PM requirements. Going over the guide to large fleets, (www.arb.ca.gov/msprog/ordiesel/documents/largefleet2010fs.pdf) the fleet can choose a number of actions to come into compliance, and determine how many vehicles they want to retrofit, or how many Tier 0s they need to retire to comply.

The fleet can create a number of scenarios to test which actions their fleet could take to move the fleet into compliance.



NOx Requirements Fulfilled?	YES			PM Requirements Fulfilled?	NO		
NOx Requirements (Comply with either Fleet Average or BACT)				PM Requirements (Comply with either Fleet Average or BACT)			
Fleet Average		BACT		Fleet Average		BACT	
NOx Fleet Target =	6.0	Needed Hp Turnover =	460.6	PM Fleet Target =	0.21	Needed Hp with VDECS =	1151.6
NOx Fleet Average =	8.6			PM Fleet Average =	0.49		
NOx Fleet Average w/ Hours =	10.1	Current Hp Turnover =	674.0	PM Fleet Average w. Hours =	0.58	Current Hp with VDECS =	405.0
March 1, 2009, to March 1, 2010							

Once both NOx and PM are in compliance, fleets can move on to 2011, and future years, and insert planned retirements, retrofits, etc., to create their custom compliance plan.