California Environmental Protection Agency AIR RESOURCES BOARD	CATERPILLAR, INC.	EXECUTIVE ORDER U-R-001-0234 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 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-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engine and emission control system produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2004	4CPXL78.1ERK	69.0 and 78.1	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Direct Diesel Injection, Turbocharger, Charge Air Cooler and Engine Control Module	Crane, Loader, Tractor, Pump, Compressor, Generator and Industrial Equipment

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
KW > 560	Tier 1	STD	1.3	9.2	N/A	11.4	0.54	20	15	50
		CERT	0.4	8.3	–	1.2	0.13	9	2	20

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

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

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 15TH day of December 2003.

Allen Lyons, Chief
Mobile Source Operations Division

ATTACHMENT 1 OF 1

Engine Model Su. ıary Form

Manufacturer: **Caterpillar Inc.**

Engine category: **Nonroad CI**

EPA Engine Family: **4CPXL78.1ERK**

Mfr Family Name:

Process Code: **New Submission**

U-R-001-0234

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
1	3516B	3230@1800	690	1115	9419@1800	NA	NA	CAC, EM,DI,TC,ECM
2	3516B	2300@1750	520	817	8235@1300	624	728	EM,DI,TC,ECM
3	3516B	1900@1750	404	634	6837@1300	501	585	EM,DI,TC,ECM
4	3516B	1379@1600	328	472	5692@1100	403	398	EM,DI,TC,ECM
5	3516B	1655@1750	358	563	5952@1300	429	501	EM,DI,TC,ECM
6	3516B	1648@1200	540	582	7208@1200	NA	NA	EM,DI,TC,ECM
7	3516B	1855@1200	607	654	8111@1200	NA	NA	EM,DI,TC,ECM
8	3516B	2034@1200	670	721	8997@1200	NA	NA	EM,DI,TC,ECM
9	3516B	2374@1800	492	794	6920@1800	NA	NA	EM,DI,TC,ECM
11	3516B	2876@1800	602	972	8386@1800	NA	NA	EM,DI,TC,ECM
12	3516B	2316@1800	483	780	6752@1800	NA	NA	EM,DI,TC,ECM
13	3516B	2534@1800	526	849	7389@1800	NA	NA	EM,DI,TC,ECM
14	3516B	1855@1200	603	649	8111@1200	NA	NA	EM,DI,TC,ECM
15	3516B	2549@1800	517	835	6315@1800	NA	NA	EM,DI,TC,ECM
16	3516B	1855@1200	596	642	8111@1200	NA	NA	EM,DI,TC,ECM
17	3516B	1855@1200	596	642	8111@1200	NA	NA	EM,DI,TC,ECM
18	3516B	2300@1750	489	768	8235@1300	NA	NA	EM,DI,TC,ECM
19	3516B	1900@1750	404	634	6837@1300	501	585	EM,DI,TC,ECM
20	3516B	2000@1800	435	703	6749@1350	494	598	EM,DI,TC,ECM
21	3516B	2100@1800	456	736	6749@1350	494	598	EM,DI,TC,ECM
22	3516B	2200@1800	477	771	6749@1350	494	598	EM,DI,TC,ECM
23	3516B	1916@1200	590	636	8381@1200	NA	NA	EM,DI,TC,ECM
24	3516B	2100@1200	671	723	9184@1200	NA	NA	EM,DI,TC,ECM
25	3516B	2092@1800	441	713	6099@1800	NA	NA	EM,DI,TC,ECM
26	3516B	2150@1200	688	741	9401@1200	NA	NA	EM,DI,TC,ECM
27	3516B	2669 @ 1800	541	873	7780 @ 1800	NA	NA	EM,DI,TC,ECM

Engine Model Summary Form

Manufacturer: **Caterpillar Inc.**

Engine category: **Nonroad CI**

EPA Engine Family: **4CPXL78.1ERK**

Mfr Family Name:

Process Code: **Running Change**

U-R-001-0234

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
29	3516	2878 @ 1800	633	1022	8397	NA	NA	EM,DI,TC,ECM

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U-R-001-0234

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
30	3516	2628 @ 1800	559	903	7663 @ 1800	NA	NA	CAC EM,DI,TC,ECM

Engine Model Summary Form

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EPA Engine Family: **4CPXL78.1ERK**

Mfr Family Name:

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u-R-001-0234

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
31	3516	2876 @ 1800	662	1004	8386 @ 1800	NA	NA	CAC,EM,DI,TC,ECM

Engine Model Summary Form

Manufacturer: **Caterpillar Inc.**

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U-R-001-0234

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32	3516	2415 @ 1750	526	826	8654 @ 1300	601	702	CAC, EM,DI,TC,ECM