

VN2915
VN response
+ Revised 2016 ROP
Cert/Dev

Nov 27, 2017

Diane Kavanaugh Vetort
MDEQ-AQD Jackson District
State Office Building, 4th Floor
301 East Louis B. Glick Hwy.
Jackson, Michigan 49201-1556



RE: Violation Notice (SRN N2915 Washtenaw County)

Dear Ms. Kavanaugh,

This letter is in response to your letter dated November 6, 2017.

We have carefully reviewed the alleged violations and have undertaken appropriate countermeasures and corrective actions to avoid a reoccurrence. Set forth below are brief restatements, followed by Toyota's responses to each.

Question 1. The dates the violation occurred?

Answer 1. The violation occurred periodically between April 2016 and May 2017 when certain tests were performed, as outlined below.

Question 2. Please provide an explanation of the causes and duration of the violations.

Answer 2(a). The periodic deviation from the permit condition was caused by intermittent fuel rich high air intake testing during catalyst and engine testing.

Answer 2(b). The duration of the deviation is best calculated in fuel use for each respective test scenario that contributed. There were two test patterns executed in the EG6 cell with fuel rich / high air intake conditions. Those test patterns were "Catalyst Aging" and "Engine Evaluation". A summary of fuel tracking for EG6 is provided below for reference for the following explanation.

Catalyst Aging testing occurred April 2016 – June 2016, then again August 2016 to May 2017. During the catalyst aging test pattern, a momentary fuel rich high air intake condition existed (5 sec / minute). This 5-sec interval during a 1-minute repeating pattern was responsible for 8.33% of the fuel use during this time frame. Applying 8.33% to total fuel (16,739 gallons) used in this time frame, we calculate 1394 gallons burned at fuel rich / high air intake.

Engine Evaluation test pattern testing was conducted in July 2016. Fuel rich / high air intake condition existed 71% of the testing time. Applying this 71 % to the total fuel (177.8 gallons) used in this time frame, we calculate 126 gallons were burned at fuel rich / high air intake.

Question 3. Is the violation ongoing?

Answer 3. No, subsequent testing under the above conditions are now authorized by the PTI issued by MDEQ on October 30, 2017.

Question 4. What actions were taken when the violation was identified?

Answer 4. Fuel rich high air intake testing was stopped immediately.

Question 5. How will you prevent re-occurrence?

Answer 5. After immediately stopping all fuel rich high air intake testing in EG6, Toyota submitted a PTI to modify the ROP to accommodate fuel rich / high air intake testing in EG6. The PTI was approved by the MDEQ on October 30, 2017.

12-month Rolling CO Emissions for EU-EG6
Toyota Motor North America R&D
Ann Arbor, Michigan

EU-EG6	FUEL USE			CO Emissions				
	Existing Limit	60,000	Proposed Limit	22,360	187.4 lb CO/1000 gal Fuel	Emissions Limit		5.62
MONTH	Gasoline (gal)	12-Month Rolling (gal/12-mo)	In Compliance - Less than Limit (yes/no)	Emission Factor (lb CO/1000 gal Fuel)	CO Emissions meets or exceeds LEVII-ULEV (lb/mo)	CO Emissions Total (tons/mo)	12-Month Rolling (tons/12-mo)	In Compliance - Less than Limit (yes/no)
16-Apr	891.00	891.00	YES	502.67	447.88	0.22	0.22	YES
16-May	73.50	964.50	YES	502.67	36.95	0.02	0.24	YES
16-Jun	80.70	1,045.20	YES	502.67	40.57	0.02	0.26	YES
16-Jul*	177.80	1,223.00	YES	4,977	884.91	0.44	0.71	YES
16-Aug	692.80	1,915.80	YES	502.67	348.25	0.17	0.88	YES
16-Sep	858.80	2,774.60	YES	502.67	431.69	0.22	1.10	YES
16-Oct	2,944.80	5,719.40	YES	502.67	1,480.26	0.74	1.84	YES
16-Nov	102.70	5,822.10	YES	502.67	51.62	0.03	1.86	YES
16-Dec	771.70	6,593.80	YES	502.67	387.91	0.19	2.06	YES
17-Jan	4,205.70	10,799.50	YES	502.67	2,114.08	1.06	3.11	YES
17-Feb	2,395.50	13,195.00	YES	502.67	1,204.15	0.60	3.71	YES
17-Mar	2,463.10	15,658.10	YES	502.67	1,238.13	0.62	4.33	YES
17-Apr	10.20	14,777.30	YES	502.67	5.13	0.00	4.11	YES
17-May	1,255.00	15,958.80	YES	502.67	630.85	0.32	4.41	YES
17-Jun	825.60	16,703.70	YES	187.40	154.72	0.08	4.47	YES
17-Jul	20.20	16,546.10	YES	187.40	3.79	0.00	4.03	YES
17-Aug	2,224.50	18,077.80	YES	187.40	416.87	0.21	4.06	YES

*Power Train (PT) Used the EG6 Engine Test Cell during month of July 2016. Of the 177.8 gallons used during July, approximately 71% of that operation was used under fuel rich/WOT conditions. Using PT's uncontrolled emission factor for fuel rich/WOT conditions, and the ULEV factor for the remaining usage, emissions for July are estimated to be:

Type/Engine mode	Fuel Usage	CO Emission Factor	Emissions
fuel rich/WOT	126.3 gallons X	6930 lb/1000 gallons =	875.3 lb CO
stoichiometric	51.5 gallons X	187 lb/1000 gallons =	9.7 lb CO
TOTAL/Weighted Average	177.8 gallons X	4977 lb/1000 gallons =	884.9 lb CO

While at no point did we exceed our 12-month rolling limit, we regret that these isolated deviations from the permit conditions occurred. Further, per your request, we will be revising and submitting the 2016 ROP. Please feel free to call or email me with any questions regarding the contents of this letter.

Thank You

Patrick Sickon 11-30-2017

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