



December 22, 2016

Via U.S. Mail and E-mail

Mr. Sam Liveson
Michigan Department of Environmental Quality
Air Quality Division
27700 Donald Court
Warren, MI 48092
livesons1@michigan.gov

**RE: Fiat Chrysler Automobiles US LLC (FCA) – Technology Center SRN: 1436
Response to December 1, 2016 Violation Notice**

Dear Mr. Liveson:

This letter responds to AQD's December 1, 2016 Violation Notice, which alleged noncompliance with the Renewable Operating Permit for FCA's Technology Center ("CTC"). Specifically, the Violation Notice noted that a CTC stack test (performed between August 31 and September 2) measured CO emissions in excess of 0.01 pounds per gallon of fuel from Wing C Oxidizer 4.01 and Wing D Oxidizer 4.01 (collectively "the TOs"). The Violation Notice alleged that those test results evidenced a violation of the 0.01 lbs/gal limit for CO emissions from all of FG-CNTRLDCCELLS-S2, i.e., based on an emissions test for 2 of the 11 oxidizers and 17 of the 50 test cells in that flexible group. Following the stack test, FCA undertook an internal investigation in several stages, as discussed below.

Stack Test Review

During the stack test, representatives from FCA and AQD (e.g., including you, Rohit Patel, and Stuart Weiss) discussed observations that some of the preliminary CO test readings appeared higher than anticipated. When FCA later received the draft test data, which contained higher-than-anticipated CO emissions data from certain equipment, FCA began a detailed review of the test analysis to evaluate whether the test process was accurate. After a series of communications with the stack test vendor, FCA was unable to identify any inaccuracies in the test methods and therefore finalized the stack test report for submittal to AQD near the end of October.

The Initial Site Operations Investigation

CTC staff also conducted a detailed review of the relevant operating conditions during the stack test. This included examining the selected test cells and their underlying operations (e.g., the type of test, the stage of testing, the fuel used, and other variables). Staff also reviewed how test cell exhaust was routed to the TOs, from both an equipment performance and loading perspective. This part of the review included, but was not limited to, confirming equipment calibrations, evaluating damper positions, evaluating blower operation, and confirming temperature recordings. FCA also hired W.J. O'Neil Company (burner specialists) to assist in this equipment evaluation. This initial review concluded that the TOs and their test cells were generally functioning as intended. On the other hand, determining whether the tested conditions fairly represent the larger flexible group and normal operation remain the subject of ongoing evaluation.

Additional Third Party Equipment Investigation

Following the initial equipment review and FCA's submittal of the stack test report to AQD, CTC solicited the assistance of Durr Systems Inc. (pollution control experts) and Catalytic International (the TOs' manufacturer) to provide additional insight into the TOs' performance. The operational evaluations also considered the physical setup and output of the engine test cells. While each company provided feedback based on its expertise, they together confirmed that the performance of the TOs is dependent on multiple factors, including (without limitation) engine exhaust flow rate, blower protection damper position, blower speed, engine size, inlet CO concentration, inlet air temperature, the test cell procedure, and number of engines tested. Due to the inherently variable nature of engine testing at a research and design facility like CTC (and specifically the equipment in Wing C and Wing D), any of these parameters can change over the course of a test cycle.

Engine Test Cell and TO Optimization

As a result of the third party equipment investigation, FCA sought to determine the optimal conditions for sustaining and improving the TOs' performance despite the unavoidable variations in the underlying testing. To assist, FCA hired RWDI, Inc. to monitor the various operating parameters (air flows, temperatures, destruction efficiency, etc.) as engine tests were run under various conditions. Due to the multiple combinations of operating scenarios evaluated, the testing by RWDI lasted several weeks. Although additional analysis is likely, this research has provided FCA with a better understanding of the test cell operations and their impacts on emissions.

Investigation Outcomes

As a result of this multi-stage investigation, FCA has already identified and implemented an improved operating procedure for Oxidizer 4.01 in Wing C, which includes raising the oxidizer temperature set point to 1500 deg F from 1425 deg F. This change results in increased CO destruction and emissions below 0.01 lb/gal. That said, FCA is still evaluating additional changes to the test cell and control equipment operation to further reduce CO emissions, which may supplement or modify the current system settings. Thus, while FCA has a working solution in place to reduce CO emissions in Wing C, FCA is still evaluating additional options for improving the overall operation and emission control efficiency. Ultimately, this may include measures that necessitate a permit-to-install revision (e.g., if modified emission limits or equipment changes are desired), but FCA is still evaluating its potential options.

FCA's ongoing optimization for Wing C (including its Oxidizer 4.01) will ultimately guide the decision-making for future changes in Wing D. As of now, however, FCA has already made several adjustments for Wing D Oxidizer 4.01 (including a 1500 deg F operating temperature) to ensure a sufficient level of CO destruction and compliance until the company is ready to decide on a final strategy.

FCA US LLC

Chrysler Technology Center

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Auburn Hills, MI 48326

Next Steps

Given the ongoing nature of FCA's systems analysis as well as the potential need for permit-to-install revisions, FCA proposes to provide an updated status report to AQD by January 9, 2017. Following submission of that updated status report, FCA anticipates meeting face-to-face with AQD representatives concerning the FG-CNTRLDCELLS-S2 issues, including a discussion of potential permitting or agency concerns with FCA's proposed changes. In the interim, however, FCA will continue to: (1) monitor operations and the current procedures for the TOs to ensure compliance with applicable emission limits; and (2) evaluate additional improvements to sustain that compliance.

Conclusion

FCA has operated the FG-CNTRLDCELLS-S2 engine test cells and TOs in accordance with the CTC air permit requirements, but also acknowledges the benefit of re-evaluating these operations and emission control strategies to assure sustainable compliance going forward. The recent stack test and subsequent multi-stage investigation have already resulted in FCA improving the test cells' and TOs' performance, but FCA hopes to further improve these operations and ultimately review the final improvements with AQD relatively soon.

Prior to receiving FCA's proposed updated status report, please feel free to contact Mr. Mark Werthman at (248) 576-7377 or mark.werthman@fcagroup.com with any concerns.

Sincerely,

A handwritten signature in black ink that reads "David K. Jump on behalf of". The signature is written in a cursive style.

Mark Cerny
Director, Powertrain

cc: Mr. Al Johnston, FCA Corporate EHS
Mr. Rohit Patel, FCA Corporate EHS
Mr. Mark Werthman, FCA Tech Center
Mr. Stuart Weiss, FCA Tech Center