



Air Resources Board



Matthew Rodriguez
Secretary for
Environmental Protection

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Edmund G. Brown Jr.
Governor

April 5, 2013

Mr. William P. Allen, Manager
Global Emissions Certification
and Compliance
Large Power Systems Division (MOS 11)
Caterpillar Inc.
P.O. Box 600
Mossville, Illinois 61552

Dear Mr. Allen:

This letter responds to Caterpillar/ Progress Rail Services (CAT/PR) request for a "conditional" California Air Resources Board (ARB) locomotive emissions verification for the Progress Rail - PR30 locomotive. Progress Rail Services, a Caterpillar subsidiary, is the manufacturer of the PR30 locomotive, an intermediate line haul locomotive designed to achieve U.S. EPA Tier 4 emission levels.

The PR30 locomotive is an EMD SD40-2 chassis repowered by a Caterpillar 3516C-HD diesel engine. The PR30 locomotive is equipped with a Caterpillar Clean Emissions Module (CEM), which is a Caterpillar developed exhaust after-treatment system that includes urea based selective catalytic reduction (SCR) and diesel oxidation catalyst technology.

Based on the available information from CAT/PR application, test data, and other sources, ARB hereby approves a limited conditional verification for the PR30 locomotive within a horsepower range of 2,650 to 3,005. CAT/PR will perform ARB conditional verification with the test locomotive known as SJVR # 3003, and in parallel, with the U.S. EPA conditional verification (see attachment). Until ARB conditional verification has been approved, any future PR30 locomotives will not be eligible for emission credits or ARB incentive funding.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

Printed on Recycled Paper

Mr. William P. Allen, Manager

April 5, 2013

Page 2

ARB Conditional Verification – Specific Conditions:

ARB approved an emissions verification for CAT/PR's PR30 locomotive with a first generation SCR system (referred to as "eight filter") on February 22, 2011. This letter is in regards to CAT/PR's subsequent effort to obtain an ARB emissions verification for a second generation SCR system (referred to as "24 filter").

The ARB conditional verification will require CAT/PR to conduct another full verification for the PR30 locomotives with the second generation (24 filter) SCR system. This new verification will be needed to verify the emission reduction levels and deterioration rates from zero (i.e., meeting minimum required de-greened hours) to 3,000 engine hours, and to ensure the reliability of locomotive aftertreatment system under a normal line-haul duty cycle.

- The CAT/PR – PR30 locomotive, with the 24 filter SCR system, selected to perform the 3,000 hour in-use durability testing is SJVR #3003 (now part of Genesee & Wyoming, Inc.).
- ARB has granted relief from the mid-point or 1,500 hour emission test for this specific conditional verification. This relief was granted based on CAT/PR's two sets of prior verification emission testing results, at or near mid-point hours, for the PR30 locomotive.
- The ARB conditional verification must be completed no later than December 20, 2014, which is consistent with the U.S. EPA conditional verification deadline.
- The ARB conditional verification allows the four CAT/PR – PR30 locomotives (PRLX 3004; and SJVR 3002, 3003, and 3004) currently in service, and recently funded under ARB's Proposition 1B and Carl Moyer incentive programs, to be considered ARB verified.
- Until the conditional verification process is completed and approved by ARB, any future CAT/PR - PR30 locomotives will not be eligible for ARB Ultra Low Emitting Locomotive credit or ARB incentive funding programs.

Mr. William P. Allen, Manager
April 5, 2013
Page 3

In addition to the requirements already stipulated in U.S. EPA's conditional verification dated December 19, 2012, the following criteria must also be met:

1. Caterpillar will notify ARB by email within 48 hours of Caterpillar's becoming aware of any issues impacting normal operation of the locomotive that arise during the in-field demonstration period.
2. Caterpillar will include ARB in all correspondence with U.S. EPA regarding this verification.
3. A third party statement for in-field demonstrations will be provided by San Joaquin Valley Railroad consistent with Section 2704(e) of ARB's Verification Procedure.

CAT/PR's failure to complete the ARB conditional verification by the December 20, 2014 deadline, and to meet the conditions specified above, will remove the CAT/PR PR30 second generation (24 filter) SCR system locomotive from eligibility for the 1998 Locomotive NOx Fleet Average Agreement credit and any ARB incentive funding programs.

We look forward to working with CAT/PR and the U.S. EPA regarding the conditional verification process for the PR30 locomotive with the second generation SCR system. If you have any questions about this matter, please contact Mr. Harold Holmes, Manager, Rail Strategies Section at (916) 324-8029 or at hholmes@arb.ca.gov.

Sincerely,



Jack Kitowski
Assistant Division Chief
Stationary Source Division

Attachment(s)

cc: See next page.

Mr. William P. Allen, Manager
April 5, 2013
Page 4

APR 11 2013 10:11 AM
U.S. EPA
6100

cc: Mr. Dennis Johnson
U.S. Environmental Protection Agency
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 6406J
Washington, D.C. 20460

Mrs. Britney J. McCoy
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 6406J
Washington, D.C. 20460

Mr. Lawrence P. Oeler
U.S. EPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 6403J
Washington, D.C. 20460

Mr. Douglas Biagini
Caterpillar Inc.
P.O. Box 610-AC6140
Mossville, Illinois 61552

Mr. Glenn Luksik
Caterpillar Inc.
495 Metro Place South, Suite 250
Dublin, Ohio 43017

Mrs. Connie Day
Program Supervisor
Technology Advancement Office
South Coast AQMD
21865 East Copley Drive
Diamond Bar, California 91765

Continued on next page.

Mr. William P. Allen, Manager
April 5, 2013
Page 5

cc: (continued)

Mr. Aaron Tarango, Supervisor
Strategies & Incentives Department
San Joaquin Valley APCD
1990 East Gettysburg
Fresno, California 93726

Harold Holmes, Manager
Rail Strategies Section



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, DC 20460

OFFICE OF
AIR AND RADIATION

DEC 19 2012

Brian J. Hockridge
Emissions Certification Manager
Caterpillar Inc.
P.O. Box 600
Mossville, IL 61552-0600

Dear Mr. Hockridge:

The U.S. Environmental Protection Agency (EPA) has reviewed your request for verification of the Caterpillar Locomotive Selective Catalytic Reduction (SCR) System by Caterpillar Inc. (Caterpillar). Based on our evaluation of the application, the test data, and additional information provided, EPA hereby conditionally verifies that this technology reduces emissions of certain criteria pollutants by the percentages described in the table below. This conditional verification expires two years from the date of this letter.

The technology is approved for use on the following locomotive engine(s) provided all of the operating criteria are met as described below:

Technology	Engine Model/Application	Fuel, Max Sulfur (ppm)	Reductions (%)			
			PM	NO _x	HC	CO
Caterpillar Locomotive Selective Catalytic Reduction System (SCR) System	Caterpillar 3516, heavy duty, line-haul locomotive engine; originally manufactured to meet Tier 2 standards for model years 2010–2011 and remanufactured to meet Tier 1+ standards for model years 2012–2013; turbocharged with power ratings 2650 ≤ Horsepower ≤ 3005	15	10	75	90	70

The following criteria must be met in order for appropriately retrofitted engines to achieve the aforementioned emission reductions:

1. The locomotive must be operated on ultra-low sulfur diesel fuel (ULSD) of 15 ppm or less.
2. The locomotive must always have a supply of Diesel Exhaust Fluid (DEF) that meets and displays certification of the American Petroleum Institute ISO Standard 22241-1 quality

7

requirements that ensures the proper purity and concentration of 32.5% of urea. The engines and locomotives must be designed to track and log, in nonvolatile computer memory¹, all incidents of engine operation with inadequate DEF injection or DEF quality.

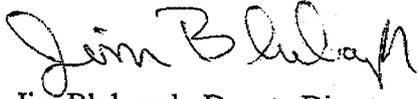
3. The SCR system shall not be sold or operated in geographic areas where the DEF may freeze (-11°C), unless it is equipped with tank heaters and DEF line heaters to prevent freezing.
4. To ensure the appropriate DEF is purchased, the customer is required to maintain DEF purchase receipts and refill records and make them available to Caterpillar upon request. DEF usage log and mileage records will be collected and analyzed by Caterpillar on a semi-annual basis.
5. Caterpillar is required to provide the operator with clear and visible instructions for maintaining DEF for proper system operation.
6. Each installation will be equipped with a monitoring system that displays warning lights visible to the operator and audible alarms for low DEF tank level, high SCR inlet temperature and system abnormalities. The monitoring system will also store diagnostic error codes related to DEF tank level and system malfunctions.
7. The engine exhaust temperature must achieve at least 240 °C for 40% of operation and not exceed 550 °C. Caterpillar will review actual locomotive operating conditions and perform temperature data-logging prior to retrofitting a locomotive with the Caterpillar Locomotive SCR System to ensure compatibility. In the event that a locomotive's application and/or duty cycle changes, temperature data-logging must be repeated to confirm that the engine exhaust temperature still meets the above criteria.
8. The Caterpillar Locomotive SCR System may require replacement if SCR inlet temperature exceeds 550 °C for an extended, continuous period of time. Operation with temperatures above 550 °C may require inspection for damage by Caterpillar.
9. The Caterpillar Locomotive SCR catalyst should be replaced after 15,000 hours of operation or when the locomotive is rebuilt/remanufactured, whichever comes first.
10. Caterpillar is responsible for informing customers, in writing, that disposal of the Caterpillar Locomotive SCR System must be in accordance to all applicable federal, state, and local laws.

Information on the Caterpillar Locomotive SCR System, percent reduction, and applicable engines will be posted on the EPA's Verified Technology List website at: <http://www.epa.gov/cleandiesel/verification/verif-list.htm>. EPA reserves the right to review and/or revoke this conditional verification if these operating criteria are not met or if information becomes available regarding the safety, design and/or operation of the technology. In addition, Caterpillar must satisfy the terms of this conditional verification as outlined under a separate December 19, 2012 letter to Caterpillar to achieve full EPA verification of this technology.

¹ Non-volatile storage is computer memory that can retain stored information even when not powered.

Thank you for participating in EPA's Technology Assessment Center Verification Program. If you have any questions or comments, please contact Britney J. McCoy, of my staff, at (202) 343-9218.

Sincerely,

A handwritten signature in black ink that reads "Jim Blubaugh". The signature is written in a cursive style with a large initial "J" and a stylized "B".

Jim Blubaugh, Deputy Director
Transportation and Climate Division
Office of Transportation and Air Quality