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## MEMORANDUM

**TO:** Joe Somers

**FROM:** Sandeep Kishan, Meredith Weatherby

**DATE:** October 26, 1998

**SUBJECT: Clean Screen Analysis with 1996 Colorado Data**

Radian used the 1996 Colorado I/M data (400,000 vehicles) to test the clean screen model developed by Radian using the Arizona pilot I/M data. The Colorado vehicles were ranked using the Arizona clean screen model and were put into targeting bins of 10%, 20%, 30%, etc.

### **Task 1 - Total Emissions**

Once the entire dataset of Colorado vehicles was ranked by targeting level and put into 10% increments, the data was separated into model year groups of 1982-1985 vehicles, 1986-1989 vehicles, 1990-1993 vehicles, 1994 and newer vehicles, and 1990 and newer vehicles. For each of these model year groups and 10% targeting increments, the sum of emissions screened out were calculated.

Radian also determined the sum of emissions screened out by emitter category groupings and model year group. The emitter categories were defined using normal, high, very high, and super emitters of HC and CO, and normal and high emitters of NOx. Table 1 shows the standards that were used to determine these emitter categories. A vehicle was a normal emitter of HC/CO if its HC value was less than two times the HC standard and its CO value was less than three times

Tables 3 through 5 show the sum of emissions by model year group. Tables 6 through 10 show the sum of emissions by emitter category groups for each of the five model year groups.

**Table 1. Emissions Standards used for Emitter Categories**

<b>Model Years</b>	<b>HC Standard (g/mi)</b>	<b>CO Standard (g/mi)</b>	<b>NOx Standard (g/mi)</b>
1982 - 1993	0.41	3.4	1.0
1994 and newer	0.25	3.4	0.4

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**Table 2. Definitions for Each Emitter Category**

<b>Emitter Category</b>	<b>Definition</b>
<i>HC and CO</i>	
Normal	HC value is less than or equal to 2 times the HC standard and CO value is less than or equal to 3 times the CO standard.
High	HC value is between 2 and 4 times the HC standard and CO value is between 3 and 4 times the CO standard.
Very High	HC value is over 4 times the HC standard but less than 10 g/mi, and CO value is over 4 times the HC standard but less than 150 g/mi.
Super	HC value is over 10 g/mi, and CO value is over 150 g/mi.
<i>NOx</i>	
Normal	NOx value is less than or equal to 2 times the NOx standard.
High	NOx value is over 2 times the NOx standard.

## **Task 2 - Total Excess Emissions**

Radian also determined the sum of excess emissions that were screened out for the clean screened vehicles. The excess emissions were determined using IM240 phase-in and final cutpoints. The phase-in cutpoints used were: 1.2 g/mi for HC, 20.0 g/mi for CO, and 2.0 g/mi for NOx. The final cutpoints used were: 0.8 g/mi for HC, 15.0 g/mi for CO, and 2.0 g/mi for NOx. Tables 11 through 13 show the sum of excess HC, CO, and NO<sub>x</sub> emissions screened out by targeting percentage.

Radian also determined the sum of excess emissions screened out by emitter category groupings and model year group. Tables 14 through 23 show the sum of emissions by emitter category groups for each of the three model year groups.

## **Task 3 - Fraction of Excess Emissions Retained by Each Model Year Group**

The results from Tables 11 through 13 were then changed to reflect the percent of overall emissions retained by model year for each 10% targeting level for the overall fleet. These results are shown in Tables 24 and 25. Radian also calculated the percent of vehicles within each model year group excused from the I/M testing at each 10% targeting interval. These results are shown in Table 26. The results from Tables 24 and 25 were combined with the results from Table 26 to calculate the emission exhaust credits retained for specific model year groupings versus the specific exemption rate for that particular model year group. The results for phase-in cutpoints are in Table 27, and the results for final cutpoints are shown in Table 28.

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**Table 3. Sum of HC Emissions Screened Out by Model Year Group and Targeting Percentage**

Targeting Percentage	MY 82 -85		MY 86-89		MY 90-93		MY 94 +		MY 90+	
	# of vehicles	Sum HC (g/mi)								
10%	0	0	425	257	10,479	2,330	28,638	2,941	39,117	5,270
20%	0	0	987	499	33,669	8,165	44,428	5,374	78,097	13,539
30%	0	0	4,340	1,840	64,549	17,148	49,737	6,255	114,286	23,403
40%	0	0	20,251	9,173	87,058	24,351	50,859	6,439	137,917	30,790
50%	29	19	35,561	18,099	110,382	33,620	51,738	6,615	162,120	40,235
60%	605	519	57,957	33,956	126,744	42,703	51,946	6,652	178,690	49,355
70%	12,089	15,830	83,128	57,719	129,631	44,443	51,946	6,652	181,577	51,095
80%	17,587	23,529	110,665	83,995	136,138	48,704	51,946	6,652	188,084	55,357
90%	37,731	53,387	128,144	102,679	138,057	50,202	51,946	6,652	190,003	56,855

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**Table 4. Sum of CO Emissions Screened Out by Model Year Group and Targeting Percentage**

Targeting Percentage	MY 82-85		MY 86-89		MY 90-93		MY 94 +		MY 90 +	
	# of vehicles	Sum CO (g/mi)								
10%	0	0	425	4,103	10,479	50,750	28,638	65,522	39,117	116,272
20%	0	0	987	9,185	33,669	169,746	44,428	119,766	78,097	289,512
30%	0	0	4,340	37,725	64,549	359,036	49,737	138,019	114,286	497,055
40%	0	0	20,251	190,088	87,058	506,375	50,859	142,101	137,917	648,476
50%	29	408	35,561	342,412	110,382	670,119	51,738	145,862	162,120	815,980
60%	605	8,758	57,957	592,374	126,744	828,328	51,946	146,529	178,690	974,856
70%	12,089	254,382	83,128	946,491	129,631	854,843	51,946	146,529	181,577	1,001,372
80%	17,587	366,912	110,665	1,356,468	136,138	917,503	51,946	146,529	188,084	1,064,032
90%	37,731	804,594	128,144	1,639,126	138,057	940,007	51,946	146,529	190,003	1,086,536

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**Table 5. Sum of NO<sub>x</sub> Emissions Screened Out by Model Year Group and Targeting Percentage**

Targeting Percentage	MY 82-85		MY 86-89		MY 90-93		MY 94 +		MY 90 +	
	# of vehicles	Sum NO <sub>x</sub> (g/mi)	# of vehicles	Sum NO <sub>x</sub> (g/mi)	# of vehicles	Sum NO <sub>x</sub> (g/mi)	# of vehicles	Sum NO <sub>x</sub> (g/mi)	# of vehicles	Sum NO <sub>x</sub> (g/mi)
10%	0	0	425	487	10,479	6,890	28,638	9,060	39,117	15,951
20%	0	0	987	1,010	33,669	23,748	44,428	15,525	78,097	39,273
30%	0	0	4,340	4,198	64,549	48,790	49,737	17,825	114,286	66,615
40%	0	0	20,251	21,583	87,058	67,320	50,859	18,366	137,917	85,685
50%	29	36	35,561	40,715	110,382	89,101	51,738	18,841	162,120	107,942
60%	605	806	57,957	69,906	126,744	105,541	51,946	18,935	178,690	124,475
70%	12,089	18,700	83,128	106,080	129,631	108,458	51,946	18,935	181,577	127,393
80%	17,587	27,961	110,665	145,280	136,138	115,604	51,946	18,935	188,084	134,539
90%	37,731	64,262	128,144	173,623	138,057	117,737	51,946	18,935	190,003	136,671

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**Table 6. Sum of Emissions (g/mi) by Emitter Category Group for 1982-1985 Vehicles**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	13.3	268.6	26.7	4.0	114.6	4.5	0.0	0.0	0.0
60%	7.3	174.5	19.0	210.5	4,033.7	400.5	168.3	3,119.6	165.9	18.4	247.1	2.0
70%	113.5	1,729.9	305.9	2,428.7	40,988.6	4,301.3	8,157.9	153,072.4	6,246.1	866.8	10,555.0	47.8
80%	165.3	2,413.3	451.7	3,602.8	59,663.7	6,451.3	11,544.8	213,796.4	8,906.8	1,495.7	16,192.9	77.0
90%	328.4	4,549.5	903.2	6,674.6	111,391.1	11,896.2	25,685.7	454,700.7	19,333.3	3,411.6	36,693.9	176.9
Targeting Percentage	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	1.6	24.9	4.3	0.0	0.0	0.0	0.0	0.0	0.0
60%	0.8	8.1	2.1	46.7	514.3	114.6	67.0	660.8	101.7	0.0	0.0	0.0
70%	40.5	477.7	250.3	813.4	10,066.2	2,279.1	3,350.9	37,058.0	5,254.8	58.6	434.2	15.2
80%	60.4	725.9	368.6	1,367.3	16,750.1	3,808.6	5,141.7	56,588.6	7,860.4	150.8	780.9	36.7
90%	165.1	1,957.3	1,116.0	2,944.8	37,047.4	8,820.8	13,575.2	156,224.3	21,897.5	601.4	2,030.4	117.8

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**Table 7. Sum of Emissions (g/mi) by Emitter Category Group for 1986-1989 Vehicles**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	106.6	2,206.9	285.1	42.4	529.5	56.1	45.8	725.8	28.6	0.0	0.0	0.0
20%	237.9	5,413.4	706.4	73.2	904.0	96.8	100.3	1,934.8	68.2	14.3	159.9	0.3
30%	1,099.1	25,331.6	3,211.5	200.7	3,169.0	321.3	289.0	6,051.7	233.8	51.6	1,000.3	2.1
40%	5,275.3	121,469.8	15,817.9	1,170.5	18,601.5	1,974.5	1,474.5	33,551.6	1,165.7	219.4	4,855.6	12.5
50%	9,459.2	207,124.3	27,674.1	2,681.5	38,453.5	4,356.7	2,916.6	61,790.9	2,302.6	467.1	7,820.3	23.0
60%	14,943.7	314,764.7	42,642.6	5,266.5	72,910.7	8,312.1	6,913.4	129,299.7	4,865.4	1,221.6	14,439.6	53.6
70%	20,235.4	413,173.6	56,314.1	8,789.2	116,632.3	13,343.7	14,590.3	264,029.5	9,394.5	2,637.6	29,086.4	103.8
80%	25,676.8	517,828.1	70,570.9	12,725.6	170,295.6	19,466.5	23,071.4	428,000.2	14,110.9	4,273.5	47,622.2	165.1
90%	28,780.5	575,749.5	78,878.2	14,811.0	197,236.2	22,797.6	29,436.6	546,886.4	17,507.8	5,448.0	62,136.3	226.4
Targeting Percentage	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	5.4	87.9	33.9	12.9	116.9	28.4	43.6	436.4	55.3	0.0	0.0	0.0
20%	5.4	87.9	33.9	12.9	116.9	28.4	55.3	567.9	75.8	0.0	0.0	0.0
30%	22.3	354.7	118.8	54.6	563.6	136.3	122.7	1,254.2	174.7	0.0	0.0	0.0
40%	202.3	3,444.9	1,097.2	380.7	3,692.2	891.6	392.4	4,359.0	612.6	58.4	113.4	11.4
50%	455.0	7,241.6	2,379.2	991.1	9,353.8	2,317.8	1,031.8	10,427.4	1,643.8	97.0	200.4	17.5
60%	1,028.3	15,760.6	5,260.0	1,919.8	18,501.7	4,679.6	2,553.7	26,475.5	4,073.4	109.0	221.2	19.6
70%	1,756.7	26,906.0	9,082.0	3,409.8	33,697.9	8,794.3	5,758.2	61,722.1	8,960.3	542.0	1,243.2	86.9
80%	2,418.6	36,850.4	12,198.8	5,370.6	52,940.7	13,893.9	9,617.1	101,170.4	14,731.8	841.6	1,760.9	142.4
90%	3,045.4	46,584.9	15,391.0	7,119.3	70,855.9	18,757.5	12,906.2	137,207.2	19,867.1	1,131.7	2,469.8	197.3

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**Table 8. Sum of Emissions (g/mi) by Emitter Category Group for 1990-1993 Vehicles**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	4,277.9	96,315.0	13,981.1	255.4	5,002.4	335.0	331.6	9,441.2	255.2	0.0	0.0	0.0
20%	10,668.7	237,626.6	34,196.6	807.7	13,224.8	1,123.5	880.2	23,081.0	667.9	114.4	786.4	6.0
30%	17,815.0	397,101.2	57,306.9	1,629.0	26,324.9	2,381.5	1,907.1	47,367.2	1,516.6	240.6	2,333.8	10.0
40%	22,945.6	510,697.8	72,729.2	2,285.5	36,225.4	3,414.1	2,742.4	66,580.0	2,190.2	310.2	3,193.2	12.9
50%	28,409.8	617,297.1	89,118.1	3,386.9	50,462.6	4,966.5	4,393.4	98,497.4	3,449.6	461.8	5,741.3	20.0
60%	32,181.7	688,932.3	99,057.5	4,802.0	70,572.8	7,104.3	6,872.6	147,026.8	5,525.4	912.9	12,453.8	38.5
70%	32,826.6	700,860.3	100,768.6	5,030.1	73,290.0	7,415.2	7,371.2	155,898.5	5,883.7	1,034.6	13,020.3	45.4
80%	34,262.2	725,341.1	104,167.5	5,640.8	80,221.1	8,140.5	8,486.8	175,469.9	6,535.4	1,188.3	16,113.2	51.0
90%	34,672.5	732,411.2	105,214.3	5,822.0	82,475.0	8,378.7	8,955.0	183,706.6	6,842.2	1,351.8	18,500.0	55.7
Targeting Percentage	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	161.4	2,769.8	989.7	96.8	1,141.3	222.2	125.5	1,579.4	164.1	21.7	22.6	3.6
20%	398.3	6,459.2	1,992.3	347.0	4,083.5	846.5	301.5	4,227.6	436.9	21.7	22.6	3.6
30%	605.0	9,740.1	3,081.7	612.6	6,824.0	1,487.6	547.2	7,201.1	816.9	46.7	163.1	14.3
40%	759.6	11,859.1	3,842.0	923.8	9,796.6	2,256.4	776.4	9,960.8	1,226.1	46.7	163.1	14.3
50%	1,050.2	15,557.4	5,265.9	1,275.9	13,294.3	3,206.1	1,210.0	14,967.2	1,901.9	46.7	163.1	14.3
60%	1,144.5	16,867.8	5,712.3	1,644.4	17,042.4	4,170.8	1,738.0	21,757.5	2,849.5	59.4	202.7	17.1
70%	1,167.3	17,115.8	5,806.9	1,740.0	17,847.0	4,411.0	1,865.8	23,137.1	3,044.6	59.4	202.7	17.1
80%	1,307.8	18,723.4	6,380.7	2,167.3	21,468.5	5,538.6	2,244.1	26,492.0	3,708.0	59.4	202.7	17.1
90%	1,325.5	18,930.8	6,455.8	2,247.1	22,147.8	5,732.0	2,421.4	28,161.8	3,975.7	59.4	202.7	17.1

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**Table 9. Sum of Emissions (g/mi) by Emitter Category Group for 1994 and Newer Vehicles**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	1,918.1	42,194.1	6,234.8	146.0	2,813.3	236.5	168.8	4,907.2	190.8	0.0	0.0	0.0
20%	6,560.4	141,884.3	21,201.3	583.0	8,795.8	918.8	561.8	14,494.7	536.0	87.2	587.7	5.0
30%	13,147.4	288,092.6	42,560.7	1,342.2	21,132.5	2,129.3	1,529.8	37,548.7	1,361.3	213.5	2,135.1	8.9
40%	18,172.2	398,816.8	57,605.0	1,993.1	30,961.7	3,155.8	2,351.5	56,541.7	2,032.0	283.1	2,994.5	11.9
50%	23,548.3	503,163.8	73,691.7	3,088.2	45,082.5	4,701.6	3,980.4	88,138.9	3,286.2	434.6	5,542.6	18.9
60%	27,295.3	574,260.6	83,559.4	4,500.8	65,169.6	6,837.7	6,457.6	136,620.2	5,361.4	885.7	12,255.1	37.5
70%	27,940.2	586,188.7	85,270.5	4,728.8	67,886.8	7,148.6	6,956.3	145,492.0	5,719.6	1,007.4	12,821.6	44.4
80%	29,375.8	610,669.4	88,669.3	5,339.6	74,817.9	7,873.9	8,071.8	165,063.4	6,371.4	1,161.2	15,914.4	49.9
90%	29,786.1	617,739.5	89,716.1	5,520.7	77,071.7	8,112.1	8,540.0	173,300.1	6,678.1	1,324.7	18,301.2	54.6
Targeting Percentage	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	23.0	261.8	107.5	21.7	205.0	60.7	30.6	345.6	56.4	21.7	22.6	3.6
20%	109.1	1,401.6	503.1	135.1	1,362.8	378.6	106.7	1,196.1	201.8	21.7	22.6	3.6
30%	260.8	3,478.1	1,310.3	348.1	3,334.7	909.2	273.8	3,152.0	497.5	32.5	162.9	13.2
40%	396.1	5,163.0	1,978.2	640.5	6,040.7	1,636.7	482.3	5,693.4	886.8	32.5	162.9	13.2
50%	667.9	8,506.4	3,315.2	973.6	9,279.1	2,545.3	894.0	10,242.4	1,529.3	32.5	162.9	13.2
60%	760.7	9,800.7	3,756.1	1,336.8	12,993.7	3,497.8	1,420.9	17,025.1	2,474.9	45.2	202.5	16.0
70%	783.5	10,048.7	3,850.7	1,432.4	13,798.4	3,738.0	1,548.7	18,404.6	2,670.1	45.2	202.5	16.0
80%	924.0	11,656.3	4,424.6	1,859.8	17,419.8	4,865.6	1,927.1	21,759.5	3,333.4	45.2	202.5	16.0
90%	941.7	11,863.7	4,499.7	1,939.5	18,099.2	5,059.0	2,104.4	23,429.3	3,601.1	45.2	202.5	16.0

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**Table 10. Sum of Emissions (g/mi) by Emitter Category Group for 1990 and Newer Vehicles**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	2,359.8	54,120.9	7,746.3	109.5	2,189.0	98.4	162.9	4,534.1	64.4	0.0	0.0	0.0
20%	4,108.3	95,742.4	12,995.3	224.7	4,429.0	204.7	318.4	8,586.3	131.9	27.1	198.7	1.0
30%	4,667.5	109,008.7	14,746.2	286.8	5,192.5	252.2	377.3	9,818.5	155.2	27.1	198.7	1.0
40%	4,773.4	111,881.0	15,124.3	292.3	5,263.7	258.3	390.9	10,038.3	158.2	27.1	198.7	1.0
50%	4,861.5	114,133.2	15,426.4	298.7	5,380.0	265.0	412.9	10,358.5	163.3	27.1	198.7	1.0
60%	4,886.4	114,671.6	15,498.2	301.3	5,403.2	266.6	415.0	10,406.5	164.0	27.1	198.7	1.0
70%	4,886.4	114,671.6	15,498.2	301.3	5,403.2	266.6	415.0	10,406.5	164.0	27.1	198.7	1.0
80%	4,886.4	114,671.6	15,498.2	301.3	5,403.2	266.6	415.0	10,406.5	164.0	27.1	198.7	1.0
90%	4,886.4	114,671.6	15,498.2	301.3	5,403.2	266.6	415.0	10,406.5	164.0	27.1	198.7	1.0
Targeting Percentage	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	138.4	2,507.9	882.2	75.1	936.2	161.6	94.9	1,233.7	107.6	0.0	0.0	0.0
20%	289.2	5,057.6	1,489.2	211.9	2,720.6	468.0	194.9	3,031.4	235.2	0.0	0.0	0.0
30%	344.2	6,262.0	1,771.4	264.4	3,489.3	578.4	273.4	4,049.1	319.4	14.1	0.2	1.1
40%	363.5	6,696.1	1,863.7	283.3	3,755.9	619.7	294.1	4,267.4	339.2	14.1	0.2	1.1
50%	382.3	7,051.0	1,950.7	302.4	4,015.2	660.9	316.0	4,724.8	372.7	14.1	0.2	1.1
60%	383.8	7,067.1	1,956.1	307.6	4,048.6	673.0	317.0	4,732.5	374.6	14.1	0.2	1.1
70%	383.8	7,067.1	1,956.1	307.6	4,048.6	673.0	317.0	4,732.5	374.6	14.1	0.2	1.1
80%	383.8	7,067.1	1,956.1	307.6	4,048.6	673.0	317.0	4,732.5	374.6	14.1	0.2	1.1
90%	383.8	7,067.1	1,956.1	307.6	4,048.6	673.0	317.0	4,732.5	374.6	14.1	0.2	1.1

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**Table 11. Sum of Excess HC Emissions Screened out by Model Year Group and Targeting Percentage for IM240 Phase-In and Final Cutpoints**

Targeting Percentage	Phase-In Cutpoints					Final Cutpoints				
	MY 82-85	MY 86-89	MY 90-93	MY 94+	MY 90+	MY 82-85	MY 86-89	MY 90-93	MY 94+	MY 90+
	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)	HC (g/mi)
10%	0.0	44.2	46.5	81.5	127.9	0.0	68.4	81.5	114.6	196.2
20%	0.0	77.8	250.0	157.3	407.3	0.0	118.6	422.0	229.1	651.1
30%	0.0	196.6	655.1	204.3	859.4	0.0	293.8	1,107.7	301.6	1,409.3
40%	0.0	819.8	1,000.9	217.2	1,218.1	0.0	1,332.8	1,740.8	320.2	2,061.0
50%	0.4	1,771.6	1,790.2	229.4	2,019.6	1.4	3,001.8	3,059.6	338.2	3,397.8
60%	72.1	4,654.1	3,038.9	229.8	3,268.8	137.1	7,353.3	5,050.2	339.9	5,390.1
70%	4,663.7	10,918.5	3,381.4	229.8	3,611.2	7,013.5	16,357.0	5,557.0	339.9	5,896.9
80%	7,224.9	18,115.1	4,006.5	229.8	4,236.3	10,706.5	26,507.5	6,654.8	339.9	6,994.7
90%	17,499.3	23,795.4	4,399.5	229.8	4,629.3	25,573.3	34,470.3	7,201.2	339.9	25,573.3

# DRAFT

**Table 12. Sum of Excess CO Emissions Screened out by Model Year Group and Targeting Percentage for IM240 Phase-In and Final Cutpoints**

Targeting Percentage	Phase-In Cutpoints					Final Cutpoints				
	MY 82-85	MY 86-89	MY 90-93	MY 94+	MY 90+	MY 82-85	MY 86-89	MY 90-93	MY 94+	MY 90+
	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)	CO (g/mi)
10%	0.0	450.3	971.9	1,725.5	2,697.3	0.0	565.0	1,585.9	2,353.2	3,939.1
20%	0.0	1,009.4	4,218.0	3,302.6	7,520.6	0.0	1,293.7	6,026.1	4,598.7	10,624.8
30%	0.0	3,073.7	11,879.4	3,747.7	15,627.1	0.0	3,900.8	16,663.9	5,306.5	21,970.3
40%	0.0	16,720.6	18,365.4	3,840.6	22,206.0	0.0	21,228.0	25,820.3	5,443.1	31,263.3
50%	44.0	28,421.1	29,789.8	3,981.7	33,771.5	54.6	37,051.0	41,683.2	5,690.0	47,373.2
60%	846.5	59,002.7	49,108.2	3,994.3	53,102.5	1,309.2	77,399.2	67,777.1	5,708.0	73,485.1
70%	70,344.1	136,188.6	52,680.7	3,994.3	56,675.1	91,534.5	174,331.5	72,568.1	5,708.0	78,276.2
80%	100,613.4	237,723.8	60,873.4	3,994.3	64,867.7	131,294.0	297,902.6	83,694.7	5,708.0	89,402.7
90%	224,167.4	317,719.3	65,838.2	3,994.3	69,832.5	293,953.6	395,019.1	89,924.2	5,708.0	293,953.6

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**Table 13. Sum of Excess NOx Emissions Screened out by Model Year Group and Targeting Percentage for IM240 Phase-In and Final Cutpoints**

Targeting Percentage	Phase-In Cutpoints					Final Cutpoints				
	MY 82-85	MY 86-89	MY 90-93	MY 94 +	MY 90+	MY 82-85	MY 86-89	MY 90-93	MY 94 +	MY 90+
	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)	NOx (g/mi)
10%	0.0	29.6	58.2	26.7	84.9	0.0	29.6	58.2	26.7	84.9
20%	0.0	36.1	249.0	46.3	295.4	0.0	36.1	249.0	46.3	295.4
30%	0.0	97.8	562.2	53.8	616.0	0.0	97.8	562.2	53.8	616.0
40%	0.0	514.9	981.0	55.0	1,036.0	0.0	514.9	981.0	55.0	1,036.0
50%	0.3	1,378.2	1,650.9	56.5	1,707.4	0.3	1,378.2	1,650.9	56.5	1,707.4
60%	54.4	3,290.6	2,196.8	57.5	2,254.3	54.4	3,290.6	2,196.8	57.5	2,254.3
70%	2,205.3	7,181.5	2,336.8	57.5	2,394.3	2,205.3	7,181.5	2,336.8	57.5	2,394.3
80%	3,398.3	11,218.9	3,051.6	57.5	3,109.1	3,398.3	11,218.9	3,051.6	57.5	3,109.1
90%	9,734.0	15,312.9	3,217.7	57.5	3,275.2	9,734.0	15,312.9	3,217.7	57.5	9,734.0

# DRAFT

**Table 14. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1982-1985 Vehicles (Phase-In Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	0.0	0.0	0.0	0.4	44.0	0.0	0.0	0.0	0.0
60%	0.0	0.0	0.0	0.9	0.0	0.0	28.4	583.4	0.0	16.0	207.1	0.0
70%	0.0	0.0	0.0	23.3	0.0	0.0	2,561.8	55,810.1	0.0	774.4	9,016.6	0.0
80%	0.0	0.0	0.0	47.0	0.0	0.0	3,688.2	77,480.5	0.0	1,354.1	13,847.7	0.0
90%	0.0	0.0	0.0	86.9	0.0	0.0	8,744.5	166,102.6	0.0	3,093.6	166,102.6	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
60%	0.0	0.0	0.1	2.5	0.0	26.6	24.3	56.0	27.7	0.0	0.0	0.0
70%	0.0	0.0	102.3	31.4	0.0	571.1	1,220.2	5,178.6	1,526.8	52.6	338.8	5.2
80%	0.0	0.0	146.6	60.2	0.0	954.6	1,937.8	8,716.7	2,282.4	137.6	568.5	14.7
90%	0.0	0.0	480.0	115.8	0.0	2,518.8	4,900.2	25,304.1	6,689.5	558.2	1,335.8	45.8

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**Table 15. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1982-1985 Vehicles (Final Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	0.2	0.0	0.0	1.2	54.6	0.0	0.0	0.0	0.0
60%	0.0	0.0	0.0	9.2	0.0	0.0	60.1	958.7	0.0	16.8	217.1	0.0
70%	0.1	0.0	0.0	198.1	0.0	0.0	3,912.2	72,000.3	0.0	805.2	9,400.0	0.0
80%	0.1	0.0	0.0	328.5	0.0	0.0	5,609.5	100,414.5	0.0	1,401.3	14,429.7	0.0
90%	0.1	0.0	0.0	601.5	0.0	0.0	13,063.5	215,013.3	0.0	3,199.6	32,732.0	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
60%	0.0	0.0	0.1	13.0	0.0	26.6	38.0	133.4	27.7	0.0	0.0	0.0
70%	0.0	0.0	102.3	173.8	0.0	571.1	1,869.4	9,775.0	1,526.8	54.6	359.2	5.2
80%	0.0	0.0	146.6	301.8	0.0	954.6	2,923.4	15,833.9	2,282.4	142.0	615.9	14.7
90%	0.1	0.0	480.0	609.9	0.0	2,518.8	7,525.9	44,714.1	6,689.5	572.6	1,494.1	45.8

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**Table 16. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1986-1989 Vehicles (Phase-In Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.6	0.0	0.0	22.0	344.8	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	2.0	0.0	0.0	37.4	749.6	0.0	13.1	139.9	0.0
30%	0.0	0.0	0.0	3.6	0.0	0.0	95.1	1,954.2	0.0	44.4	880.3	0.0
40%	0.0	0.0	0.0	22.1	0.0	0.0	401.7	11,720.1	0.0	184.6	4,275.6	0.0
50%	0.0	0.0	0.0	62.2	0.0	0.0	780.2	19,979.2	0.0	407.1	6,820.3	0.0
60%	0.0	0.0	0.0	120.7	0.0	0.0	2,252.0	42,346.2	0.0	1,105.2	12,513.3	0.0
70%	0.0	0.0	0.0	216.7	0.0	0.0	5,259.5	97,931.7	0.0	2,408.4	25,280.1	0.0
80%	0.0	0.0	0.0	312.5	0.0	0.0	8,774.7	174,816.6	0.0	3,902.7	41,478.1	0.0
90%	0.0	0.0	0.0	364.6	0.0	0.0	11,570.0	233,074.1	0.0	4,959.6	54,069.5	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	7.9	1.7	0.0	6.4	19.9	105.5	15.3	0.0	0.0	0.0
20%	0.0	0.0	7.9	1.7	0.0	6.4	23.7	119.9	21.8	0.0	0.0	0.0
30%	0.0	0.0	18.8	3.2	0.0	30.3	50.3	239.2	48.7	0.0	0.0	0.0
40%	0.0	0.0	177.2	18.6	0.0	169.6	139.2	691.3	164.6	53.6	33.7	3.4
50%	0.0	0.0	417.2	54.3	0.0	465.8	378.0	1,541.0	489.8	89.8	80.7	5.5
60%	0.0	0.0	996.0	101.2	0.0	1,023.6	5,054.2	4,061.7	1,265.4	100.6	81.5	5.6
70%	0.0	0.0	1,974.0	170.0	0.0	2,216.3	2,356.8	12,305.3	2,962.3	507.2	671.4	28.9
80%	0.0	0.0	2,634.8	278.3	0.0	3,579.9	4,058.1	20,503.0	4,949.8	788.8	926.1	54.4
90%	0.0	0.0	3,427.0	366.1	0.0	4,997.5	5,477.8	29,269.1	6,815.1	1,057.3	1,306.7	73.3

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**Table 17. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1986-1989 Vehicles (Final Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	7.0	0.0	0.0	29.2	414.0	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	14.7	0.0	0.0	52.2	966.9	0.0	13.5	144.9	0.0
30%	0.1	0.0	0.0	28.0	0.0	0.0	132.4	2,629.3	0.0	46.8	910.3	0.0
40%	0.4	0.0	0.0	145.2	0.0	0.0	620.8	15,588.8	0.0	196.2	4,420.6	0.0
50%	1.0	0.0	0.0	390.3	0.0	0.0	1,241.1	27,307.5	0.0	427.1	7,070.3	0.0
60%	1.9	0.0	0.0	806.6	0.0	0.0	3,337.0	57,379.3	0.0	1,144.0	12,985.7	0.0
70%	3.0	0.0	0.0	1,434.1	0.0	0.0	7,640.3	127,923.3	0.0	2,484.8	26,222.5	0.0
80%	3.9	0.0	0.0	2,025.3	0.0	0.0	12,479.8	221,580.3	0.0	4,026.3	42,993.0	0.0
90%	4.5	0.0	0.0	2,369.1	0.0	0.0	16,295.3	292,115.0	0.0	5,122.4	56,059.4	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	7.9	4.6	0.0	6.4	27.6	151.1	15.3	0.0	0.0	0.0
20%	0.0	0.0	7.9	4.6	0.0	6.4	33.7	181.9	21.8	0.0	0.0	0.0
30%	0.0	0.0	18.8	14.0	0.0	30.3	72.5	361.2	48.7	0.0	0.0	0.0
40%	0.2	0.0	177.2	99.2	0.0	169.6	215.5	1,165.1	164.6	55.2	53.4	3.4
50%	0.4	0.0	417.2	273.5	0.0	465.8	576.2	2,562.8	489.8	92.2	110.4	5.5
60%	0.5	0.0	996.0	511.1	0.0	1,023.6	1,448.9	6,918.0	1,265.4	103.4	116.2	5.6
70%	0.9	0.0	1,974.0	881.2	0.0	2,216.3	3,394.0	19,377.5	2,962.3	518.8	808.2	28.9
80%	1.4	0.0	2,634.8	1,406.7	0.0	3,579.9	5,757.8	32,209.1	4,949.8	806.4	1,120.2	54.4
90%	1.8	0.0	3,427.0	1,842.4	0.0	4,997.5	7,752.6	45,263.9	6,815.1	1,082.1	1,580.8	73.3

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**Table 18. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1990-1993 Vehicles (Phase-In Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.3	0.0	0.0	14.3	937.6	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	4.7	0.0	0.0	106.2	3,604.4	0.0	80.0	486.0	0.0
30%	0.0	0.0	0.0	12.5	0.0	0.0	317.8	9,590.2	0.0	194.3	1,833.5	0.0
40%	0.0	0.0	0.0	20.5	0.0	0.0	513.4	14,968.7	0.0	256.7	2,572.8	0.0
50%	0.0	0.0	0.0	41.9	0.0	0.0	971.4	23,329.9	0.0	390.2	4,821.0	0.0
60%	0.0	0.0	0.0	63.1	0.0	0.0	1,610.1	35,831.8	0.0	793.3	10,748.7	0.0
70%	0.0	0.0	0.0	69.8	0.0	0.0	1,777.8	38,678.8	0.0	905.4	11,190.5	0.0
80%	0.0	0.0	0.0	87.2	0.0	0.0	2,083.6	43,753.1	0.0	1,041.2	13,983.4	0.0
90%	0.0	0.0	0.0	90.7	0.0	0.0	2,244.2	46,319.1	0.0	1,185.5	16,069.0	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	21.5	0.9	0.0	16.7	10.5	31.6	18.4	20.5	2.6	1.6
20%	0.0	0.0	93.1	4.1	0.0	92.6	34.4	124.9	61.8	20.5	2.6	1.6
30%	0.0	0.0	198.3	13.3	0.0	215.2	87.0	332.8	139.5	30.1	122.9	9.2
40%	0.0	0.0	320.2	26.6	0.0	388.7	153.5	701.0	262.8	30.1	122.9	9.2
50%	0.0	0.0	581.2	39.8	0.0	613.3	316.7	1,516.1	447.3	30.1	122.9	9.2
60%	0.0	0.0	660.1	58.7	0.0	847.8	472.1	2,385.2	678.9	41.6	142.5	10.0
70%	0.0	0.0	678.7	63.4	0.0	912.0	523.3	2,668.9	736.1	41.6	142.5	10.0
80%	0.0	0.0	804.6	83.5	0.0	1,251.6	669.4	2,994.4	985.4	41.6	142.5	10.0
90%	0.0	0.0	817.7	88.2	0.0	1,303.0	749.2	3,307.5	1,087.1	41.6	142.5	10.0

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**Table 19. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1990-1993 Vehicles (Final Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.1	0.0	0.0	9.4	0.0	0.0	29.4	1,510.7	0.0	0.0	0.0	0.0
20%	0.3	0.0	0.0	63.8	0.0	0.0	171.7	5,271.2	0.0	82.4	511.0	0.0
30%	0.6	0.0	0.0	151.8	0.0	0.0	504.5	13,976.0	0.0	200.7	1,908.5	0.0
40%	1.0	0.0	0.0	228.3	0.0	0.0	814.0	21,687.6	0.0	265.5	2,677.8	0.0
50%	1.4	0.0	0.0	402.6	0.0	0.0	1,506.7	33,898.7	0.0	405.0	5,001.0	0.0
60%	2.0	0.0	0.0	597.1	0.0	0.0	2,518.6	52,167.3	0.0	824.1	11,123.7	0.0
70%	2.0	0.0	0.0	640.8	0.0	0.0	2,764.2	56,069.9	0.0	939.4	11,590.2	0.0
80%	2.2	0.0	0.0	757.9	0.0	0.0	3,269.8	63,679.2	0.0	1,081.2	14,458.1	0.0
90%	2.3	0.0	0.0	787.4	0.0	0.0	3,501.6	67,247.9	0.0	1,231.9	16,613.7	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	21.5	5.7	0.0	16.7	16.0	67.6	18.4	20.9	7.6	1.6
20%	0.0	0.0	93.1	29.2	0.0	92.6	53.6	236.3	61.8	20.9	7.6	1.6
30%	0.1	0.0	198.3	82.0	0.0	215.2	137.1	646.5	139.5	30.9	132.9	9.2
40%	0.2	0.0	320.2	157.1	0.0	388.7	243.8	1,321.9	262.8	30.9	132.9	9.2
50%	0.4	0.0	581.2	234.6	0.0	613.3	478.0	2,650.7	447.3	30.9	132.9	9.2
60%	0.5	0.0	660.1	331.2	0.0	847.8	733.8	4,328.7	678.9	42.8	157.5	10.0
70%	0.5	0.0	678.7	358.6	0.0	912.0	808.6	4,750.5	736.1	42.8	157.5	10.0
80%	0.6	0.0	804.6	474.9	0.0	1,251.6	1,025.4	5,399.9	985.4	42.8	157.5	10.0
90%	0.6	0.0	817.7	498.0	0.0	1,303.0	1,136.5	5,905.0	1,087.1	42.8	157.5	10.0

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**Table 20. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1994 and Newer Vehicles (Phase-In Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.0	0.0	0.0	42.8	1,469.6	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	0.0	0.0	0.0	72.9	2,522.8	0.0	24.7	158.7	0.0
30%	0.0	0.0	0.0	0.0	0.0	0.0	84.6	2,843.0	0.0	24.7	158.7	0.0
40%	0.0	0.0	0.0	0.0	0.0	0.0	90.4	2,908.8	0.0	24.7	158.7	0.0
50%	0.0	0.0	0.0	0.0	0.0	0.0	100.7	3,005.0	0.0	24.7	158.7	0.0
60%	0.0	0.0	0.0	0.0	0.0	0.0	101.1	3,017.7	0.0	24.7	158.7	0.0
70%	0.0	0.0	0.0	0.0	0.0	0.0	101.1	3,017.7	0.0	24.7	158.7	0.0
80%	0.0	0.0	0.0	0.0	0.0	0.0	101.1	3,017.7	0.0	24.7	158.7	0.0
90%	0.0	0.0	0.0	0.0	0.0	0.0	101.1	3,017.7	0.0	24.7	158.7	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	7.8	0.0	0.0	2.3	38.7	255.9	16.5	0.0	0.0	0.0
20%	0.0	0.0	9.2	0.0	0.0	9.9	59.6	621.1	27.3	0.0	0.0	0.0
30%	0.0	0.0	10.9	0.0	0.0	11.2	82.0	746.0	31.7	12.9	0.0	0.0
40%	0.0	0.0	10.9	0.0	0.0	11.7	89.1	773.1	32.4	12.9	0.0	0.0
50%	0.0	0.0	11.3	0.0	0.0	12.3	91.0	817.9	32.9	12.9	0.0	0.0
60%	0.0	0.0	11.3	0.0	0.0	13.4	91.0	817.9	32.9	12.9	0.0	0.0
70%	0.0	0.0	11.3	0.0	0.0	13.4	91.0	817.9	32.9	12.9	0.0	0.0
80%	0.0	0.0	11.3	0.0	0.0	13.4	91.0	817.9	32.9	12.9	0.0	0.0
90%	0.0	0.0	11.3	0.0	0.0	13.4	91.0	817.9	32.9	12.9	0.0	0.0

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**Table 21. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1994 and Newer Vehicles (Final Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.8	0.0	0.0	60.1	1,954.5	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	1.9	0.0	0.0	109.1	3,472.8	0.0	25.5	168.7	0.0
30%	0.0	0.0	0.0	3.4	0.0	0.0	130.4	3,932.3	0.0	25.5	168.7	0.0
40%	0.0	0.0	0.0	3.5	0.0	0.0	137.8	4,027.4	0.0	25.5	168.7	0.0
50%	0.0	0.0	0.0	3.5	0.0	0.0	151.0	4,169.3	0.0	25.5	168.7	0.0
60%	0.0	0.0	0.0	3.7	0.0	0.0	151.9	4,187.3	0.0	25.5	168.7	0.0
70%	0.0	0.0	0.0	3.7	0.0	0.0	151.9	4,187.3	0.0	25.5	168.7	0.0
80%	0.0	0.0	0.0	3.7	0.0	0.0	151.9	4,187.3	0.0	25.5	168.7	0.0
90%	0.0	0.0	0.0	3.7	0.0	0.0	151.9	4,187.3	0.0	25.5	168.7	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	7.8	1.9	0.0	2.3	51.8	398.7	16.5	0.0	0.0	0.0
20%	0.0	0.0	9.2	3.7	0.0	9.9	88.9	957.2	27.3	0.0	0.0	0.0
30%	0.0	0.0	10.9	4.5	0.0	11.2	124.4	1,205.5	31.7	13.3	0.0	0.0
40%	0.0	0.0	10.9	4.8	0.0	11.7	135.1	1,247.0	32.4	13.3	0.0	0.0
50%	0.0	0.0	11.3	4.9	0.0	12.3	139.8	1,351.9	32.9	13.3	0.0	0.0
60%	0.0	0.0	11.3	5.4	0.0	13.4	140.0	1,351.9	32.9	13.3	0.0	0.0
70%	0.0	0.0	11.3	5.4	0.0	13.4	140.0	1,351.9	32.9	13.3	0.0	0.0
80%	0.0	0.0	11.3	5.4	0.0	13.4	140.0	1,351.9	32.9	13.3	0.0	0.0
90%	0.0	0.0	11.3	5.4	0.0	13.4	140.0	1,351.9	32.9	13.3	0.0	0.0

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**Table 22. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1990 and Newer Vehicles (Phase-In Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	0.0	0.3	0.0	0.0	57.0	2,407.2	0.0	0.0	0.0	0.0
20%	0.0	0.0	0.0	4.7	0.0	0.0	179.1	6,127.2	0.0	104.8	644.8	0.0
30%	0.0	0.0	0.0	12.5	0.0	0.0	402.4	12,433.2	0.0	219.0	1,992.2	0.0
40%	0.0	0.0	0.0	20.5	0.0	0.0	603.9	17,877.5	0.0	281.4	2,731.6	0.0
50%	0.0	0.0	0.0	41.9	0.0	0.0	1,072.1	26,334.9	0.0	415.0	4,979.7	0.0
60%	0.0	0.0	0.0	63.1	0.0	0.0	1,711.2	38,849.5	0.0	818.1	10,907.4	0.0
70%	0.0	0.0	0.0	69.8	0.0	0.0	1,879.0	41,696.5	0.0	930.2	11,349.3	0.0
80%	0.0	0.0	0.0	87.2	0.0	0.0	2,184.7	46,770.7	0.0	1,065.9	14,142.1	0.0
90%	0.0	0.0	0.0	90.7	0.0	0.0	2,345.4	49,336.8	0.0	1,210.2	16,227.8	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	29.3	0.9	0.0	19.0	49.2	287.5	35.0	20.5	2.6	1.6
20%	0.0	0.0	102.3	4.1	0.0	102.5	94.0	746.0	89.1	20.5	2.6	1.6
30%	0.0	0.0	209.2	13.3	0.0	226.4	169.1	1,078.8	171.2	43.1	122.9	9.2
40%	0.0	0.0	331.2	26.6	0.0	400.3	242.6	1,474.1	295.2	43.1	122.9	9.2
50%	0.0	0.0	592.5	39.8	0.0	625.6	407.7	2,334.0	480.1	43.1	122.9	9.2
60%	0.0	0.0	671.4	58.7	0.0	861.1	563.1	3,203.1	711.7	54.6	142.5	10.0
70%	0.0	0.0	690.0	63.4	0.0	925.4	614.3	3,486.8	768.9	54.6	142.5	10.0
80%	0.0	0.0	815.8	83.5	0.0	1,264.9	760.4	3,812.3	1,018.3	54.6	142.5	10.0
90%	0.0	0.0	828.9	88.2	0.0	1,316.3	840.2	4,125.4	1,120.0	54.6	142.5	10.0

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**Table 23. Sum of Excess Emissions (g/mi) by Emitter Category Group for 1990 and Newer Vehicles (Final Cutpoints)**

Targeting Percentage	Normal NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.1	0.0	0.0	10.2	0.0	0.0	89.5	3,465.1	0.0	0.0	0.0	0.0
20%	0.3	0.0	0.0	65.7	0.0	0.0	280.8	8,743.9	0.0	108.0	679.8	0.0
30%	0.6	0.0	0.0	155.3	0.0	0.0	634.8	17,908.2	0.0	226.2	2,077.2	0.0
40%	1.0	0.0	0.0	231.9	0.0	0.0	951.8	25,715.0	0.0	291.0	2,846.6	0.0
50%	1.4	0.0	0.0	406.1	0.0	0.0	1,657.8	38,067.9	0.0	430.6	5,169.7	0.0
60%	2.0	0.0	0.0	600.8	0.0	0.0	2,670.5	56,354.6	0.0	849.7	11,292.4	0.0
70%	2.0	0.0	0.0	644.5	0.0	0.0	2,916.1	60,257.3	0.0	965.0	11,759.0	0.0
80%	2.2	0.0	0.0	761.6	0.0	0.0	3,421.7	67,866.5	0.0	1,106.7	14,626.8	0.0
90%	2.3	0.0	0.0	791.2	0.0	0.0	3,653.5	71,435.2	0.0	1,257.4	16,782.4	0.0
	High NOx											
	Normal HC/CO			High HC/CO			Very High HC/CO			Super HC/CO		
	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
10%	0.0	0.0	29.3	7.6	0.0	19.0	67.8	466.3	35.0	20.9	7.6	1.6
20%	0.0	0.0	102.3	32.9	0.0	102.5	142.5	1,193.5	89.1	20.9	7.6	1.6
30%	0.1	0.0	209.2	86.5	0.0	226.4	261.6	1,852.0	171.2	44.3	132.9	9.2
40%	0.2	0.0	331.2	162.0	0.0	400.3	378.8	2,568.9	295.2	44.3	132.9	9.2
50%	0.4	0.0	592.5	239.5	0.0	625.6	617.8	4,002.7	480.1	44.3	132.9	9.2
60%	0.5	0.0	671.4	336.6	0.0	861.1	873.9	5,680.6	711.7	56.2	157.5	10.0
70%	0.5	0.0	690.0	364.0	0.0	925.4	948.6	6,102.4	768.9	56.2	157.5	10.0
80%	0.6	0.0	815.8	480.3	0.0	1,264.9	1,165.4	6,751.9	1,018.3	56.2	157.5	10.0
90%	0.6	0.0	828.9	503.4	0.0	1,316.3	1,276.6	7,257.0	1,120.0	56.2	157.5	10.0



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**Table 25. Exhaust Emission Credits Retained by Model Year Group  
with Overall Fleet Exemption Rates – Final Cutpoints**

Percent of Total Fleet Excused from I/M Test	Vehicle Model Year Groupings														
	1982-85			1986-89			1990-93			1994+			1990+		
	Pollutant														
	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>
0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
10%	100%	100%	100%	99.8%	99.9%	99.8%	98.9%	98.2%	98.2%	66.3%	58.8%	53.6%	97.4%	95.9%	97.4%
20%	100%	100%	100%	99.7%	99.7%	99.8%	94.1%	93.3%	92.3%	32.6%	19.4%	19.4%	91.4%	88.9%	91.0%
30%	100%	100%	100%	99.2%	99.1%	99.4%	84.6%	81.5%	82.5%	11.3%	7.0%	6.4%	81.3%	77.0%	81.2%
40%	100%	100%	100%	96.5%	95.2%	96.8%	75.8%	71.3%	69.5%	5.8%	4.6%	4.4%	72.7%	67.3%	68.4%
50%	100%	100%	100%	92.1%	91.6%	91.5%	57.5%	53.6%	48.7%	0.5%	0.3%	1.8%	54.9%	50.5%	47.9%
60%	99.8%	99.9%	99.8%	80.6%	82.4%	79.6%	29.9%	24.6%	31.7%	0.0%	0.0%	0.0%	28.5%	23.2%	31.2%
70%	90.2%	90.3%	91.5%	56.9%	60.4%	55.5%	22.8%	19.3%	27.4%	0.0%	0.0%	0.0%	21.8%	18.1%	26.9%
80%	85.1%	86.1%	86.9%	30.2%	32.3%	30.6%	7.6%	6.9%	5.2%	0.0%	0.0%	0.0%	7.2%	6.5%	5.1%
90%	64.3%	68.8%	62.6%	9.2%	10.2%	5.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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**Table 26. Exemption Rates by Model Year Group**

Percent of Total Fleet Excused from I/M Test	Percent Within Model Year Groupings Excused From I/M Test				
	1982-85	1986-89	1990-93	1994+	1990+
	10%	0.00%	0.32%	7.59%	55.13%
20%	0.00%	0.75%	24.39%	85.53%	41.10%
30%	0.00%	3.28%	46.75%	95.75%	60.15%
40%	0.00%	15.30%	63.06%	97.91%	72.59%
50%	0.04%	26.87%	79.95%	99.60%	85.32%
60%	0.83%	43.79%	91.80%	100.00%	94.04%
70%	16.55%	62.80%	93.89%	100.00%	95.56%
80%	24.07%	83.61%	98.61%	100.00%	98.99%
90%	51.65%	96.82%	100.00%	100.00%	100.00%

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**Table 27. Percent of Excess Emissions Retained by Model Year Group - Phase-In Cutpoints**

Percent of MY Group Excused from Testing															
	MY 1982-1985			MY 1986-1989			MY 1990-1993			MY 1994 +			MY 1990 +		
	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)
10%	94.9	94.6	95.0	97.9	97.0	98.0	98.3	97.8	97.3	93.6	92.2	91.6	98.7	98.1	98.7
20%	89.1	89.0	89.4	95.5	94.0	94.6	95.5	94.9	93.8	87.1	84.3	83.2	97.3	96.2	97.5
30%	82.5	83.4	81.7	91.3	90.4	89.3	92.0	90.7	89.8	80.7	76.5	74.8	94.5	93.0	94.5
40%	75.5	77.6	72.9	84.9	85.4	82.3	87.9	85.5	85.5	74.3	68.7	66.3	91.5	89.6	91.3
50%	68.6	71.7	64.1	74.7	76.4	71.8	83.5	80.0	79.9	67.9	60.8	57.9	86.6	83.8	86.4
60%	55.8	58.6	51.8	62.3	65.0	59.1	78.7	74.0	72.0	59.3	50.5	48.1	81.5	77.7	81.3
70%	41.9	43.9	38.8	49.4	51.9	46.9	69.9	65.0	61.0	48.4	37.5	36.9	75.3	70.2	71.0
80%	27.9	29.3	25.9	36.4	38.2	34.9	59.2	54.6	48.6	37.6	24.5	25.6	63.6	58.6	56.4
90%	14.0	14.6	12.9	21.3	22.4	18.3	35.2	29.9	34.3	22.6	12.4	13.7	41.9	36.8	38.9

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**Table 28. Percent of Excess Emissions Retained by Model Year Group - Final Cutpoints**

Percent of MY Group Excused from Testing															
	MY 1982-1985			MY 1986-1989			MY 1990-1993			MY 1994 +			MY 1990 +		
	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)	HC (%)	CO (%)	NOx (%)
10%	94.2	94.3	95.0	97.7	96.9	98.0	98.2	97.5	97.3	93.9	92.5	91.6	98.7	98.0	98.7
20%	87.8	88.4	89.4	94.7	93.7	94.6	95.4	94.6	93.8	87.8	85.0	83.2	97.5	96.0	97.5
30%	80.6	82.4	81.7	90.0	89.9	89.3	91.7	90.3	89.8	81.6	77.6	74.8	94.6	92.7	94.5
40%	73.1	76.1	72.9	83.2	84.5	82.3	87.5	85.0	85.5	75.5	70.1	66.3	91.7	89.3	91.3
50%	65.5	69.8	64.1	72.9	75.2	71.8	82.9	79.4	79.9	69.4	62.6	57.9	86.7	83.3	86.4
60%	53.2	56.9	51.8	60.4	63.6	59.1	77.5	73.2	72.0	60.9	52.5	48.1	81.4	77.1	81.3
70%	39.9	42.7	38.8	47.7	50.7	46.9	68.3	64.0	61.0	49.8	39.5	36.9	74.5	69.3	71.0
80%	26.6	28.5	25.9	34.8	37.2	34.9	57.4	53.5	48.6	38.7	26.6	25.6	62.4	57.5	56.4
90%	13.3	14.2	12.9	20.1	21.6	18.3	34.1	29.0	34.3	23.3	14.0	13.7	40.8	35.8	38.9