California Environmental Protection Agency AIR RESOURCES BOARD	LIEBHERR MACHINES BULLE SA	EXECUTIVE ORDER U-R-018-0056 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)
2005	5LHAL9.96ARA	6.64 and 9.96	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Direct Diesel Injection, Turbocharger, Charge Air Cooler, Smoke Puff Limiter	Crane, Loader, Dozer, Compressor

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
130 ≤ kW < 225	Tier 2	STD	N/A	N/A	6.6	3.5	0.20	20	15	50
75 ≤ kW < 130	Tier 2	STD	N/A	N/A	6.6	5.0	0.30	20	15	50
		CERT	--	--	5.9	0.8	0.14	13	3	44

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 28TH day of December 2004.

Allen Lyons, Chief
Mobile Source Operations Division

Engine Model S' mary Form

ATTACHMENT

U-R_018- 0056

Manufacturer: **LIEBHERR MACHINES BULLE SA**

Engine category: **Nonroad CI**

EPA Engine Family: **5LHAL9.96ARA**

Mfr Family Name: **NA**

Process Code: **New Submission**

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
NA	D924TI-E	197@2000	165@197	NA	727@1200	212@727	NA	DDI, SPL, TC, CAC,
NA	D924TI-E	173@2000	143@173	NA	555@1200	167@555	NA	SPL, TC, CAC,
NA	D926TI-E	300@2000	167@300	NA	885@1500	168@885	NA	SPL, TC, CAC,
NA	D926TI-E	244@2000	134@244	NA	859@1200-130	168@859	NA	SPL, TC, CAC,
NA	D924TI-E	165@2000	135@165	NA	522@1300	155@522	NA	SPL, TC, CAC,
NA	D926TI-E	256@2000	142@256	NA	915@1250	178@915	NA	SPL, TC, CAC,
NA	D926TI-E	272@2000	147@272	NA	948@1250	184@948	NA	SPL, TC, CAC,
NA	D926TI-E	205@2100	109@205	NA	774@1000	148@774	NA	SPL, TC, CAC,
NA	D924TI-E	115@1800	110@115	NA	472@1000	138@472	NA	SPL, TC, CAC,
NA	D924TI-E	165@2000	136@165	NA	601@1200	171@601	NA	SPL, TC, CAC,
NA	D924TI-E	137@2000	115@137	NA	476@1150	138@476	NA	SPL, TC, CAC,
NA	D924TI-E	173@2000	145@173	NA	664@1000	195@664	NA	SPL, TC, CAC,
NA	D924TI-E	153@2000	128@153	NA	601@1000	176@601	NA	SPL, TC, CAC,
NA	D924TI-E	136@2000	115@136	NA	538@1000	156@538	NA	SPL, TC, CAC,
NA	D 926 TI-E	186@2100	100@186	NA	700@1000	135@700	NA	SPL, TC, CAC,