State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-64

Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board by Sections 43000.5, 43013 and 43018 of the Health and Safety Code; and,

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That the following Caterpillar, Inc. 1998 model-year engine, with rated power between 175 and 750 horsepower, and exhaust emission control systems are certified as described below for use in heavy-duty off-road equipment:

Typical Equipment Usage: Industrial Equipment, Tractor, Motor Grader, Wheel Loader, Scraper, Generator, Articulated Dump Truck

Fuel Type: Diesel

Engine Family	Liters	(Cubic Inches)	Exhaust Emission Control Systems and Special Features
WCPXL14.6MRJ	14.6	(893)	Turbocharger Smoke Puff Limiter Charge Air Cooler

Engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matters (PM) certification exhaust emission standards, in grams per brake horsepower-hour (g/bhp-hr), and the opacity of smoke emission standards, in percent (%), during acceleration (Accel), lugging (Lug), and peak (Peak) modes, for this engine family are (Title 13, California Code of Regulations, Section 2423):

Exhaust Emissions (g/bhp-hp)				Smoke Opacity (%)		
THC	CO	NOx	PM	Accel	Lug	Peak
1.0	8.5	6.9	0.4	20	15	50

The THC, CO, NOx and PM exhaust emission certification values, in g/bhp-hr, and the opacity of smoke emission certification values, in percent (%), for this engine family are:

	Exhaust Emissions (g/bhp-hr)				Smoke Opacity (%)		
Engine Family	THC	CO	NOx	PM	Accel	Lug	Peak
WCPXL14.6MRJ	0.1	2.7	6.6	0.3	15	5	30

BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with the "Emission Control Labels--1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Section 2425 et seq.).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 9th day of December 1997.

R. B. Summerfield, Chief
Mobile Source Operations Division

LARGE ENGINE MODEL SUMMARY

9/8/97

EO: U-R-1-64

Manufacturer: CATERPILLAR INC. Process Code: New Submission

EPA Engine Family: WCPXL14.6MRJ Manufacturer Family Name: NA

1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
Note: Peak HP	and Peak Torque	fuel rates are	nominal values.	Due to product-	ion engine avgs.	these fuel rates	may change.	
1 - Cert Engine	3406	599 @ 1800	352	213.4	2045 @ 1350	405	183.9	EM, DI, TC, SPL,
2	3406	320 @ 2100	174	122.8	1176 @ 1200	229	92.5	EM, DCAC, SPL,
3	3406	325 @ 2100	172	121.8	1206 @ 1200	236	95.2	EM, DCAC, SPL,
4	3406	338 @ 2100	184	130.2	1259 @ 1200	245	98.9	EM, DCAC, SPL,
5	3406	341 @ 2100	186	131.6	1240 @ 1200	242	97.6	EM, DCAC, SPL,
6	3406	328 @ 2100	178	126.1	1215 @ 1200	237	95.6	EM, DCAC, SPL,
7	3406	328 @ 2100	178	126.1	1215 @ 1200	237	95.6	EM, DCAC, SPL,
8	3406	289 @ 1850	162	100.7	991 @ 1200	195	78.8	EM, DCAC, SPL,
9	3406	365 @ 2000	191	128.7	1221 @ 1200	251	101.4	EM, DCAC, SPL,
10	3406	355 @ 2000	187	125.5	1201 @ 1200	246	99.5	EM, DCAC, SPL,
11	3406	400 @ 2000	213	143.1	1361 @ 1400	281	132.4	EM, DCAC, SPL,
12	3406	420 @ 2000	222	149.2	1448 @ 1200	295	118.9	EM, DCAC, SPL,
13	3406	460 @ 2100	237	167.1	1461 @ 1400	281	132.4	EM, DCAC, SPL,
14	3406	325 @ 1800	190	114.9	1153 @ 1200	239	96.6	EM, DCAC, SPL,
15	3406	345 @ 1800	201	122.0	1233 @ 1200	260	105.0	EM, DCAC, SPL,
16	3406	325 @ 2000	174	116.8	1099 @ 1400	220	103.7	EM, DCAC, SPL,
17	3406	340 @ 2000	181	121.9	1161 @ 1400	226	109.5	EM, DCAC, SPL,
18	3406	325 @ 1800	190	114.9	1153 @ 1200	243	98.1	EM, DCAC, SPL,
19	3406	345 @ 1800	201	122.0	1233 @ 1200	260	105.0	EM, DCAC, SPL,
20	3406	325 @ 2100	168	118.9	1089 @ 1400	218	102.8	EM, DCAC, SPL,
21	3406	335 @ 2100	174	122.9	1133 @ 1400	227	106.9	EM, DCAC, SPL,
22	3406	335 @ 2100	174	122.9	1133 @ 1400	218	102.6	EM, DCAC, SPL,
23	3406	500 @ 2100	255	180.0	1600 @ 1400	296	139.4	EM, DCAC, SPL,
24	3406	360 @ 1800	203	122.7	1264 @ 1200	252	101.9	EM, DCAC, SPL,
25	3406	360 @ 2000	190	127.8	1213 @ 1400	234	110.2	EM, DCAC, SPL,
26	3406	360 @ 1800	203	122.8	1264 @ 1200	252	101.9	EM, DCAC, SPL,
27	3406	360 @ 2100	185	130.6	1202 @ 1400	232	109.4	EM, DCAC, SPL,
28	3406	380 @ 2100	195	137.7	1287 @ 1400	249	117.1	EM, DCAC, SPL,
29	3406	400 @ 2100	207	146.0	1369 @ 1400	265	124.9	EM, DCAC,SPL,
30	3406	390 @ 2100	201	141.9	1331 @ 1400	258	121.2	EM, DCAC, SPL,
31	3406	435 @ 2100	227	160.4	1505 @ 1400	293	138.1	EM, DCAC, SPL,
32	3406	347 @ 1900	189	120.8	1219 @ 1200	243	98.3	EM, DCAC, SPL,
33	3406	382 @ 1900	208	133.2	1264 @ 1200	272	110.2	EM, DCAC, SPL,

33	3406	382 @ 1900	208	133.2	1304 @ 1200	273	110.2	EM, DCAC, SPL,
34	3406	347 @ 1900	189	120.8	1219 @ 1200	243	98.3	EM, DCAC, SPL,
35	3406	375 @ 1800	211	127.6	1317 @ 1200	262	106.0	EM, DCAC, SPL,
36	3406	390 @ 2000	207	139.3	1339 @ 1400	259	122.0	EM, DCAC, SPL,
37	3406	400 @ 1800	227	137.6	1430 @ 1200	283	114.2	EM, DCAC, SPL,
38	3406	400 @ 1900	219	140.2	1379 @ 1200	278	112.4	EM, DCAC, SPL,
39	3406	375 @ 2000	198	133.3	1280 @ 1400	247	116.3	EM, DCAC, SPL,
40	3406	400 @ 2000	212	142.7	1379 @ 1400	267	125.7	EM, DCAC, SPL,
41	3406	375 @ 2100	193	136.2	1270 @ 1400	245	115.5	EM, DCAC, SPL,
42	3406	400 @ 2100	206	145.8	1369 @ 1400	265	124.9	EM, DCAC, SPL,
43	3406	435 @ 2100	227	160.5	1505 @ 1400	293	138.1	EM, DCAC, SPL,
44	3406	485 @ 2100	257	181.9	1680 @ 1400	332	156.2	EM, DCAC, SPL,
45	3406	385 @ 1800	218	133.3	1275 @ 1350	249	113.0	EM, DCAC, SPL,
46	3406	440 @ 2000	231	155.4	1398 @ 1400	269	126.9	EM, DCAC, SPL,
47	3406	440 @ 1800	251	151.9	1495 @ 1350	292	132.4	EM, DCAC, SPL,
48	3406	440 @ 1900	242	154.8	1462 @ 1350	285	129.6	EM, DCAC, SPL,
49	3406	440 @ 2000	231	155.4	1398 @ 1400	269	126.9	EM, DCAC, SPL, CAC

EO: U-R-1-64

LARGE ENGINE MODEL SUMMARY

7/9/97

EO: U-R-1-64

Manufacturer: CATERPILLAR INC.

Process Code: New Sub - continued

EPA Engine Family: WCPXL14.6MRJ

Manufacturer Family Name:

1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
Note: Peak HP	and Peak Torque	fuel rates are	nominal values.	Due to product-	ion engine avgs.	these fuel rates	may change.	
50	3406	430 @ 2100	220	155.7	1345 @ 1400	259	121.8	EM, DI, TC, SPL,
51	3406	460 @ 2100	237	167.6	1461 @ 1400	281	132.4	EM, DI, ~~AC~~ CAC, SPL,
52	3406	465 @ 1800	266	161.4	1597 @ 1350	301	141.7	EM, DI, ~~AC~~ CAC, SPL,
53	3406	490 @ 2100	249	175.7	1558 @ 1400	299	140.7	EM, DI, ~~AC~~ CAC, SPL,
54	3406	500 @ 2100	255	180.0	1600 @ 1400	296	139.4	EM, DI, ~~AC~~ CAC, SPL,
55	3406	515 @ 1900	284	181.2	1711 @ 1350	331	150.4	EM, DI, ~~AC~~ CAC, SPL,
56	3406	515 @ 2100	264	186.2	1661 @ 1400	318	149.9	EM, DI, ~~AC~~ CAC, SPL,
57	3406	459 @ 1800	262	158.4	1570 @ 1350	306	139.9	EM, DI, ~~AC~~ CAC, SPL,
58	3406	530 @ 1800	303	183.7	1800 @ 1350	350	159.0	EM, DI, ~~AC~~ CAC, SPL,
59	3406	490 @ 2100	264	186.8	1594 @ 1400	328	154.8	EM, DI, ~~AC~~ CAC, SPL,