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Pennsylvania Technical Advisory Committee

Diesel Powered Equipment

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May 15, 2004

Joseph Sbaffoni, Director
Bureau of Deep Mine Safety
Fayette County Health Center
100 New Salem Road. Room 167
Uniontown, Pa. 15401

RE: Cummins QSB C240 Diesel Engine

Dear Mr. Sbaffoni:

The TAC has previously submitted to you a recommendation for approval for the Cummins QSB C240 turbo-charged Diesel Engine with DST after-treatment system. That recommendation verified that the unit met the requirements of Section 203A(1),(2), and (3) in that the tailpipe emissions of the locomotive does not exceed 0.12 mg per cubic meter when diluted by 100% of the MSHA approval plate ventilation rate of the diesel engine. However, we also stated that it would be necessary to verify our Alternate Emissions test results in the field. Accordingly, the Department issued a tentative approval for this unit until additional investigation could be conducted by the TAC.

Further verification was needed for following reasons:

1. MSHA lug curve numbers are not available for this engine. This is due to the fact that MSHA had approved the engine for use at 240 hp. and our recommendation is for the engine to be operated at 190 hp; therefore, the emission values for this engine when operating at 190 hp must be verified in the field.
2. The emissions values observed during the initial testing were very low and we suspected they were not representative of the repeatable emissions values for the engine due either to the fact that the engine was not broken in and/or the long sampling lines for the testing ports to the sampling location were affecting the emission values.
3. Since this is the first Electronically Controlled- Turbo-Charged engine to be used in Pennsylvania, we wanted to be absolutely certain the test results were accurate.

Investigation

Our original emissions testing of this engine was preformed at the Brookville facility on November 20, 2003. At this time two emissions test were conducted on both the untreated and treated emissions with the following results.

Treated CO	Untreated CO
1. 0 ppm	49 ppm
2. 0 ppm	51 ppm

The results of these tests showed and average CO reading of 50 ppm untreated and 0 ppm treated. At that time, we believed the absence of CO in the treated emissions may be the result of the newness of the engine and after-treatment system or the long sampling lines.

Our verification emissions test was also preformed at the Brookville facility on May 4, 2004. At that time the engine had accumulated 683 hrs of operational time and would be considered to be out of the break-in period. We again conducted two tests of both the treated and untreated emissions with the following results.

Treated CO	Untreated CO
1. 23 ppm	73 ppm
2. 25 ppm	71 ppm

The results of the verification test showed and average CO reading of 72 ppm untreated and 24 ppm treated when sampled at the sampling ports in the cab. We also tested treated and untreated emissions at their source before they enter the sampling line and recorded the same results. Accordingly, we feel confident that the above CO emissions numbers are repeatable and representative of this engine when operating at 190 hp. It is to be noted that the treated CO emissions during verification testing changed from 0 ppm to and average of 23 ppm and we believe, as first expected, the absence of CO during our initial testing was due to the newness of the engine and after-treatment system. This is based on the fact that no changes were made to emissions system components between the time of our initial and final verification testing but the CO emissions are now averaging 23 ppm instead of the 0 ppm that was recorded in our initial test.

Recommendation

The TAC is confident that the 90 second Alternate Test Procedure applied for by Brookville Mining Equipment Corporation will produce emissions values that are representative for the Cummins QSB C 240 engine when operating at the 190 hp.

We recommend final approval of the Alternate Test Procedure for the above listed engine provided the drive train of the equipment does not change. If a major component of the drive train is to be changed, it will be necessary for Brookville Mining Equipment Corporation to notify the BDMS and TAC so that the TAC can investigate that change to insure continued compliance.

Furthermore, the TAC would recommend the baseline untreated CO number, required by Section 217-A of the Underground Bituminous Coal Mining Law, for the Cummins QSB C240 engine serial no. 46331180 be listed as 72 ppm CO. The TAC is making this recommendation due to the facts outlined in this document. It must be noted that the TAC has not, to date, made any recommendations as to the baseline of a specific engine; however, we believe this recommendation is needed and warranted at this time. It must also be stated the above listed baseline is not a baseline for all Cummins QSB C240 engines but only for the engine with the serial number listed above.

Gene Davis

Robert Du Breucq